

GENERAL SPECIFICATIONS

Item		Specification
Transmission model		F4A42-1-JZB3
Engine model		4G94-MPI
Torque converter	Type	3-element, 1-stage, 2-phase type
	Lock-up	Provided
	Stall torque ratio	2.0
Transmission type		4 forward speeds, 1 reverse speed, fully automatic
Transmission gear ratio	1st	2.842
	2nd	1.495
	3rd	1.000
	4th	0.713
	Reverse	2.720
Final reduction ratio (Differential gear ratio)		3.735
Clutch		Multi-disk type × 3 sets
Brake		Multi-disk type × 2 sets
Manual control system		P-R-N-D-3-2-L (7 position) or P-R-N-D (4 position) + sport mode (up, down)
Shift pattern control		Electronic control
Hydraulic control during shifting		Electronic control (Each clutch hydraulically independently controlled)
Lock-up clutch control		Electronic control

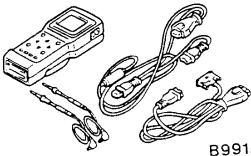
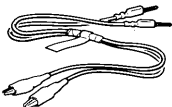
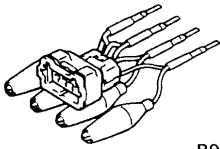
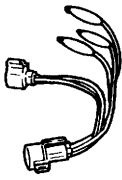
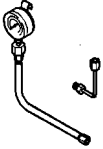
SERVICE SPECIFICATIONS

Item	Standard value	
A/T fluid temperature sensor resistance k Ω	At 0°C	16.7 – 20.5
	At 20°C	7.3 – 8.9
	At 40°C	3.4 – 4.2
	At 60°C	1.9 – 2.2
	At 80°C	1.0 – 1.2
	At 100°C	0.57 – 0.69
Damper clutch control (DCC) solenoid valve coil resistance (at 20°C) Ω	2.7 – 3.4	
Low & reverse (LR) solenoid valve coil resistance (at 20°C) Ω	2.7 – 3.4	
Second (2ND) solenoid valve coil resistance (at 20°C) Ω	2.7 – 3.4	
Underdrive solenoid valve (UD solenoid valve) coil resistance (at 20°C) Ω	2.7 – 3.4	
Overdrive solenoid valve (OD solenoid valve) coil resistance (at 20°C) Ω	2.7 – 3.4	
Stall speed r/min	2,100 – 2,600	

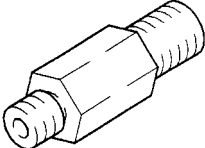
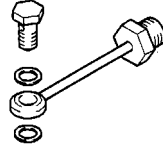
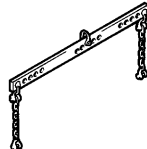
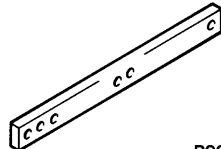
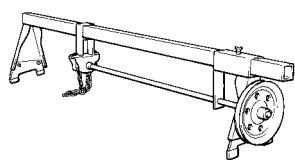
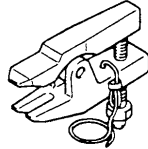
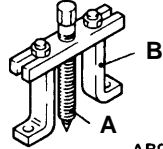
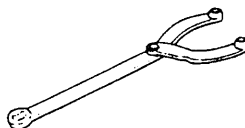
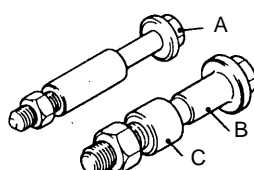
LUBRICANT

Item	Specified lubricants	Capacity (L)
Transmission fluid	ELC-4 SP III	7.7

SPECIAL TOOLS

Tools	No.	Name	Application
 B991502	MB991502	MUT-II Sub assembly	Diagnosis code checking
	MB991529	Diagnosis code checking harness	
 B991536	MB991536	Test harness set	Adjustment of throttle position sensor
	MD998478	Test harness (3P, square)	Inspection of lever position sensor Voltage measurement of crank angle sensor
	MD998330 (including MD998331)	Oil pressure gauge (2,942 kPa)	Hydraulic pressure measurement

23A AUTOMATIC TRANSMISSION BASE – Special Tools

Tools	No.	Name	Application
	MD998332	Adapter	Oil pressure gauge connection
	MD998900	Adapter	
 B991454	MB991454	Engine hanger	Supporting the engine assembly during removal and installation of the transmission (Using the MB991454's chain)
 B991527	MB991527	Engine hanger	
 GENERAL SERVICE TOOL MZ203827	GENERAL SERVICE TOOL MZ203827	Engine lifter	
 B991113	MB990635 or MB991113	Steering linkage puller	Ball joint disconnection
 AB990241	MB990241 A: MB990242 B: MB990244	Axle shaft puller A: Puller shaft B: Puller bar	Drive shaft removal
 B990767	MB990767	End yoke holder	Fixing the hub
 00005697	A: MB991017 B: MB990998 C: MB991000	A,B: Front hub remover and installer C: Spacer	Provisional holding of the wheel bearing

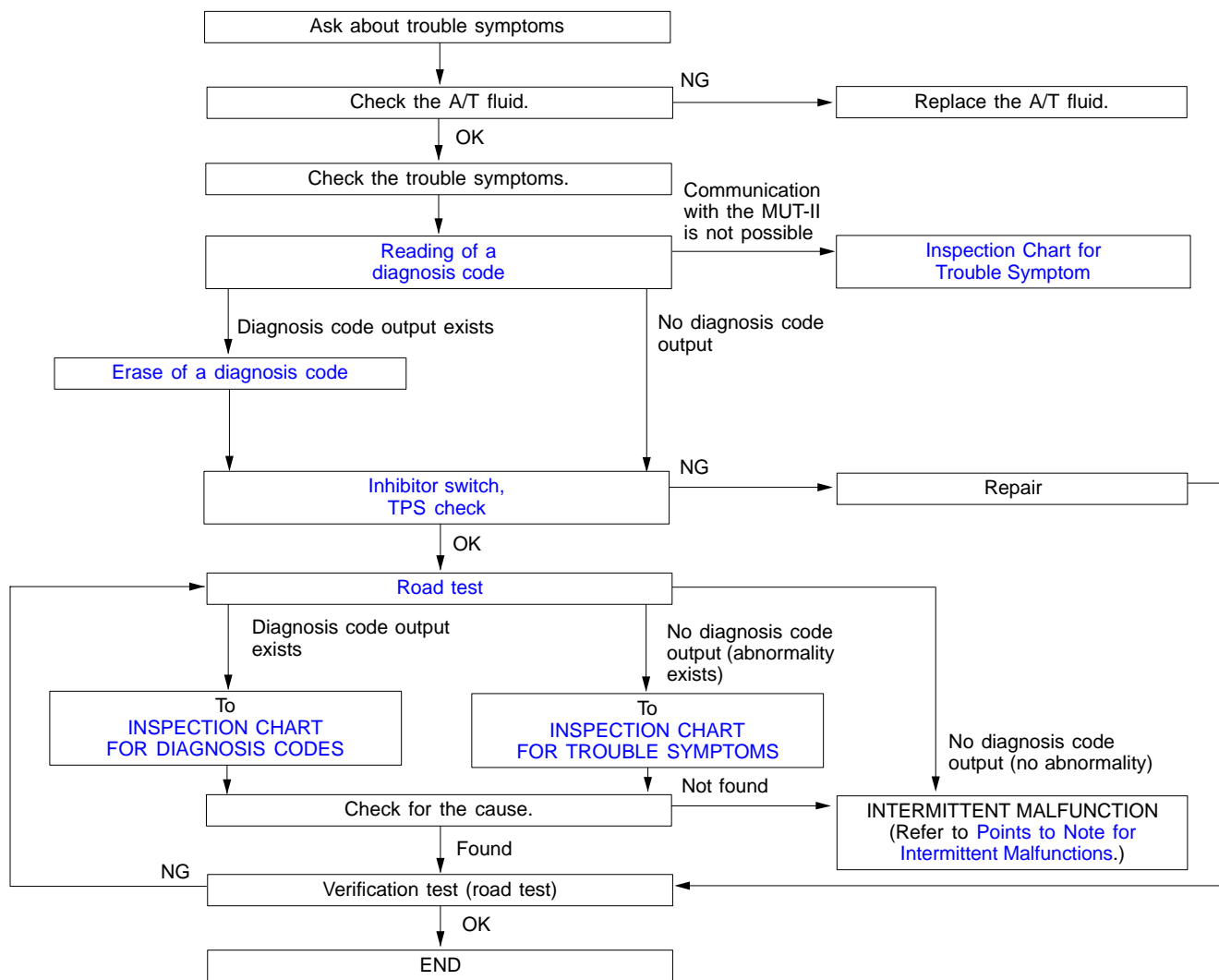
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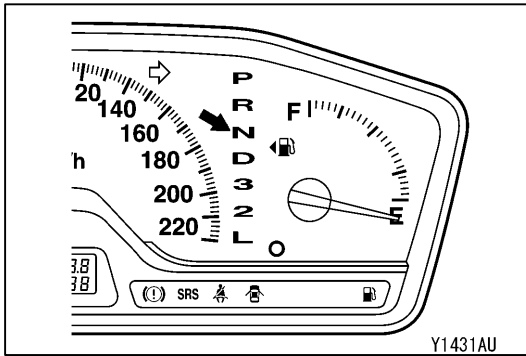
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TROUBLESHOOTING <A/T>

STANDARD FLOW OF DIAGNOSIS TROUBLESHOOTING





DIAGNOSIS FUNCTION

N RANGE LAMP SYSTEM

If there is a problem with any of the following items which are related to the A/T system, the N range lamp will flash at a rate of approximately 1 Hz.

If the N range lamp is flashing at a rate of approximately 1 Hz, check the diagnosis output.

- N range lamp flashing item

Input shaft speed sensor system
Output shaft sensor system
Solenoid valve system
Non-synchronization at various shift ranges
A/T control relay system

Caution

If the N range lamp is flashing at a frequency of approximately 2 Hz (faster than at 1 Hz), it means that the automatic transmission fluid temperature is too high. Stop the vehicle in a safe place and wait until the N range lamp switches off.

METHOD OF READING THE DIAGNOSIS CODE

Use the MUT-II or the warning lamp (N range indicator lamp) to take a reading of the diagnosis codes. (Refer to [How to Use Troubleshooting/Inspection Service Points.](#))

ROAD TEST

The road test below has been established for vehicles with standard selector lever.

Proce- dure	Pre-test/op- eration condi- tions	Test/operation	Judgment value	Check item	DTC No.	Inspection procedure if there is an abnormality
1	Ignition switch: OFF	Ignition switch (1) ON	Data List No. 54 Battery voltage [V]	A/T control relay	54	A/T control relay system
2	Ignition switch: ON Engine: Stop Selector lever position: P	Selector lever position: (1) P (2) R (3) N (4) D (5) 3 (6) 2 (7) L	Data List No. 61 (1) P (2) R (3) N (4) D (5) 3 (6) 2 (7) L	Inhibitor switch	–	Inhibitor switch system
		Accelerator pedal (1) Fully closed (2) Depressed (3) Fully opened	Data List No. 11 (1) 335 – 935 mV (2) Gradually in- creases from (1) (3) 4,400 – 5,300 mV	TPS	11 12 14	TPS system
		Brake pedal (1) Depressed (2) Released	Data List No. 26 (1) ON (2) OFF	Stop lamp switch	26	Stop lamp switch system
3	Ignition switch: START Engine: Stopped	Starting test at P or N position	Starting should be possible	Starting possible/not possible	–	Starting not possible
4	Driving after engine has warmed up	Drive for 15 min- utes or more until the A/T fluid tem- perature rises to 70 – 80°C.	Data list No.15 Gradually rises to 70 – 80°C	A/T fluid temper- ature sensor	15	A/T fluid temperature sensor system
5	Engine: Idling Selector lever position: N	Brake pedal (re-test) (1) Depressed (2) Released	Data List No. 26 (1) ON (2) OFF	Stop lamp switch	26	Stop lamp switch system
		A/C switch (1) ON (2) OFF	Data List No. 65 (1) ON (2) OFF	Dual pressure switch	–	Dual pres- sure switch system
		Accelerator pedal (1) Fully closed (2) Depressed	Data List No. 21 (1) The engine speed displayed on the tachometer is iden- tical to the engine speed displayed on MUT-II. (2) Gradually in- creases from (1)	Crank angle sen- sor	21	Crank angle sensor system

23A AUTOMATIC TRANSMISSION BASE – Troubleshooting <A/T>

Proce- dure	Pre-test/op- eration condi- tions	Test/operation	Judgment value	Check item	DTC No.	Inspection procedure if there is an abnormality
5	Engine: Idling Selector lever position: N	Selector lever position (1) N to D (2) N to R	No abnormal shock during shifting Within 2 seconds of time lag	Malfunction when starting off	–	Engine stalls during shifting
					–	N-to-D shocks, large time lag
					–	N-to-R shocks, large time lag
					–	N-to-D, N- to-R shocks, large time lag
				Driving not pos- sible	–	Does not move forward
					–	Does not reverse
					–	Does not move (for- ward or re- verse)
6	Selector lever position: N (Must be done on a level and straight road.)	Selector lever position and en- gine (1) Engine idling in 1st (L range) (vehicle stopped) (2) Driving at a constant speed of 10 km/h in 1st (L range) (3) Driving at a constant speed of 30 km/h in 2nd (2 range) (4) Driving at a constant speed of 50 km/h in 3rd (3 range) (5) Driving at a constant speed of 50 km/h in 4th (D range)	Data List No. 63 (2) 1st (3) 2nd (4) 3rd (5) 4th	Shift condition	–	–
			Data List No. 31 (2) 0% (3) 100% (4) 100% (5) 100%	Low & reverse solenoid valve (LR solenoid valve)	31	LR solenoid valve system
			Data List No. 32 (2) 0% (3) 0% (4) 0% (5) 100%	Underdrive sole- noid valve (UD solenoid valve)	32	UD solenoid valve system
			Data List No. 33 (2) 100% (3) 0% (4) 100% (5) 0%	Second solenoid valve (2ND sole- noid valve)	33	2nd solenoid valve system
			Data List No. 34 (2) 100% (3) 100% (4) 0% (5) 0%	Overdrive sole- noid valve (OD solenoid valve)	34	OD solenoid valve system
			Data List No. 29 (1) 0 km/h (5) 50 km/h	Vehicle speed output	–	Vehicle speed output system

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23A AUTOMATIC TRANSMISSION BASE – Troubleshooting <A/T>

Procedure	Pre-test/operation conditions	Test/operation	Judgment value	Check item	DTC No.	Inspection procedure if there is an abnormality
6	Selector lever position: N (Must be done on a level and straight road.)	Selector lever position and engine	Data List No. 22 (4) 1,800 – 2,100 r/min	Input shaft speed sensor	22	Input shaft speed sensor system
		(1) Engine idling in 1st (L range) (vehicle stopped) (2) Driving at a constant speed of 10 km/h in 1st (L range) (3) Driving at a constant speed of 30 km/h in 2nd (2 range) (4) Driving at a constant speed of 50 km/h in 3rd (3 range) (5) Driving at a constant speed of 50 km/h in 4th (D range)	Data List No. 23 (4) 1,800 – 2,100 r/min	Output shaft speed sensor	23	Output shaft sensor system
		Selector lever position and engine	Data List No. 36 (1) 70% – 90% to 0% (2) 70% – 90%	Damper clutch control solenoid valve (DCC solenoid valve)	36	DCC solenoid valve system (Short/Open circuit) DCC solenoid valve system (Defective system)
		(1) Driving at 30 km/h in 2 range, then fully close the accelerator. (2) Driving at a constant speed of 50 km/h in 3rd	Data List No. 52 (1) –300 – –100 r/min or 100 – 300 r/min (2) –10 – 10 r/min		52	

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23A AUTOMATIC TRANSMISSION BASE – Troubleshooting <A/T>

Procedure	Pre-test/operation conditions	Test/operation	Judgment value	Check item	DTC No.	Inspection procedure if there is an abnormality
7	Suspends the INVECS-II function using MUT-II Selector lever position: D (Must be done on a level and straight road.)	Use the MUT-II to monitor data list Nos. 11, 23 and 63. (1) Accelerate to 4th gear at an TPS output of 1.5 V (opening angle 30%). (2) Slowly decelerate and stop. (3) Accelerate to 4th gear at an TPS output of 2.5 V (opening angle 50%). (4) At 60 km/h in 4th, shift down to 3 range. (5) At 40 km/h in 3rd, shift down to 2 range. (6) At 20 km/h in 2nd, shift down to L range.	For (1), (2) and (3), the output shaft speed (vehicle speed) should be identical, and there should be no abnormal shocks. For (4), (5) and (6), downshifting should occur immediately after the operation is carried out.	Problem during shifting	–	Shocks, engine racing
				Incorrect shift points	–	All points
					–	Some points
				No shifting	–	No diagnosis codes
					22	Input shaft speed sensor system
					23	Output shaft sensor system
				No shifting from 1st to 2nd, or no shifting from 2nd to 1st	31	LR solenoid valve system
					33	2nd solenoid valve system
					41	1st without completion of shifting
					42	2nd without completion of shifting
				No shifting from 2nd to 3rd, or no shifting from 3rd to 2nd	33	2nd solenoid valve system
					34	OD solenoid valve system
					42	2nd without completion of shifting
					43	3rd without completion of shifting
				No shifting from 3rd to 4th, or no shifting from 4th to 3rd	32	UD solenoid valve system
					33	2nd solenoid valve system
					43	3rd without completion of shifting
					44	4th without completion of shifting

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Procedure	Pre-test/operation conditions	Test/operation	Judgment value	Check item	DTC No.	Inspection procedure if there is an abnormality
8	Selector lever position: N	Use the MUT-II to monitor data list Nos. 22 and 23. (1) Select R and drive at 10 km/h.	The ratio of data list No. 22 and No. 23 should be the same as the transmission ratio when reversing.	No shifting	22	Input shaft speed sensor system
					23	Output shaft sensor system
					46	Reverse without completion of shifting

The road test below has been established for vehicles with sport selector lever.

No.	Pre-test/operation conditions	Test/operation	Judgment value	Check item	DTC No.	Inspection procedure if there is an abnormality
1	Ignition switch: OFF	Ignition switch (1) ON	Data List No. 54 Battery voltage [V]	A/T control relay	54	A/T control relay system
2	Ignition switch: ON Engine: Stop Selector lever position: P	Selector lever position (1) P (2) R (3) N (4) D	Data List No. 61 (1) P (2) R (3) N (4) D	Inhibitor switch	–	Inhibitor switch system
		Selector lever position (1) D (1st gear) (2) Select the sport mode (1st gear) (3) Upshift and hold the selector lever in that position (2nd gear) (4) Downshift and hold the selector lever in that position (1st gear)	Data List No. 67 (1) OFF (2) ON (3) ON (4) ON Data List No. 68 (1) OFF (2) OFF (3) ON (4) OFF Data List No. 69 (1) OFF (2) OFF (3) OFF (4) ON Shift indicator lamp (1) D or 1 illuminate (2) Only 1 illuminate (2) Only 2 illuminate (2) Only 1 illuminate	Select switch Upshift switch Downshift switch	–	Shift switch assembly system
		Accelerator pedal (1) Fully closed (2) Depressed (3) Fully opened	Data List No. 11 (1) 335 – 935 mV (2) Gradually increases from (1) (3) 4,500 – 5,500 mV	TPS	11 12 14	TPS system
		Brake pedal (1) Depressed (2) Released	Data List No. 26 (1) ON (2) OFF	Stop lamp switch	26	Stop lamp switch system
		Starting test at P or N position	Starting should be possible	Starting possible/not possible	–	Starting not possible
4	Driving after engine has warmed up	Drive for 15 minutes or more until the A/T fluid temperature rises to 70 – 80°C.	Data list No.15 Gradually rises to 70 – 80°C	A/T fluid temperature sensor	15	A/T fluid temperature sensor system

23A AUTOMATIC TRANSMISSION BASE – Troubleshooting <A/T>

No.	Pre-test/operation conditions	Test/operation	Judgment value	Check item	DTC No.	Inspection procedure if there is an abnormality
5	Engine: Idling Selector lever position: N	Brake pedal (re-test) (1) Depressed (2) Released	Data List No. 26 (1) ON (2) OFF	Stop lamp switch	26	Stop lamp switch system
		A/C switch (1) ON (2) OFF	Data List No. 65 (1) ON (2) OFF	Dual pressure switch	–	Dual pressure switch system
		Accelerator pedal (1) Fully closed (2) Depressed	Data List No. 21 (1) The engine speed displayed on the tachometer is identical to the engine speed displayed on MUT-II. (2) Gradually increases from (1)	Crank angle sensor	21	Crank angle sensor system
		Selector lever position (1) N to D (2) N to R	No abnormal shock during shifting Within 2 seconds of time lag	Malfunction when starting off	–	Engine stalls during shifting
					–	N-to-D shocks, large time lag
					–	N-to-R shocks, large time lag
					–	N-to-D, N-to-R shocks, large time lag
				Driving not possible	–	Does not move forward
					–	Does not reverse
					–	Does not move (forward or reverse)

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23A AUTOMATIC TRANSMISSION BASE – Troubleshooting <A/T>

No.	Pre-test/operation conditions	Test/operation	Judgment value	Check item	DTC No.	Inspection procedure if there is an abnormality
6	Selector lever position: sport mode (Must be done on a level and straight road.)	Selector lever position and engine	Data List No. 63 (2) 1st (3) 2nd (4) 3rd (5) 4th	Shift condition	–	–
		(1) Engine idling in 1st gear (vehicle stopped)				
		(2) Driving at a constant speed of 10 km/h in 1st gear	Data List No. 31 (2) 0% (3) 100% (4) 100% (5) 100%	Low & reverse solenoid valve (LR solenoid valve)	31	LR solenoid valve system
		(3) Driving at a constant speed of 30 km/h in 2nd gear	Data List No. 32 (2) 0% (3) 0% (4) 0% (5) 100%	Underdrive solenoid valve (UD solenoid valve)	32	UD solenoid valve system
		(4) Driving at a constant speed of 50 km/h in 3rd gear	Data List No. 33 (2) 100% (3) 0% (4) 100% (5) 0%	Second solenoid valve (2ND solenoid valve)	33	2nd solenoid valve system
		(5) Driving at a constant speed of 50 km/h in 4th gear	Data List No. 34 (2) 100% (3) 100% (4) 0% (5) 0%	Overdrive solenoid valve (OD solenoid valve)	34	OD solenoid valve system
			Data List No. 29 (1) 0 km/h (5) 50 km/h	Vehicle speed output	–	Vehicle speed output system
			Data List No. 22 (4) 1,800 – 2,100 r/min	Input shaft speed sensor	22	Input shaft speed sensor system
			Data List No. 23 (4) 1,800 – 2,100 r/min	Output shaft speed sensor	23	Output shaft speed sensor system
		Selector lever position and engine	Data List No. 36 (1) 70% – 90% to 0% (2) 70% – 90%	Damper clutch control solenoid valve (DCC solenoid valve)	36	DCC solenoid valve system (short/open circuit). DCC solenoid valve system (short/open circuit).
		(1) Driving at 30 km/h in 2 range, then fully close the accelerator.	Data List No. 52 (1) –300 – –100 r/min or 100 – 300 r/min (2) –10 – 10 r/min		52	
		(2) Driving at a constant speed of 50 km/h in 3rd				

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23A AUTOMATIC TRANSMISSION BASE – Troubleshooting <A/T>

No.	Pre-test/operation conditions	Test/operation	Judgment value	Check item	DTC No.	Inspection procedure if there is an abnormality
7	Suspends the IN-VECS-II function using MUT-II Selector lever position: D (Must be done on a level and straight road.)	Use the MUT-II to monitor data list Nos. 11, 23 and 63. (1) Accelerate to 4th gear at an TPS output of 1.5 V (opening angle 30%). (2) Slowly decelerate and stop. (3) Accelerate to 4th gear at an TPS output of 2.5 V (opening angle 50%). (4) At 60 km/h in 4th, shift down to 3rd gear. (5) At 40 km/h in 3rd, shift down to 2nd gear. (6) At 20 km/h in 2nd, shift down to 1st gear.	For (1), (2) and (3), the output shaft speed (vehicle speed) should be identical, and there should be no abnormal shocks. For (4), (5) and (6), downshifting should occur immediately after the operation is carried out.	Problem during shifting	–	Shocks, engine racing
				Incorrect shift points	–	All points
					–	Some points
				No shifting	–	No diagnosis codes
					22	Input shaft speed sensor system
					23	Output shaft sensor system
				No shifting from 1st to 2nd, or no shifting from 2nd to 1st	31	LR solenoid valve system
					33	2nd solenoid valve system
					41	1st without completion of shifting
					42	2nd without completion of shifting
				No shifting from 2nd to 3rd, or no shifting from 3rd to 2nd	33	2nd solenoid valve system
					34	OD solenoid valve system
					42	2nd without completion of shifting
					43	3rd without completion of shifting
				No shifting from 3rd to 4th, or no shifting from 4th to 3rd	32	UD solenoid valve system
					33	2nd solenoid valve system
					43	3rd without completion of shifting
					44	4th without completion of shifting
8	Selector lever position: N	Use the MUT-II to monitor data list Nos. 22 and 23. (1) Select R and drive at 10 km/h.	The ratio of data list No. 22 and No. 23 should be the same as the transmission ratio when reversing.	No shifting	22	Input shaft speed sensor system
					23	Output shaft sensor system
					46	Reverse without completion of shifting

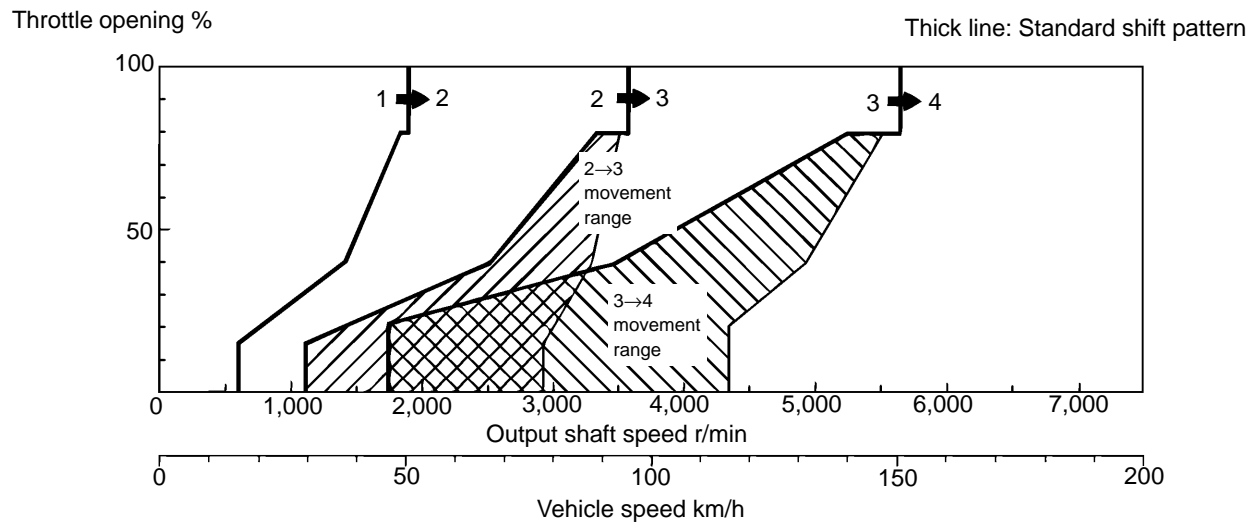
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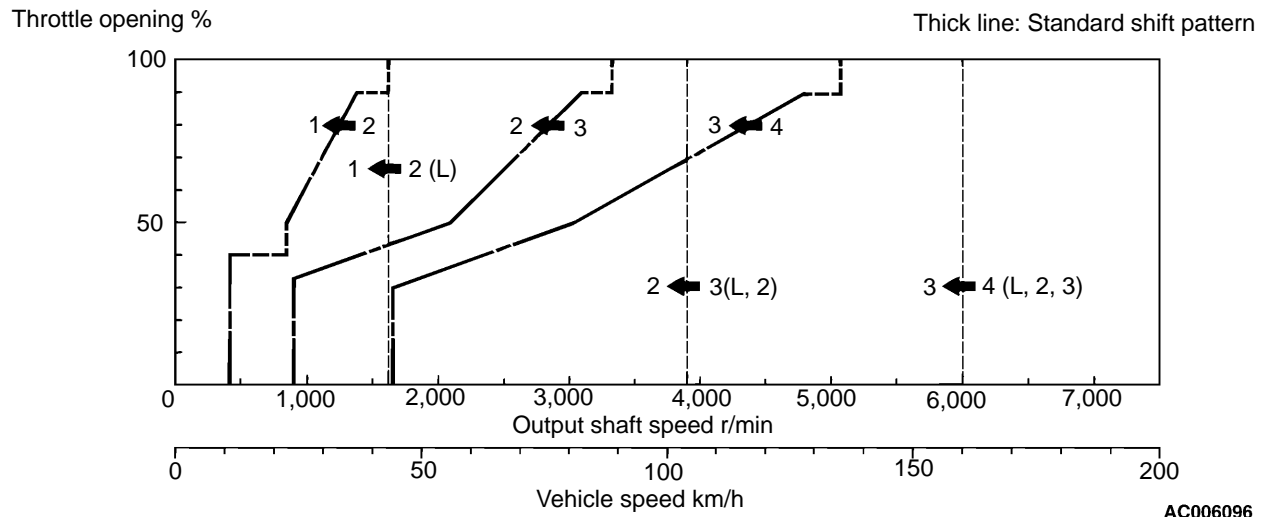
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SHIFT PATTERN

UPSHIFT PATTERN



DOWNSHIFT PATTERN



INSPECTION CHART FOR DIAGNOSIS CODE

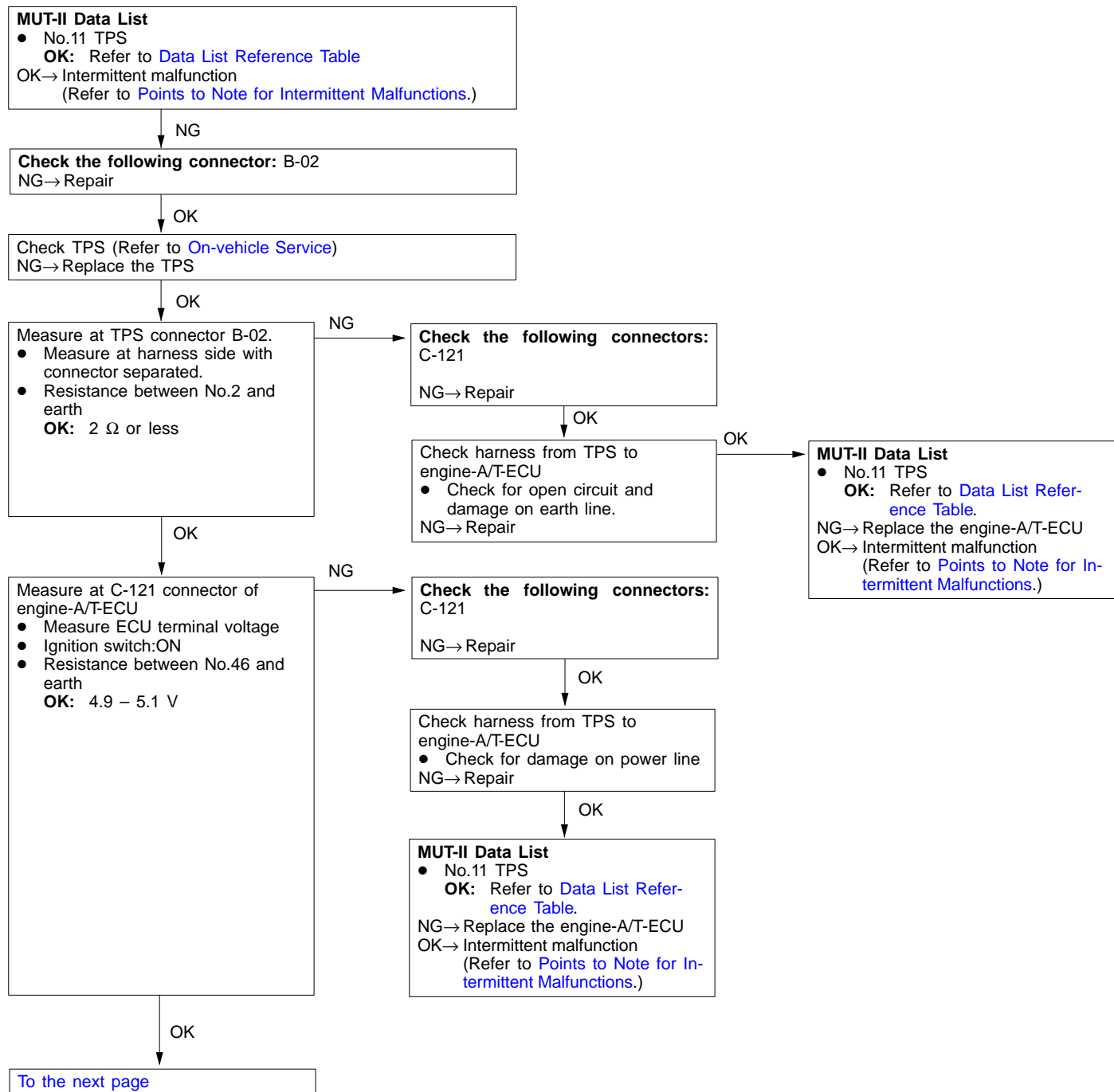
Diagnosis code	Diagnosis item	
11	Throttle position sensor system (TPS)	Short-circuit
12		Open circuit
14		Incorrect sensor adjustment
15	A/T fluid temperature sensor system	Open circuit
21	Crank angle sensor system	Open circuit
22	Input shaft speed sensor system	Short-circuit/Open circuit
23	Output shaft sensor system	Short-circuit/Open circuit
26	Stop lamp switch system	Short-circuit
31	LR solenoid valve system	Short-circuit/Open circuit
32	UD solenoid valve system	Short-circuit/Open circuit
33	2nd solenoid valve system	Short-circuit/Open circuit
34	OD solenoid valve system	Short-circuit/Open circuit
36	DCC solenoid valve system	Short-circuit/Open circuit
41	1st gear ratio does not meet the specification	
42	2nd gear ratio does not meet the specification	
43	3rd gear ratio does not meet the specification	
44	4th gear ratio does not meet the specification	
46	Reverse gear ratio does not meet the specification	
52	DCC solenoid valve system	Defective system
54	A/T control relay system	Short-circuit to earth/Open circuit
56	N range lamp system	Short-circuit to earth

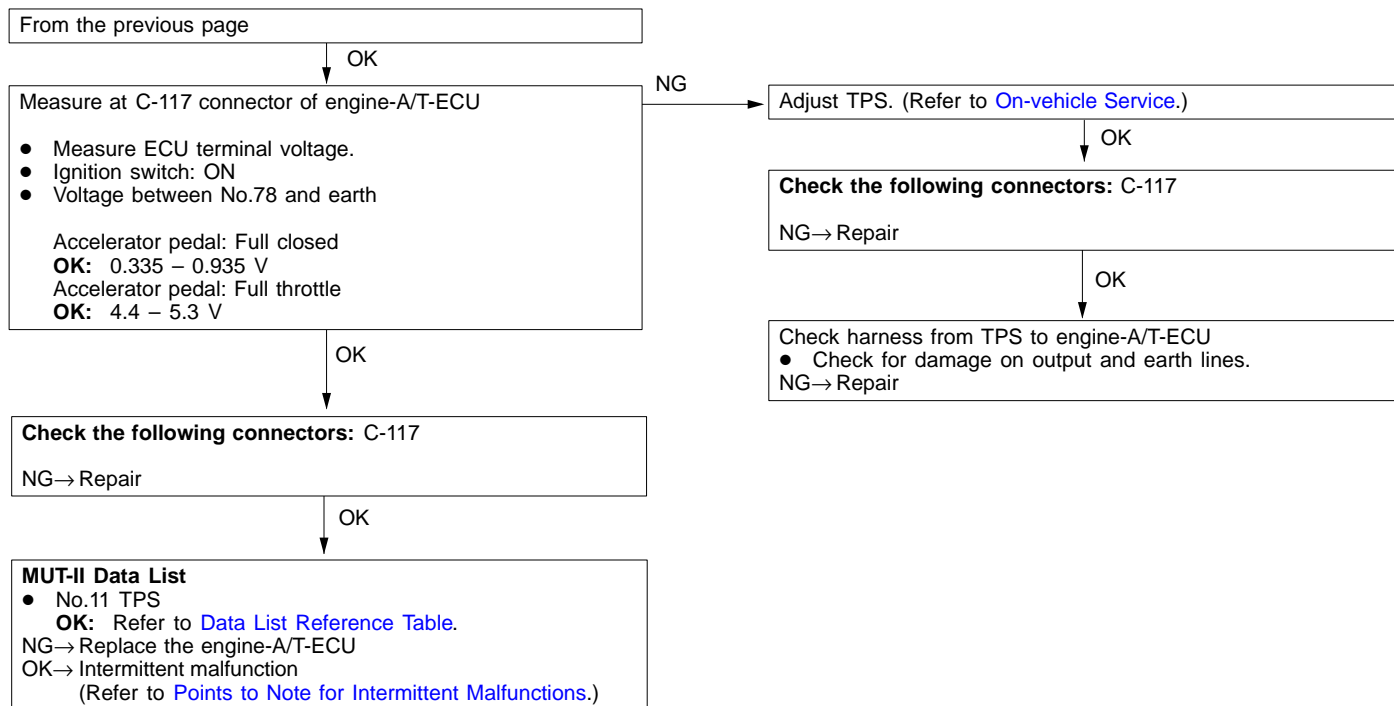
NOTE

If engine-A/T-ECU of vehicle with immobilizer needs to be replaced, replace the immobilizer-ECU at the same time and re-resister the ignition key. (Refer to [Ignition Switch](#), [Immobilizer System](#).)*

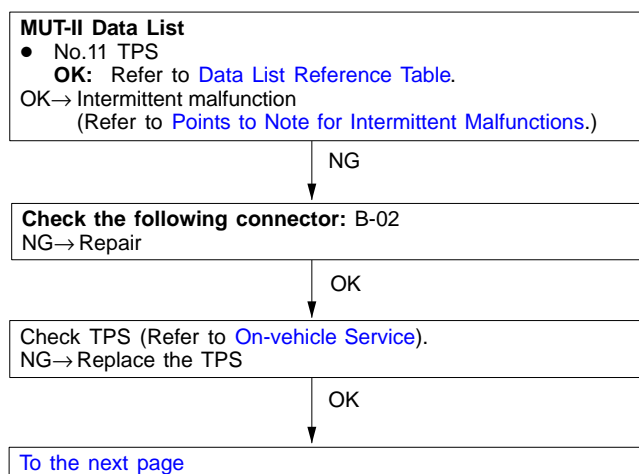
INSPECTION PROCEDURES FOR DIAGNOSIS CODES

Code No.11 Throttle position sensor (TPS) Short circuit system.	Probable cause
When TPS output exceeds 4.8 V with the engine running in idle speed, Code No.11 is generated as an overvoltage.	<ul style="list-style-type: none"> • Malfunction of TPS • Malfunction of harness or connector • Malfunction of engine A/T-ECU

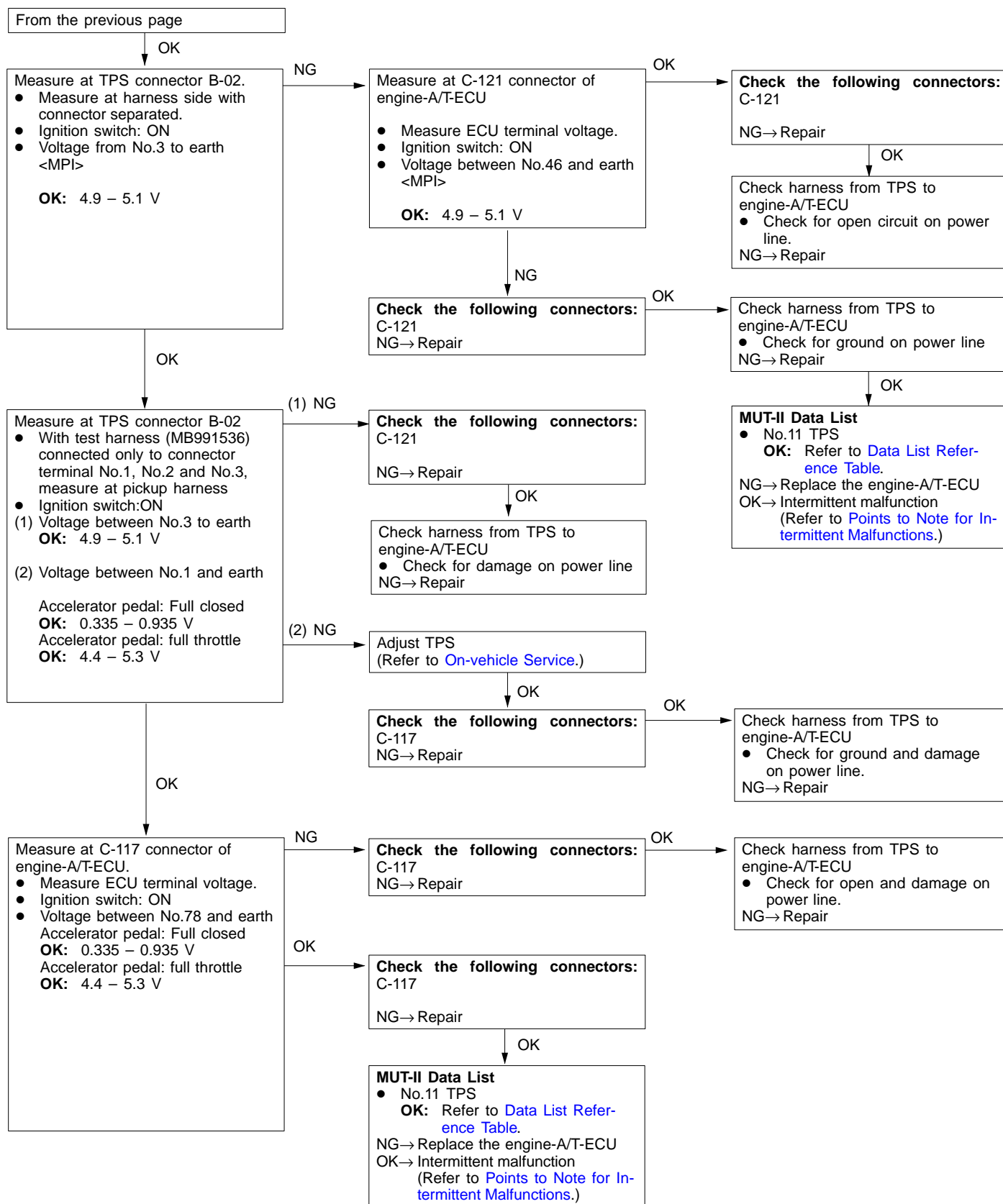




Code No.12 Throttle position sensor (TPS) Open circuit system.	Probable cause
When TPS output is less than 0.2 V with the engine running in idle speed, Code No.12 is generated as an undervoltage.	<ul style="list-style-type: none"> • Malfunction of TPS • Malfunction of harness or connector • Malfunction of engine-A/T-ECU



MAIN
Group
23
23A



Code No.14 Throttle position sensor (TPS) Incorrect sensor adjustment system.

Probable cause

When TPS output is less than 0.2 V or exceeds 1.2 V with the engine running in idle speed, Code No.14 is generated as ASP poor adjustment.

- Malfunction of TPS
- Malfunction of harness or connector
- Malfunction of engine-A/T-ECU

MUT-II Diagnostic Trouble Code

- Is Code No.11 output?

YES→Check for short circuit on TPS for [Code No.11](#)

NO

MUT-II Diagnostic Trouble Code

- Is Code No.12 output?

YES→Check for open circuit on TPS for [Code No.12](#)

NO

MUT-II Data List

- Code No.11 TPS

OK: Refer to [Data List Reference Table](#).

OK→ Intermittent malfunction

(Refer to [Points to Note for Intermittent Malfunctions.](#))

NG

Check the following connector: B-02

NG→ Repair

OK

Check TPS (Refer to [On-vehicle Service.](#))

NG→ Replace the TPS

OK

Measure TPS connector B-02.

- Measure at harness side with connector separated
- Ignition switch: ON
- Voltage between No.3 to earth
OK: 4.9 – 5.1 V

NG

Measure at C-121 connector of engine-A/T-ECU

- Measure ECU terminal voltage
- Ignition switch: ON
- Voltage between No.46 and earth
OK: 4.9 – 5.1 V

OK

Check the following connectors: C-121

NG→ Repair

OK

Check harness from TPS to engine-A/T-ECU

- Check for open circuit on power line.

NG→ Repair

NG

Check the following connectors: C-121

NG→ Repair

OK

Check harness from TPS to engine-A/T-ECU

- Check for ground on power line

NG→ Repair

OK

MUT-II Data List

- No.11 TPS

OK: Refer to [Data List Reference Table](#)

NG→ Replace the engine-A/T-ECU

OK→ Intermittent malfunction (Refer to [Points to Note for Intermittent Malfunctions.](#))

OK

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OK

Measure at TPS connector B-02.

- With test harness (MB991536) connected only to connector terminal No.1, No.2 and No.3, measure at pickup harness.
- Ignition switch:ON

(1) Voltage between No.3 to earth

OK: 4.9 – 5.1 V

(2) Voltage between No.1 and earth

Accelerator pedal: Full closed

OK: 0.335 – 0.935 V

Accelerator pedal: full throttle

OK: 4.4 – 5.3 V

(1) NG

Check the following connectors: C-121

NG→Repair

OK

Check harness from TPS to engine-A/T-ECU

- Check for damage on power line.

NG→Repair

(2) NG

Adjust TPS. ([Refer to On-vehicle Service.](#))

OK

Check the following connectors: C-117

NG→Repair

OK

Check harness from TPS to engine-A/T-ECU

- Check for ground and damage on power line.

NG→Repair

OK

Measure at C-117 connector of engine-A/T-ECU

- Measure ECU terminal voltage.
- Ignition switch: ON
- Voltage between No.78 and earth <MPI>

Accelerator pedal: Full closed

OK: 0.335 – 0.935 V

Accelerator pedal: full throttle

OK: 4.4 – 5.3 V

NG

Check the following connectors: C-117

NG→Repair

OK

Check harness from TPS to engine-A/T-ECU

- Check for open and damage on power line.

NG→Repair

OK

Check the following connectors: C-117

NG→Repair

OK

MUT-II Data List

- [No.11 TPS](#)

OK: Refer to Data List Reference Table

NG→ Replace the engine-A/T-ECU

OK→ Intermittent malfunction ([Refer to GROUP 00 – Points to Note for Intermittent Malfunctions.](#))

Code No.15 A/T fluid temperature sensor system.

Probable cause

When A/T fluid temperature sensor output exceeds 4.5 V after the vehicle runs more than 10 minutes (when the fluid temperature is not increased), Code No.15 is generated as A/T fluid temperature sensor open.

- Malfunction of A/T fluid temperature sensor
- Malfunction of harness or connector fault
- Malfunction of engine-A/T-ECU

MUT-II Data List

- [No.15 A/T fluid temperature sensor](#)
- (1) Cold start
OK: Almost equal to ambient temperature (outside air temperature)
- (2) Hot start
OK: 70 – 80 °C
- OK→ Intermittent malfunction
 (Refer to [Points to Note for Intermittent Malfunctions.](#))

NG

Measure at C-121 connector of engine-A/T-ECU.

- Measure ECU terminal voltage.
- Ignition switch: ON
- Voltage between 57 to earth
OK: 0.5 V or less

NG

Check the following connector: C-121
 NG→ Repair

OK

MUT-II Data List

- [No.15 A/T fluid temperature sensor](#)
- (1) Cold start
OK: Almost equal to ambient temperature (outside air temperature)
- (2) Hot start
OK: 70 – 80 °C
- NG→ Replace the engine-A/T-ECU
 OK→ Intermittent malfunction
 (Refer to [Points to Note for Intermittent Malfunctions.](#))

OK

Measure at C-121 connector of engine-A/T-ECU

- Measure ECU terminal voltage.
 - Ignition switch: ON
 - Voltage between 124 to earth
- (1) ATF temperature: 20 °C
OK: 3.8 – 4.0 V
- (2) ATF temperature: 40 °C
OK: 3.2 – 3.4 V
- (3) ATF temperature: 80 °C
OK: 1.7 – 1.9 V

OK

Check the following connector: C-121
 NG→ Repair

OK

MUT-II Data List

- [No.15 A/T fluid temperature sensor](#)
- (1) Cold start
OK: Almost equal to ambient temperature (outside air temperature)
- (2) Hot start
OK: 70 – 80 °C
- NG→ Replace the engine-A/T-ECU
 OK→ Intermittent malfunction
 (Refer to [Points to Note for Intermittent Malfunctions.](#))

NG

Check the following connectors: C-121, B-15
 NG→ Repair

OK

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OK

Measure at connector B-15 of A/T control solenoid valve assembly.

- Measure at sensor side with connector separated.
- Resistance between 1 – 2

(1) ATF temperature: 0 °C

OK: 16.7 – 20.5 kΩ

(2) ATF temperature: 20 °C

OK: 7.3 – 8.9 kΩ

(3) ATF temperature: 40 °C

OK: 3.4 – 4.2 kΩ

(4) ATF temperature: 60 °C

OK: 1.9 – 2.2 kΩ

(5) ATF temperature: 80 °C

OK: 1.0 – 1.2 kΩ

(6) ATF temperature: 100 °C

OK: 0.57 – 0.69 kΩ

NG→Replace A/T fluid temperature sensor

OK

Measure at connector B-15 of A/T control solenoid valve assembly.

- Measure at harness side with connector separated.

(1) Voltage between 1 to earth

- Ignition switch: ON

OK: 4.5 – 4.9 V

(2) Resistance between 2 to earth

OK: 2 Ω or less

(1) NG

Check harness from A/T control solenoid valve assembly to engine-A/T-ECU

- Check for open circuit on output line.

NG→Repair

OK

MUT-II Data List

- [No.15 A/T fluid temperature sensor](#)

(1) Cold start

OK: Almost equal to ambient temperature (outside air temperature)

(2) Hot start

OK: 70 – 80 °C

NG→Replace the engine-A/T-ECU

OK→Intermittent malfunction

(Refer to [Points to Note for Intermittent Malfunctions.](#))

(2) NG

Check harness from A/T control solenoid valve assembly to engine-A/T-ECU

- Check for open circuit and damage on earth line.

NG→Repair

OK

Check harness from A/T control solenoid valve assembly to engine-A/T-ECU

- Check for damage on output line.
- Check for damage on earth line.

NG→Repair

Code No.21 Crank angle sensor system.	Probable cause
When the output pulse is not detected for more than 5 seconds from the crank angle sensor at the speed of more than 25 km/h, Code No.21 is generated as crank angle sensor open.	<ul style="list-style-type: none"> Malfunction of crank angle sensor Malfunction of harness or connector Malfunction of engine-A/T-ECU

MUT-II Data List

- No.21 Crank angle sensor

OK: Refer to Data List Reference Table.

OK→ Intermittent malfunction
(Refer to [Points to Note for Intermittent Malfunctions.](#))

NG

Check the following connector: B-121

NG→ Repair

OK

Measure crank angle sensor connector B-121.

- Measure at harness side with connector separated.

(1) Resistance between No.1 and earth
OK: 2 Ω or less

(2) Voltage between No.2 and earth
Ignition switch:ON
OK: 4.9 – 5.1 V

(3) Voltage between No.3 to earth
Ignition switch:ON
OK: System voltage

(1) NG

Check harness from crank angle sensor to body earth.

- Check for open circuit and damage on earth line.

NG→ Repair

(2) NG

Measure at connector C-121 of engine-A/T-ECU.

- Measure ECU terminal voltage.
- Disconnect B-122
- Ignition switch:ON
- Voltage between No. 45 and earth

OK: 4.9 – 5.1 V

OK

Check the following connector: C-121
NG→ Repair

OK

Check harness from crank angle sensor to engine-A/T-ECU.

- Check for open circuit on output line.

NG→ Repair

NG

Check the following connector: C-121
NG→ Repair

OK

Check harness from crank angle sensor to engine-A/T-ECU

- Check for ground on output line

NG→ Repair

OK

MUT-II Data List

- No.21 Crank angle sensor

OK: Refer to Data List Reference Table.

NG→ Replace the engine-A/T-ECU

OK→ Intermittent malfunction
(Refer to [Points to Note for Intermittent Malfunctions.](#))

(3) NG

Check the following connector: B-11X
NG→ Repair

OK

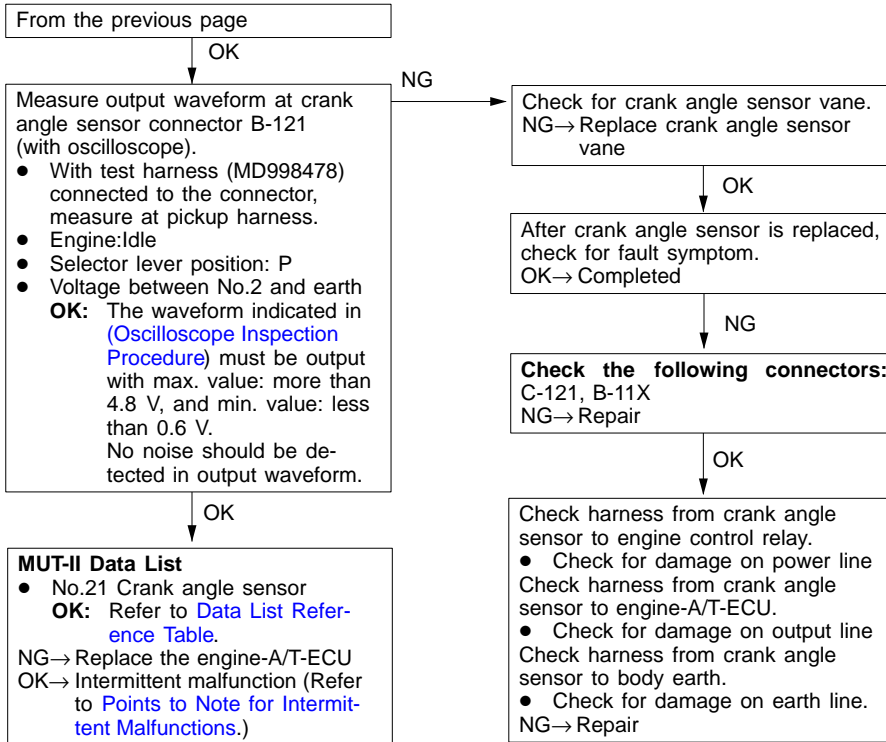
Check harness from crank angle sensor to engine control relay.

- Check for open circuit and ground on power line.

NG→ Repair

OK

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Code No.22 Input shaft speed sensor system.	Probable cause
When the output pulse is not detected for more than 1 second from the input shaft speed sensor at the speed of 30 km/h in 3rd or 4th gear, Code No.22 is generated as input shaft speed sensor short or open circuit. When Code No.22 is output four times, the 2nd or 3rd gear is fixed as a fail safe and N range indication lamp is illuminated in a frequency of 1 Hz.	<ul style="list-style-type: none"> Malfunction of input shaft speed sensor Malfunction of underdrive clutch retainer Malfunction of harness or connector Malfunction of engine-A/T-ECU

MUT-II Data List

- No.22 Input shaft speed sensor

OK: Refer to Data List Reference Table)

OK→ Intermittent malfunction

(Refer to [Points to Note for Intermittent Malfunctions.](#))*

NG

Measure at C-125 connector of engine-A/T-ECU.

- Measure engine-A/T-ECU terminal voltage.
- Ignition switch: ON
- Voltage between 16 to earth
- OK: 0.5 V or less

NG

Check the following connector: C-125

NG→ Repair.

OK

MUT-II Data List

- No.22 Input shaft speed sensor

OK: Refer to Data List Reference Table)

NG→ Replace the engine-A/T-ECU.

OK→ Intermittent malfunction

(Refer to [Points to Note for Intermittent Malfunctions.](#))*

OK

Measure at C-114 connector of engine-A/T-ECU.

- Measure ECU terminal voltage.
- Disconnect B-107
- Ignition switch: ON
- Voltage between 103 to earth
- OK: 4.9 – 5.1 V

NG

Check the following connectors: B-107, C-114

NG→ Repair.

OK

Check harness from input shaft speed sensor to engine-A/T-ECU.

- Check for ground on output line.

NG→ Repair.

OK

MUT-II Data List

- No.22 Input shaft speed sensor

OK: Refer to [Data List Reference Table](#))

NG→ Replace the engine-A/T-ECU

OK→ Intermittent malfunction

(Refer to [Points to Note for Intermittent Malfunctions.](#))*

OK

Measure output waveform of input shaft speed sensor at connector C-114 of engine-A/T-ECU (with oscilloscope).

- Vehicle speed: Approx. 50 km/h
- Shift gear: 3rd
- Voltage between 103 to earth
- OK: The waveform indicated in [Oscilloscope Inspection Procedure](#) must be output with max. value: more than 4.8 V, and min. value: less than 0.8 V. No noise should be detected in output waveform.

OK

Check the following connector: C-114

NG→ Repair.

OK

MUT-II Data List

- No.22 Input shaft speed sensor

OK: Refer to [Data List Reference Table](#))

NG→ Replace the engine-A/T-ECU

OK→ Intermittent malfunction

(Refer to [Points to Note for Intermittent Malfunctions.](#))*

NG

Check the following connectors: B-107, C-114

NG→ Repair.

OK

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OK

Measure at connector B-107 of input shaft speed sensor.

- Measure at harness side with connector separated.

(1) Resistance between 1 to earth

OK: 2 Ω or less

(2) Voltage between 2 to earth

- Ignition switch: ON

OK: 4.9 – 5.1 V

(3) Voltage between 3 to earth

- Ignition switch: ON

OK: System voltage

(1) NG

Check harness from input shaft speed sensor to engine-A/T-ECU.

- Check for open circuit and damage on earth line.

NG→Repair.

(2) NG

Check harness from input shaft speed sensor to engine-A/T-ECU.

- Check for open circuit on output line.

NG→Repair.

(3) NG

Check the following connectors: C-129, C-209, C-210
NG→Repair.

OK

After input shaft speed sensor is replaced, check fault symptom.

OK→Completed

NG

Check the following connectors: C-129, C-209, C-210

NG→Repair.

OK

Check harness from input shaft speed sensor to engine-A/T-ECU.

- Check for damage on output line.
- Check for damage on earth line.

Check harness from input shaft speed sensor to J/B.

- Check for damage on power line.

NG→Repair.

OK

After underdrive clutch retainer is replaced (A/T overhaul ★), check fault symptom

NG→Remove noise source

OK→Completed

OK

Check harness from input shaft speed sensor to J/B.

- Check for open circuit and ground on power line.

NG→Repair.

Code No.23 Output shaft speed sensor system.	Probable cause
<p>When output shaft speed sensor generates less than 50 % output of vehicle speed sensor for more than 1 second at the speed of more than 30 km/h in 3rd or 4th gear, Code No.23 is generated as output shaft speed sensor short or open circuit.</p> <p>When Code No.23 is output four times, the 2nd or 3rd gear is fixed as a fail safe and N range indication lamp is illuminated in a frequency of 1 Hz.</p>	<ul style="list-style-type: none"> • Malfunction of output shaft speed sensor • Malfunction of transfer drive gear and driven gear • Malfunction of harness or connector • Malfunction of engine-A/T-ECU

MUT-II Data List

- [No.23 Output shaft speed sensor](#)
OK: Refer to Data List Reference Table)

OK→ Intermittent malfunction
(Refer to [Points to Note for Intermittent Malfunctions.](#))*

NG

Measure at C-125 connector of engine-A/T-ECU.

- Measure engine-A/T-ECU terminal voltage.
- Ignition switch: ON
- Voltage between 16 to earth
OK: 0.5 V or less

NG

Check the following connector: C-125

NG→ Repair.

OK

MUT-II Data List

- [No.23 Output shaft speed sensor](#)
OK: Refer to Data List Reference Table)

NG→ Replace the engine-A/T-ECU.
OK→ Intermittent malfunction
(Refer to [Points to Note for Intermittent Malfunctions.](#))*

OK

Measure at C-114 connector of engine-A/T-ECU.

- Measure ECU terminal voltage.
- Disconnect B-106
- Ignition switch: ON
- Voltage between 104 to earth
OK: 4.9 – 5.1 V

NG

Check the following connectors: B-106, C-114

NG→ Repair.

OK

Check harness from output shaft speed sensor to engine-A/T-ECU.

- Check for ground on output line.
NG→ Repair.

OK

MUT-II Data List

- [No.23 Output shaft speed sensor](#)
OK: Refer to Data List Reference Table)

NG→ Replace the engine-A/T-ECU.
OK→ Intermittent malfunction
(Refer to [Points to Note for Intermittent Malfunctions.](#))*

OK

Measure output waveform of output shaft speed sensor at connector C-114 of engine-A/T-ECU (with oscilloscope).

- Vehicle speed: Approx. 50 km/h
- Shift gear: 3rd
- Voltage between 104 to earth
OK: The waveform indicated in [Oscilloscope Inspection Procedure](#) must be output with max. value: more than 4.8 V, and min. value: less than 0.8 V. No noise should be detected in output waveform.

OK

Check the following connector: C-114

NG→ Repair.

OK

MUT-II Data List

- [No.23 Output shaft speed sensor](#)
OK: Refer to Data List Reference Table)

NG→ Replace the engine-A/T-ECU.
OK→ Intermittent malfunction
(Refer to [Points to Note for Intermittent Malfunctions.](#))*

NG

Check the following connectors: B-106, C-114

NG→ Repair.

OK

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OK

Measure at connector B-106 of output shaft speed sensor.

- Measure at harness side with connector separated.

(1) Resistance between 1 to earth

OK: 2 Ω or less

(2) Voltage between 2 to earth

- Ignition switch: ON

OK: 4.9 – 5.1 V

(3) Voltage between 3 to earth

- Ignition switch: ON

OK: System voltage

(1) NG

Check harness from output shaft speed sensor to engine-A/T-ECU.

- Check for open circuit and damage on earth line.

NG→Repair.

(2) NG

Check harness from output shaft speed sensor to engine-A/T-ECU.

- Check for open circuit on output line.

NG→Repair.

(3) NG

Check the following connectors: C-129, C-209, C-210

NG→Repair.

OK

After output shaft speed sensor is replaced, check fault symptom.

OK→Completed

NG

Check the following connectors: C-129, C-209, C-210

NG→Repair.

OK

Check harness from output shaft speed sensor to engine-A/T-ECU.

- Check for damage on output line.
- Check for damage on earth line.

Check harness from output shaft speed sensor to J/B.

- Check for damage on power line.

NG→Repair.

OK

After transfer drive gear and driven gear are replaced (A/T overhaul ★), check fault symptom.

NG→Remove noise source

OK→Completed

OK

Check harness from output shaft speed sensor to J/B.

- Check for open circuit and ground on power line.

NG→Repair.

Code No.26 Stop lamp switch system.

Probable cause

When stop lamp switch is ON for more than 5 minutes while driving, Code No.26 is generated as stop lamp switch short circuit.

- Malfunction of brake pedal
- Malfunction of stop lamp switch
- Malfunction of harness or connector
- Malfunction of engine-A/T-ECU

Check for brake pedal height
(Refer to [On-Vehicle Service](#))
NG→Adjusut

OK

MUT-II Data List

- [No.26 Stop lamp switch](#)
- (1) Depress brake pedal
OK: ON
- (2) Release brake pedal
OK: OFF
- OK→ Intermittent malfunction
(Refer to [Points to Note for Intermittent Malfunctions.](#))

NG

Check the following connector: C-103

NG→ Repair

OK

Check stop lamp switch
(Refer to [Brake Pedal](#))
NG→ Replace

OK

Measure at stop lamp switch connector C-103.
Separate connector to measure at harness side.

- Voltage between 2 to earth
OK: System voltage

NG

Check the following connector: C-135
NG→ Repair

OK

Check harness from stop lamp switch to battery.

- Check for open circuit or damage on power line.

NG→ Repair

OK

Measure at C-114 connector of engine-A/T-ECU

- Measure ECU terminal voltage.
- Voltage between 123 to earth

NG

Check the following connectors:
C-114, C-108, C-103
NG→ Repair

OK

- (1) Depress brake pedal
OK: System voltage
- (2) Release brake pedal
OK: 1 V or less

OK

Check harness from stop lamp switch to engine-A/T-ECU

- Check for damage on output line.

NG→ Repair

OK

Check the following connectors: C-114

NG→ Repair

OK

Check for open circuit or damage on harness from stop lamp switch to stop lamp.
NG→ Repair

MUT-II Data List

- [No.26 Stop lamp switch](#)
- (1) Depress brake pedal
OK: ON
- (2) Release brake pedal
OK: OFF
- NG→ Replace the engine-A/T-ECU
- OK→ Intermittent malfunction
(Refer to [Points to Note for Intermittent Malfunctions.](#))

Code No.31 LR solenoid valve system.	Probable cause
When drive terminal voltage of LR solenoid valve is less than 3.0 V, Code No.31 is generated as solenoid valve short or open circuit. 3rd gear is fixed as a fail safe, and N range indicator lamp is flashed in a frequency of 1 Hz.	<ul style="list-style-type: none"> Malfunction of LR solenoid valve Malfunction of harness or connector Malfunction of engine-A/T-ECU

MUT-II Diagnostic Trouble Code

- Is Code No.54 output?
YES→Code No.54 Check [A/T control relay system](#)

NO

MUT-II Actuator test

- [No.1 LR solenoid valve](#)
OK: Operating sound audible
OK→ Intermittent malfunction
(Refer to [Points to Note for Intermittent Malfunctions.](#))

NG

Measure at C-114 connector of engine-A/T-ECU

- Measure ECU terminal voltage.
- Ignition switch:ON
- Voltage between 129 to earth

OK: System voltage

OK

Check the following connectors: B-10X, B-15, C-114

NG→ Repair

OK

Check harness from A/T control solenoid valve assembly to A/T control relay.

- Check for damage on power line.
- Check harness from A/T control solenoid valve assembly to engine-A/T-ECU
- Check for damage on output line.

NG→ Repair

OK

MUT-II Actuator test

- [No.1 LR solenoid valve](#)
OK: Operating sound audible
NG→ Replace the engine-A/T-ECU
OK→ Intermittent malfunction
(Refer to [Points to Note for Intermittent Malfunctions.](#))

Check the following connector: B-15

NG→ Repair

OK

Measure at connector B-15 of A/T control solenoid valve assembly.

- Separate connector and measure at solenoid valve side.
- Resistance between 6 – 10

OK: 2.7 – 3.4 Ω

NG→ Replace LR solenoid valve.

OK

Check the following connectors: B-10X, C-114

NG→ Repair

OK

Check harness from A/T control solenoid valve assembly to A/T control relay.

- Check for open circuit on power line.
- Check harness from A/T control solenoid valve assembly to engine-A/T-ECU
- Check for open circuit and ground on output line.

NG→ Repair

OK

MUT-II Actuator test

- [No.1 LR solenoid valve](#)
OK: Operating sound audible
NG→ Replace the engine-A/T-ECU
OK→ Intermittent malfunction
(Refer to [Points to Note for Intermittent Malfunctions.](#))

Code No.32 UD solenoid valve system.	Probable cause
When drive terminal voltage of solenoid valve is less than 3.0 V, Code No.32 is generated as solenoid valve short or open circuit. 3rd gear is fixed as a fail safe, and N range indicator lamp is flashed in a frequency of 1 Hz.	<ul style="list-style-type: none"> Malfunction of UD solenoid valve Malfunction of harness or connector Malfunction of engine-A/T-ECU

MUT-II Diagnostic Trouble Code

- Is Code No.54 output?
YES→Code No.54 Check [A/T control relay system](#).

NO

MUT-II Actuator test

- [No.2 UD solenoid valve](#)
OK: Operating sound audible
OK→ Intermittent malfunction
(Refer to [Points to Note for Intermittent Malfunctions](#).)

NG

Measure at C-114 connector of engine-A/T-ECU

- Measure ECU terminal voltage.
- Ignition switch:ON
- Voltage between 120 to earth
OK: System voltage

OK

Check the following connectors: B-10X, C-114
NG→ Repair

OK

Check harness from A/T control solenoid valve assembly to A/T control relay.

- Check for damage on power line.
- Check harness from A/T control solenoid valve assembly to engine-A/T-ECU
- Check for damage on output line.
NG→ Repair

OK

MUT-II Actuator test

- [No.2 UD solenoid valve](#)
OK: Operating sound audible
NG→ Replace the engine-A/T-ECU
OK→ Intermittent malfunction
(Refer to [Points to Note for Intermittent Malfunctions](#).)

Check the following connector: B-15

NG→ Repair

OK

Measure at connector B-15 of A/T control solenoid valve assembly.

- Separate connector and measure at solenoid valve side.
- Resistance between 3 – 9
OK: 2.7 – 3.4 Ω
NG→ Replace UD solenoid valve

OK

Check the following connectors: B-10X, C-114

NG→ Repair

OK

Check harness from A/T control solenoid valve assembly to A/T control relay.

- Check for open circuit on power line.
- Check harness from A/T control solenoid valve assembly to engine-A/T-ECU
- Check for open circuit and ground on output line.
NG→ Repair

OK

MUT-II Actuator test

- [No.2 UD solenoid valve](#)
OK: Operating sound audible
NG→ Replace the engine-A/T-ECU
OK→ Intermittent malfunction
(Refer to [Points to Note for Intermittent Malfunctions](#).)

Code No.33 2ND solenoid valve system.	Probable cause
When drive terminal voltage of 2ND solenoid valve is less than 3.0 V, Code No.33 is generated as solenoid valve short or open circuit. 3rd gear is fixed as a fail safe, and N range indicator lamp is flashed in a frequency of 1 Hz.	<ul style="list-style-type: none"> Malfunction of 2ND solenoid valve Malfunction of Harness or connector Malfunction of Engine-A/T-ECU

MUT-II Diagnostic Trouble Code

- Is Code No.54 output?
YES→Code No.54 Check [A/T control relay system](#).

NO

MUT-II Actuator test

- [No.3 2ND solenoid valve](#)
OK: Operating sound audible
OK→ Intermittent malfunction
(Refer to [Points to Note for Intermittent Malfunctions.](#))

NG

Measure at C-114 connector of engine-A/T-ECU

- Measure ECU terminal voltage.
- Ignition switch: ON
- Voltage between 106 to earth
OK: System voltage

OK

Check the following connectors: B-10X, C-114
NG→ Repair

OK

Check harness from A/T control solenoid valve assembly to A/T control relay.

- Check for damage on power line.
- Check harness from A/T control solenoid valve assembly to engine-A/T-ECU
- Check for damage on output line.
NG→ Repair

OK

MUT-II Actuator test

- [No.3 2ND solenoid valve](#)
OK: Operating sound audible
NG→ Replace the engine-A/T-ECU
OK→ Intermittent malfunction
(Refer to [Points to Note for Intermittent Malfunctions.](#))

NG

Check the following connector: B-15

NG→ Repair

OK

Measure at connector B-15 of A/T control solenoid valve assembly.

- Separate connector and measure at solenoid valve side
- Resistance between 4 – 9
OK: 2.7 – 3.4 Ω
NG→ Replace 2ND solenoid valve

OK

Check the following connectors: B-10X, C-114

NG→ Repair

OK

Check harness from A/T control solenoid valve assembly to A/T control relay.

- Check for open circuit on power line.
- Check harness from A/T control solenoid valve assembly to engine-A/T-ECU
- Check for open circuit and ground on output line.
NG→ Repair

OK

MUT-II Actuator test

- [No.3 2ND solenoid valve](#)
OK: Operating sound audible
NG→ Replace the engine-A/T-ECU
OK→ Intermittent malfunction
(Refer to [Points to Note for Intermittent Malfunctions.](#))

Code No.34 OD solenoid valve system.	Probable cause
When drive terminal voltage of OD solenoid valve is less than 3.0 V, Code No.34 is generated as solenoid valve short or open circuit. 3rd gear is fixed as a fail safe, and N range indicator lamp is flashed in a frequency of 1 Hz.	<ul style="list-style-type: none"> • Malfunction of OD solenoid valve • Malfunction of harness or connector • Malfunction of engine-A/T-ECU

MUT-II Diagnostic Trouble Code

- Is Code No.54 output?
YES→Code No.54 Check [A/T control relay system](#).

NO

MUT-II Actuator test

- [No.4 OD solenoid valve](#)
OK: Operating sound audible
OK→ Intermittent malfunction
(Refer to [Points to Note for Intermittent Malfunctions](#).)

NG

Measure at C-114 connector of engine-A/T-ECU

- Measure ECU terminal voltage.
- Ignition switch: ON
- Voltage between 130 to earth
OK: System voltage

OK

Check the following connectors: B-10X, C-114

NG→ Repair

OK

Check harness from A/T control solenoid valve assembly to A/T control relay.

- Check for damage on power line.
- Check harness from A/T control solenoid valve assembly to engine-A/T-ECU
- Check for damage on output line.

NG→ Repair

OK

MUT-II Actuator test

- [No.4 OD solenoid valve](#)
OK: Operating sound audible
NG→ Replace the engine-A/T-ECU
OK→ Intermittent malfunction
(Refer to [Points to Note for Intermittent Malfunctions](#).)

Check the following connector: B-15

NG→ Repair

OK

Measure at connector B-15 of A/T control solenoid valve assembly.

- Separate connector and measure at solenoid valve side
- Resistance between 5 – 9
OK: 2.7 – 3.4 Ω

NG→ Replace OD solenoid valve

OK

Check the following connectors: B-10X, C-114

NG→ Repair

OK

Check harness from A/T control solenoid valve assembly to A/T control relay.

- Check for open circuit on power line.
- Check harness from A/T control solenoid valve assembly to engine-A/T-ECU
- Check for open circuit and ground on output line.

NG→ Repair

OK

MUT-II Actuator test

- [No.4 OD solenoid valve](#)
OK: Operating sound audible
NG→ Replace the engine-A/T-ECU
OK→ Intermittent malfunction
(Refer to [Points to Note for Intermittent Malfunctions](#).)

Code No.36 DCC solenoid valve system.	Probable cause
When drive terminal voltage of DCC solenoid valve is less than 3.0 V, Code No.36 is generated as DCC solenoid valve short or open circuit. 3rd gear is fixed as a fail safe, and N range indicator lamp is flashed in a frequency of 1 Hz.	<ul style="list-style-type: none"> Malfunction of DCC solenoid valve Malfunction of harness or connector Malfunction of engine-A/T-ECU

MUT-II Diagnostic Trouble Code

- Is Code No.54 output?
YES→Code No.54 Check [A/T control relay system](#).

NO

MUT-II Actuator test

- [No. 6 DCC solenoid valve](#)
OK: Operating sound audible
OK→ Intermittent malfunction
(Refer to [Points to Note for Intermittent Malfunctions](#).)

NG

Measure at C-114 connector of engine-A/T-ECU

- Measure ECU terminal voltage.
- Ignition switch: ON
- Voltage between 107 to earth
OK: System voltage

OK

Check the following connectors: B-10X, C-114
NG→ Repair

OK

Check harness from A/T control solenoid valve assembly to A/T control relay.

- Check for damage on power line.
- Check harness from A/T control solenoid valve assembly to engine-A/T-ECU
- Check for damage on output line.
NG→ Repair

OK

MUT-II Actuator test

- [No. 6 DCC solenoid valve](#)
OK: Operating sound audible
NG→ Replace the engine-A/T-ECU
OK→ Intermittent malfunction
(Refer to [Points to Note for Intermittent Malfunctions](#).)

Check the following connector: B-15

NG→ Repair

OK

Measure at connector B-15 of A/T control solenoid valve assembly.

- Separate connector and measure at solenoid valve side.
- Resistance between 7 – 10
OK: 2.7 – 3.4 Ω
NG→ Replace DCC solenoid valve

OK

Check the following connectors: B-10X, C-114

NG→ Repair

OK

OK

Check harness from A/T control solenoid valve assembly to A/T control relay.

- Check for open circuit on power line.
- Check harness from A/T control solenoid valve assembly to engine-A/T-ECU
- Check for open circuit and ground on output line.
NG→ Repair

MUT-II Actuator test

- [No. 6 DCC solenoid valve](#)
OK: Operating sound audible
NG→ Replace the engine-A/T-ECU
OK→ Intermittent malfunction
(Refer to [Points to Note for Intermittent Malfunctions](#).)

Code No.41 1st gear ratio does not meet the specification	Probable cause.
Code No.42 2nd gear ratio does not meet the specification	
Code No.43 3rd gear ratio does not meet the specification	
Code No.44 4th gear ratio does not meet the specification	
Code No.46 Reverse gear ratio does not meet the specification	
When the value calculated by multiplying output shaft speed sensor output by individual shift gear ratios is not matched with input shaft speed sensor output after individual shift operations are completed, corresponding diagnosis trouble codes are generated. When individual diagnosis codes are generated four times, 3rd gear is fixed and N range indicator lamp is flashed.	

- Malfunction of input shaft speed sensor
- Malfunction of output shaft speed sensor
- Malfunction of harness or connector
- Malfunction of UD clutch retainer
- Malfunction of Transfer drive gear, driven gear
- Malfunction of LR brake system (in the case of No. 41 and 46)
- Malfunction of UD clutch system (in the case of No. 41, 42 and 43)
- Malfunction of 2ND brake system (in the case of No. 42 and 44)
- Malfunction of OD clutch system (in the case of No. 43 and 44)
- Malfunction of REV clutch system (in the case of No. 46)
- Malfunction of valve body assembly
- Malfunction of one-way clutch
- Malfunction of engine-A/T-ECU
- Noise generated

MUT-II Diagnostic Trouble Code

- Is Code No.22 output?
- YES→Check Code No.22 Check [input shaft speed sensor system](#).

NO

MUT-II Diagnostic Trouble Code

- Is Code No.23 output?
- YES→Check Code No.23 Check [output shaft speed sensor system](#).

NO

MUT-II Actuator test

- [No.1 LR solenoid valve](#)
- [No.2 UD solenoid valve](#)
- [No.3 2ND solenoid valve](#)
- [No.4 OD solenoid valve](#)

OK: Operating sound audible

NG→Replace corresponding solenoid valve

OK

Measure output waveform of input shaft speed sensor at connector C-114 of engine-A/T-ECU (with oscilloscope).

- Vehicle speed: Approx. 50 km/h
- Shift gear: 3rd
- Voltage between No.103 to earth

OK: The waveform indicated in [Oscilloscope Inspection Procedure](#) must be output with max. value: more than 4.8 V, and min. value: less than 0.8 V. No noise should be detected in output waveform.

OK

[To the next page](#)

NG

Check the following connectors: B-107, C-114
NG→Repair

OK

Check harness from input shaft speed sensor to engine-A/T-ECU

- Check for damage on output line
- NG→Repair

OK

After input shaft speed sensor is replaced, check fault symptom.
NG→Complete

OK

After UD clutch retainer is replaced (A/T overhaul), check fault symptom.
OK→Completed
NG→Remove noise source

23A AUTOMATIC TRANSMISSION BASE – Troubleshooting <A/T>

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OK

Measure output waveform of output shaft speed sensor at connector C-114 of engine-A/T-ECU (with oscilloscope).

- Vehicle speed: Approx. 50 km/h
- Shift gear: 3rd
- Voltage between 104 to earth

OK: The waveform indicated in [Oscilloscope Inspection Procedure](#) must be output with max. value: more than 4.8 V, and min. value: less than 0.8 V.
No noise should be detected in output waveform.

NG

Check the following connectors: B-106, C-114
NG→ Repair

OK

Check harness from output shaft speed sensor to engine-A/T-ECU

- Check for damage on output line.
- NG→ Repair

OK

After output shaft speed sensor is replaced, check fault symptom.

OK→ Completed

NG

After transfer drive gear and driven gear are replaced, check fault symptom.

OK→ Completed

NG→ Remove noise source

OK

After valve body assembly is replaced, check fault symptom.
OK→ Completed

NG

After engine-A/T-ECU is replaced, check fault symptom.
OK→ Completed

NG

A/T overhaul

- Replace UD clutch (single or several code/s of No. 41, 42 and 43 is/are generated).
- Replace OD clutch (single or several code/s of No. 43 and 44 is/are generated).
- Replace REV clutch (single or several code/s of No. 46 is/are generated).
- Replace LR brake (single or several code/s of No. 46 is/are generated).
- Replace 2ND brake (single or several code/s of No. 42 and 44 is/are generated).
- Replace one-way clutch (single code No. 46 is generated).

Code No.52 DCC solenoid valve system.	Probable cause
If the duty ratio for driving DCC solenoid valve is retained 100 % for more than 4 seconds when the damper clutch is activated, Code No.52 is generated as damper clutch control system fault.	<ul style="list-style-type: none"> ● Malfunction of input shaft speed sensor ● Malfunction of DCC solenoid valve ● Malfunction of harness connector ● Malfunction of reverse clutch retainer ● Malfunction of engine-A/T-ECU ● Malfunction of torque converter

MUT-II Diagnostic Trouble Code

- Is Code No.22 output?
YES→CheckCode No.22 Check [input shaft speed sensor system](#)

NO

MUT-II Actuator test

- [No.6 DCC solenoid valve](#)
OK: Operating sound audible
NG→Replace DCC solenoid valve

OK

Measure output waveform of input shaft speed sensor at connector C-114 of engine-A/T-ECU (with oscilloscope).
 ● Vehicle speed: Approx. 50 km/h
 ● Shift gear: 3rd
 ● Voltage between No. 103 to earth
 OK: The waveform indicated in [Oscilloscope Inspection Procedure](#) must be output with max. value: more than 4.8 V, and min. value: less than 0.8 V.
 No noise should be detected in output waveform.

NG

Check the following connectors: B-107, C-114
NG→Repair

OK

Check harness from input shaft speed sensor to engine-A/T-ECU
 ● Check for damage on output line
 NG→Repair

OK

After input shaft speed sensor is replaced, check fault symptom.
 NG→Completed

OK

After reverse clutch retainer is replaced, check fault symptom.
 OK→Completed
 NG→Remove noise source

OK

After valve body assembly is replaced, check fault symptom.
 OK→Completed

NG

After engine-A/T-ECU is replaced, check fault symptom.
 OK→Completed
 NG→Replace torque converter

Code No.54 A/T control relay system.	Probable cause
When A/T control relay voltage is less than 7 V after ignition switch is ON, Code No.54 is generated as A/T control relay earth short or open circuit. 3rd gear is fixed as a fail safe, and N range indicator lamp is flashed in a frequency of 1 Hz.	<ul style="list-style-type: none"> Malfunction of A/T control relay Malfunction of harness connector Malfunction of engine-A/T-ECU

MUT-II Data List

- No.54 A/T control relay
- Ignition switch: ON
- OK: System voltage
- OK→ Intermittent malfunction
(Refer to [Points to Note for Intermittent Malfunctions.](#))

NG

Check the following connector: B-10X

NG→ Repair

OK

Check single A/T control relay

NG→ Repair

OK

Measure A/T control relay connector B-10X.

- Separate A/T control relay to measure at connector side.
- (1) Resistance between 3 to earth
OK: 2 Ω or less
- (2) Voltage between 1 to earth
OK: System voltage
- (3) Voltage between 2 to earth
OK: System voltage

(1) NG

Check the following connector: C-121

NG→ Repair

OK

Check harness from A/T control relay to engine-A/T-ECU.

- Check for open circuit and damage on earth line.
- NG→ Repair

OK

MUT-II Data List

- No.54 A/T control relay
- Ignition switch: ON
- OK: System voltage
- NG→ Replace the engine-A/T-ECU
- OK→ Intermittent malfunction
(Refer to [Points to Note for Intermittent Malfunctions.](#))

(2) NG

Check the following connectors: C-136

NG→ Repair

OK

Check harness from A/T control relay to battery.

- Check for open circuit and ground on power line.
- NG→ Repair

(3) NG

Check the following connectors: C-129, C-209, C-210

NG→ Repair

OK

Check harness from A/T control relay to ignition switch.

- Check for open circuit and ground on power line.
- NG→ Repair

OK

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OK

Measure at connector C-117 of engine-A/T-ECU.

- Measure ECU terminal voltage.
 - Ignition switch: ON
 - Voltage between 77 to earth
 - Voltage between 89 to earth
- OK:** System voltage

NG

Check the following connectors: B-10X, B-15, C-117 C-136
NG→ Repair

OK

Check harness from A/T control relay to engine-A/T-ECU.

- Check for open, ground and damage on power line.
- NG→ Repair

OK

Check harness from A/T control relay to battery.

- Check for damage on power line.
 - Check harness from A/T control relay to engine-A/T-ECU.
 - Check for damage on earth line.
- Check harness from A/T control relay to A/T control solenoid valve assembly.
- Check for ground on output line.
- NG→ Repair

Check the following connector: C-117

NG→ Repair

OK

MUT-II Data List

- [No.54 A/T control relay](#)

- Ignition switch: ON

OK: System voltage

NG→ Replace the engine-A/T-ECU

OK→ Intermittent malfunction

(Refer to [Points to Note for Intermittent Malfunctions.](#))

Code No.56 N range lamp system.	Probable cause
When N range signal is not detected after N range lamp is ON, Code No.56 is generated as N range lamp earth short circuit.	<ul style="list-style-type: none"> • Malfunction of N range lamp bulb • Malfunction of harness or connector • Malfunction of engine-A/T-ECU

Connect MUT-II diagnosis connector.

- Ignition switch: ON
- OK:** N range indicator lamp flashing
- OK→ Intermittent malfunction
(Refer to [Points to Note for Intermittent Malfunctions.](#))

NG

Check for N range indicator lamp bulb.
(Refer to [Combination Meter.](#))
NG→ Replace

OK

Check the following connector: C-02

NG→ Repair

OK

- C-02 Measure at combination meter connector.
- Measure at harness side with connector separated.
 - Resistance between 48 to earth
 - OK:** 2 Ω or less

NG

Check the following connector: C-02

NG→ Repair

OK

- Check harness from combination meter to body earth.
- Check for open circuit and damage on earth line.
 - NG→ Repair

OK

Check the following connectors: B-16, C-02, C-130, C-114
NG→ Repair

OK

- Check harness from fan combination meter to engine-A/T-ECU
- Check for open, ground and damage on power line.
 - Check harness from combination meter to body earth.
 - Check for damage on earth line.
 - NG→ Repair

OK

Connect MUT-II diagnosis connector.

- Ignition switch: ON
- OK:** N range indicator lamp flashing
- NG→ Replace the engine-A/T-ECU
- OK→ Intermittent malfunction
(Refer to [Points to Note for Intermittent Malfunctions.](#))

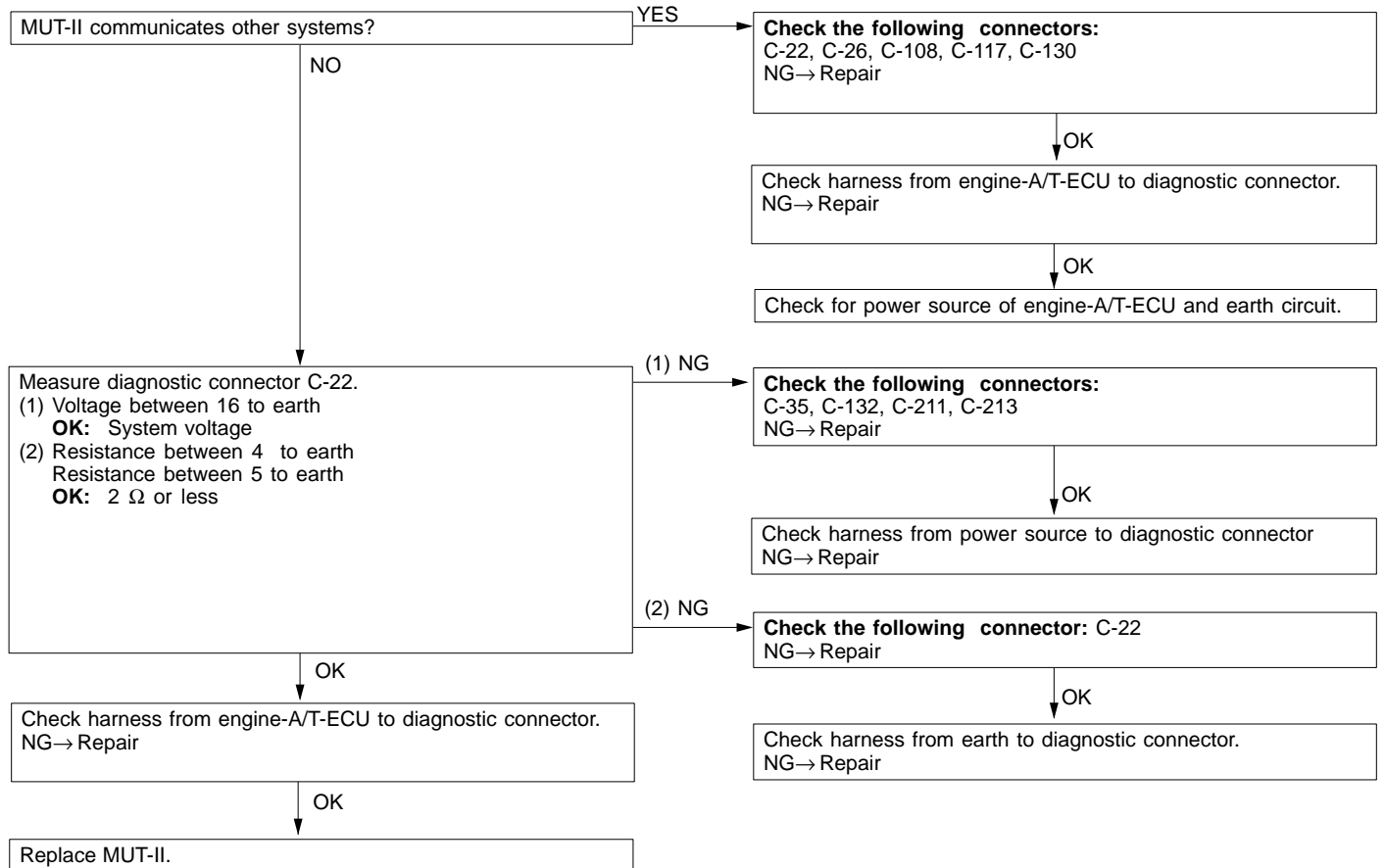
INSPECTION CHART FOR TROUBLE SYMPTOMS

Trouble Symptom		Inspection procedure No.
Communication with the MUT-II is not possible		1
Driving not possible	Starting not possible	2
	Does not move forward	3
	Does not reverse	4
	Does not move (forward or reverse)	5
Malfunction when starting off	Engine stalls during shifting	6
	N-to-D shocks, large time lag	7
	N-to-R shocks, large time lag	8
	N-to-D, N-to-R shocks, large time lag	9
Problem during shifting	Shocks, engine racing	10
Incorrect shift points	All points	11
	Some points	12
No shifting	No diagnosis codes	13
Problem during driving	Poor acceleration	14
	Vibration	15
Inhibitor switch system		16
Dual pressure switch system		17
Vehicle speed output system		18
Shift switch assembly system <Vehicles with sport mode>		19
Shift indicator display error <Vehicles with sport mode>		20

INSPECTION PROCEDURES FOR TROUBLE SYMPTOMS

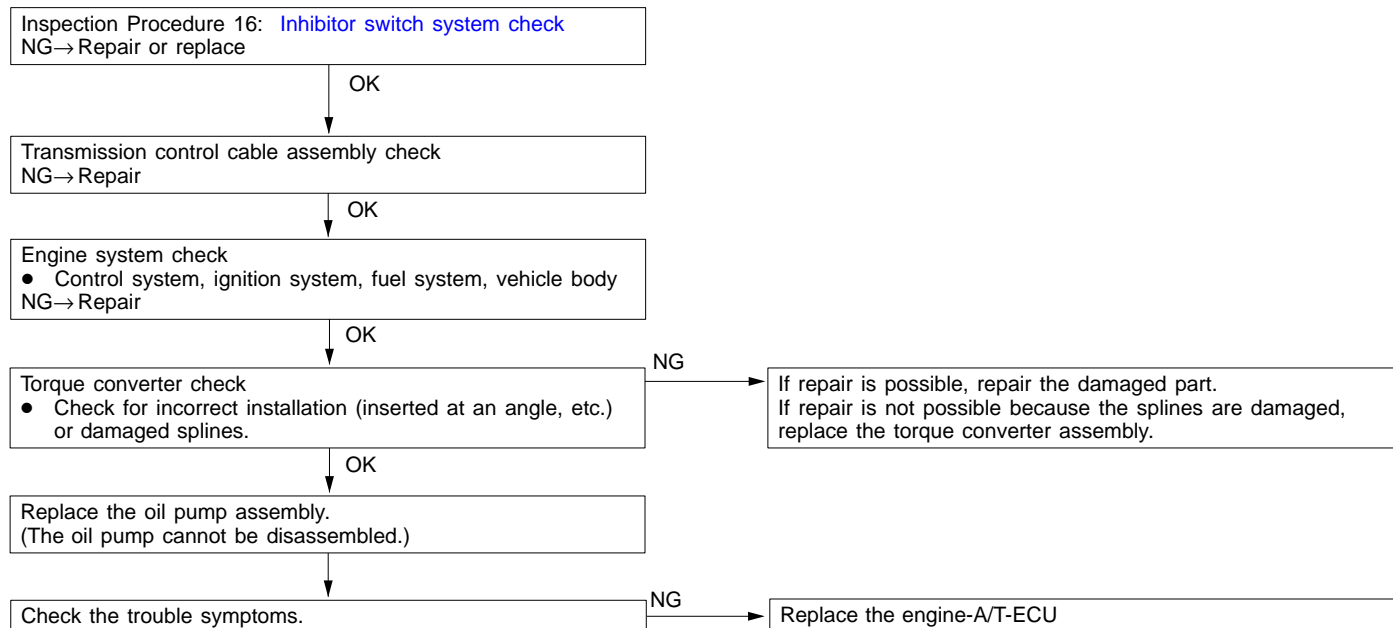
Inspection procedure 1

Communication with the MUT-II is not possible	Probable cause
Failure may occur on power supply circuit of Engine-A/T-ECU and diagnostic connector, and earth circuit.	<ul style="list-style-type: none"> • Malfunction of diagnostic line • Malfunction of harness or connector • Malfunction of MUT-II • Malfunction of engine-A/T-ECU



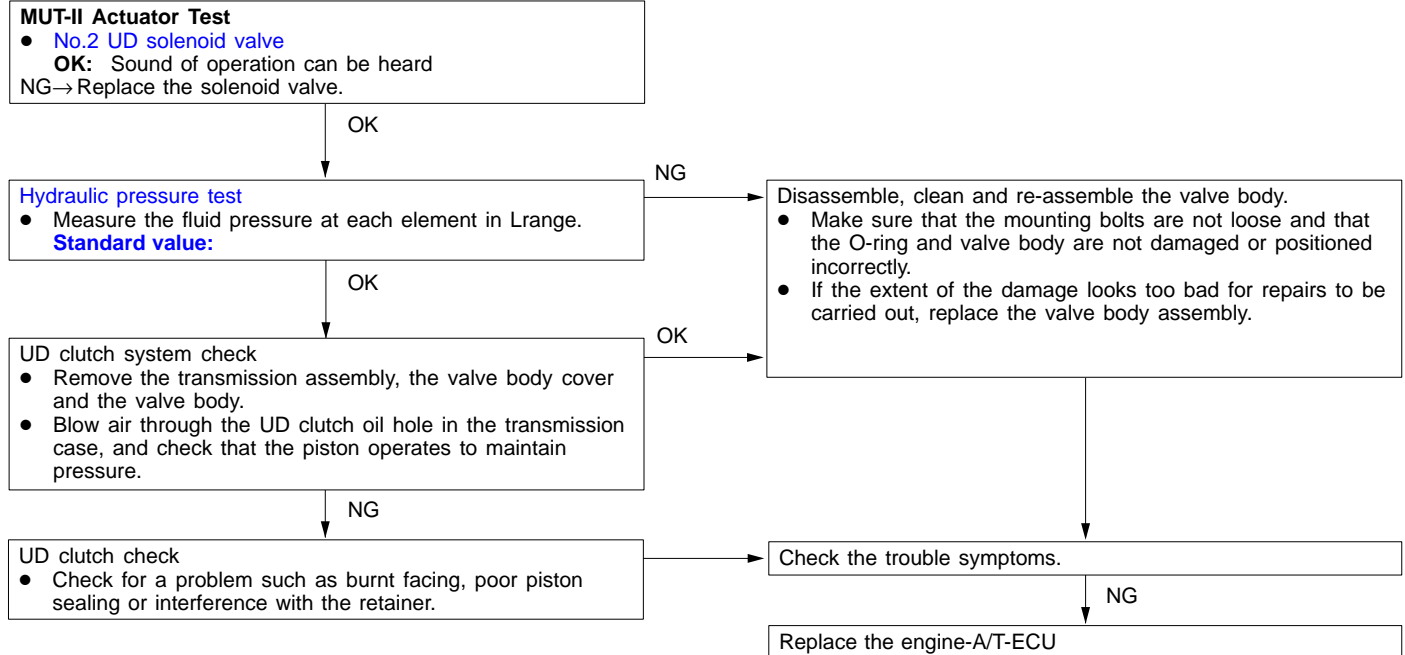
Inspection procedure 2.

Starting not possible	Probable cause
If the engine will not start when the selector lever is at the P or N position, the cause is probably a malfunction of the inhibitor switch system, the transmission control cable assembly, the engine system, the torque converter or the oil pump.	<ul style="list-style-type: none"> • Malfunction of inhibitor switch system • Malfunction of transmission control cable assembly • Malfunction of engine system • Malfunction of torque converter • Malfunction of oil pump • Malfunction of engine-A/T-ECU



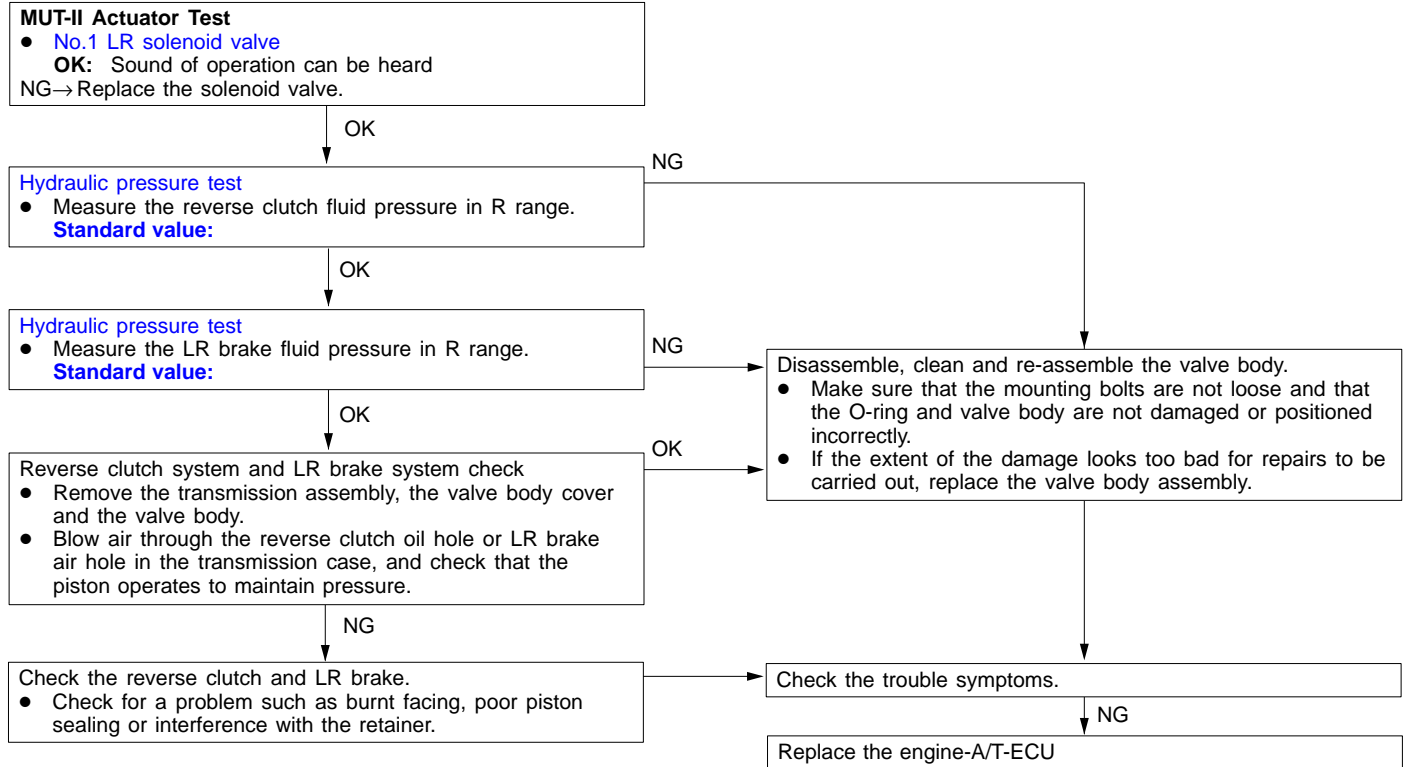
Inspection procedure 3.

Does not move forward	Probable cause
If the vehicle does not move forward when the engine is idling and the selector lever is moved from N to D, 3, 2 or L the cause is probably a problem with line pressure, or a malfunction of the UD clutch or valve body.	<ul style="list-style-type: none"> Abnormal line pressure Malfunction of UD solenoid valve Malfunction of UD clutch system Malfunction of valve body Malfunction of engine-A/T-ECU



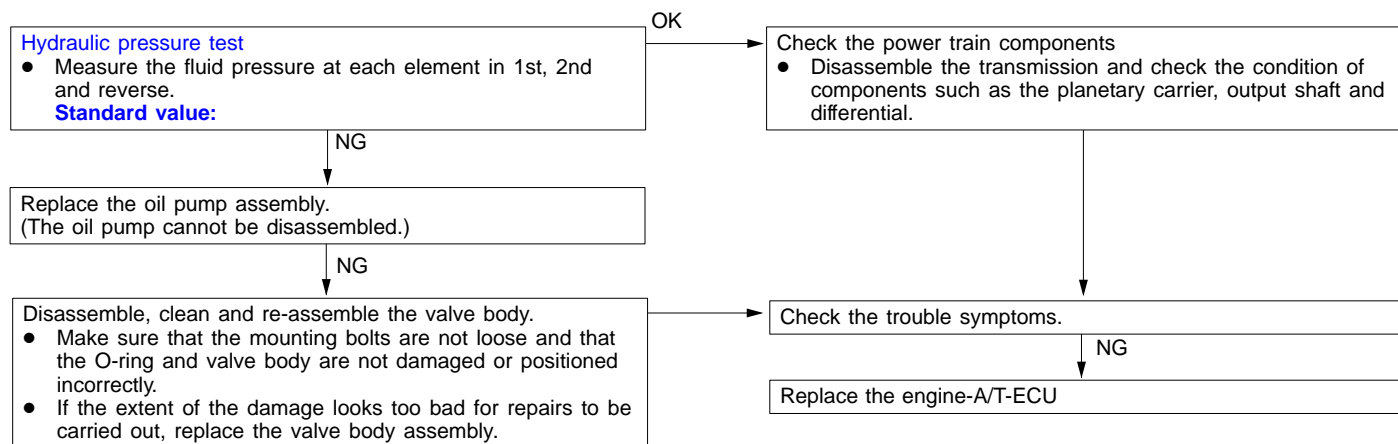
Inspection procedure 4.

Does not reverse	Probable cause
<p>If the vehicle does not reverse when the engine is idling and the selector lever is moved from N to R, the cause is probably a problem with reverse clutch pressure or LR brake pressure, or a malfunction of the reverse clutch, LD clutch or valve body.</p>	<ul style="list-style-type: none"> Abnormal reverse clutch pressure Abnormal LR brake pressure Malfunction of LR solenoid valve Malfunction of reverse clutch Malfunction of LR brake Malfunction of valve body Malfunction of engine-A/T-ECU



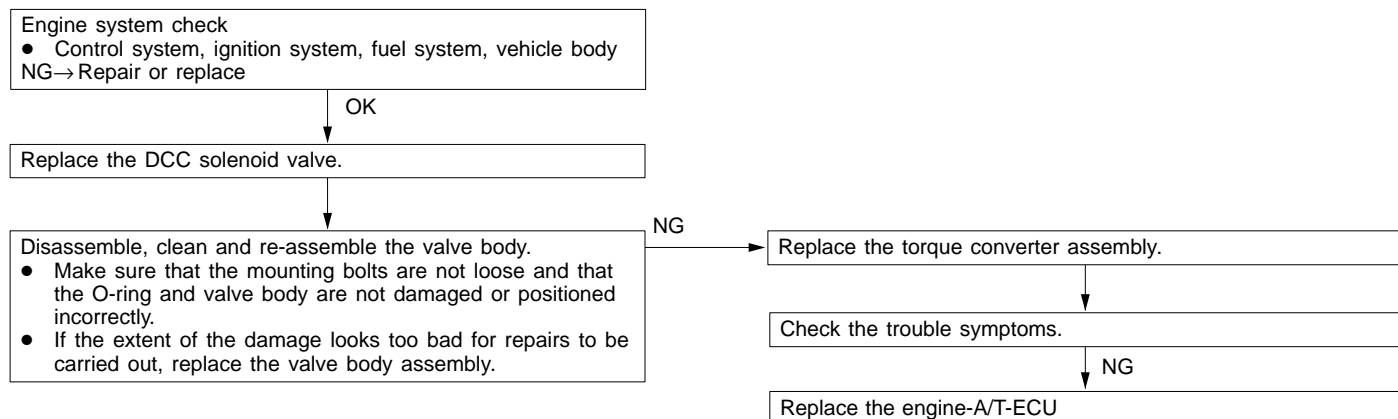
Inspection procedure 5.

Does not move (forward or reverse)	Probable cause
<p>If the vehicle does not move forward or reverse when the selector lever is moved to any position while the engine is idling, the cause is probably a problem with line pressure or a malfunction of the oil pumps and valve bodies in the power train.</p>	<ul style="list-style-type: none"> Abnormal line pressure Malfunction of power train components Malfunction of oil pump Malfunction of valve body Malfunction of engine-A/T-ECU



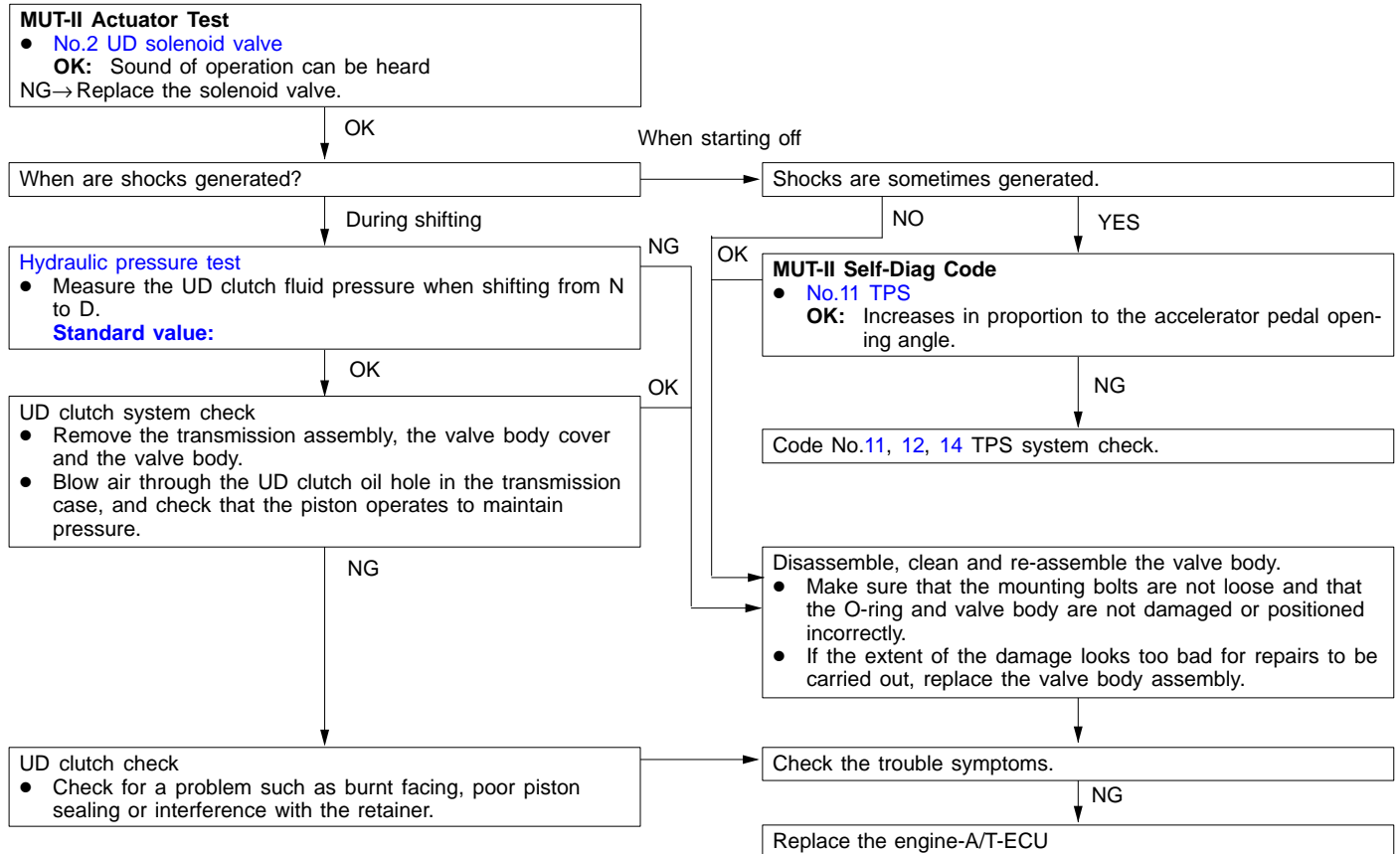
Inspection procedure 6.

Engine stalls during shifting	Probable cause
<p>If the engine stalls when the selector lever is moved from N to D or R while the engine is idling, the cause is probably a malfunction of the engine system, DCC solenoid valve, valve body, or torque converter (damper clutch).</p>	<ul style="list-style-type: none"> Malfunction of engine system Malfunction of DCC solenoid valve Malfunction of valve body Malfunction of torque converter (malfunction of damper clutch) Malfunction of engine-A/T-ECU



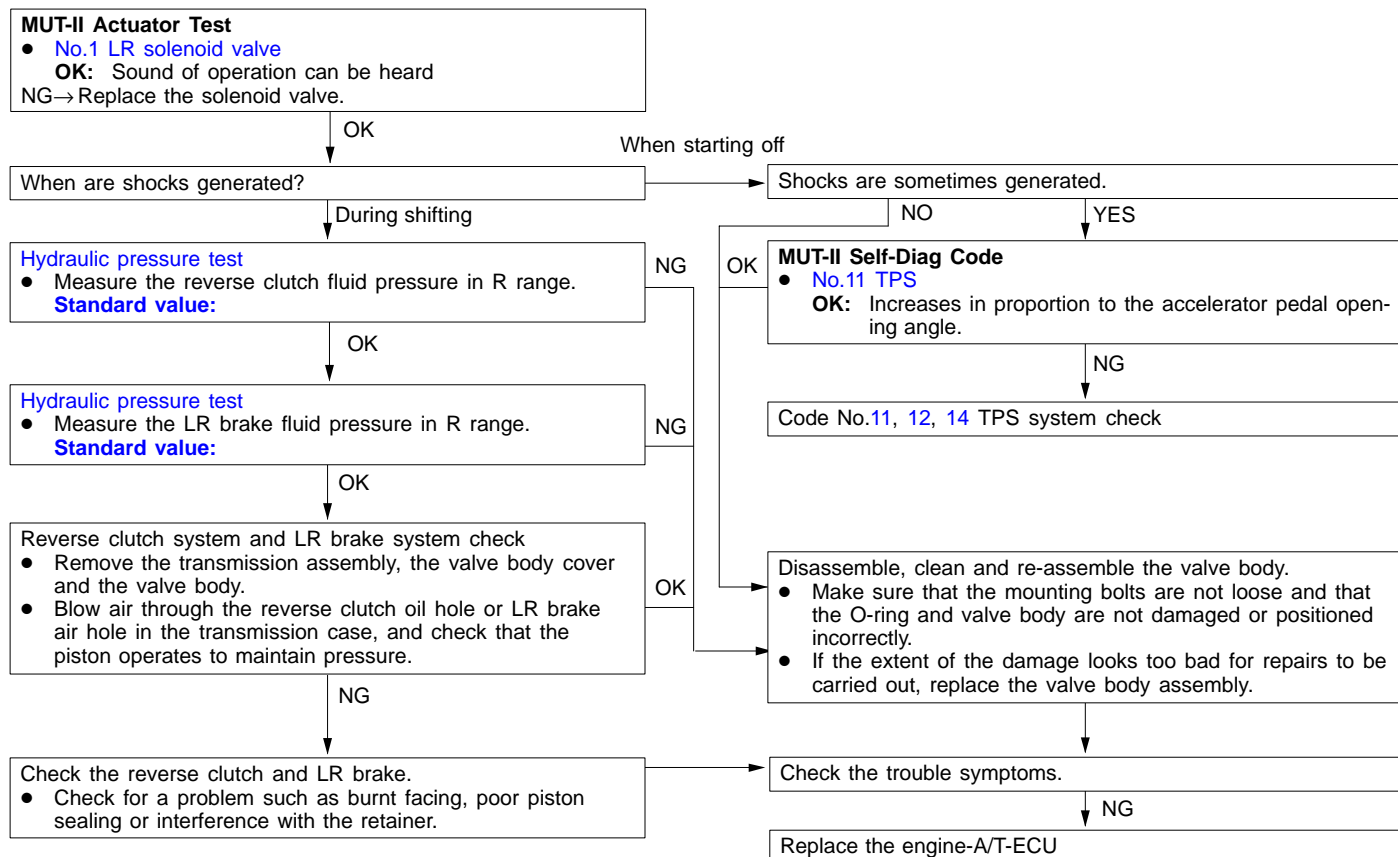
Inspection procedure 7.

N-to-D shocks, large time lag	Probable cause
If abnormal shocks or a time lag of 2 seconds or more occurs when the selector lever is moved from N to both D while the engine is idling, the cause is probably abnormal UD clutch pressure, or a malfunction of the UD clutch, valve body, or of TPS.	<ul style="list-style-type: none"> Abnormal UD clutch pressure Malfunction of UD solenoid valve Malfunction of UD clutch system Malfunction of valve body Malfunction of TPS Malfunction of engine-A/T-ECU



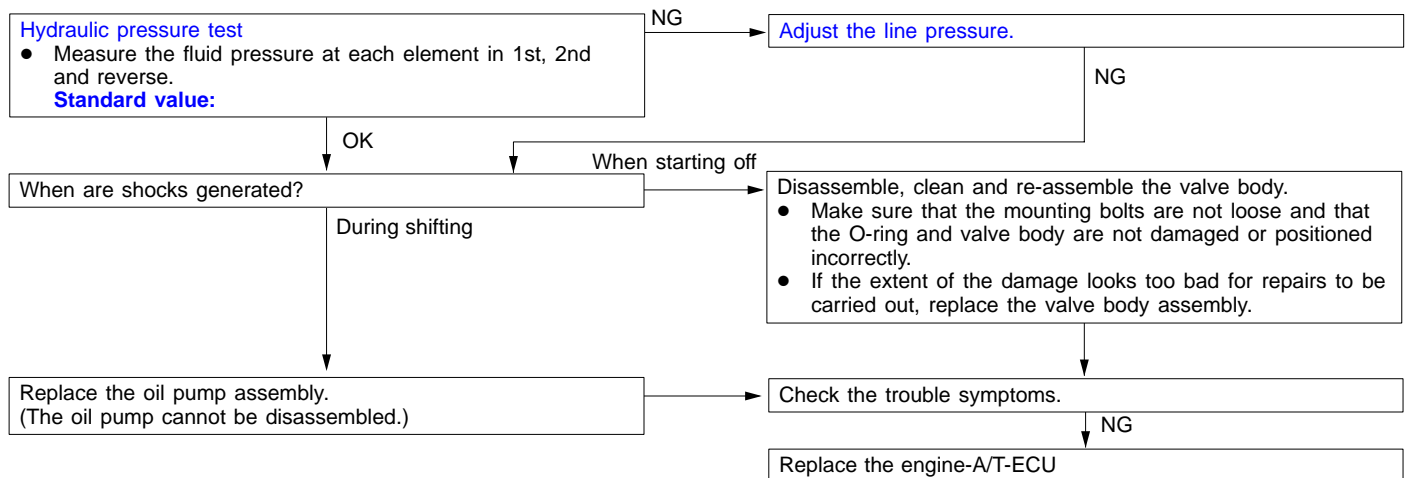
Inspection procedure 8.

N-to-R shocks, large time lag	Probable cause
<p>If abnormal shocks or a time lag of 2 seconds or more occurs when the selector lever is moved from N to R while the engine is idling, the cause is probably abnormal reverse clutch pressure or LR brake pressure, or a malfunction of the reverse clutch, LR brake, valve body or TPS.</p>	<ul style="list-style-type: none"> Abnormal reverse clutch pressure Abnormal LR brake pressure Malfunction of LR solenoid valve Malfunction of reverse clutch Malfunction of LR brake Malfunction of valve body Malfunction of TPS Malfunction of engine-A/T-ECU



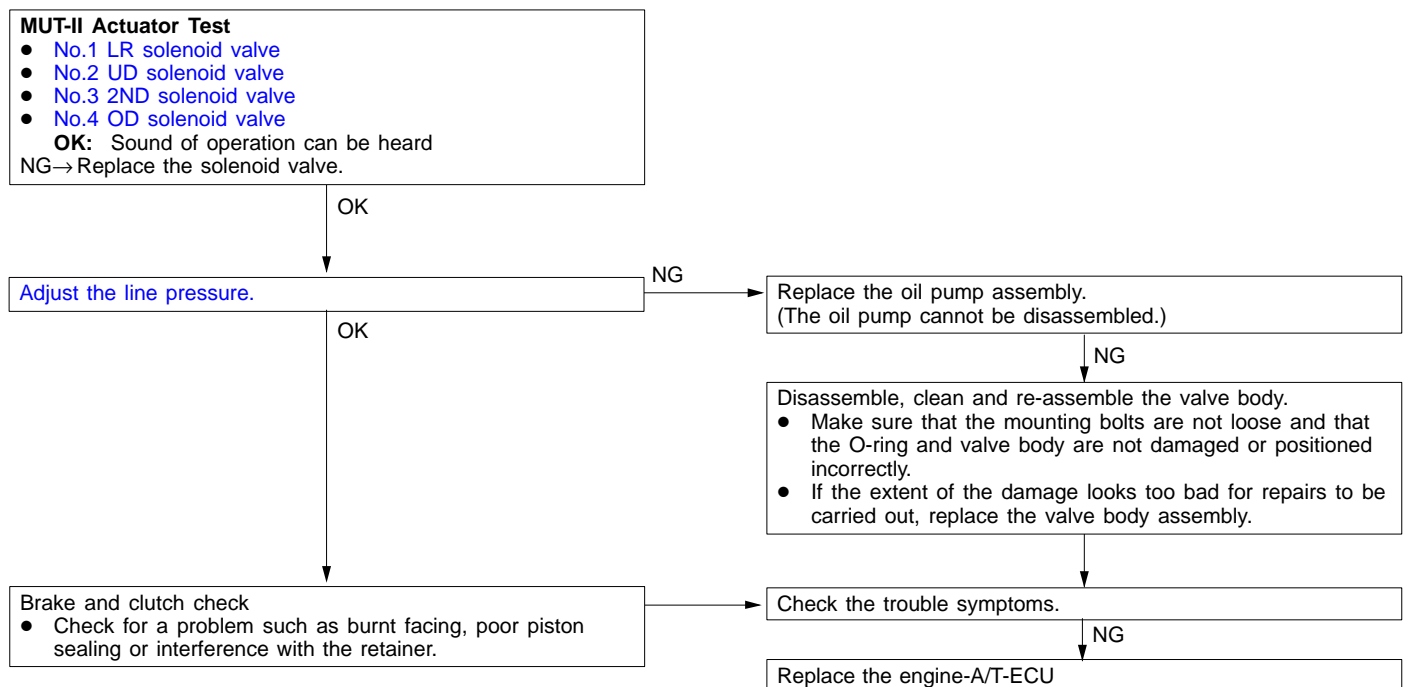
Inspection procedure 9.

N-to-D and N-to-R shocks, large time lag	Probable cause
If abnormal shocks or a time lag of 2 seconds or more occurs when the selector lever is moved from N to both D and R while the engine is idling, the cause is probably abnormal line pressure, or a malfunction of the oil pump or valve body.	<ul style="list-style-type: none"> Abnormal line pressure Malfunction of oil pump Malfunction of valve body Malfunction of engine-A/T-ECU



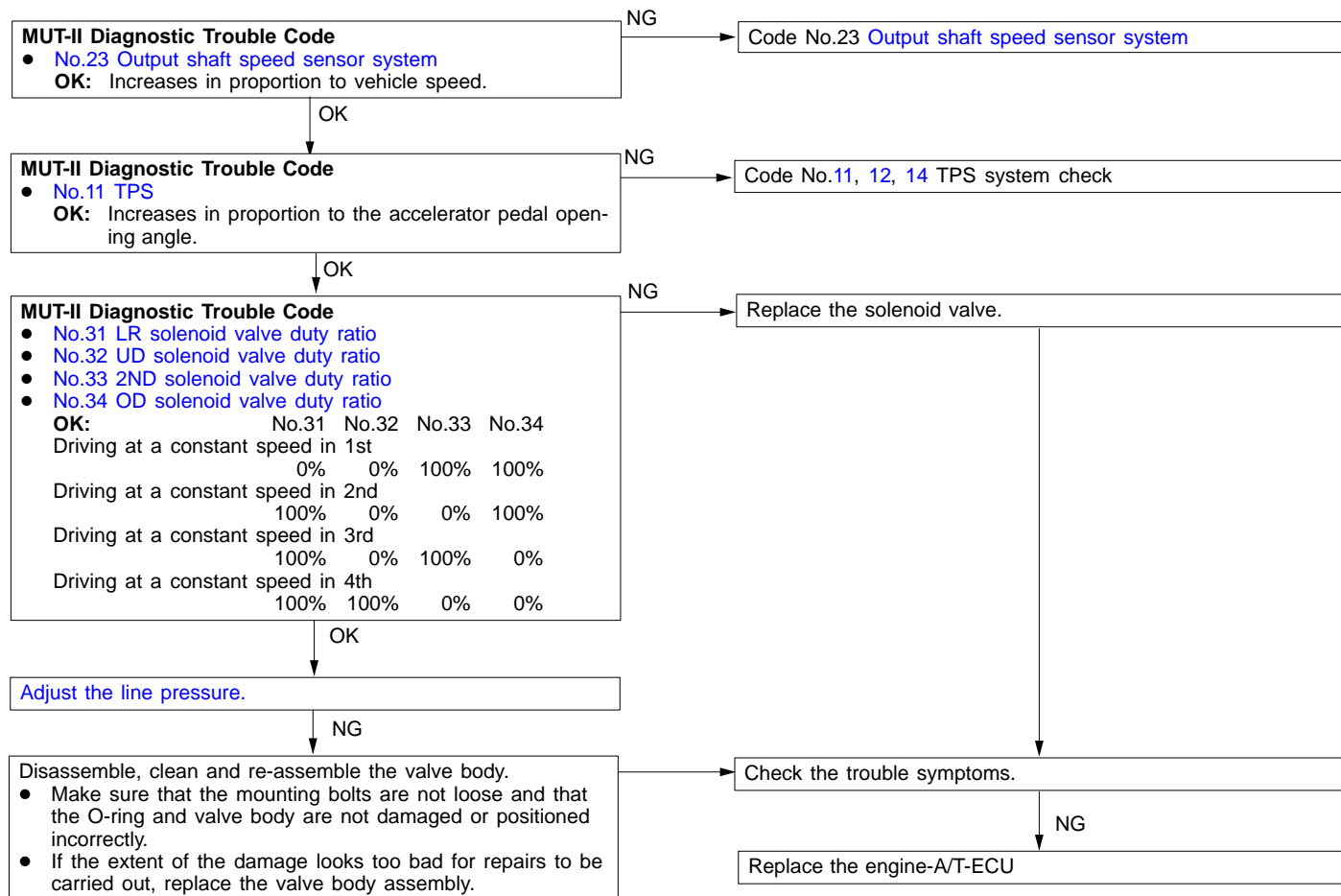
Inspection procedure 10.

Shocks, engine racing	Probable cause
If shocks occur when driving due to upshifting or downshifting, or the transmission speed becomes higher than the engine speed, the cause is probably abnormal line pressure or a malfunction of a solenoid valve, oil pump, valve body or of a brake or clutch.	<ul style="list-style-type: none"> Abnormal line pressure Malfunction of solenoid valve Malfunction of oil pump Malfunction of valve body Malfunction of brake or clutch Malfunction of engine-A/T-ECU



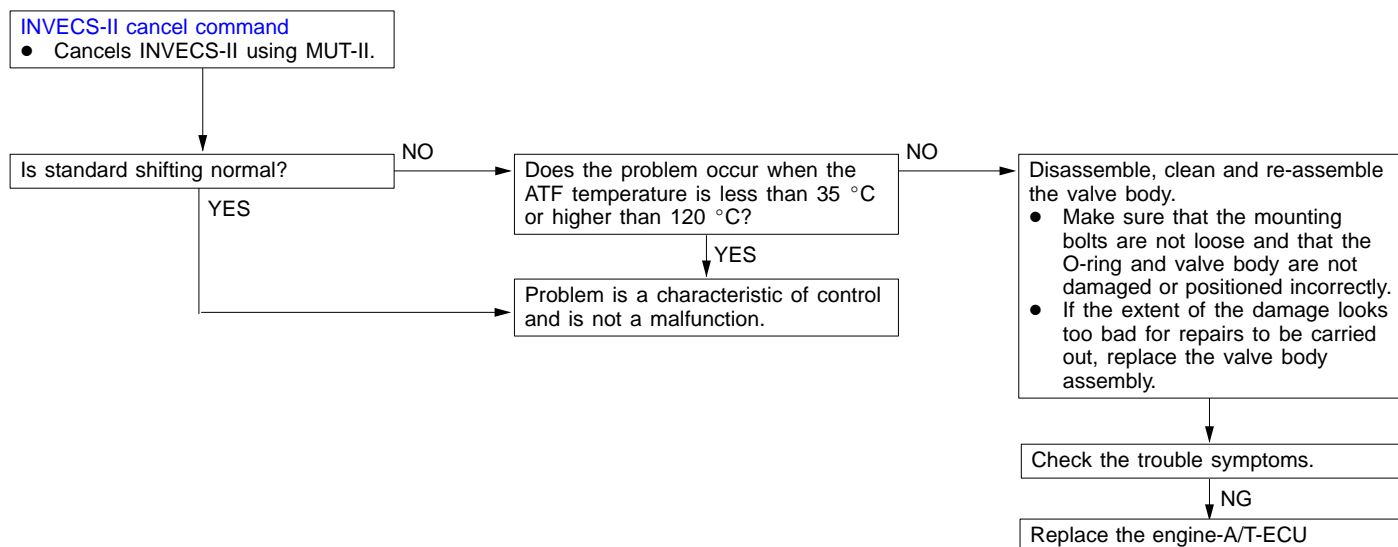
Inspection procedure 11.

All points (incorrect shift points)	Probable cause
If all shift points are incorrect during driving, the cause is probably a malfunction of the output speed sensor TPS or solenoid valve.	<ul style="list-style-type: none"> Malfunction of output shaft speed sensor Malfunction of TPS Malfunction of solenoid valve Abnormal line pressure Malfunction of valve body Malfunction of engine-A/T-ECU



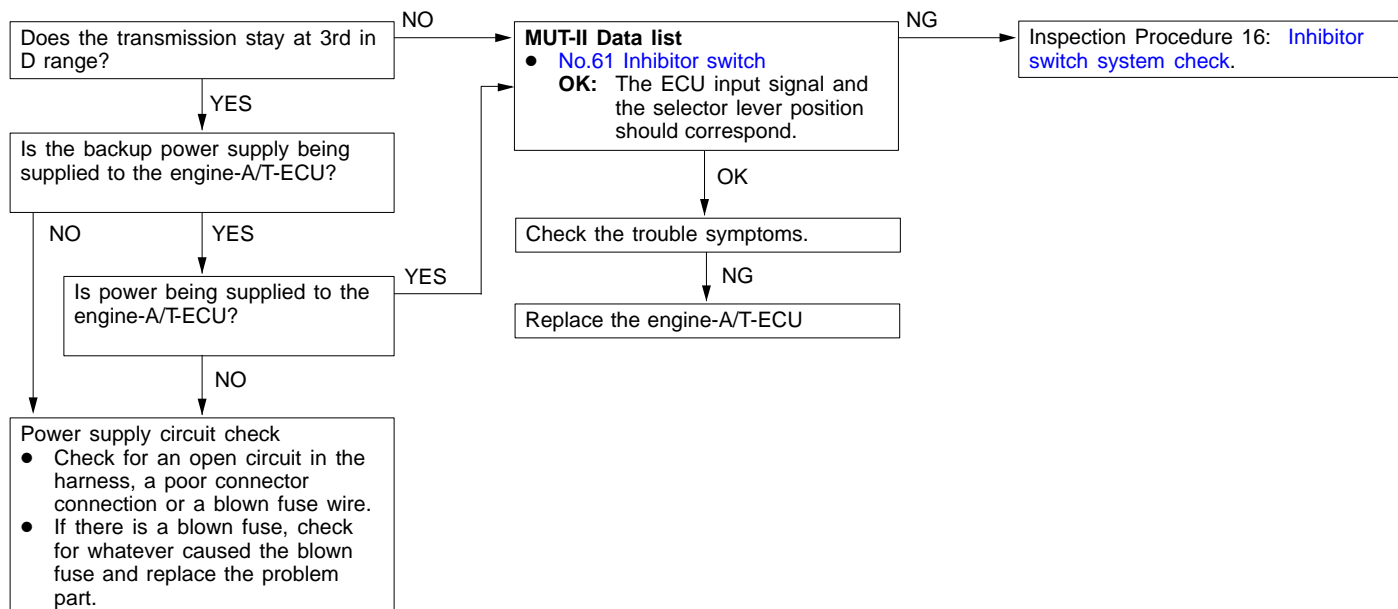
Inspection procedure 12.

Some points (incorrect shift points)	Probable cause
If some of the shift points are incorrect while driving, the cause is probably a malfunction of the valve body, or it is a characteristic of control and is not a malfunction.	<ul style="list-style-type: none"> Malfunction of valve body Malfunction of engine-A/T-ECU



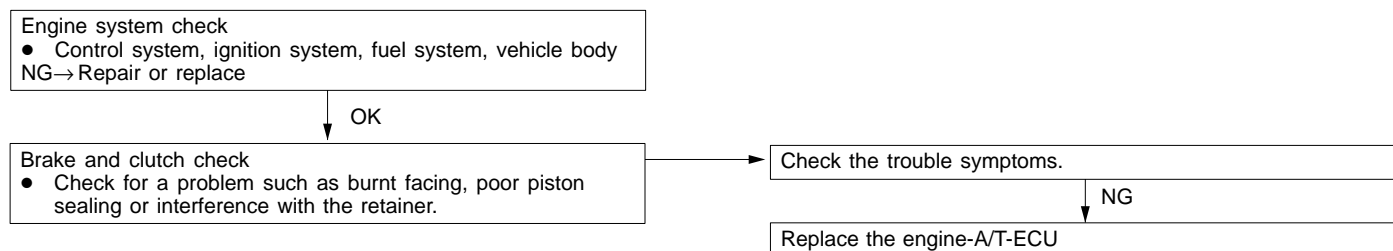
Inspection procedure 13.

No diagnosis code (no shifting)	Probable cause
No shifting during driving However, if a diagnosis code is not output, the cause is probably malfunction of the inhibitor switch system, the engine A/T-ECU.	<ul style="list-style-type: none"> Malfunction of inhibitor switch Malfunction of engine-A/T-ECU



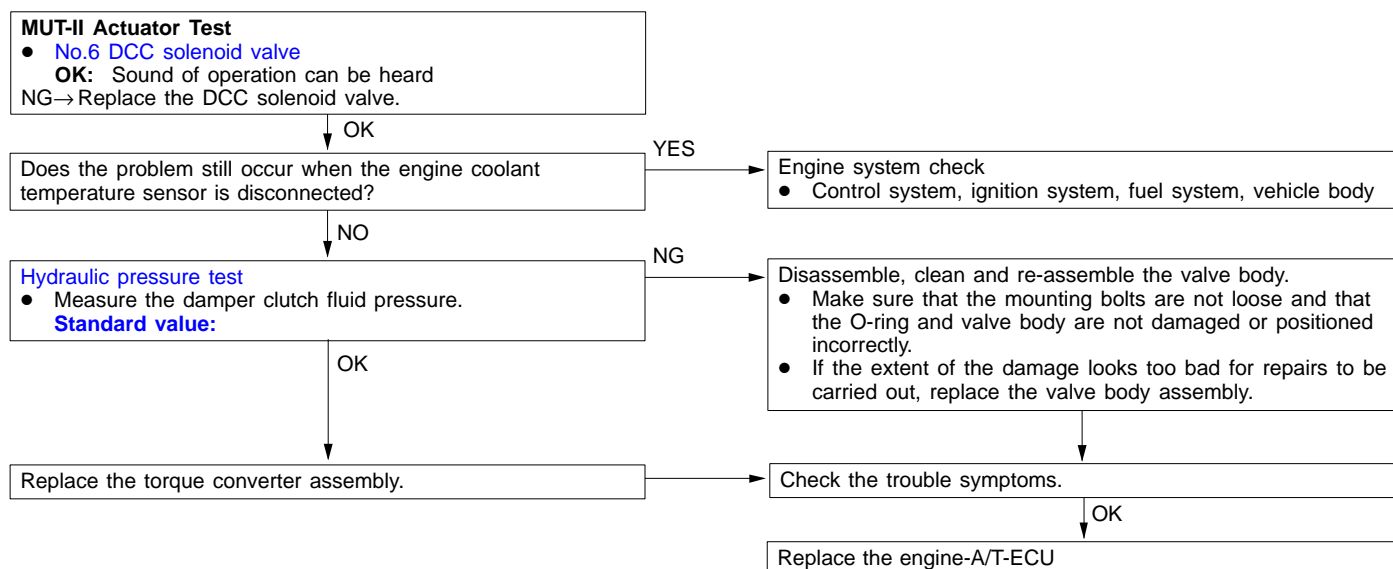
Inspection procedure 14

Poor acceleration	Probable cause
If the vehicle does not accelerate after downshifting, the cause is probably a malfunction of the engine system or of a brake or clutch.	<ul style="list-style-type: none"> Malfunction of engine system Malfunction of brake or clutch Malfunction of engine-A/T-ECU



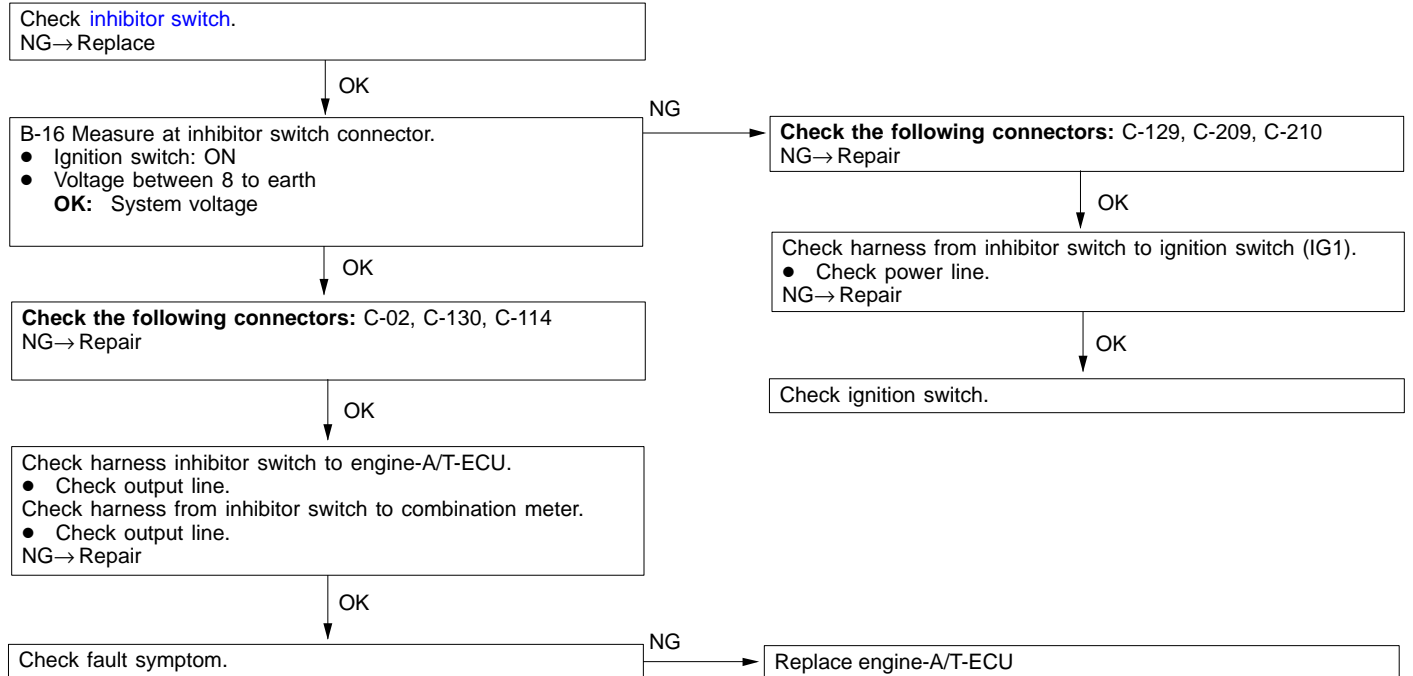
Inspection procedure 15

Vibration	Probable cause
If vibration occurs when accelerating or decelerating while driving at a constant speed or driving in top range, the cause is probably abnormal damper clutch pressure, or a malfunction of the engine system, DCC solenoid valve, torque converter or valve body.	<ul style="list-style-type: none"> Abnormal damper clutch pressure Malfunction of engine system Malfunction of DCC solenoid valve Malfunction of torque converter Malfunction of valve body Malfunction of engine-A/T-ECU



Inspection procedure 16.

Inhibitor switch system	Probable cause
Failure may occur on inhibitor switch or ignition switch circuit, etc.	<ul style="list-style-type: none"> • Malfunction of inhibitor switch system • Malfunction of ignition switch • Malfunction of harness or connector • Malfunction of engine-A/T-ECU



Inspection procedure 17.

Dual pressure switch system	Probable cause
The cause is probably a malfunction of the dual pressure switch circuit, or of the engine-A/T-ECU.	<ul style="list-style-type: none"> Malfunction of dual pressure switch Malfunction of harness or connector Malfunction of A/C system Malfunction of engine-A/T-ECU

MUT-II Data List

- No.65 Dual pressure switch
- Engine: Idle
- A/C set temperature: Inside temperature
25 °C or more : Max Cool
Less than 25 °C : Max Hot

(1) A/C switch: ON

OK: ON

(2) A/C switch: OFF

OK: OFF

OK→ Intermittent malfunction
(Refer to [Points to Note for Intermittent Malfunctions.](#))

NG

Check the following connector:

A-36

NG→ Repair

OK

Measure dual pressure switch connector A-36.

- Measure at harness side with connector separated.
- Engine: Idle
- A/C set temperature: Inside temperature
25 °C or more : Max Cool
Less than 25 °C : Max Hot
- A/C switch: ON
- Voltage between 2 to earth

OK: System voltage

NG

Measure A/C-ECU connector C-32.

- ECU terminal voltage
- Engine: Idle
- A/C set temperature: Inside temperature
25 °C or more : Max Cool
Less than 25 °C : Max Hot
- A/C switch: ON
- Voltage between 4 to earth

OK: System voltage

OK

Check the following connectors:

C-26, C-111

NG→ Repair

OK

Check harness from dual pressure switch to A/C-ECU.

- Check for open circuit on power line.

NG→ Repair

OK→ Check A/C-ECU.

(Refer to [On-vehicle Service.](#))

NG

Check the following connectors:

C-26, C-111

NG→ Repair

OK

Check harness from dual pressure switch to A/C-ECU.

- Check for ground on power line.

NG→ Repair

OK

MUT-II Data List

- No.65 Dual pressure switch
- Engine: Idle
- A/C set temperature: Inside temperature
25 °C or more : Max Cool
Less than 25 °C : Max Hot

(1) A/C switch: ON

OK: ON

(2) A/C switch: OFF

OK: OFF

NG→ Check A/C system. (Refer to [Troubleshooting.](#))

OK→ Intermittent malfunction (Refer to [Points to Note for Intermittent Malfunctions.](#))

[To the next page](#)

From the previous page

OK

Measure at C-117 connector of engine-A/T-ECU.

- ECU terminal voltage
- Engine: Idle
- A/C set temperature: Inside temperature:
25 °C or more : Max Cool
Less than 25 °C : Max Hot
- A/C switch: ON
- Voltage between 83 to earth
- (1) A/C switch: ON
OK: System voltage
- (1) A/C switch: ON
OK: 0.5 V or less

NG

Check the following connectors: C-111, C-128, C-117
NG→ Repair

OK

Check harness dual pressure switch to engine-A/T-ECU

- Check for ground on output line.
- NG→ Repair
OK→ Check dual pressure switch.
(Refer to [On-vehicle Service](#))

OK

Check the following connectors: C-117

NG→ Repair

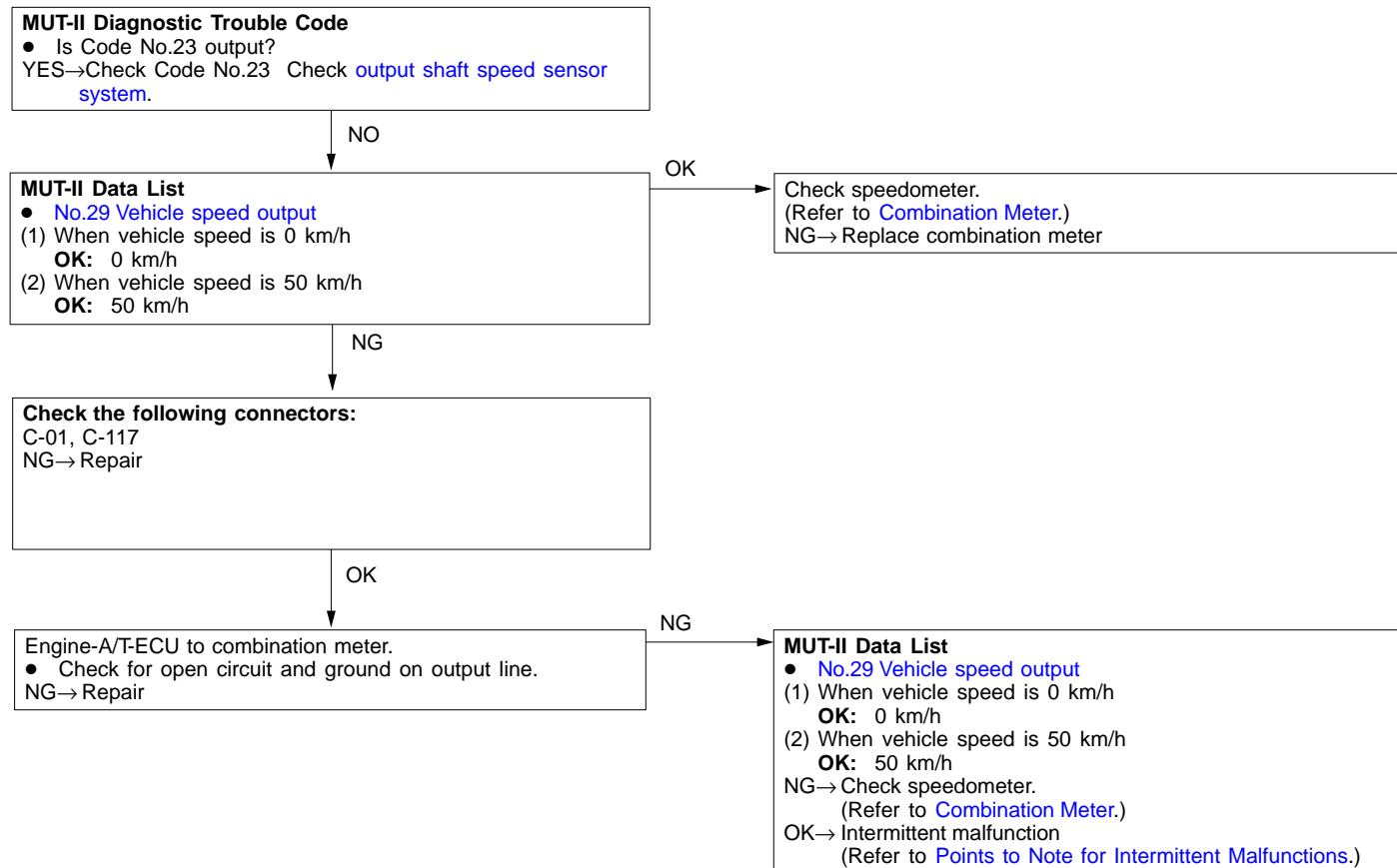
OK

MUT-II Service Data

- [No.65 Dual pressure switch](#)
- Engine: Idle
- A/C set temperature: Inside temperature
25 °C or more : Max Cool
Less than 25 °C : Max Hot
- (1) A/C switch: ON
OK: ON
- (2) A/C switch: OFF
OK: OFF
- NG→ Check A/C system
(Refer to [Troubleshooting](#))
- OK→ Intermittent malfunction
(Refer to [Points to Note for Intermittent Malfunctions.](#))

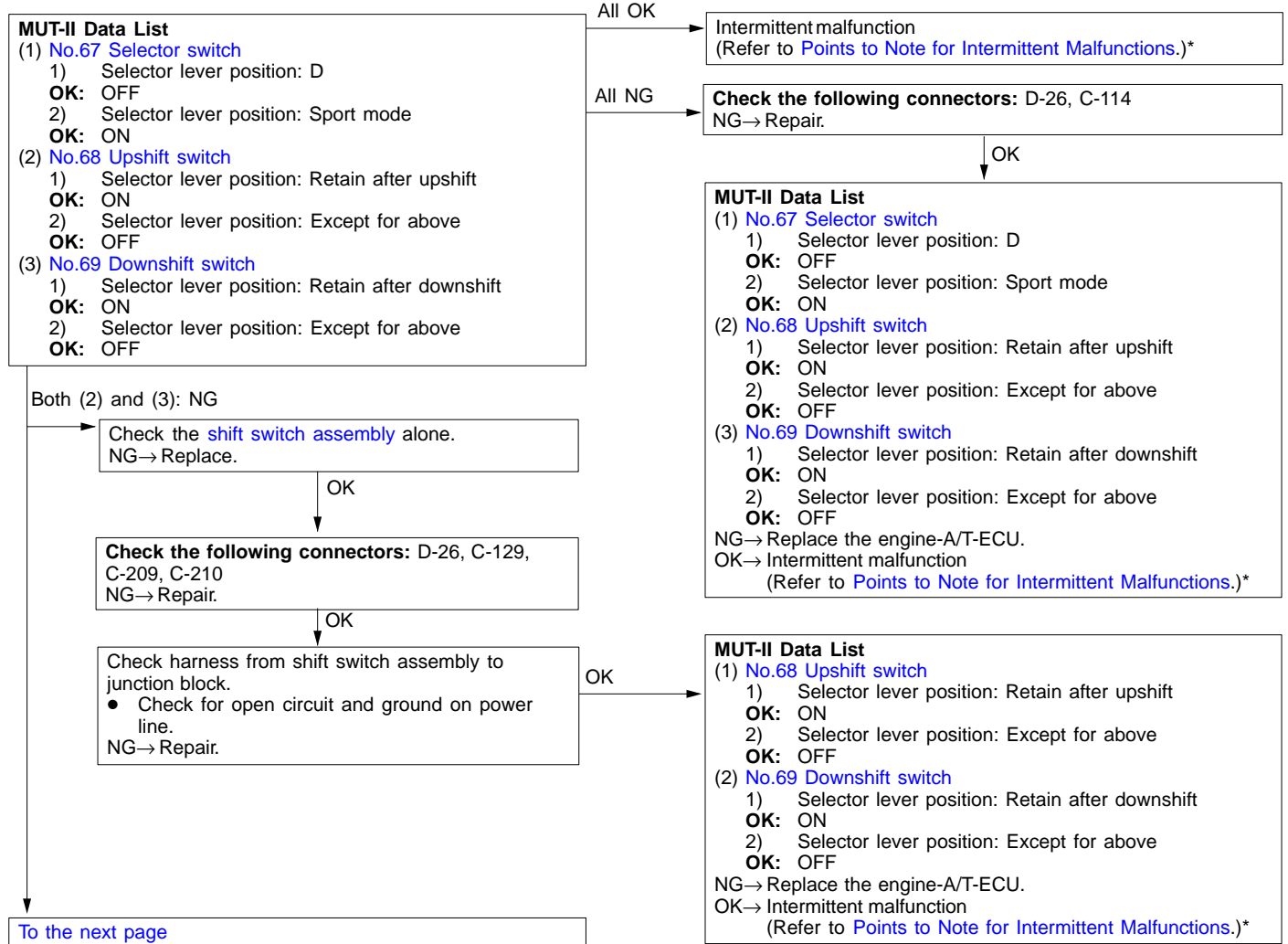
Inspection procedure 18.

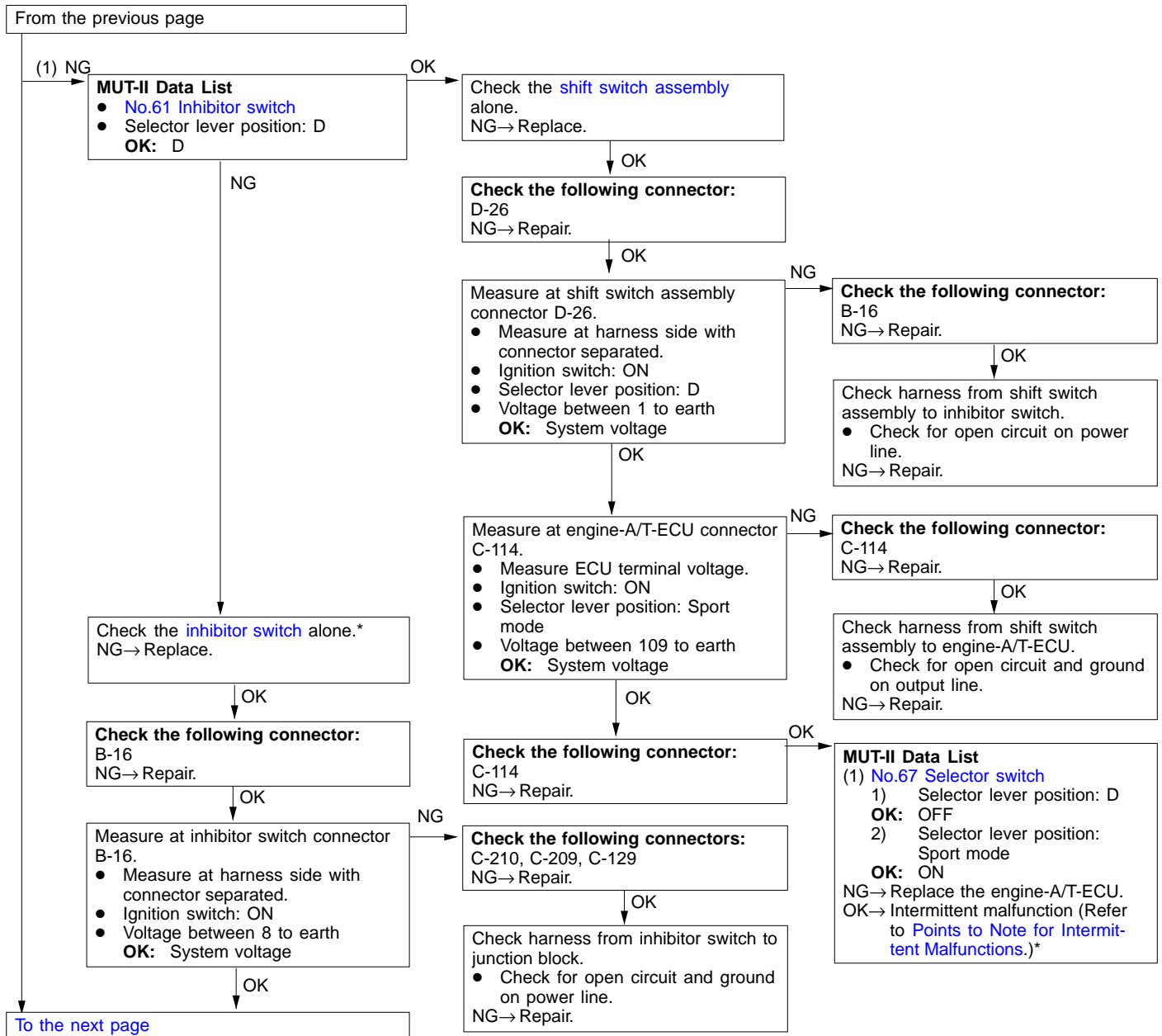
Vehicle speed output system	Probable cause
Failure may occur on vehicle speed output circuit, and engine-A/T-ECU.	<ul style="list-style-type: none"> • Malfunction of output shaft speed sensor • Malfunction of speedometer • Malfunction of harness or connector • Malfunction of engine-A/T-ECU

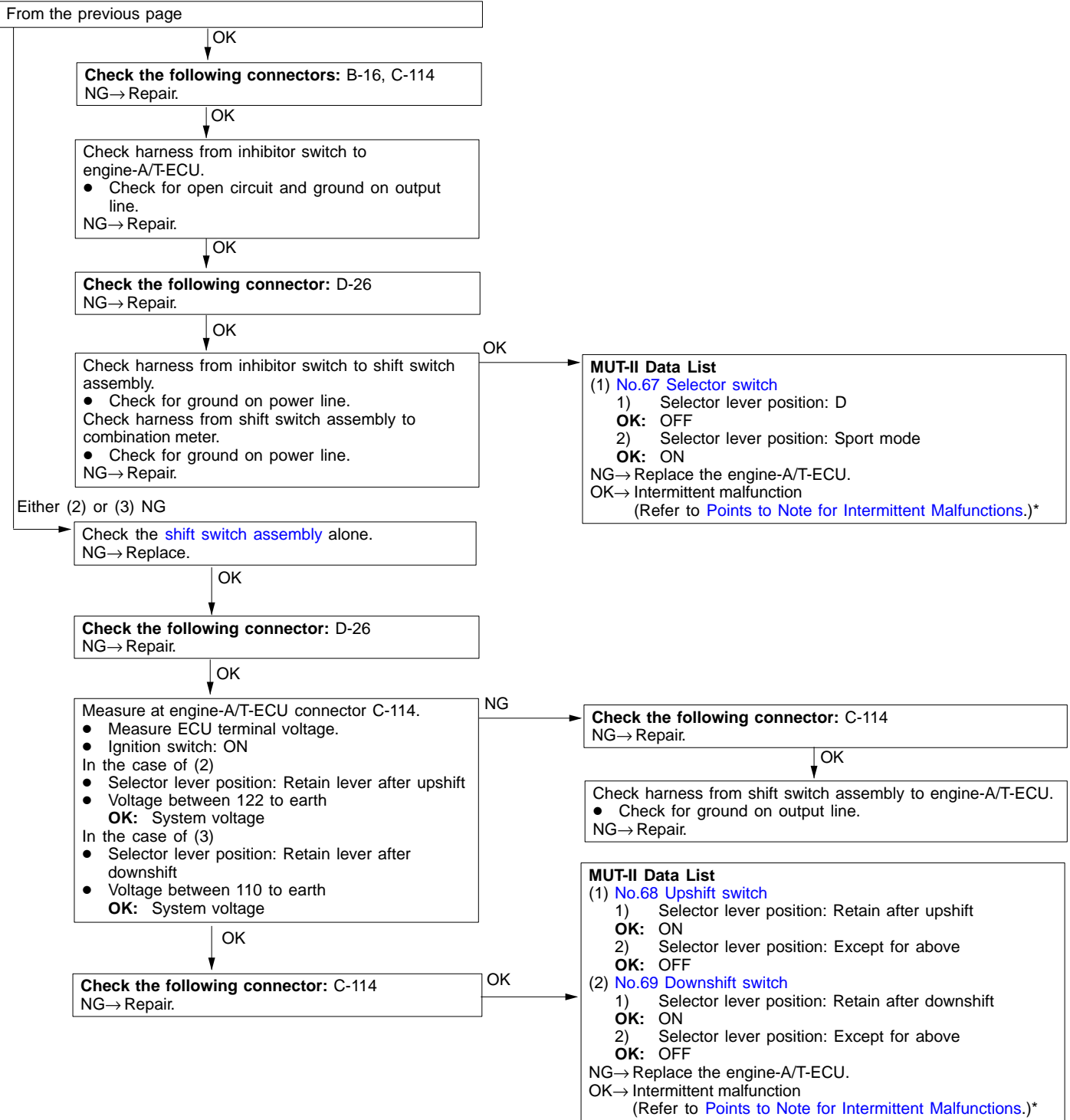


Inspection procedure 19.

Shift switch assembly system <Vehicles with sport mode>	Probable cause
Failure may occur in shift switch assembly or engine-A/T-ECU, etc.	<ul style="list-style-type: none"> • Malfunction of shift switch assembly • Malfunction of inhibitor switch system • Malfunction of harness or connector • Malfunction of engine-A/T-ECU







Inspection procedure 20

Shift indicator display error <Vehicles with sport mode>	Probable cause
Failure may occur on engine-A/T-ECU and combination meter, or signal output circuit.	<ul style="list-style-type: none"> • Malfunction of shift switch assembly • Malfunction of engine-A/T-ECU • Malfunction of combination meter • Malfunction of harness or connector

MUT-II Data List

(1) No.67 Selector switch

- No.68 Upshift switch
- No.69 Downshift switch

OK: Refer to Data List Reference Table.

NG→check the shift switch assembly

OK

Measure at engine-A/T-ECU connector C-114.

- Voltage at which shift position is displayed with MUT-II actuator function

OK: Voltage in the table below:

Measuring terminal		117 – earth	118 – earth	105 – earth
Shift indicator	1	Approx. 9V	0 V	0 V
	6	0 V	Approx. 9V	Approx. 9V

NG

Check the following connector: C-114

NG→ Repair.

OK

Replace the engine-A/T-ECU.

OK

Measure at combination meter C-02.

- Remove combination meter, and measure at connector.
- Voltage at which shift position is displayed with MUT-II actuator function

OK: Voltage in the table below:

Measuring terminal		43 – earth	39 – earth	41 – earth
Shift indicator	1	Approx. 9V	0 V	0 V
	6	0 V	Approx. 9V	Approx. 9V

OK

Check the following connector: C-02

NG→ Repair.

OK

Replace the combination meter.

NG

Check harness engine-A/T-ECU to combination meter.

- Check output lines (3 lines).

NG→ Repair.

DATA LIST REFERENCE TABLE

The road test below has been established for vehicles with standard selector lever.

Data list No.	Check item	Inspection conditions		Normal condition				
11	Throttle position sensor (TPS)	Ignition switch: ON Engine: Stopped Selector lever position: P	Accelerator pedal: Fully closed	335 – 935 mV				
			Accelerator pedal: Depressed	Gradually increases from the above value.				
			Accelerator pedal: Fully open	4,400 – 5,300 mV				
15	A/T fluid temperature sensor	Driving after engine has warmed up	Drive for 15 minutes or more until the ATF temperature reaches 70 – 80°C.	Gradually increases to 70 – 80°C.				
21	Crank angle sensor <MPI>	Engine: Idling Selector lever position: P	Compare the engine speeds displayed on the tachometer and the MUT-II.	Identical				
22	Input shaft speed sensor	Shift range: 3rd	Driving at a constant speed of 50 km/h in 3rd	1,800 – 2,100 r/min				
23	Output shaft speed sensor	Shift range: 3rd	Driving at a constant speed of 50 km/h in 3rd	1,800 – 2,100 r/min				
26	Stop lamp switch	Ignition switch: ON Engine: Stopped	Brake pedal: Depressed	ON				
			Brake pedal: Released	OFF				
29	Vehicle speed output	Selector lever position: 3 range	Idling in 1st (Vehicle stopped)	0 km/h				
			Driving at a constant speed of 50 km/h in 3rd	50 km/h				
31	LR solenoid valve duty ratio	Selector lever position: L, 2, 3, D range	Data List No.	No. 31	No. 32	No. 33	No. 34	
32	UD solenoid valve duty ratio		Driving at a constant speed in 1st	0%	0%	100%	100%	
33	2nd solenoid valve duty ratio		Driving at a constant speed in 2nd	100%	0%	0%	100%	
34	OD solenoid valve duty ratio		Driving at a constant speed in 3rd	100%	0%	100%	0%	
			Driving at a constant speed in 4th	100%	100%	0%	0%	
36	DCC solenoid valve duty ratio	Shift range: 2nd	Driving at 30 km/h in 2 range, then fully close accelerator.	70% – 90% to 0%				
			Driving at 50 km/h in 3rd	70% – 90%				
52	Damper clutch slip amount	Shift range: 2nd	Driving at 30 km/h in 2 range, then fully close accelerator.	–300 – –100 r/min or 100 – 300 r/min				
			Driving at a constant speed of 50 km/h in 3rd	–10 – 10 r/min				
54	Control relay output voltage	Ignition switch: OFF	Ignition switch: ON	System voltage (V)				

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Data list No.	Check item	Inspection conditions		Normal condition
61	Inhibitor switch	Ignition switch: ON Engine: Stopped	Selector lever position: P	P
			Selector lever position: R	R
			Selector lever position: N	N
			Selector lever position: D	D
			Selector lever position: 3	3
			Selector lever position: 2	2
			Selector lever position: L	L
65	Dual pressure switch	Engine: Idling	A/C switch: ON	ON
			A/C switch: OFF	OFF

The road test below has been established for vehicles with sport selector lever.

Data list No.	Check item	Inspection conditions		Normal condition			
11	Throttle position sensor (TPS)	Ignition switch: ON Engine: Stopped Selector lever position: P	Accelerator pedal: Fully closed	335 – 935 mV			
			Accelerator pedal: Depressed	Gradually increases from the above value.			
			Accelerator pedal: Fully open	4,400 – 5,300 mV			
15	A/T fluid temperature sensor	Driving after engine has warmed up	Drive for 15 minutes or more until the ATF temperature reaches 70 – 80°C.	Gradually increases to 70 – 80°C.			
21	Crank angle sensor <MPI> Ignition coil <CARBURETTOR>	Engine: Idling Selector lever position: P	Compare the engine speeds displayed on the tachometer and the MUT-II.	Identical			
22	Input shaft speed sensor	Shift range: 3rd	Driving at a constant speed of 50 km/h in 3rd	1,800 – 2,100 r/min			
23	Output shaft speed sensor	Shift range: 3rd	Driving at a constant speed of 50 km/h in 3rd	1,800 – 2,100 r/min			
26	Stop lamp switch	Ignition switch: ON Engine: Stopped	Brake pedal: Depressed	ON			
			Brake pedal: Released	OFF			
29	Vehicle speed output	Selector lever position: 3 range	Idling in 1st (Vehicle stopped)	0 km/h			
			Driving at a constant speed of 50 km/h in 3rd	50 km/h			
31	LR solenoid valve duty ratio	Selector lever position: L, 2, 3, D range	Data List No.	No. 31	No. 32	No. 33	No. 34
32	UD solenoid valve duty ratio		Driving at a constant speed in 1st	0%	0%	100%	100%
33	2nd solenoid valve duty ratio		Driving at a constant speed in 2nd	100%	0%	0%	100%
34	OD solenoid valve duty ratio		Driving at a constant speed in 3rd	100%	0%	100%	0%
			Driving at a constant speed in 4th	100%	100%	0%	0%

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Data list No.	Check item	Inspection conditions		Normal condition		
36	DCC solenoid valve duty ratio	Shift range: 2nd	Driving at 30 km/h in 2 range, then fully close accelerator.	70% – 90% to 0%		
			Driving at 50 km/h in 3rd	70% – 90%		
52	Damper clutch slip amount	Shift range: 2nd	Driving at 30 km/h in 2 range, then fully close accelerator.	–300 – –100 r/min or 100 – 300 r/min		
			Driving at a constant speed of 50 km/h in 3rd	–10 – 10 r/min		
54	Control relay output voltage	Ignition switch: OFF	Ignition switch: ON	System voltage (V)		
61	Inhibitor switch	Ignition switch: ON Engine: Stopped	Selector lever position: P	P		
			Selector lever position: R	R		
			Selector lever position: N	N		
			Selector lever position: D	D		
65	Dual pressure switch	Engine: Idling	A/C switch: ON	ON		
			A/C switch: OFF	OFF		
67	Select switch	Ignition switch: ON Engine: Stopped	Data list No.	No. 67	No. 68	No. 69
			Selector lever position: D	Off	Off	Off
68	Upshift switch		Selector lever operation: Select sport mode	On	Off	Off
			Selector lever operation: Upshift and hold the selector lever	On	On	Off
69	Downshift switch		Selector lever operation: Downshift and hold the selector lever	On	Off	On

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ACTUATOR TEST JUDGMENT VALUE

Item No.	Check item	Test contents	Inspection conditions	Normal condition
1	LR solenoid valve	The solenoid valve specified by the MUT-II is driven at 50% duty for 5 seconds. No other solenoid valves are energised.	Ignition switch: ON Selector lever position: P Engine: Stopped Throttle (accelerator) Opening angle voltage: Less than 1 V The fail-safe function should not be operating.	The sound of operation should be heard when the solenoid valve is driven.
2	UD solenoid valve			
3	2nd solenoid valve			
4	OD solenoid valve			
6	DCC solenoid valve			
7	Shift indicator 1st gear(vehicles with sport mode only)	Illuminate shift indicator indicated by MUT-II for 3 seconds	Ignition switch: ON Selector lever position: P Engine: Stopped Accelerator pedal: released	Shift indicator is displayed.
8	Shift indicator 2nd gear(vehicles with sport mode only)			
9	Shift indicator 3rd gear(vehicles with sport mode only)			
10	Shift indicator 4th gear(vehicles with sport mode only)			
12	A/T control relay	The A/T control relay turns off for 3 seconds.	Ignition switch: ON Selector lever position: P Engine: Stopped Throttle (accelerator) Opening angle voltage: Less than 1 V The fail-safe function should not be operating.	Data List No. 54 (1) During test: 0 V (2) Normal: System voltage (V)

INVECS-II CANCEL COMMAND

Item No.	Item	Contents	NOTE
14	INVECS-II	Stops the INVECS-II control and changes gear according to the standard shift pattern.	Use this procedure when carrying out road test procedure 7. This function cancels the stopping of INVECS-II control when the ignition switch is turned OFF and then back ON.

CHECK AT A/T-ECU TERMINALS

1	2	3	4		5	6	7	8	41	42	43		44	45	46	71	72	73	74		75	76	77	101	102	103	104		105	106	107																									
9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	90	91	92	93	94	95	96	97	98	108	109	110	111	112	113	114	115	116	117	118	119	120
24	25	26	27	28	29	30	31	32	33	34	35	58	59	60	61	62	63	64	65	66	90	91	92	93	94	95	96	97	98	121	122	123	124	125	126	127	128	129	130																	

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Ter- minal No.	Check item	Inspection conditions	Standard value
50	A/T control relay	Ignition switch: OFF	0 V
		Ignition switch: ON	System voltage
76	Earth	At all times	0 V
77	Solenoid valve power supply	Ignition switch: OFF	0 V
		Ignition switch: ON	System voltage
80	Vehicles speed output	When stopped	0 V
		Move forward slowly	0 → 5 V flashing
81	Sensor earth	At all times	0 V
88	Earth	At all times	0 V
89	Solenoid valve power supply	Ignition switch: OFF	0 V
		Ignition switch: ON	System voltage
97	Earth	At all times	0 V
101	Inhibitor switch P	Ignition switch: ON Selector lever position: P	System voltage
		Ignition switch: ON Selector lever position: Other than the above	0 V
102	Inhibitor switch D	Ignition switch: ON Selector lever: D	System voltage
		Ignition switch: ON Selector lever position: Other than the above	0 V
103	Input shaft speed sensor	Measure between terminals 57 and 103 using an oscilloscope. Engine: 2,000 r/min Gear range: 3rd	Refer to Oscilloscope inspection procedure.
104	Output shaft speed sensor	Measure between terminals 57 and 104 using an oscilloscope. Engine: 2,000 r/min Gear range: 3rd	Refer to Oscilloscope inspection procedure.
106	2nd solenoid valve	Engine: Idling Gear range: 2nd	System voltage
		Engine: Idling Selector lever position: P	7 – 9 V
107	DCC solenoid valve	Engine: Idling Gear range: 1st	System voltage
108	Inhibitor switch R	Engine: Idling Selector lever position: R	System voltage
		Engine: Idling Gear range: Other than the above	0 V

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Ter- minal No.	Check item	Inspection conditions	Standard value
109	Inhibitor switch 3	Ignition switch: ON Selector lever operation: 3	System voltage
		Ignition switch: ON Selector lever operation: Other than the above	0 V
110	Inhibitor switch L	Ignition switch: ON Selector lever operation: L	System voltage
		Ignition switch: ON Selector lever operation: Other than the above	0 V
120	UD solenoid valve	Engine: Idling Gear range: 1st	System voltage
		Engine: Idling Gear range: Park	7 – 9 V
121	Inhibitor switch N	Ignition switch: ON Selector lever position: N	System voltage
		Ignition switch: ON Selector lever position: Other than the above	0 V
122	Inhibitor switch 2	Ignition switch: ON Selector lever operation: 2	System voltage
		Ignition switch: ON Selector lever operation: Other than the above	0 V
123	Stop lamp switch	Ignition switch: ON Brake pedal: Depressed	System voltage
		Ignition switch: ON Brake pedal: Released	0 V
124	A/T fluid temperature sensor	ATF temperature: 20°C	3.8 – 4.0 V
		ATF temperature: 40°C	3.2 – 3.4 V
		ATF temperature: 80°C	1.7 – 1.9 V
129	LR solenoid valve	Engine: Idling Selector lever position: P	System voltage
		Engine: Idling Gear range: 2nd	7 – 9 V
130	OD solenoid valve	Engine: Idling Gear range: 3rd	System voltage
		Engine: Idling Selector lever position: P	7 – 9 V

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The following terminal numbers have been established only for vehicles with sport mode.

Terminal No.	Check item	Inspection conditions	Standard value
105	Shift indicator C	Refer to table below	0 V
109	Select switch	Selector lever position: sport mode	System voltage
		Selector lever position: Except for above	0 V
110	Downshift switch	Selector lever position: Downshift and hold the selector lever	System voltage
		Selector lever position: Except for above	0 V
117	Shift indicator A	Refer to table below	0 V
118	Shift indicator B	Refer to table below	0 V
122	Upshift switch	Selector lever position: Upshift and hold the selector lever	System voltage
		Selector lever position: Except for above	0 V

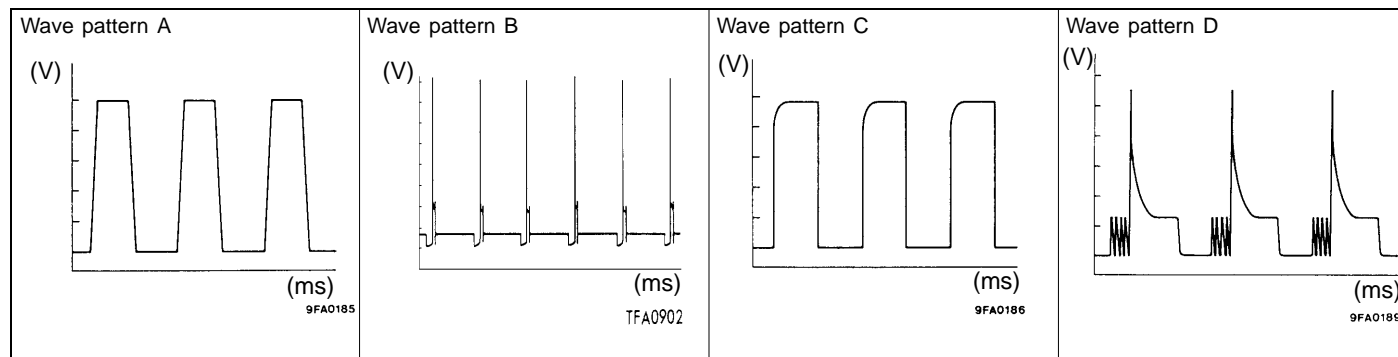
When shift indicator is illuminated by means of MUT-II actuator function, ensure that terminal voltage is equal to the following value:

Terminal No.		105	117	118
Inspection Item		Shift indicator C	Shift indicator A	Shift indicator B
Shift indicator (shift position)	1	0 V	Approx. 9 V	0 V
	2	0 V	0 V	Approx. 9 V
	3	0 V	Approx. 9 V	Approx. 9 V
	4	Approx. 9 V	0 V	0 V

OSCILLOSCOPE INSPECTION PROCEDURE

Check item	Inspection conditions		Normal condition (Wave pattern sample)
Crank angle sensor	Selector lever position: N	Idling (vehicle stopped)	Wave pattern A
Input shaft speed sensor	Gear range: 3rd	Driving at a constant speed of 50 km/h in 3rd (Engine speed: 1,800 – 2,100 r/min)	Wave pattern C
Output shaft speed sensor			
Vehicle speed sensor			
LR solenoid valve	Ignition switch: ON Engine: Stopped Selector lever position: P Throttle (accelerator) opening angle voltage: Less than 1 V	Force-drive the solenoid valves (actuator test).	Wave pattern D
UD solenoid valve			
2nd solenoid valve			
OD solenoid valve			
DCC solenoid valve			

Waveform sample



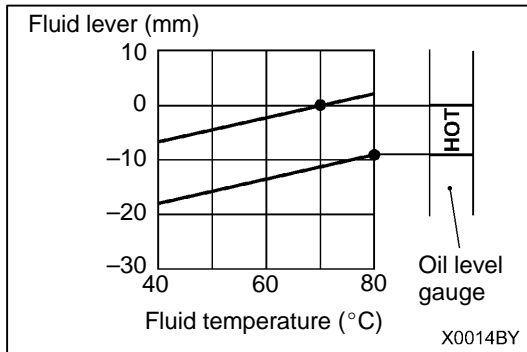
ON-VEHICLE SERVICE

ESSENTIAL SERVICE

AUTOMATIC TRANSMISSION FLUID (ATF) CHECK

Caution

When replacing the transmission with a new one, overhauling the existing transmission, or driving in a harsh condition, the ATF cooler line should always be flushed out and ATF should be replaced with a new one.



1. Drive the vehicle until the ATF temperature reaches the normal temperature (70 – 80°C).

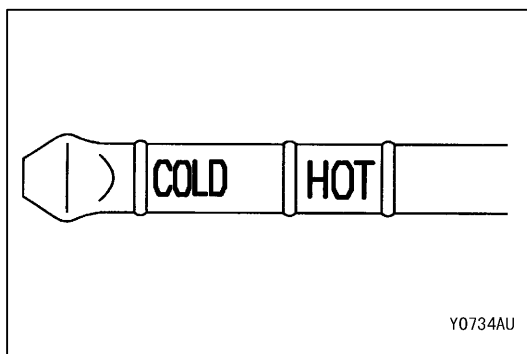
NOTE

- 1) Measure ATF temperature using MUT-II.
- 2) Check the oil level referring to the characteristics chart shown at left if it takes some time to reach the normal operation temperature of ATF (70 – 80°C.)

2. Park the vehicle on a level surface.
3. Move the selector lever to all positions to fully charge the torque converter and the fluid lines with ATF, and then move the selector lever to the N position.
4. After wiping away any dirt from around the oil level gauge, pull out the oil level gauge and check the level of ATF.

NOTE

If the ATF has a burnt smell, or if it has become very contaminated or dirty, it means that the ATF has become contaminated by minute particles from bushings (metal) or worn parts. In such a case, the transmission needs to be overhauled and the ATF cooler line needs to be flushed out.



5. Check that the ATF level is between the HOT marks on the oil level gauge. If the ATF level is too low, add more ATF until the level reaches between the HOT marks.

Automatic transmission fluid:

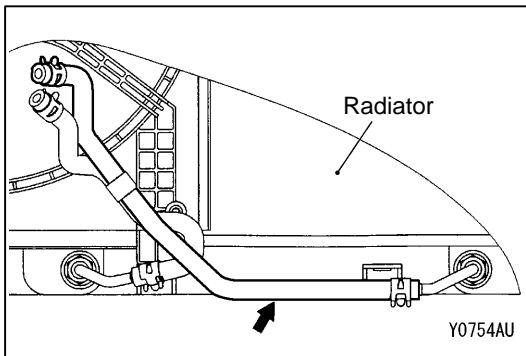
ELC-4 SP III

NOTE

If the ATF level is too low, the oil pump draws air into the system along with the ATF, and air bubbles will thus form in the fluid circuit. This will cause a drop in fluid pressure and cause the shift points to change and the clutches and brakes to slip.

If the ATF level is too high, the gear will churn the ATF and cause bubbles to develop, which can then cause the same problems as when the ATF fluid is too low. In either case, the air bubbles can cause overheating and oxidation of the ATF, and also prevent the valves, clutches and brakes from operating normally. In addition, if bubbles develop in the ATF, the ATF can overflow from the transmission vent holes and be mistaken for leaks.

6. Securely re-insert the oil level gauge.



AUTOMATIC TRANSMISSION FLUID (ATF) REPLACEMENT

Caution

Before replacing the transmission with a new one, overhauling the existing transmission, or connecting the cooler pipe to the transmission, the ATF cooler line should always be flushed out.

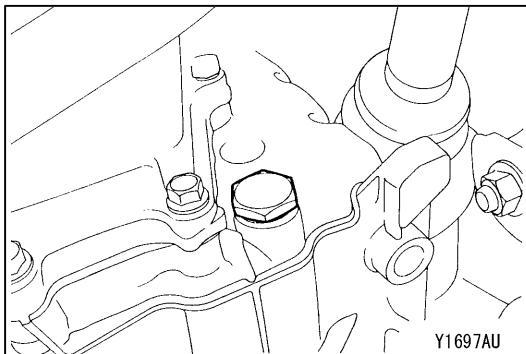
If you have an ATF changer, use the ATF changer to flush the ATF. If you do not have an ATF changer, follow the procedure given below.

1. Remove the hose shown in the illustration which allows the ATF to flow from the ATF cooler (built into the radiator) to the transmission.
2. Start the engine and discharge the ATF.
Driving conditions: N range, idling

Caution

The engine should be stopped within one minute of it being started. If the ATF has all been discharged before this, stop the engine at that point.

Discharge amount: Approx. 3.5 L



3. Remove the drain plug at the bottom of the transmission case to drain out the remaining ATF.

Discharge amount: Approx. 2.0 L

4. Install the drain plug with a gasket in between, and tighten it to the specified torque.

Tightening torque: 32 ± 2 N·m

5. Pour in new ATF through the oil filler tube.

Amount to add: Approx. 5.5 L

Caution

Stop pouring in the ATF once 5.5 L has been poured in.

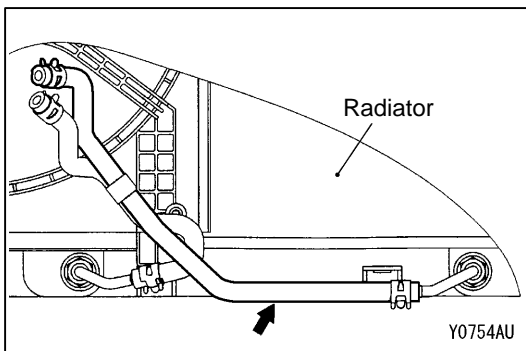
6. Repeat the operation in step 2.

NOTE

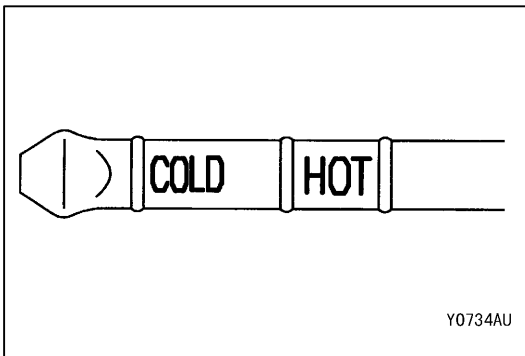
Carry out steps 2 and 6 so that at least 7.0 L has been discharged from the cooler hose. After this, discharge a small quantity of ATF and check for contamination. If the ATF is contaminated, repeat steps 6 and 7.

7. Pour in new ATF through the oil filler tube.

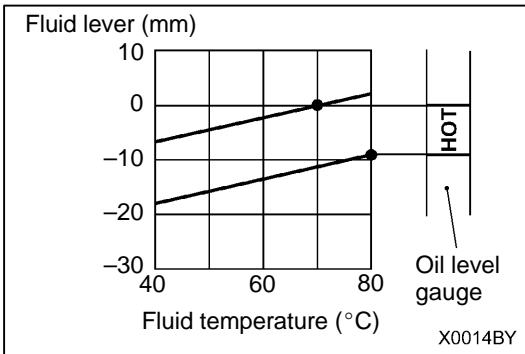
Amount to add: Approx. 3.5 L



8. Connect the hose which was disconnected in step 1, and then securely re-insert the oil level gauge.
9. Start the engine, and let it run at idle for 1 – 2 minutes.
10. Move the selector lever to all positions once, and then return it to the N position.

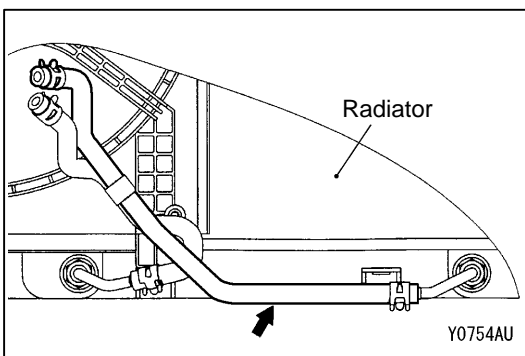


11. Check that the ATF level on the oil level gauge is at the COLD mark. If it is not up to this mark, add more ATF.
12. Drive the vehicle until the ATF temperature reaches the normal temperature (70 – 80°C), and then re-check the ATF level.
The ATF level must be between the HOT marks.



NOTE

- 1) The COLD mark is for reference only; the HOT marks should be used as the standard for judgment.
- 2) Measure ATF temperature using MUT-II.
- 3) Check the oil level referring to the characteristics chart shown at left if it takes some time until reaching the normal operation temperature of ATF(70 – 80°C.)
13. When ATF is under the specified level, top up ATF. When ATF is over the specified level, drain the excessive ATF from the drain plug to adjust ATF level to the specified level.
14. Securely insert the oil level gauge into the oil filler tube.



AUTOMATIC TRANSMISSION FLUID COOLER LINE FLUSHING

Caution

If replacing the transmission with a new one, if overhauling the existing transmission, or if the ATF has deteriorated or is contaminated, the ATF cooler line must always be flushed out.

1. Remove the hose shown in the illustration which allows the ATF to flow from the ATF cooler (built into the radiator) to the transmission.
2. Start the engine and discharge the ATF.
Driving conditions: N range, idling

Caution

The engine should be stopped within one minute of it being started. If the ATF has all been discharged before this, stop the engine at that point.

Discharge amount: Approx. 3.5 L

3. Pour in new ATF through the oil filler tube.

Amount to add: Approx. 3.5 L

Caution
Stop pouring in the ATF once 3.5 L has been poured in.

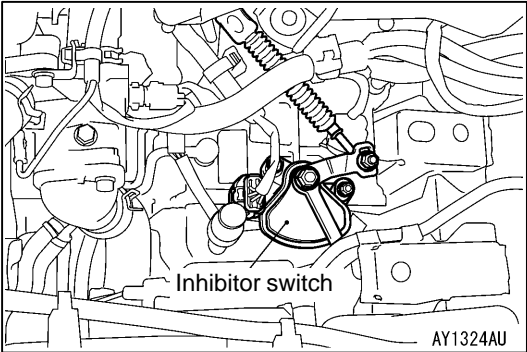
4. Repeat the operation in step 2.

NOTE
Carry out steps 2 and 4 so that at least 7.0 L has been discharged from the cooler hose. After this, discharge a small quantity of ATF and check for contamination. If the ATF is contaminated, repeat steps 4 and 5.

5. Carry out the procedure in “Automatic Transmission Fluid (ATF) Replacement” from step 3 onwards.

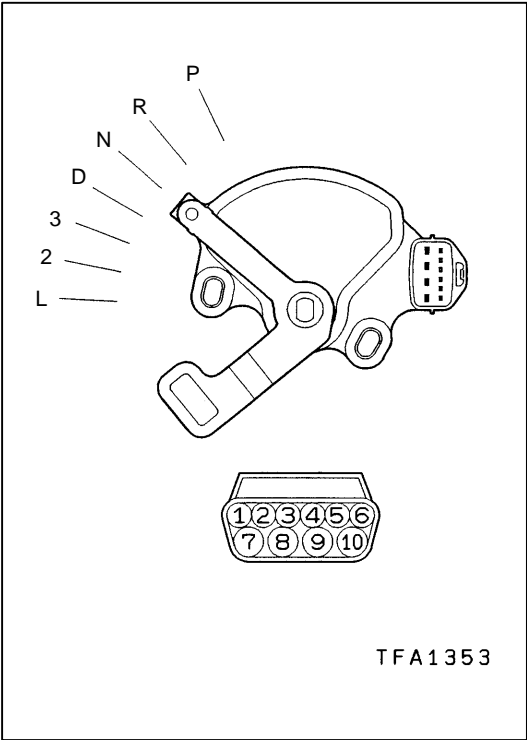
THROTTLE POSITION SENSOR (TPS) ADJUSTMENT

Refer to [On-vehicle Service](#).

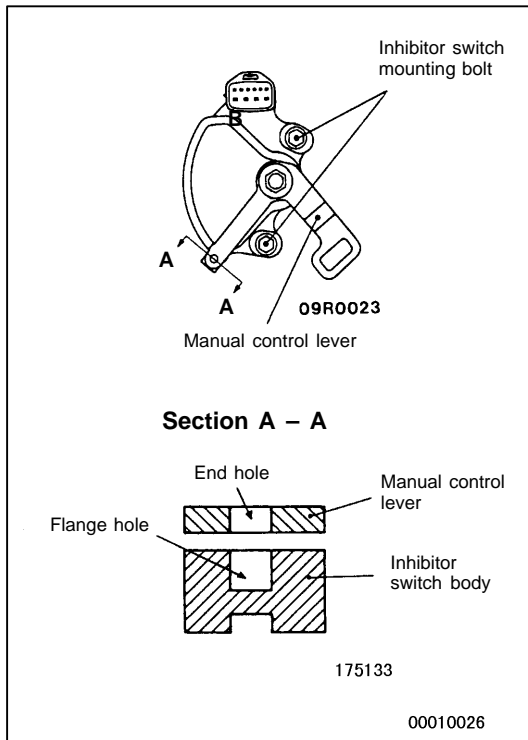


INHIBITOR SWITCH CONTINUITY CHECK

Item	Terminal No.									
	1	2	3	4	5	6	7	8	9	10
P			○					○	○	○
R							○	○		
N				○				○	○	○
D	○							○		
3					○			○		
2		○						○		
L						○		○		



TFA1353



INHIBITOR SWITCH AND CONTROL CABLE ADJUSTMENT

1. Move the selector lever to the N position.
2. Loosen the adjusting nut, and set the manual control lever upper and lower to the free condition.
3. Move the manual control lever lower to the neutral position.
4. Loosen the inhibitor switch body mounting bolt, and then turn the inhibitor switch to adjust so that the hole at the end of the manual control lever lower and the hole in the inhibitor switch body flange (section A – A in the illustration at left) are aligned.
5. Tighten the inhibitor switch body mounting bolt to the specified torque.

Tightening torque: 11 ± 1 N·m

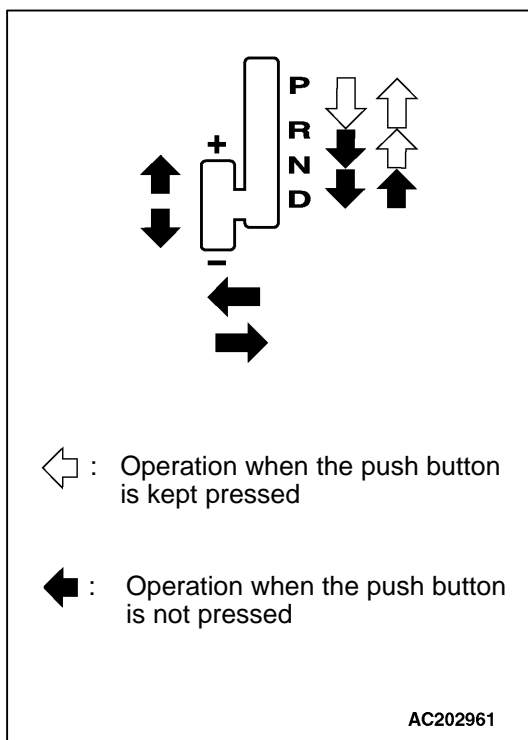
Caution

Be careful not to let the inhibitor switch body slip out of place.

6. Gently push the transmission control cable in the direction of B as shown in the illustration at left, and tighten the adjusting nut to the specified torque.

Tightening torque: 24 ± 4 N·m

7. Check that the selector lever is at the N position.
8. Check that the transmission shifts to the correct range corresponding to the position of the selector lever, and that it functions correctly in that range.

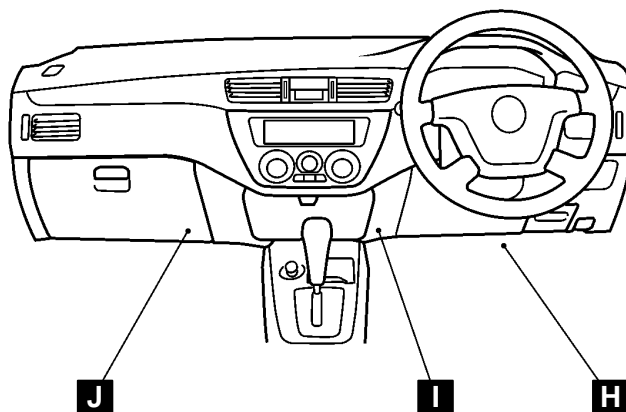
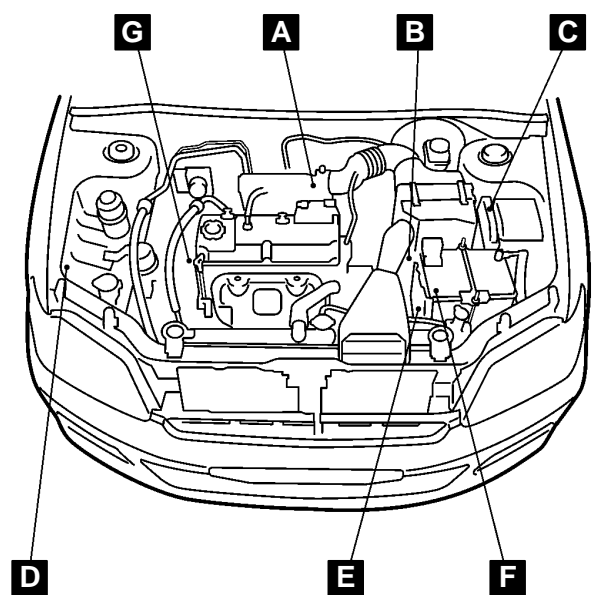


SELECTOR LEVER OPERATION CHECK <VEHICLES WITH SPORT MODE>

1. Apply the parking brake, and check that the selector lever moves smoothly and accurately to each range position.
2. Check that the engine starts when the selector lever is at the N or P position, and that it does not start when the selector lever is in any other position.
3. Start the engine, release the parking brake, and check that the vehicle moves forward when the selector lever is moved from N range to D or, 1st., 2nd., 3rd. or 4th on sport mode, and that the vehicle reverses when the selector lever is moved to R range.
4. Stop the engine.

A/T CONTROL COMPONENT LOCATION

Name	Symbol	Name	Symbol
A/T control relay	C	Inhibitor switch	F
A/T fluid temperature sensor	E	Input shaft speed sensor	B
Crank angle sensor	H	Output shaft speed sensor	B
Diagnosis connector	I	Solenoid valve	F
Dual pressure switch	D	Stop lamp switch	H
Engine-A/T-ECU	J	Throttle position sensor (TPS)	A



A/T CONTROL COMPONENT CHECKS

CRANK ANGLE SENSOR CHECK <MPI>

Refer to [Troubleshooting](#).

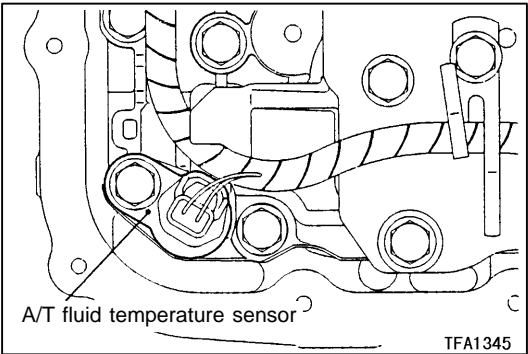
THROTTLE POSITION SENSOR (TPS) CHECK

Refer to [On-vehicle Service](#).

INHIBITOR SWITCH CHECK

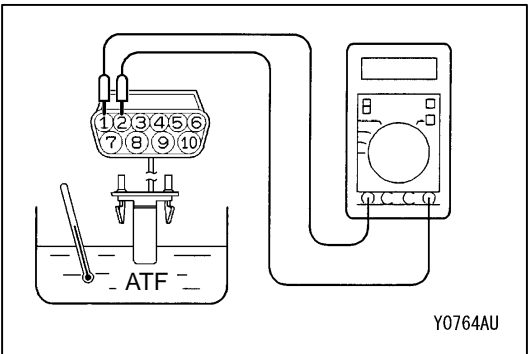
STOP LAMP SWITCH CHECK

[Brake Pedal](#).



A/T FLUID TEMPERATURE SENSOR CHECK

1. Remove the A/T fluid temperature sensor.



2. Measure the resistance between terminals 1 and 2 of the A/T fluid temperature sensor.

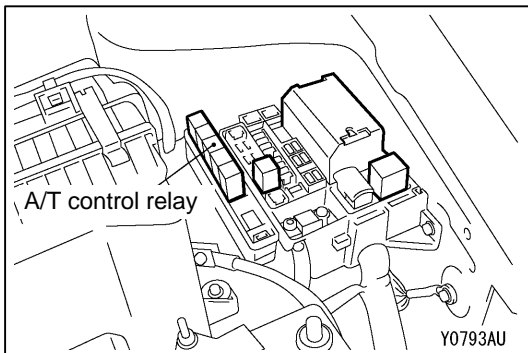
Standard value:

Temperature (°C)	Resistance [kΩ]
0	16.7 – 20.5
20	7.3 – 8.9
40	3.4 – 4.2
60	1.9 – 2.2
80	1.0 – 1.2
100	0.57 – 0.69

NOTE

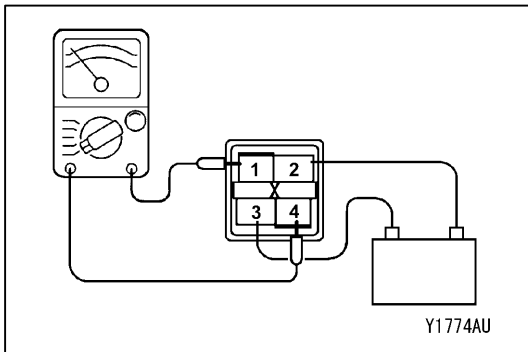
The N range indicator lamp on the combination meter flashes when the temperature reaches approximately 125°C or higher, and then stops flashing when the temperature drops below approximately 115°C.

3. If the A/T fluid temperature sensor resistance and the temperature when the N range indicator lamp is flashing or switched off are outside the standard value ranges, replace the A/T fluid temperature sensor.



A/T control relay check

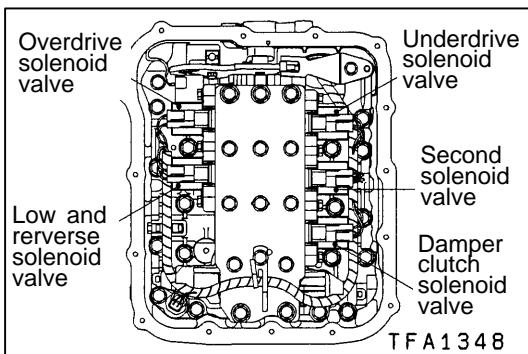
1. Remove the A/T control relay.



2. Use jumper leads to connect terminal 2 of the A/T control relay to the battery (–) terminal, and terminal 3 to the battery (+) terminal.
3. Check the continuity between terminals 1 and 4 of the A/T control relay while alternately connecting and disconnecting the jumper leads from the battery terminals.

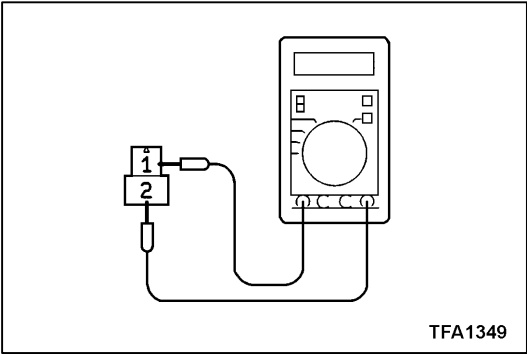
Jumper leads	Continuity between terminals 1 and 4
Connected	Continuity
Disconnected	No continuity

4. If there is a malfunction, replace the A/T control relay.



A/T CONTROL SOLENOID VALVE ASSEMBLY CHECK

1. Remove the valve body cover.
2. Disconnect the connectors for each solenoid valve.



3. Measure the resistances between terminals 1 and 2 of each solenoid valve.

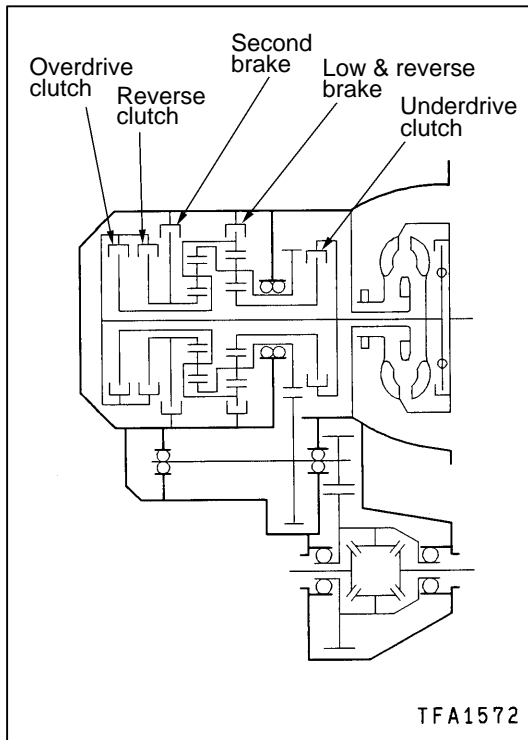
Standard value:

Name	Resistance value
Damper clutch control (DCC) solenoid valve	2.7 – 3.4 k Ω at 20 °C
Low & reverse solenoid valve (LR solenoid valve)	
Second solenoid valve (2ND solenoid valve)	
Underdrive solenoid valve (UD solenoid valve)	
Overdrive solenoid valve (OD solenoid valve)	

4. If a measurement value is outside the standard value range, replace the solenoid valve.

DUAL PRESSURE SWITCH CHECK

Refer to [On-vehicle Service](#).



TORQUE CONVERTER STALL TEST

The purpose of this test is to measure the maximum engine speed when the torque converter stalls in D or R ranges in order to check the torque converter (Stator and one-way clutch operation) and the holding performance of the clutches and brakes which are built into the transmission.

Caution

For safety, the front and rear of the vehicle should be kept clear of other people while this test is being carried out.

1. Check the ATF level, the ATF temperature and the engine coolant temperature.
 - ATF level: HOT position on oil level gauge
 - ATF temperature: 70 – 80°C
 - Engine coolant temperature: 80 – 100°C
2. Place wheel locks on both the left and right front wheels.
3. Pull the parking brake lever to apply the parking brake and depress the brake pedal fully.
4. Start the engine.
5. Move the selector lever to the D position, fully depress the accelerator pedal and quickly take a reading of the maximum engine speed at this time.

Caution

- 1) **Do not keep the throttle fully open for any longer than 8 seconds.**
- 2) **If carrying out the stall test two or more times, move the selector lever to the N position and run the engine at a speed of 1,000 r/min to let the ATF cool down before the next test is carried out.**

Standard stalling engine speed:

2,100 – 2,600 r/min

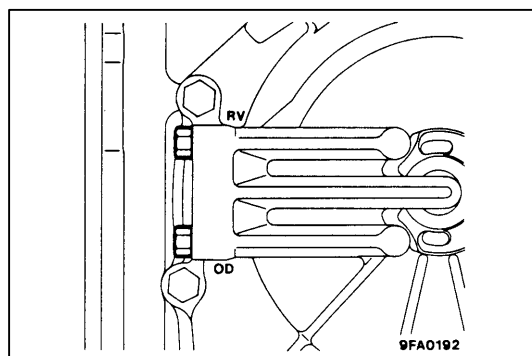
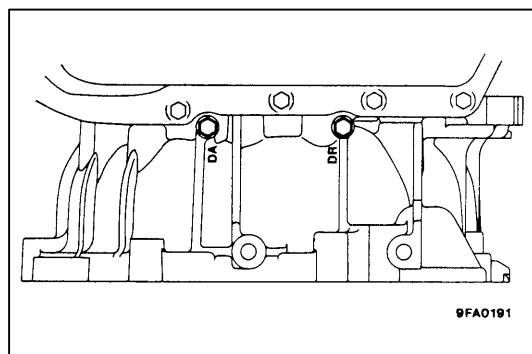
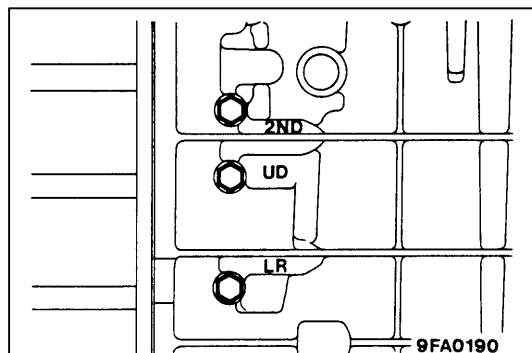
6. Move the selector lever to the R position and repeat the test described above.

Standard stalling engine speed:

2,100 – 2,600 r/min

TORQUE CONVERTER STALL TEST JUDGMENT RESULTS

1. High stalling speed in both D and R ranges
 - Low line pressure
 - Low & reverse brake slipping
2. High stalling speed in D range only
 - Underdrive clutch slipping
3. High stalling speed in R range only
 - Reverse clutch slipping
 - Reduction brake slipping
4. High stalling speed in both D and R ranges
 - Malfunction of torque converter
 - Poor engine output



HYDRAULIC PRESSURE TEST

- (1) Let the engine warm up until the ATF temperature is 70 – 80°C.
- (2) Jack up the vehicle so that the tires can spin freely.
- (3) Install the special tool (MD998330: 2,992 kPa oil pressure gauge) and the adapters (MD998332, MD998900) to each hydraulic pressure outlet port.

NOTE

2ND : Second brake pressure port
 UD : Underdrive clutch pressure port
 LR : Low & reverse brake pressure port
 DR : Torque converter pressure port
 DA : Damper clutch pressure port
 RV : Reverse clutch pressure port
 OD : Overdrive clutch pressure port

- (4) Measure the various hydraulic pressures under the conditions given in the standard hydraulic pressure table, and check that the measurements are within the standard value ranges.
- (5) If the measurements are outside the standard value range, remedy the problem while referring to the hydraulic pressure test diagnosis table.

STANDARD HYDRAULIC PRESSURE TABLE

Measurement conditions			Standard hydraulic pressure kPa					
Shift lever position	Shift range position	Engine speed r/min	Underdrive clutch pressure [UD pressure]	Reverse clutch pressure [RC pressure]	Overdrive clutch pressure [OD pressure]	Low & brake pressure [LR pressure]	Second brake pressure [2nd pressure]	Torque converter pressure [DR pressure]
P	–	2,500	–	–	–	260 – 340	–	500 – 700
R	Re-verse	2,500	–	1,320 – 1,720	–	1,320 – 1,720	–	500 – 700
N	–	2,500	–	–	–	260 – 340	–	500 – 700
L	1st	2,500	1,010 – 1,050	–	–	1,010 – 1,050	–	500 – 700
2	2nd	2,500	1,010 – 1,050	–	–	–	1,010 – 1,050	500 – 700
3	3rd	2,500	780 – 880	–	780 – 880	–	–	–
D	4th	2,500	–	–	780 – 880	–	780 – 880	–

HYDRAULIC PRESSURE TEST DIAGNOSIS TABLE

Symptom	Problem location
All hydraulic pressures are too high	Malfunction of regulator valve
All hydraulic pressures are too low	Malfunction of oil pump Blocked oil filter Blocked oil cooler Malfunction of regulator valve Malfunction of relief valve Incorrect valve body installation
Abnormal hydraulic pressure in R range only	Malfunction of regulator valve
Abnormal hydraulic pressure in 3rd or 4th only	Malfunction of regulator valve Malfunction of switch bulb
Abnormal UD pressure only	Malfunction of oil seal K, L, M or Q Malfunction of underdrive solenoid valve Malfunction of underdrive pressure control valve Abnormality with check ball Blocked orifices Incorrect valve body installation
Abnormal REV pressure only	Malfunction of oil seal A, B or C Abnormality with check ball Blocked orifices Incorrect valve body installation
Abnormal OD pressure only	Malfunction of oil seal D, E or F Malfunction of overdrive solenoid valve Malfunction of overdrive pressure control valve Abnormality with check ball Blocked orifices Incorrect valve body installation
Abnormal LR pressure only	Malfunction of oil seal I, J or P Malfunction of low & reverse solenoid valve (also used for the direct clutch) Malfunction of low & reverse pressure control valve Malfunction of switch bulb Malfunction of fail-safe valve A Abnormality with check ball Blocked orifices Incorrect valve body installation
Abnormal 2nd pressure only	Malfunction of oil seal G, H or O Malfunction of second solenoid valve Malfunction of second pressure control valve Malfunction of fail-safe valve B Blocked orifices Incorrect valve body installation
Abnormal DR pressure only	Blocked oil cooler Malfunction of oil seal N Malfunction of damper clutch control solenoid valve Malfunction of damper clutch control solenoid valve Malfunction of torque converter pressure control valve Blocked orifices Incorrect valve body installation

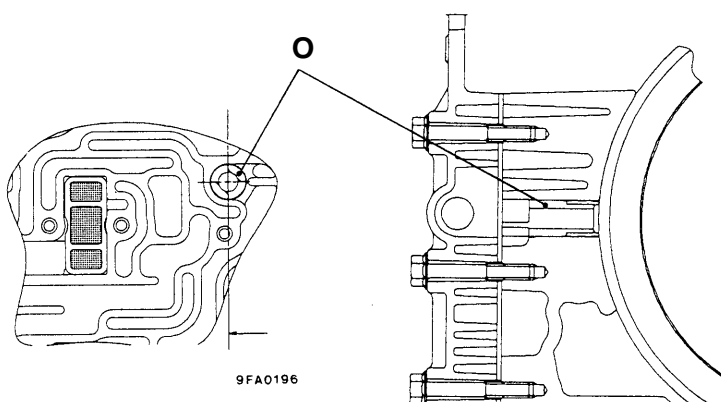
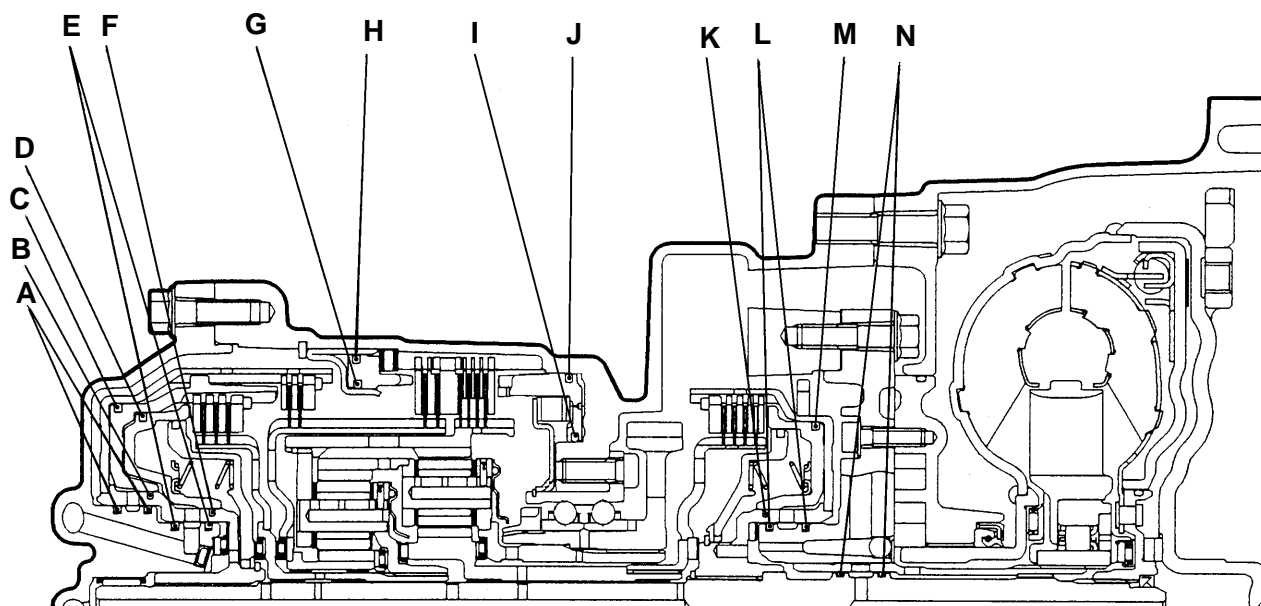
Symptom	Problem location
Pressure applied to non-operating element	Incorrect transmission control cable adjustment Malfunction of manual valve Incorrect valve body installation

MAIN

Group
23

23A

Oil seal layout

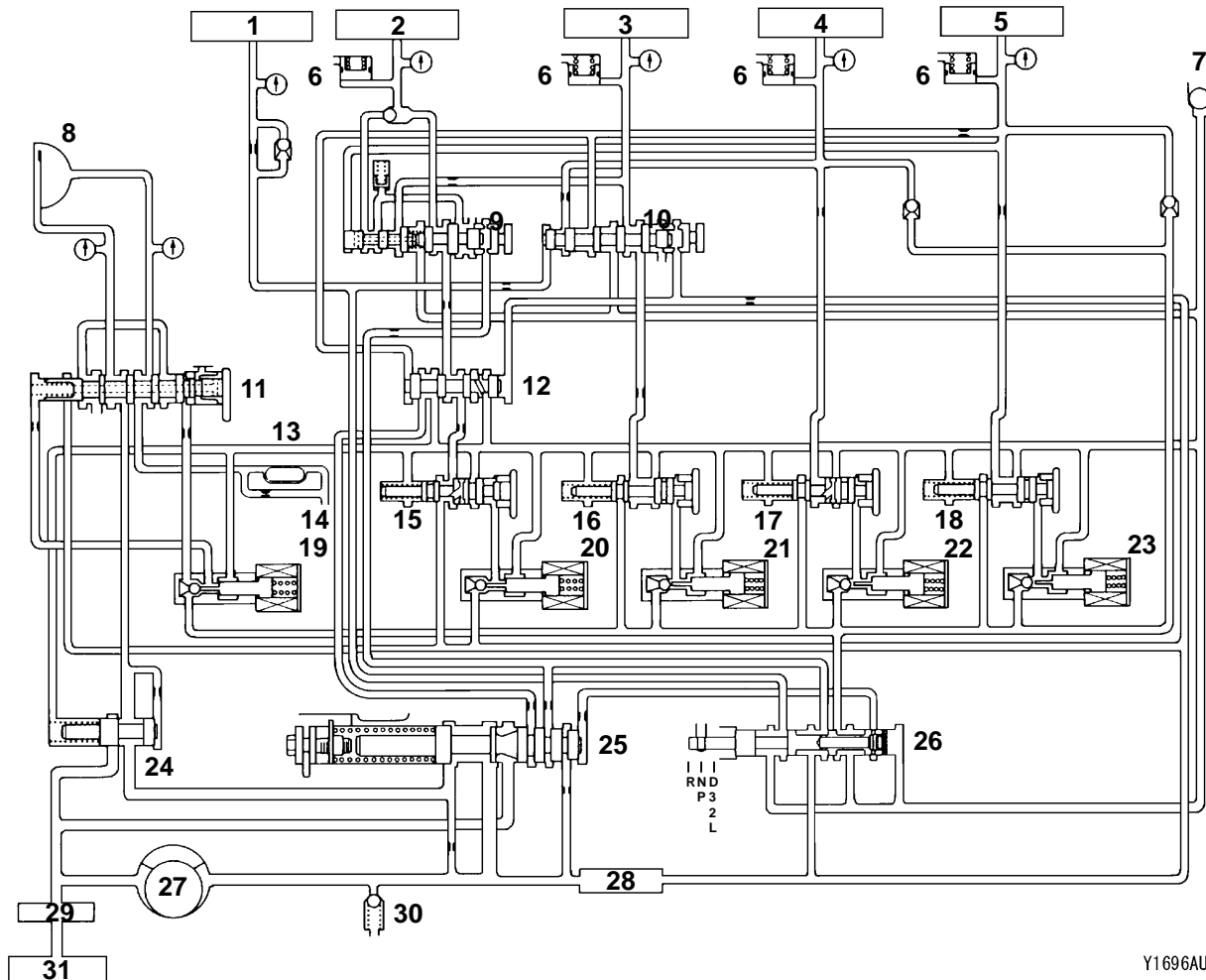


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HYDRAULIC CIRCUIT

Parking & Neutral



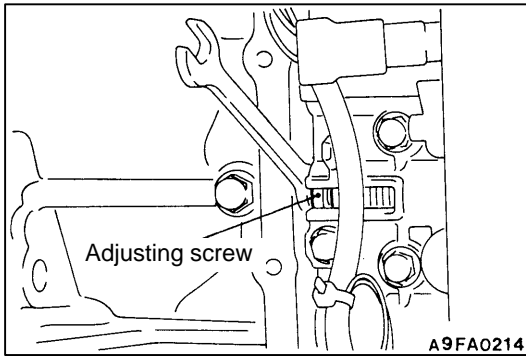
- | | |
|--|---|
| 1. Reverse clutch | 17. UD pressure control valve |
| 2. LR brake | 18. OD pressure control valve |
| 3. 2nd brake | 19. DCC solenoid valve |
| 4. UD clutch | 20. LR solenoid valve |
| 5. OD clutch | 21. 2nd solenoid valve |
| 6. Accumulator | 22. UD solenoid valve |
| 7. Check ball | 23. OD solenoid valve |
| 8. Damper clutch | 24. Torque converter pressure control valve |
| 9. Fail-safe valve A | 25. Regulator valve |
| 10. Fail-safe valve B | 26. Manual valve |
| 11. Damper clutch control solenoid valve | 27. Oil pump |
| 12. Switch bulb | 28. Oil strainer |
| 13. Transmission oil cooler | 29. Oil filter |
| 14. Lubrication | 30. Relief valve |
| 15. LR pressure control valve | 31. Oil pan |
| 16. 2nd pressure control valve | |

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23A



LINE PRESSURE ADJUSTMENT

- (1) Discharge the ATF, and then remove the valve body cover.
- (2) Turn the adjusting screw shown in the illustration at left to adjust the UD pressure until it is at the standard value. The pressure increases when the screw is turned anti-clockwise.

NOTE

Adjust to the middle of the standard range when the transmission is at the 1st or 2nd gear.

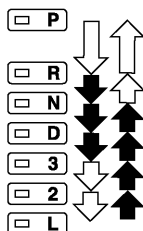
Standard value: 1,010 – 1,050 kPa

Change in pressure for a single full turn of the adjusting screw: 35 kPa

- (3) Install the valve body cover, and then pour in the specified amount of ATF.
- (4) [Carry out a fluid pressure test.](#)
Readjust if necessary.

SELECTOR LEVER OPERATION CHECK

1. Apply the parking brake, and check that the selector lever moves smoothly and accurately to each range position.
2. Check that the engine starts when the selector lever is at the N or P position, and that it does not start when the selector lever is in any other position.
3. Start the engine, release the parking brake, and check that the vehicle moves forward when the selector lever is moved from N range to D, 3, 2 or L range, and that the vehicle reverses when the selector lever is moved to R range.
4. Stop the engine.



↔ : Operation when the pushbutton is kept pressed

→ : Operation when the pushbutton is not pressed

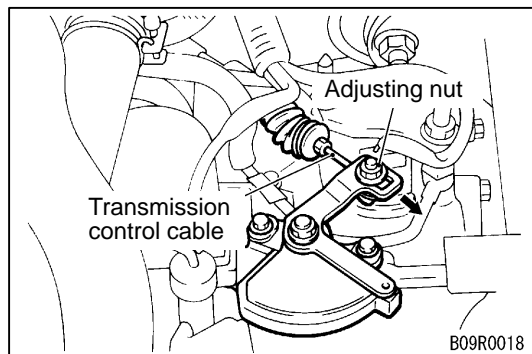
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TRANSMISSION CONTROL CABLE ADJUSTMENT

1. Remove the battery and battery tray.
2. Move the selector lever to the N position.
3. Loosen the upper control lever adjusting nut.
4. Gently pull the transmission control cable in the direction of the arrow, and then tighten the adjusting nut.

Tightening torque: 12 ± 2 N·m

5. Check that the transmission shifts to the correct range corresponding to the position of the selector lever, and that it functions correctly in that range.



TRANSMISSION CONTROL

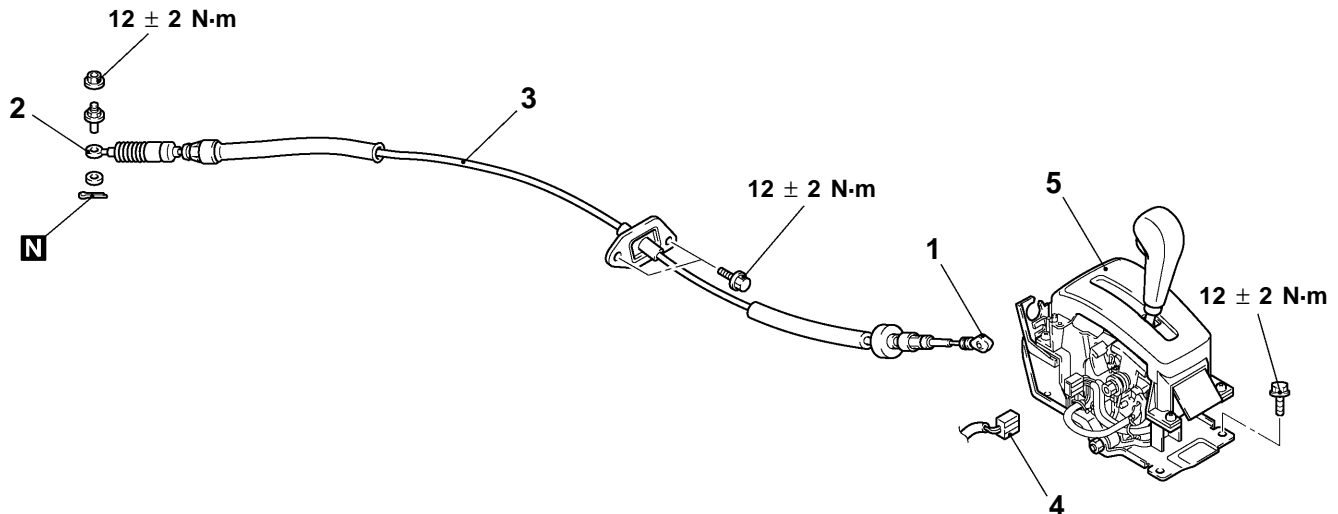
REMOVAL AND INSTALLATION

Caution

When removing and installing the transmission control cable and shift lock cable unit, be careful not to hit them against the SRS-ECU.

Pre-removal and Post-installation Operations

- Air Cleaner Assembly Removal and Installation
- Front Floor Console Removal and Installation
- Battery and Battery Tray Removal and Installation
- Check the operation of the selector lever assembly <Post-Installation only>



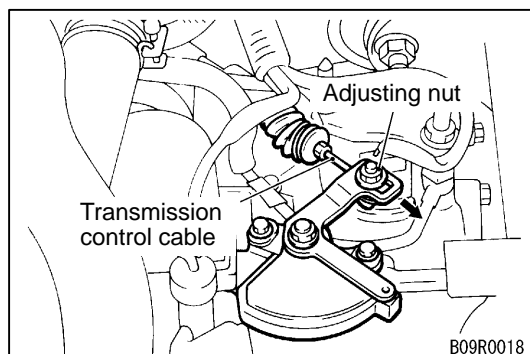
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Transmission control cable removal steps

1. Transmission control cable connection (selector lever side)
2. Transmission control cable connection (transmission side)
 - SRS-ECU
 - Rear heater duct B
3. Transmission control cable

Selector lever assembly removal steps

1. Transmission control cable connection (selector lever side)
4. Indicator lamp connector
5. Selector lever assembly



INSTALLATION SERVICE POINT

▶A◀ TRANSMISSION CONTROL CABLE (TRANSMISSION SIDE) INSTALLATION

1. Move the selector lever to the N position.
2. Check that the inhibitor switch is at N range.
3. Gently pull the transmission control cable in the direction of the arrow, and then tighten the adjusting nut.

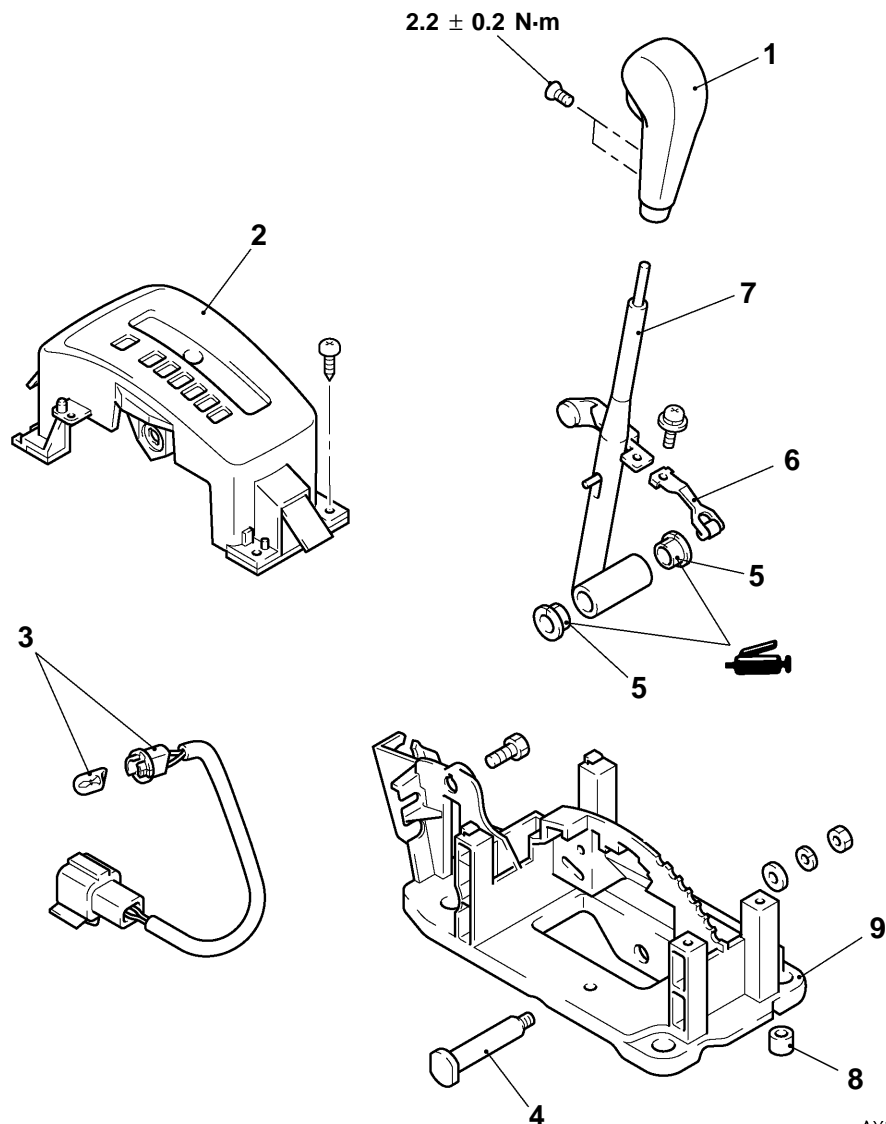
Tightening torque: 12 ± 2 N-m

SELECTOR LEVER ASSEMBLY DISASSEMBLY AND REASSEMBLY

MAIN

Group
23

23A



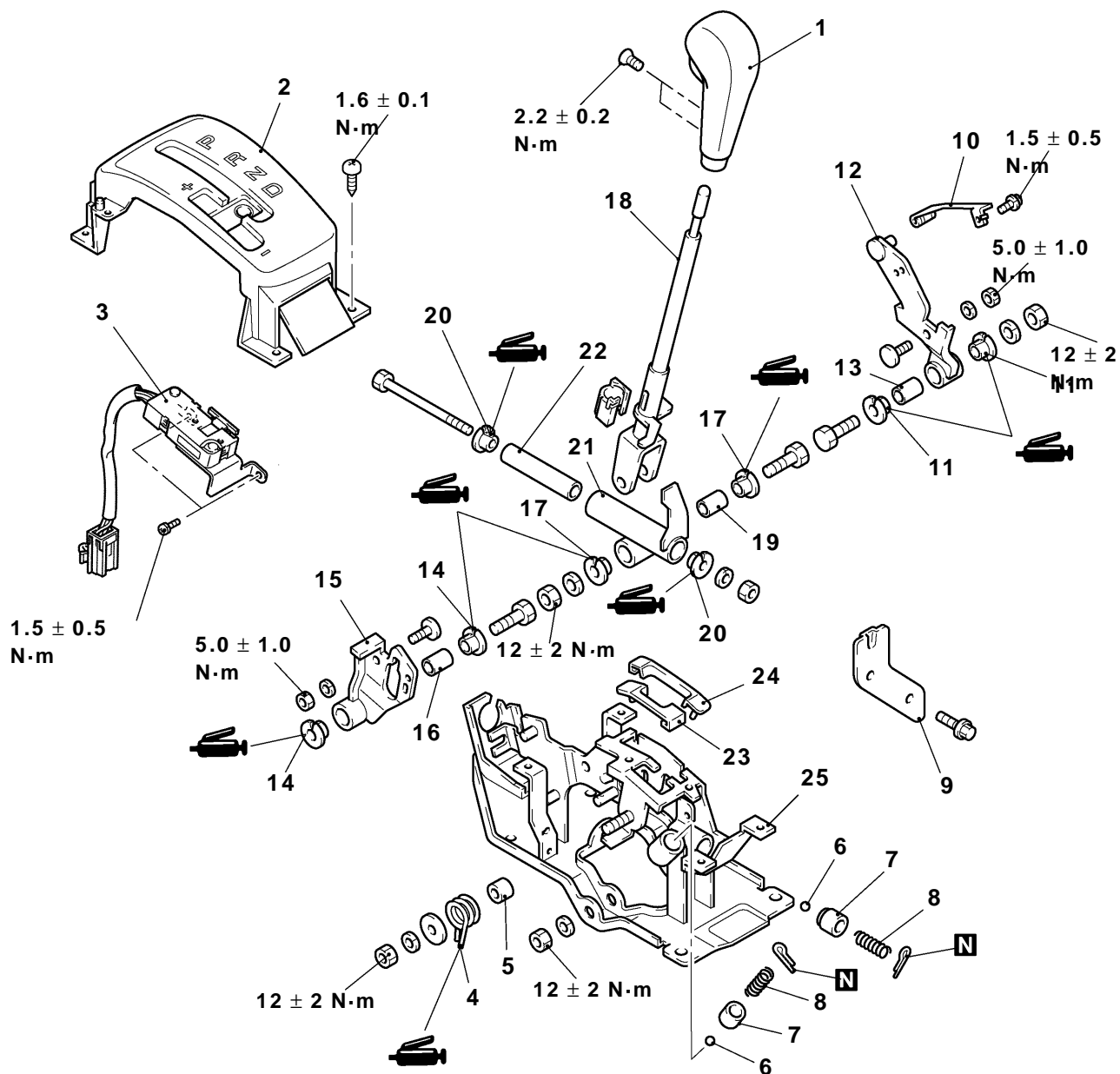
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Disassembly steps

1. Shift knob
2. Indicator assembly
3. Position indicator lamp assembly
4. Bolt
5. Bushing

6. Detent spring
7. Shift lever assembly
8. Color
9. Bracket assembly

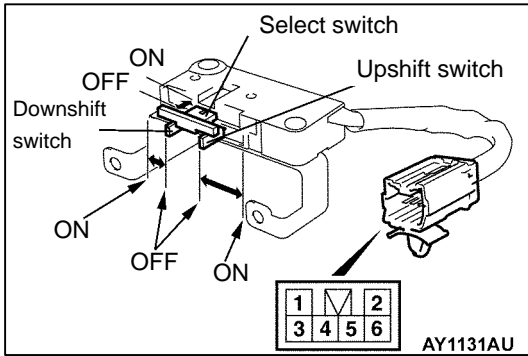
SELECTOR LEVER ASSEMBLY <VEHICLES WITH SPORT MODE> DISASSEMBLY AND REASSEMBLY



AC202961

Disassembly steps

1. Shift knob
2. Indicator panel assembly
3. Shift switch assembly
4. Return spring
5. Pipe
6. Ball
7. Ball support
8. Spring
9. Plate
10. Detent spring assembly
11. Bush
12. Arm assembly
13. Inner pipe
14. Bush
15. Plate assembly
16. Inner pipe
17. Bush
18. Lever assembly
19. Inner pipe
20. Bush
21. Pipe assembly
22. Inner pipe
23. Stopper A
24. Stopper B
25. Bracket assembly



INSPECTION

SHIFT SWITCH ASSEMBLY CONTINUITY CHECK

Switch position		Terminal No.					
		1	2	3	4	5	6
Select switch	ON						
	OFF						
Upshift switch	ON						
	OFF						
Downshift switch	ON						
	OFF						

TRANSMISSION ASSEMBLY

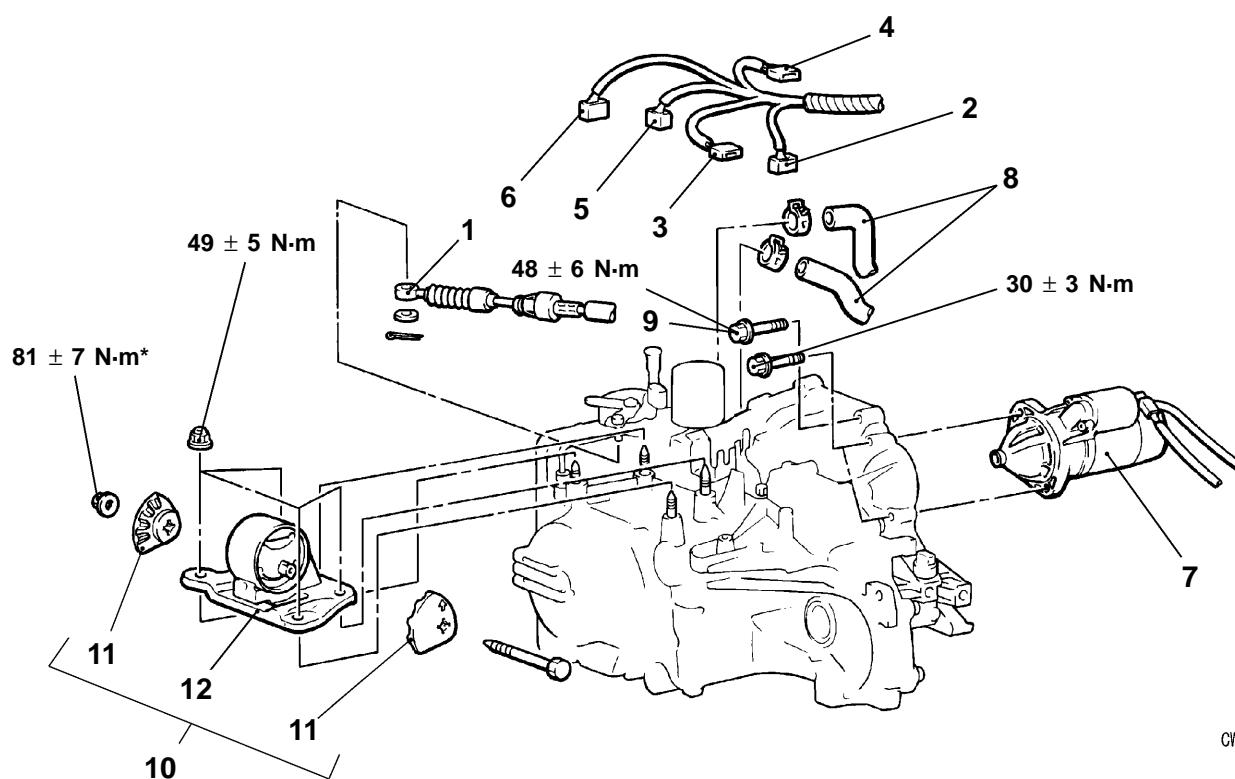
REMOVAL AND INSTALLATION

Caution

In order to prevent the insulator from being damaged, mounting locations marked by * should be provisionally tightened, and then fully tightened when the body is supporting the full weight of the engine.

Pre-removal and Post-installation Operations

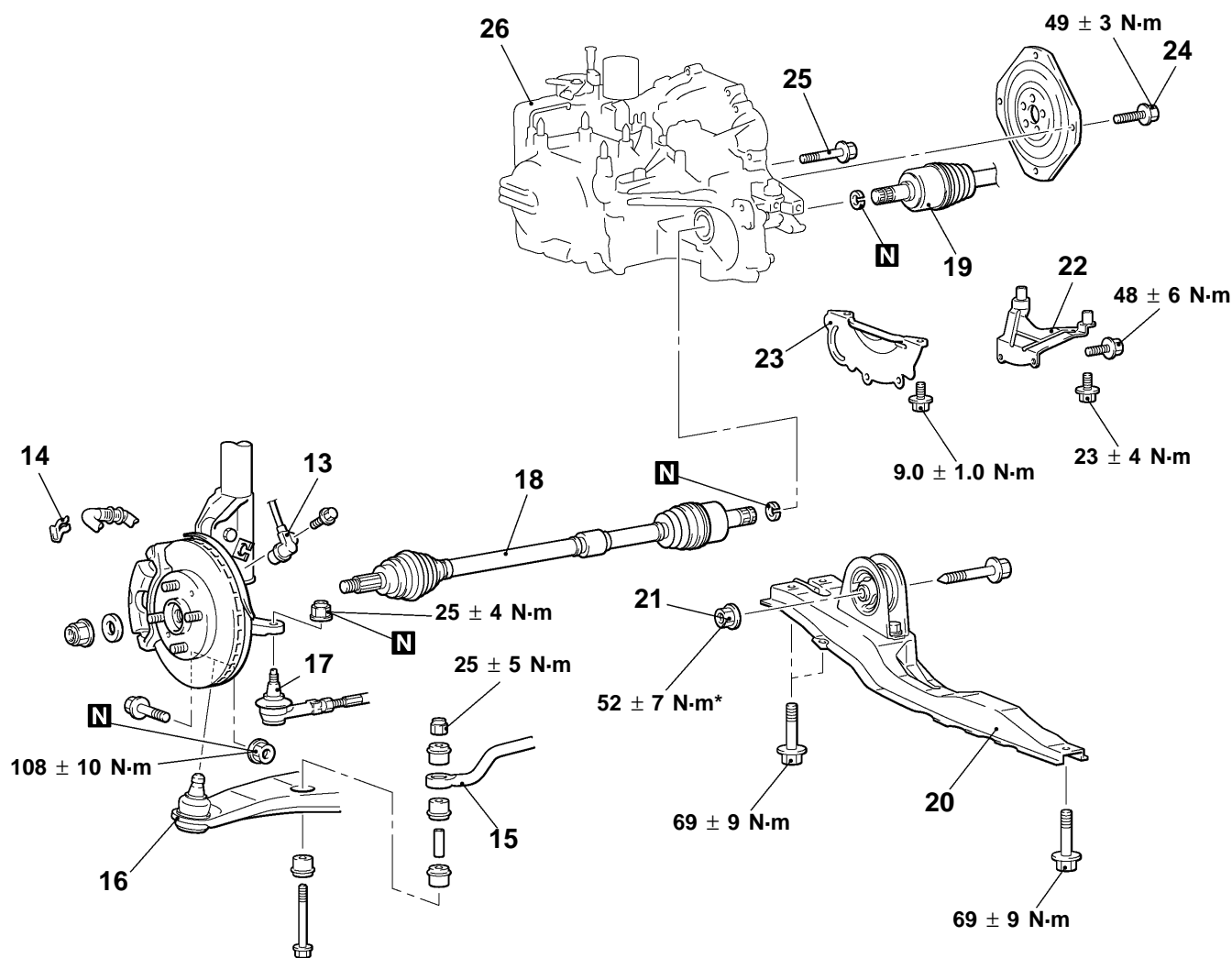
- Under Cover Removal and Installation
- Engine Coolant Draining and Supplying (Refer to [On-vehicle Service.](#))
- [Transmission Fluid Draining and Filling](#)
- [Front Exhaust Pipe Removal and Installation](#)
- Battery and Battery Tray Removal and Installation
- [Air Cleaner Removal and Installation](#)
- Front Wheel Alignment Check And Adjustment <Post-Installation only> (Refer to [On-vehicle Service.](#))



CW0631AU

Removal steps

- | | | |
|--|-----|--|
| 1. Transmission control cable connection | ◀A▶ | 7. Starter motor |
| 2. Input shaft speed sensor connector | | 8. Transmission oil cooler tube |
| 3. Output shaft speed sensor connector | | 9. Transmission assembly upper part coupling bolts |
| 4. Vehicle speed sensor connector | | 10. Transmission mount bracket assembly |
| 5. Inhibitor switch connector | | ▶D▶ 11. Transmission mount stopper |
| 6. A/T control solenoid valve assembly connector | ◀B▶ | 12. Transmission mount |
| | | • Engine assembly supporting |



AY1140AU

- Lifting up of the vehicle

13. Speed sensor

14. Brake hose clamp

►C◀

15. Stabilizer bar connection

16. Lower arm ball joint connection

17. Tie rod end connection

►B◀

18. Drive shaft <L.H.> connection

►B◀

19. Drive shaft <R.H.> connection

20. Centermember assembly

◀E▶

21. Front roll stopper installation bolt

22. Transmission stay

23. Bell housing cover

24. Drive plate coupling bolts

- Support the transmission with a transmission jack

25. Transmission assembly lower part coupling bolts

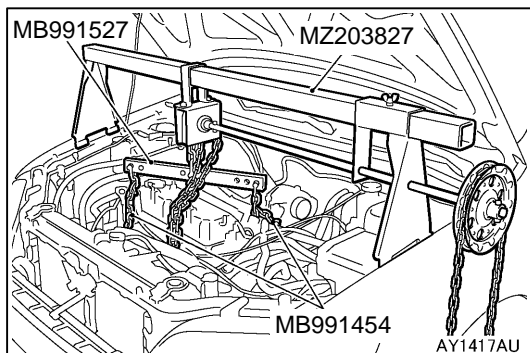
►A◀

26. Transmission assembly

REMOVAL SERVICE POINTS

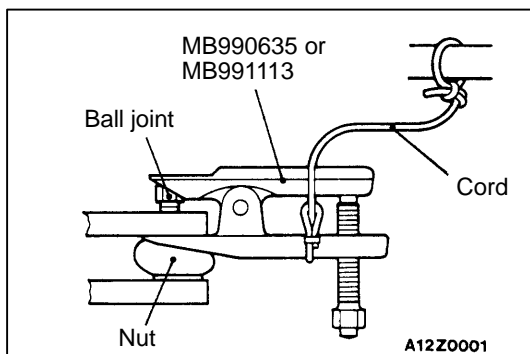
◀A▶ STARTER MOTOR REMOVAL

Remove the starter motor with the starter motor harness still connected and secure it inside the engine compartment.



◀B▶ ENGINE ASSEMBLY SUPPORTING

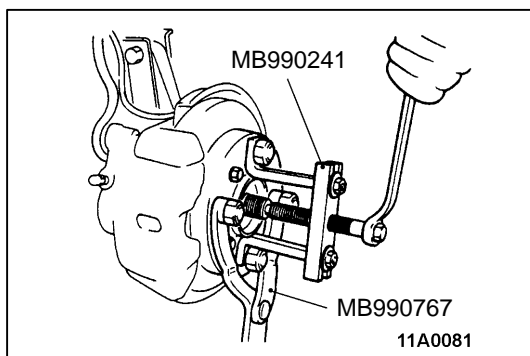
Set the special tool to the vehicle to support the engine assembly.



◀C▶ TIE ROD END DISCONNECTION

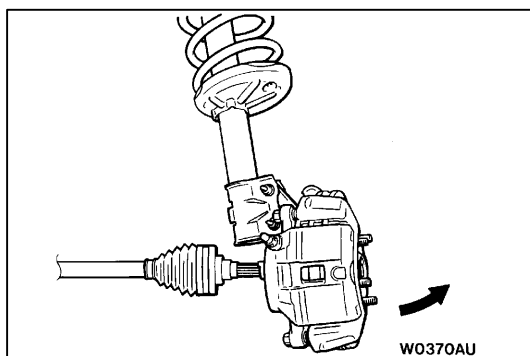
Caution

1. Loosen the nut only; do not remove it from the ball joint. Otherwise ball joint thread will be damaged.
2. The special tool should be suspended by a cord to prevent it from coming off.

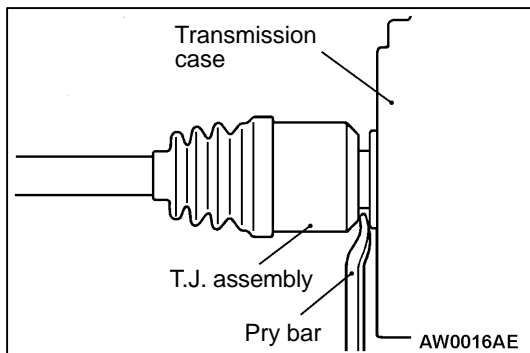


◀D▶ DRIVE SHAFT REMOVAL

1. Use the special tools to push out the drive shaft from the hub.



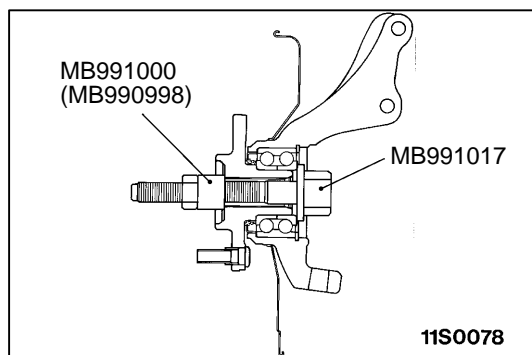
2. While pulling out the lower side of the rotor toward you to remove the drive shaft from the hub.



3. Insert a pry bar between the transmission case and the drive shaft, and then pry the drive shaft from the transmission.

Caution

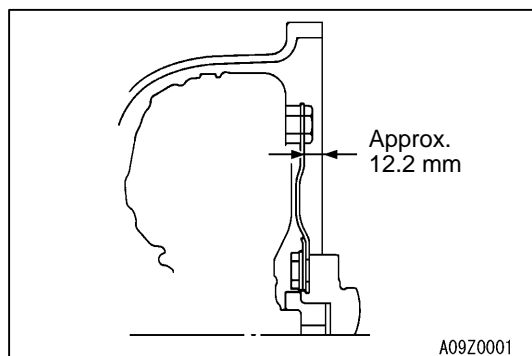
- (1) Always use a lever as pulling out the drive shaft from R.J. assembly may damage the T.J. assembly.
- (2) Care must be taken to ensure that the oil seal of the transmission is not damaged by the spline part of the drive shaft.



- (3) Do not apply the vehicle weight to the wheel bearing while loosening the drive shaft nut. If, however, the vehicle weight must be applied to the bearing (because of moving the vehicle), temporarily secure the wheel bearing by using the special tool.

◀E▶ DRIVE PLATE COUPLING BOLTS

1. Remove the drive plate coupling bolts while turning the crank shaft.
2. Press in the torque converter to the transmission side so that the torque converter does not remain on the engine side.



INSTALLATION SERVICE POINTS

▶A◀ TRANSMISSION ASSEMBLY INSTALLATION

After securely inserting the torque converter into the transmission side so that the value shown in the illustration, install the transmission assembly to the engine.

▶B◀ DRIVE SHAFT INSTALLATION

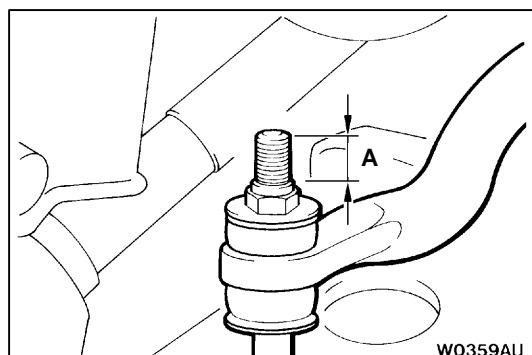
Caution

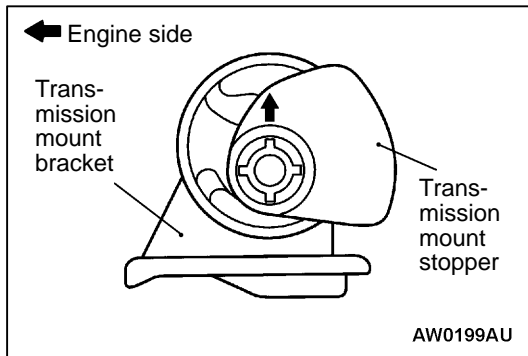
Care must be taken to ensure that the oil seal of the transmission is not damaged by the spline part of the drive shaft.

▶C◀ STABILIZER BAR INSTALLATION

Tighten the self-locking nut so that the stabilizer bar mounting bolt protrudes as shown.

Standard value (A): 22.5 – 23.5 mm





►D◄ TRANSMISSION MOUNT STOPPER INSTALLATION

Install the transmission mount stopper so that the arrow points as shown in the illustration.

MAIN

Group
23

23A

ENGINE-A/T-ECU

REMOVAL AND INSTALLATION

Refer to [Engine-A/T-ECU](#).