AUTOMATIC TRANSMISSION

CONTENTS

WARNINGS REGARDING SERVICING OF SUPPLEMENTAL RESTRAINT SYSTEM (SRS) EQUIPPED VEHICLES

WARNING!

(1) Improper service or maintenance of any component of the SRS, or any SRS-related component, can lead to personal injury or death to service personnel (from inadvertent firing of the air bag) or to the driver and passenger (from rendering the SRS inoperative).

(2) Service or maintenance of any SRS component or SRS-related component must be performed only at an authorized MITSUBISHI dealer.

(3) MITSUBISHI dealer personnel must thoroughly review this manual, and especially its GROUP 52B – Supplemental Restraint System (SRS) before beginning any service or maintenance of any component of the SRS or any SRS-related component.

NOTE

The SRS includes the following components: SRS-ECU, SRS warning lamp, air bag module, clock spring and interconnecting wiring. Other SRS-related components (that may have to be removed/installed in connection with SRS service or maintenance) are indicated in the table of contents by an asterisk (*).

GENERAL

OUTLINE OF CHANGES

The following service procedures for items which are different from before have been established to correspond to the following changes:

- The sports mode is now available on some GDI engine vehicles.
- The final reduction ratio has been changed.
- On GDI engine vehicles, the ECU has been changed from the A/T-ECU to the engine-A/T-ECU.
- The shift pattern has been changed.
- The A/T key interlock and shift lock mechanisms have been added.

GENERAL INFORMATION

Transmission model	F4A41	F4A42
Engine model	4G9-MPI	4G9-GDI
Final reduction ratio	4.406	4.041

LUBRICANT

Items	Specified lubricant	Quantity L
Transmission fluid	DIA QUEEN ATF SP II M, ATF SP III or equivalent	7.8

TROUBLESHOOTING <A/T>

ROAD TEST

The road test procedure has been established due to the addition of models with sports mode.

*: Refer to '96 CARISMA Workshop Manual (Pub No. PWDE9502).

Check by the following procedure.

No.	State prior to test and operation	Test and operation	Judgement value	Check item	Diagnosis code No.	Inspection procedure page if there is an abnormality
1	Ignition switch: OFF	Ignition switch (1) ON	Data list No. 54 Battery voltage [V]	Control relay	54	A/T Control relay system (23-15)
2	Ignition switch: ON Engine: Stopped 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 (23-17)
		Selector lever position (1) D (1st gear) (2) Selector sports mode (1st gear) (3) Upshift and hold the selector lever (2nd gear) (4) Downshift and hold the selector lever (1st gear)	Data list No.67 No.68 No.69 (1) OFF OFF OFF (2) ON OFF OFF (3) ON ON OFF (4) ON OFF ON Shift indicator lamp (1) D and 1 illuminate (2) Only 1 illuminates (3) Only 2 illuminates (4) Only 1 illuminates	Select switch Upshift switch Downshift switch	–	Shift switch assembly system (23-18)

No.	State prior to test and operation	Test and operation	Judgement value	Check item	Diagnosis code No.	Inspection procedure page if there is an abnormality
2	Ignition switch: ON Engine: Stopped Selector lever position: P	Accelerator pedal (1) Released (2) Half depressed (3) Depressed	Data list No. 11 (1) 400 – 1,000 mV (2) Gradually rises from (1) (3) 4,500 – 5,000 mV	Accelerator pedal position sensor	11 12 14	Accelerator pedal position sensor system (23-8)
			Data list No. 25 (1) OFF (2) ON	Wide open throttle switch	25	Wide open throttle switch system (23-11)
		Brake pedal (1) Depressed (2) Released	Data list No. 26 (1) ON (2) OFF	Stop lamp switch	26	Stop lamp switch system (23-12)
3	Ignition switch: ST Engine: Stopped	Starting test with lever P or N range	Starting should be possible	Starting possible or impossible	–	Starting impossible (23-27)*
4	Warming up	Drive for 15 minutes or more so that the A/T fluid temperature becomes 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 (23-9)
5	Engine: Idling Selector lever position: N Engine: Idling Selector lever position: N	Brake pedal (Retest) (1) Depressed (2) Released	Data list No. 26 (1) ON (2) OFF	Stop lamp switch	26	Stop lamp switch system (23-12)
		A/C switch (1) ON (2) OFF	Data list No. 65 (1) ON (2) OFF	Dual pressure switch	–	Dual pressure switch system (23-19)
		Accelerator pedal (1) Released (2) Half depressed	Data list No. 21 (1) 550 – 850 r/min Gradually rises from (1)	Crank angle sensor	21	Crank angle sensor system (23-9)
		Selector lever position (1) N → D (2) N → R	Should be no abnormal shifting shocks Time lag should be within 2 seconds	Malfunction when starting	–	Engine stalling during shifting (23-29)*
					–	Shocks when changing from N to D and large time lag (23-29)*
					–	Shocks when changing from N to R and large time lag (23-30)*
					–	Shocks when changing from N to D,N to R and large time lag (23-31)*

No.	State prior to test and operation	Test and operation	Judgement value	Check item	Diagnosis code No.	Inspection procedure page if there is an abnormality
5	Engine: Idling Selector lever position: N	Selector lever position (1) N → D (2) N → R	Should be no abnormal shifting shocks Time lag should be within 2 seconds	Driving impossible	–	Does not move forward (23-27)*
					–	Does not reverse (23-28)*
					–	Does not move (forward or reverse) (23-28)*
6	Selector lever position: Sports mode (Carry out on a flat and straight road.)	Selector lever position and vehicle speed (1) Idling in 1st (Vehicle stopped) (2) Driving at constant speed of 10 km/h in 1st (3) Driving at constant speed of 30 km/h in 2nd (4) Driving at 50 km/h in 3rd with accelerator fully closed (5) Driving at constant speed of 50 km/h in 4th (Each condition should be maintained for 10 seconds or more.)	Data list No. 63 (2) 1st, (4) 3rd, (3) 2nd, (5) 4th	Shift condition	–	–
			Data list No. 31 (2) 0 %, (4) 100 %, (3) 100 %, (5) 100 %	Low and reverse solenoid valve	31	Low and reverse solenoid valve system (23-12)
			Data list No. 32 (2) 0 %, (4) 0 %, (3) 0 %, (5) 100 %	Underdrive solenoid valve	32	Underdrive solenoid valve system (23-12)
			Data list No. 33 (2)100 %, (4) 100 %, (3) 0 %, (5) 0 %	Second solenoid valve	33	Second solenoid valve system (23-12)
			Data list No. 34 (2) 100 %, (4) 0 %, (3) 100 %, (5) 0 %	Overdrive solenoid valve	34	Overdrive solenoid valve system (23-12)
			Data list No. 29 (1) 0 km/h (4) 50 km/h	Vehicle speed sensor	–	Vehicle speed sensor system (23-19)
			Data list No. 22 (4) 1,800 – 2,100 r/min	Input shaft speed sensor	22	Input shaft speed sensor system (23-10)
			Data list No. 23 (4) 1,800 – 2,100 r/min	Output shaft speed sensor	23	Output shaft speed sensor system (23-11)
7	Selector lever position: Sports mode (Carry out on a flat and straight road.)	Selector lever position and vehicle speed (1) Release the accelerator pedal fully while driving at 50 km/h in 3rd gear. (2) Driving at constant speed of 50 km/h in 3rd gear.	Data list No. 36 (1) 0 % (2) Approx. 70 – 90 %	Damper clutch control solenoid valve	36 52	Damper clutch control solenoid valve system (23-13)
			Data list No. 52 (1) Approx. 100 – 300 r/min (2) Approx. 0 – 10 r/min			

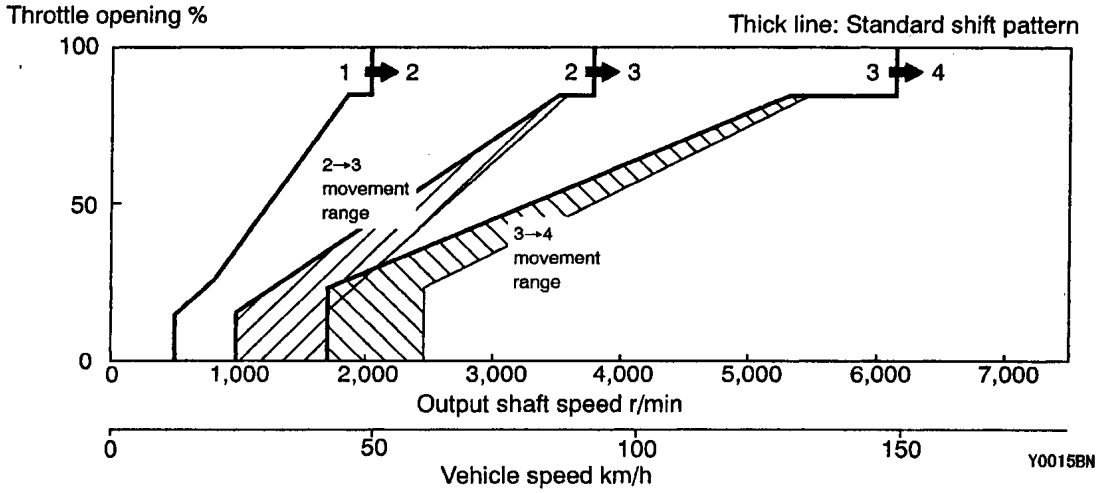
No.	State prior to test and operation	Test and operation	Judgement value	Check item	Diagnosis code No.	Inspection procedure page if there is an abnormality
8	Use the MUT-II to stop the INVECS-II function. Selector lever position: D (Carry out on a flat and straight road.)	Monitor data list No. 11, 23, and 63 with the MUT-II. (1) Accelerate to 4th gear at a throttle position sensor output of 1.5V (accelerator opening angle of 30 %). (2) Gently decelerate to a standstill. (3) Accelerate to 4th gear at a throttle position sensor output of 2.5 V (accelerator opening angle of 50%). (4) While driving at 60 km/h in 4th gear, shift down to 3rd (5) While driving at 40 km/h in 3rd gear, shift down to 2nd (6) While driving at 20 km/h in 2nd gear, shift down to 1st	For (1), (2) and (3), the reading should be the same as the specified output shaft speed and no abnormal shocks should occur. For (4), (5) and (6), downshifting should occur immediately after the shifting operation is made.	Malfunction when shifting	–	Shocks and running up (23-31)*
				Displaced shifting points	–	All points (23-32)*
					–	Some points (23-33)*
				Does not shift	–	No diagnosis code (23-33)*
					22	Input shaft speed sensor system (23-10)
					23	Output shaft speed sensor system (23-11)
				Does not shift from 1 to 2 or 2 to 1	31	Low and reverse solenoid valve system (23-9)
					33	Second solenoid valve system (23-9)
					41	1st gear ratio is not specified (23-14)
					42	2nd gear ratio is not specified (23-14)
				Does not shift from 2 to 3 or 3 to 2	33	Second solenoid valve system (23-9)
					34	Overdrive solenoid valve system (23-9)
					42	2nd gear ratio is not specified (23-14)
					43	3rd gear ratio is not specified (23-14)
				Does not shift from 3 to 4 or 4 to 3	32	Underdrive solenoid valve system (23-9)
					33	Second solenoid valve system (23-9)
					43	3rd gear ratio is not specified (23-14)
					44	4th gear ratio is not specified (23-14)

No.	State prior to test and operation	Test and operation	Judgement value	Check item	Diagnosis code No.	Inspection procedure page if there is an abnormality
9	Selector lever position: N (Carry out on a flat and straight road.)	Monitor data list No. 22 and No. 23 with the MUT-II. (1) Move selector lever to R range, drive at constant speed of 10 km/h.	The ratio between data list No. 22 and No. 23 should be the same as the gear ratio when reversing.	Does not shift	22	Input shaft speed sensor system (23-10)
					23	Output shaft speed sensor system (23-11)
					46	Reverse gear ratio is not specified (23-14)

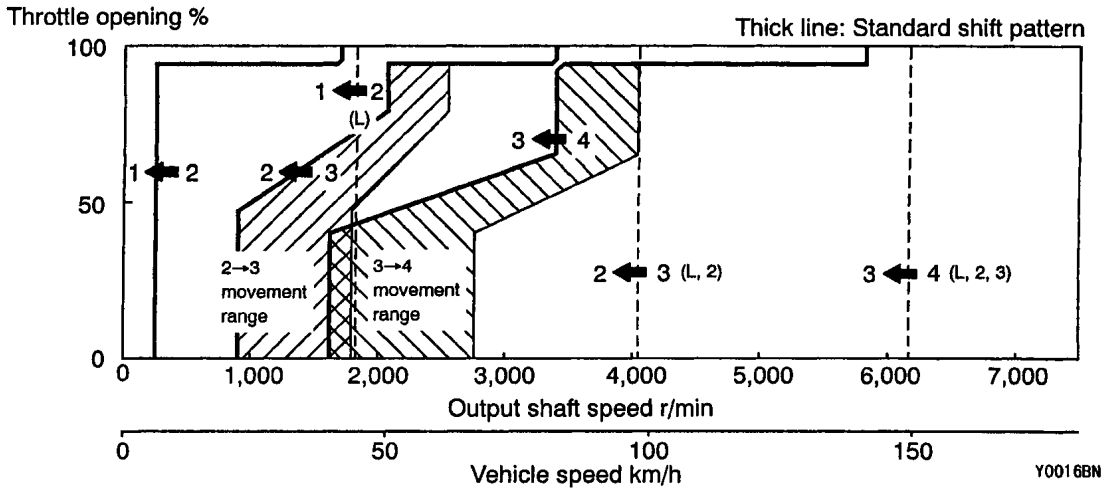
SHIFT PATTERN

<MPI>

UPSHIFT PATTERN



DOWNSHIFT PATTERN



<GDI>

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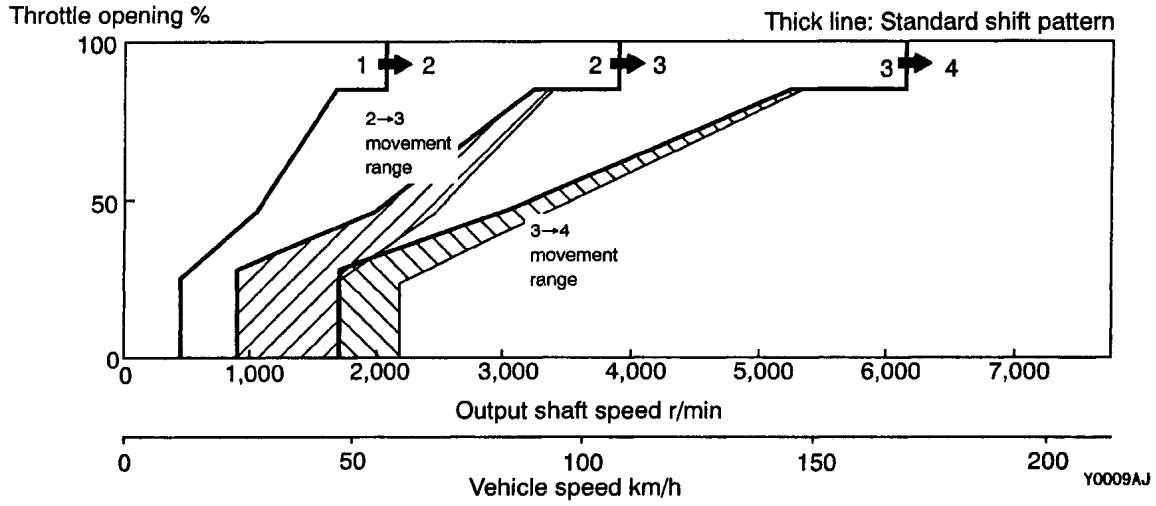

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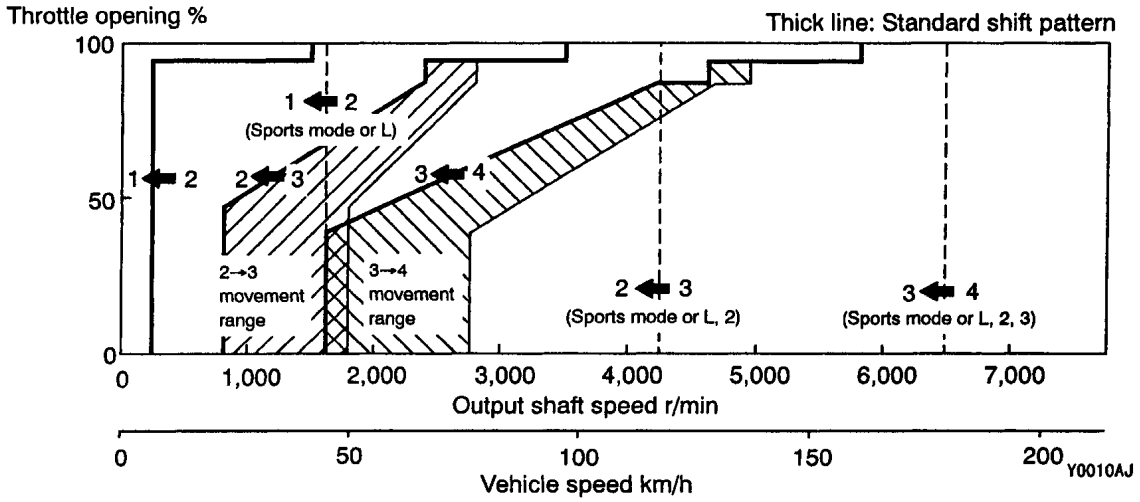


INSPECTION CHART FOR DIAGNOSIS CODE

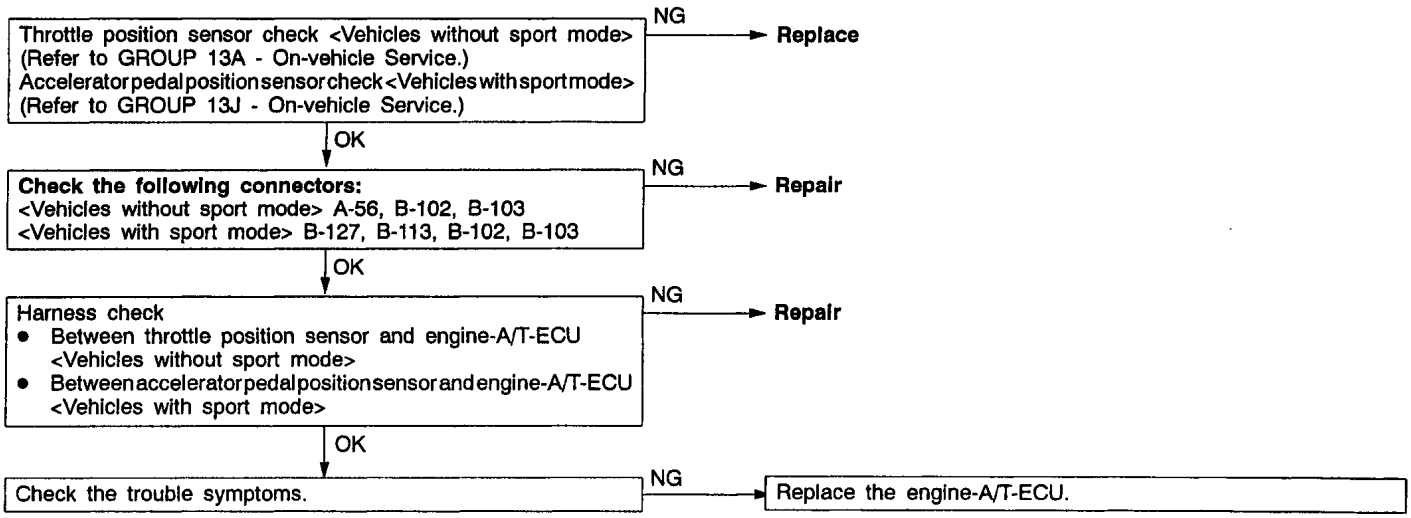
Code	Diagnosis item		Reference page
11	Throttle position sensor system (TPS) <Vehicles without sport mode> Accelerator pedal position sensor system (APS) <Vehicles with sport mode>	Short circuit	23-8
12		Open circuit	23-8
14		Sensor maladjustment	23-8
15	A/T fluid temperature sensor system	Open circuit	23-9
21	Crank angle sensor system	Open circuit	23-9
22	Input shaft speed sensor system	Short circuit/open circuit	23-10
23	Output shaft speed sensor system	Short circuit/open circuit	23-11
25	Wide open throttle switch system	Short circuit	23-11
26	Stop lamp switch system	Short circuit/open circuit	23-12
31	Low and reverse solenoid valve system	Short circuit/open circuit	23-12
32	Underdrive solenoid valve system	Short circuit/open circuit	23-12

Code	Diagnosis item		Reference page
33	Second solenoid valve system	Short circuit/open circuit	23-12
34	Overdrive solenoid valve system	Short circuit/open circuit	23-12
36	Damper control clutch solenoid valve system	Short circuit/open circuit	23-13
41	1st gear ratio does not meet the specification		23-14
42	2st gear ratio does not meet the specification		23-14
43	3rd gear ratio does not meet the specification		23-14
44	4th gear ratio does not meet the specification		23-14
46	Reverse gear ratio does not meet the specification		23-14
51	Abnormal communication with engine-ECU		23-15
52	Damper control clutch solenoid valve system	Defective system	23-13
54	A/T Control relay system	Short circuit to earth/ open circuit	23-15
56	N range lamp system	Short circuit to earth	23-15

INSPECTION PROCEDURES FOR DIAGNOSIS CODES

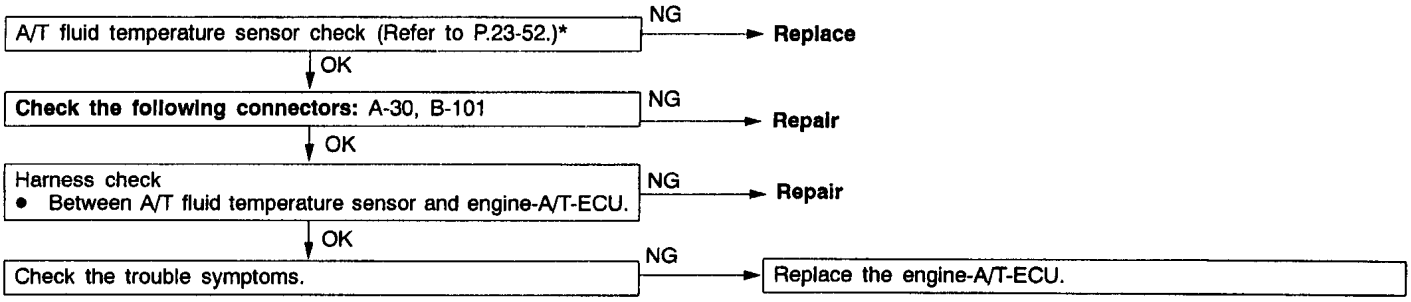
On GDI engine vehicles, the ECU has been changed from the A/T-ECU to the engine-A/T-ECU. Due to this change, the INSPECTION PROCEDURES FOR DIAGNOSIS CODES have been changed as follows:

Code No. 11, 12, 14 Throttle position sensor system (TPS) <Vehicles without sport mode>, Accelerator pedal position sensor (APS) <Vehicles with sport mode>	**Probable cause**
If the APS output voltage is 4.8 V or higher when the engine is idling, the output is judged to be too high and diagnosis code No. 11 is output. If the TPS or APS output voltage is 0.2 V or lower at times other than when the engine is idling, the output is judged to be too low and diagnosis code No. 12 is output. If the TPS or APS output voltage is 0.2 V or lower or if it is 1.2 V or higher when the engine is idling, the TPS or APS adjustment is judged to be incorrect and diagnosis code No. 14 is output.	• Malfunction of the throttle position sensor <Vehicles without sport mode> • Malfunction of the accelerator pedal position sensor <Vehicles with sport mode> • Malfunction of connector • Malfunction of the engine-A/T-ECU



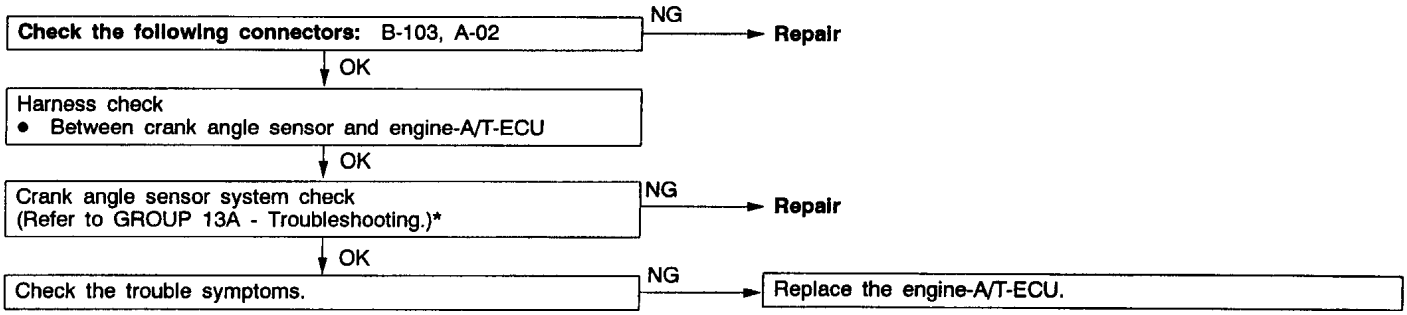
Code No. 15 A/T fluid temperature sensor system	Probable cause
If the A/T fluid temperature sensor output voltage is 2.6 V or more even after driving for 10 minutes or more (if the A/T fluid temperature does not increase), it is judged that there is an open circuit in the A/T fluid temperature sensor and diagnosis code No. 15 is output.	• Malfunction of the A/T fluid temperature sensor • Malfunction of connector • Malfunction of the engine-A/T-ECU

*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).



Code No. 21 Crank angle sensor system	Probable cause
If no output pulse is detected from the crank angle sensor for 5 seconds or more while driving at 25 km/h or more, it is judged that there is an open circuit in the crank angle sensor and diagnosis code No. 21 is output.	• Malfunction of the crank angle sensor • Malfunction of connector • Malfunction of the engine-A/T-ECU

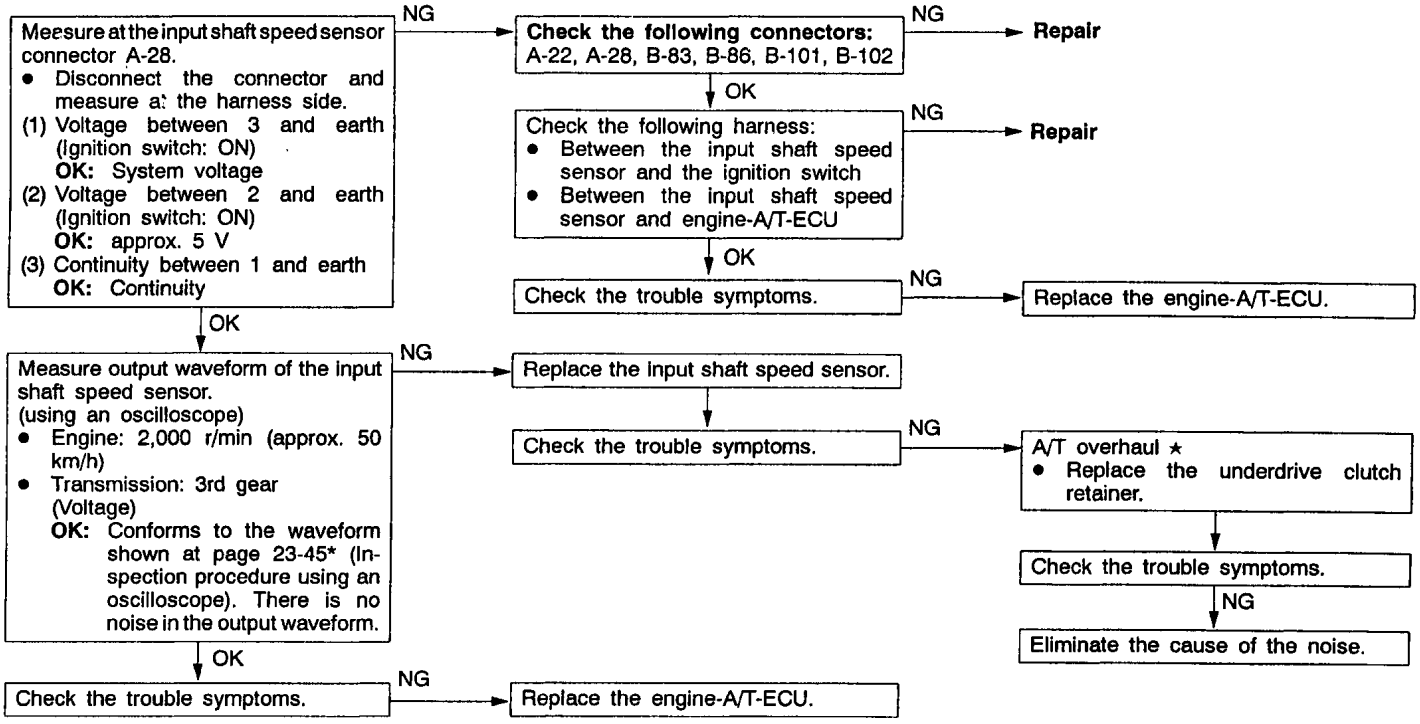
*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).



Code No. 22 Input shaft speed sensor system	Probable cause
If no output pulse is detected from the input shaft speed sensor for 1 second or more while driving in 3rd or 4th gear at a speed of 30 km/h or more, there is judged to be an open circuit or short-circuit in the input shaft speed sensor and diagnosis code No. 22 is output. If diagnosis code No. 22 is output four times, the transmission is locked into 3rd gear (D range) or 2nd gear (downshifting at Sport mode) as a fail-safe measure, and the N range lamp flashes at a frequency of 1 Hz.	• Malfunction of the input shaft speed sensor • Malfunction of the underdrive clutch retainer • Malfunction of connector • Malfunction of the engine-A/T-ECU

*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).

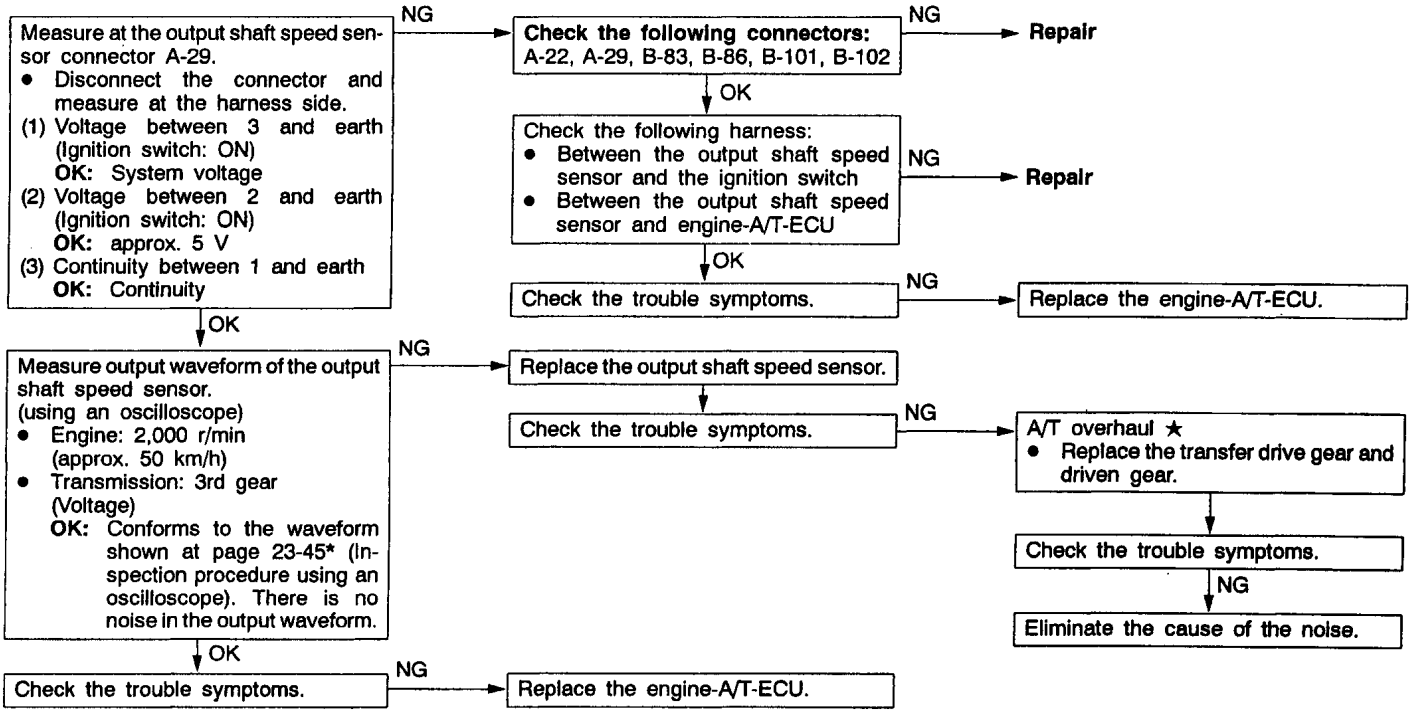
★: Refer to the Transmission Workshop Manual.



Code No. 23 Output shaft speed sensor system	Probable cause
If the output from the output shaft speed sensor is continuously 50% lower than the vehicle speed for 1 second or more while driving in 3rd or 4th gear at a speed of 30 km/h or more, there is judged to be an open circuit or short-circuit in the output shaft speed sensor and diagnosis code No. 23 is output. If diagnosis code No. 23 is output four times, the transmission is locked into 3rd gear (D range) or 2nd gear (downshifting at Sport mode) as a fail-safe measure, and the N range lamp flashes at a frequency of 1 Hz.	• Malfunction of the output shaft speed sensor • Malfunction of the transfer drive gear or driven gear • Malfunction of connector • Malfunction of the engine-A/T-ECU

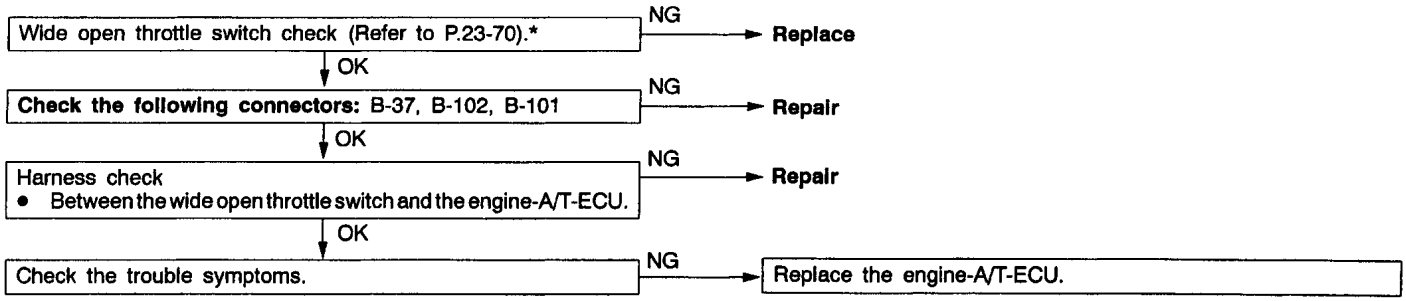
*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).

★: Refer to the Transmission Workshop Manual.



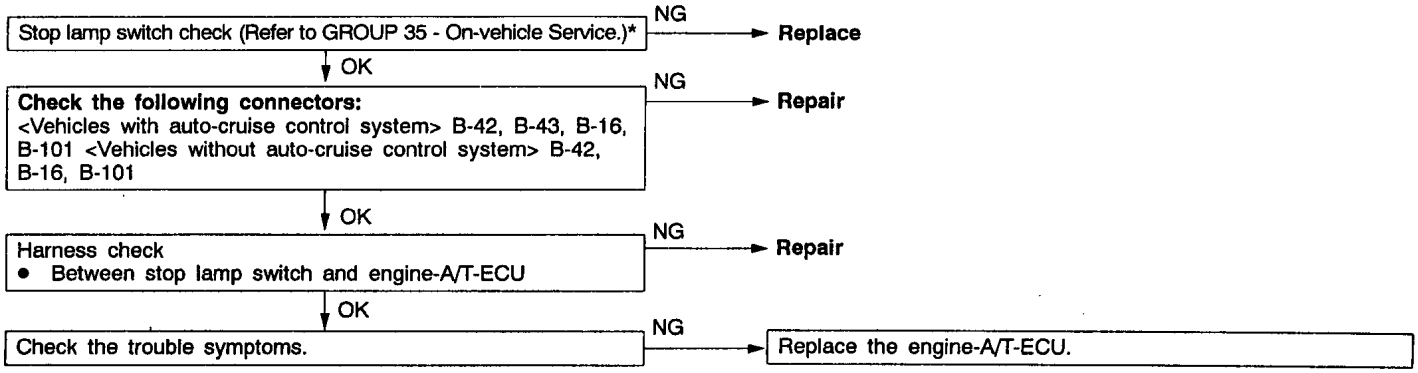
Code No. 25 Wide open throttle switch system	Probable cause
If the wide open throttle switch is on for 1 second or more with the throttle valve opening angle at 70% or less, it is judged that there is a short circuit in the wide open throttle switch and diagnosis code No. 25 is output.	• Malfunction of the wide open throttle switch • Malfunction of connector • Malfunction of the engine-A/T-ECU

*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).



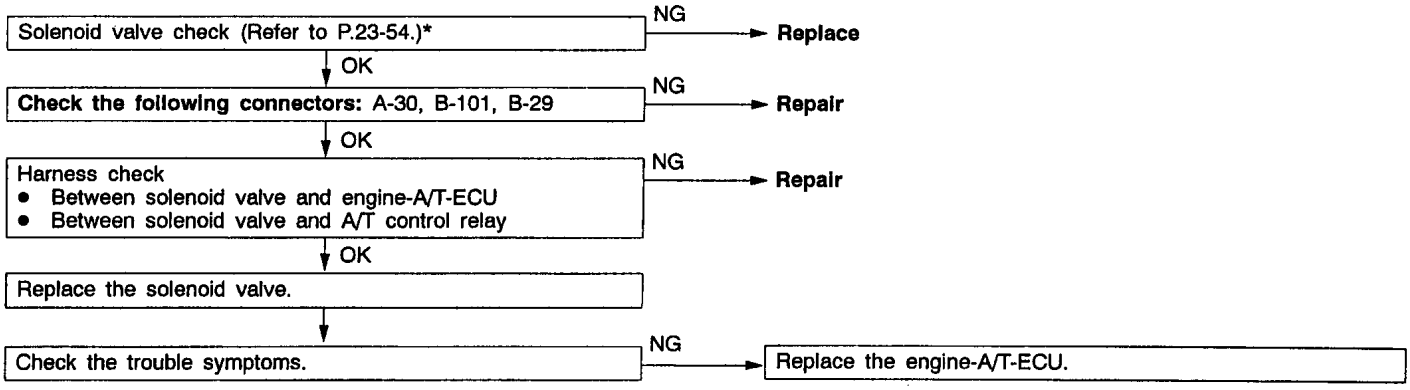
Code No. 26 Stop lamp switch system	Probable cause
If the stop lamp switch is on for 5 minutes or more while driving, it is judged that there is a short circuit in the stop lamp switch and diagnosis code No. 26 is output.	• Malfunction of the stop lamp switch • Malfunction of connector • Malfunction of the engine-A/T-ECU

*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).



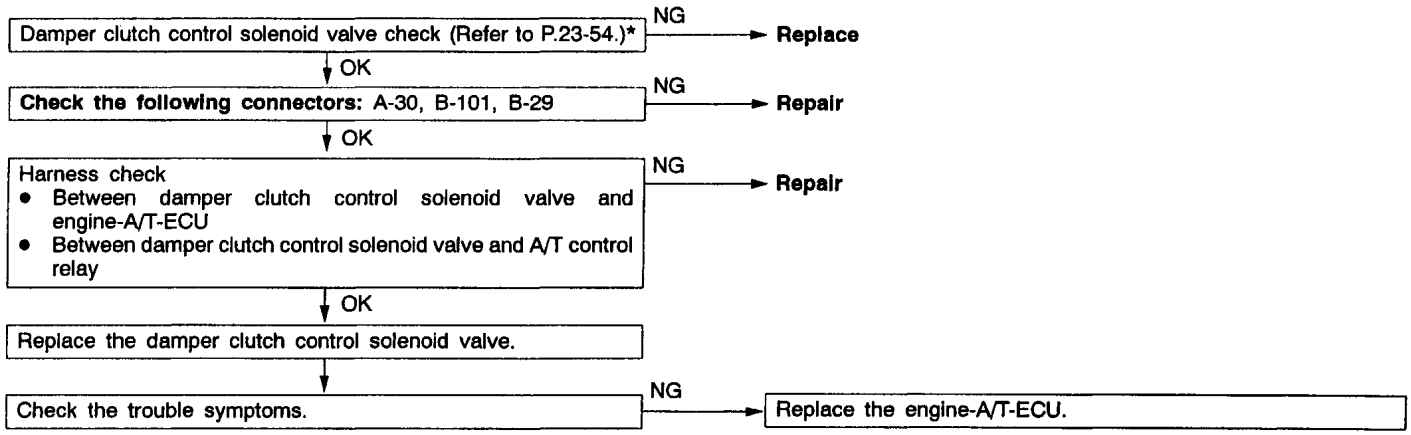
Code No. 31 Low and reverse solenoid valve system Code No. 32 Underdrive solenoid valve system Code No. 33 Second solenoid valve system Code No. 34 Overdrive solenoid valve system	Probable cause
If the resistance value for a solenoid valve is too large or too small, it is judged that there is a short-circuit or an open circuit in the solenoid valve and the respective diagnosis code is output. The transmission is locked into 3rd gear as a fail-safe measure, and the N range lamp flashes at a frequency of 1 Hz.	• Malfunction of solenoid valve • Malfunction of connector • Malfunction of the engine-A/T-ECU

*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).



Code No. 36, 52 Damper clutch control solenoid valve system	Probable cause
If the resistance value for the damper clutch control solenoid valve is too large or too small, it is judged that there is a short-circuit or an open circuit in the damper clutch control solenoid valve and diagnosis code No. 36 is output. If the drive duty rate for the damper clutch control solenoid valve is 100 % for a continuous period of 4 seconds or more, it is judged that there is an abnormality in the damper clutch control system and diagnosis code No. 52 is output. When diagnosis code No. 36 is output, the transmission is locked into 3rd gear as a fail-safe measure, and the N range lamp flashes at a frequency of 1 Hz.	• Malfunction of the damper clutch control solenoid valve • Malfunction of connector • Malfunction of the engine-A/T-ECU

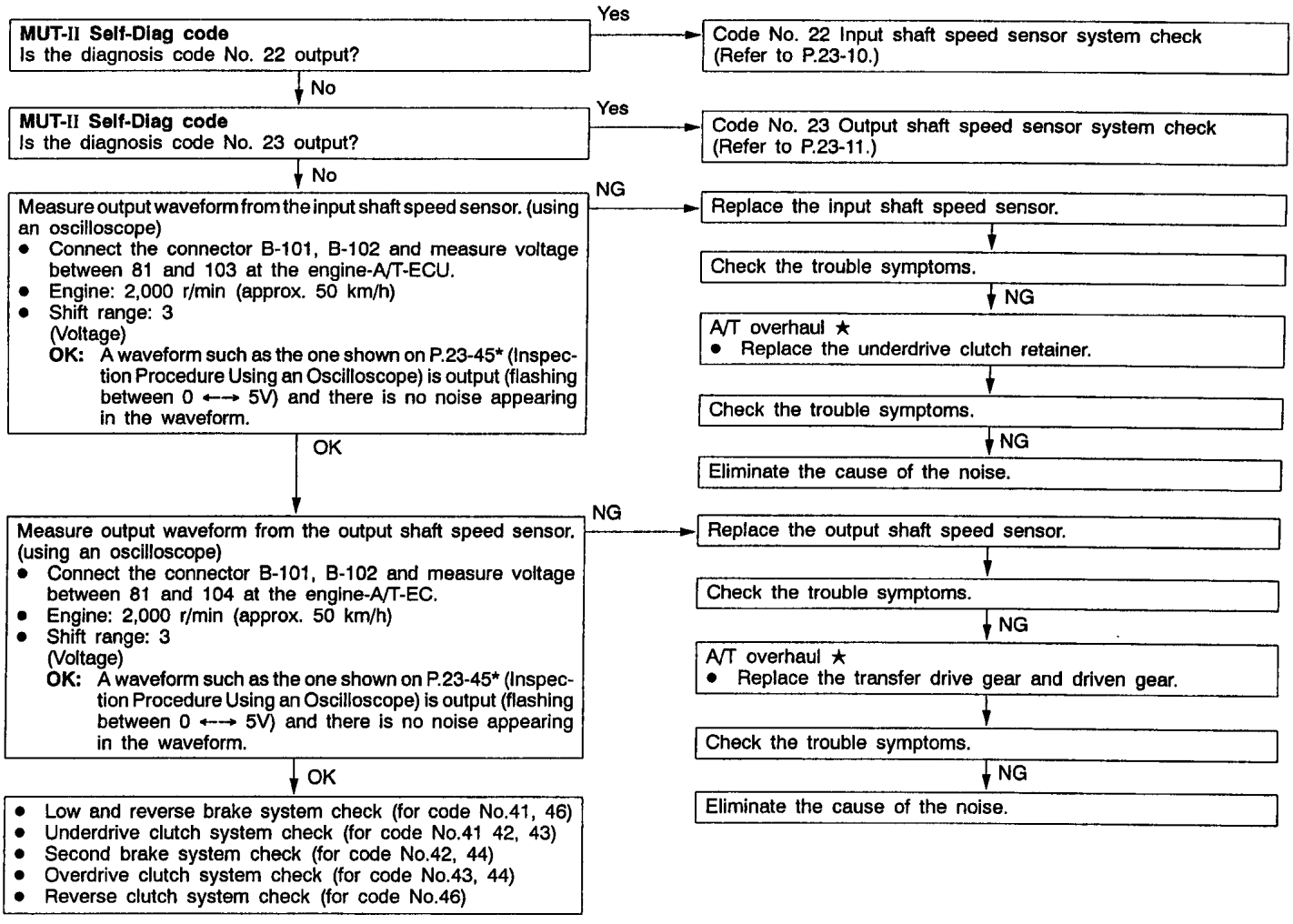
*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).



Code No. 41 1st gear ratio does not meet the specification 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	Probable cause
If the output from the output shaft speed sensor multiplied by each gear ratio is not the same as the output from the input shaft speed sensor after shifting to each gear has been completed, each diagnosis code is output. If each diagnosis code is output four times, the transmission is locked into 3rd gear as a fail-safe measure, and the N range lamp flashes at a frequency of 1 Hz.	• Malfunction of the input shaft speed sensor • Malfunction of the output shaft speed sensor • Malfunction of the underdrive clutch retainer • Malfunction of the transfer drive gear or driven gear • Malfunction of the low and reverse brake system (for code No.41, 46) • Malfunction of the underdrive clutch system (for code No.41 42, 43) • Malfunction of the second brake system (for code No.42, 44) • Malfunction of the overdrive clutch system (for code No.43, 44) • Malfunction of the reverse clutch system (for code No.46) • Noise generated

*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).

★: Refer to the Transmission Workshop Manual.

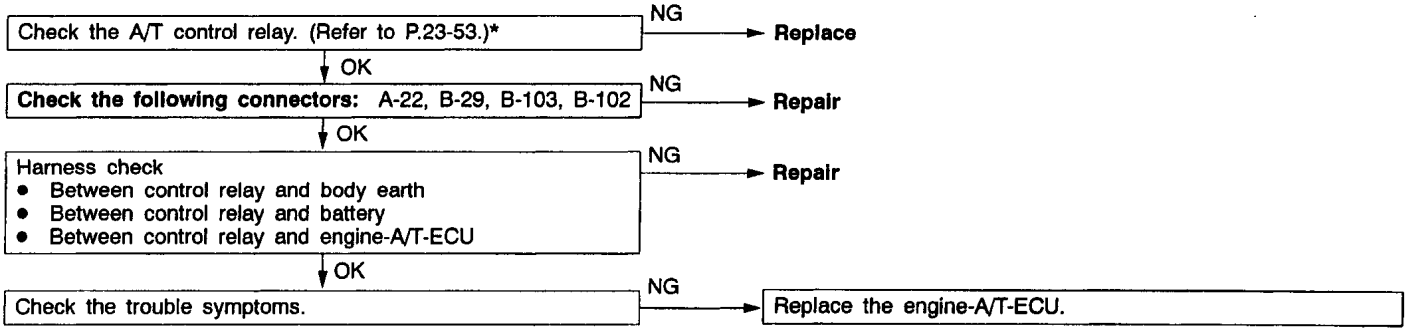


Code No. 51 Abnormal communication with engine-A/T-ECU	Probable cause
If normal communication is not possible for a continuous period of 1 second or more when the ignition switch is at the ON position, the battery voltage is 10 V or more and the engine speed is 450 r/min or more, diagnosis code No. 51 is output. Diagnosis code No. 51 is also output if the data being received is abnormal for a continuous period of 4 seconds under the same conditions.	• Malfunction of connector • Malfunction of the engine-A/T-ECU

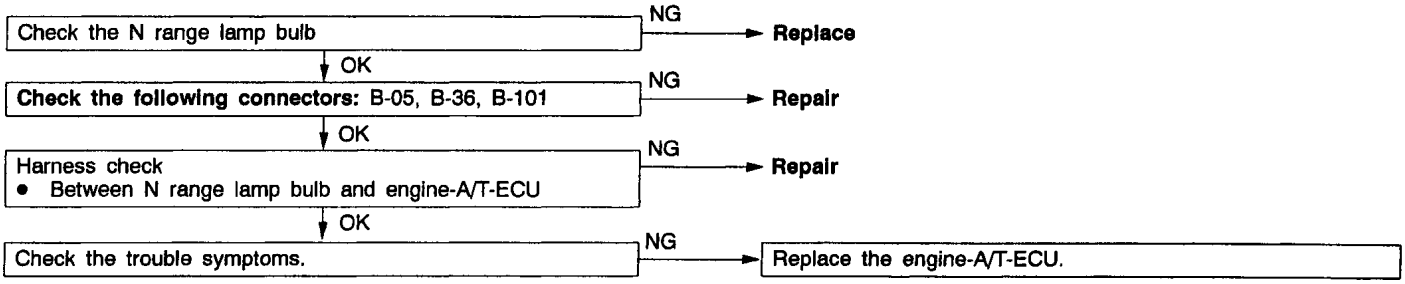
Replace the engine-A/T-ECU.

Code No. 54 A/T control relay system	Probable cause
If the A/T control relay voltage is less than 7 V after the ignition switch has been turned ON, it is judged that there is an open circuit or a short-circuit in the A/T control relay earth and diagnosis code No. 54 is output. Then the transmission is locked into 3rd gear as a fail-safe measure, and the N range lamp flashes at a frequency of 1 Hz.	• Malfunction of the A/T control relay • Malfunction of connector • Malfunction of the engine-A/T-ECU

*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).



Code No. 56 N range lamp system	Probable cause
If the N range signal is off after an N range lamp illumination instruction (ON instruction) has been given, it is judged that there is a short-circuit in the N range lamp earth and diagnosis code No. 56 is output.	• Malfunction of the N range lamp bulb • Malfunction of connector • Malfunction of the engine-A/T-ECU



INSPECTION CHART FOR TROUBLE SYMPTOMS

*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).

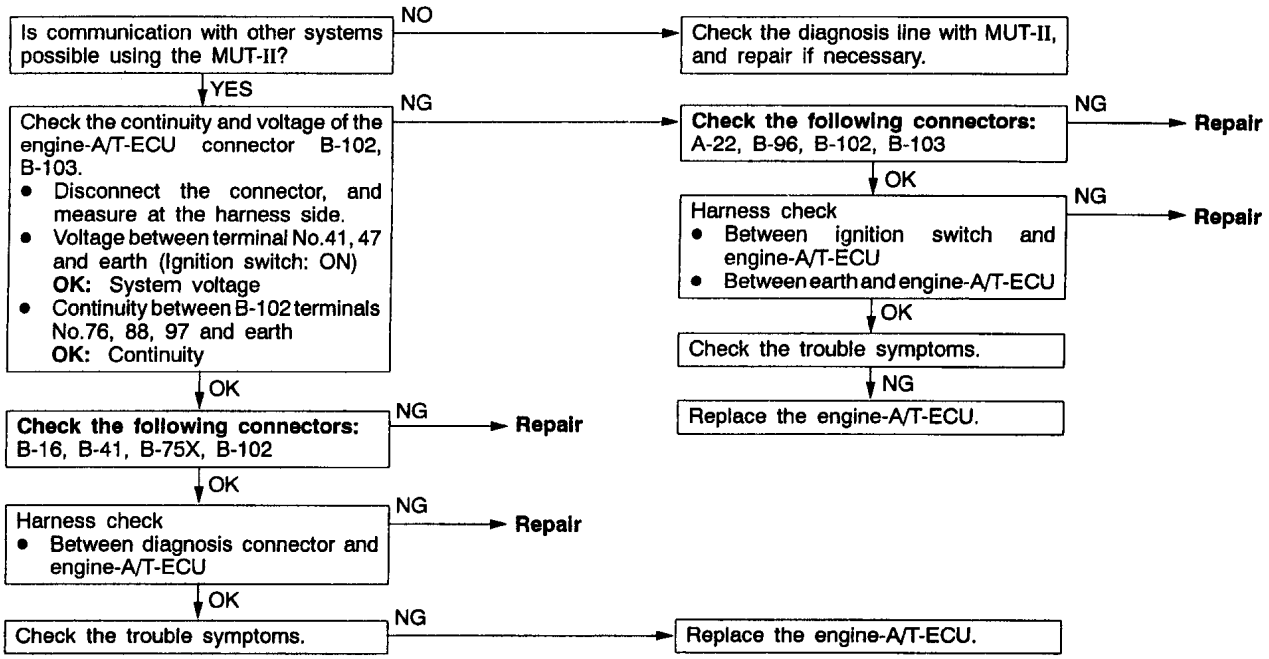
Trouble symptom		Inspection procedure No.	Reference page
Communication with MUT-II is not possible		1	23-17
Driving impossible	Starting impossible	2	23-27*
	Does not move forward	3	23-27*
	Does not reverse	4	23-28*
	Does not move (forward or reverse)	5	23-28*
Malfunction when starting	Engine stalling when shifting	6	23-29*
	Shocks when changing from N to D and large time lag	7	23-29*
	Shocks when changing from N to R and large time lag	8	23-30*
	Shocks when changing from N to D, N to R and large time lag	9	23-31*
Malfunction when shifting	Shocks and running up	10	23-31*
Displaced shifting points	All points	11	23-32*
	Some points	12	23-33*
Does not shift	No diagnosis codes	13	23-33*
Malfunction while driving	Poor acceleration	14	23-34*
	Vibration	15	23-35*
Inhibitor switch system		16	23-17
Mode control switch system <Vehicles without sport mode>		17	23-18
Shift switch assembly system <Vehicles with sport mode>		18	23-18
Dual pressure switch system		19	23-19
Vehicle speed sensor system		20	23-19

INSPECTION PROCEDURES FOR TROUBLE SYMPTOMS

On GDI engine vehicles, the ECU has been changed from the A/T-ECU to the engine-A/T-ECU. Due to this change, the INSPECTION PROCEDURES FOR TROUBLE SYMPTOMS have been been changed as follows:

INSPECTION PROCEDURE 1

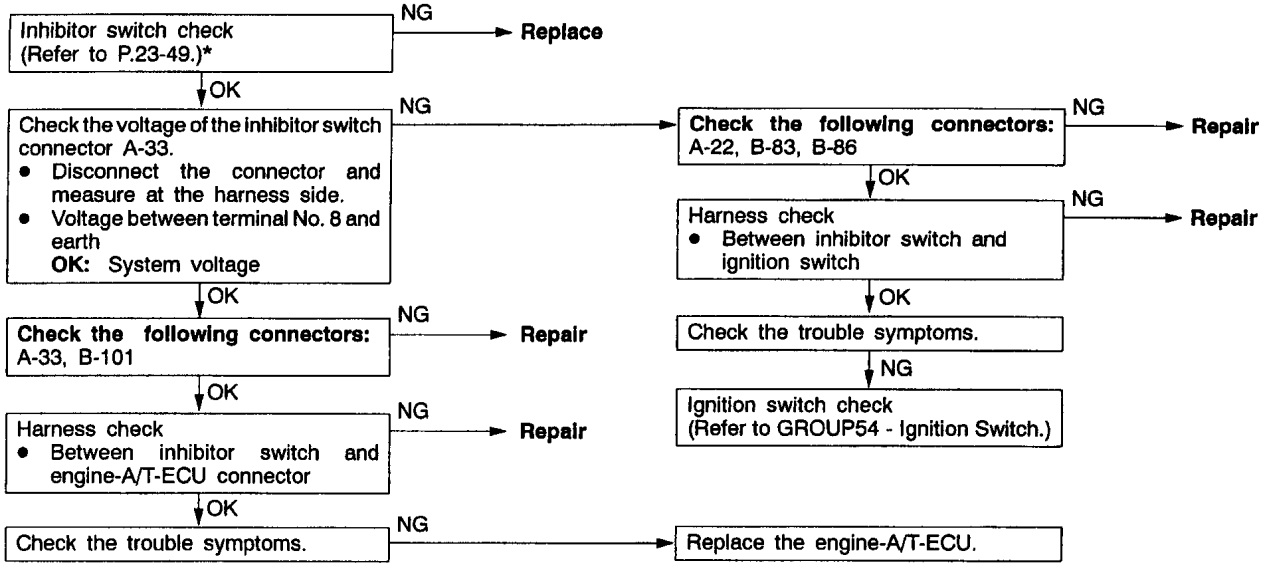
Communication with MUT-II is not possible	Probable cause
If communication with the MUT-II is not possible, the cause is probably a defective diagnosis line or the engine-A/T-ECU is not functioning.	• Malfunction of diagnosis line • Malfunction of connector • Malfunction of the engine-A/T-ECU



INSPECTION PROCEDURE 16

Inhibitor switch system	Probable cause
The cause is probably a malfunction of the inhibitor switch circuit, ignition switch circuit or a defective engine-A/T-ECU.	• Malfunction of the inhibitor switch • Malfunction of the ignition switch • Malfunction of connector • Malfunction of the engine-A/T-ECU

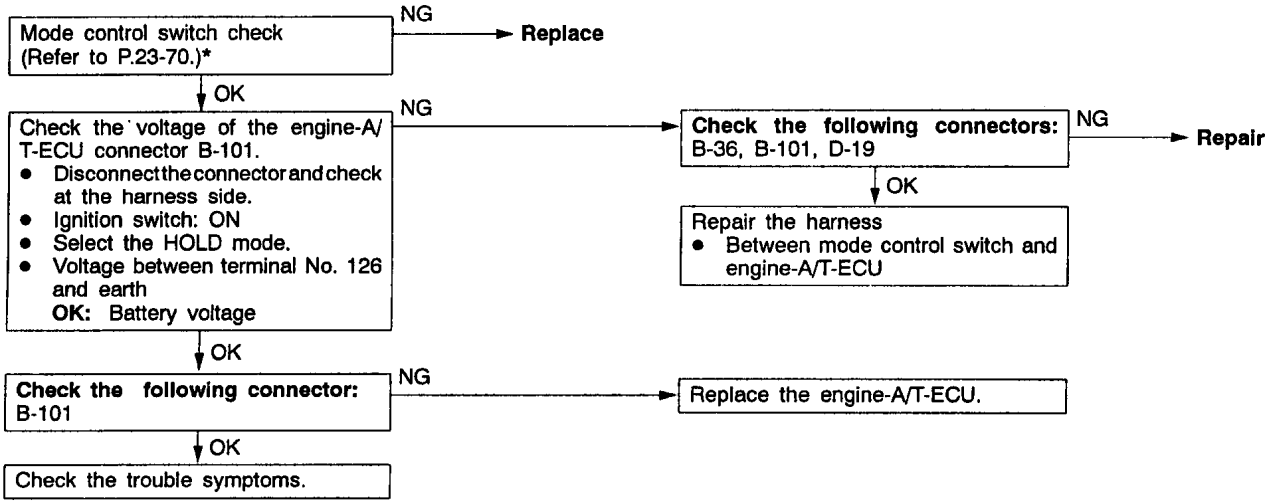
*: Refer to '96 CARISMA Workshop Manual (Pub. No.PWDE9502).



INSPECTION PROCEDURE 17

Mode control switch system <Vehicles without sport mode>	Probable cause
The cause is probably a defective mode control switch circuit or a defective engine-A/T-ECU.	• Malfunction of the mode control switch • Malfunction of connector • Malfunction of the engine-A/T-ECU

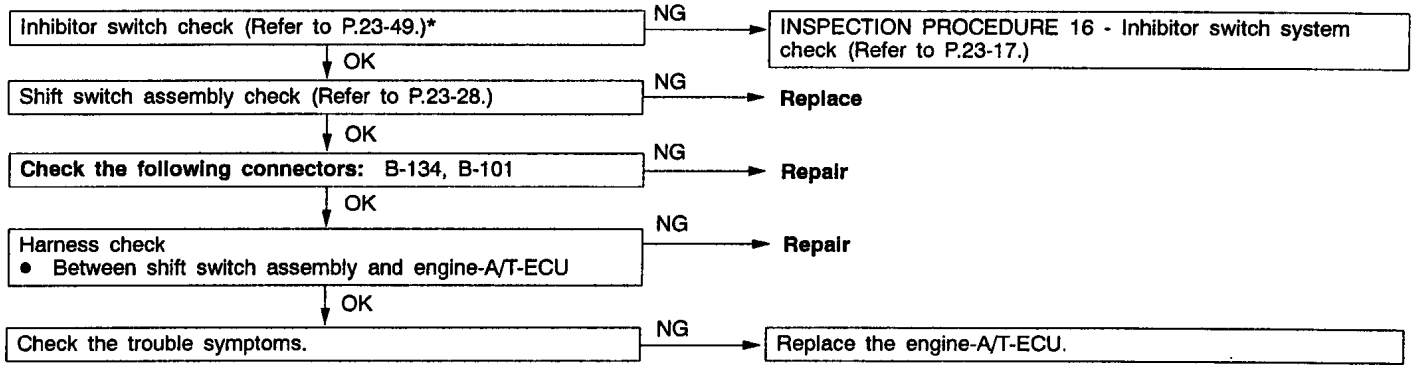
*: Refer to '96 CARISMA Workshop Manual (Pub. No.PWDE9502).



INSPECTION PROCEDURE 18

Shift switch assembly system <Vehicles with sport mode>	Probable cause
The cause is probably a malfunction of the inhibitor switch circuit, shift switch assembly circuit or a engine-A/T-ECU.	• Malfunction of the inhibitor switch • Malfunction of the shaft switch assembly • Malfunction of connector • Malfunction of the engine-A/T-ECU

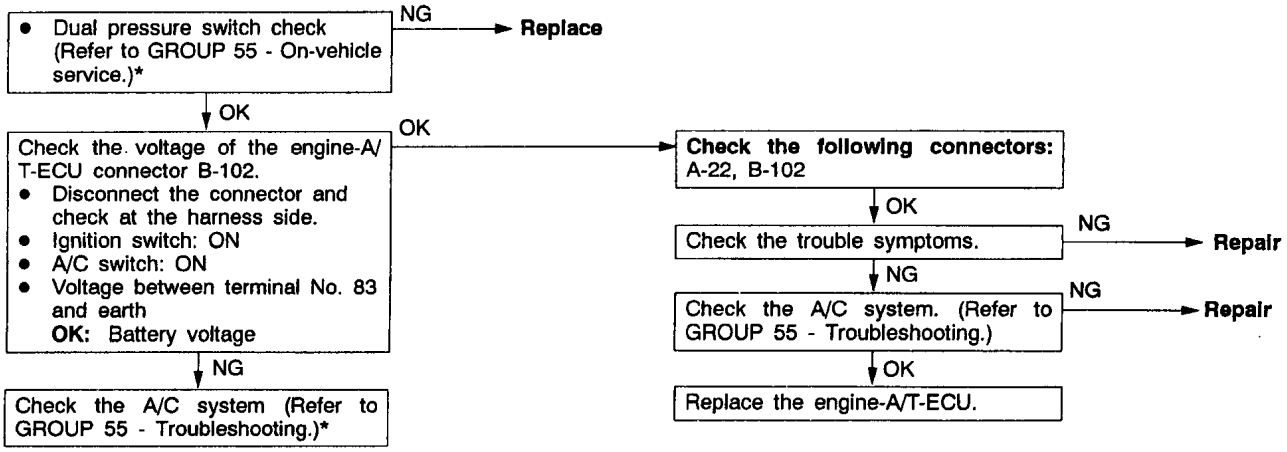
*: Refer to '96 CARISMA Workshop Manual (Pub. No.PWDE9502).



INSPECTION PROCEDURE 19

Dual pressure switch system	Probable cause
The cause is probably a defective dual pressure switch circuit or a defective engine-A/T-ECU.	• Malfunction of the dual pressure switch • Malfunction of connector • Malfunction of A/C system • Malfunction of the engine-A/T-ECU

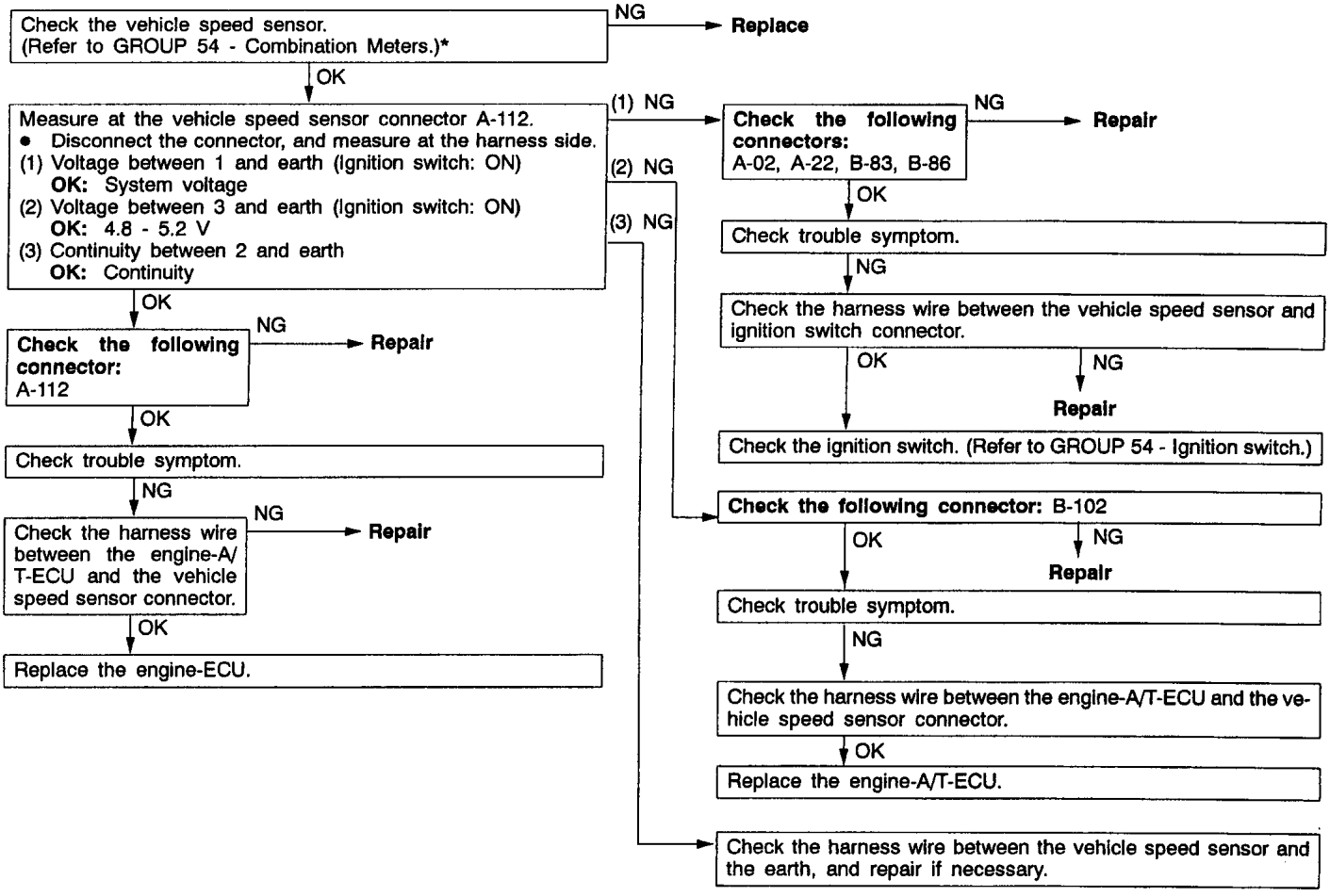
*: Refer to '96 CARISMA Workshop Manual (Pub. No.PWDE9502).



INSPECTION PROCEDURE 20

Vehicle speed sensor system	Probable cause
The cause is probably a defective vehicle speed sensor circuit or a defective engine-A/T-ECU.	• Malfunction of the vehicle speed sensor • Malfunction of connector • Malfunction of the engine-A/T-ECU

*: Refer to '96 CARISMA Workshop Manual (Pub. No.PWDE9502).



DATA LIST REFERENCE TABLE

Due to the introduction of vehicles with sports mode, item Nos. 61 and 63 have been changed as follows:

Item No.	Check item	Check requirement		Normal value
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
63	Shift position	Selector lever position: Sports mode	Driving at constant speed of 10 km/h in 1st gear	1st
			Driving at constant speed of 30 km/h in 2nd gear	2nd
			Driving at constant speed of 50 km/h in 3rd gear	3rd
			Driving at constant speed of 70 km/h in 4th gear	4th

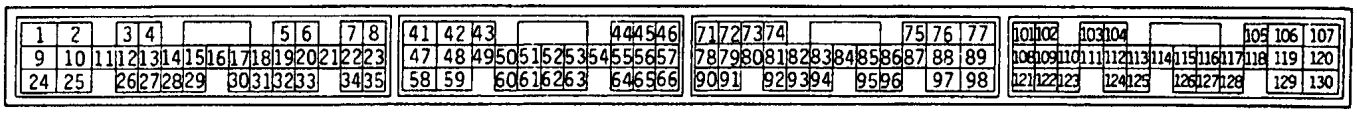
ACTUATOR TEST JUDGEMENT VALUE

Due to the introduction of vehicles with sports mode, item Nos. 7, 8, 9 and 10 have been added as follows:

Item No.	Check item	Test content	Check requirement	Normal value
7	1st indicator lamp	Illuminate each indicator lamp for three seconds according to the signal from the MUT-II.	Ignition switch: ON Selector lever position: P Engine: 0 r/min Vehicle speed: 0 km/h (Vehicles stopped) Throttle (Accelerator) opening voltage: Less than 0 V	Shift indicator lamp illuminates.
8	2nd indicator lamp			
9	3rd indicator lamp			
10	4th indicator lamp			

CHECK AT ENGINE-A/T-ECU TERMINALS

On GDI engine vehicles, the ECU has been changed from the A/T-ECU to the engine-A/T-ECU. Due to this change, the CHECK AT ENGINE-A/T-ECU TERMINALS has been changed as follows:



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Terminal No.	Check item	Check requirement	Standard value
45	Crank angle sensor	Engine: Idling	2.0 – 2.4 V
50	A/T control relay	Ignition switch: OFF	0 V
		Ignition switch: ON	System voltage
57	Sensor earth	Always	0 V
66	Backup power supply	Ignition switch: OFF	System voltage
76	Earth	Always	0 V
77	Solenoid valve power supply	Ignition switch: OFF	0 V
		Ignition switch: ON	System voltage
78	Throttle position sensor (TPS) <Vehicles without sport mode>	Accelerator pedal: Released (Engine stopped)	0.5 – 1.0 V
		Accelerator pedal: Depressed (Engine stopped)	4.5 – 5.0 V
80	Vehicle speed sensor	When stopped	0 V
		Move forward slowly	0 → 5 V flashing
83	A/C compressor load signal	A/C switch: OFF	0 V
		A/C switch: ON	0 V
84	Diagnosis control	–	–
85	Diagnosis output	Normal (No diagnosis code output)	0 → 5 V flashing
88	Earth	Always	0 V
89	Solenoid valve power supply	Ignition switch: OFF	0 V
		Ignition switch: ON	System voltage
95	Accelerator pedal position sensor (APS) <Vehicles with sport mode>	Accelerator pedal: Released (Engine stopped)	0.5 – 1.0 V
		Accelerator pedal: Depressed (Engine stopped)	4.5 – 5.0 V
97	Earth	Always	0 V
101	Inhibitor switch P	Selector lever position: P	System voltage
		Selector lever position: Other than above	0 V

Terminal No.	Check item	Check requirement	Standard value
102	Inhibitor switch D	Selector lever position: D	System voltage
		Selector lever position: Other than above	0 V
103	Input shaft speed sensor	Measure between terminal No. 81 and No.103 by an oscilloscope. Engine: 2,000 r/min Shift range: 3rd gear	Refer to P.23-45*, Oscilloscope inspection procedure.
104	Output shaft speed sensor	Measure between terminal No. 81 and No.104 by an oscilloscope. Engine: 2,000 r/min Shift range: 3rd gear	Refer to P.23-45*, Oscilloscope inspection procedure.
105	1st gear shift indicator lamp <Vehicles with sport mode>	Gear: 1st gear	System voltage
		Gear: Other than above	0 V
106	Second solenoid valve	Shift range: 2nd gear	System voltage
		Selector lever position: P	Approx. 7 – 9 V
107	Damper clutch control solenoid valve	Selector lever position: Sport mode (1st gear)	System voltage
		Selector lever position: Sport mode (50 km/h in 3rd gear)	Other than system voltage
108	Inhibitor switch R	Selector lever position: R	System voltage
		Selector lever position: Other than above	0 V
109	Inhibitor switch 3 <Vehicles without sport mode>	Selector lever position: 3	System voltage
		Selector lever position: Other than above	0 V
	Select switch <Vehicles with sport mode>	Selector lever position: Sport mode	System voltage
		Selector lever position: Other than above	0 V
110	Inhibitor switch L <Vehicles without sport mode>	Selector lever position: L	System voltage
		Selector lever position: Other than above	0 V
	Down shift switch <Vehicles with sport mode>	Selector lever position: Downshift and lever held	System voltage
		Selector lever position: Other than above	0 V
115	Wide-open throttle switch	Accelerator pedal: Released	4.5 – 5.5 V
		Accelerator pedal: Depressed	Less than 0.4 V
117	3rd gear shift indicator lamp <Vehicles with sport mode>	Shift range: 3rd gear	System voltage
		Shift range: Other than above	0 V
118	2nd gear shift indicator lamp <Vehicles with sport mode>	Shift range: 2nd gear	System voltage
		Shift range: Other than above	0 V
120	Underdrive solenoid valve	Shift range: 1st gear	System voltage
		Selector lever position: P	Approx. 7 – 9 V

Terminal No.	Check item	Check requirement	Standard value
121	Inhibitor switch N	Selector lever position: N	System voltage
121	Inhibitor switch N	Selector lever position: Other than above	0 V
122	Inhibitor switch 2 <Vehicles without sport mode>	Selector lever position: 2	System voltage
		Selector lever position: Other than above	0 V
	Upshift switch <Vehicles with sport mode>	Selector lever position: Upshift and lever held	System voltage
		Selector lever position: Other than above	0 V
123	Stop lamp switch	Brake pedal: Depressed	System voltage
		Brake pedal: Released	0 V
124	A/T fluid temperature sensor	A/T fluid temperature: 20°C (68°F)	3.8 – 4.0 V
		A/T fluid temperature: 40°C (104°F)	3.2 – 3.4 V
		A/T fluid temperature: 80°C (176°F)	1.7 – 1.9 V
126	Mode control switch <Vehicles without sport mode>	Select HOLD mode	System voltage
		Select AUTO mode	0 V
128	4th gear shift indicator lamp <Vehicles with sport mode>	Gear: 4th gear	System voltage
		Gear: Other than above	0 V
129	Low-reverse solenoid valve	Selector lever position: P	System voltage
		Shift range: 2nd gear	Approx. 7 – 9 V
130	Overdrive solenoid valve	Shift range: 3rd gear	System voltage
		Selector lever position: P	Approx. 7 – 9 V

TROUBLESHOOTING <A/T KEY INTERLOCK AND SHIFT LOCK MECHANISMS>

TROUBLE SYMPTOM TABLE

Symptom	Inspection procedure No.	Reference page
Can move selector lever from "P" to "R" without depressing brake pedal when ignition key is at positions other than "LOCK (OFF)"	1	23-24
Cannot move selector lever from "P" to "R" with brake pedal depressed when ignition key is at positions other than "LOCK (OFF)"	2	23-24
Can move selector lever from "P" to "R" with brake pedal depressed when ignition key is at "LOCK (OFF)"	3	23-25
Cannot move selector lever from "P" to "R" smoothly	4	23-25
Cannot move selector lever from "R" to "P"	5	23-25
Cannot turn ignition key to "LOCK (OFF)" when selector lever is at "P"	6	23-25
Can turn ignition key to "LOCK (OFF)" when selector lever is at positions other than "P"	7	23-25

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

INSPECTION PROCEDURE 1

Can move selector lever from "P" to "R" without depressing brake pedal when ignition key is at positions other than "LOCK (OFF)"	**Probable cause**
Lock cam or lock cable is suspected to be faulty.	• Malfunction of lock cam • Defective shift lock cable

Check by referring to the probable cases.

INSPECTION PROCEDURE 2

Cannot move selector lever from "P" to "R" with brake pedal depressed when ignition key is at positions other than "LOCK (OFF)"	**Probable cause**
Selector lever assembly, shift lock cable, key interlock cable transmission control cable or lock cam is suspected to be faulty.	• Malfunction of selector lever assembly • Malfunction of shift lock cable • Defective key interlock cable • Defective transmission control cable • Malfunction of lock cam

Check by referring to the probable cases.

INSPECTION PROCEDURE 3

Can move selector lever from "P" to "R" with brake pedal depressed when ignition key is at "LOCK (OFF)"	Probable cause
Lock cam or key interlock cable is suspected to be faulty.	• Malfunction of lock cam • Defective key interlock cable

Check by referring to the probable cases.

INSPECTION PROCEDURE 4

Cannot move selector lever from "P" to "R" smoothly	Probable cause
Key interlock cable, shift lock cable, lock cam or selector lever assembly is suspected to be faulty.	• Defective key interlock cable • Defective shift lock cable • Malfunction of lock cam • Malfunction of selector lever assembly

Check by referring to the probable cases.

INSPECTION PROCEDURE 5

Cannot move selector lever from "R" to "P"	Probable cause
Selector lever assembly or transmission control cable is suspected to be faulty.	• Malfunction of selector lever assembly • Defective transmission control cable

Check by referring to the probable cases.

INSPECTION PROCEDURE 6

Cannot turn ignition key to "LOCK (OFF)" when selector lever is at "P"	Probable cause
Lock cam key interlock cable or key cylinder slider is suspected to be faulty.	• Malfunction of lock cam • Defective key interlock cable • Malfunction of slider

Check by referring to the probable cases.

INSPECTION PROCEDURE 7

Can turn ignition key to "LOCK (OFF)" when selector lever is at positions other than "P"	Probable cause
Lock cam, key cylinder cover or key interlock cable is suspected to be faulty.	• Malfunction of lock cam • Defective key cylinder cover • Malfunction of key inter lock cable

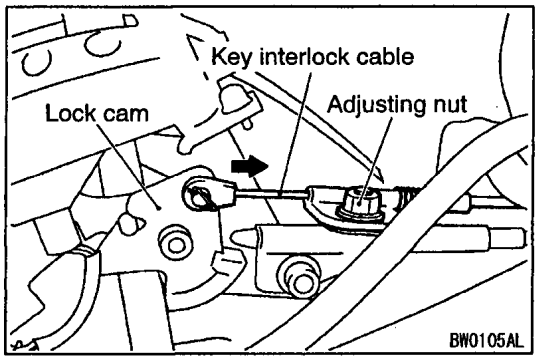
Check by referring to the probable cases.

ON-VEHICLE SERVICE

KEY INTERLOCK MECHANISM CHECK

1. Carry out the following check.

Inspection procedure	Inspection conditions		Check details (Normal condition)
1	Brake pedal: Depressed	Ignition switch position: "LOCK (OFF)" or pulled out	The selector lever cannot be moved from the "P" position to any other position when the pushbutton on the selector lever is not being pressed.
2		Ignition switch position: Other than "LOCK (OFF)" or pulled out	The selector lever can easily be moved from the "P" position to some other position when the pushbutton on the selector lever is being pressed.
3	Brake pedal: Released	Selector lever position: Other than "P"	The ignition switch will not turn to the "LOCK (OFF)" position.
4		Selector lever position: "P"	The ignition switch can turn smoothly to the "LOCK (OFF)" position.



2. When the above operations are defective, adjust the shift lock cable as follows:
   (1) Remove the front floor console, and then provisionally install the selector lever knob.
   (2) Move the selector lever to the "P" position.
   (3) Turn the ignition key to "LOCK (OFF)" position.
   (4) Loosen the locking nut of the key interlock cable.
   (5) Push the cable joint on the lock cam gently toward the arrow until the cable stops. Tighten the locking nut.

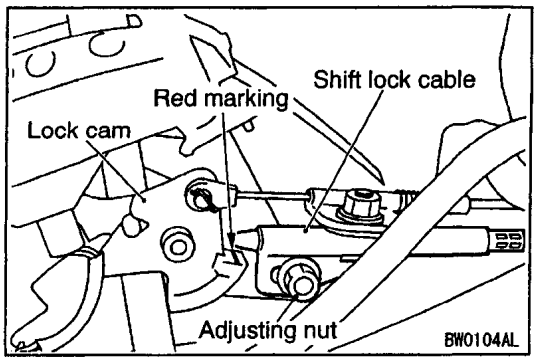
   Tightening torque: 12 Nm

   (6) Install the floor console.
3. After adjusting, check the operation once more. If the operation is still incorrect, replace the key interlock cable. (Refer to P.23-32.)

SHIFT LOCK MECHANISM CHECK

1. Carry out the following check.

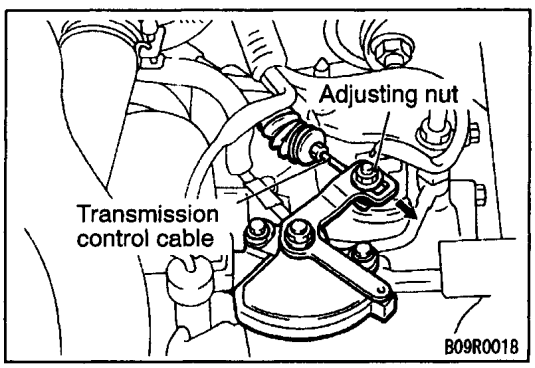
Inspection procedure	Inspection conditions		Check details (Normal condition)
1	Brake pedal: Depressed	Ignition switch position: "ACC"	The selector lever cannot be moved from the P position to any other position when the pushbutton on the selector lever is not being pressed.
2			The selector lever can easily be moved from the P position to some other position when the pushbutton on the selector lever is being pressed.
3	Brake pedal: Released		The selector lever can easily be moved from the R position to the P position when the pushbutton on the selector lever is being pressed.



2. If the above operations do not occur correctly, adjust the shift lock cable unit by the following procedure.
   (1) Remove the front floor console, and then provisionally install the selector lever knob.
   (2) Move the selector lever to the "P" position.
   (3) Turn the ignition key to "LOCK (OFF)" position.
   (4) Loosen the locking nut of the shift lock cable.
   (5) Tighten the locking nut so that the end of the shift lock cable comes above the red marking of the lock cam.

   Tightening torque: 12 Nm

   (6) Install the floor console.
3. After adjusting, check the operation once more. If the operation is still incorrect, replace the shift lock cable. (Refer to P.23-32.)

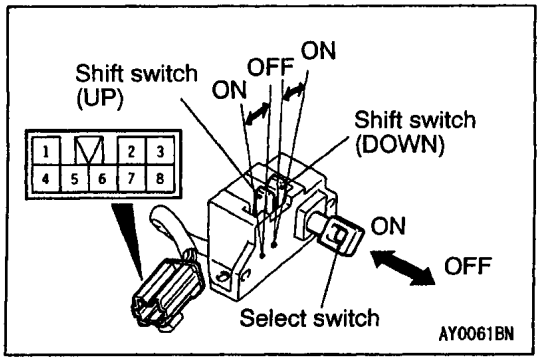


TRANSMISSION CONTROL CABLE ADJUSTMENT

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

Tightening torque: 12 Nm

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.



SHIFT SWITCH ASSEMBLY CONTINUITY CHECK

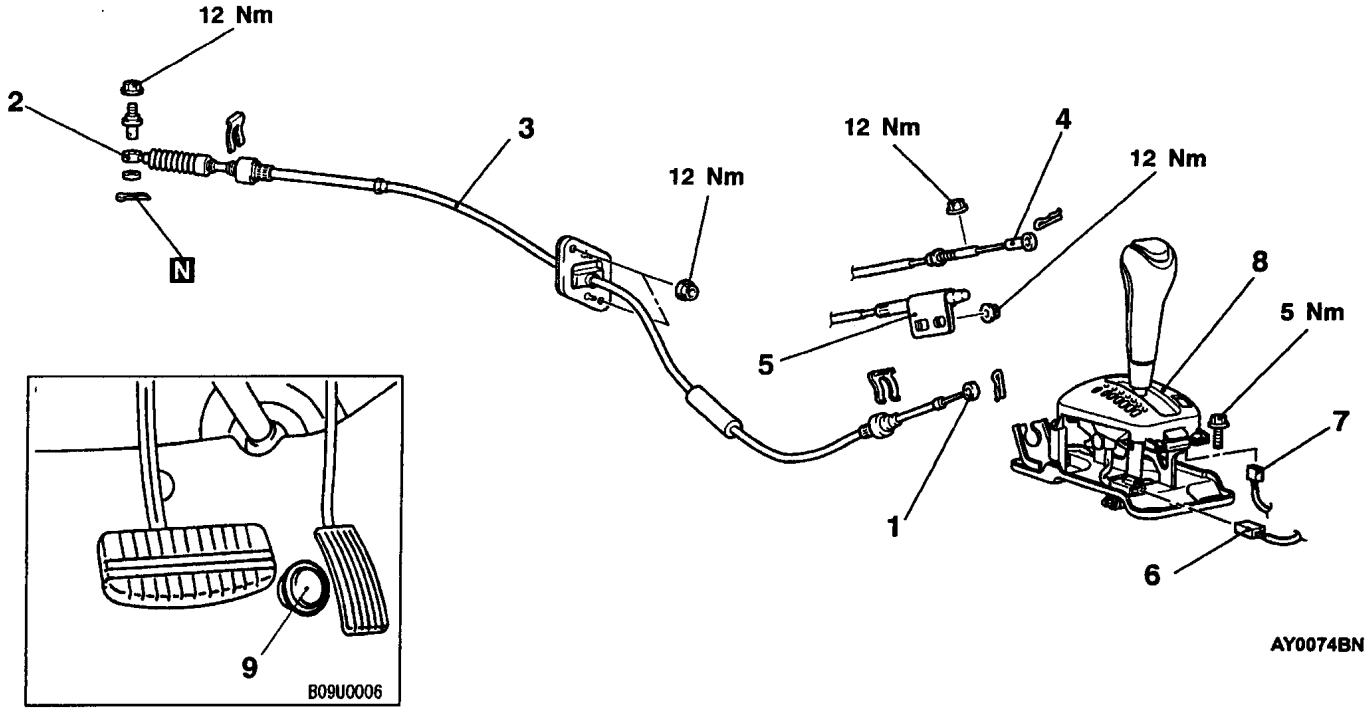
Switch position		Terminal No.					
		3	4	5	6	7	8
Select switch	ON	○					○
	OFF	○				○	
Shift switch (UP)	ON			○	○		
	OFF	○					○
Shift switch (DOWN)	ON		○		○		
	OFF	○					○

TRANSMISSION CONTROL

REMOVAL AND INSTALLATION

Caution: SRS
Be careful not to subject the SRS-ECU to any shocks during removal and installation of the transmission control cable and selector lever assembly.

Pre-removal and Post-installation Operation
Front Floor Console Assembly Removal and Installation
(Refer to GROUP 52A.)



Transmission control cable removal steps

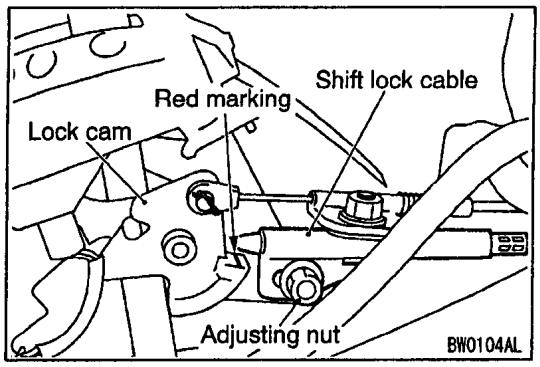
- Front floor console
1. Transmission control cable connection (Shift lever side)
▶C◀ 2. Transmission control cable connection (Transmission side)
- SRS-ECU
3. Transmission control cable

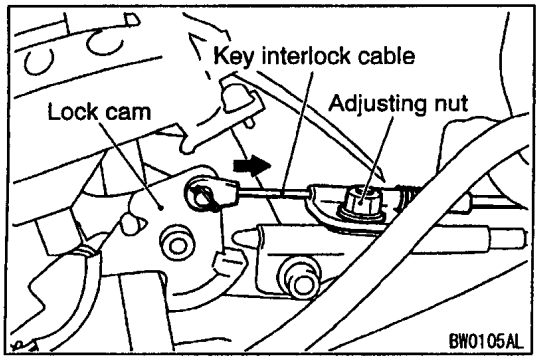
Selector lever assembly removal steps

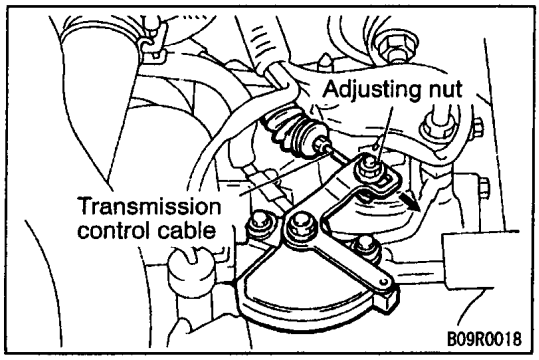
- Front floor console
1. Transmission control cable connection (Shift lever side)
▶B◀ 4. Key interlock cable connection (selector lever side)
▶A◀ 5. Shift lock cable connection (selector lever side)
6. Indicator lamp connector connection
7. Hold switch connector connection
8. Selector lever assembly

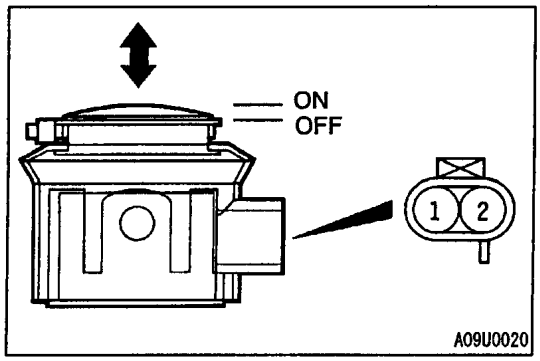
Wide open throttle switch removal

9. Wide open throttle switch









INSTALLATION SERVICE POINTS

▶A◀ SHIFT LOCK CABLE (SELECTOR LEVER SIDE) INSTALLATION

1. Provisionally install the selector lever knob, and then move the selector lever to the "P" position and turn the ignition switch to the "LOCK (OFF)" position.
2. Tighten the locking nut so that the end of the shift lock cable comes above the red marking of the lock cam.

Tightening torque: 12 Nm

▶B◀ KEY INTER LOCK CABLE (SELECTOR LEVER SIDE) INSTALLATION

1. Install the key interlock cable on the lock cam.
2. Install the spring and washer of the key interlock cable as shown.
3. While lightly pushing the cable coupling portion of the lock cam in the direction, tighten the nut to the specified torque.

Tightening torque: 12 Nm

▶C◀ 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.

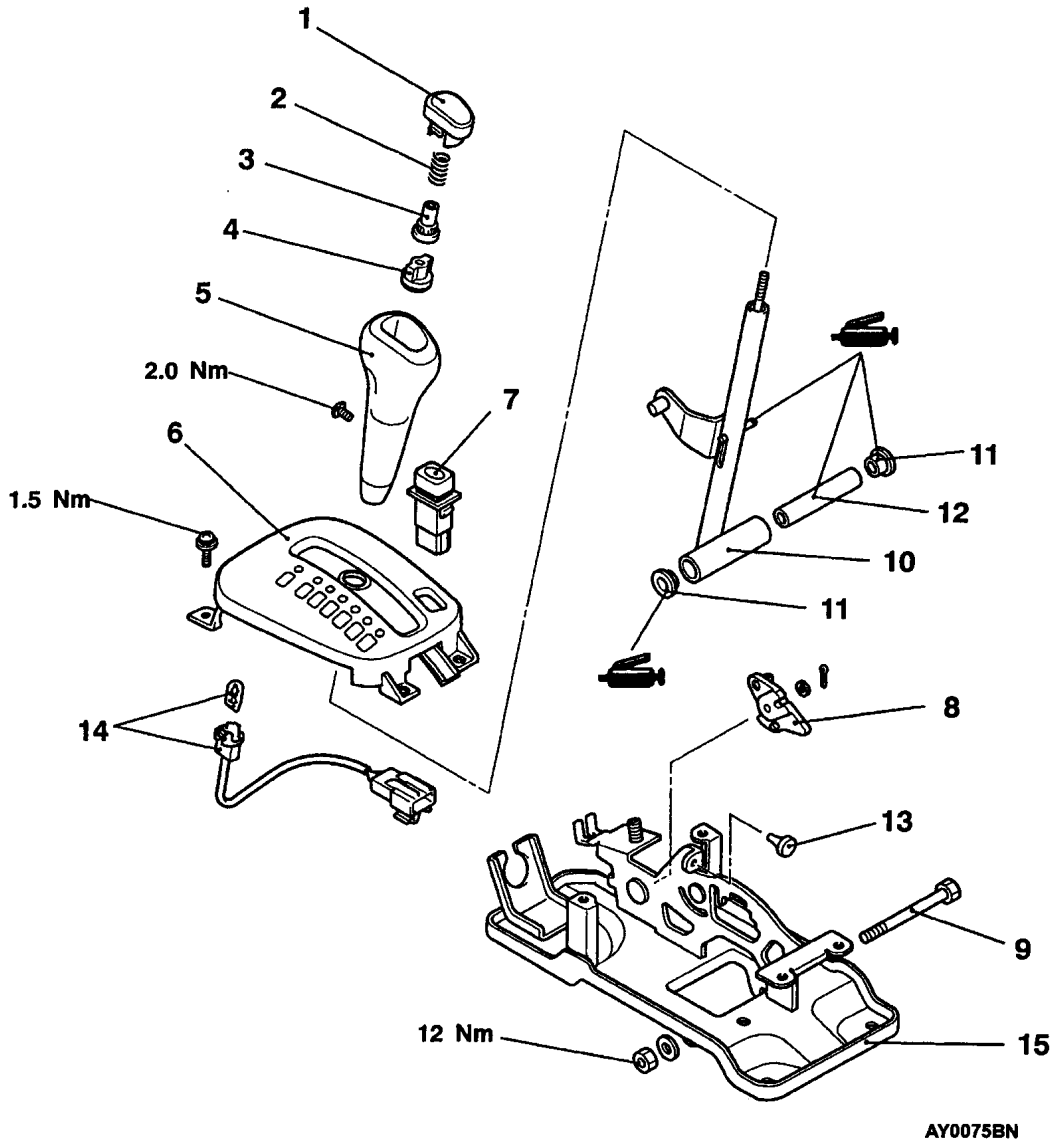
Tightening torque: 12 Nm

INSPECTION

WIDE OPEN THROTTLE SWITCH CHECK

Switch position	Terminal No.	
	1	2
ON	○	○
OFF		

SELECTOR LEVER ASSEMBLY
DISASSEMBLY AND REASSEMBLY



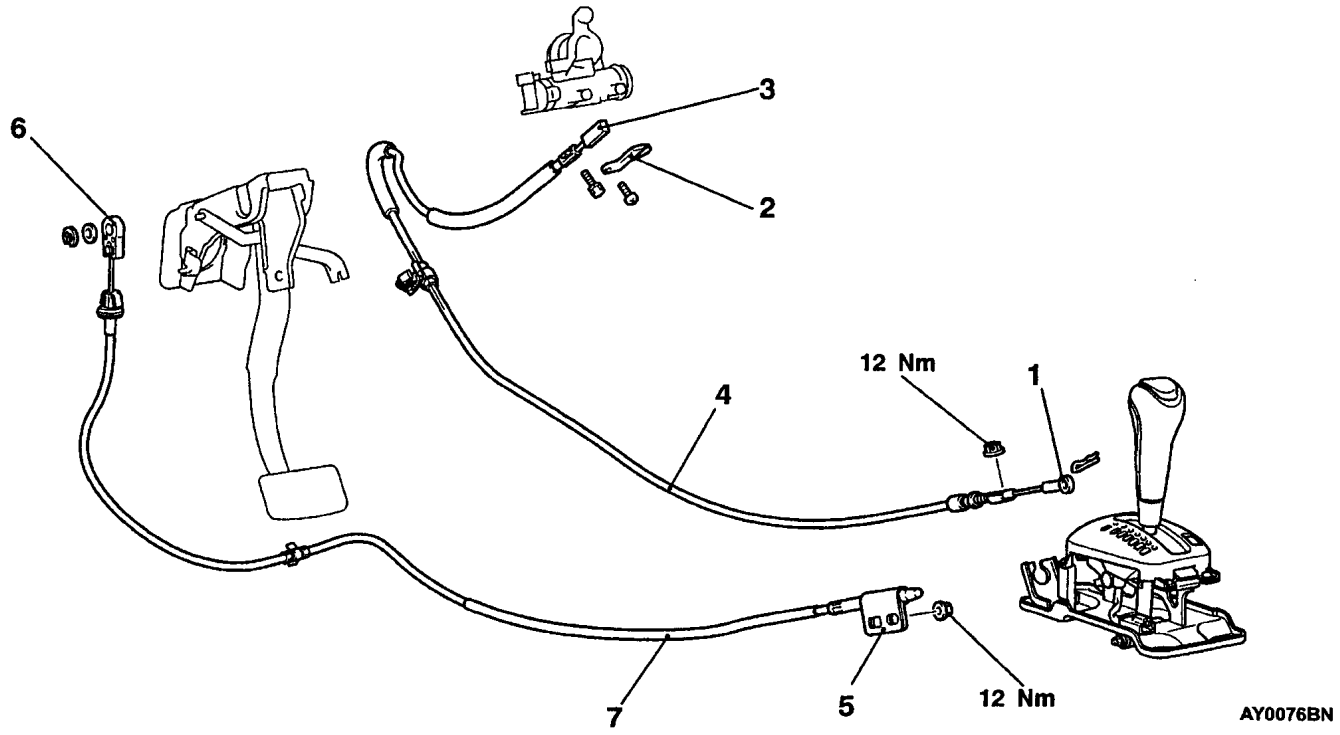
Disassembly steps

1. Push button
2. Spring
3. Bumper
4. Adjuster
5. Selector knob
6. Indicator panel assembly
7. Hold switch
8. Lock cam
9. Bolt
10. Shift lever assembly
11. Bushing
12. Pipe
13. Stopper
14. Indicator lamp assembly
15. Bracket assembly

SHIFT LOCK AND KEY INTERLOCK MECHANISMS

REMOVAL AND INSTALLATION

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



Key interlock cable removal steps

- Front floor console

▶B◀ 1. Key interlock cable connection (Selector lever side)

- Lower column cover

2. Cover

◀A▶ 3. Key interlock cable connection (Steering lock cylinder side)

4. Key interlock cable

Shift lock cable removal steps

- Front floor console

▶A◀ 5. Shift lock cable connection (Selector lever side)

- Under cover

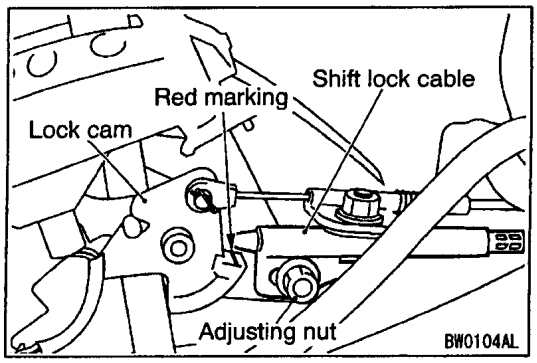
6. Shift lock cable connection (Brake pedal side)

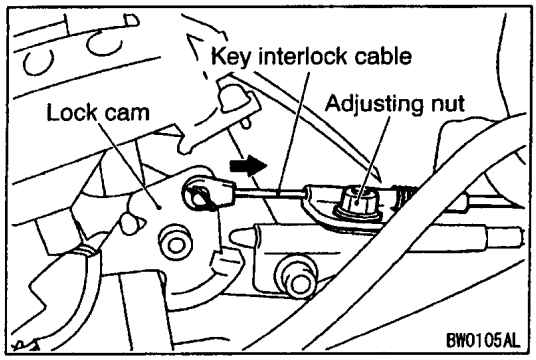
7. Shift lock cable

REMOVAL SERVICE POINT

◀A▶ KEY INTERLOCK CABLE (STEERING CYLINDER SIDE) REMOVAL

Turn the ignition switch to the "ACC" position, and then pull the key interlock cable out from the ignition key cylinder.





INSTALLATION SERVICE POINTS

▶A◀ SHIFT LOCK CABLE (SELECTOR LEVER SIDE) INSTALLATION

1. Provisionally install the selector lever knob, and then move the selector lever to the "P" position and turn the ignition switch to the "LOCK (OFF)" position.
2. Tighten the locking nut so that the end of the shift lock cable comes above the red marking of the lock cam.

Tightening torque: 12 Nm

▶B◀ KEY INTER LOCK CABLE (SELECTOR LEVER SIDE) INSTALLATION

1. Install the key interlock cable on the lock cam.
2. Install the spring and washer of the key interlock cable as shown.
3. While lightly pushing the cable coupling portion of the lock cam in the direction, tighten the nut to the specified torque.

Tightening torque: 12 Nm