AUTOMATIC TRANSAXLE

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23109000170

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23109000187

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) and GROUP 00 – Maintenance Service 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 light, 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 INFORMATION

23100010240

The newly-developed F4A41 and F4A42 automatic transaxle have been used.
These newly-developed transaxles combine the highest-precision electronic and mechanical technology to provide a new era in automatic transaxle performance.
The main features of these new transaxles are described below:
(1) The "INVECS-II" automatic transaxle system seeks to provide the ultimate in easy driving.
(2) Feedback control and learning control are incorporated into the control for all gear shifting clutches to provide an excellent shift feeling that suppresses shifting shocks throughout the vehicle.
(3) The gear shifting clutches use a hydraulic balancing mechanism to enable gear shifting at extra-high engine speed.
(4) The number of shafts has been decreased to two. Increased use has been made of metal plates. The one-way clutch has been removed. These features help to reduce the weight of the A/T assembly.
(5) Increased meshing ratios and improved rigidity of the gear supports and casing result in less noise.

Transaxle model		F4A41-1-M8A3	F4A42-1-M8A5
Torque converter	Type	3-element, 1-stage, 2-phase	
	Torque converter clutch	Provided (3rd to 4th)	
	Stall torque ratio	2.00	
Transaxle ratio		4-speed forward, 1-speed reverse fully automatic	
Gear ratio	1st	2.842	
	2nd	1.529	
	3rd	1.000	
	4th	0.712	
	Reverse	2.480	
Reduction ratio		4.042	
Number of underdrive clutch discs		3	4
Number of overdrive clutch discs		3	4
Number of reverse clutch discs		2	
Number of low-reverse brake discs		4	5
Number of second brake discs		2	3
Manual control type		P-R-N-D-3-2-L (7 positions)	
Shift pattern control		Electronic control (INVECS-II)	
Oil pressure control during shifting		Electronic control (each oil pressure independently controlled)	
Torque converter clutch control		Electronic control	

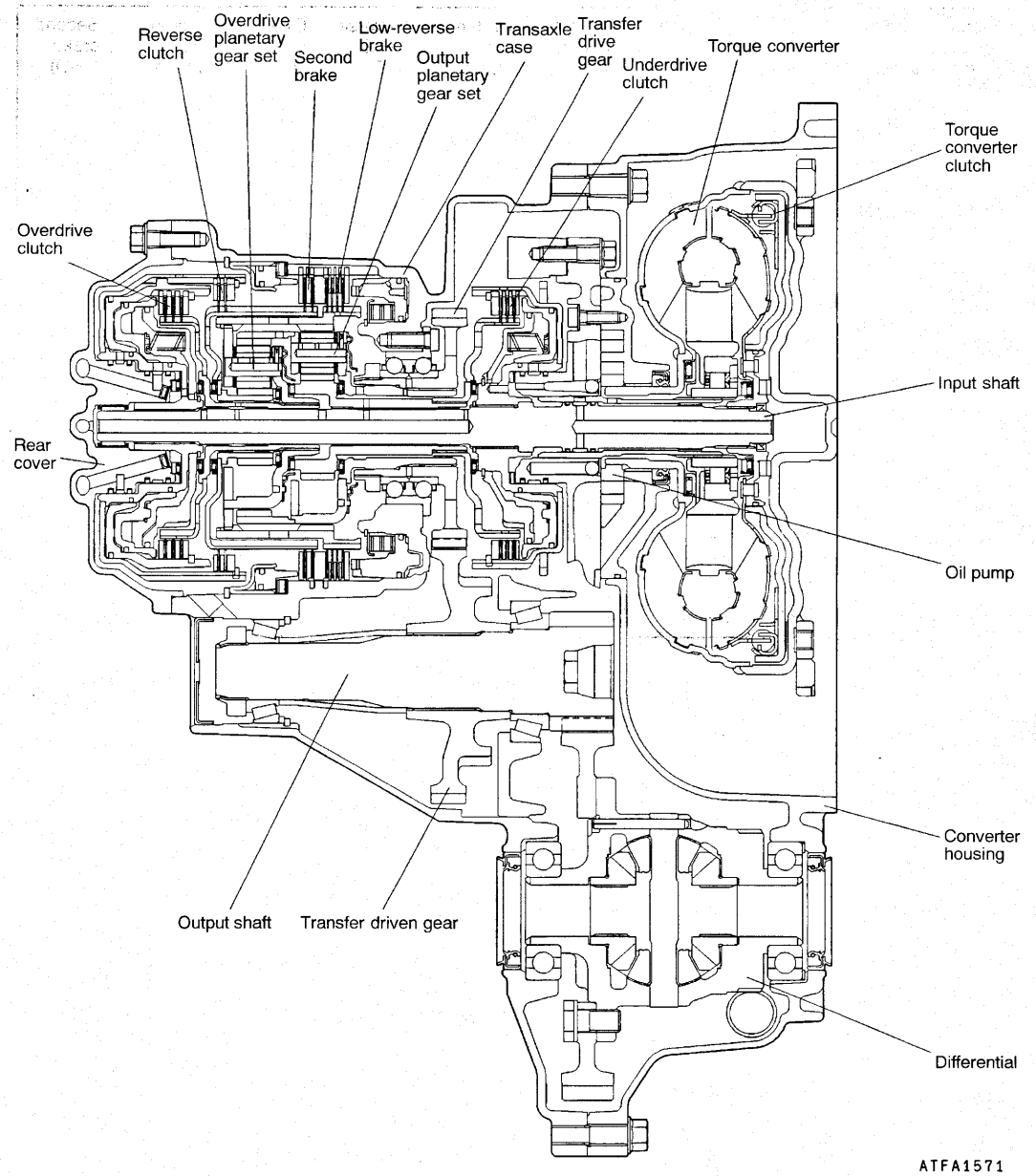
FUNCTION ELEMENT TABLE

× : Function element

Operating element / Selector lever position		Gear ratio	Engine start	Parking mechanism	Under-drive clutch (UD)	Reverse clutch (REV)	Over-drive clutch (OD)	Low-reverse brake (LR)	Second brake (2ND)
P	Parking	-	OK	×	-	-	-	×	-
R	Reverse	2.480	-	-	-	×	-	×	-
N	Neutral	-	OK	-	-	-	-	×	-
D	1st	2.842	-	-	×	-	-	×	-
D	2nd	1.529	-	-	×	-	-	-	×
D	3rd	1.000	-	-	×	-	×	-	-
D	4th	0.712	-	-	-	-	×	-	×
3	1st	2.842	-	-	×	-	-	×	-
3	2nd	1.529	-	-	×	-	-	-	×
3	3rd	1.000	-	-	×	-	×	-	-
2	1st	2.842	-	-	×	-	-	×	-
2	2nd	1.529	-	-	×	-	-	-	×
L	1st	2.842	-	-	×	-	-	×	-

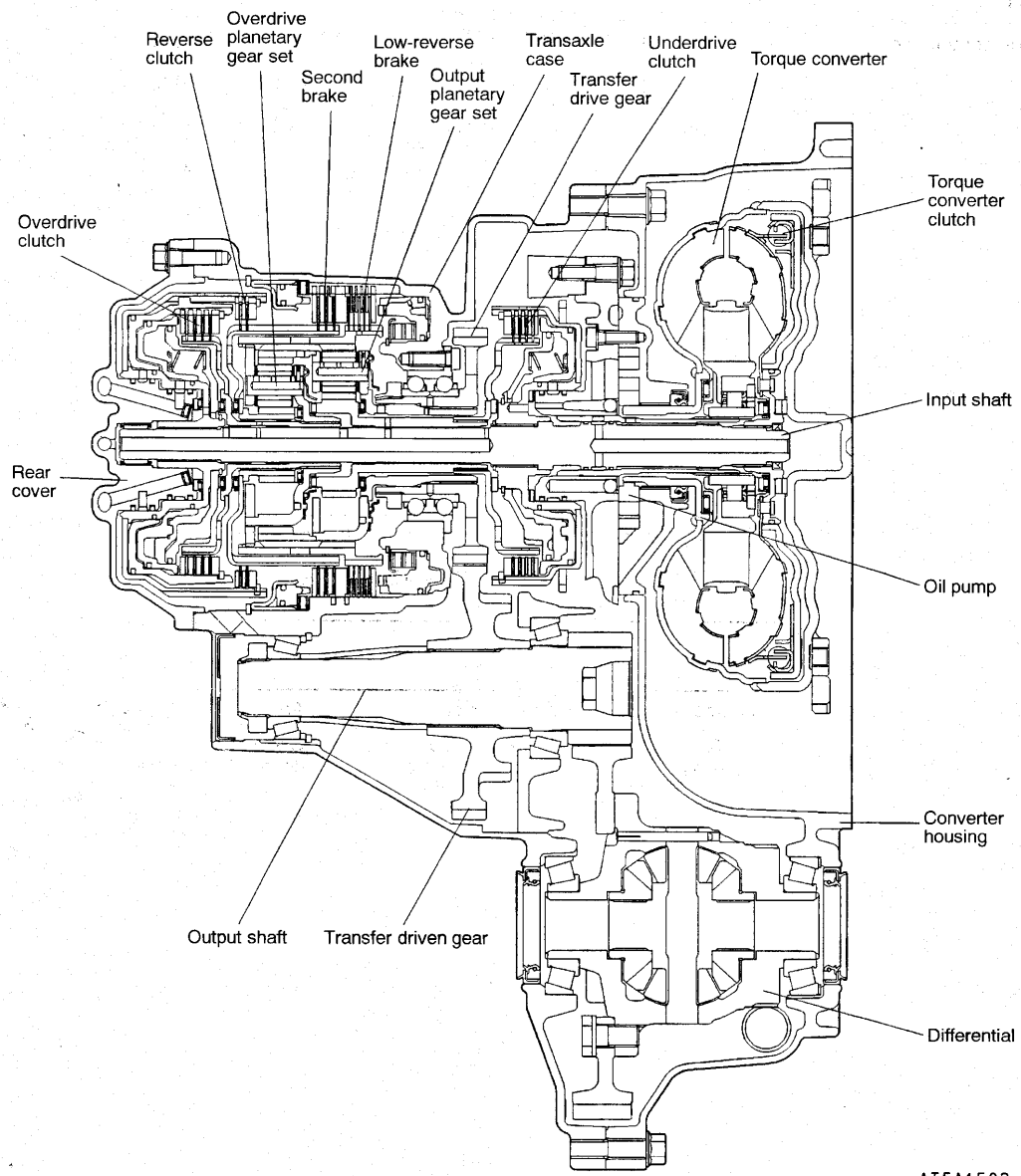
SECTIONAL VIEW

F4A41



SECTIONAL VIEW

F4A42



SERVICE SPECIFICATIONS

23100030093

Items		Standard value
Oil temperature sensor kΩ	at 0°C (32°F)	16.7 - 20.5
	at 100°C (212°F)	0.57 - 0.69
Resistance of torque converter clutch control solenoid coil [at 20°C (68°F)] Ω		2.7 - 3.4
Resistance of Low-Reverse solenoid valve coil [at 20°C (68°F)] Ω		2.7 - 3.4
Resistance of second solenoid valve coil [at 20°C (68°F)] Ω		2.7 - 3.4
Resistance of underdrive solenoid valve coil [at 20°C (68°F)] Ω		2.7 - 3.4
Resistance of overdrive solenoid valve coil [at 20°C (68°F)] Ω		2.7 - 3.4
Stall speed r/min		1,900 - 2,400
Line pressure adjustment value kPa (psi)		1,010 - 1,050 (147 - 152)
Protruding length of stabilizer bar mounting bolt mm (in.)		22 (.87)

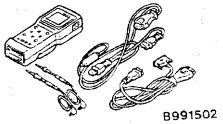
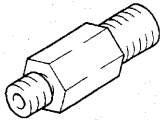
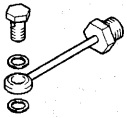
LUBRICANT

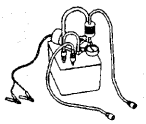
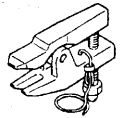
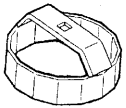
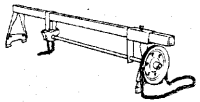
23100040089

Items	Specified lubricant	Quantity dm^3 (qts.)
Transmission fluid	DIAMOND ATF SPII, DIAMOND ATF SPII M or equivalent	7.8 (8.2)

SPECIAL TOOLS

23100060108

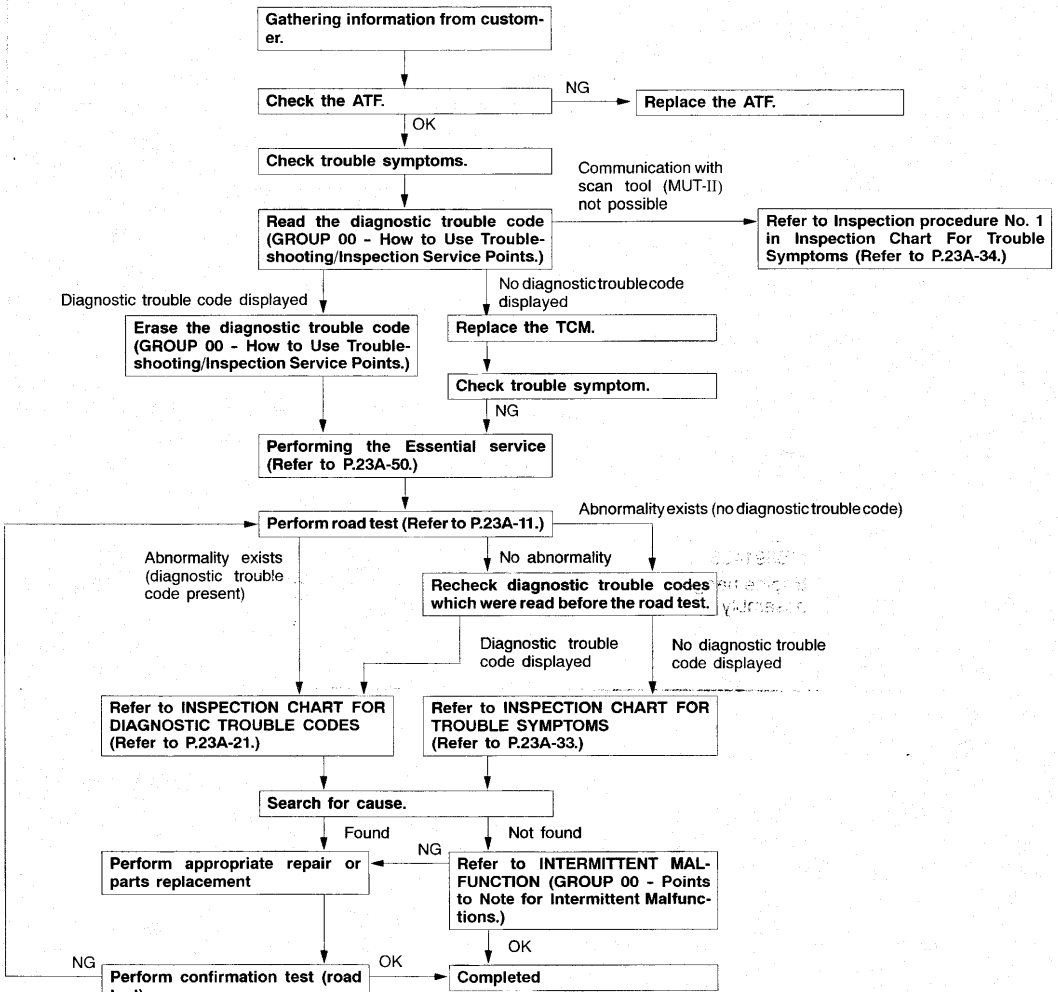
Tool	Tool number and name	Supersession	Application
 B991502	MB991502 Scan tool (MUT-II)	MB991496-OD	Checking for diagnostic trouble codes (DTC)
	MD998330 Oil pressure gauge 2,942 kPa (427 psi)	MD998330-01	Measurement of oil pressure
	MD998332 Adapter	MD998332-01	
	MD998900 Adapter	MD998900-01	

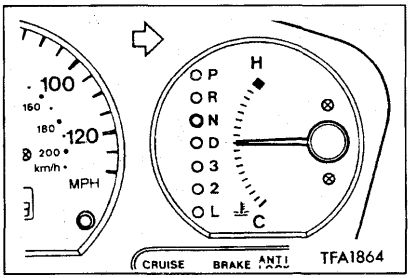
Tool	Tool number and name	Supersession	Application
	MB995062 Flushing tool	-	Flushing of cooler and tubes
 B991113	MB991113 Steering linkage puller	MB991113-01	Removal of the tie rod end and the lower arm
	MB991610 Oil filter wrench	-	Removal and installation of automatic transaxle oil filter
 Z203827	GENERAL SERVICE TOOL MZ203827 Engine lifter	MZ203827-01	Supporting the engine assembly during removal and installation of the transaxle
 B991453	MB991453 Engine hanger assembly	MZ203827-01	Supporting the engine assembly during removal and installation of the transaxle

TROUBLESHOOTING

23100760350

DIAGNOSTIC TROUBLESHOOTING FLOW





DIAGNOSIS FUNCTION

2310770094

1. N (Neutral) range light

The N range light flashes at a frequency of approximately 1 Hz (once per second) if there is an abnormality in any of the items in the table below which are related to the A/T system. Note that the N range light will flash only when the shift lever position is at the advance range (D, 3, 2 or L). Check for diagnostic trouble codes if the N range light is flashing at a frequency of approximately 1 Hz.

N range light flashing items

Input shaft speed sensor system
Output shaft speed sensor system
Each solenoid valve system
Gear incorrect ratio
A/T control relay system

Caution

- **If the N range light is flashing at a frequency of approximately 2 Hz (two flashes per second), it means that the automatic transmission fluid temperature is too high. Stop the vehicle in a safe place and wait until the N range light switches off.**

2. Method of reading the diagnostic trouble code

Use the Scan tool (MUT-II) or the N range light to take a reading of the diagnostic trouble codes. (Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points.)

ROAD TEST

23100780356

Check by the following procedures

Procedure	Condition before test/Operation	Test/Operation	Judgement value	Check item	Diagnostic code No.	Inspection procedure page if there is an abnormality
1	Ignition switch: OFF	Ignition switch (1) ON	Data list No. 54 (1) Control Relay Voltage [V]	A/T Control relay	54	A/T Control relay system (23A-32)
2	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	Park/Neutral position switch	27 28	Park/Neutral position switch system (23A-25)
		Accelerator pedal (1) Fully closed (2) Depressed (3) Fully open	Data list No. 11 (1) 400 - 1,000 mV (2) Gradually rises from (1) (3) 4,500 - 5,000 mV	TPS	11 12 14	TPS system (23A-22)
		Brake pedal (1) Depressed (2) Released	Data list No. 26 (1) ON (2) OFF	Stop light switch	26	Stop light switch system (23A-25)
3	Ignition switch: ST Engine: Stopped	Starting test with lever P or N range	Starting should be possible	Starting	-	Starting impossible (23A-34)
4	Warming up	Drive for 15 minutes or more so that the automatic fluid temperature becomes 70 - 90°C. (158 - 194 °F)	Data list No. 15 Gradually rises to 70 - 90°C	Oil temperature sensor	15 16	Oil temperature sensor system (23A-22)

Procedure	Condition before test/Operation	Test/Operation	Judgement value	Check item	Diagnostic 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 light switch	26	Stop light switch system (23A-25)
		A/C switch (1) ON (2) OFF	Data list No. 65 (1) ON (2) OFF	Dual pressure switch	-	Dual pressure switch system (23A-42)
5	Engine: Idling Selector lever position: N	Accelerator pedal (1) Fully closed (2) Depressed	Data list No. 64 (1) ON (2) OFF	Closed throttle position switch	-	Closed throttle position switch system (23A-42)
			Data list No. 21 (1) 600 - 900 rpm (2) Gradually rises from (1)	Crankshaft position sensor	21	Crankshaft position sensor system (23A-22)
			Data list No. 57 (2) Data changes	Communication with ECM	51	Abnormal communication with ECM (23A-32)
5	Engine: Idling Selector lever position: N	Selector lever position (1) N → D (2) N → R	Should be no abnormal shifting shocks Time lag when shifting should be within 2 seconds	Malfunction when starting	-	Engine stalling when shifting (23A-36)
					-	Shocks when changing from N to D and long time lag (23A-37)
					-	Shocks when changing from N to R and long time lag (23A-38)
					-	Shocks when changing from N to D,N to R and long time lag (23A-38)
				Driving impossible	-	Does not move forward (23A-35)
					-	Does not reverse (23A-35)
					-	Does not move (forward or reverse) (23A-36)

Procedure	Condition before test/Operation	Test/Operation	Judgement value	Check item	Diagnostic code No.	Inspection procedure page if there is an abnormality
6	Selector lever position: N (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 (6.2 mph) in L position (3) Driving at constant speed of 30 km/h (19 mph) in 2 position (4) Accelerate to 50 km/h (31 mph) in 3 position, then release accelerator pedal. (5) Driving at constant speed of 50 km/h (31 mph) in D position (Each condition should be maintained for 10 seconds or more.)	Data list No. 63 (2) 1st, (3) 2nd, (4) 3rd, (5) 4th	Shift condition	-	-
			Data list No. 31 (2) 0 %, (3) 100 %, (4) 100 %, (5) 100 %	Low and reverse solenoid valve	31	Low and reverse solenoid valve system (23A-26)
			Data list No. 32 (2) 0 %, (3) 0 %, (4) 0 %, (5) 100 %	Underdrive solenoid valve	32	Underdrive solenoid valve system (23A-26)
			Data list No. 33 (2)100 %, (3) 0 %, (4) 100 %, (5) 0 %	Second solenoid valve	33	Second solenoid valve system (23A-26)

Procedure	Condition before test/Operation	Test/Operation	Judgement value	Check item	Diagnostic code No.	Inspection procedure page if there is an abnormality
6	Selector lever position: N (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 (6.2 mph) in L position (3) Driving at constant speed of 30 km/h (19 mph) in 2 position (4) Accelerate to 50 km/h (31 mph) in 3 position, then release accelerator pedal. (5) Driving at constant speed of 50 km/h (31 mph) in D position (Each condition should be maintained for 10 seconds or more.)	Data list No. 34 (2) 100 %, (3) 100 %, (4) 0 %, (5) 0 %	Overdrive solenoid valve	34	Overdrive solenoid valve system (23A-26)
			Data list No. 29 (1) 0 km/h (4) 50 km/h	Vehicle speed sensor	-	Vehicle speed sensor system (23A-43)
			Data list No. 22 (4) 1,800 - 2,100 rpm	Input shaft speed sensor	22	Input shaft speed sensor system (23A-23)
			Data list No. 23 (4) 1,800 - 2,100 rpm	Output shaft speed sensor	23	Output shaft speed sensor system (23A-24)
7	Selector lever position: 3 (on a flat and straight road.)	Selector lever position and vehicle speed (1) Accelerate to 50 km/h (31 mph) in 3 position, then release accelerator pedal. (2) Driving at constant speed of 50 km/h (31 mph)	Data list No. 36 (1) 0 % (2) Approx. 70 - 90 %	Torque converter clutch solenoid	36 52 53	Torque converter clutch control solenoid system (23A-26)
			Data list No. 52 (1) Approx. 100 - 300 rpm (2) Approx. 0 - 10 rpm			

Procedure	Condition before test/Operation	Test/Operation	Judgement value	Check item	Diagnostic code No.	Inspection procedure page if there is an abnormality
8	Use the scan tool (MUT-II) to stop the IN-VECS-II function. Selector lever position: D (on a flat and straight road.)	Monitor data list No. 11, 23, and 63 with the scan tool (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 (37 mph) in 4th gear, shift down to 3 range. (5) While driving at 40 km/h (25 mph) in 3rd gear, shift down to 2 range. (6) While driving at 20 km/h (12 mph) 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 shift shocks should occur. For (4), (5) and (6), downshifting should occur immediately after shifting.	Malfunction when shifting	-	Shift shocks and lipping (23A-39)
				Displaced shifting points	-	All points (23A-39)
					-	Some points (23A-40)
				Does not shift	-	No diagnostic trouble code (23A-40)
					22	Input shaft speed sensor system (23A-23)
					23	Output shaft speed sensor system (23A-24)

Procedure	Condition before test/Operation	Test/Operation	Judgement value	Check item	Diagnostic code No.	Inspection procedure page if there is an abnormality
8	Use the scan tool (MUT-II) to stop the IN-VECS-II function. Selector lever position: D (on a flat and straight road.)	Monitor data list No. 11, 23, and 63 with the scan tool (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 (37 mph) in 4th gear, shift down to 3 range. (5) While driving at 40 km/h (25 mph) in 3rd gear, shift down to 2 range. (6) While driving at 20 km/h (12 mph) 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 shift shocks should occur. For (4), (5) and (6), downshifting should occur immediately after shifting.	Does not shift from 1 to 2 or 2 to 1	31	Low and reverse solenoid valve system (23A-26)
					33	Second solenoid valve system (23A-26)
					41	1st gear incorrect ratio (23A-27)
					42	2nd gear incorrect ratio (23A-28)

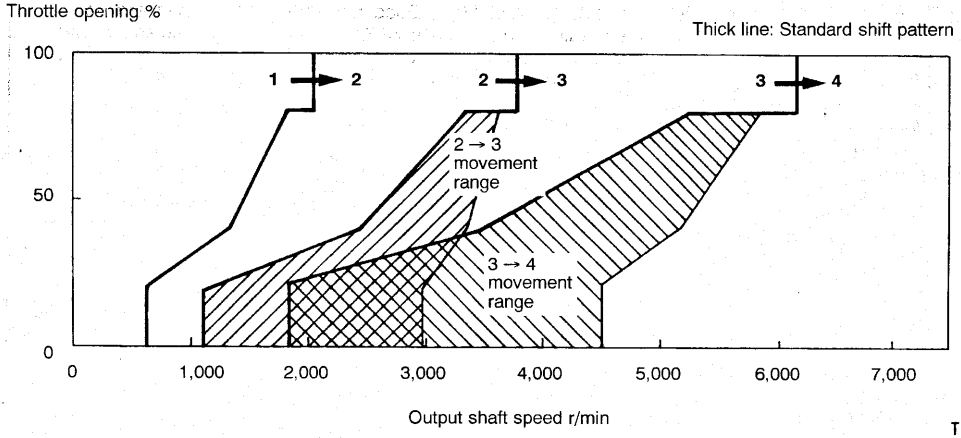
Procedure	Condition before test/Operation	Test/Operation	Judgement value	Check item	Diagnostic code No.	Inspection procedure page if there is an abnormality
8	Use the scan tool (MUT-II) to stop the IN-VECS-II function. Selector lever position: D (on a flat and straight road.)	Monitor data list No. 11, 23, and 63 with the scan tool (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 (37 mph) in 4th gear, shift down to 3 range. (5) While driving at 40 km/h (25 mph) in 3rd gear, shift down to 2 range. (6) While driving at 20 km/h (12 mph) 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 shift shocks should occur. For (4), (5) and (6), downshifting should occur immediately after shifting.	Does not shift from 2 to 3 or 3 to 2	33	Second solenoid valve system (23A-26)
					34	Overdrive solenoid valve system (23A-26)
					42	2nd gear incorrect ratio (23A-28)
					43	3rd gear incorrect ratio (23A-29)

Procedure	Condition before test/Operation	Test/Operation	Judgement value	Check item	Diagnostic code No.	Inspection procedure page if there is an abnormality
8	Use the scan tool (MUT-II) to stop the IN-VECS-II function. Selector lever position: D (on a flat and straight road.)	Monitor data list No. 11, 23, and 63 with the scan tool (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 (37 mph) in 4th gear, shift down to 3 range. (5) While driving at 40 km/h (25 mph) in 3rd gear, shift down to 2 range. (6) While driving at 20 km/h (12 mph) 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 shift shocks should occur. For (4), (5) and (6), downshifting should occur immediately after shifting.	Does not shift from 3 to 4 or 4 to 3	32	Underdrive solenoid valve system (23A-26)
					33	Second solenoid valve system (23A-26)
					43	3rd gear incorrect ratio (23A-29)
					44	4th gear incorrect ratio (23A-29)
9	Selector lever position: N (on a flat and straight road.)	Monitor data list No. 22 and No. 23 with the scan tool (MUT-II). (1) Move selector lever to R range, drive at constant speed of 10 km/h (6.2 mph).	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 (23A-23)
					23	Output shaft speed sensor system (23A-24)
					46	Reverse gear incorrect ratio (23A-31)

SHIFT PATTERN

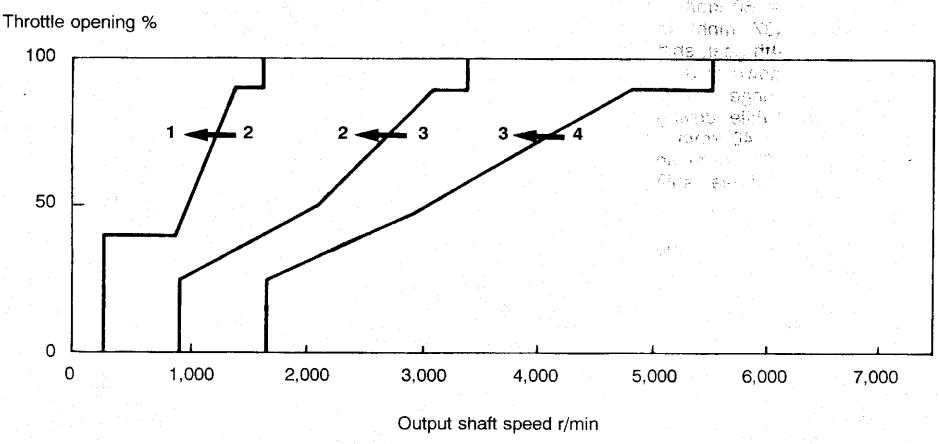
<4G1>

UPSHIFT PATTERN



TFA2029

DOWNSHIFT PATTERN



TFA2030

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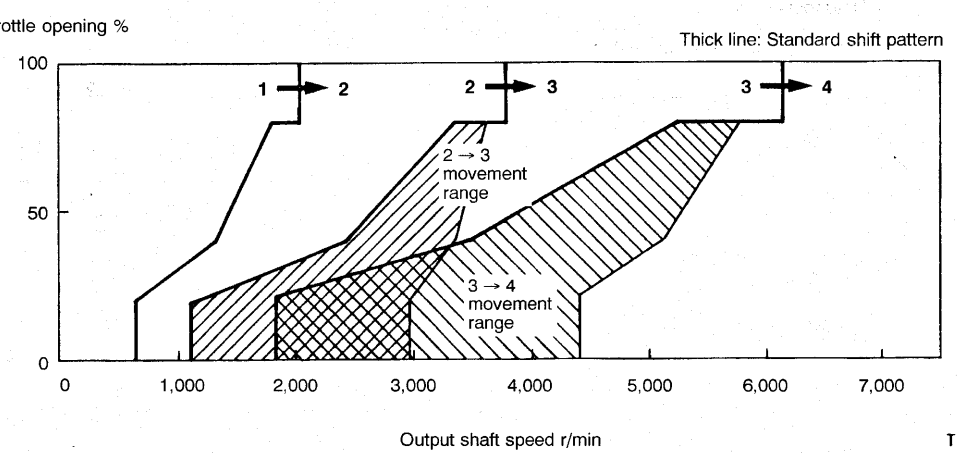

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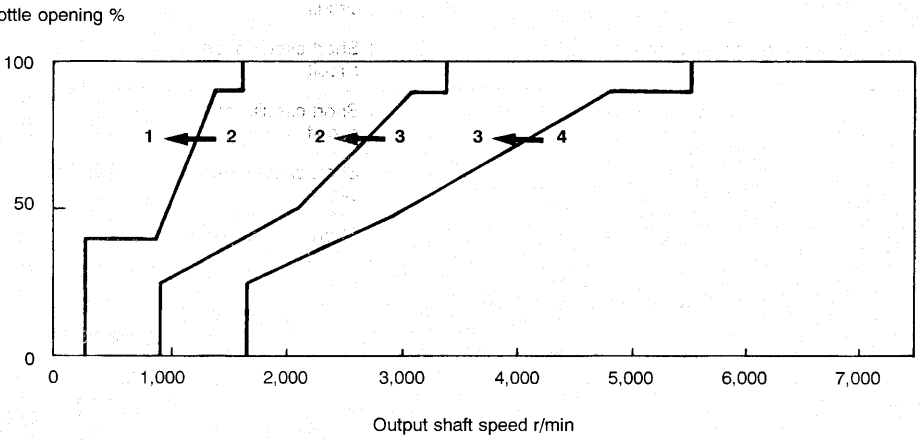


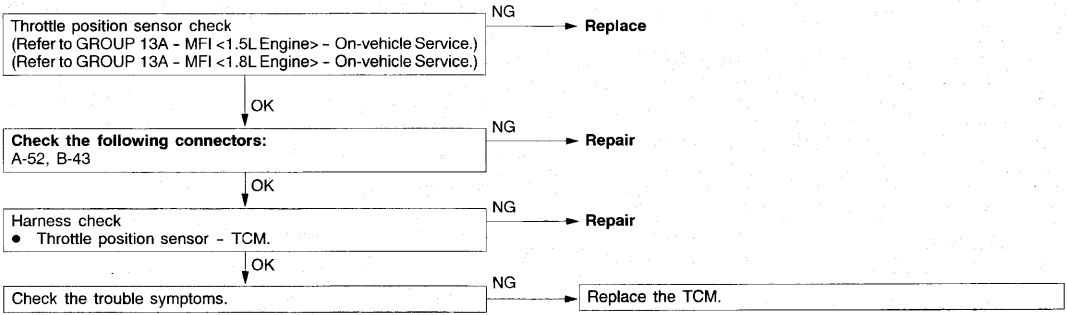
INSPECTION CHART FOR DIAGNOSTIC TROUBLE CODE

23100790328

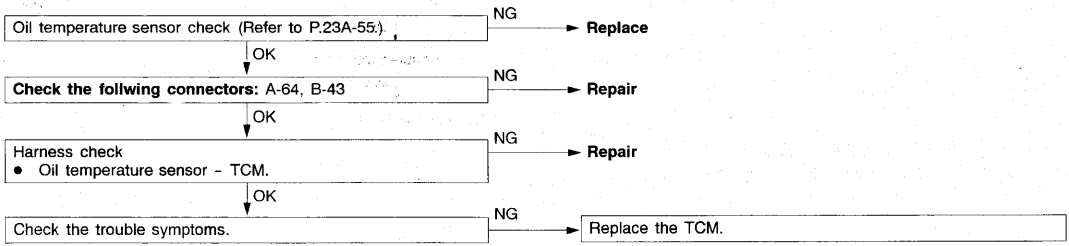
Code	Diagnosis item		Reference page
11	Throttle position sensor system	Short circuit	23A-22
12		Open circuit	23A-22
14		Sensor maladjustment	23A-22
15	Oil temperature sensor system	Open circuit	23A-22
16		Short circuit	23A-22
21	Crankshaft position sensor system	Open circuit	23A-22
22	Input shaft speed sensor system	Short circuit/open circuit	23A-23
23	Output shaft speed sensor system	Short circuit/open circuit	23A-24
26	Stop light switch system	Short circuit/open circuit	23A-25
27	Park/Neutral position switch system	Open circuit	23A-25
28		Short circuit	23A-25
31	Low and reverse solenoid valve system	Short circuit/open circuit	23A-26
32	Underdrive solenoid valve system	Short circuit/open circuit	23A-26
33	Second solenoid valve system	Short circuit/open circuit	23A-26
34	Overdrive solenoid valve system	Short circuit/open circuit	23A-26
36	Torque converter clutch solenoid system	Short circuit/open circuit	23A-26
41	1st gear incorrect ratio		23A-27
42	2nd gear incorrect ratio		23A-28
43	3rd gear incorrect ratio		23A-29
44	4th gear incorrect ratio		23A-30
46	Reverse gear incorrect ratio		23A-31
51	Abnormal communication with ECM		23A-32
52	Torque converter clutch solenoid system	Defective system	23A-26
53		Lock-up stuck on	23A-26
54	A/T Control relay system	Short circuit to ground/open circuit	23A-32
56	N range light system	Short circuit to ground	23A-33
71	Malfunction of TCM		23A-33

INSPECTION PROCEDURES FOR DIAGNOSTIC TROUBLE CODES

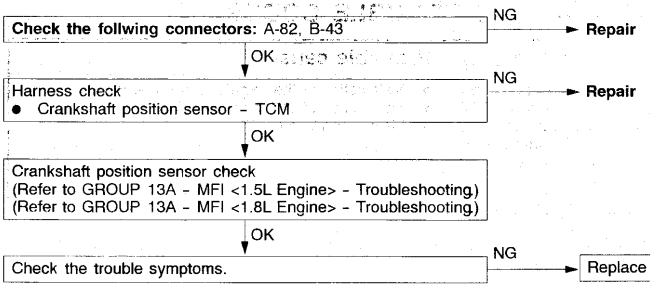
Code No. 11, 12, 14 Throttle position sensor system	Probable cause
If the TPS output voltage is 4.8 V or higher when the engine is idling, the output is judged to be too high and diagnostic trouble code No. 11 is output. If the TPS output voltage is 0.2 V or lower at times other than when the engine is idling, the output is judged to be too low and diagnostic trouble code No. 12 is output. If the TPS output voltage is 0.2 V or lower or if it is 1.2 V or higher when the engine is idling, the TPS adjustment is judged to be incorrect and diagnostic trouble code No. 14 is output.	• Malfunction of the throttle position sensor • Malfunction of connector • Malfunction of the TCM



Code No. 15, 16 Oil temperature sensor system	Probable 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 diagnostic trouble code No. 15 is output. If the oil temperature sensor output detects the voltage which corresponds to 200°C (392°F) or more for more than one second, it is judged that there is an open circuit in oil temperature sensor and diagnostic trouble code No.16 is output.	• Malfunction of the oil temperature sensor • Malfunction of connector • Malfunction of the TCM

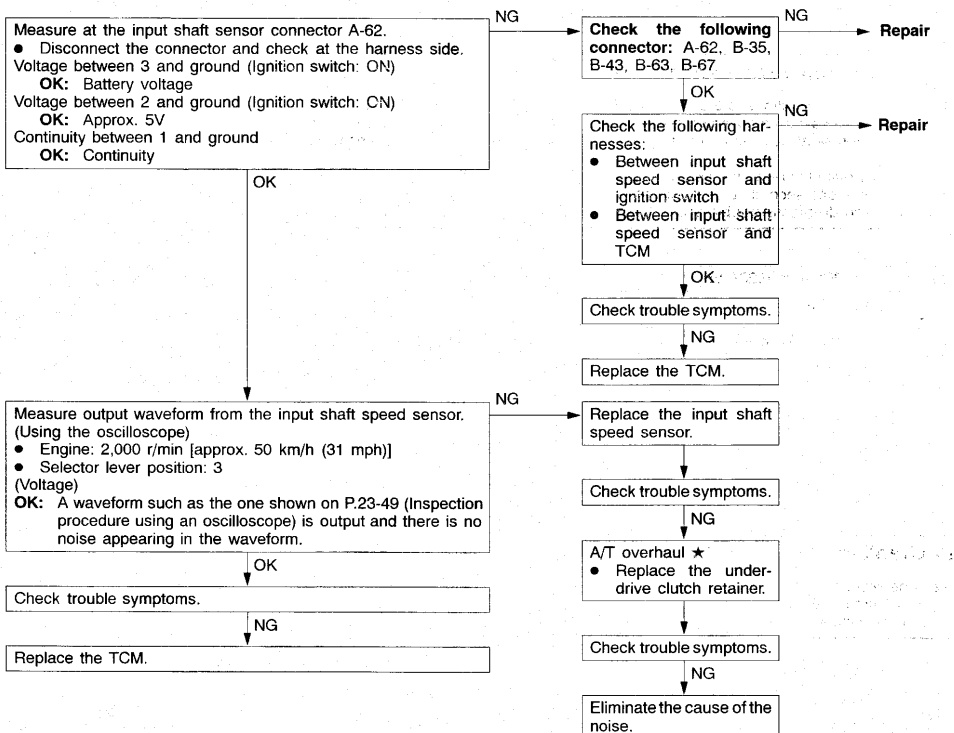


Code No. 21 Crankshaft position sensor system	Probable cause
If no output pulse is detected from the crankshaft position sensor for 5 seconds or more while driving at 25 km/h (16 mph) or more, it is judged that there is an open circuit in the crankshaft position sensor and diagnostic trouble code No. 21 is output.	• Malfunction of the crankshaft position sensor • Malfunction of connector • Malfunction of the TCM



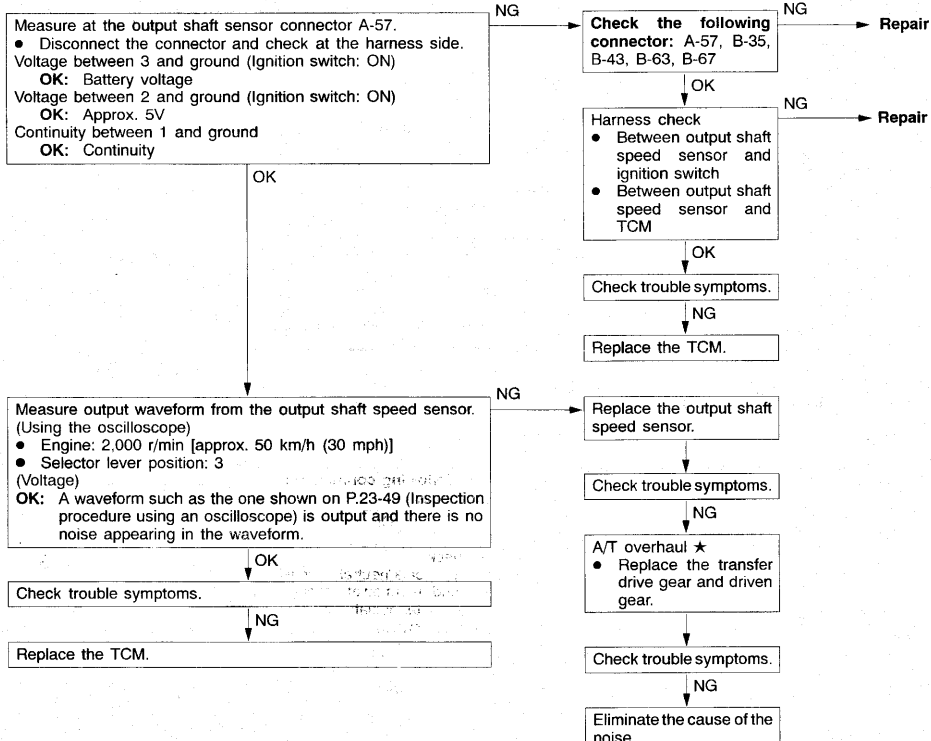
Code No. 22 Input shaft speed sensor system	Probable cause
If no output pulse is detected from the input shaft speed sensor for 1 second or more while driving in 3rd or 4th gear at a speed of 30 km/h (19 mph) or more, it is judged to be an open circuit or short-circuit in the input shaft speed sensor and diagnostic trouble code No. 22 is output. If diagnostic trouble code No. 22 is output four times, the transaxle is locked into 3rd gear or 2nd gear as a fail-safe measure, and the N range light 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 TCM

★: Refer to GROUP 23B.

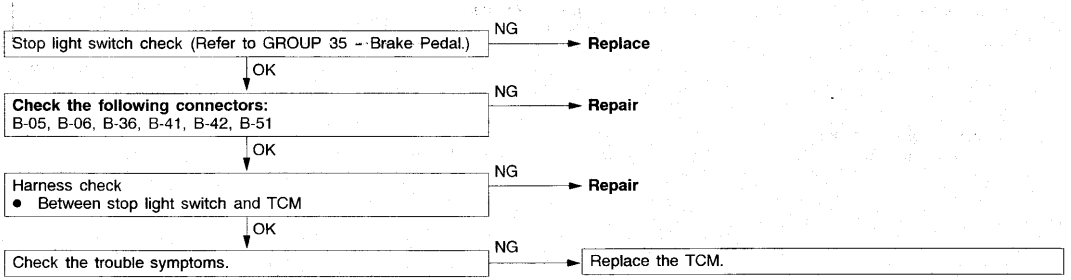


Code No. 23 Output shaft speed sensor system	Probable cause
If the output from the output shaft speed sensor is continuously 50% lower than the vehicle speed for 1 second or more while driving in 3rd or 4th gear at a speed of 30 km/h or more, it is judged to be an open circuit or short-circuit in the output shaft speed sensor and diagnostic trouble code No. 23 is output. If diagnostic trouble code No. 23 is output four times, the transmission is locked into 3rd gear or 2nd gear as a fail-safe measure, and the N range light 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 TCM

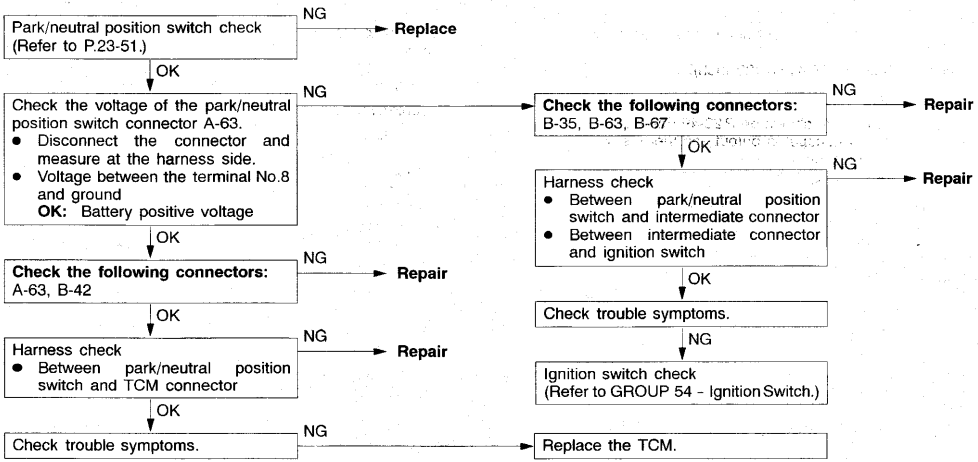
★: Refer to GROUP 23B.



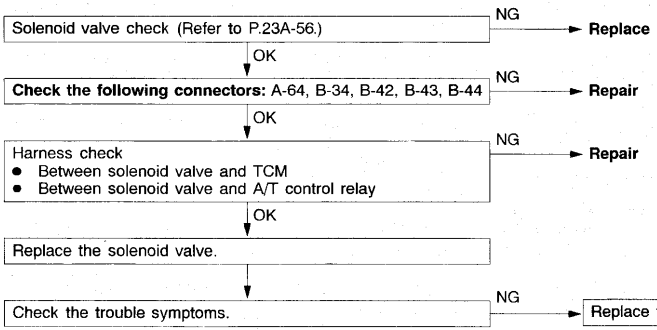
Code No. 26 Stop light switch system	Probable cause
If the stop light switch is on for 5 minutes or more while driving, it is judged that there is a short circuit in the stop light switch and diagnostic trouble code No. 26 is output.	• Malfunction of the stop light switch • Malfunction of connector • Malfunction of the TCM



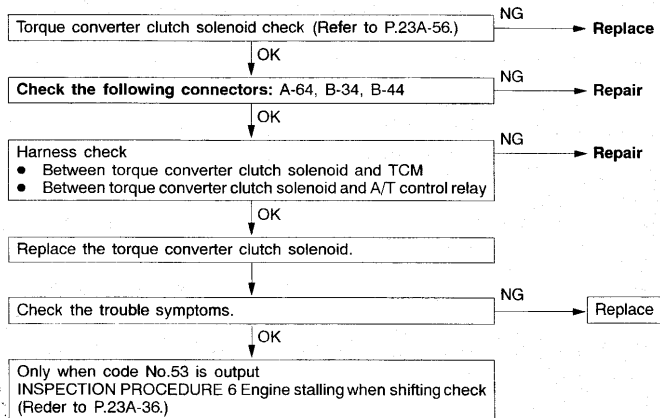
Code No.27, 28 Park/Neutral position switch system	Probable cause
If the TCM detects no park/neutral position switch input signal for a continuous period of 30 seconds, it is judged that there is an open circuit in the park/neutral position switch and diagnostic trouble code No.27 is output. If the TCM detects more than two kinds of park/neutral position switch input signals for a continuous period of 30 seconds, it is judged that there is an open circuit in the park/neutral position switch and diagnostic trouble code No.28 is output.	• Malfunction of the park/neutral position switch • Malfunction of the ignition switch • Malfunction of connector • Malfunction of the TCM



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 diagnostic trouble code is output. The transaxle is locked into 3rd gear as a fail-safe measure, and the N range light flashes at a frequency of 1 Hz.	• Malfunction of solenoid valve • Malfunction of connector • Malfunction of the TCM



Code No. 36, 52, 53 Torque converter clutch solenoid system	Probable cause
If the resistance value for the torque converter clutch solenoid is too large or too small, it is judged that there is a short-circuit or an open circuit in the torque converter clutch solenoid and diagnostic trouble code No. 36 is output. If the drive duty rate for the torque converter clutch solenoid is 100 % for a continuous period of 4 seconds or more, it is judged that there is an abnormality in the torque converter clutch system and diagnostic trouble code No. 52 is output. When diagnostic trouble code No. 36 is output, the transaxle is locked into 3rd gear as a fail-safe measure, and the N range light flashes at a frequency of 1 Hz. If the lock-up clutch remains engaged for a continuous period of 10 seconds when the TCM is attempting to disengage the lock-up clutch, it is judged that the torque converter clutch is stuck on and diagnostic trouble code No.53 is output.	• Malfunction of the torque converter clutch solenoid • Malfunction of connector • Malfunction of the TCM



Code No. 41 1st gear incorrect ratio	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, diagnostic trouble code No. 41 is output. If diagnostic trouble code No. 41 is output four times, the transaxle is locked into 3rd gear as a fail-safe measure, and the N range light 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 GROUP 23B.

SCAN TOOL DTC
Is the diagnostic trouble code No. 22 output?
Yes → Code No. 22 Input shaft speed sensor system check (Refer to P.23A-23.)
No ↓

SCAN TOOL DTC
Is the diagnostic trouble code No. 23 output?
Yes → Code No. 23 Output shaft speed sensor system check (Refer to P.23A-24.)
No ↓

Measure output waveform from the input shaft speed sensor. (using an oscilloscope)
- Connect the connector B-43 and measure voltage between 31 and 43 at the TCM.
- Engine: 2,000 r/min [approx. 50 km/h (31 mph)]
- Selector lever position: 3
(Voltage)
OK: A waveform such as the one shown on P.23A-49 (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-43 and measure voltage between 32 and 43 at the TCM.
- Engine: 2,000 r/min [approx. 50 km/h (31 mph)]
- Selector lever position: 3
(Voltage)
OK: A waveform such as the one shown on P.23A-49 (Inspection Procedure Using an Oscilloscope) is output (flashing 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 ★
- Replace the underdrive clutch. (No.42, No.43 or no diagnostic trouble code is output.)
- Replace the low and reverse brake. (No.46 or no diagnostic trouble code is output.)

Code No. 42 2nd gear incorrect ratio	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, diagnostic trouble code No. 42 is output. If diagnostic trouble code No. 42 is output four times, the transaxle is locked into 3rd gear as a fail-safe measure, and the N range light 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 GROUP 23B.

SCAN TOOL DTC
Is the diagnostic trouble code No. 22 output?

Yes → Code No. 22 Input shaft speed sensor system check (Refer to P.23A-23.)

No

SCAN TOOL DTC
Is the diagnostic trouble code No. 23 output?

Yes → Code No. 23 Output shaft speed sensor system check (Refer to P.23A-24.)

No

Measure output waveform from the input shaft speed sensor. (using an oscilloscope)
- Connect the connector B-43 and measure voltage between 31 and 43 at the TCM.
- Engine: 2,000 r/min [approx. 50 km/h (31 mph)]
- Selector lever position: 3

(Voltage)
OK: A waveform such as the one shown on P.23A-49 (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-43 and measure voltage between 32 and 43 at the TCM.
- Engine: 2,000 r/min [approx. 50 km/h (31 mph)]
- Selector lever position: 3

(Voltage)
OK: A waveform such as the one shown on P.23A-49 (Inspection Procedure Using an Oscilloscope) is output (flashing 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 ★
- Replace the underdrive clutch. (No.41, No.43 or no diagnostic trouble code is output.)
- Replace the second brake. (No.44 or no diagnostic trouble code is output.)

Code No. 43 3rd gear incorrect ratio	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, diagnostic trouble code No. 43 is output. If diagnostic trouble code No. 43 is output four times, the transaxle is locked into 3rd gear as a fail-safe measure, and the N range light 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 GROUP 23B.

SCAN TOOL DTC
Is the diagnostic trouble code No. 22 output?

Yes → Code No. 22 Input shaft speed sensor system check (Refer to P.23A-23.)

No ↓

SCAN TOOL DTC
Is the diagnostic trouble code No. 23 output?

Yes → Code No. 23 Output shaft speed sensor system check (Refer to P.23A-24.)

No ↓

Measure output waveform from the input shaft speed sensor. (using an oscilloscope)
- Connect the connector B-43 and measure voltage between 31 and 43 at the TCM.
- Engine: 2,000 r/min [approx. 50 km/h (31 mph)]
- Selector lever position: 3

(Voltage)
OK: A waveform such as the one shown on P.23A-49 (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-43 and measure voltage between 32 and 43 at the TCM.
- Engine: 2,000 r/min [approx. 50 km/h (31 mph)]
- Selector lever position: 3

(Voltage)
OK: A waveform such as the one shown on P.23A-49 (Inspection Procedure Using an Oscilloscope) is output (flashing 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 ★
- Replace the underdrive clutch. (No.41, No.42 or no diagnostic trouble code is output.)
- Replace the overdrive clutch. (No.44 or no diagnostic trouble code is output.)

Code No. 44 4th gear incorrect ratio	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, diagnostic trouble code No. 44 is output. If diagnostic trouble code No. 44 is output four times, the transaxle is locked into 3rd gear as a fail-safe measure, and the N range light 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 GROUP 23B.

SCAN TOOL DTC
Is the diagnostic trouble code No. 22 output?
- Yes → Code No. 22 Input shaft speed sensor system check (Refer to P.23A-23.)
- No ↓

SCAN TOOL DTC
Is the diagnostic trouble code No. 23 output?
- Yes → Code No. 23 Output shaft speed sensor system check (Refer to P.23A-24.)
- No ↓

Measure output waveform from the input shaft speed sensor. (using an oscilloscope)
- Connect the connector B-43 and measure voltage between 31 and 43 at the TCM.
- Engine: 2,000 r/min [approx. 50 km/h (31 mph)]
- Selector lever position: 3

(Voltage)
OK: A waveform such as the one shown on P.23A-49 (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-43 and measure voltage between 32 and 43 at the TCM.
- Engine: 2,000 r/min [approx. 50 km/h (31 mph)]
- Selector lever position: 3

(Voltage)
OK: A waveform such as the one shown on P.23A-49 (Inspection Procedure Using an Oscilloscope) is output (flashing 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 ★
- Replace the second brake. (No.42 or no diagnostic trouble code is output.)
- Replace the overdrive clutch. (No.43 or no diagnostic trouble code is output.)

Code No. 46 Reverse gear incorrect ratio	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, diagnostic trouble code No. 46 is output. If diagnostic trouble code No. 46 is output four times, the transaxle is locked into 3rd gear as a fail-safe measure, and the N range light 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 GROUP 23B.

SCAN TOOL DTC
Is the diagnostic trouble code No. 22 output?

Yes → Code No. 22 Input shaft speed sensor system check (Refer to P.23A-23.)

No ↓

SCAN TOOL DTC
Is the diagnostic trouble code No. 23 output?

Yes → Code No. 23 Output shaft speed sensor system check (Refer to P.23A-24.)

No ↓

Measure output waveform from the input shaft speed sensor. (using an oscilloscope)
- Connect the connector B-43 and measure voltage between 31 and 43 at the TCM.
- Engine: 2,000 r/min [approx. 50 km/h (31 mph)]
- Selector lever position: 3

(Voltage)
OK: A waveform such as the one shown on P.23A-49 (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-43 and measure voltage between 32 and 43 at the TCM.
- Engine: 2,000 r/min [approx. 50 km/h (31 mph)]
- Selector lever position: 3

(Voltage)
OK: A waveform such as the one shown on P.23A-49 (Inspection Procedure Using an Oscilloscope) is output (flashing between 0 ←→ 5V) and there is no noise appearing in the waveform.

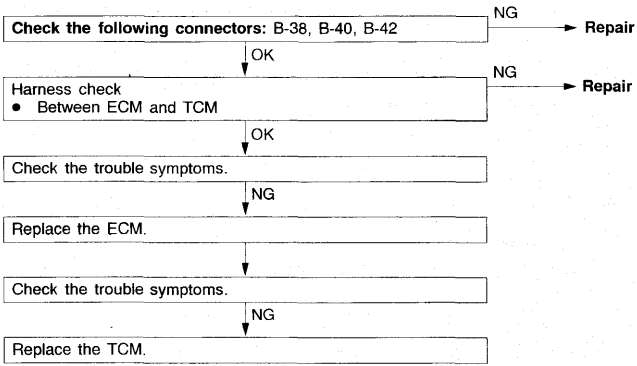
NG → Replace the output shaft speed sensor.
↓
Check the trouble symptoms.
NG ↓
A/T overhaul ★
- Replace the transfer drive gear and driven gear.

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

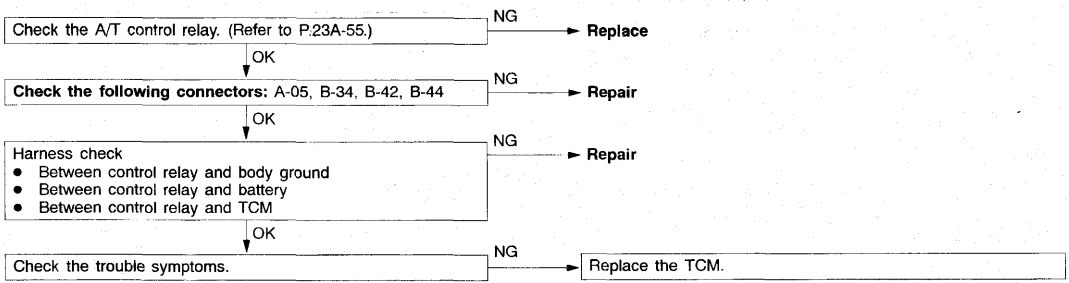
OK ↓

A/T overhaul ★
- Replace the low and reverse brake. (No.41 or no diagnostic trouble code is output.)
- Replace the reverse clutch. (No diagnostic trouble code is output.)

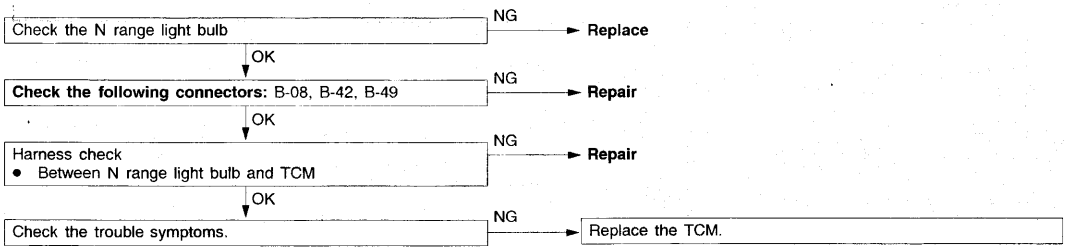
Code No. 51 Abnormal communication with ECM	Probable cause
If normal communication is not possible for a continuous period of 1 second or more when the battery voltage is 10 V or more and the engine speed is 450 r/min or more, diagnostic trouble code No. 51 is output. Diagnostic trouble code No. 51 is 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 ECM • Malfunction of the TCM



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



Code No. 56 N range light system	Probable cause
If the N range signal is off after an N range light illumination instruction (ON instruction) has been given, it is judged that there is a short-circuit in the N range light earth and diagnostic trouble code No. 56 is output.	• Malfunction of the N range light bulb • Malfunction of connector • Malfunction of the TCM



Code No. 71 Malfunction of TCM	Probable cause
There is an abnormality in the TCM. The transaxle is locked into 3rd gear as a fail-safe measure.	• Malfunction of the TCM

Replace the TCM.

INSPECTION CHART FOR TROUBLE SYMPTOMS

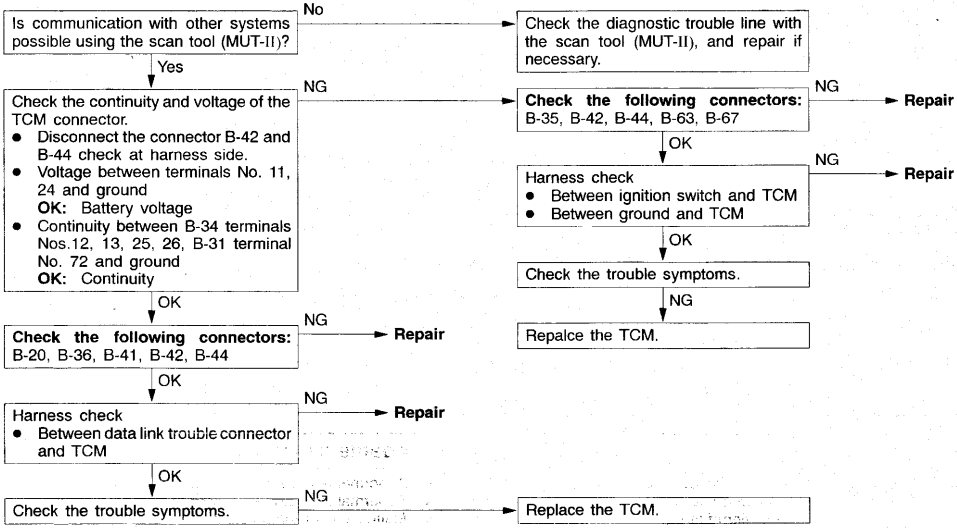
23100800328

Trouble symptom		Inspection procedure No.	Reference page
Communication with the scan tool (MUT-II) is not possible		1	23A-34
Driving impossible	Starting impossible	2	23A-34
	Does not move forward	3	23A-35
	Does not reverse	4	23A-35
	Does not move (forward or reverse)	5	23A-36
Malfunction when starting	Engine stalling when shifting	6	23A-36
	Shocks when changing from N to D and long time lag	7	23A-37
	Shocks when changing from N to R and long time lag	8	23A-38
	Shocks when changing from N to D, N to R and long time lag	9	23A-38
Malfunction when shifting	Shift shocks and lipping	10	23A-39
Displaced shifting points	All points	11	23A-39
	Some points	12	23A-40
Does not shift	No diagnostic trouble codes	13	23A-40
Malfunction while driving	Poor acceleration	14	23A-41
	Vibration	15	23A-41
Closed throttle position switch system		16	23A-42
Dual pressure switch system		17	23A-42
Vehicle speed sensor system		18	23A-43
Cruise control unit signal line system <F4A42>		19	23A-43

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

INSPECTION PROCEDURE 1

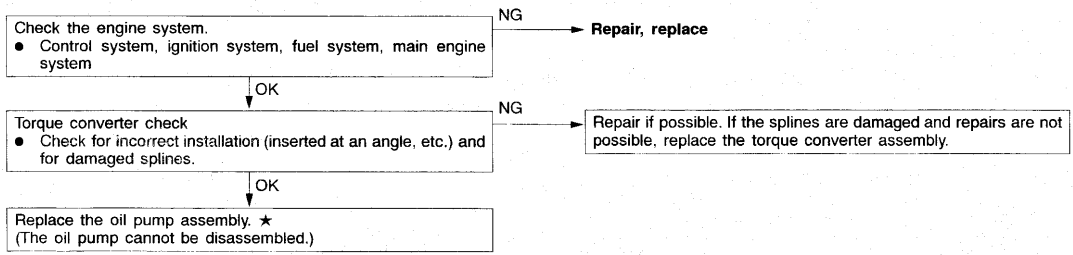
Communication with the scan tool (MUT-II) is not possible	Probable cause
If communication with the scan tool (MUT-II) is not possible, the cause is probably a defective diagnostic trouble line or the TCM is not functioning.	• Malfunction of diagnostic trouble line • Malfunction of connector • Malfunction of the TCM



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

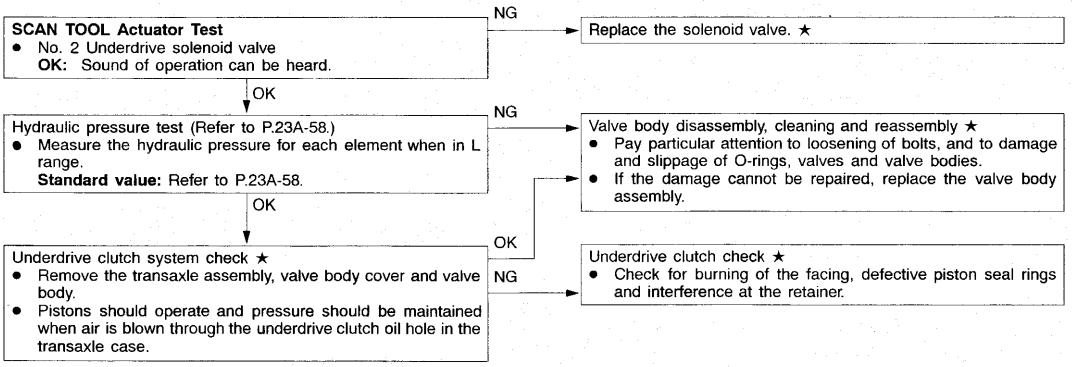
★: Refer to GROUP 23B.



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

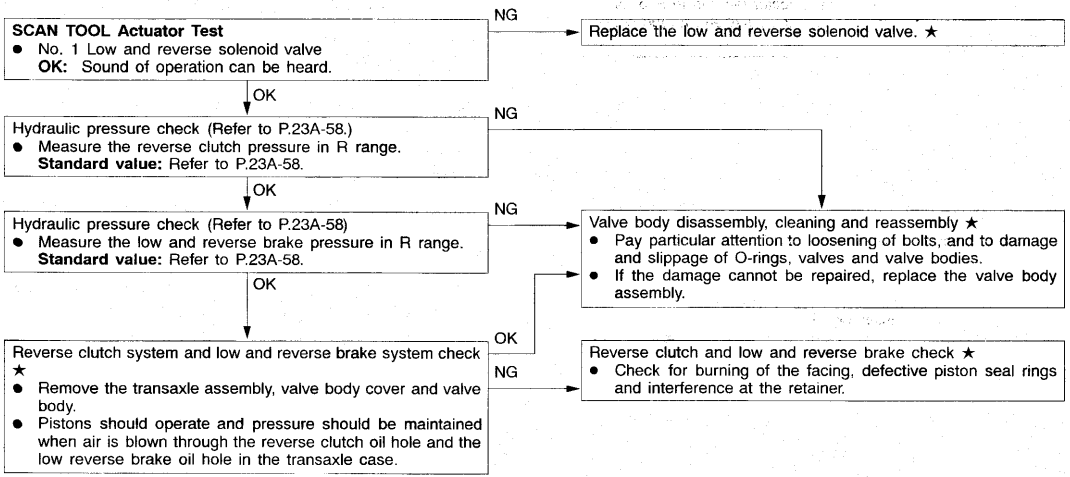
★: Refer to GROUP 23B.



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 GROUP 23B.



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 GROUP 23B.

Hydraulic pressure check (Refer to P.23A-58.)
- Measure the hydraulic pressure for each element when moving forward and back.
  Standard value: Refer to P.23A-58.

OK → Power train check ★
- Disassemble the transaxle, check the condition of the planetary carrier, output shaft and differential, etc.

NG ↓

Replace the oil pump assembly. ★
(The oil pump cannot be disassembled.)

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.

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, torque converter clutch solenoid, valve body or torque converter (torque converter clutch malfunction).	• Malfunction of the engine system • Malfunction of the torque converter clutch solenoid • Malfunction of the valve body • Malfunction of the torque converter (Malfuction of the torque converter clutch)

★: Refer to GROUP 23B.

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

NG → **Repair, replace**

OK ↓

Replace the torque converter clutch solenoid.

↓

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.

NG → Repalce the torque converter.

INSPECTION PROCEDURE 7

Shocks when changing from N to D and long 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 closed throttle 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 closed throttle position switch

★: Refer to the GROUP 23B.

SCAN TOOL Actuator Test
- No. 2 Underdrive solenoid valve
  OK: Sound of operation can be heard.

NG → Replace the underdrive solenoid valve. ★

OK ↓

When does the shock occur?

When starting → Shocks sometimes occur

When shifting ↓

Hydraulic pressure test (Refer to P.23A-58.)
- Measure the underdrive clutch pressure when shifting from N to D.
  Standard value: Refer to P.23A-58.

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 ↓

Underdrive clutch system check ★
- Remove the transaxle assembly, valve body cover and valve body.
- Pistons should operate and pressure should be maintained when air is blown through the underdrive clutch oil hole in the transaxle case.

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 ↓

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

No / Yes

SCAN TOOL Data list
- No. 64 Closed throttle position switch
  OK: Turns from on to off when the accelerator pedal is slightly depressed from the fully closed position.

OK / NG

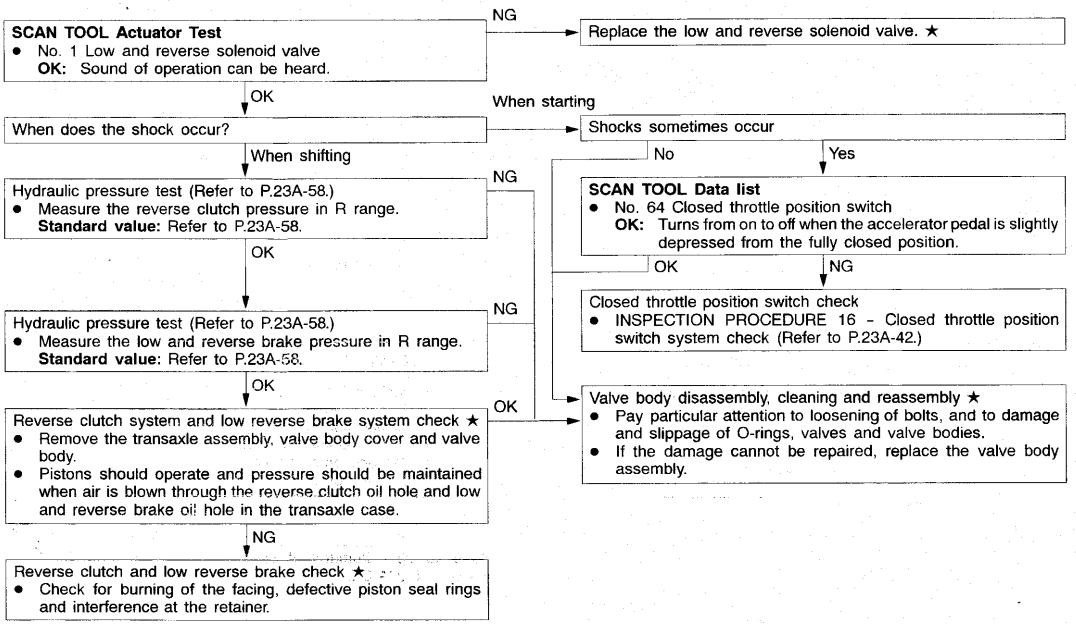
OK → Valve body disassembly, cleaning and reassembly ★
- Pay particular attention to loosening of bolts, and to damage and slippage of O-rings, valves and valve bodies.
- If the damage cannot be repaired, replace the valve body assembly.

NG → Closed throttle position switch check
- INSPECTION PROCEDURE 16 - Closed throttle position switch system check (Refer to P.23A-42.)

INSPECTION PROCEDURE 8

Shocks when changing from N to R and long 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 closed throttle 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 closed throttle position switch

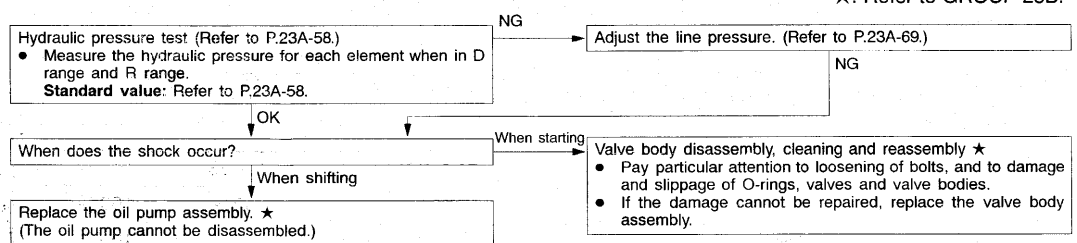
★: Refer to GROUP 23B.



INSPECTION PROCEDURE 9

Shocks when changing from N to D, N to R and long 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 GROUP 23B.



INSPECTION PROCEDURE 10

Shift shocks and lipping	Probable cause
If shocks occur when driving due to upshifting or downshifting and the transaxle 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 GROUP 23B.

SCAN TOOL Actuator Test
- No. 1 Low and reverse solenoid valve
- No. 2 Underdrive solenoid valve
- No. 3 Second solenoid valve
- No. 4 Overdrive solenoid valve

OK: Sound of operation can be heard.

NG → Replace the solenoid valve.

OK ↓

Adjust the line pressure. (Refer to P.23A-69.)

NG → Replace the oil pump assembly. ★ (The oil pump cannot be disassembled.)

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 ↓

Clutch and brake check ★
- Check for burning of the facing, defective piston seal rings and interference at the retainer.

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 TCM

★: Refer to GROUP 23B.

SCAN TOOL Data list
- No. 23 Output shaft speed sensor

OK: Increases in proportion to vehicle speed.

NG → Code No. 23 - Output shaft speed sensor system (Refer to P.23A-24.)

OK ↓

SCAN TOOL Data list
- No. 11 TPS

OK: Increases in proportion to accelerator pedal opening angle

NG → Code No. 11, 12, 14 TPS system check (Refer to P.23A-22.)

OK ↓

SCAN TOOL Data list
- No. 31 Low and reverse solenoid valve duty %
- No. 32 Underdrive solenoid valve duty %
- No. 33 Second solenoid valve duty %
- No. 34 Overdrive solenoid valve duty %

OK: Refer to the table below.

NG → Replace the solenoid valve. ★

NG ↓

Replace the TCM.

OK ↓

Adjust the line pressure. (Refer to P.23A-69.)

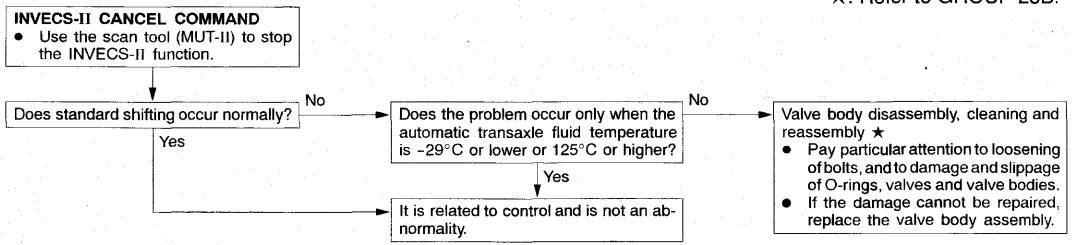
NG → Valve body disassembly, cleaning and reassembly ★
- Pay particular attention to loosening of bolts, and to damage and slippage of O-rings, valves and valve bodies.
- If the damage cannot be repaired, replace the valve body assembly.

	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 %

INSPECTION PROCEDURE 12

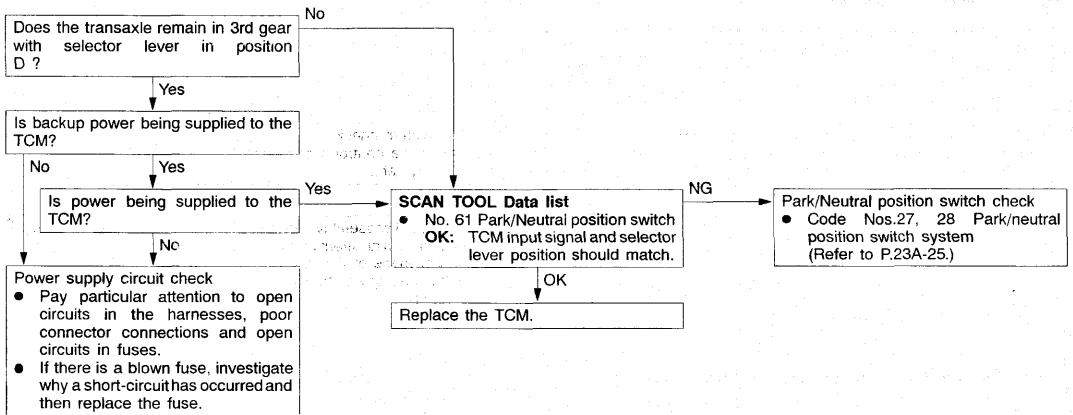
Some points (Displaced shifting points)	Probable cause
If some of the shift points are displaced while driving, the cause is probably a malfunction of the valve body, or it is related to control and is not an abnormality.	• Malfunction of the valve body

★: Refer to GROUP 23B.



INSPECTION PROCEDURE 13

No diagnostic trouble codes (Does not shift)	Probable cause
If shifting does not occur while driving and no diagnostic trouble codes are output, the cause is probably a malfunction of the Park/Neutral position switch, or TCM.	• Malfunction of the Park/Neutral position switch • Malfunction of the TCM



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 GROUP 23B.

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 in top range, the cause is probably abnormal torque converter clutch pressure or a malfunction of the engine system, torque converter clutch solenoid, torque converter or valve body.	• Abnormal torque converter clutch pressure • Malfunction of the engine system • Malfunction of the torque converter clutch solenoid • Malfunction of the torque converter • Malfunction of the valve body

★: Refer to GROUP 23B.

SCAN TOOL Actuator Test
- No. 6 Torque converter clutch solenoid
  OK: Sound of operation can be heard.

NG → Replace the torque converter clutch 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.23A-58.)
- Measure the torque converter clutch pressure.
  Standard value: Refer to P.23A-58.

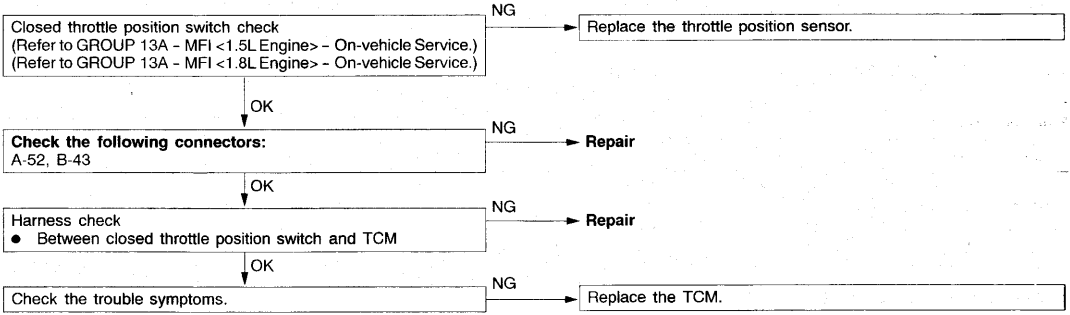
NG → Valve body disassembly, cleaning and reassembly ★
- Pay particular attention to loosening of bolts, and to damage and slippage of O-rings, valves and valve bodies.
- If the damage cannot be repaired, replace the valve body assembly.

OK ↓

Replace the torque converter assembly.

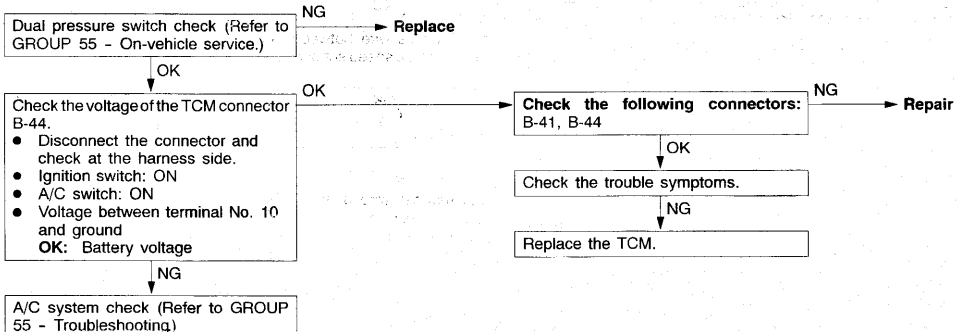
INSPECTION PROCEDURE 16

Closed throttle position switch system	Probable cause
The cause is probably a defective closed throttle position switch circuit or a defective TCM circuit.	• Malfunction of the closed throttle position switch • Malfunction of connector • Malfunction of the TCM



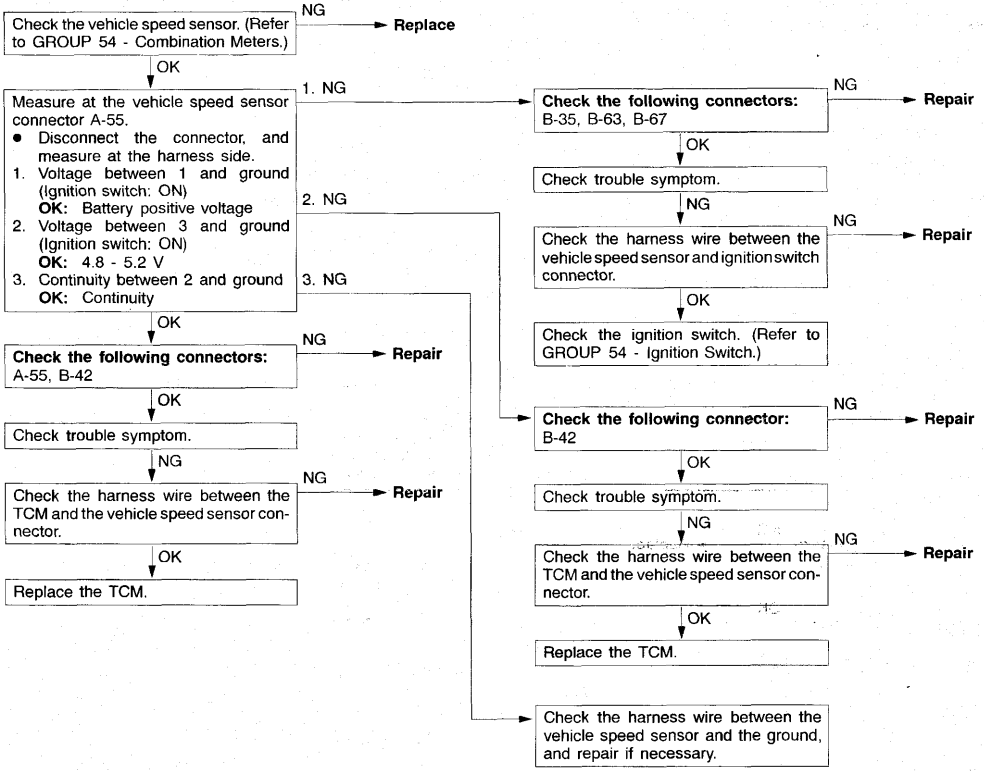
INSPECTION PROCEDURE 17

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



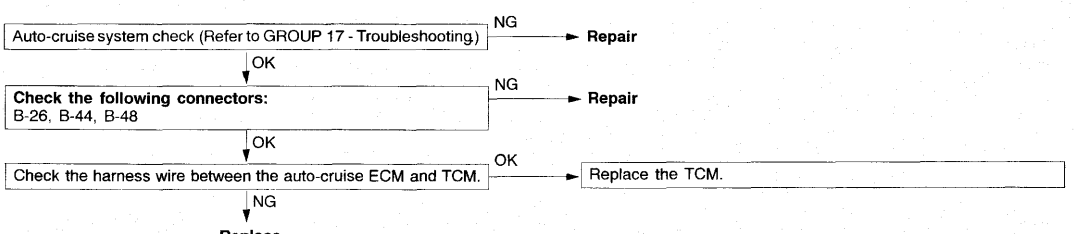
INSPECTION PROCEDURE 18

Vehicle speed sensor system	Probable cause
A malfunction may be present on the speed sensor circuit or the TCM.	• Malfunction of the vehicle speed sensor • Malfunction of the connector • Malfunction of the TCM



INSPECTION PROCEDURE 19

Cruise control unit signal line system <F4A42>	Probable cause
A malfunction may be present on the auto-cruise signal line circuit or the TCM.	• Malfunction of connector • Malfunction of the TCM • Malfunction of the auto-cruise ECM



SERVICE DATA REFERENCE TABLE

23100810116

Item No.	Check item	Check requirement		Normal value
11	Throttle position sensor	Engine: Stopped Selector lever position: P	Accelerator pedal: Fully closed	400 - 1,000 mV
			Accelerator pedal: Depressed	Gradually rises from the above value
			Accelerator pedal: Fully open	4,500 - 5,000 mV
15	Oil temperature sensor	Warming up	Drive for 15 minutes or more so that the automatic transmission fluid temperature becomes 70 - 90 °C. (158 - 194 °F)	Gradually rises to 70 - 90 °C
21	Crankshaft position sensor	Engine: Idling Selector lever position: P	Accelerator pedal: Fully closed	600 - 900 rpm
			Accelerator pedal: Depressed	Gradually rises from the above value
22	Input shaft speed sensor	Selector lever position: 3	Driving at constant speed of 50 km/h (31 mph) in 3rd gear	1,800 - 2,100 rpm
23	Output shaft speed sensor	Selector lever position: 3	Driving at constant speed of 50 km/h (31 mph) in 3rd gear	1,800 - 2,100 rpm
26	Stop light switch	Ignition switch: ON Engine: Stopped	Brake pedal: Depressed	ON
			Brake pedal: Released	OFF
29	Vehicle speed sensor	Selector lever position: 3	Idling with 1st gear (Vehicle stopped)	0 km/h
			Driving at constant speed of 50 km/h (31 mph) in 3rd gear	50 km/h
31	Low and reverse solenoid valve duty %	Selector lever position: L, 2, 3, D	Driving at constant speed of 10 km/h (6.2 mph) in 1st gear	No. 31: 0 %, No. 32: 0 %, No. 33: 100 %, No. 34: 100%
32	Underdrive solenoid valve duty %		Driving at constant speed of 30 km/h (19 mph) in 2nd gear	No. 31: 100 %, No. 32: 0 %, No. 33: 0 %, No. 34: 100%
33	Second solenoid valve duty %		Driving at constant speed of 50 km/h (31 mph) in 3rd gear	No. 31: 100 %, No. 32: 0 %, No. 33: 100 %, No. 34: 0%
34	Overdrive solenoid valve duty %		Driving at constant speed of 50 km/h (31 mph) in 4th gear	No. 31: 100 %, No. 32: 100 %, No. 33: 0 %, No. 34: 0%

Item No.	Check item	Check requirement		Normal value
36	Torque converter clutch solenoid duty %	Selector lever position: 3	Accelerate to 50 km/h (31 mph) in 3 position, then release accelerator pedal*	0 %
			Driving at constant speed of 50 km/h (31 mph) in 3rd gear	Approx. 70 - 90 %
52	Amount of torque converter clutch slippage	Selector lever position: 3	Accelerate to 50 km/h (31 mph) in 3 position, then release accelerator pedal*	Approx. 100 - 300 rpm*
			Driving at constant speed of 50 km/h (31 mph) in 3rd gear	Approx. 0 - 10 rpm
54	A/T control relay output voltage		Ignition switch: OFF → ON	0 V → Battery voltage (V)
57	Engine volumetric efficiency	Selector lever position: N	Accelerator pedal fully closed → depressed	Data changes
61	Park/Neutral position switch	Ignition switch: ON Engine: Stopped	Selector lever position: P	P
			Selector lever position: R	R
			Selector lever position: N	N
			Selector lever position: D	D
			Selector lever position: 3	3
			Selector lever position: 2	2
			Selector lever position: L	L
63	Shift position	Selector lever position: L, 2, 3, D	Driving at constant speed of 10 km/h (6.2 mph) in 1st gear	1st
			Driving at constant speed of 30 km/h (19 mph) in 2nd gear	2nd
			Driving at constant speed of 50 km/h (31 mph) in 3rd gear	3rd
			Driving at constant speed of 50 km/h (31 mph) in 4th gear	4th

NOTE
*: The torque converter clutch is released when the accelerator is fully closed (Closed throttle position switch: ON).

Item No.	Check item	Check requirement		Normal value
64	Closed throttle position switch	Engine: Idling Selector lever position: N	Accelerator pedal: Fully closed	ON
			Accelerator pedal: Depressed	OFF
65	Dual pressure switch	Engine: Idling Selector lever position: N	A/C switch: ON	ON
			A/C switch: OFF	OFF
66	Auto-cruise ECM signal	While auto-cruise operating	Plain road	OFF
			Sloping road	ON

ACTUATOR TEST JUDGEMENT VALUE

23100820089

Item No.	Check item	Test content	Check requirement	Normal value
1	Low reverse solenoid valve	Drive the solenoid valve specified by the scan tool (MUT-II) at 50 % duty for 5 seconds. No other solenoid valve should be energized.	Ignition switch: ON Selector lever position: P Engine: 0 r/min Vehicle speed: 0 km/h (0 mph) (Vehicle stopped) Throttle opening voltage: Less than 1 V Closed throttle position switch: ON While fail-safe function is not in operation.	The operation sound should be audible when the solenoid valve is driven.
2	Underdrive solenoid valve			
3	Second solenoid valve			
4	Overdrive solenoid valve			
6	Torque converter clutch solenoid			
12	A/T control relay	Control relay is OFF for 3 seconds.		Data list No. 54 (1) During test: 0 V (2) Normal: Battery voltage [V]

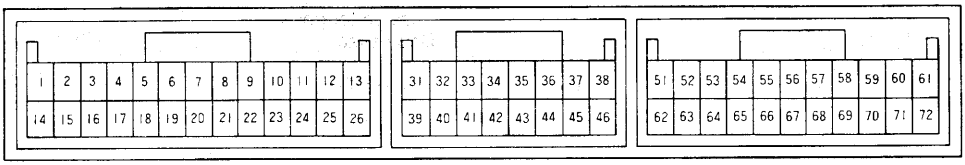
INVECS-II CANCEL COMMAND

23100950078

Item No.	Item	Content	Remarks
14	INVECS-II	Stop the INVECS-II control and change gears according to the standard shift pattern.	Use this function when carrying out procedure 8 in the road tests. (Refer to P.23A-15.)

CHECK AT TCM TERMINALS

23100840115



A9FA0133

Terminal No.	Check item	Check requirement	Standard value
1	Underdrive solenoid valve	Selector lever position: L (1st gear)	Battery voltage
		Selector lever position: P	Approx.7 - 9 V
2	Solenoid valve power supply	Ignition switch: OFF	0 V
		Ignition switch: ON	Battery voltage
3	Solenoid valve power supply	Ignition switch: OFF	0 V
		Ignition switch: ON	Battery voltage
8	Cruise control unit (OD-OFF signal) <F4A42>	No OD-OFF request (Auto-cruise operating: Plain road)	Battery voltage
		OD-OFF request (Auto-cruise operating: Sloping road)	0 V
10	Dual pressure switch	A/C switch: OFF	0 V
		A/C switch: ON	Battery voltage
11	Power supply	Ignition switch: OFF	0 V
		Ignition switch: ON	Battery voltage
12	Ground	Always	0 V
13	Ground	Always	0 V
14	Overdrive solenoid valve	Selector lever position: 3 (3rd gear)	Battery voltage
		Selector lever position: P	Approx. 7 - 9 V
15	Torque converter control solenoid	Selector lever position: L (1st gear)	Battery voltage
		Selector lever position: 3 (50 km/h in 3rd gear)	Battery voltage
16	Second solenoid valve	Selector lever position: 2 (2nd gear)	Battery voltage
		Selector lever position: P	Approx. 7 - 9 V
23	Diagnosis control	-	-
24	Power supply	Ignition switch: OFF	0 V
		Ignition switch: ON	Battery voltage
25	Ground	Always	0 V

Terminal No.	Check item	Check requirement	Standard value
26	Ground	Always	0 V
31	Input shaft speed sensor	Measure between terminal No. 31 and No. 43 by an oscilloscope. Engine: 2,000 r/min Selector lever position: 3 (3rd gear)	Refer to P.23A-49, Oscilloscope inspection procedure.
32	Output shaft speed sensor	Measure between terminal No. 32 and No. 43 by an oscilloscope. Engine: 2,000 r/min Selector lever position: 3 (3rd gear)	Refer to P.23A-49, Oscilloscope inspection procedure.
33	Crankshaft position sensor	Engine: Idling	2.0 - 2.4 V
36	Closed throttle position switch	Engine: Idling	0 V
		Engine: Other than idling	5 V
38	Back up power suuply	Always	Battery voltage
43	Sensor ground	Always	0 V
44	Oil temperature sensor	ATF temperature: 25 °C	3.8 - 4.0 V
		ATF temperature: 80 °C	2.3 - 2.5 V
45	Thottle position sensor (TPS)	Accelerator pedal: Released (Engine stopped)	0.5 - 1.0 V
		Accelerator pedal: Depressed (Engine stopped)	4.5 - 5.0 V
53	Communication with ECM	Engine: Idling Selector lever position: D	Other than 0 V
54	Communication with ECM	Engine: Idling Selector lever position: D	Other than 0 V
55	PNP switch P	Selector lever position: P	Battery voltage
		Selector lever position: Other than above	0 V
56	PNP switch N	Selector lever position: N	Battery voltage
		Selector lever position: Other than above	0 V
57	PNP switch 3	Selector lever position: 3	Battery voltage
		Selector lever position: Other than above	0 V
58	PNP switch L	Selector lever position: L	Battery voltage
		Selector lever position: Other than above	0 V
59	Stop light switch	Brake pedal: Depressed	Battery voltage
		Brake pedal: Released	0 V
62	Low and reverse solenoid valve	Selector lever position: P	Battery voltage
		Selector lever position: 2 (2nd gear)	Approx. 7 - 9 V
63	Diagnosis output	Normal (No diagnosis code output)	0 → 5 V flashing
66	PNP switch R	Selector lever position: R	Battery voltage
		Selector lever position: Other than above	0 V

Terminal No.	Check item	Check requirement	Standard value
67	PNP switch D	Selector lever position: D	Battery voltage
		Selector lever position: Other than above	0 V
68	PNP switch 2	Selector lever position: 2	Battery voltage
		Selector lever position: Other than above	0 V
69	Vehicle speed sensor	When stopped	0 V
		Move forward slowly	0 → 5 V flashing
71	A/T control relay	Ignition switch: OFF	0 V
		Ignition switch: ON	Battery voltage
72	Ground	Ignition switch: ON	0 V

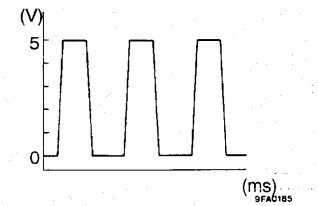
OSCILLOSCOPE INSPECTION PROCEDURE

23100850088

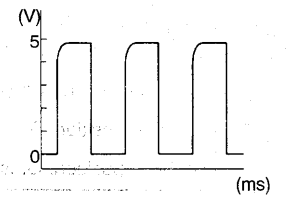
Check item	Check requirement		Normal condition (Waveform sample)
Crankshaft position sensor	Selector lever position: N	Idling (Vehicle stopped)	Waveform A
Input shaft speed sensor	Selector lever position: 3	Driving at constant speed of 50 km/h in 3rd gear (Engine: 1,800 - 2,100 r/min)	Waveform B
Output shaft speed sensor			
Vehicle speed sensor			
Low reverse solenoid valve	Ignition switch: ON Selector lever position: P Engine: 0 r/min Vehicle speed: 0 km/h (Vehicle stopped) Throttle (Accelerator) opening angle: Less than 1 V Closed throttle position switch: ON	Force drive each solenoid valve (Actuator test)	Waveform C
Underdrive solenoid valve			
Second solenoid valve			
Overdrive solenoid valve			
Torque converter clutch control solenoid			

Waveform sample

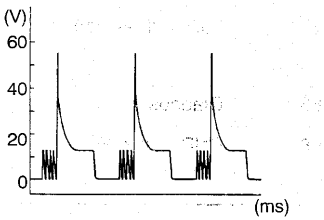
Waveform A



Waveform B



Waveform C



ON-VEHICLE SERVICE

23100090268

ESSENTIAL SERVICE

1. AUTOMATIC TRANSMISSION FLUID CHECK

Refer to GROUP 00 - Maintenance Service.

2. AUTOMATIC TRANSMISSION FLUID REPLACEMENT

23100100299

Refer to GROUP 00 - Maintenance Service.

3. FLUSHING COOLERS AND TUBES

23110480059

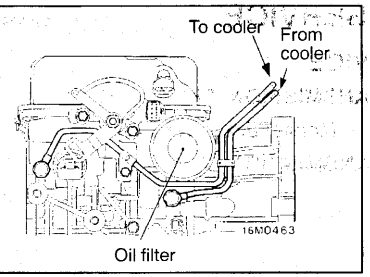
When a transaxle failure has contaminated the fluid, the oil cooler(s) must be flushed. The cooler bypass valve in the transaxle must be replaced also.
The torque converter must also be replaced with an exchange unit. This will ensure that metal particles or sludged oil are not later transferred back into the reconditioned (or replaced) transaxle.
There are two different procedures for flushing coolers and lines. The recommended procedure is to use the special tool MB995062 Flushing tool. The other procedure is to use a hand suction gun and mineral spirits.

WARNING: WEAR PROTECTIVE EYEWEAR THAT MEETS THE REQUIREMENTS OF OSHA AND ANSI Z87.1 - 1968. WEAR STANDARD INDUSTRIAL RUBBER GLOVES. KEEP LIGHTED CIGARETTES, SPARKS, FLAMES, AND OTHER IGNITION SOURCES AWAY FROM THE AREA TO PREVENT THE IGNITION OF COMBUSTIBLE LIQUIDS AND GASES. KEEP A CLASS (B) FIRE EXTINGUISHER IN THE AREA WHERE THE FLUSHER WILL BE USED.
KEEP THE AREA WELL VENTILATED.
DO NOT LET FLUSHING SOLVENT COME IN CONTACT WITH YOUR EYES OR SKIN: IF EYE CONTAMINATION OCCURS, FLUSH EYES WITH WATER FOR 15 TO 20 SECONDS. REMOVE CONTAMINATED CLOTHING AND WASH AFFECTED SKIN WITH SOAP AND WATER. SEEK MEDICAL ATTENTION.

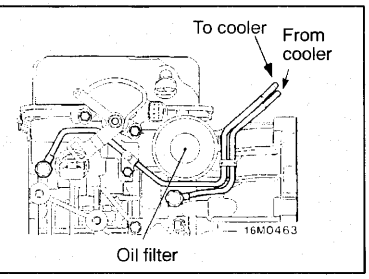
Cooler Flush Using Special Tool MB995062

(1) Remove cover plate filler plug on the special tool MB995062.
Fil reservoir 1/2 to 3/4 full of fresh flushing solution. Flushing solvents are petroleum based solutions generally used to clean automatic transmission components. DO NOT use solvents containing acids, water, gasoline, or any other corrosive liquids.
(2) Reinstall filler plug on the special tool MB995062.
(3) Verify pump power switch is turned OFF.
Connect red alligator clip to positive (+) battery post.
Connect black (-) alligator clip to a good ground.
(4) Disconnect the cooler lines at the transmission.

NOTE
When flushing transmission cooler and lines, ALWAYS reverse flush.



(5) Connect the BLUE pressure line to the OUTLET (From) cooler line.
(6) Connect the CLEAR return line to the INLET (To) cooler line.
(7) Turn pump ON for two to three minutes to flush cooler(s) and lines. Monitor pressure readings and clear return lines. Pressure readings should stabilize below 138 kPa (20 psi) for vehicles equipped with a single cooler and 208 kPa (30 psi) for vehicles equipped with dual coolers. If flow is intermittent or exceeds these pressures, replace cooler.
(8) Turn pump OFF.
(9) Disconnect CLEAR suction line from reservoir at cover plate. Disconnect CLEAR return line at cover plate, and place it in a drain pan.
(10) Turn pump ON for 30 seconds to purge flushing solution from cooler and lines. Turn pump OFF.
(11) Place CLEAR suction line into a one quart container of DIAMOND ATF SPII, DIAMOND ATF SPII M or equivalent automatic transmission fluid.
(12) Turn pump ON until all transmission fluid is removed from the one quart container and lines. This purges any residual cleaning solvent from the transmission cooler and lines. Turn pump OFF.
(13) Disconnect alligator clips from battery. Reconnect flusher lines to cover plate, and remove flushing adapters from cooler lines.



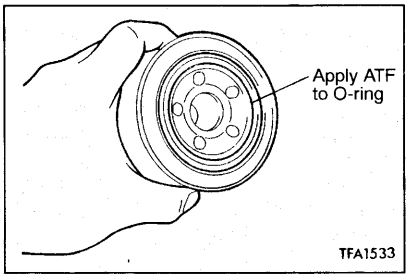
4. OIL COOLER FLOW CHECK

23110490045

After the new or repaired transmission has been installed, fill to the proper level with DIAMOND ATF SPII, DIAMOND ATF SPII M or equivalent automatic transmission fluid. The flow should be checked using the following procedure:
(1) Disconnect the cooler line at the transmission and place a collecting container under the disconnected line.

Caution
With the fluid set at the proper level, fluid collection should not exceed one quart of internal damage to the transmission may occur.

(2) Run the engine at curb idle speed, with the shift selector in neutral.
(3) If fluid flow is intermittent or it takes more than 20 seconds to collect one quart of ATF, replace the cooler.
(4) If flow is found to be within acceptable limits, reconnect the cooler line. Then fill transmission to the proper level, using the approved type of automatic transmission fluid.



5. OIL FILTER REPLACEMENT

23101050098

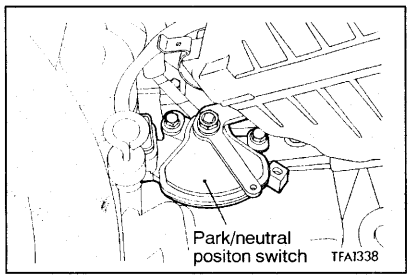
1. Use the special tool (MB991610) to remove the automatic transaxle oil filter.
2. Clean the transaxle case side mounting surface.
3. Apply a small amount of automatic transmission fluid to the O-ring of the new oil filter.
4. Use the special tool (MB991610) to install the automatic transaxle oil filter.

   NOTE
   Tightening torque: 12 Nm (9 ft.lbs.)
5. Check the quantity of the automatic transmission fluid. (Refer to GROUP 00 - Maintenance Service.)

6. THROTTLE POSITION SENSOR ADJUSTMENT

23100190166

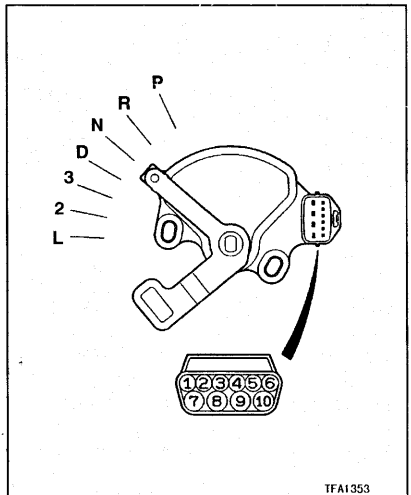
Refer to GROUP 13A - MFI <1.5L Engine> - On-vehicle Service.
Refer to GROUP 13A - MFI <1.8L Engine (Vehicles without auto-cruise control system)> - On-vehicle Service.
Refer to GROUP 13A - MFI <1.8L Engine (Vehicles with auto-cruise control system)> - On-vehicle Service.

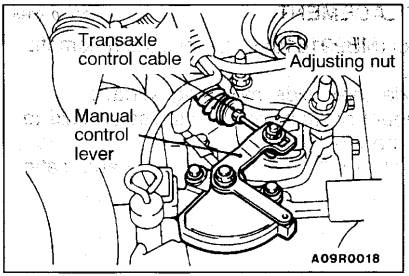


7. PARK/NEUTRAL POSITION SWITCH CONTINUITY CHECK

23100140161

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

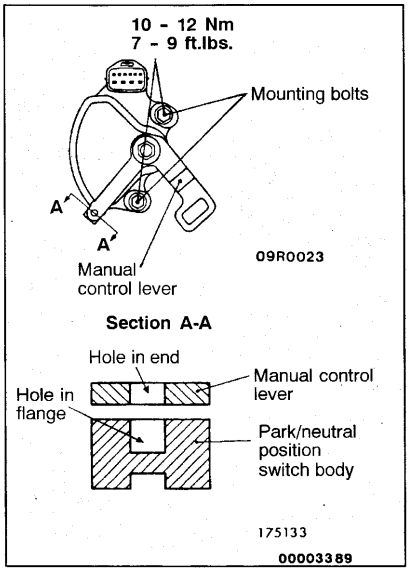




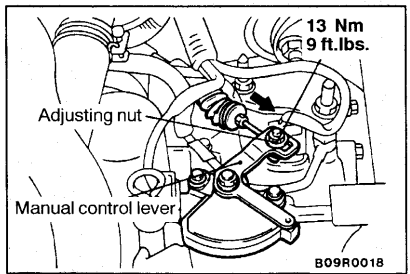
8. PARK/NEUTRAL POSITION SWITCH AND CONTROL CABLE ADJUSTMENT

23100150102

1. Set the selector lever to the "N" position.
2. Loosen the control cable to manual control lever coupling nut to free the cable and lever.
3. Set the manual control lever to the neutral position.



4. Loosen the park/neutral position switch body mounting bolts and turn the park/neutral position switch body so the hole in the end of the manual control lever and the hole (cross section A-A in the figure on the left) in the flange of the park/neutral position switch body flange are aligned.
5. Tighten the park/neutral position switch body mounting bolts to the specified torque. Be careful at this time that the position of the switch body is not changed.

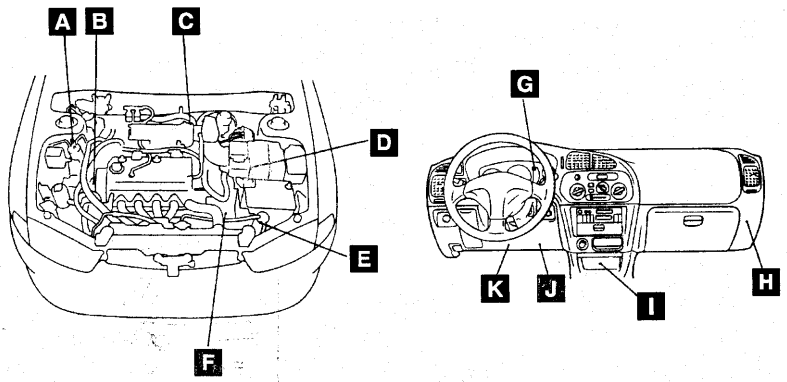


6. Gently pull the transaxle control cable in the direction of the arrow, and then tighten the adjusting nut.
7. Check that the selector lever is in the "N" position.
8. Check that each range on the transaxle side operates and functions correctly for each position of the selector lever.

A/T CONTROL COMPONENT LOCATION

23100860104

Name	Symbol	Name	Symbol
A/T control relay	I	Output shaft speed sensor	D
Crankshaft position sensor <4G1>	B	Park/Neutral position (PNP) switch	F
Crankshaft position sensor <4G9>	B	Shift indicator light	G
Data link connector	J	Solenoid valve	E
Dual pressure switch	A	Stop light switch	K
Engine control module (ECM)	H	Throttle position sensor <4G1> (built into closed throttle position switch)	C
Input shaft speed sensor	D	Throttle position sensor <4G9> (built into closed throttle position switch)	C
Oil temperature sensor	E	Transaxle control module (TCM)	I
		Vehicle speed sensor	D



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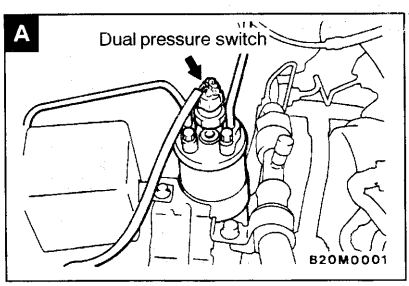

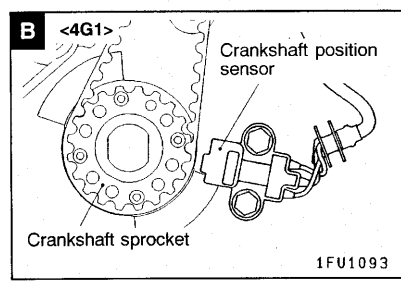

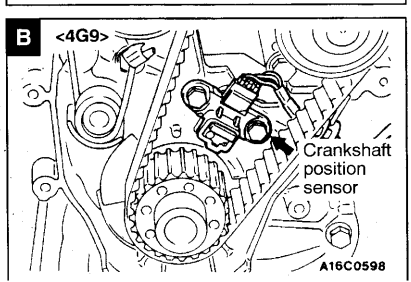

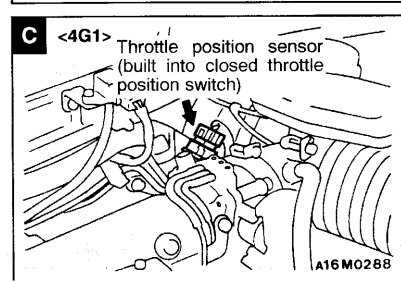

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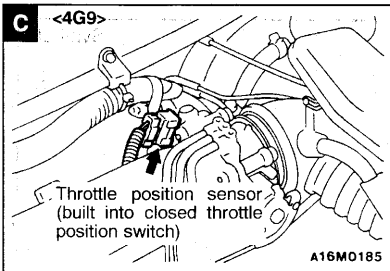

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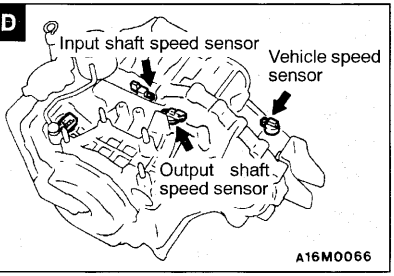

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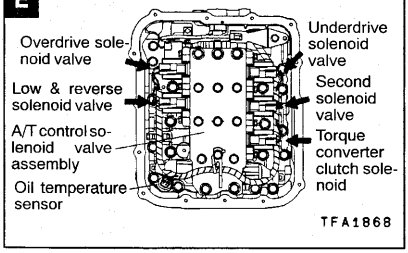

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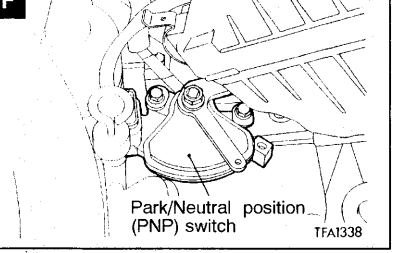

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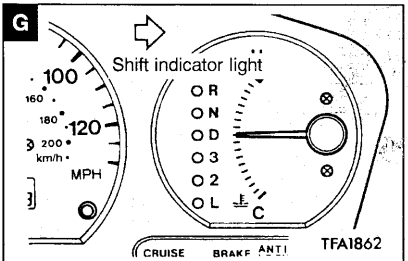

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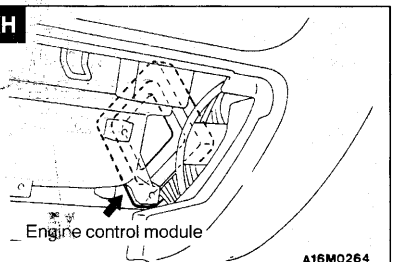

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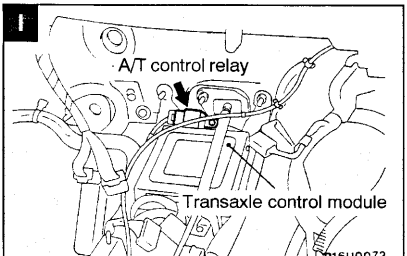

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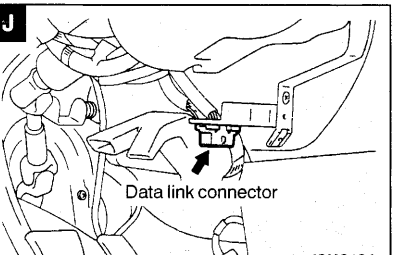

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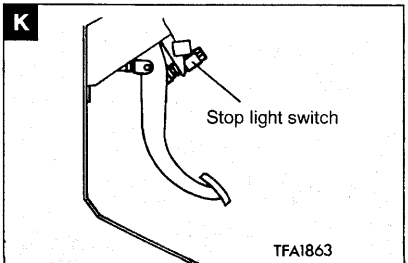


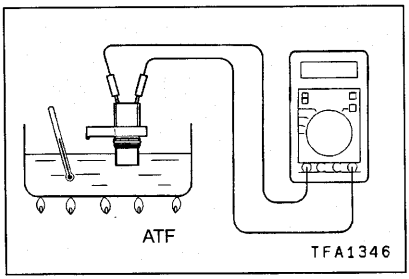
A/T CONTROL COMPONENT CHECK 23100900073

1. CRANKSHAFT POSITION SENSOR CHECK

Refer to GROUP 13A - MFI <1.5L Engine> - Troubleshooting.
Refer to GROUP 13A - MFI <1.8L Engine> - Troubleshooting.

2. THROTTLE POSITION SENSOR CHECK 23100390269

Refer to GROUP 13A - MFI <1.5L Engine> - On-vehicle Service.
Refer to GROUP 13A - MFI <1.8L Engine> - On-vehicle Service.



3. OIL TEMPERATURE SENSOR CHECK 23100450080

1. Remove the oil temperature sensor.
2. Measure the resistance between terminals No.1 and No.2 of the oil temperature sensor connector.

Standard value:

Oil temperature [°C (°F)]	Resistance (kΩ)
0 (32)	16.7 - 20.5
100 (212)	0.57 - 0.69

3. Replace the sensor if not within the standard value.

4. PARK/NEUTRAL POSITION SWITCH CHECK 23100140178

Refer to P.23-51.

5. STOP LIGHT SWITCH CHECK 23100910045

Refer to GROUP 35 - Brake Pedal.

6. VEHICLE SPEED SENSOR CHECK 23100460113

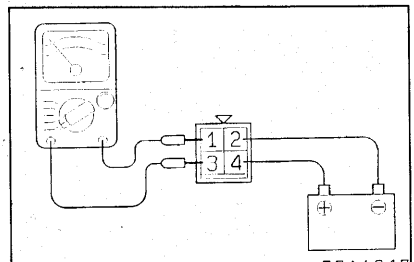
Refer to GROUP 54 - On-vehicle Service.

7. DUAL PRESSURE SWITCH CHECK 23100470093

Refer to GROUP 55 - On-vehicle Service.

8. CLOSED THROTTLE POSITION SWITCH CHECK 23100410187

Refer to GROUP 13A - On-vehicle Service.

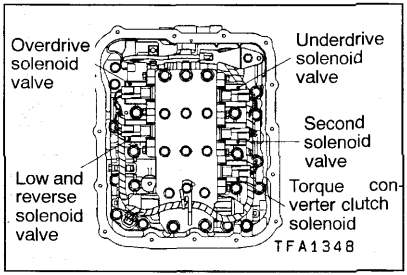


9. A/T CONTROL RELAY CHECK 23100930041

1. Remove the A/T control relay.
2. Use jumper wires to connect the A/T control relay terminal (2) to the battery (-) terminal and terminal (4) to the battery (+) terminal.
3. Check the continuity between the terminal (1) and the terminal (3) of the A/T control relay when the jumper wires are connected to and disconnected from the battery.

Jumper wire	Continuity between terminals No.1 and No.3
Connected	Continuity
Disconnected	No continuity

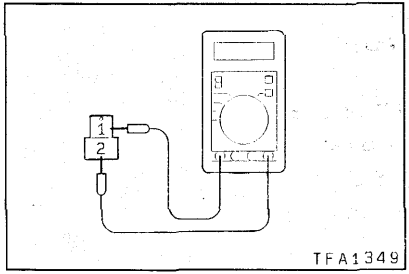
4. If there is a problem, replace the A/T control relay.



10. SOLENOID VALVE CHECK

23100940044

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

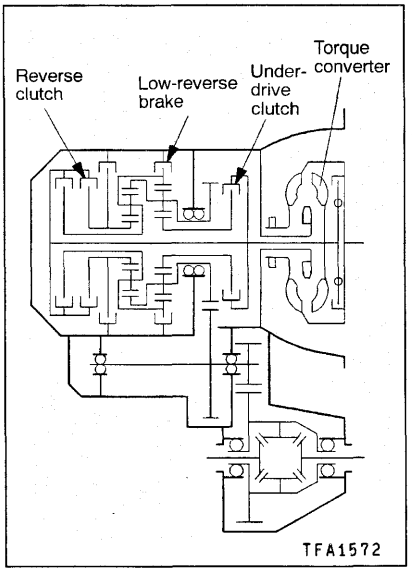


3. Measure the resistance between terminals 1 and 2 of each solenoid valve.

Standard value:

Name	Resistance
Torque converter clutch solenoid	2.7 - 3.4 Ω (at 20°C (68°F))
Low and reverse solenoid valve	
Second solenoid valve	
Underdrive solenoid valve	
Overdrive solenoid valve	

4. If the resistance is not within the standard value, replace the solenoid valve.



TORQUE CONVERTER STALL TEST 23100540107

This test measures the maximum engine speed when the selector lever is at the D or R position and the torque converter stalls to test the operation of the torque converter, starter motor and one-way clutch operation and the holding performance of the clutches and brakes in the transaxle.

Caution
Do not let anybody stand in front of or behind the vehicle while this test is being carried out.

1. Check the automatic transmission fluid level and temperature and the engine coolant temperature.
   - Fluid level: At the HOT mark on the oil level gauge
   - Fluid temperature: 80 - 100°C (176 - 212°F)
   - Engine coolant temperature: 80 - 100°C (176 - 212°F)
2. Chock both rear wheels.
3. Pull the parking brake lever on, with the brake pedal fully depressed.
4. Start the engine.
5. Move the selector lever to the D position, fully depress the accelerator pedal and take a reading of the maximum engine speed at this time.

   Caution
   1. **The throttle should not be left fully open for any more than eight seconds.**
   2. **If carrying out the stall test two or more times, move the selector lever to the N position and run the engine at 1,000 r/min to let the automatic transmission fluid cool down before carrying out subsequent tests.**

   Standard value:

   Stall speed: 1,900 - 2,400 r/min
6. Move the selector lever to the R position and carry out the same test again.

   Standard value:

   Stall speed: 1,900 - 2,400 r/min

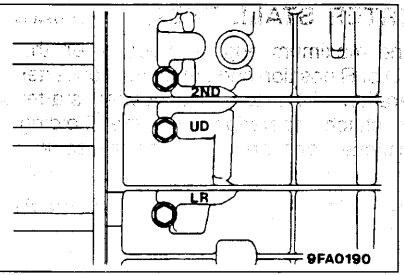
TORQUE CONVERTER STALL TEST JUDGEMENT RESULTS

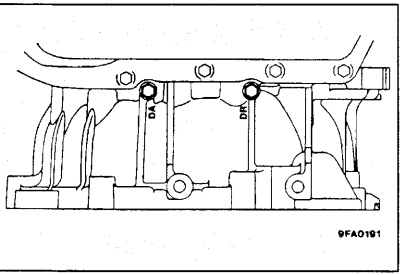
a. Stall speed is too high in both D and R ranges
   - Low line pressure
   - Low & reverse brake slippage

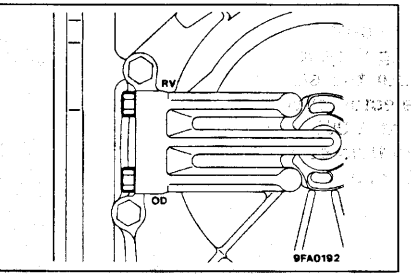
b. Stall speed is too high in D range only
   - Underdrive clutch slippage

c. Stall speed is too high in R range only
   - Reverse clutch slippage

d. Stall speed too low in both D and R ranges
   - Malfunction of torque converter
   - Insufficient engine output







HYDRAULIC PRESSURE TEST

23100550117

1. Warm up the engine until the automatic transmission fluid temperature is 80–100°C.
2. Jack up the vehicle so that the wheels are free to turn.
3. Connect the special tools (2,942 kPa (427 psi) oil pressure gauge [MD998330] and joints [MD998332, MD998900]) to each pressure discharge port.

   NOTE
   2ND: Second brake pressure port
   UD: Underdrive clutch pressure port
   LR: Low and reverse brake pressure port
   DA: Torque converter apply pressure port
   DR: Torque converter release pressure port
   RV: Reverse clutch pressure port
   OD: Overdrive clutch pressure port

4. Measure the hydraulic pressure at each port under the conditions given in the standard hydraulic pressure table, and check that the measured values are within the standard value ranges.
5. If a value is outside the standard range, correct the problem while referring to the hydraulic pressure test diagnosis table.

STANDARD HYDRAULIC PRESSURE TEST

Measurement condition			Standard hydraulic pressure kPa					
Selector lever position	Shift position	Engine speed (r/min)	Underdrive clutch pressure [UD]	Reverse clutch pressure [RV]	Overdrive clutch pressure [OD]	Low and reverse brake pressure [LR]	Second brake pressure [2ND]	Torque converter pressure [DR]
P	-	2,500	-	-	-	310 - 390 (46 - 57)	-	250 - 390 (37 - 57)
R	Reverse	2,500	-	1,270 - 1,770 (185 - 256)	-	1,270 - 1,770 (185 - 256)	-	500 - 700 (73 - 101)
N	-	2,500	-	-	-	310 - 390 (46 - 57)	-	250 - 390 (37 - 57)
D	1st gear	2,500	1,010 - 1,050 (147 - 152)	-	-	1,010 - 1,050 (147 - 152)	-	500 - 700 (73 - 101)
	2nd gear	2,500	1,010 - 1,050 (147 - 152)	-	-	-	1,010 - 1,050 (147 - 152)	500 - 700 (73 - 101)
	3rd gear	2,500	590 - 690 (85 - 100)	-	590 - 690 (85 - 100)	-	-	450 - 650 (65 - 94)
	4th gear	2,500	-	-	590 - 690 (85 - 100)	-	590 - 690 (85 - 100)	450 - 650 (65 - 94)

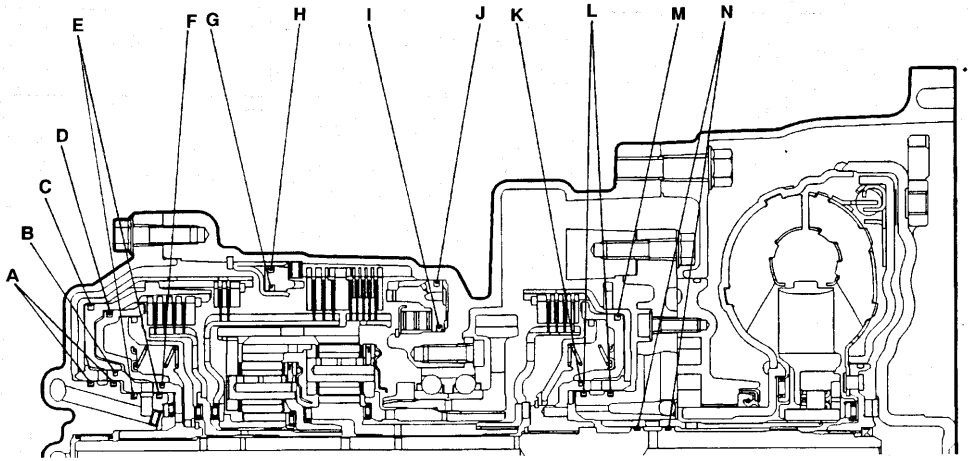
HYDRAULIC PRESSURE TEST DIAGNOSIS TABLE

Trouble symptom	Probable cause
All hydraulic pressures are high.	Incorrect transaxle control cable adjustment
	Malfunction of the regulator valve
All hydraulic pressures are low.	Incorrect transaxle control cable adjustment
	Malfunction of the oil pump
	Clogged internal oil filter
	Clogged oil cooler
	Malfunction of the regulator valve
	Malfunction of the relief valve
	Incorrect valve body installation
Hydraulic pressure is abnormal in "R" range only.	Malfunction of the regulator valve
	Clogged orifice
	Incorrect valve body installation
Hydraulic pressure is abnormal in "3" or "4" range only.	Malfunction of the overdrive solenoid valve
	Malfunction of the overdrive pressure control valve
	Malfunction of the regulator valve
	Malfunction of the switch valve
	Clogged orifice
	Incorrect valve body installation

Trouble symptom	Probable cause
Only underdrive hydraulic pressure is abnormal.	Malfunction of the oil seal K
	Malfunction of the oil seal L
	Malfunction of the oil seal M
	Malfunction of the underdrive solenoid valve
	Malfunction of the underdrive pressure control valve
	Malfunction of check ball
	Clogged orifice
	Incorrect valve body installation
Only reverse clutch hydraulic pressure is abnormal.	Malfunction of the oil seal A
	Malfunction of the oil seal B
	Malfunction of the oil seal C
	Clogged orifice
	Incorrect valve body installation
Only overdrive hydraulic pressure is abnormal.	Malfunction of the oil seal D
	Malfunction of the oil seal E
	Malfunction of the oil seal F
	Malfunction of the overdrive solenoid valve
	Malfunction of the overdrive pressure control valve
	Malfunction of check ball
	Clogged orifice
	Incorrect valve body installation
Only low and reverse hydraulic pressure is abnormal.	Malfunction of the oil seal I
	Malfunction of the oil seal J
	Malfunction of the low and reverse solenoid valve
	Malfunction of the low and reverse pressure control valve
	Malfunction of the switch valve
	Malfunction of the fail safe valve A
	Malfunction of check ball
	Clogged orifice
	Incorrect valve body installation

Trouble symptom	Probable cause
Only second hydraulic pressure is abnormal.	Malfunction of the oil seal G
	Malfunction of the oil seal H
	Malfunction of the oil seal O
	Malfunction of the second solenoid valve
	Malfunction of the second pressure control valve
	Malfunction of the fail safe valve B
	Clogged orifice
	Incorrect valve body installation
Only torque converter pressure is abnormal.	Clogged oil cooler
	Malfunction of the oil seal N
	Malfunction of the torque converter clutch solenoid
	Malfunction of the torque converter clutch control valve
	Malfunction of the torque converter pressure control valve
	Clogged orifice
	Incorrect valve body installation
Pressure applied to element which should not receive pressure.	Incorrect transaxle control cable adjustment
	Malfunction of the manual valve
	Malfunction of check ball
	Incorrect valve body installation

OIL SEAL LAYOUT



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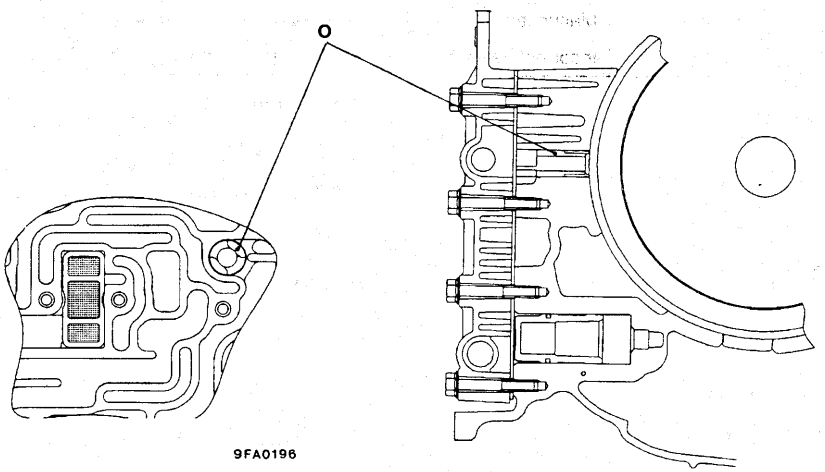

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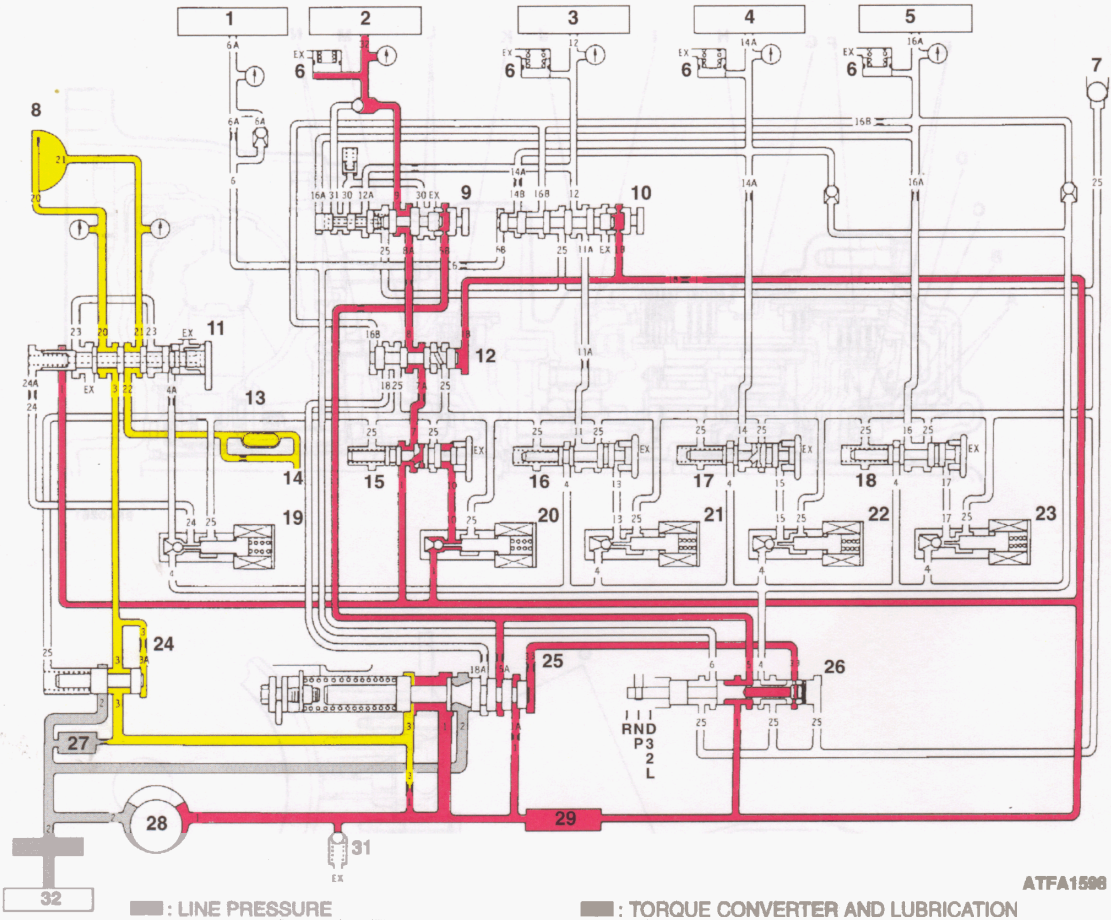
HYDRAULIC CIRCUIT

23100880094

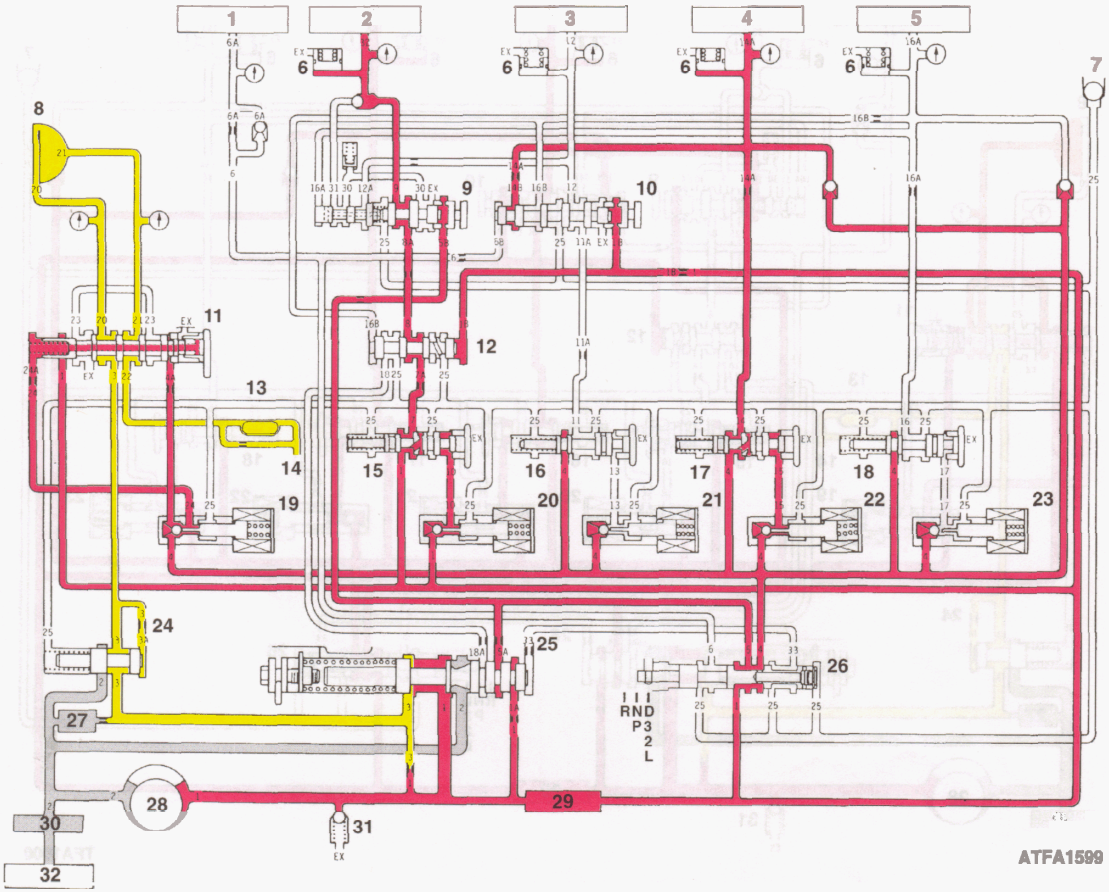
PARKING AND NEUTRAL



: LINE PRESSURE
: OIL PUMP SUCTION PRESSURE
: TORQUE CONVERTER CLUTCH PRESSURE
: TORQUE CONVERTER AND LUBRICATION PRESSURE
: TORQUE CONVERTER CLUTCH SOLENOID VALVE PRESSURE

1. REVERSE CLUTCH
2. LOW-REVERSE BRAKE
3. SECOND BRAKE
4. UNDERDRIVE CLUTCH
5. OVERDRIVE CLUTCH
6. ACCUMULATOR
7. CHECK BALL
8. TORQUE CONVERTER CLUTCH
9. FAIL SAFE VALVE A
10. FAIL SAFE VALVE B
11. TORQUE CONVERTER CLUTCH CONTROL VALVE
12. SWITCH VALVE
13. AUTOMATIC TRANSMISSION FLUID COOLER
14. LUBRICATION
15. LOW-REVERSE PRESSURE CONTROL VALVE
16. SECOND PRESSURE CONTROL VALVE
17. UNDERDRIVE PRESSURE CONTROL VALVE
18. OVERDRIVE PRESSURE CONTROL VALVE
19. TORQUE CONVERTER CLUTCH SOLENOID
20. LOW-REVERSE SOLENOID VALVE
21. SECOND SOLENOID VALVE
22. UNDERDRIVE SOLENOID VALVE
23. OVERDRIVE SOLENOID VALVE
24. TORQUE CONVERTER PRESSURE CONTROL VALVE
25. REGULATOR VALVE
26. MANUAL VALVE
27. OIL FILTER
28. OIL PUMP
29. OIL STRAINER
30. OIL FILTER (BUILT-IN TYPE)
31. RELIEF VALVE
32. OIL PAN

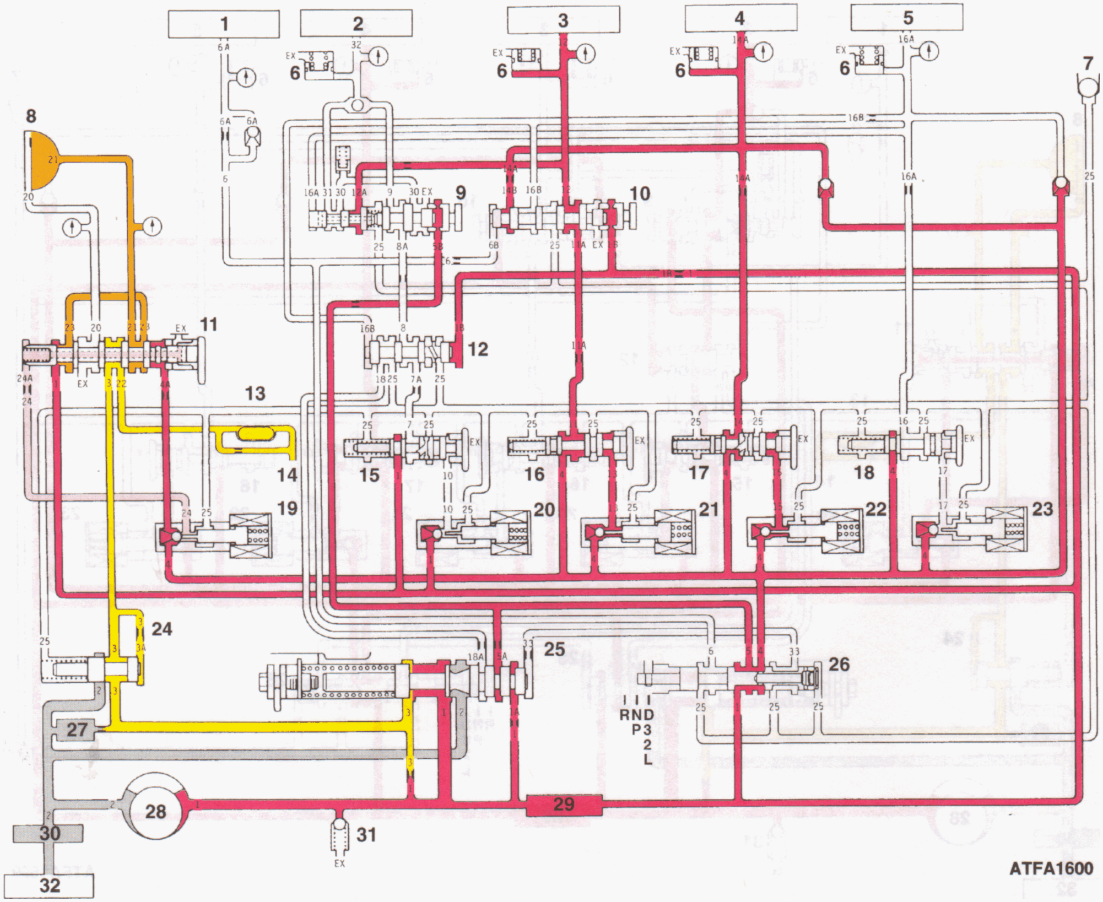
1ST GEAR



: LINE PRESSURE
: OIL PUMP SUCTION PRESSURE
: TORQUE CONVERTER CLUTCH PRESSURE
: TORQUE CONVERTER AND LUBRICATION PRESSURE
: TORQUE CONVERTER CLUTCH SOLENOID VALVE PRESSURE

1. REVERSE CLUTCH
2. LOW-REVERSE BRAKE
3. SECOND BRAKE
4. UNDERDRIVE CLUTCH
5. OVERDRIVE CLUTCH
6. ACCUMULATOR
7. CHECK BALL
8. TORQUE CONVERTER CLUTCH
9. FAIL SAFE VALVE A
10. FAIL SAFE VALVE B
11. TORQUE CONVERTER CLUTCH VALVE
12. SWITCH VALVE
13. AUTOMATIC TRANSMISSION FLUID COOLER
14. LUBRICATION
15. LOW-REVERSE PRESSURE CONTROL VALVE
16. SECOND PRESSURE CONTROL VALVE
17. UNDERDRIVE PRESSURE CONTROL VALVE
18. OVERDRIVE PRESSURE CONTROL VALVE
19. TORQUE CONVERTER CLUTCH SOLENOID
20. LOW-REVERSE SOLENOID VALVE
21. SECOND SOLENOID VALVE
22. UNDERDRIVE SOLENOID VALVE
23. OVERDRIVE SOLENOID VALVE
24. TORQUE CONVERTER PRESSURE CONTROL VALVE
25. REGULATOR VALVE
26. MANUAL VALVE
27. OIL FILTER
28. OIL PUMP
29. OIL STRAINER
30. OIL FILTER (BUILT-IN TYPE)
31. RELIEF VALVE
32. OIL PAN

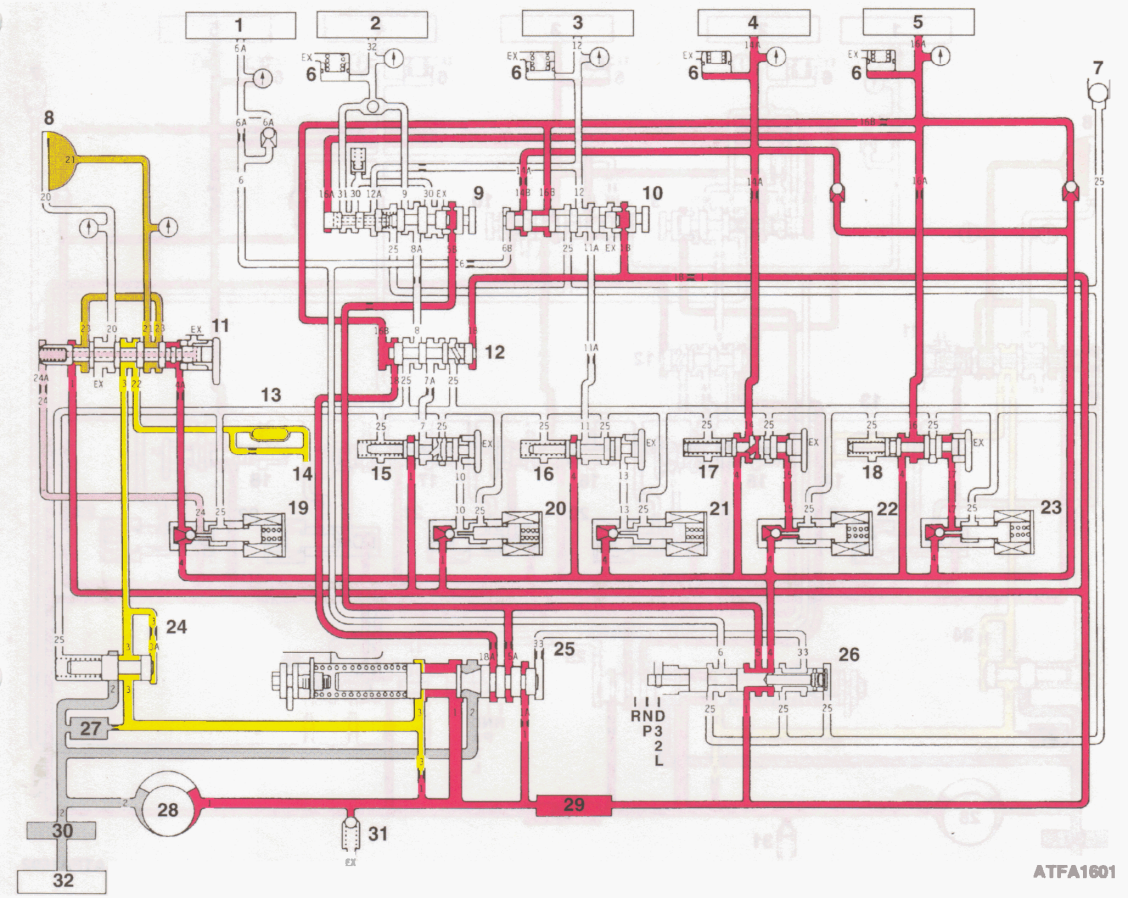
2ND GEAR



: LINE PRESSURE
: OIL PUMP SUCTION PRESSURE
: TORQUE CONVERTER CLUTCH PRESSURE
: TORQUE CONVERTER AND LUBRICATION PRESSURE
: TORQUE CONVERTER CLUTCH SOLENOID VALVE PRESSURE

1. REVERSE CLUTCH
2. LOW-REVERSE BRAKE
3. SECOND BRAKE
4. UNDERDRIVE CLUTCH
5. OVERDRIVE CLUTCH
6. ACCUMULATOR
7. CHECK BALL
8. TORQUE CONVERTER CLUTCH
9. FAIL SAFE VALVE A
10. FAIL SAFE VALVE B
11. TORQUE CONVERTER CLUTCH VALVE
12. SWITCH VALVE
13. AUTOMATIC TRANSMISSION FLUID COOLER
14. LUBRICATION
15. LOW-REVERSE PRESSURE CONTROL VALVE
16. SECOND PRESSURE CONTROL VALVE
17. UNDERDRIVE PRESSURE CONTROL VALVE
18. OVERDRIVE PRESSURE CONTROL VALVE
19. TORQUE CONVERTER CLUTCH SOLENOID
20. LOW-REVERSE SOLENOID VALVE
21. SECOND SOLENOID VALVE
22. UNDERDRIVE SOLENOID VALVE
23. OVERDRIVE SOLENOID VALVE
24. TORQUE CONVERTER PRESSURE CONTROL VALVE
25. REGULATOR VALVE
26. MANUAL VALVE
27. OIL FILTER
28. OIL PUMP
29. OIL STRAINER
30. OIL FILTER (BUILT-IN TYPE)
31. RELIEF VALVE
32. OIL PAN

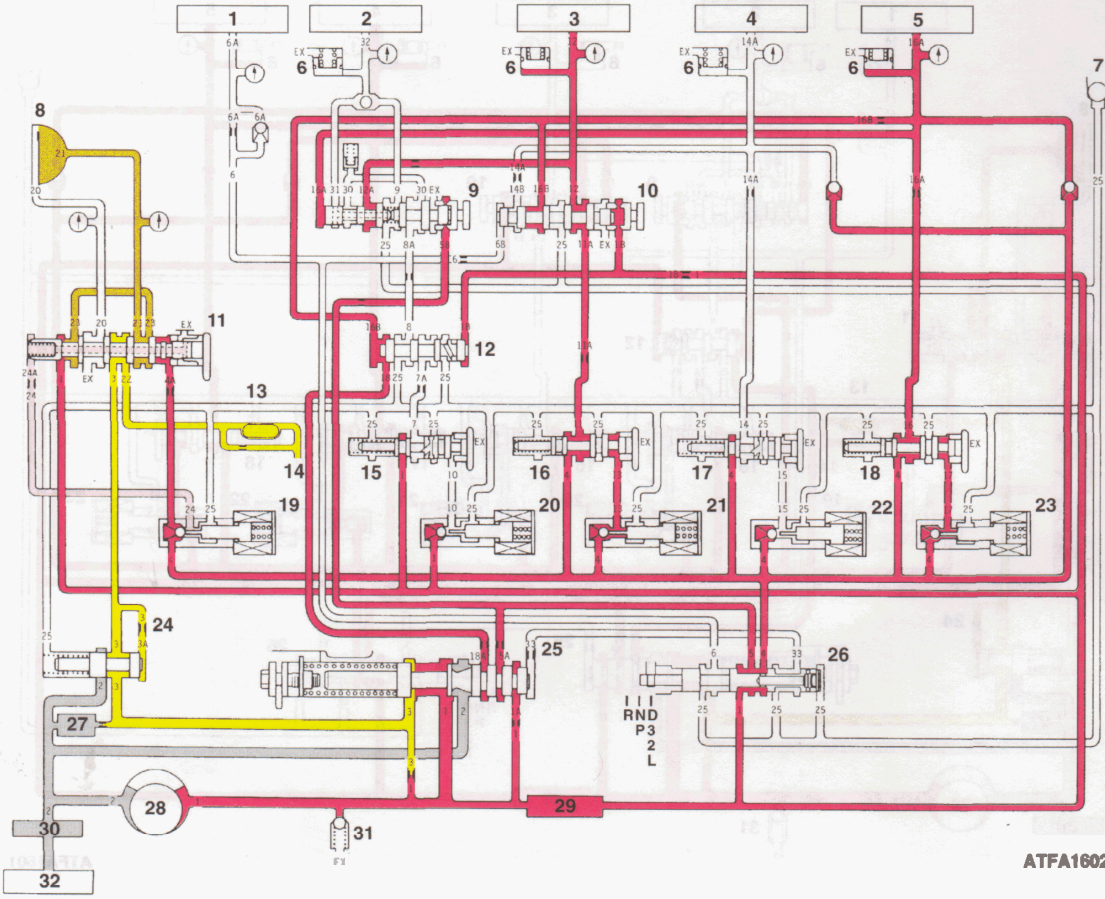
3RD GEAR



: LINE PRESSURE
: OIL PUMP SUCTION PRESSURE
: TORQUE CONVERTER CLUTCH PRESSURE
: TORQUE CONVERTER AND LUBRICATION PRESSURE
: TORQUE CONVERTER CLUTCH SOLENOID VALVE PRESSURE

1. REVERSE CLUTCH
2. LOW-REVERSE BRAKE
3. SECOND BRAKE
4. UNDERDRIVE CLUTCH
5. OVERDRIVE CLUTCH
6. ACCUMULATOR
7. CHECK BALL
8. TORQUE CONVERTER CLUTCH
9. FAIL SAFE VALVE A
10. FAIL SAFE VALVE B
11. TORQUE CONVERTER CLUTCH VALVE
12. SWITCH VALVE
13. AUTOMATIC TRANSMISSION FLUID COOLER
14. LUBRICATION
15. LOW-REVERSE PRESSURE CONTROL VALVE
16. SECOND PRESSURE CONTROL VALVE
17. UNDERDRIVE PRESSURE CONTROL VALVE
18. OVERDRIVE PRESSURE CONTROL VALVE
19. TORQUE CONVERTER CLUTCH SOLENOID
20. LOW-REVERSE SOLENOID VALVE
21. SECOND SOLENOID VALVE
22. UNDERDRIVE SOLENOID VALVE
23. OVERDRIVE SOLENOID VALVE
24. TORQUE CONVERTER PRESSURE CONTROL VALVE
25. REGULATOR VALVE
26. MANUAL VALVE
27. OIL FILTER
28. OIL PUMP
29. OIL STRAINER
30. OIL FILTER (BUILT-IN TYPE)
31. RELIEF VALVE
32. OIL PAN

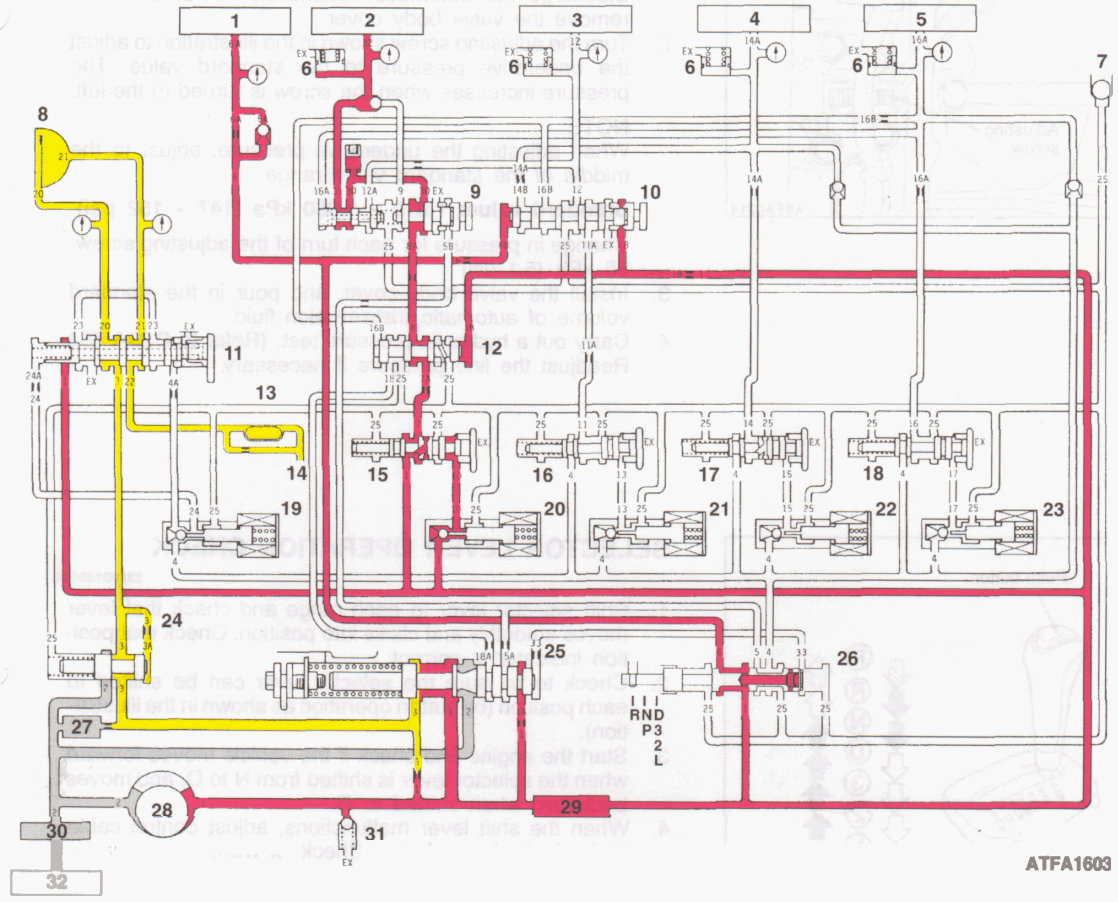
4TH GEAR



: LINE PRESSURE
: OIL PUMP SUCTION PRESSURE
: TORQUE CONVERTER CLUTCH PRESSURE
: TORQUE CONVERTER AND LUBRICATION PRESSURE
: TORQUE CONVERTER CLUTCH SOLENOID VALVE PRESSURE

1. REVERSE CLUTCH
2. LOW-REVERSE BRAKE
3. SECOND BRAKE
4. UNDERDRIVE CLUTCH
5. OVERDRIVE CLUTCH
6. ACCUMULATOR
7. CHECK BALL
8. TORQUE CONVERTER CLUTCH
9. FAIL SAFE VALVE A
10. FAIL SAFE VALVE B
11. TORQUE CONVERTER CLUTCH VALVE
12. SWITCH VALVE
13. AUTOMATIC TRANSMISSION FLUID COOLER
14. LUBRICATION
15. LOW-REVERSE PRESSURE CONTROL VALVE
16. SECOND PRESSURE CONTROL VALVE
17. UNDERDRIVE PRESSURE CONTROL VALVE
18. OVERDRIVE PRESSURE CONTROL VALVE
19. TORQUE CONVERTER CLUTCH SOLENOID
20. LOW-REVERSE SOLENOID VALVE
21. SECOND SOLENOID VALVE
22. UNDERDRIVE SOLENOID VALVE
23. OVERDRIVE SOLENOID VALVE
24. TORQUE CONVERTER PRESSURE CONTROL VALVE
25. REGULATOR VALVE
26. MANUAL VALVE
27. OIL FILTER
28. OIL PUMP
29. OIL STRAINER
30. OIL FILTER (BUILT-IN TYPE)
31. RELIEF VALVE
32. OIL PAN

REVERSE



: LINE PRESSURE
: OIL PUMP SUCTION PRESSURE
: TORQUE CONVERTER CLUTCH PRESSURE
: TORQUE CONVERTER AND LUBRICATION PRESSURE
: TORQUE CONVERTER CLUTCH SOLENOID VALVE PRESSURE

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3. SECOND BRAKE
4. UNDERDRIVE CLUTCH
5. OVERDRIVE CLUTCH
6. ACCUMULATOR
7. CHECK BALL
8. TORQUE CONVERTER CLUTCH
9. FAIL SAFE VALVE A
10. FAIL SAFE VALVE B
11. TORQUE CONVERTER CLUTCH VALVE
12. SWITCH VALVE
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14. LUBRICATION
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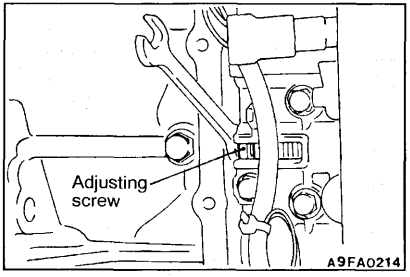


LINE PRESSURE ADJUSTMENT

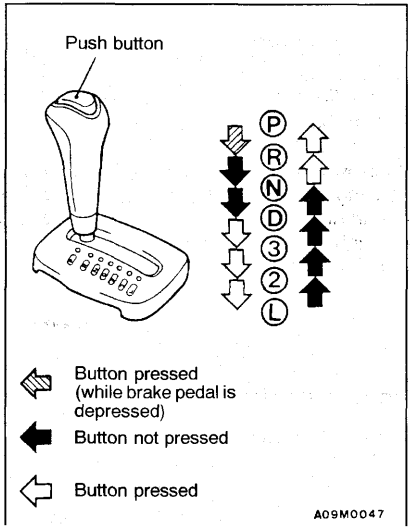
23100170092

1. Discharge the automatic transmission fluid, and then remove the valve body cover.
2. Turn the adjusting screw shown in the illustration to adjust the underdrive pressure to the standard value. The pressure increases when the screw is turned to the left.

   NOTE
   When adjusting the underdrive pressure, adjust to the middle of the standard value range.

   Standard value: 1,010 - 1,050 kPa (147 - 152 psi)

   Change in pressure for each turn of the adjusting screw: 35 kPa (5.1 psi)
3. Install the valve body cover, and pour in the standard volume of automatic transmission fluid.
4. Carry out a hydraulic pressure test. (Refer to P.23A-58.) Readjust the line pressure if necessary.



SELECTOR LEVER OPERATION CHECK

23100130106

1. Shift selector lever to each range and check that lever moves smoothly and clicks into position. Check that position indicator is correct.
2. Check to be sure the selector lever can be shifted to each position (by button operation as shown in the illustration).
3. Start the engine and check if the vehicle moves forward when the selector lever is shifted from N to D, and moves backward when shifted to R.
4. When the shift lever malfunctions, adjust control cable and selector lever sleeve. Check for worn shift lever assembly sliding parts.

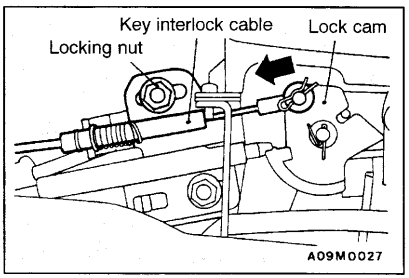
   NOTE
   To move the selector lever from the "P" position to any other position, first turn the ignition key to any position other than "LOCK (OFF)" and depress the brake pedal.

KEY INTERLOCK MECHANISM CHECK

23200090100

1. Carry out the following inspection.

Inspection procedure	Check requirements		Check item (Normal condition)
1	Brake pedal: Depressed	Ignition key position: "LOCK (OFF)" or removed	Pushing the push button of selector lever and shifting from P to other positions are impossible.
2		Ignition key position: "ACC"	Pushing the push button of selector lever and shifting from P to other positions are possible.
3	Brake pedal: Not depressed	Selector lever: Other than P	Turning the ignition key to "LOCK" is impossible.
4		Selector lever: P	Turning the ignition key to "LOCK" smoothly is possible.



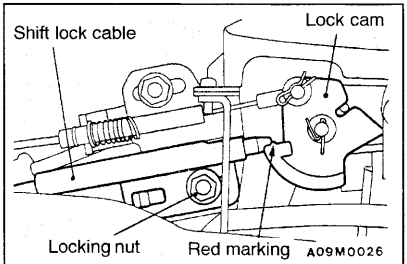
2. When the above operations are defective, adjust the key interlock cable in following procedure.
   (1) Remove the front floor console. (Refer to GROUP 52A.)
   (2) Shift selector lever to "P".
   (3) Turn the ignition key to "LOCK".
   (4) Loosen the locking nut of the key interlock cable.
   (5) Push the cable joint on the lock cam gently toward the arrow, and tighten the locking nut.
   (6) Install the front floor console.

SHIFT LOCK MECHANISM CHECK

23200100100

1. Carry out the following inspections.

Inspection procedure	Check condition		Check item (Normal condition)
1	Brake pedal: Not depressed	Ignition key position: "ACC"	Pushing the selector lever push button and shifting from "P" to other positions are impossible.
2	Brake pedal: Depressed		Pushing the selector lever push button and shifting from "P" to other positions smoothly are possible.
3	Brake pedal: Not depressed		Pushing the selector lever push button and shifting from "R" to "P" smoothly are possible.



2. When the above operations are defective, adjust the shift lock cable as follows:
   (1) Remove the front floor console. (Refer to GROUP 52A.)
   (2) Shift selector lever to "P".
   (3) Loosen the locking nut of shift lock cable.
   (4) Tighten the locking nut so that the end of the shift lock cable comes above the red marking of the lock cam.
   (5) Install the front floor console.

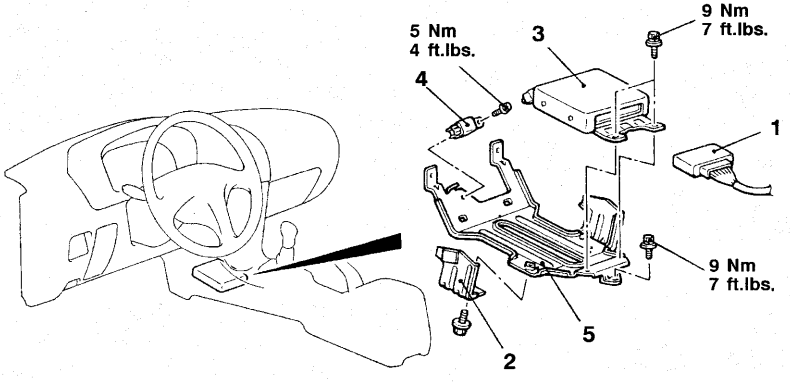
TRANSAXLE CONTROL

23100660322

REMOVAL AND INSTALLATION

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

Caution: SRS
Be careful not to subject the SRS-ECU to any shocks during removal and installation of the transaxle control cable, key interlock cable, shift lock cable and selector lever assembly.



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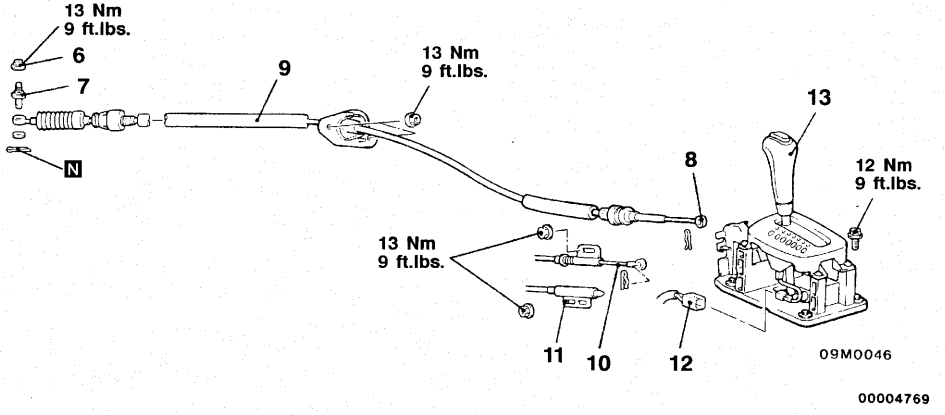


09M0046

00004769

Transaxle control cable assembly removal steps

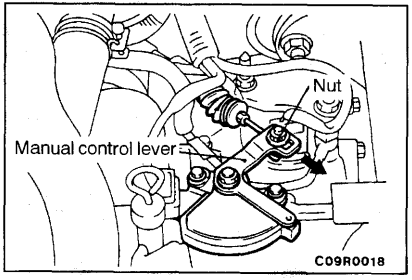
1. Wiring harness connector
2. Arm (L.H.)
3. A/T-ECU
- ▶A◀ 6. Nut
7. Adjuster
8. Transaxle control cable connection
9. Transaxle control cable assembly

Selector lever assembly removal steps

8. Transaxle control cable connection
10. Key interlock cable connection
11. Shift lock cable connection
12. Wiring harness connector
13. Selector lever assembly

A/T-ECU and carpet bracket removal steps

1. Wiring harness connector
2. Arm (L.H.)
3. A/T-ECU
4. Control relay
- ● Heater unit (Refer to GROUP 55.)
5. Carpet bracket



INSTALLATION SERVICE POINT

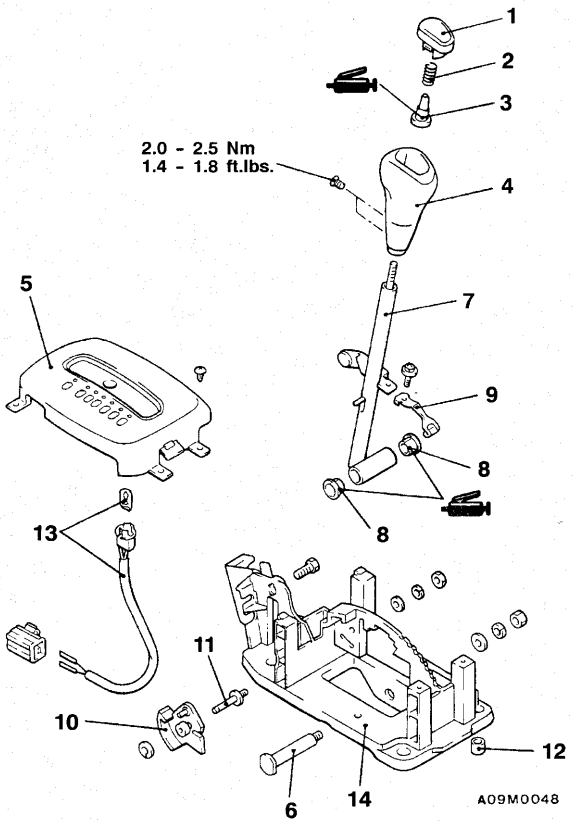
▶A◀ NUT INSTALLATION

1. Put the selector lever in the "N" position.
2. Loosen the adjusting nut, gently pull the transaxle control cable in the direction of the arrow and tighten the nut.

SELECTOR LEVER ASSEMBLY

23100680090

DISASSEMBLY AND REASSEMBLY



Disassembly steps

1. Push button
2. Spring
3. Adjuster
4. Shift knob
5. Indicator panel assembly
6. Bolt
7. Shift lever assembly
8. Bushing
9. Detent spring
10. Lock cam
11. Pin
12. Collar
13. Position indicator light assembly
14. Bracket assembly

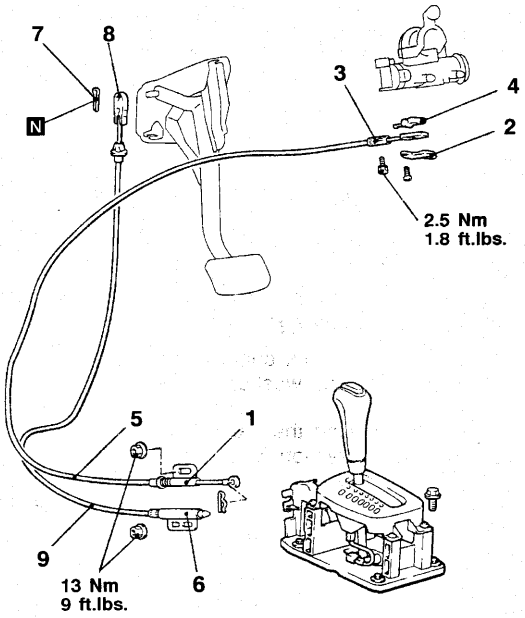
AUTOMATIC TRANSAXLE KEY INTERLOCK & SHIFT LOCK MECHANISMS

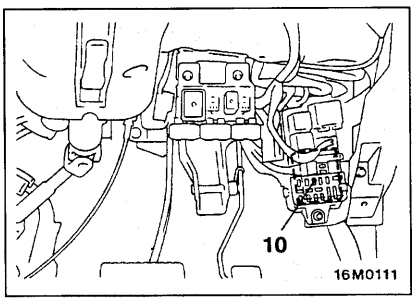
23200120137

REMOVAL AND INSTALLATION

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

Caution: SRS
Be careful not to subject the SRS-ECU to any shocks during removal and installation of the key interlock cable and shift lock cable.





Key interlock cable removal steps

▶C◀ 1. Key interlock cable connection (selector lever side)
- Lower column cover (Refer to GROUP 37A - Steering Wheel and Shaft)

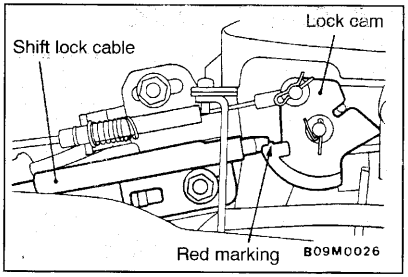
2. Cover
▶B◀ 3. Key interlock cable connection (steering lock cylinder side)
4. Slider
5. Key interlock cable

Shift lock cable removal steps

▶A◀ 6. Shift lock cable connection (selector lever side)
7. Cotter pin
8. Shift lock cable connection (brake pedal side)
9. Shift lock cable

ETACS-ECU or BUZZER-ECU removal

10. ETACS-ECU or buzzer-ECU



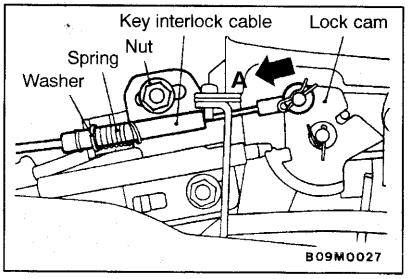
INSTALLATION SERVICE POINTS

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

1. Place the selector lever in position "P".
2. Fasten the shift lock cable at the position where the end of the shift lock cable is positioned above the red marking.

▶B◀ KEY INTERLOCK CABLE (STEERING LOCK CYLINDER SIDE) INSTALLATION

Turn the ignition key to the "LOCK" position and install the key interlock cable.



▶C◀ KEY INTERLOCK 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 A, tighten the nut to fasten the key interlock cable.

INSPECTION

23200130017

Check the cable assembly for function and for damage.

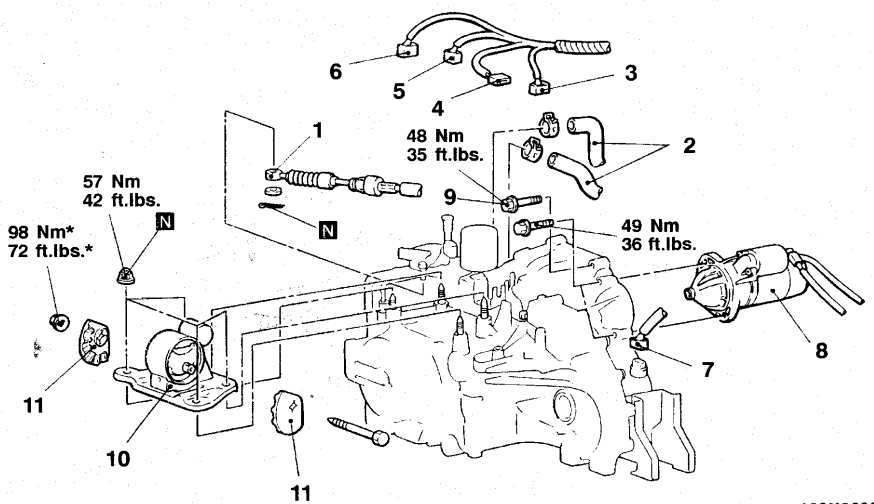
TRANSAXLE ASSEMBLY

23100570342

REMOVAL AND INSTALLATION

Pre-removal Operation
(1) Transaxle Fluid Draining
(Refer to GROUP 00 - Maintenance Service.)
(2) Under Cover Removal
(3) Battery and Battery Tray Removal
(4) Air Cleaner Assembly Removal

Post-installation Operation
(1) Air Cleaner Assembly Installation
(2) Battery and Battery Tray Installation
(3) Under Cover Installation
(4) Transaxle Fluid Supplying
(Refer to GROUP 00 - Maintenance Service.)
(5) Selector Lever Operation Check
(6) Speedometer Operation Check
(7) Press the dust cover with a finger to check whether the dust cover is cracked or damaged.



Removal steps

1. Transaxle control cable connection
2. Transaxle oil cooler hoses connection
3. Pulse generator "A" connector
4. Pulse generator "B" connector
5. Park/neutral position switch connector
6. A/T control solenoid valve assembly connector
7. Vehicle speed sensor connector

◀A▶ 8. Starter motor

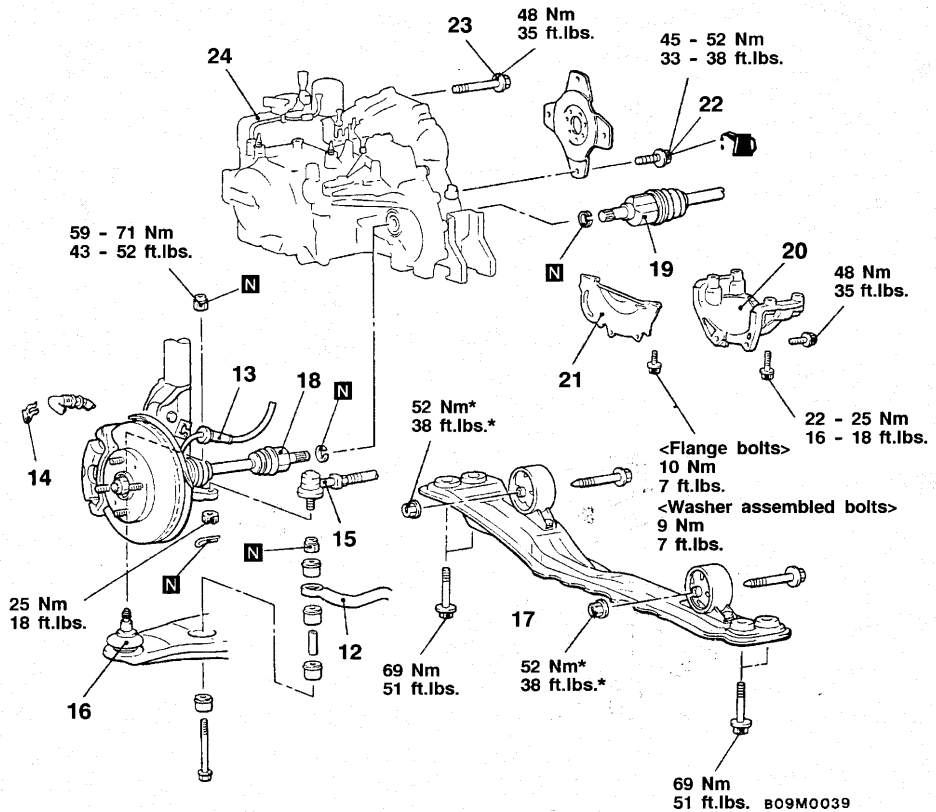
9. Transaxle assembly upper part coupling bolts

◀B▶ 10. Transaxle mount bracket

▶C◀ 11. Transaxle mount stopper

◀C▶ • Engine assembly supporting

Caution
Mounting locations marked by * should be provisionally tightened, and then fully tightened when the body is supporting the full weight of the engine.



Lifting up of the vehicle

- ▶B◀ 12. Stabilizer bar connection
- 13. Speed sensor cable connection <Vehicles with ABS>
- 14. Brake hose clamp
- ◀D▶ 15. Tie rod end connection
- ◀D▶ 16. Lower arm ball joint connection
- 17. Centermember assembly
- ◀E▶ 18. Drive shaft <L.H.> connection
- ◀E▶ 19. Drive shaft <R.H.> connection
- 20. Transaxle stay <Except 1.5L engine>
- 21. Bell housing cover
- ◀F▶ 22. Drive plate bolts
- ◀F▶ 23. Transaxle assembly lower part coupling bolts
- ◀F▶ ▶A◀ 24. Transaxle assembly

Caution

Mounting locations marked by * should be provisionally tightened, and then fully tightened when the body is supporting the full weight of the engine.

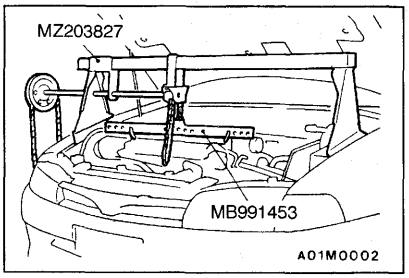
REMOVAL SERVICE POINTS

◀A▶ STARTER MOTOR REMOVAL

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

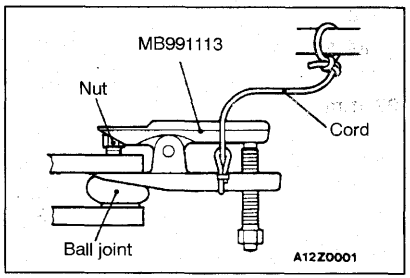
◀B▶ TRANSAXLE MOUNT BRACKET REMOVAL

Jack up the transaxle assembly gently with a garage jack, and then remove the transaxle mounting.



◀C▶ ENGINE ASSEMBLY SUPPORTING

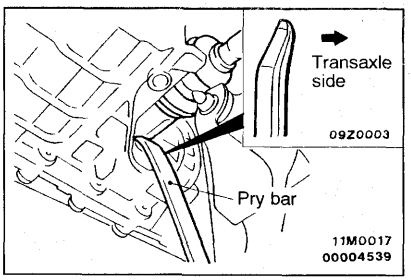
Set the special tool to the vehicle to support the engine assembly.



◀D▶ TIE ROD END/LOWER ARM BALL JOINT DISCONNECTION

Caution

1. **Before using the special tool, loosen the tie-rod end mounting nut. Only loosen the nut; do not remove it from the ball joint.**
2. **Support the special tool with a cord, etc. to prevent it from coming off.**

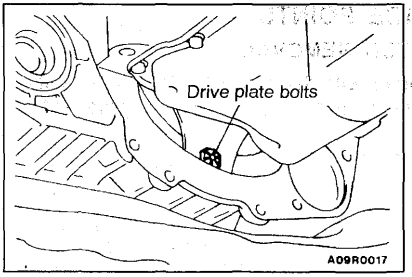


◀E▶ DRIVE SHAFT <L.H.>/DRIVE SHAFT <R.H.> DISCONNECTION

1. Insert a pry bar between the transaxle case and the drive shaft as shown to remove the drive shaft.

   NOTE
   Do not remove the hub and knuckle from the drive shaft.

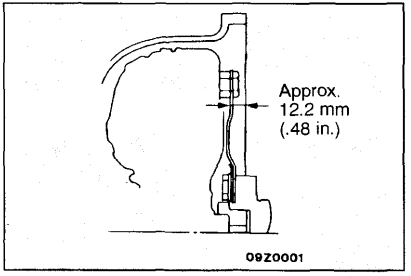
   Caution
   Always use a pry bar, or the ball joint will be damaged.
2. Suspend the removed drive shaft with a wire so that there are no sharp bends in any of the joints.
3. Use a shop towel to cover the transaxle case to prevent foreign material from entering it.



◀F▶ DRIVE PLATE BOLTS/TRANSAXLE ASSEMBLY LOWER PART COUPLING BOLTS/TRANSAXLE ASSEMBLY REMOVAL

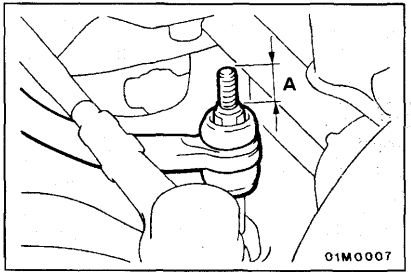
1. Support the transaxle assembly by using a transaxle jack.
2. Remove the drive plate bolts while turning the crank shaft.
3. Press in the torque converter to the transaxle side so that the torque converter does not remain on the engine side.
4. Remove the transaxle assembly lower bolts and lower the transaxle assembly.

INSTALLATION SERVICE POINTS



▶A◀ TRANSAXLE ASSEMBLY INSTALLATION

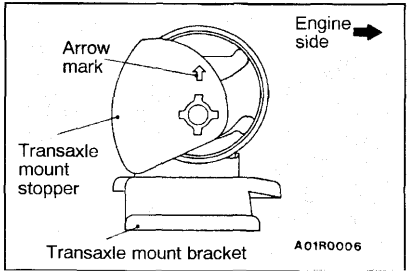
After securely inserting the torque converter into the transaxle side so that the shown dimension is approx. 12.2 mm (.48 in.), install the transaxle assembly to the engine.



▶B◀ STABILIZER BAR INSTALLATION

Tighten the self-locking nut so that the stabilizer mounting bat protrudes 22 mm (.87 in.) as shown.

Standard value (A): 22 mm (.87 in.)



▶C◀ TRANSAXLE MOUNT STOPPER INSTALLATION

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