AUTOMATIC TRANSMISSION

CONTENTS

WARNING REGARDING SERVICING OF SUPPLEMENTAL RESTRAINT SYSTEM (SRS) EQUIPPED VEHICULES

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 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, side impact sensors 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

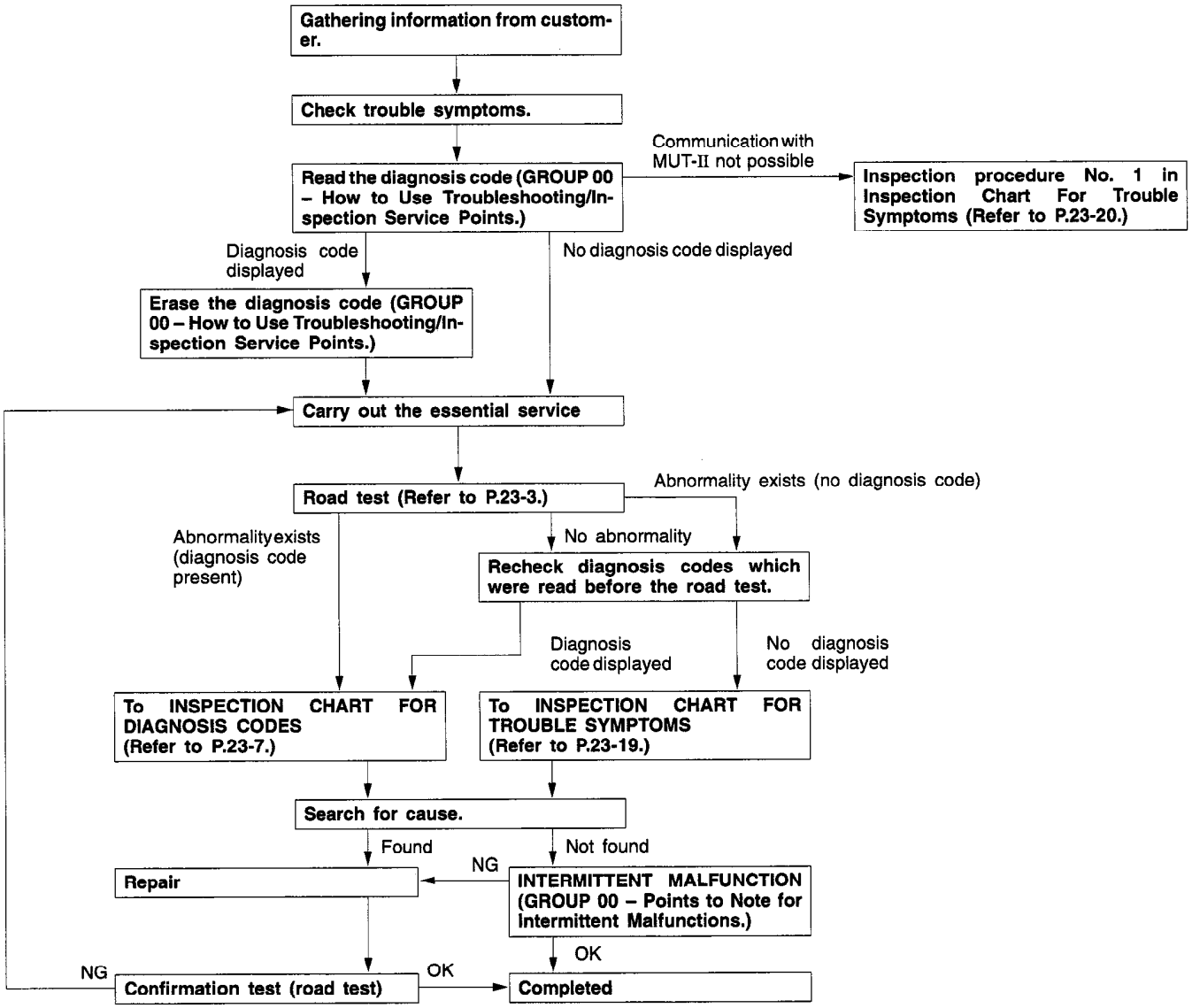
OUTLINE OF CHANGES

Maintenance service points have been established for places which are different as a result of the following changes.

- Integration of the engine-ECU and A/T-ECU
- Adoption of an electronic speedometer

TROUBLESHOOTING

STANDARD FLOW OF DIAGNOSIS TROUBLESHOOTING



ROAD TEST

23100780271

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 (23-18)
2	Ignition switch: ON Engine: Stopped Selector lever position: P Ignition switch: ON Engine: Stopped 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 (23-29)
		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 – 5,500 mV	Throttle position sensor <Vehicles without TCL> Accelerator pedal position sensor <Vehicles with TCL>	11 12 14	Throttle position sensor system (23-8) 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 (23-10)
		Mode control switch (1) HOLD (2) AUTO	Data list No.62 (1) ON (2) OFF	Mode control switch	–	Mode control switch system (23-29)
		Accelerator pedal (1) Released (2) Depressed	Data list No.25 (1) OFF (2) ON	Wide open throttle switch	25	Wide open throttle switch system (23-10)
		Brake pedal (1) Depressed (2) Released	Data list No. 26 (1) ON (2) OFF	Stop lamp switch	26	Stop lamp switch system (23-11)
3	Ignition switch: ST Engine: Stopped	Starting test with lever P or N range	Starting should be possible	Starting possible or impossible	–	Starting impossible (23-21)
4	Warming up	Drive for 15 minutes or more so that the automatic fluid temperature becomes 70 – 90°C.	Data list No. 15 Gradually rises to 70 – 90°C	Oil temperature sensor	15	Oil temperature sensor system (23-8)

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	Brake pedal (Retest) (1) Depressed (2) Released	Data list No. 26 (1) ON (2) OFF	Stop lamp switch	26	Stop lamp switch system (23-11)
		A/C switch (1) ON (2) OFF	Data list No. 65 (1) ON (2) OFF	Dual pressure switch	–	Dual pressure switch system (23-30)
		Accelerator pedal (1) Released (2) Half depressed	Data list No. 64 (1) ON (2) OFF	Idle position switch	–	Idle position switch system (23-30)
			Data list No. 21 (1) 650 – 900 rpm Gradually rises from (1)	Crank angle sensor	21	Crank angle sensor system (23-9)
			Data list No. 57 (2) Data changes	Communication with engine-ECU <Vehicles without TCL> Communication with TCL-ECU <Vehicles with TCL>	51	Serial communication system (23-18)
		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 (23-23)
					–	Shocks when changing from N to D and large time lag (23-23)
					–	Shocks when changing from N to R and large time lag (23-24)
					–	Shocks when changing from N to D,N to R and large time lag (23-25)
				Driving impossible	–	Does not move forward (23-21)
					–	Does not reverse (23-22)
					–	Does not move (forward or reverse) (23-22)

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
6	Selector lever position: N (Carry out on a flat and straight road.)	Selector lever position and vehicle speed (1) Idling in L range (Vehicle stopped) (2) Driving at constant speed of 10 km/h in L position (3) Driving at constant speed of 30 km/h in 2 position (4) Driving at 50 km/h in 3 position with accelerator fully closed (5) Driving at constant speed of 50 km/h in D position (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 (23-11)
			Data list No. 32 (2) 0 %, (4) 0 %, (3) 0 %, (5) 100 %	Underdrive solenoid valve	32	Underdrive solenoid valve system (23-11)
			Data list No. 33 (2)100 %, (4) 100 %, (3) 0 %, (5) 0 %	Second solenoid valve	33	Second solenoid valve system (23-11)
			Data list No. 34 (2) 100 %, (4) 0 %, (3) 100 %, (5) 0 %	Overdrive solenoid valve	34	Overdrive solenoid valve system (23-11)
			Data list No. 29 (1) 0 km/h (4) 50 km/h	Vehicle speed sensor	–	Vehicle speed sensor system (23-31)
			Data list No. 22 (4) 1,900 – 2,100 rpm	Input shaft speed sensor	22	Input shaft speed sensor system (23-9)
			Data list No. 23 (4) 1,900 – 2,100 rpm	Output shaft speed sensor	23	Output shaft speed sensor system (23-10)
7	Selector lever position: 3 (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 (23-12)
			Data list No. 52 (1) Approx. 100 – 300 rpm (2) Approx. 0 – 10 rpm			

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 3 range. (5) While driving at 40 km/h in 3rd gear, shift down to 2 range. (6) While driving at 20 km/h in 2nd gear, shift down to L range.	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 (23-25)
				Displaced shifting points	–	All points (23-26)
					–	Some points (23-27)
				Does not shift	–	No diagnosis code (23-27)
					22	Input shaft speed sensor system (23-9)
					23	Output shaft speed sensor system (23-10)
				Does not shift from 1 to 2 or 2 to 1	31	Low and reverse solenoid valve system (23-11)
					33	Second solenoid valve system (23-11)
					41	1st gear ratio is not specified (23-13)
					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 (23-11)
					34	Overdrive solenoid valve system (23-11)
					42	2nd gear ratio is not specified (23-14)
					43	3rd gear ratio is not specified (23-15)
				Does not shift from 3 to 4 or 4 to 3	32	Underdrive solenoid valve system (23-11)
					33	Second solenoid valve system (23-11)
					43	3rd gear ratio is not specified (23-15)
					44	4th gear ratio is not specified (23-16)

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 (23-9)
					23	Output shaft speed sensor system (23-10)
					46	Reverse gear ratio is not specified (23-17)

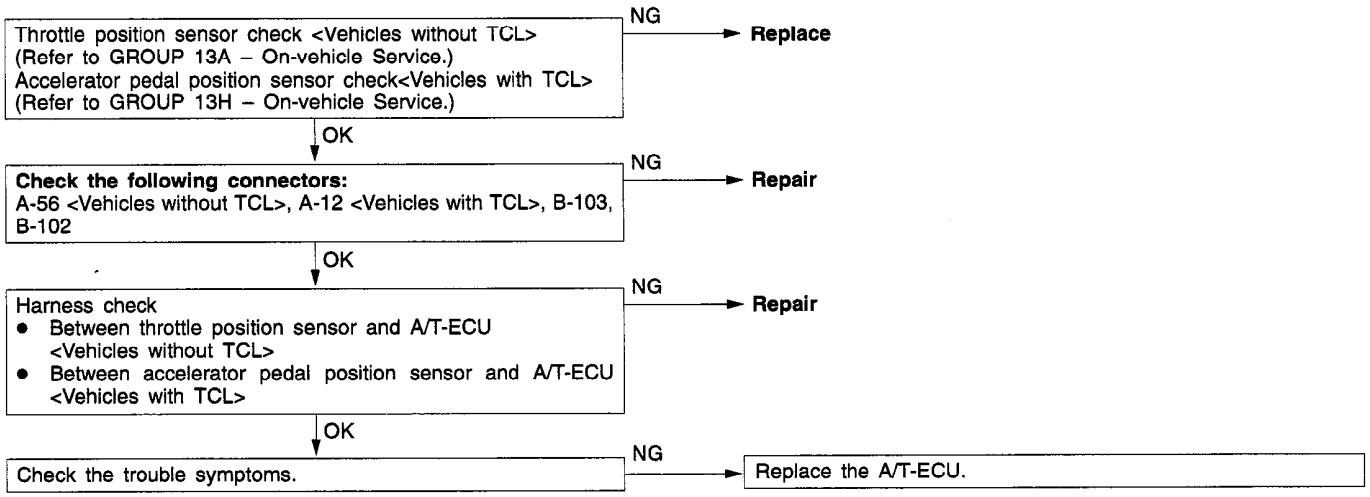
INSPECTION CHART FOR DIAGNOSIS CODE

Code	Diagnosis item		Reference page
11	Throttle position sensor system <Vehicles without TCL> Accelerator pedal position sensor system <Vehicles with TCL>	Short circuit	23-8
12		Open circuit	23-8
14		Sensor maladjustment	23-8
15	Oil temperature sensor system	Open circuit	23-8
21	Crank angle sensor system	Open circuit	23-9
22	Input shaft speed sensor system	Short circuit/open circuit	23-9
23	Output shaft speed sensor system	Short circuit/open circuit	23-10
25	Wide open throttle switch system	Short circuit	23-10
26	Stop lamp switch system	Short circuit/open circuit	23-11
31	Low and reverse solenoid valve system	Short circuit/open circuit	23-11
32	Underdrive solenoid valve system	Short circuit/open circuit	23-11
33	Second solenoid valve system	Short circuit/open circuit	23-11
34	Overdrive solenoid valve system	Short circuit/open circuit	23-11
36	Damper control clutch solenoid valve system	Short circuit/open circuit	23-12
41	1st gear ratio does not meet the specification		23-13
42	2st gear ratio does not meet the specification		23-14
43	3rd gear ratio does not meet the specification		23-15
44	4th gear ratio does not meet the specification		23-16
46	Reverse gear ratio does not meet the specification		23-17
51	Abnormal communication with engine-ECU <Vehicles without TCL> Abnormal communication with TCL-ECU <Vehicles with TCL>		23-18
52	Damper control clutch solenoid valve system	Defective system	23-12
54	A/T Control relay system	Short circuit to earth/ open circuit	23-18

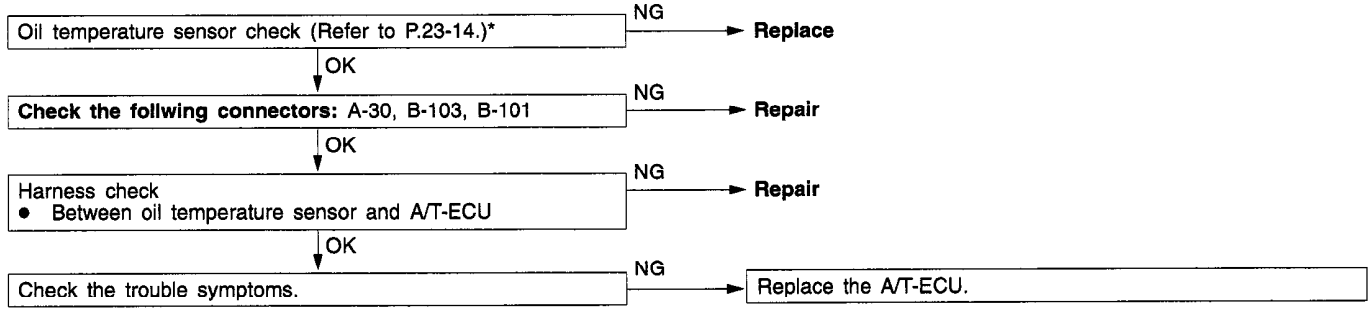
Code	Diagnosis item		Reference page
56	N range lamp system	Short circuit to earth	23-19
71	Malfunction of A/T-ECU		23-19

INSPECTION PROCEDURES FOR DIAGNOSIS CODES

Code No. 11, 12, 14 Throttle position sensor system <Vehicles without TCL>, accelerator pedal position sensor <Vehicles with TCL>	**Probable cause**
If the TPS or 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. Code No. 11 is also output if there is a problem with the APS and an APS fail-safe signal is received from the TCL-ECU. 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 TCL> • Malfunction of the accelerator pedal position sensor <Vehicles with TCL> • Malfunction of connector • Malfunction of the A/T-ECU

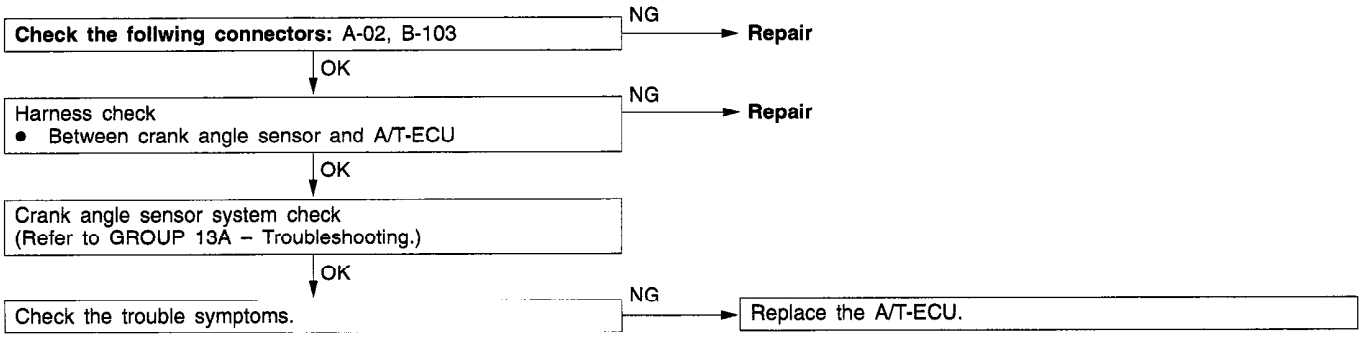


Code No. 15 Oil temperature sensor system	**Probale cause**
If the oil temperature sensor output voltage is 2.6 V or more even after driving for 10 minutes or more (if the oil temperature does not increase), it is judged that there is an open circuit in the oil temperature sensor and diagnosis code No.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



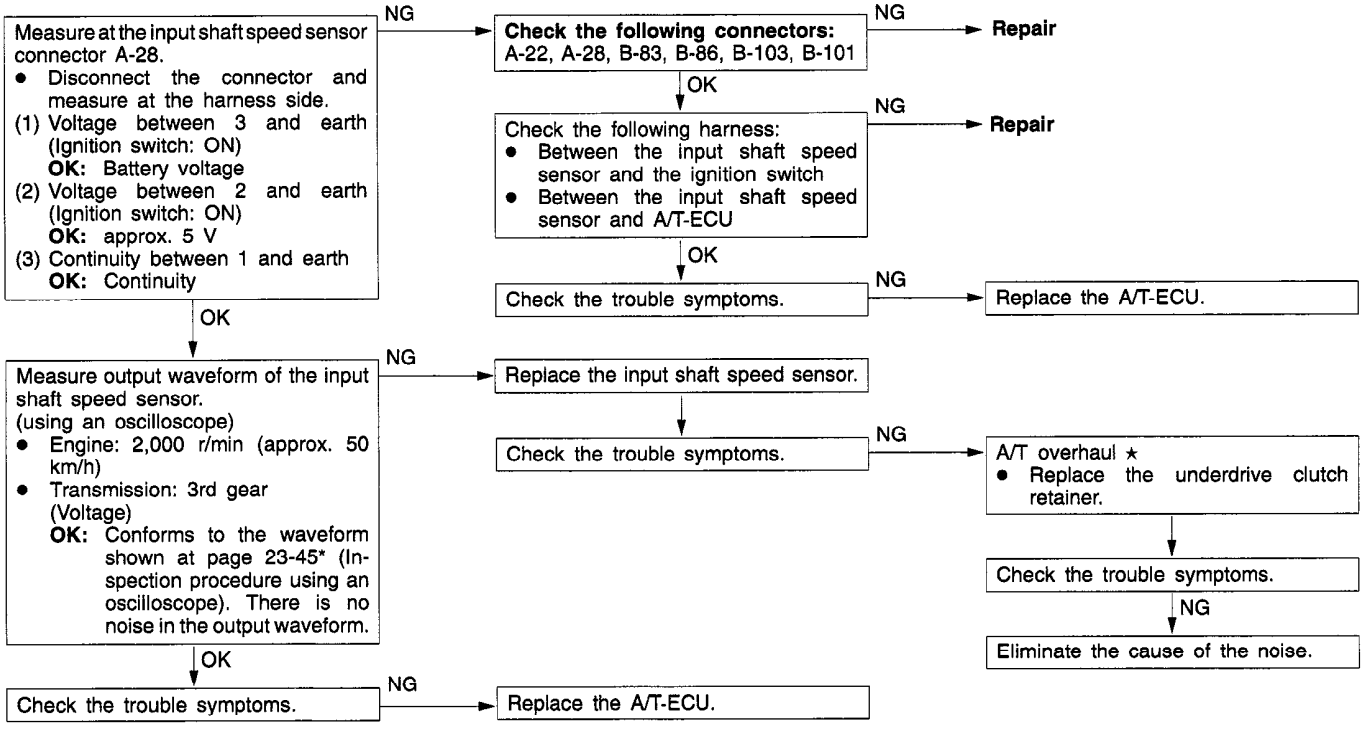
NOTE
*: Refer to '96 CARISMA Workshop Manual (Pub No. PWDE9502).

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 A/T-ECU



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 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 A/T-ECU

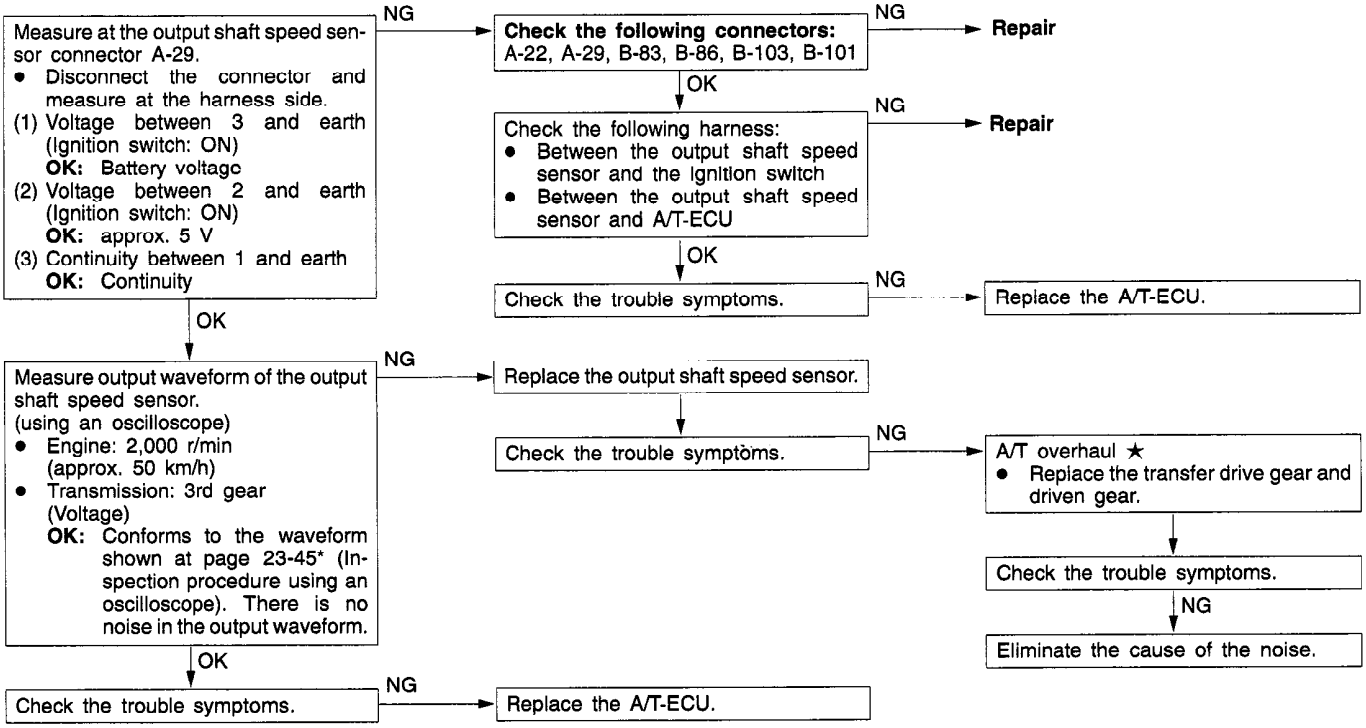
★: Refer to the Transmission Workshop Manual.



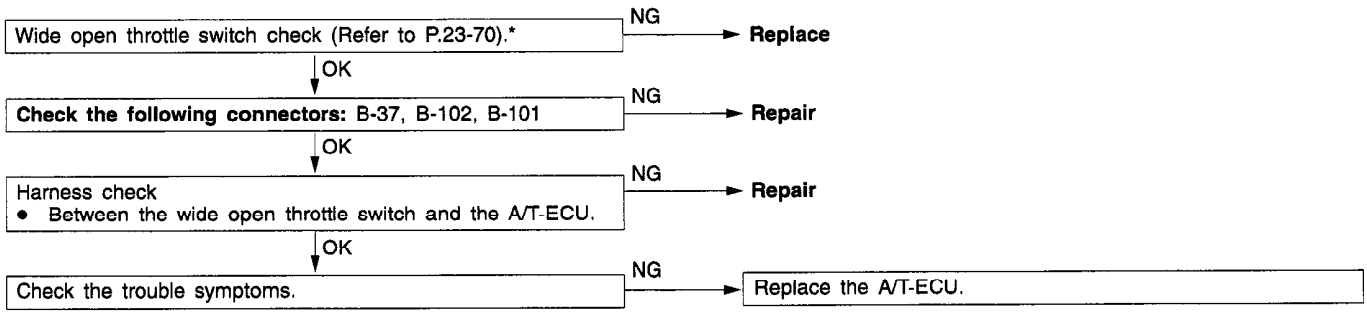
NOTE
*: Refer to '96 CARISMA Workshop Manual (Pub No. PWDE9502).

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 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 A/T-ECU

★: Refer to the Transmission Workshop Manual.

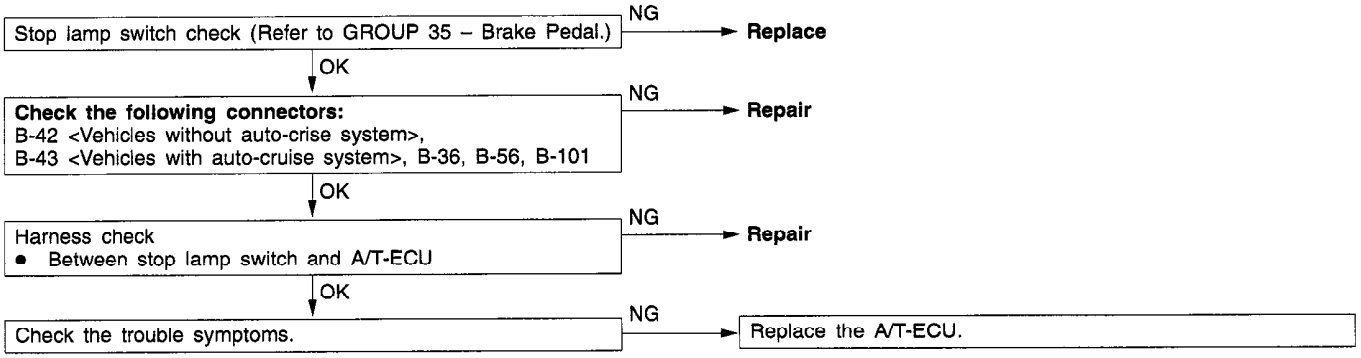


Code No. 25 Wide open throttle switch system	Probable cause
If the wide open throttle switch is on for 1 second or more with the throttle valve opening angle at 70% or less, it is judged that there is a short circuit in the wide open throttle switch and diagnosis code No. 25 is output.	• Malfunction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

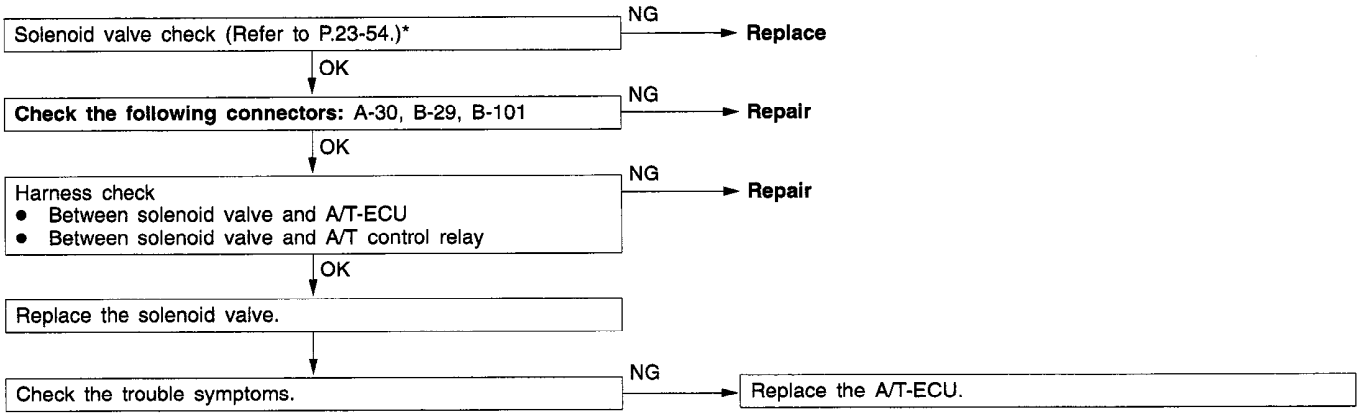


NOTE
*: Refer to '96 CARISMA Workshop Manual (Pub No. PWDE9502).

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 A/T-ECU

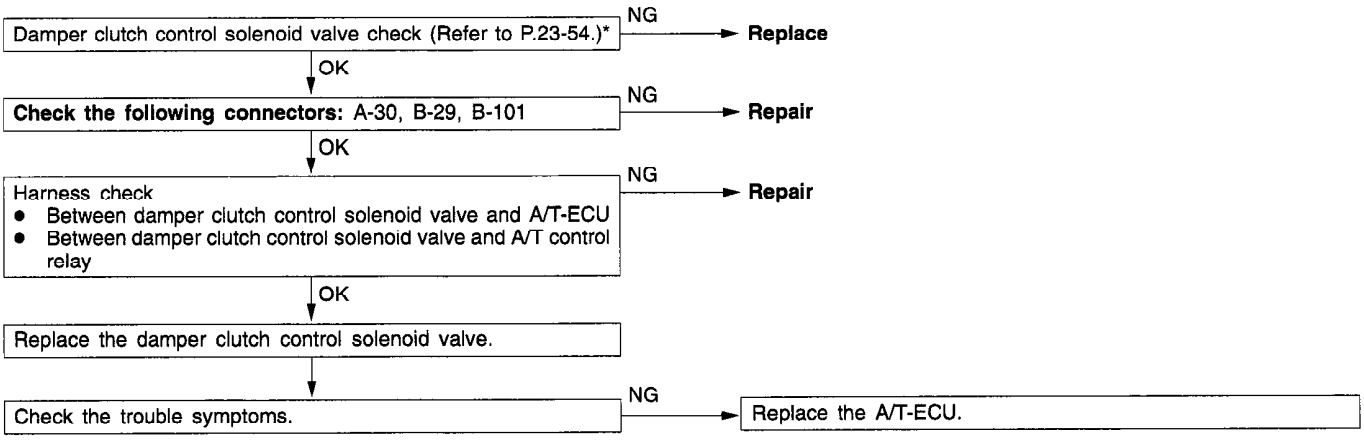


Code No. 31 Low and reverse solenoid valve system Code No. 32 Underdrive solenoid valve system Code No. 33 Second solenoid valve system Code No. 34 Overdrive solenoid valve system	Probable cause
If the resistance value for a solenoid valve is too large or too small, it is judged that there is a short-circuit 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 A/T-ECU



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

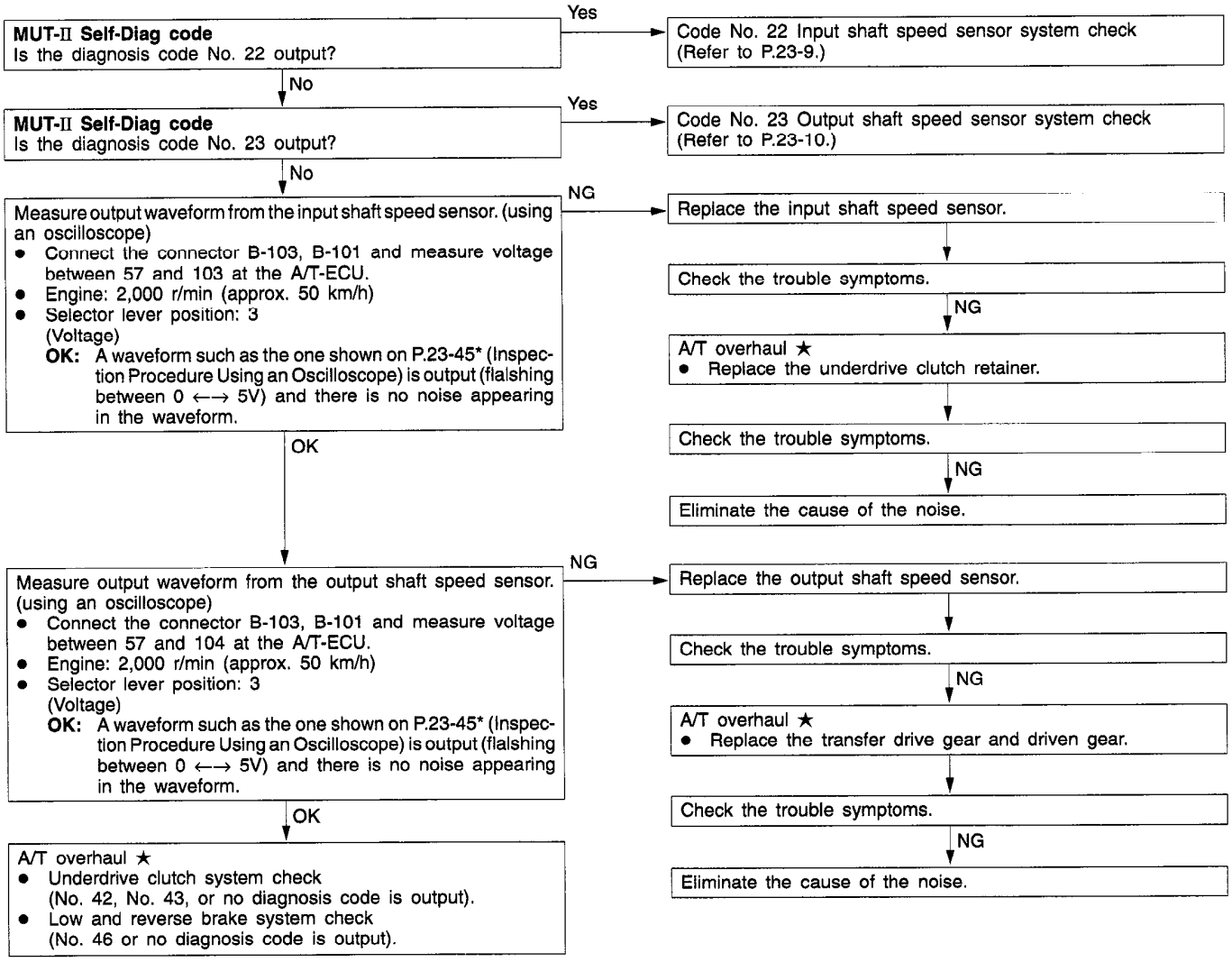
Code No. 36, 52 Damper clutch control solenoid valve system	Probable cause
If the resistance value for the damper clutch control solenoid valve is too large or too small, it is judged that there is a short-circuit or an open circuit in the damper clutch control solenoid valve and diagnosis code No. 36 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 A/T-ECU



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

Code No. 41 1st gear ratio does not meet the specification	Probable cause
If the output from the output shaft speed sensor multiplied by the 1st gear ratio is not the same as the output from the input shaft speed sensor after shifting to 1st gear has been completed, diagnosis code No. 41 is output. If diagnosis code No. 41 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 • Malfunction of the underdrive clutch system • Noise generated

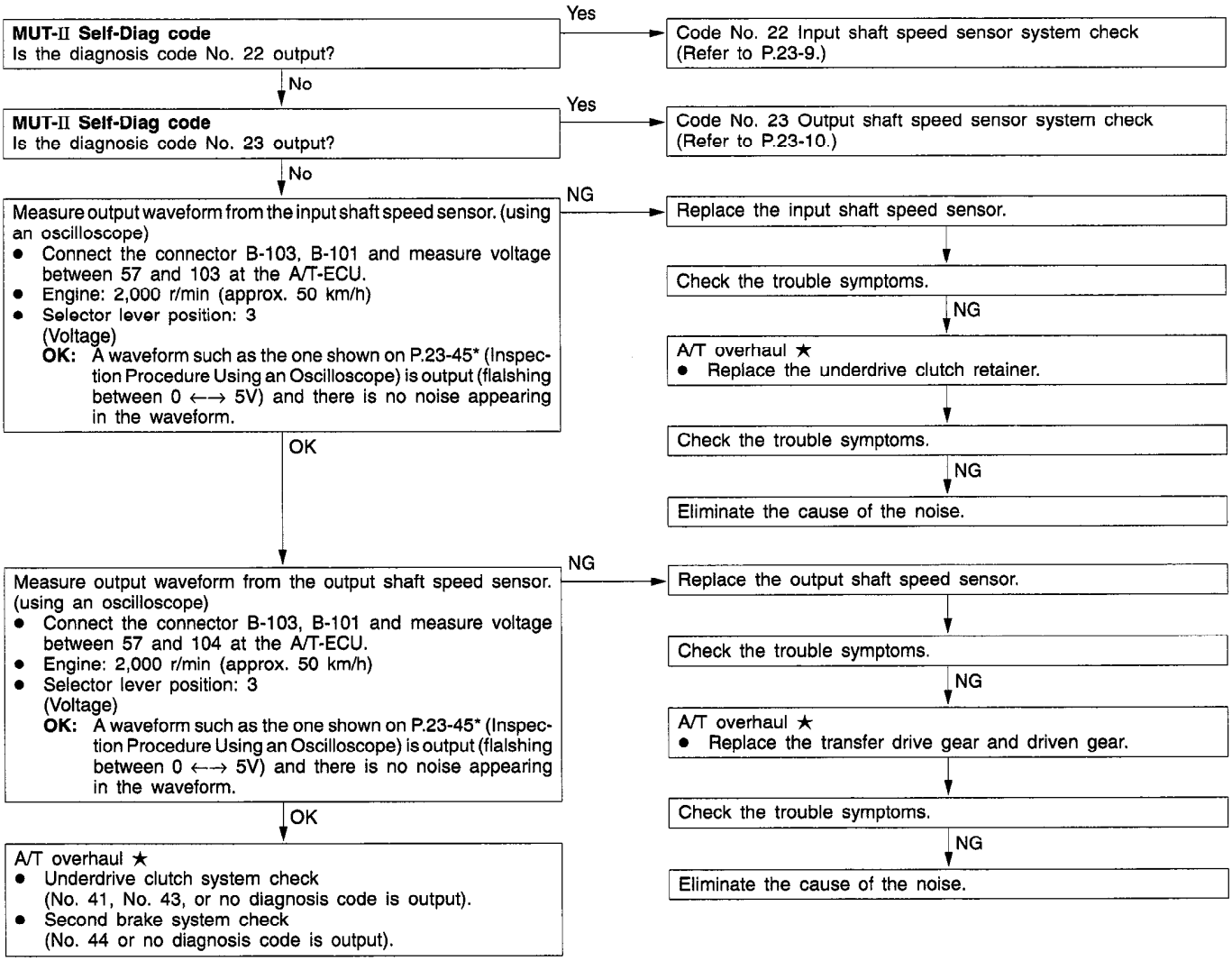
★: Refer to the Transmission Workshop Manual.



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

Code No. 42 2nd gear ratio does not meet the specification	Probable cause
If the output from the output shaft speed sensor multiplied by the 2nd gear ratio is not the same as the output from the input shaft speed sensor after shifting to 2nd gear has been completed, diagnosis code No. 42 is output. If diagnosis code No. 42 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 second brake system • Malfunction of the underdrive clutch system • Noise generated

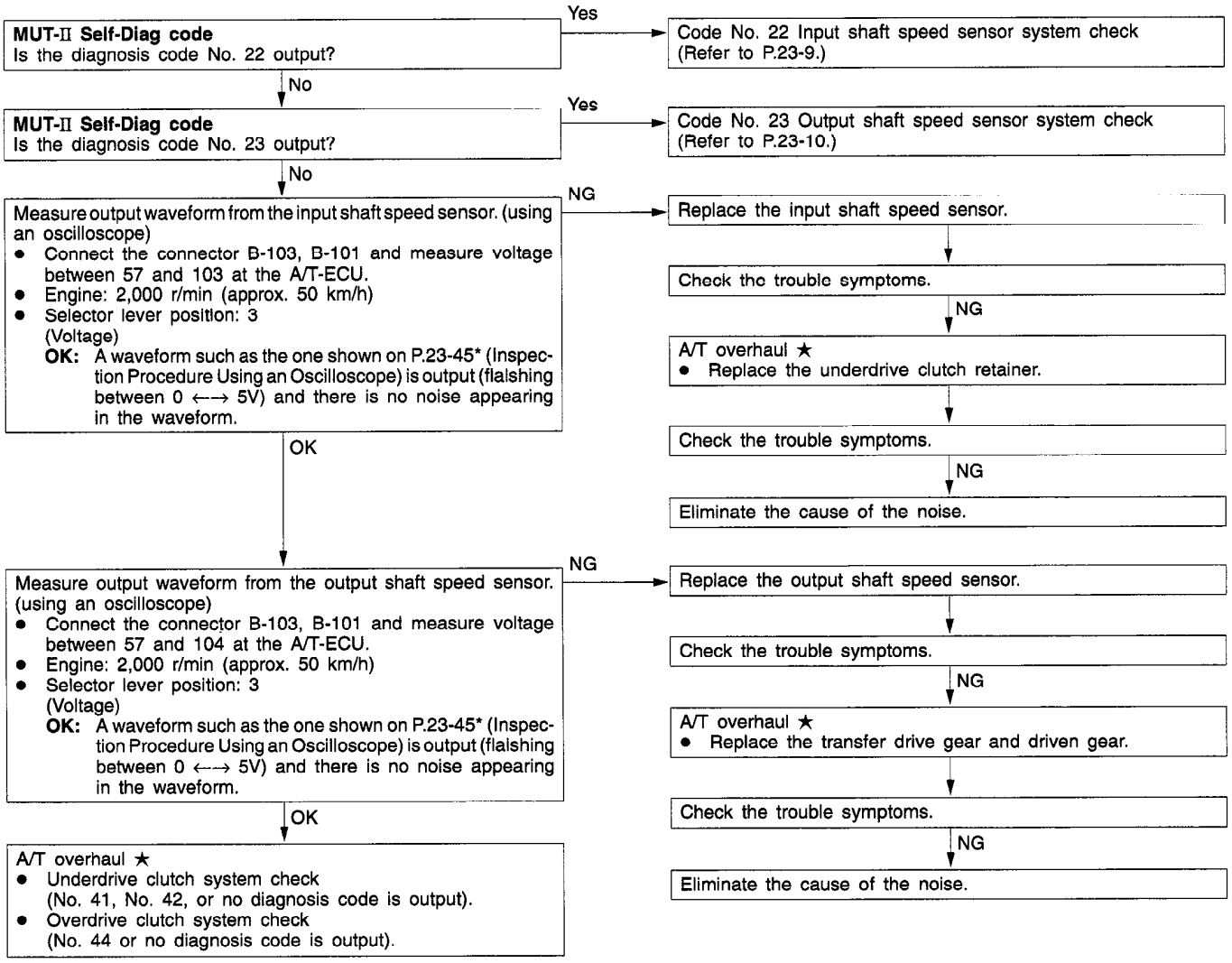
★: Refer to the Transmission Workshop Manual.



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

Code No. 43 3rd gear ratio does not meet the specification	Probable cause
If the output from the output shaft speed sensor multiplied by the 3rd gear ratio is not the same as the output from the input shaft speed sensor after shifting to 3rd gear has been completed, diagnosis code No. 43 is output. If diagnosis code No. 43 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 • Malfunciton of the transfer drive gear or driven gear • Malfunction of the underdrive clutch system • Malfunction of the overdrive clutch system • Noise generated

★: Refer to the Transmission Workshop Manual.



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

Code No. 44 4th gear ratio does not meet the specification	Probable cause
If the output from the output shaft speed sensor multiplied by the 4th gear ratio is not the same as the output from the input shaft speed sensor after shifting to 4th gear has been completed, diagnosis code No. 44 is output. If diagnosis code No. 44 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 second brake system • Malfunction of the overdrive clutch system • Noise generated

★: Refer to the Transmission Workshop Manual.

MUT-II Self-Diag code
Is the diagnosis code No. 22 output?
Yes → Code No. 22 Input shaft speed sensor system check (Refer to P.23-9.)
No ↓

MUT-II Self-Diag code
Is the diagnosis code No. 23 output?
Yes → Code No. 23 Output shaft speed sensor system check (Refer to P.23-10.)
No ↓

Measure output waveform from the input shaft speed sensor. (using an oscilloscope)
- Connect the connector B-103, B-101 and measure voltage between 57 and 103 at the A/T-ECU.
- Engine: 2,000 r/min (approx. 50 km/h)
- Selector lever position: 3

(Voltage)
OK: A waveform such as the one shown on P.23-45* (Inspection Procedure Using an Oscilloscope) is output (flashing between 0 ←→ 5V) and there is no noise appearing in the waveform.

NG → Replace the input shaft speed sensor.
↓
Check the trouble symptoms.
NG ↓
A/T overhaul ★
- Replace the underdrive clutch retainer.

↓
Check the trouble symptoms.
NG ↓
Eliminate the cause of the noise.

OK ↓

Measure output waveform from the output shaft speed sensor. (using an oscilloscope)
- Connect the connector B-103, B-101 and measure voltage between 57 and 104 at the A/T-ECU.
- Engine: 2,000 r/min (approx. 50 km/h)
- Selector lever position: 3

(Voltage)
OK: A waveform such as the one shown on P.23-45* (Inspection Procedure Using an Oscilloscope) is output (flalshing between 0 ←→ 5V) and there is no noise appearing in the waveform.

NG → Replace the output shaft speed sensor.
↓
Check the trouble symptoms.
NG ↓
A/T overhaul ★
- Replace the transfer drive gear and driven gear.

↓
Check the trouble symptoms.
NG ↓
Eliminate the cause of the noise.

OK ↓

A/T overhaul ★
- Second brake system check (No. 42 or no diagnosis code is output).
- Overdrive clutch system check (No. 43 or no diagnosis code is output).

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

Code No. 46 Reverse gear ratio does not meet the specification	Probable cause
If the output from the output shaft speed sensor multiplied by the reverse gear ratio is not the same as the output from the input shaft speed sensor after shifting to reverse gear has been completed, diagnosis code No. 46 is output. If diagnosis code No. 46 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 • Malfunciton of the transfer drive gear or driven gear • Malfunction of the low and reverse brake system • Malfunction of the reverse clutch system • Noise generated

★: Refer to the Transmission Workshop Manual.

MUT-II Self-Diag code
Is the diagnosis code No. 22 output?
Yes → Code No. 22 Input shaft speed sensor system check (Refer to P.23-9.)
No ↓

MUT-II Self-Diag code
Is the diagnosis code No. 23 output?
Yes → Code No. 23 Output shaft speed sensor system check (Refer to P.23-10.)
No ↓

Measure output waveform from the input shaft speed sensor. (using an oscilloscope)
- Connect the connector B-103, B-101 and measure voltage between 57 and 103 at the A/T-ECU.
- Engine: 2,000 r/min (approx. 50 km/h)
- Selector lever position: 3

(Voltage)
OK: A waveform such as the one shown on P.23-45* (Inspection Procedure Using an Oscilloscope) is output (flalshing between 0 ⟷ 5V) and there is no noise appearing in the waveform.

NG → Replace the input shaft speed sensor.
↓ Check the trouble symptoms.
NG → A/T overhaul ★
- Replace the underdrive clutch retainer.

↓ Check the trouble symptoms.
NG → Eliminate the cause of the noise.

OK ↓

Measure output waveform from the output shaft speed sensor. (using an oscilloscope)
- Connect the connector B-103, B-101 and measure voltage between 57 and 104 at the A/T-ECU.
- Engine: 2,000 r/min (approx. 50 km/h)
- Selector lever position: 3

(Voltage)
OK: A waveform such as the one shown on P.23-45* (Inspection Procedure Using an Oscilloscope) is output (flalshing between 0 ⟷ 5V) and there is no noise appearing in the waveform.

NG → Replace the output shaft speed sensor.
↓ Check the trouble symptoms.
NG → A/T overhaul ★
- Replace the transfer drive gear and driven gear.

↓ Check the trouble symptoms.
NG → Eliminate the cause of the noise.

OK ↓

A/T overhaul ★
- Low and reverse brake system check (No. 41 or no diagnosis code is output).
- Reverse clutch system check (No diagnosis code is output).

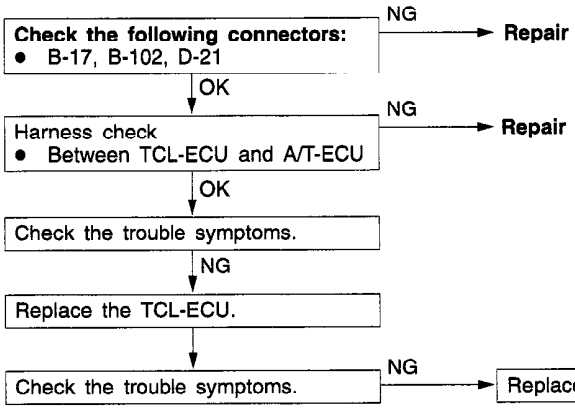
NOTE
*: Refer to '96 CARISMA Workshop Manual (Pub No. PWDE9502).

Code No. 51 Abnormal communication with engine-ECU <Vehicles without TCL> Abnormal communication with TCL-ECU <Vehicles with TCL>	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 TCL-ECU <Vehicles with TCL> • Malfunction of the A/T-ECU

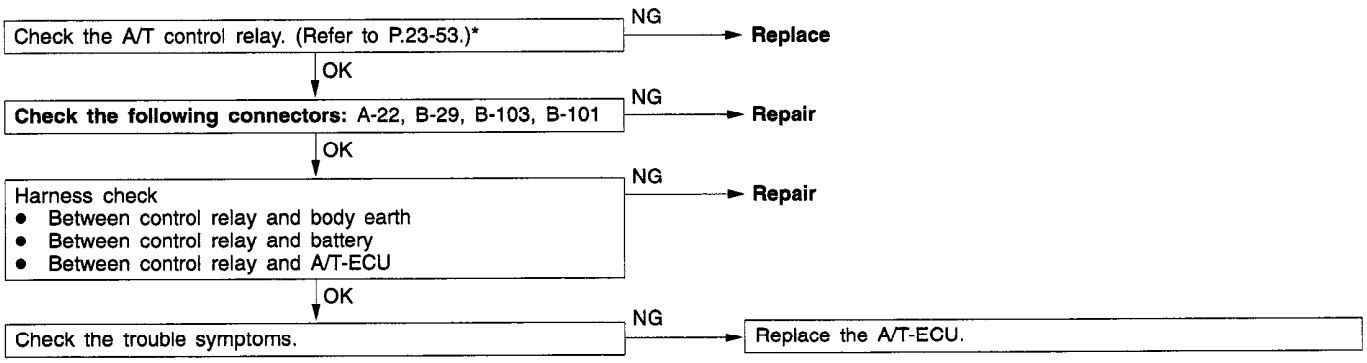
<Vehicles without TCL>

Replace the A/T-ECU.

<Vehicles with TCL>

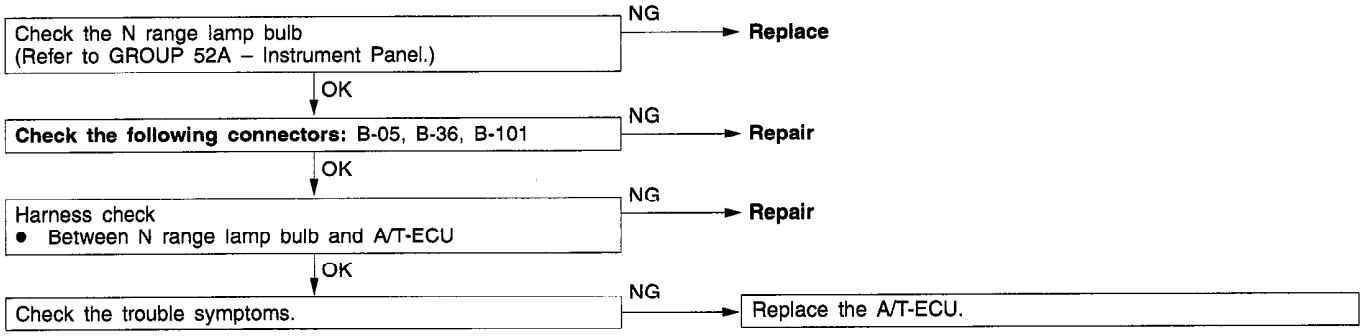


Code No. 54 A/T control relay system	Probable cause
If the A/T control relay voltage is less than 7 V after the ignition switch has been turned ON, it is judged that there is an open circuit or a short-circuit in the A/T control relay earth and diagnosis code No. 54 is output. Then the transmission is 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 A/T-ECU



NOTE
*: 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 A/T-ECU



Code No. 71 Malfunction of A/T-ECU	Probale cause
There is an abnormality in the A/T-ECU. The transmission is locked into 3rd gear as a fail-safe measure.	• Malfunction of the A/T-ECU

Replace the A/T-ECU.

INSPECTION CHART FOR TROUBLE SYMPTOMS

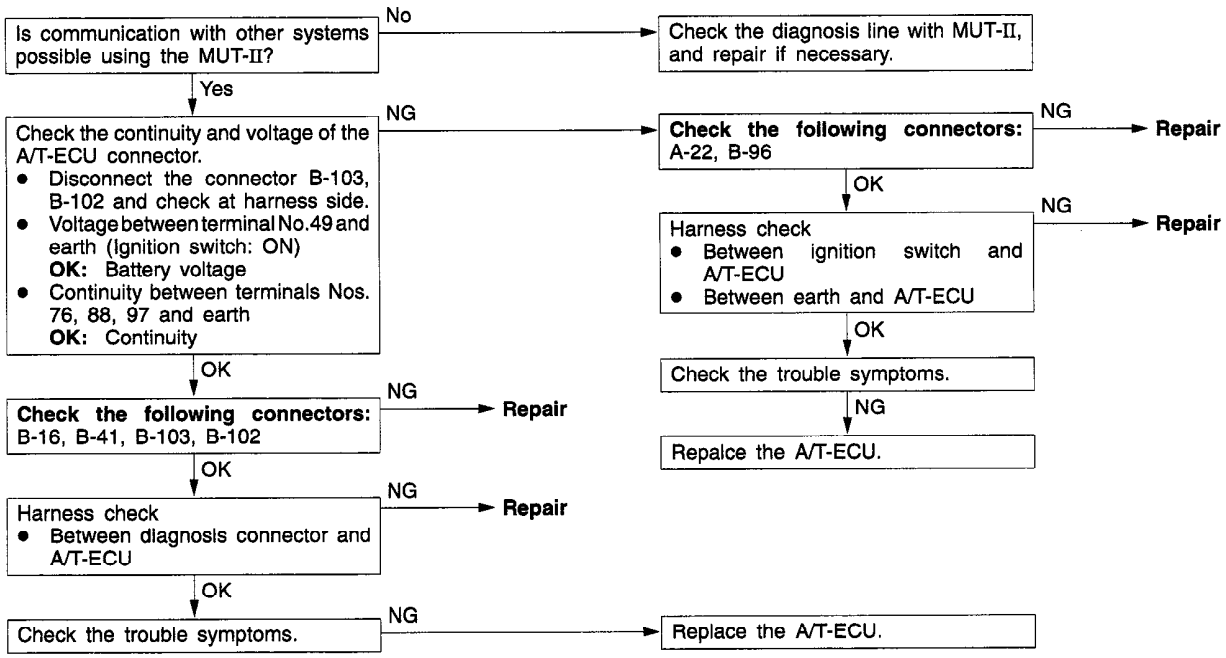
Trouble symptom		Inspection procedure No.	Reference page
Communication with MUT-II is not possible		1	23-20
Driving impossible	Starting impossible	2	23-21
	Does not move forward	3	23-21
	Does not reverse	4	23-22
	Does not move (forward or reverse)	5	23-22
Malfunction when starting	Engine stalling when shifting	6	23-23
	Shocks when changing from N to D and large time lag	7	23-23
	Shocks when changing from N to R and large time lag	8	23-24
	Shocks when changing from N to D, N to R and large time lag	9	23-25
Malfunction when shifting	Shocks and running up	10	23-25

Trouble symptom		Inspection procedure No.	Reference page
Displaced shifting points	All points	11	23-26
	Some points	12	23-27
Does not shift	No diagnosis codes	13	23-27
Malfunction while driving	Poor acceleration	14	23-28
	Vibration	15	23-28
Inhibitor switch system		16	23-29
Mode control switch system		17	23-29
Idle position switch system		18	23-30
Dual pressure switch system		19	23-30
Vehicle speed sensor system		20	23-31
Auto-cruse-ECU signal system		21	23-31

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

INSPECTION PROCEDURE 1

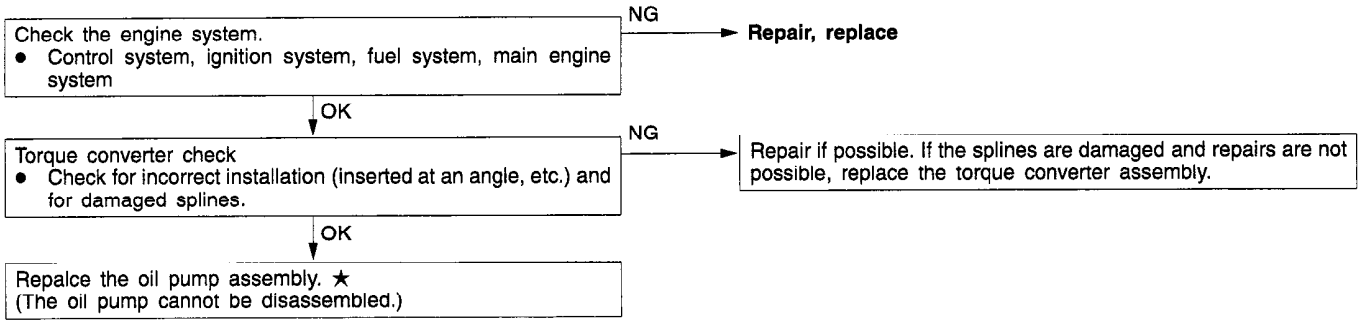
Communication with MUT-II is not possible	Probable cause
If communication with the MUT-II is not possible, the cause is probably a defective diagnosis line or the A/T-ECU is not functioning.	• Malfunction of diagnosis line • Malfunction of connector • Malfunction of the A/T-ECU



INSPECTION PROCEDURE 2

Starting impossible	Probable cause
Starting is not possible when the selector lever is in P or N range.In such cases, the cause is probably a defective engine system, torque converter or oil pump.	• Malfunction of the engine system • Malfunction of the torque converter • Malfunction of the oil pump

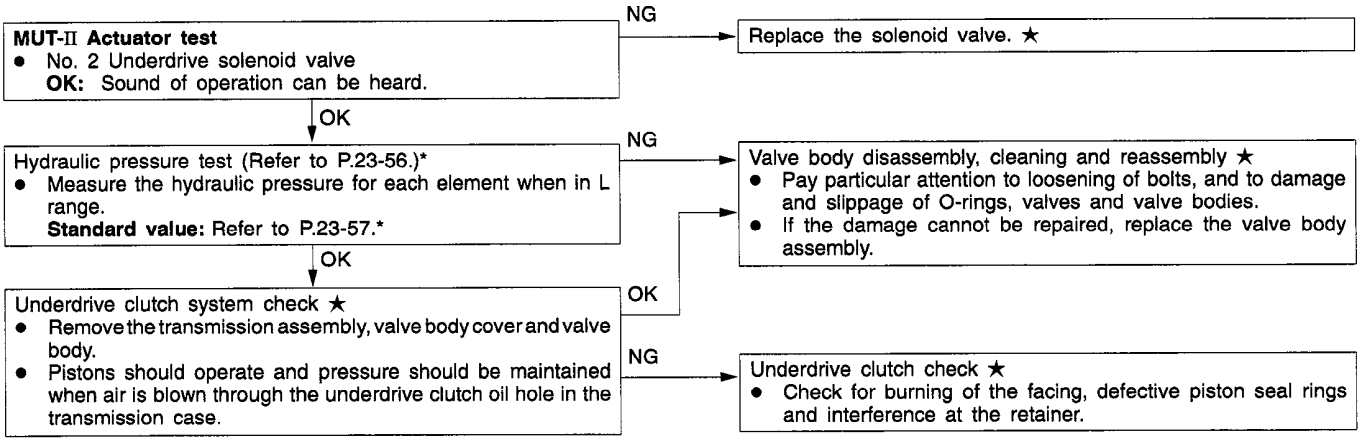
★: Refer to the Transmission Workshop Manual.



INSPECTION PROCEDURE 3

Does not move (forward)	Probable cause
If the vehicle does not move forward when the selector lever is shifted from N to D, 3, 2 or L range while the engine is idling, the cause is probably abnormal line pressure or a malfunction of the underdrive clutch or valve body.	• Abnormal line pressure • Malfunction of the underdrive solenoid valve • Malfunction of the underdrive clutch • Malfunction of the valve body

★: Refer to the Transmission Workshop Manual.

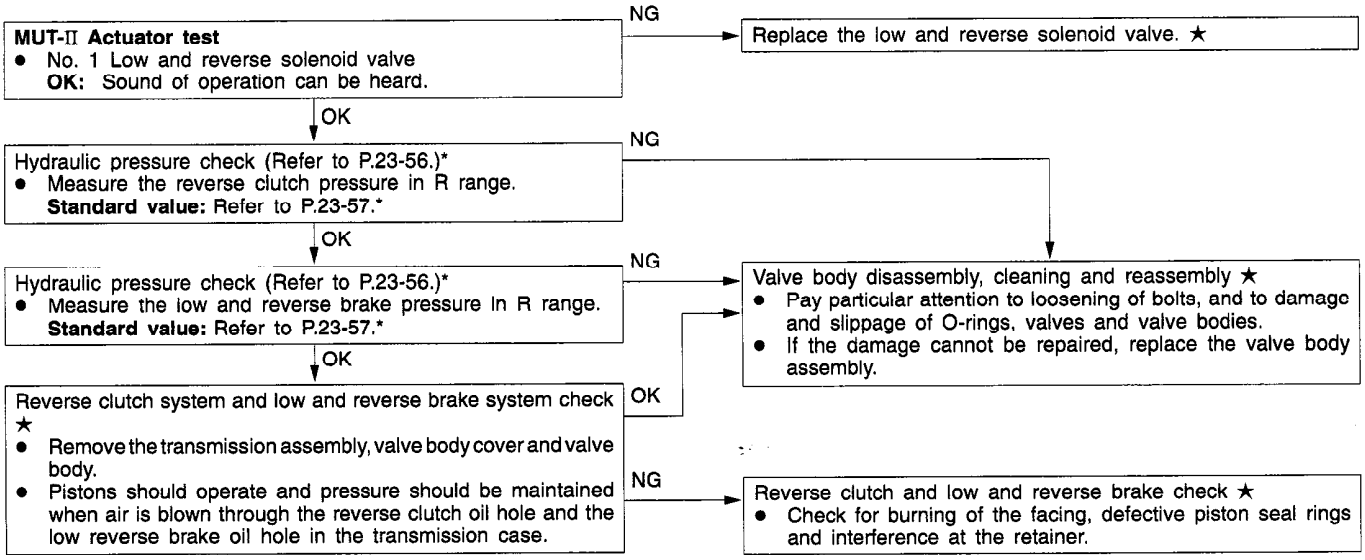


NOTE
*: Refer to '96 CARISMA Workshop Manual (Pub No. PWDE9502).

INSPECTION PROCEDURE 4

Does not reverse	Probable cause
If the vehicle does not reverse when the selector lever is shifted from N to R range while the engine is idling, the cause is probably abnormal pressure in the reverse clutch or low and reverse brake or a malfunction of the reverse clutch, low and reverse brake or valve body.	• Abnormal reverse clutch pressure • Abnormal low and reverse brake pressure • Malfunction of the low and reverse solenoid valve • Malfunction of the reverse clutch • Malfunction of the low and reverse brake • Malfunction of the valve body

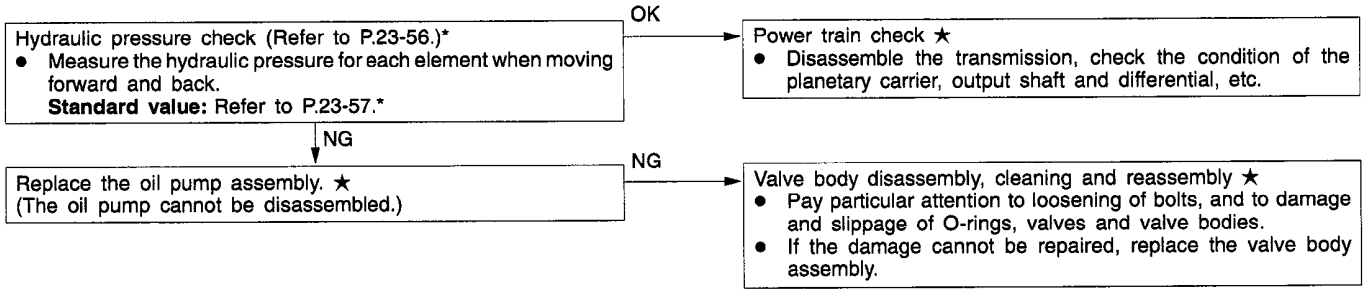
★: Refer to the Transmission Workshop Manual.



INSPECTION PROCEDURE 5

Does not move (forward or reverse)	Probable cause
If the vehicle does not move forward or reverse when the selector lever is shifted to any position while the engine is idling, the cause is probably abnormal line pressure, or a malfunction of the power train, oil pump or valve body.	• Abnormal line pressure • Malfunction of power train • Malfunction of the oil pump • Malfunction of the valve body

★: Refer to the Transmission Workshop Manual.

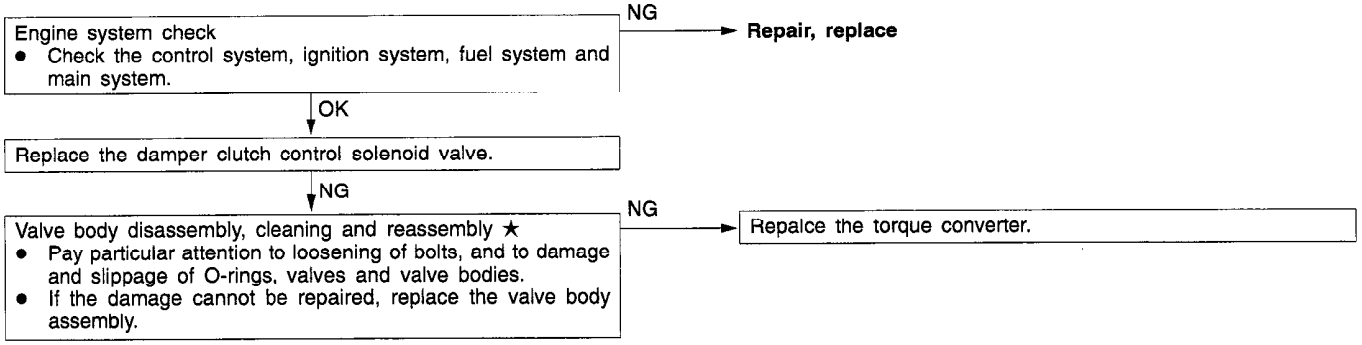


NOTE
*: Refer to '96 CARISMA Workshop Manual (Pub No. PWDE9502).

INSPECTION PROCEDURE 6

Engine stalling when shifting	Probable cause
If the engine stalls when the selector lever is shifted from N to D or R range while the engine is idling, the cause is probably a malfunction of the engine system, damper clutch solenoid valve, valve body or torque converter (damper clutch malfunction).	• Malfunction of the engine system • Malfunction of the damper clutch control solenoid valve • Malfunction of the valve body • Malfunction of the torque converter (Malfuction of the damper clutch)

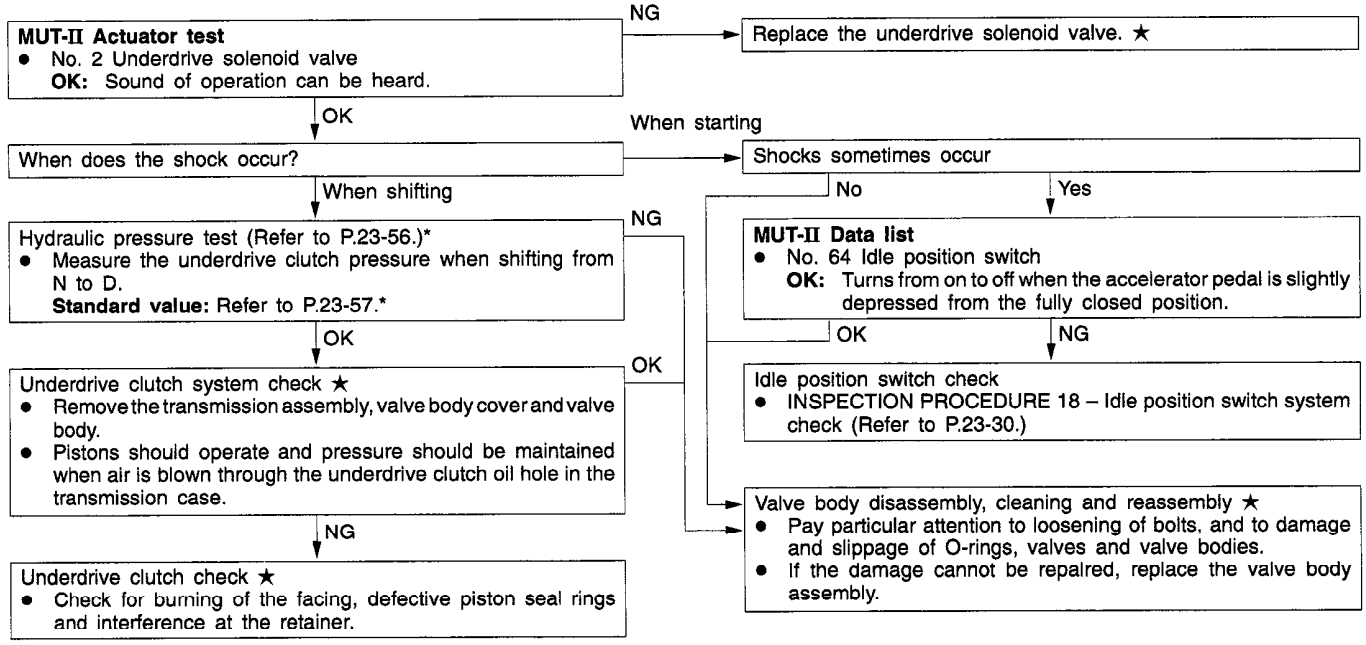
★: Refer to the Transmission Workshop Manual.



INSPECTION PROCEDURE 7

Shocks when changing from N to D and large time lag	Probable cause
If abnormal shocks or a time lag of 2 seconds or more occur when the selector lever is shifted from N to D range while the engine is idling, the cause is probably abnormal underdrive clutch pressure or a malfunction of the underdrive clutch, valve body or idle position switch.	• Abnormal underdrive clutch pressure • Malfunction of the underdrive solenoid valve • Malfunction of the underdrive clutch • Malfunction of the valve body • Malfunction of the idle position switch

★: Refer to the Transmission Workshop Manual.

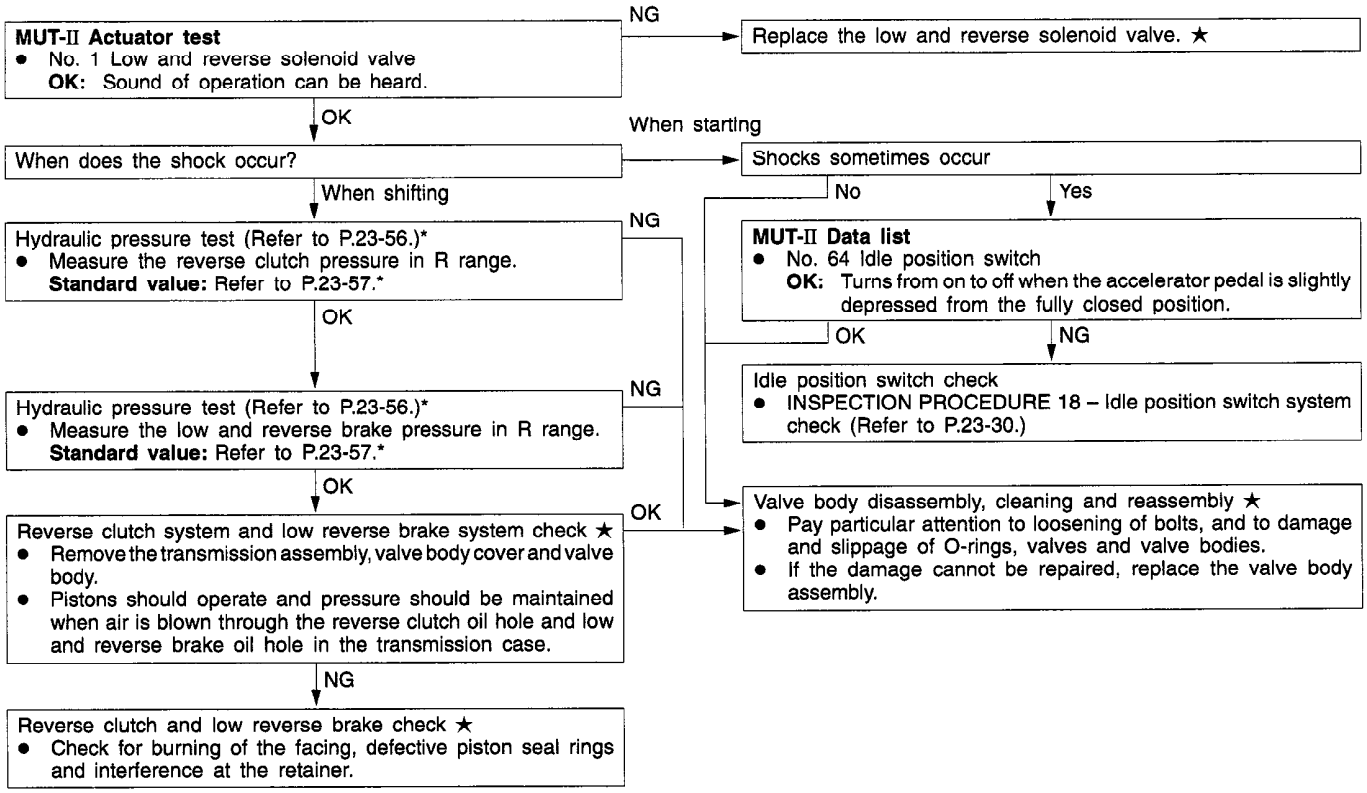


NOTE
*: Refer to '96 CARISMA Workshop Manual (Pub No. PWDE9502).

INSPECTION PROCEDURE 8

Shocks when changing from N to R and large time lag	Probable cause
If abnormal shocks or a time lag of 2 seconds or more occurs when the selector lever is shifted from N to R range while the engine is idling, the cause is probably abnormal reverse clutch pressure or low and reverse brake pressure, or a malfunction of the reverse clutch, low and reverse brake, valve body or idle position switch.	• Abnormal reverse clutch pressure • Abnormal low and reverse brake pressure • Malfunction of the low and reverse solenoid valve • Malfunction of the reverse clutch • Malfunction of the low and reverse brake • Malfunction of the valve body • Malfunction of the idle position switch

★: Refer to the Transmission Workshop Manual.

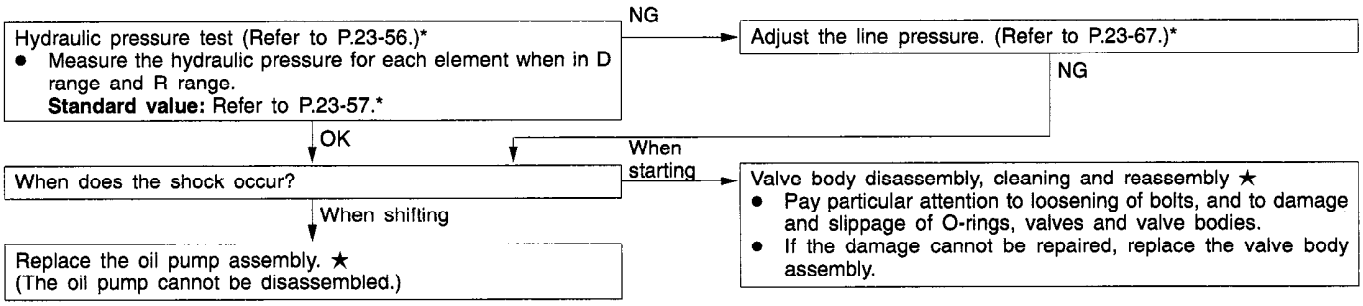


NOTE
*: Refer to '96 CARISMA Workshop Manual (Pub No. PWDE9502).

INSPECTION PROCEDURE 9

Shocks when changing from N to D, N to R and large time lag	Probable cause
If abnormal shocks or a time lag of 2 seconds or more occur when the selector lever is shifted from N to D range and from N to R range while the engine is idling, the cause is probably abnormal line pressure or a malfunction of the oil pump or valve body.	• Abnormal line pressure • Malfunction of the oil pump • Malfunction of the valve body

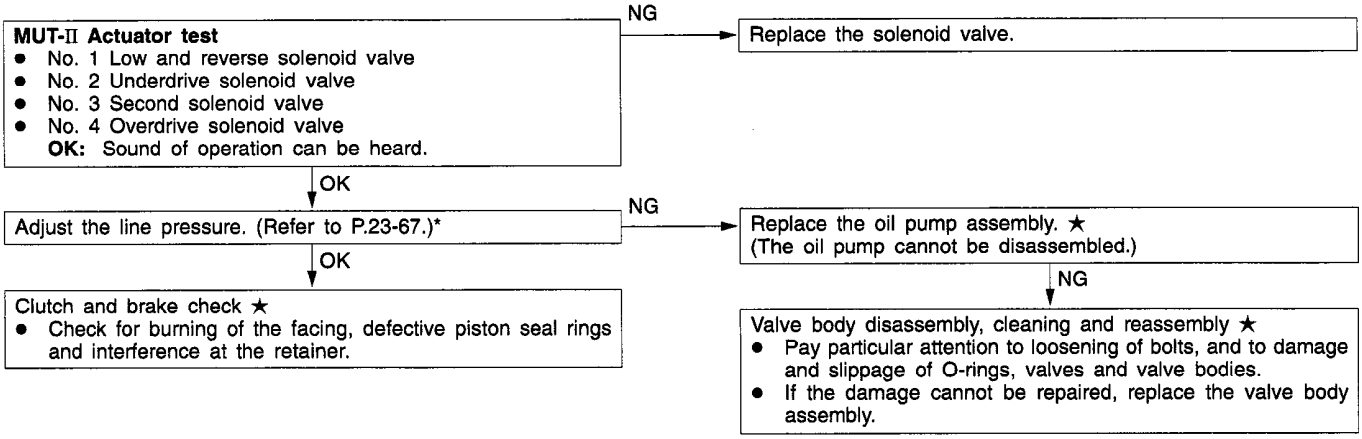
★: Refer to the Transmission Workshop Manual.



INSPECTION PROCEDURE 10

Shocks and running up	Probable cause
If shocks occur when driving due to upshifting or downshifting and 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.	• Abnormal line pressure • Malfunction of each solenoid valve • Malfunction of the oil pump • Malfunction of the valve body • Malfunction of each brake or each clutch

★: Refer to the Transmission Workshop Manual.

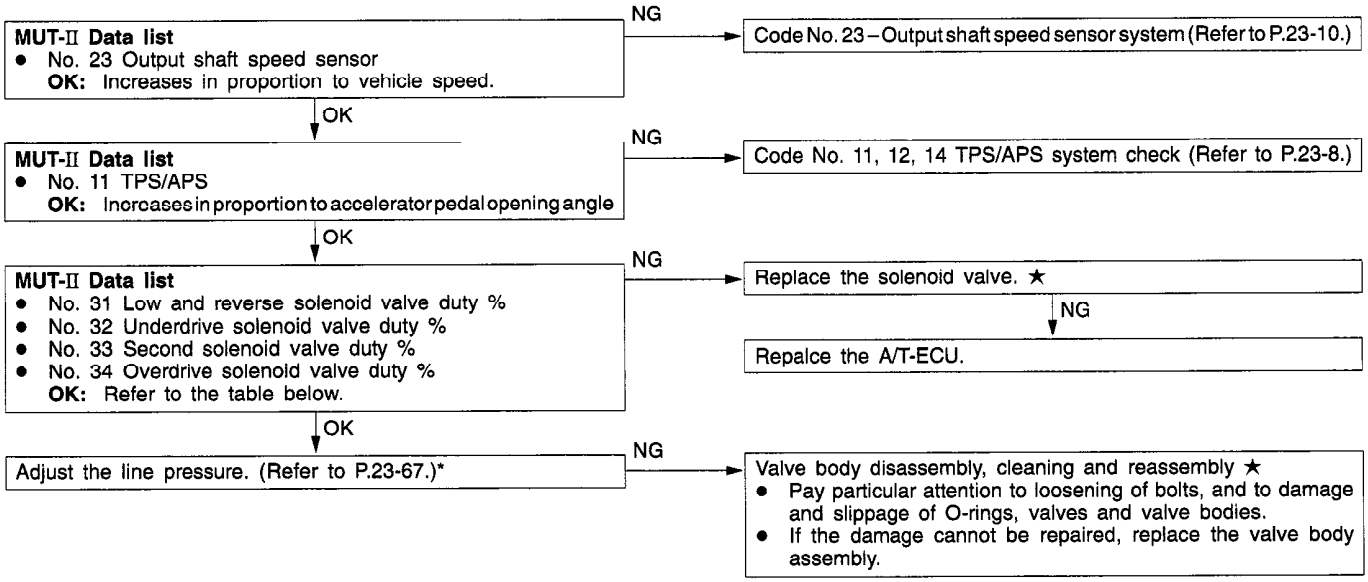


NOTE
*: Refer to '96 CARISMA Workshop Manual (Pub No. PWDE9502).

INSPECTION PROCEDURE 11

All points (Displaced shifting points)	Probable cause
If all shift points are displaced while driving, the cause is probably a malfunction of the output shaft speed sensor, TPS or of a solenoid valve.	• Malfunction of the output shaft speed sensor • Malfunction of the throttle position sensor • Malfunction of each solenoid valve • Abnormal line pressure • Malfunction of the valve body • Malfunction of the A/T-ECU

★: Refer to the Transmission Workshop Manual.



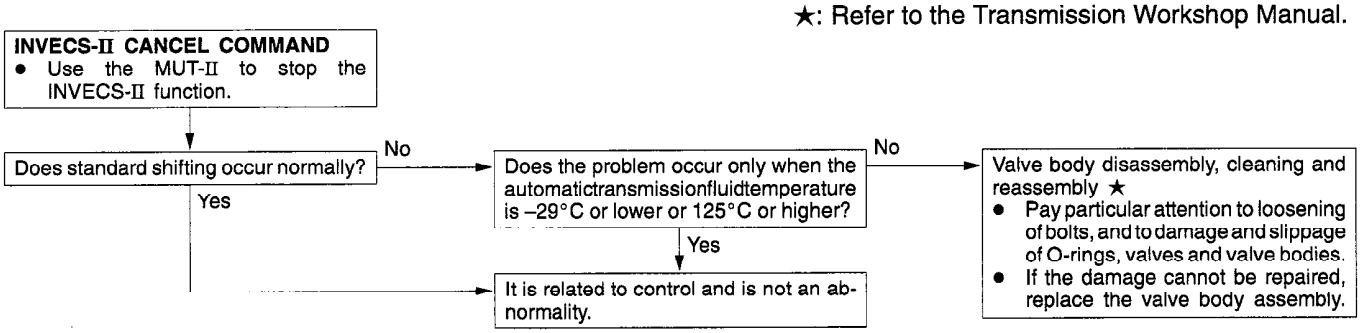
	No. 31	No. 32	No. 33	No. 34
Driving at constant speed in 1st gear	0 %	0 %	100 %	100 %
Driving at constant speed in 2nd gear	100 %	0 %	0 %	100 %
Driving at constant speed in 3rd gear	100 %	0 %	100 %	0 %
Driving at constant speed in 4th gear	100 %	100 %	0 %	0 %

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

INSPECTION PROCEDURE 12

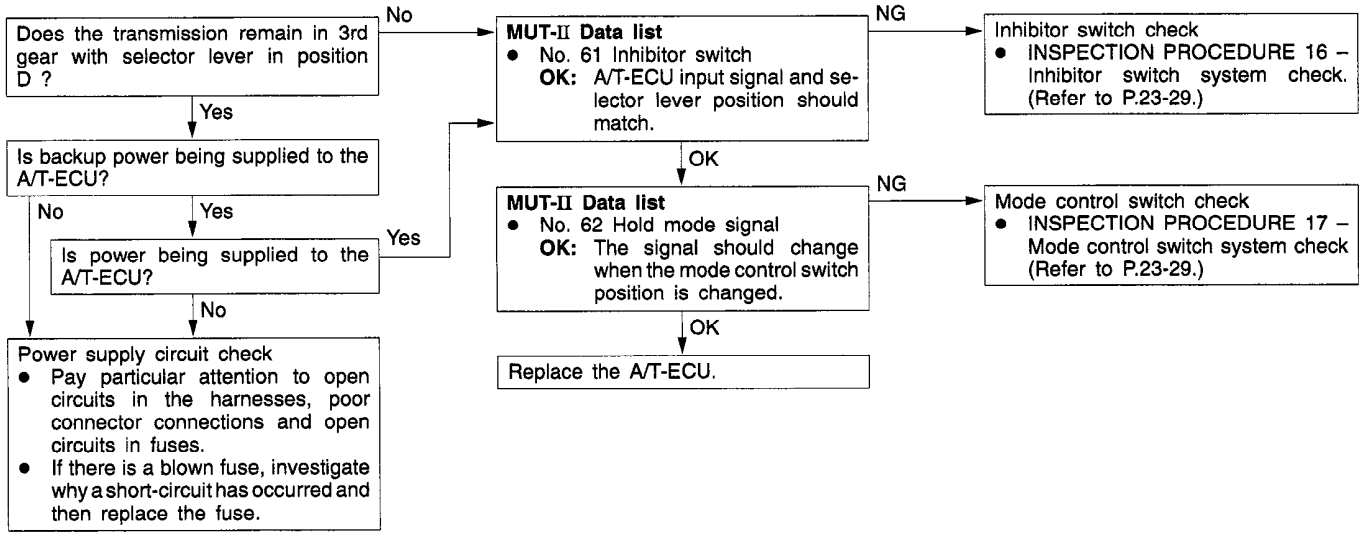
Some points (Displaced shifting points)	Probable cause
If some of the shift points are displaced while driving, the cause is probably a malfunction of the valve body, or it is related to control and is not an abnormality.	• Malfunction of the valve body

★: Refer to the Transmission Workshop Manual.



INSPECTION PROCEDURE 13

No diagnosis codes (Does not shift)	Probable cause
If shifting does not occur while driving and no diagnosis codes are output, the cause is probably a malfunction of the inhibitor switch, or A/T-ECU.	• Malfunction of the inhibitor switch • Malfunction of the A/T-ECU



INSPECTION PROCEDURE 14

Poor acceleration	Probable cause
If acceleration is poor even if downshifting occurs while driving, the cause is probably a malfunction of the engine system or of a brake or clutch.	• Malfunction of the engine system • Malfunction of the brake or clutch

★: Refer to the Transmission Workshop Manual.

Engine system check
- Check the control system, ignition system, fuel system and main system.

NG → **Replace, repair**

OK ↓

Brake or clutch check ★
- Check for burning of the facing, defective piston seal rings and interference at the retainer.

INSPECTION PROCEDURE 15

Vibration	Probable cause
If vibration occurs when driving at constant speed or when accelerating and deceleration in top range, the cause is probably abnormal damper clutch pressure or a malfunction of the engine system, damper clutch control solenoid valve, torque converter or valve body.	• Abnormal damper clutch pressure • Malfunction of the engine system • Malfunction of the damper clutch control solenoid valve • Malfunction of the torque converter • Malfunction of the valve body

★: Refer to the Transmission Workshop Manual.

MUT-II Actuator test
- No. 6 Damper clutch control solenoid valve
  OK: Sound of operation can be heard.

NG → Replace the damper clutch control solenoid valve. ★

OK ↓

Does the problem occur even when the oil temperature sensor connector is disconnected?

Yes → Engine system check
- Check the control system, ignition system, fuel system and main system.

No ↓

Hydraulic pressure test (Refer to P.23-56.)*
- Measure the damper clutch pressure.
  Standard value: Refer to P.23-57.*

NG → Valve body disassembly, cleaning and reassembly ★
- Pay particular attention to loosening of bolts, and to damage and slippage of O-rings, valves and valve bodies.
- If the damage cannot be repaired, replace the valve body assembly.

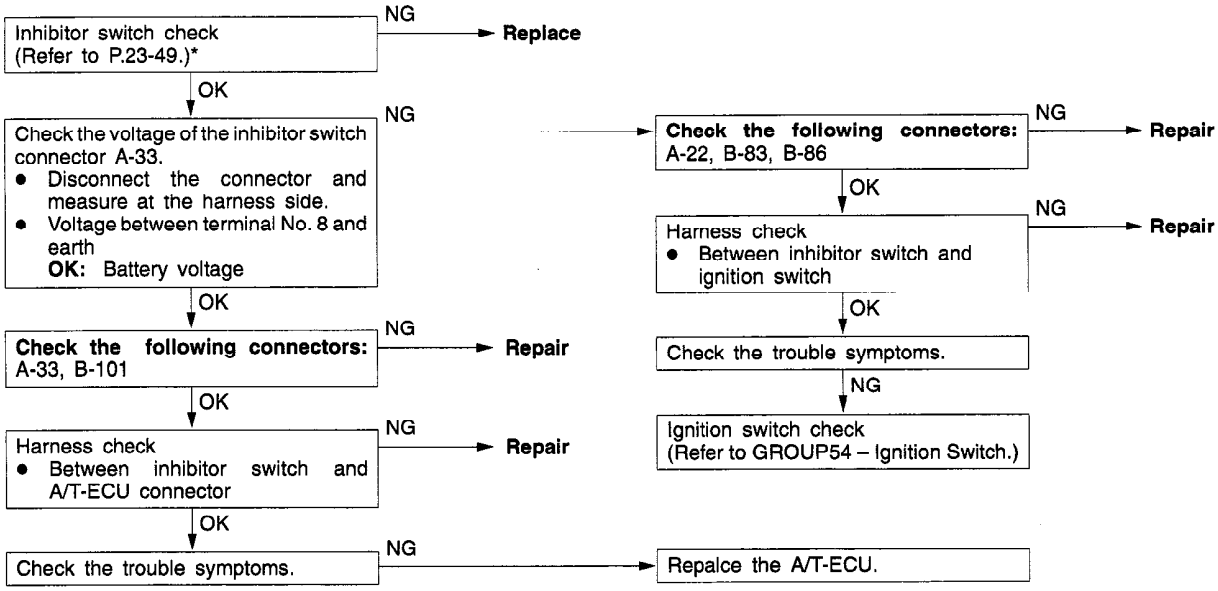
OK ↓

Replace the torque converter assembly.

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

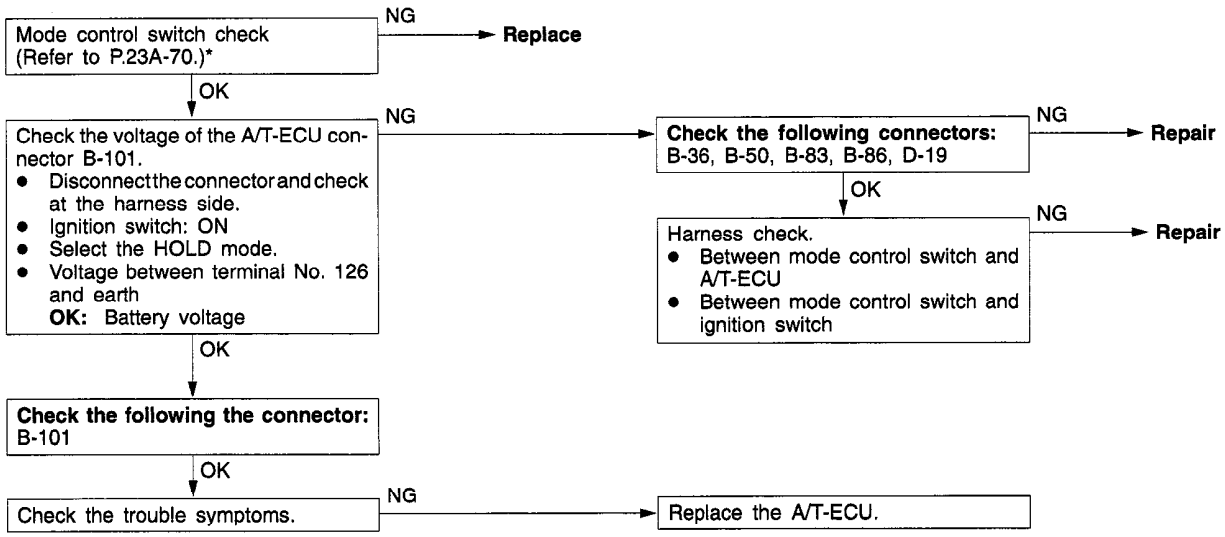
INSPECTION PROCEDURE 16

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



INSPECTION PROCEDURE 17

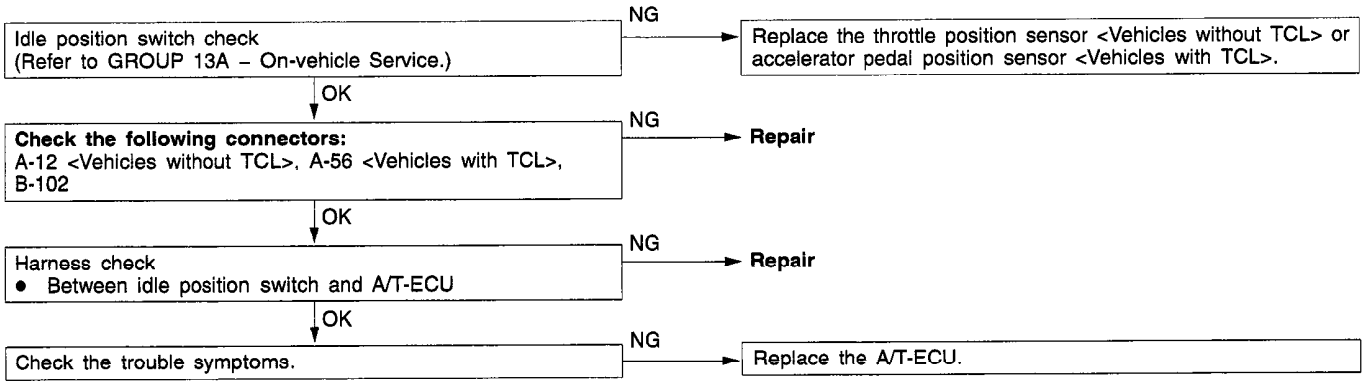
Mode control switch system	Probable cause
The cause is probably a defective mode control switch circuit or a defective A/T-ECU.	• Malfunction of the mode control switch • Malfunction of connector • Malfunction of the A/T-ECU



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

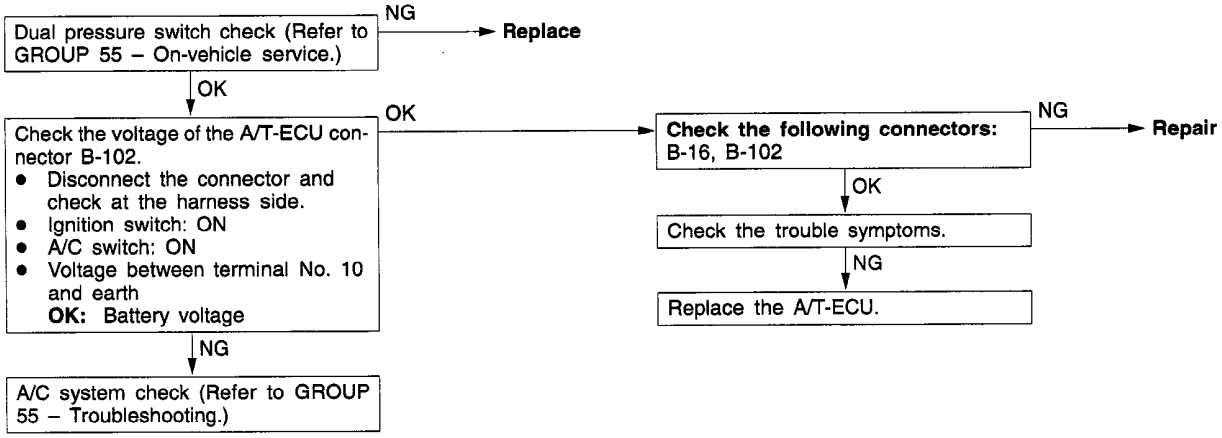
INSPECTION PROCEDURE 18

Idle position switch system	Probable cause
The cause is probably a defective idle position switch circuit or a defective A/T-ECU.	• Malfunction of the idle position switch • Malfunction of connector • Malfunction of the A/T-ECU



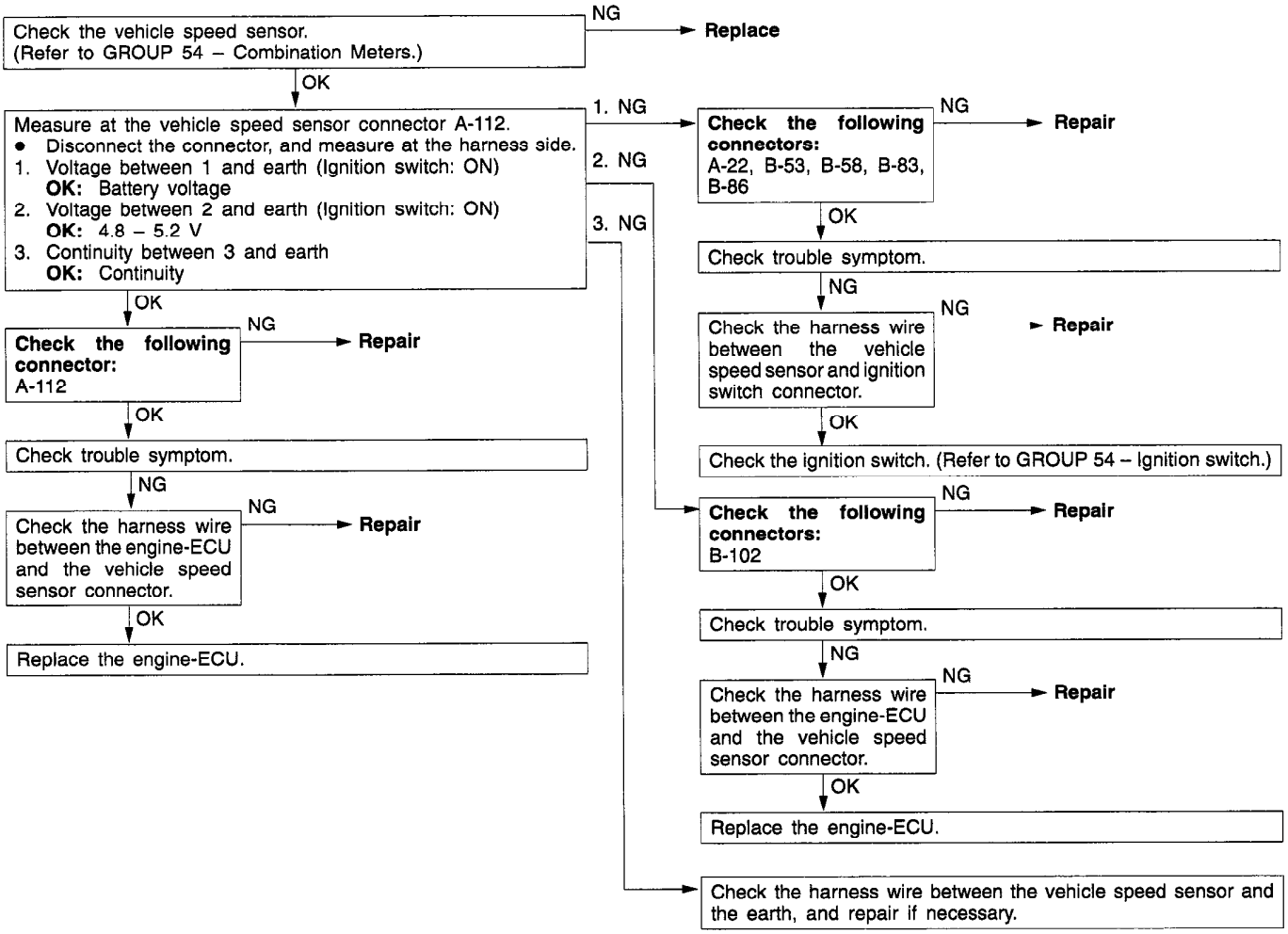
INSPECTION PROCEDURE 19

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



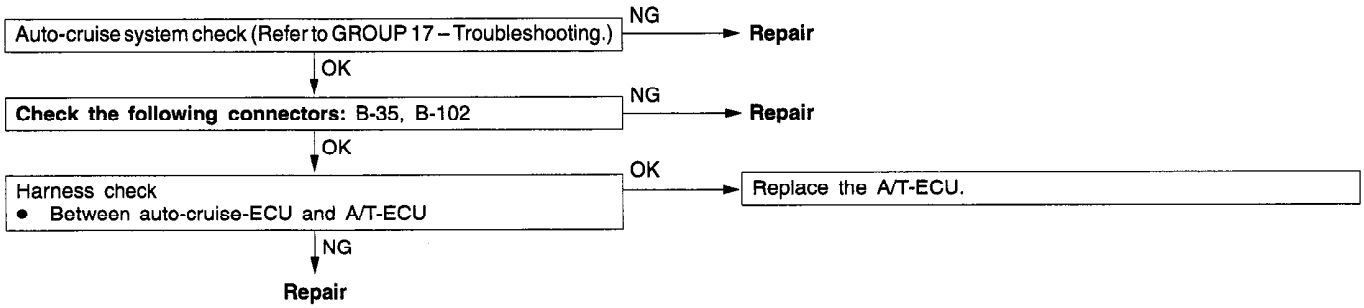
INSPECTION PROCEDURE 20

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

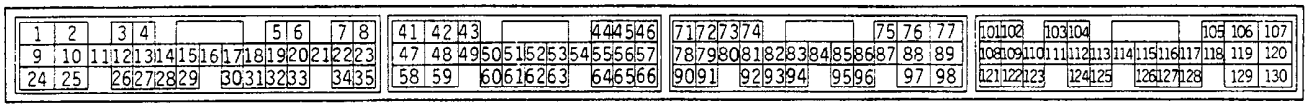


INSPECTION PROCEDURE 21

Auto-cruise-ECU signal system	Probable cause
The cause is probably a defective auto-cruise signal line circuit or a defective A/T-ECU.	• Malfunction of connector • Malfunction of the A/T-ECU • Malfunction of the auto-cruise-ECU



CHECK AT ENGINE AND A/T-ECU TERMINALS



9FA0253

Terminal No.	Check item	Check requirement	Standard value
50	A/T control relay	Ignition switch: OFF	0 V
		Ignition switch: ON	Battery voltage
57	Sensor earth	Always	0 V
75	Auto-cruise OD-OFF command	No OD-OFF request (Auto-cruise operating: Plane road)	Battery voltage
		OD-OFF request (Auto-cruise operating: Sloping road)	0V
76	Earth	Always	0 V
77	Solenoid valve power supply	Ignition switch: OFF	0 V
		Ignition switch: ON	Battery voltage
86	Communication with engine-ECU <Vehicles without TCL> Communication with TCL-ECU <Vehicles with TCL>	Engine: Idling Selector lever position: D	Other than 0 V
87	Communication with engine-ECU <Vehicles without TCL> Communication with TCL-ECU <Vehicles with TCL>	Engine: Idling Selector lever position: D	Other than 0 V
88	Earth	Always	0 V
89	Solenoid valve power supply	Ignition switch: OFF	0 V
		Ignition switch: ON	Battery voltage
97	Earth	Always	0 V
101	Inhibitor switch P	Selector lever position: P	Battery voltage
		Selector lever position: Other than above	0 V
102	Inhibitor switch D	Selector lever position: D	Battery voltage
		Selector lever position: Other than above	0 V

Terminal No.	Check item	Check requirement	Standard value
103	Input shaft speed sensor	Measure between terminal No. 57 and No. 103 by an oscilloscope. Engine: 2,000 r/min Selector lever position: 3 (3rd gear)	Refer to P.23-45*, Oscilloscope inspection procedure.
104	Output shaft speed sensor	Measure between terminal No. 57 and No. 104 by an oscilloscope. Engine: 2,000 r/min Selector lever position: 3 (3rd gear)	Refer to P.23-45*, Oscilloscope inspection procedure.
106	Second solenoid valve	Selector lever position: 2 (2nd gear)	Battery voltage
		Selector lever position: P	Approx. 7 – 9 V
107	Damper clutch control solenoid valve	Selector lever position: L (1st gear)	Battery voltage
		Selector lever position: 3 (50 km/h in 3rd gear)	Other than battery voltage
108	Inhibitor switch R	Selector lever position: R	Battery voltage
		Selector lever position: Other than above	0 V
109	Inhibitor switch 3	Selector lever position: 3	Battery voltage
		Selector lever position: Other than above	0 V
110	Inhibitor switch L	Selector lever position: L	Battery voltage
		Selector lever position: Other than above	0 V
115	Wide open throttle switch	Accelerator pedal: Released	4 V or more
		Accelerator pedal: Depressed	Less than 0.4 V
120	Underdrive solenoid valve	Selector lever position: L (1st gear)	Battery voltage
		Selector lever position: P	Approx.7 – 9 V
121	Inhibitor switch N	Selector lever position: N	Battery voltage
		Selector lever position: Other than above	0 V
122	Inhibitor switch 2	Selector lever position: 2	Battery voltage
		Selector lever position: Other than above	0 V
123	Stop lamp switch	Brake pedal: Depressed	Battery voltage
		Brake pedal: Released	0 V
124	Oil temperature sensor	ATF temperature: 25 °C	3.8 – 4.0 V
		ATF temperature: 80 °C	2.3 – 2.5 V

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

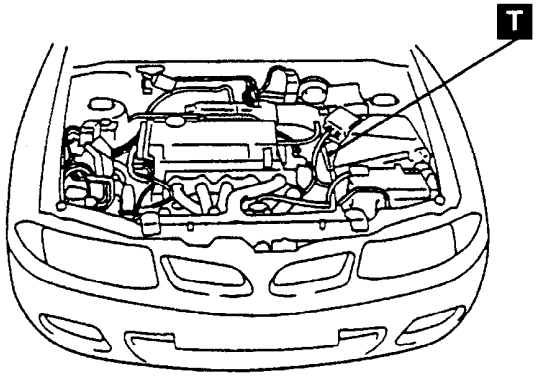
Terminal No.	Check item	Check requirement	Standard value
126	Mode control switch	Select HOLD mode	Battery voltage
		Select AUTO mode	0V
129	Low and reverse solenoid valve	Selector lever position: P	Battery voltage
		Selector lever position: 2 (2nd gear)	Approx. 7 – 9 V
130	Overdrive solenoid valve	Selector lever position: 3 (3rd gear)	Battery voltage
		Selector lever position: P	Approx. 7 – 9 V

ON-VEHICLE SERVICE

A/T CONTROL COMPONENT LOCATION

The vehicle speed sensor mounting position has been changed to correspond to the adoption of an electronic speedometer. (The sensor is now mounted on the transmission body.)

Name	Symbol
Vehicle speed sensor	T



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A/T CONTROL COMPONENT CHECK

VEHICLE SPEED SENSOR

Refer to GROUP 54 – Combination Meters.