

GROUP 23Ab

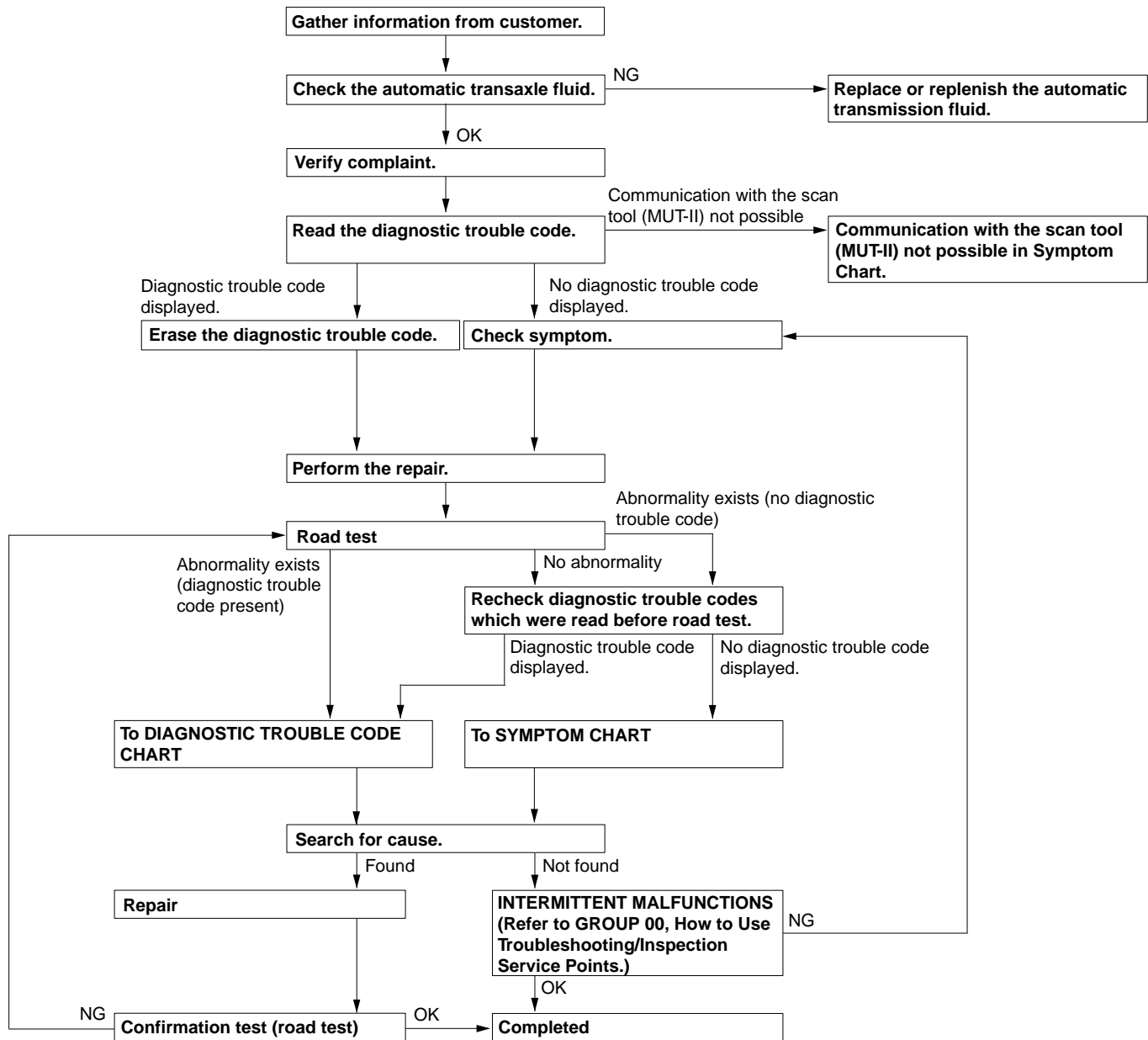
AUTOMATIC TRANSAXLE DIAGNOSIS

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DIAGNOSTIC TROUBLESHOOTING FLOW

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INTRODUCTION TO A/T DIAGNOSIS

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The automatic transaxle can exhibit any of the following symptoms: noise or vibration is generated, A/T fluid leaks, the vehicle does not move forward or backward. The causes of these symptoms could come from: Incorrect mounting, the A/T fluid may be low, or a component of the transaxle may be faulty.

The following items are suspected as causes for the INVECS-II troubles: malfunction of the PCM, the sensors, the switches, the harness or connectors.

INTRODUCTION TO A/T KEY INTERLOCK AND SHIFT LOCK MECHANISMS

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If the key interlock and shift lock mechanisms indicate a malfunction, the key interlock cable, the shift lock cable, or the selector lever assembly may be defective. In this case, follow troubleshooting below.

A/T DIAGNOSTIC TROUBLESHOOTING STRATEGY

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Use these steps to plan your diagnostic strategy. If you follow them carefully, you will find most A/T malfunctions.

1. Gather as much information as possible about the complaint from the customer.
2. Verify that the condition described by the customer exists.
3. Check the vehicle for any A/T Diagnostic Trouble Codes (DTCs).
4. If you can not verify the condition and there are no DTCs, the malfunction is intermittent. For information on how to cope with intermittent malfunctions, refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction [P.00-6](#).
5. If you can verify the condition but there are no DTCs, or the system can not communicate with the scan tool, refer to the Symptom Chart.
6. If there is a DTC, record the number of the code, then erase the code from memory using the scan tool.
7. Reconfirm the symptom with a Road Test.
8. If a DTC is set again, go to the Inspection Chart for Diagnostic Trouble Codes.
9. If a DTC is not set again, the malfunction is intermittent. For information on how to cope with intermittent malfunctions, refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction [P.00-6](#).
10. After repairs are completed, conduct a Road Test duplicating the complaint conditions to confirm the malfunction has been eliminated.

A/T KEY INTERLOCK AND SHIFT LOCK MECHANISMS DIAGNOSTIC TROUBLESHOOTING STRATEGY

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Use these steps to plan your diagnostic strategy. If you follow them carefully, you will be sure that you have exhausted most of the possible ways to find automatic transaxle key interlock and shift lock mechanisms fault.

1. Gather information from the customer.
2. Verify that the condition described by the customer exists.
3. Find the malfunction by following the Symptom Chart.
4. Verify malfunction is eliminated.

A/T DIAGNOSTIC TROUBLE CODE DIAGNOSIS

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ON-BOARD DIAGNOSTICS

The powertrain control module (PCM) monitors its input/output signals (some signals all the time and others under specified conditions). When an irregular signal is initially monitored, the PCM decides that a malfunction has occurred and records the occur-

rence as a diagnostic trouble code. There are 24 diagnostic items. The diagnostic results can be read with a scan tool. Diagnostic trouble codes are kept in memory by direct battery feed. The codes are retained in memory even if the ignition switch is in

the "LOCK" (OFF) position. Diagnostic trouble codes will, however, be erased when a battery terminal or the PCM connector is disconnected. In addition, the diagnostic trouble code can also be erased by scan tool MUT-II (MB991502).

NOTE: If a sensor is disconnected when the ignition switch is in the "ON" position, a diagnostic trouble code is stored in memory. In this case, erase the DTC using the scan tool.

The 24 diagnostic items are displayed in numeric order.

HOW TO READ AND ERASE DIAGNOSTIC TROUBLE CODES

Required Special Tool:

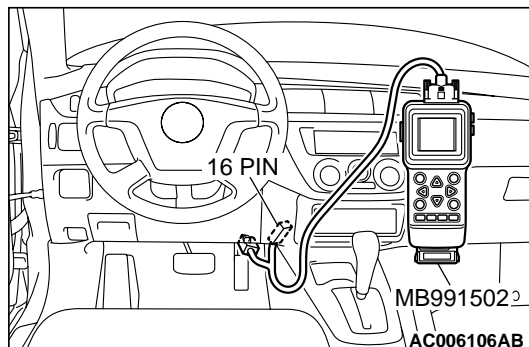
MB991502: Scan Tool (MUT-II)

CAUTION

To prevent damage to scan tool MB991502, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502.

NOTE: If the battery voltage is low, diagnostic trouble codes will not be output. Check the battery if scan tool MB991502 does not display.

NOTE: If the battery is disconnected or if the powertrain control module connector is disconnected, the diagnostic trouble codes will be erased. Do not disconnect the battery or powertrain control module before the diagnostic trouble codes have been read.



1. Connect scan tool MB991502 to the data link connector.
2. Turn the ignition switch to the "ON" position.
3. Record the diagnostic trouble codes (DTCs) for A/T.
4. Refer to the Diagnostic Trouble Code Chart.
5. Turn the ignition switch to "LOCK" (OFF) and then back to "ON" again.
6. Erase the diagnostic trouble code by selecting DTC erase from SPECIAL MENU screen, using scan tool MB991502.
7. Check for diagnostic trouble codes. Confirm that scan tool MB991502 displays "normal."
8. Turn the ignition switch to the "LOCK" (OFF) position.
9. Disconnect scan tool MB991502.

INSPECTION USING SCAN TOOL, ROAD TEST AND DATA LIST

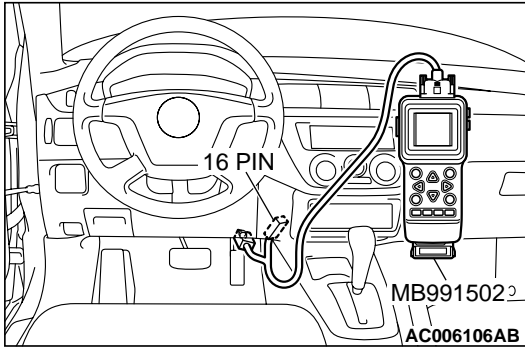
Required Special Tool:

MB991502: Scan Tool (MUT-II)

⚠ CAUTION

To prevent damage to scan tool MB991502, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502.

1. Connect scan tool MB991502 to the data link connector.
2. Turn the ignition switch to the "ON" position.
3. Carry out the inspection by means of the Road Test and the Data List function. If there is an abnormality, check and repair the chassis harnesses and components. Refer to [P.23Ab-7](#), Road Test. Refer to [P.23Ab-28](#), Data List Reference Table.
4. Re-check using scan tool MB991502 and confirm that the abnormal input and output have returned to normal as a result of the repairs.
5. Check for and inspect any diagnostic trouble codes (DTCs) that may have surfaced from testing. Erase any diagnostic trouble codes after checking.
6. Turn the ignition switch to the "LOCK" (OFF) position.
7. Disconnect scan tool MB991502 from the data link connector.
8. Start the engine again and do a test drive to confirm that the problem is eliminated.



FAIL-SAFE/BACKUP FUNCTION

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When a malfunction of a main sensor or actuator is detected by the PCM, the transaxle is controlled by pre-set control logic to maintain safe conditions for driving.

The following table shows how the fail-safe/backup function affects vehicle driveability and operation.

MALFUNCTIONING ITEM	JUDGEMENT CONDITION	CONTROL DEFAULT DURING MALFUNCTION
Input shaft speed sensor	If no output pulse from the input shaft speed sensor is detected for one second or more when the vehicle speed is 30 km/h (19 mph) or greater.	The diagnostic trouble code is recorded when the malfunction occurs during 4 monitoring periods in one drive cycle. When the judgment condition is met, the transaxle holds 3rd gear or 2nd gear, depending on speed, as a fail-safe.
Output shaft speed sensor	The output signal from the output shaft speed sensor is not present for one second or more while the vehicle is driven.	The diagnostic trouble code is recorded when the malfunction occurs during 4 monitoring periods in one drive cycle. When the judgment condition is met, the transaxle holds 3rd gear or 2nd gear, depending on speed, as a fail-safe.

MALFUNCTIONING ITEM		JUDGEMENT CONDITION	CONTROL DEFAULT DURING MALFUNCTION
Low-reverse solenoid valve		Solenoid valve resistance is below 2.7 ohms for 0.32 seconds.	The diagnostic trouble code is recorded when the malfunction occurs during 4 monitoring periods in one drive cycle. When the judgment condition is met, the A/T control relay is turned off. The transaxle will only operate in 3rd and reverse gears until the system is repaired.
Underdrive solenoid valve			
Second solenoid valve			
Overdrive solenoid valve			
Torque converter clutch solenoid valve			
Incomplete shifting	1st	The gear ratio value from the output shaft speed sensor is not the same as the output from the input shaft speed sensor for one second after shifting has been completed.	The diagnostic trouble code is recorded when the malfunction occurs during 4 monitoring periods in one drive cycle. When the judgment condition is met, the A/T control relay is turned off. The transaxle will only operate in 3rd and reverse gears until the system is repaired.
	2nd		
	3rd		
	4th		
	Reverse		
A/T control relay		A/T control relay voltage is less than seven volts for 0.1 second after the ignition switch is turned "ON."	The A/T control relay is switched off. The transaxle will only operate in 3rd and reverse gears until the system is repaired.
Malfunction in the PCM		Malfunction has occurred in the PCM.	The A/T control relay is switched off. The transaxle will only operate in 3rd and reverse gears until the system is repaired.

ROAD TEST

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Check using the following procedures.

STEP	CONDITION BEFORE TEST/ OPERATION	TEST/ OPERATION	STANDARD	INSPECTION ITEM	DTC	INSPECTION PROCEDURE PAGE
1	Ignition switch: (LOCK) OFF	Ignition switch (1) ON	Data list No. 54 (1) Control Relay Voltage [V]	A/T control relay output voltage	54	A/T control relay system (P.23Ac-268.)
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 (P.23Ac-147 , P.23Ac-182.)
		Accelerator pedal (1) Fully closed (2) Depressed (3) Fully open	Data list No. 11 (1) 335 – 935 mV (2) Gradually rises from (1) (3) 4,390 – 5,290 mV	TP sensor	11, 12, 14	TP sensor system (P.23Ac-2 , P.23Ac-18 , P.23Ac-35.)
		Brake pedal (1) Depressed (2) Released	Data list No. 26 (1) ON (2) OFF	Stoplight switch	26	Stoplight switch system (P.23Ac-138.)
3	Ignition switch: ST Engine: Stopped	Cranking test with lever in P or N range	Cranking should be possible	Cranking	-	Engine does not start
4	Engine warmed up	Drive for 15 minutes or more so that the A/T fluid temperature becomes 70 – 80°C. (158 – 176°F)	Data list No. 15 Gradually rises to 70 – 80°C (158 176°F)	A/T fluid temperature sensor	15, 16	A/T fluid temperature sensor system (P.23Ac-56 , P.23Ac-68.)

STEP	CONDITION BEFORE TEST/ OPERATION	TEST/ OPERATION	STANDARD	INSPECTION ITEM	DTC	INSPECTION PROCEDURE PAGE
5	Engine: Idling Selector lever position: N	Brake pedal (Retest) (1) Depressed (2) Released	Data list No. 26 (1) ON (2) OFF	Stoplight switch	26	Stoplight switch system (P.23Ac-138.)
		A/C switch (1) ON (2) OFF	Data list No. 65 (1) ON (2) OFF	Dual pressure switch	-	Vehicle shifts differently with A/C engaged (P.23Ad-34.)
		Accelerator pedal (1) Fully closed (2) Depressed	Data list No. 21 (1) Engine tachometer and the scan tool show the same engine speed (2) Gradually rises from (1)	Crankshaft position sensor	21	Crankshaft position sensor system (P.23Ac-77.)
		Selector lever position (1) N → D (2) N → R	Should be no abnormal shift shocks Time delay when engaging should be within 2 seconds	Malfunction when starting	-	Engine stalls when moving selector lever from N to D or N to R (P.23Ad-9.)
					-	Shift shock when shifting from N to D and long delay (P.23Ad-11.)
					-	Shift shock when shifting from N to R and long delay (P.23Ad-14.)
					-	Shift shock when shifting from N to D, N to R and long delay (P.23Ad-16.)
				Does not move	-	Does not move forward (P.23Ad-4.)
					-	Does not move backward (P.23Ad-6.)
					-	Does not move (forward or backward) (P.23Ad-8.)

STEP	CONDITION BEFORE TEST/ OPERATION	TEST/ OPERATION	STANDARD	INSPECTION ITEM	DTC	INSPECTION PROCEDURE PAGE
6	Selector lever position: N (on a flat and straight road.)	Selector lever position and vehicle speed (Each condition should be maintained for 10 seconds or more.) (1) Idling in L position (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) Driving at constant speed of 50 km/h (31 mph) in 3 position (5) Driving at constant speed of 50 km/h (31 mph) in D position	Data list No. 63 (2) 1st, (3) 2nd, (4) 3rd, (5) 4th	Shift position	-	-
			Data list No. 31 (2) 0 %, (3) 100 %, (4) 100 %, (5) 100 %	Low-reverse solenoid valve duty %	31	Low-reverse solenoid valve system (P.23Ac-200.)
			Data list No. 32 (2) 0 %, (3) 0 %, (4) 0 %, (5) 100 %	Underdrive solenoid valve duty %	32	Underdrive solenoid valve system (P.23Ac-210.)
			Data list No. 33 (2) 100 %, (3) 0 %, (4) 100 %, (5) 0 %	Second solenoid valve duty %	33	Second solenoid valve system (P.23Ac-219.)
			Data list No. 34 (2) 100 %, (3) 100 %, (4) 0 %, (5) 0 %	Overdrive solenoid valve duty %	34	Overdrive solenoid valve system (P.23Ac-228.)
			Data list No. 29 (1) 0 km/h (0 mph) (4) 50 km/h (31 mph)	Vehicle speed signal	-	Vehicle speed signal system (P.23Ad-53.)
			Data list No. 22 (4) 1,600 – 1,900 r/min	Input shaft speed sensor	22	Input shaft speed sensor system (P.23Ac-100.)
			Data list No. 23 (4) 1,600 – 1,900 r/min	Output shaft speed sensor	23	Output shaft speed sensor system (P.23Ac-119.)
7	Selector lever position: 3 (on a flat and straight road.)	Selector lever position and vehicle speed (1) Driving at speed of 60 km/h (37 mph) in 3rd gear (2) Driving at constant speed of 60 km/h (37 mph) (3) Release accelerator pedal (Speed under 50 km/h (31 mph))	Data list No. 36 (2) 70 – 90 % (3) 70 – 90 % → 0 %	Torque converter clutch solenoid valve duty %	36, 52, 53	Torque converter clutch solenoid system (P.23Ac-237, P.23Ac-258, P.23Ac-263.)
			Data list No. 52 (2) –10 to 10 r/min (3) The value changes from (2)	Torque converter clutch amount of slippage		

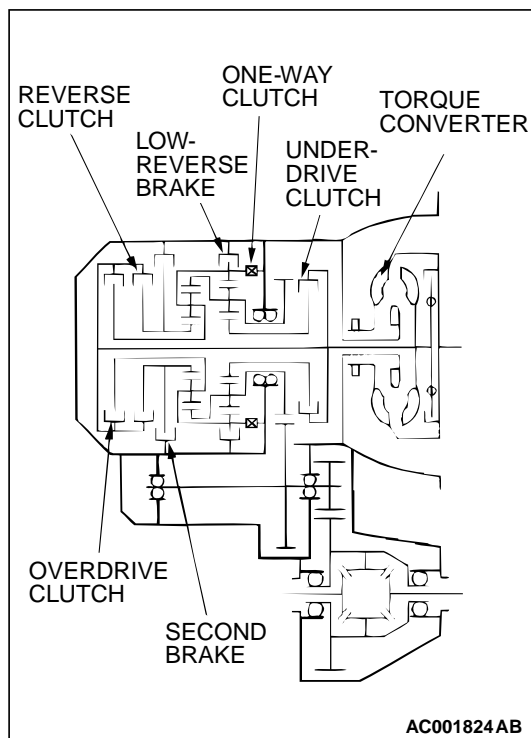
STEP	CONDITION BEFORE TEST/ OPERATION	TEST/ OPERATION	STANDARD	INSPECTION ITEM	DTC	INSPECTION PROCEDURE PAGE
8	Use the scan tool (MUT-II) to stop the INVECS-II function. Selector lever position: D (on a flat and straight road.)	(1) Accelerate to 4th gear at a TP sensor output of 1.5V (accelerator opening angle of 30 %). (2) Slowly decelerate to a stop. (3) Accelerate to 4th gear at a TP sensor output of 2.5 V (accelerator opening angle of 50%).	Data list No. 11, 23 The shifting points correspond with the scan tool display and the TP sensor voltage (opening angle) and output shaft speed, which are shown in the standard shift pattern.	Malfunction when shifting	-	Shift shock and slipping (P.23Ad-18.)
				Does not shift according to instructions	-	Early or late shifting in all gears (P.23Ad-20.)
					-	Early or late shifting in some gears (P.23Ad-23.)
					-	No diagnostic trouble code (P.23Ad-25.)
				Does not shift	22	Input shaft speed sensor system (P.23Ac-100.)
					23	Output shaft speed sensor system (P.23Ac-119.)

STEP	CONDITION BEFORE TEST/ OPERATION	TEST/ OPERATION	STANDARD	INSPECTION ITEM	DTC	INSPECTION PROCEDURE PAGE
8	Use the scan tool (MUT-II) to stop the INVECS-II function. Selector lever position: D (on a flat and straight road.)	(1) Accelerate from 1st gear to 4th gear. (2) While driving at 60 km/h (37 mph) in 4th gear, down shift to 3 range. (3) While driving at 40 km/h (25 mph) in 3rd gear, down shift to 2 range. (4) While driving at 20 km/h (12 mph) in 2nd gear, down shift to L range.	Data list No. 63 (1) 1st → 2nd → 3rd → 4th (2) 4th → 3rd (3) 3rd → 2nd (4) 2nd → 1st	Does not shift from 1 to 2 or 2 to 1	31	Low-reverse solenoid valve system (P.23Ac-200.)
					33	Second solenoid valve system (P.23Ac-219.)
					41	1st gear incorrect ratio (P.23Ac-247.)
					42	2nd gear incorrect ratio (P.23Ac-247.)
				Does not shift from 2 to 3 or 3 to 2	33	Second solenoid valve system (P.23Ac-219.)
					34	Overdrive solenoid valve system (P.23Ac-228.)
					42	2nd gear incorrect ratio (P.23Ac-247.)
					43	3rd gear incorrect ratio (P.23Ac-247.)
				Does not shift from 3 to 4 or 4 to 3	32	Underdrive solenoid valve system (P.23Ac-210.)
					33	Second solenoid valve system (P.23Ac-219.)
					43	3rd gear incorrect ratio (P.23Ac-247.)
					44	4th gear incorrect ratio (P.23Ac-247.)

STEP	CONDITION BEFORE TEST/ OPERATION	TEST/ OPERATION	STANDARD	INSPECTION ITEM	DTC	INSPECTION PROCEDURE PAGE
9	Selector lever position: N (on a flat and straight road.)	Monitor data list No. 22 and No. 23 with scan tool MB991502. (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 match	22	Input shaft speed sensor system (P.23Ac-100.)
					23	Output shaft speed sensor system (P.23Ac-119.)
					46	Reverse gear incorrect ratio (P.23Ac-247.)

TORQUE CONVERTER STALL TEST

M1231005400180



This test measures the maximum engine speed when the selector lever is in the "D" or "R" position and the torque converter stalls. This tests the operation of the torque converter, stator and one-way clutch operation, as well as the holding performance of the clutches and brakes in the transaxle.

⚠ WARNING

Do not let anyone stand in front of or behind the vehicle while this test is performed.

1. Check the A/T fluid level and temperature. Check the engine coolant temperature.
 - A/T fluid level: At the "HOT" mark on the dipstick
 - A/T fluid temperature: 70 – 80 °C (158 – 176 °F)
 - Engine coolant temperature: 80 – 100 °C (176 – 212 °F)

NOTE: Measures A/T fluid temperature with scan tool MB991502 (MUT-II).
2. Chock both rear wheels.
3. Connect a tachometer.
4. Apply the parking and service brakes fully.
5. Start the engine.

⚠ CAUTION

- The throttle should not be fully open for any more than eight seconds.
 - If you repeat the stall test when the fluid temperature is greater than 80°C (176°F), move the selector lever to the "N" position and let the engine run at approximately 1,000 r/min for at least one minute. Wait until the ATF temperature returns to 80°C (176°F) or less.
6. Move the selector lever to the "D" position. Fully depress the accelerator pedal and read the maximum engine speed.

Standard value: Stall speed: 2,100 – 2,600 r/min
 7. Move the selector lever to the "R" position. Fully depress the accelerator pedal and read the maximum engine speed.

Standard value: Stall speed: 2,100 – 2,600 r/min

TORQUE CONVERTER STALL TEST JUDGMENT RESULTS

1. Stall speed is too high in "D" range only
 - Malfunction of the torque converter (Slippage on the splines of the torque converter and the input shaft)
 - Low line pressure
 - Low-reverse brake slippage and malfunction of the one-way clutch
2. Stall speed is too high in "D" range only
 - Underdrive clutch slippage
3. Stall speed is too high in "R" range only
 - Reverse clutch slippage
4. Stall speed is too low in both "D" and "R" ranges
 - Malfunction of the torque converter (Slippage of the one-way clutch)
 - Insufficient engine output

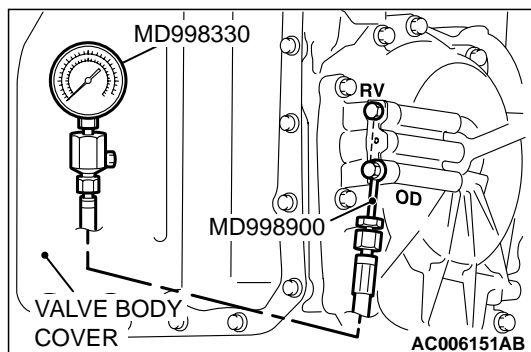
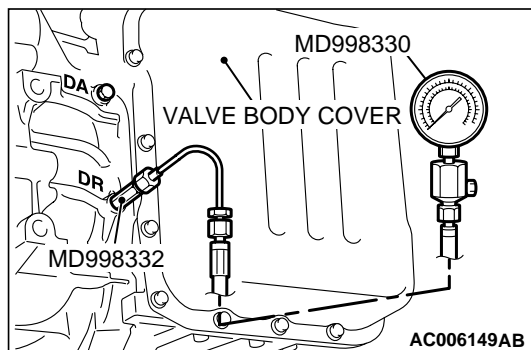
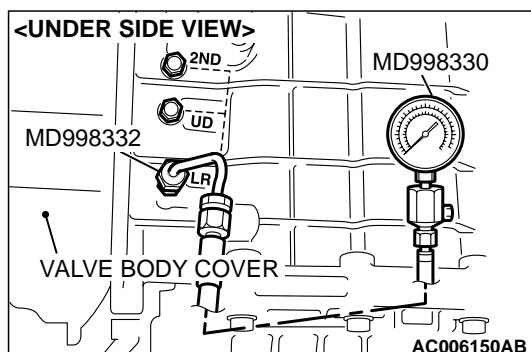
HYDRAULIC PRESSURE TESTS

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CAUTION

The A/T fluid temperature should be between 70 – 80 °C (158 – 176°F) during the test.

1. Check the A/T fluid level and temperature. Check engine coolant temperature.
 - A/T fluid level: "HOT" mark on the dipstick
 - A/T fluid temperature: 70 – 80°C (158 – 176°F)
 - Engine coolant temperature: 80 – 100°C (176 – 212°F)
2. Raise the vehicle so that the wheels are free to turn.



3. Connect the special tools (3.0 MPa (427 psi) oil pressure gauge [MD998330] and adapters [MD998332, MD998900]) to each pressure discharge port.

NOTE:

- 2ND: Second brake pressure port
 - UD: Underdrive clutch pressure port
 - LR: Low-reverse brake pressure port
 - DR: Torque converter release pressure port
 - DA: Torque converter apply pressure port ("DA" pressure is approximately the same as the "DR" pressure, so measurements are not needed)
 - RV: Reverse clutch pressure port
 - OD: Overdrive clutch pressure port
4. Restart the engine.
 5. Check that there are no leaks around the special tool port adapters.
 6. 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.
 7. If the pressure is not within the standard value, stop the engine and refer to the hydraulic pressure test diagnosis table.
 8. Remove the O-ring from the port plug and replace it.
 9. Remove the special tool, and install the plugs to the hydraulic pressure ports.
 10. Start the engine and check that there are no leaks around the plugs.

STANDARD HYDRAULIC PRESSURE TEST

MEASUREMENT CONDITION			STANDARD HYDRAULIC PRESSURE MPa (psi)					
SELECTOR LEVER POSITION	SHIFT POSITION	ENGINE SPEED (r/min)	UNDERDRIVE CLUTCH PRESSURE [UD]	REVERSE CLUTCH PRESSURE [RV]	OVERDRIVE CLUTCH PRESSURE [OD]	LOW-REVERSE BRAKE PRESSURE [LR]	SECOND BRAKE PRESSURE [2ND]	TORQUE CONVERTER PRESSURE [DR]
P	–	2,500	–	–	–	0.31 – 0.39 (45 – 57)	–	0.25 – 0.39 (37 – 57)
R	Reverse	2,500	–	1.27 – 1.77 (185 – 256)	–	1.27 – 1.77 (185 – 256)	–	0.50 – 0.70 (73 – 101)
N	–	2,500	–	–	–	0.31 – 0.39 (45 – 57)	–	0.25 – 0.39 (37 – 57)
L	1st gear	2,500	1.01 – 1.05 (147 – 152)	–	–	1.01 – 1.05 (147 – 152)	–	0.50 – 0.70 (73 – 101)

MEASUREMENT CONDITION			STANDARD HYDRAULIC PRESSURE MPa (psi)					
SELECTOR LEVER POSITION	SHIFT POSITION	ENGINE SPEED (r/min)	UNDERDRIVE CLUTCH PRESSURE [UD]	REVERSE CLUTCH PRESSURE [RV]	OVERDRIVE CLUTCH PRESSURE [OD]	LOW-REVERSE BRAKE PRESSURE [LR]	SECOND BRAKE PRESSURE [2ND]	TORQUE CONVERTER PRESSURE [DR]
2	2nd gear	2,500	1.01 – 1.05 (147 – 152)	–	–	–	1.01 – 1.05 (147 – 152)	0.50 – 0.70 (73 – 101)
3	3rd gear	2,500	0.59 – 0.69 (86 – 100)	–	0.59 – 0.69 (86 – 100)	–	–	–
D	4th gear	2,500	–	–	0.59 – 0.69 (86 – 100)	–	0.59 – 0.69 (86 – 100)	–

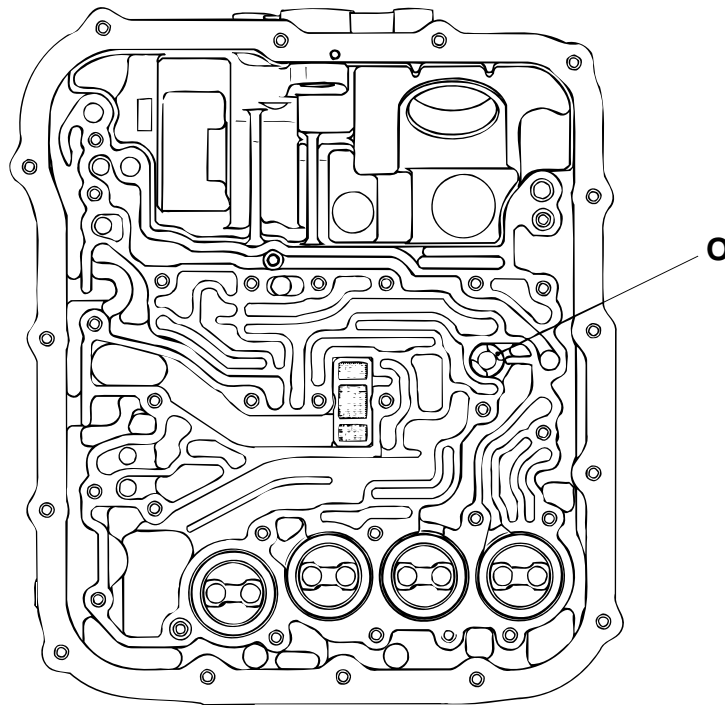
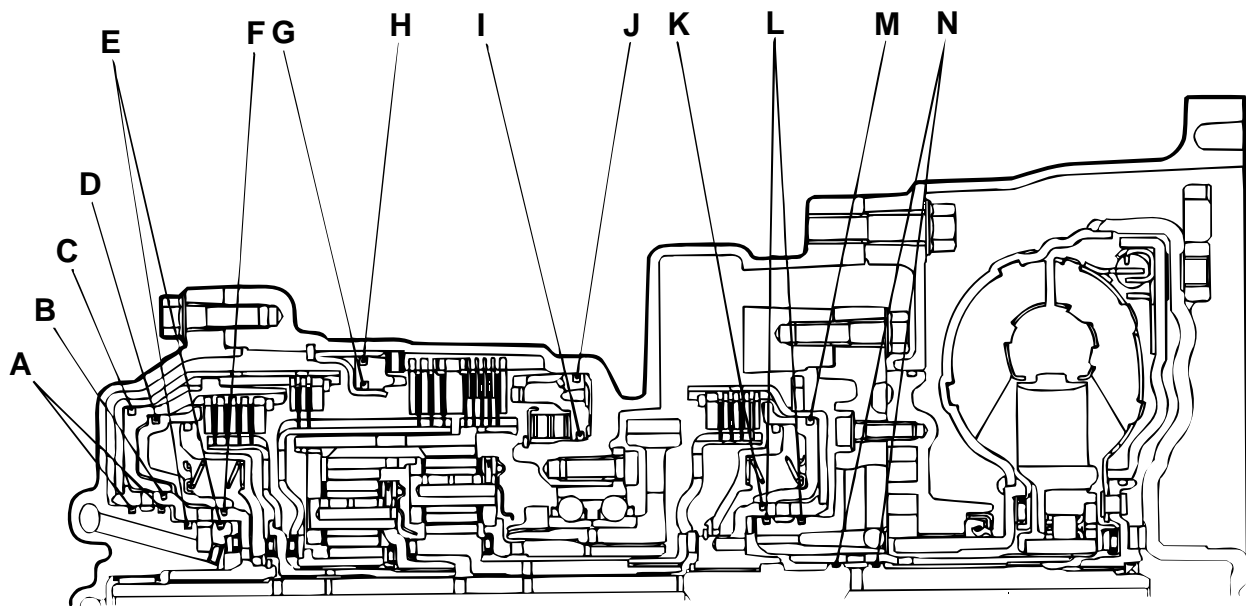
NOTE: When the torque converter pressure is measured, the engine speed should be 1,500 r/min or less.

HYDRAULIC PRESSURE TEST DIAGNOSIS TABLE

SYMPTOM	PROBABLE CAUSE
All hydraulic pressures are high.	Malfunction of the regulator valve
All hydraulic pressures are low.	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
	Improperly installed solenoid valves
	Damaged solenoid valve O-rings
Hydraulic pressure is abnormal in reverse gear only.	Malfunction of the regulator valve
	Clogged orifice
	Incorrect valve body installation
Hydraulic pressure is abnormal in 3rd or 4th gear 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
Only underdrive clutch 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 the check ball
	Clogged orifice
	Incorrect valve body installation

SYMPTOM	PROBABLE CAUSE
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 clutch 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 the check ball
	Clogged orifice
	Incorrect valve body installation
Only low-reverse brake hydraulic pressure is abnormal.	Malfunction of the oil seal I
	Malfunction of the oil seal J
	Malfunction of the low-reverse solenoid valve
	Malfunction of the low-reverse pressure control valve
	Malfunction of the switch valve
	Malfunction of the fail safe valve A
	Malfunction of all the check balls
	Clogged orifice
	Incorrect valve body installation
Only second brake 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 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 the check ball
	Incorrect valve body installation

OIL SEAL LAYOUT

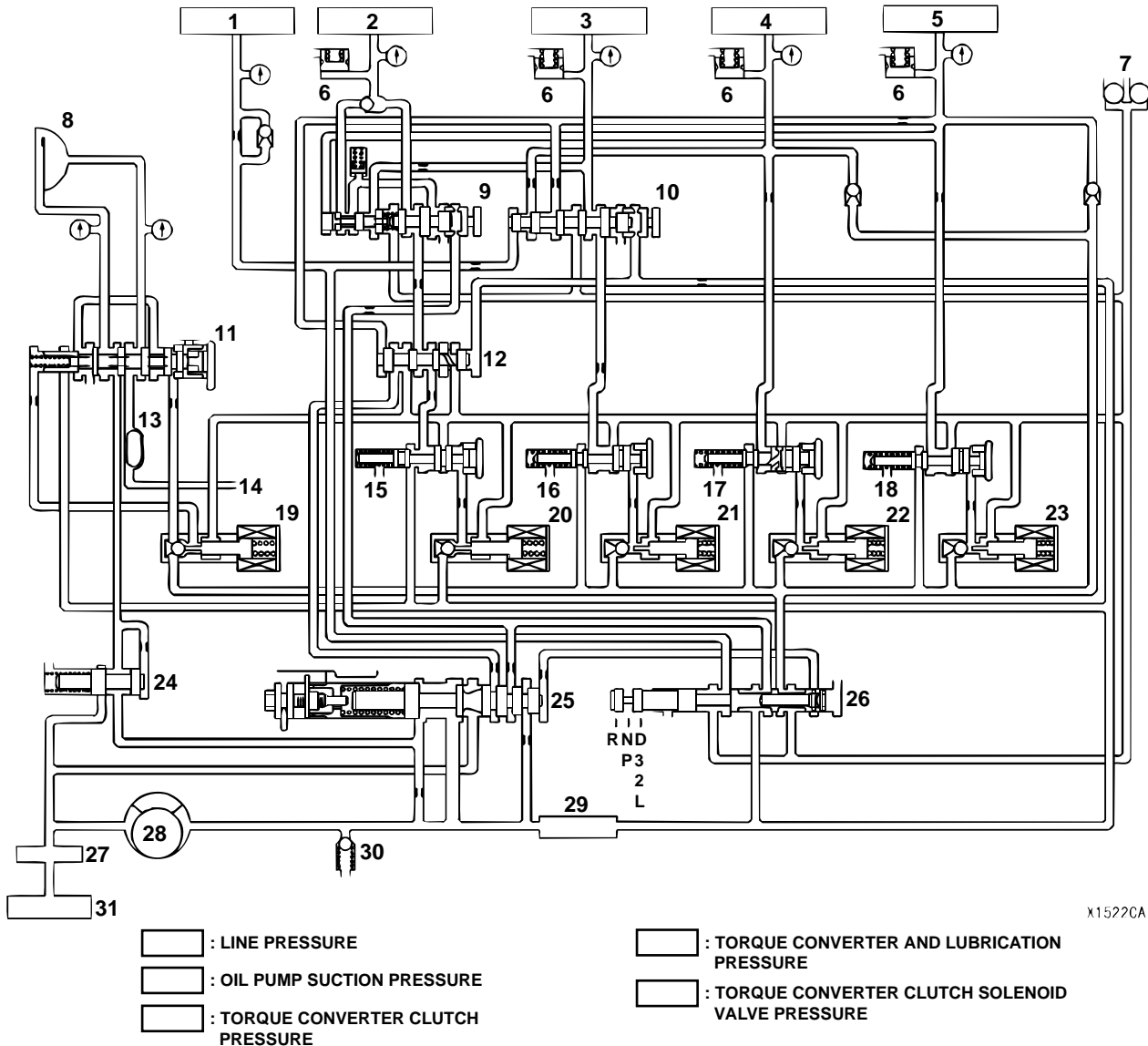


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HYDRAULIC CIRCUIT

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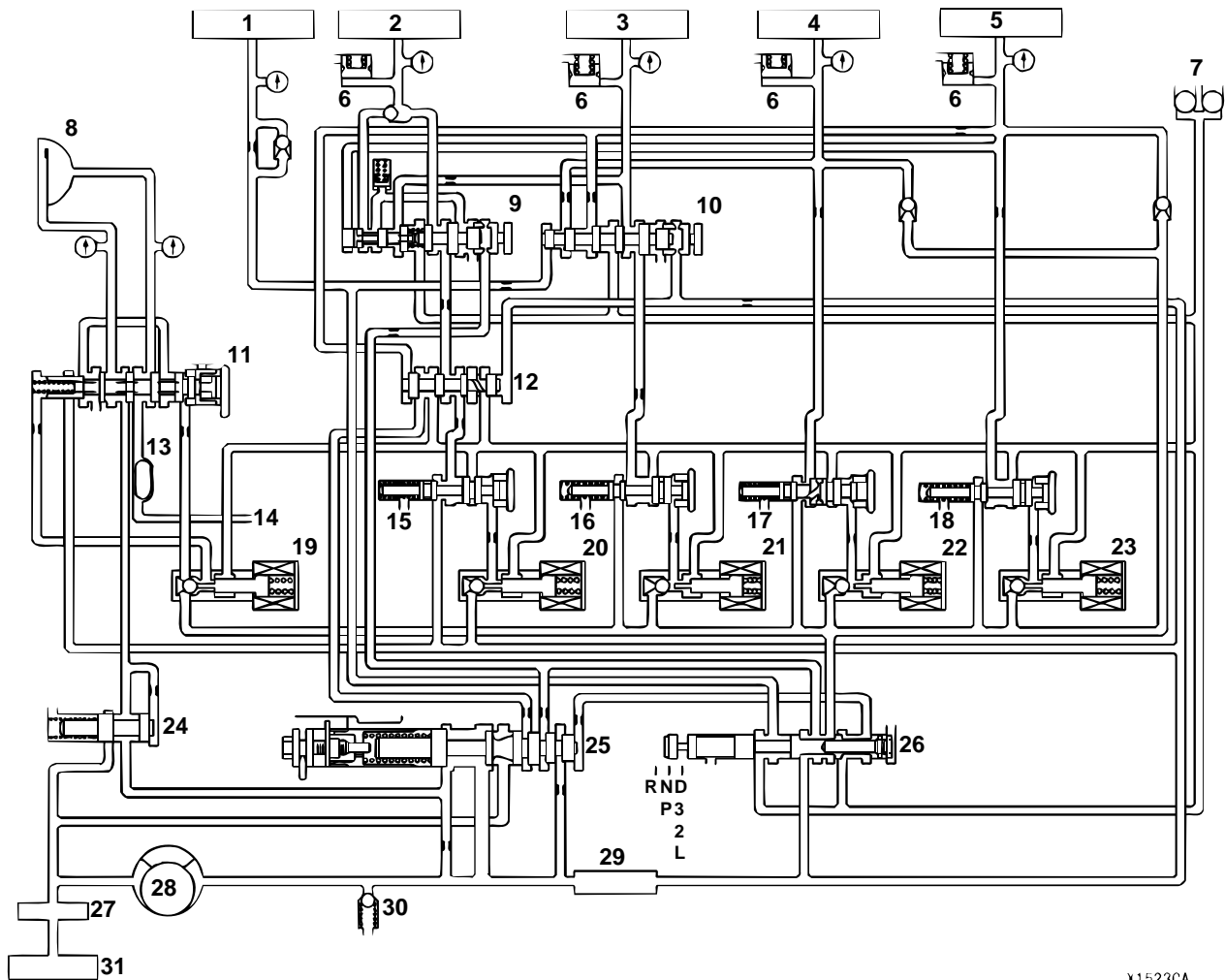
PARKING AND NEUTRAL



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

1ST GEAR



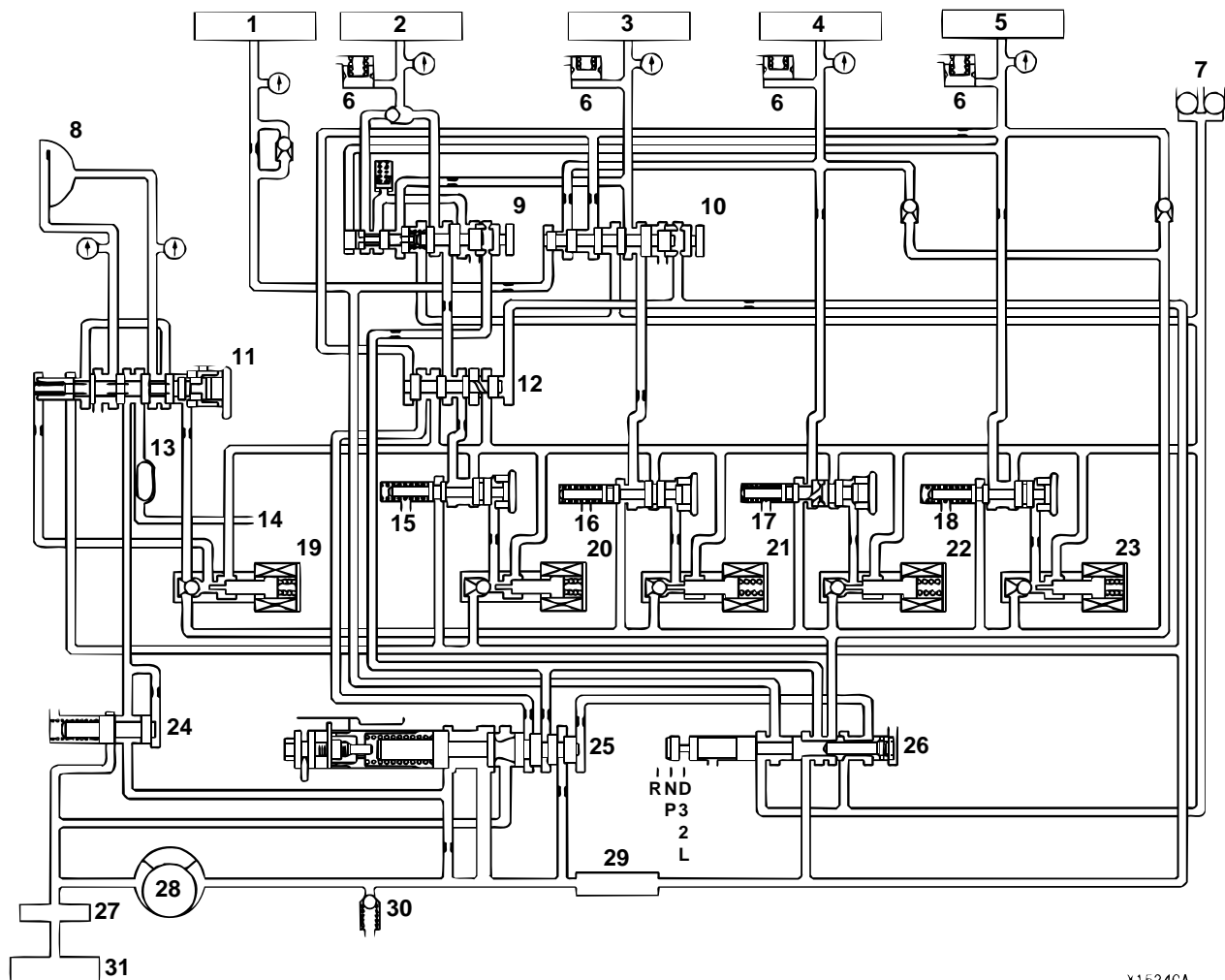
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: LINE PRESSURE
 : OIL PUMP SUCTION PRESSURE
 : TORQUE CONVERTER CLUTCH PRESSURE

: TORQUE CONVERTER AND LUBRICATION PRESSURE
 : TORQUE CONVERTER CLUTCH SOLENOID VALVE PRESSURE

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|---|---|
| 1. REVERSE CLUTCH | 17. UNDERDRIVE PRESSURE CONTROL VALVE |
| 2. LOW-REVERSE BRAKE | 18. OVERDRIVE PRESSURE CONTROL VALVE |
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| 4. UNDERDRIVE CLUTCH | 20. LOW-REVERSE SOLENOID VALVE |
| 5. OVERDRIVE CLUTCH | 21. SECOND SOLENOID VALVE |
| 6. ACCUMULATOR | 22. UNDERDRIVE SOLENOID VALVE |
| 7. CHECK BALL | 23. OVERDRIVE SOLENOID VALVE |
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| 9. FAIL SAFE VALVE A | 25. REGULATOR VALVE |
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| 11. TORQUE CONVERTER CLUTCH CONTROL VALVE | 27. OIL FILTER |
| 12. SWITCH VALVE | 28. OIL PUMP |
| 13. A/T FLUID COOLER | 29. OIL STRAINER |
| 14. LUBRICATION | 30. RELIEF VALVE |
| 15. LOW-REVERSE PRESSURE CONTROL VALVE | 31. OIL PAN |
| 16. SECOND PRESSURE CONTROL VALVE | |

2ND GEAR



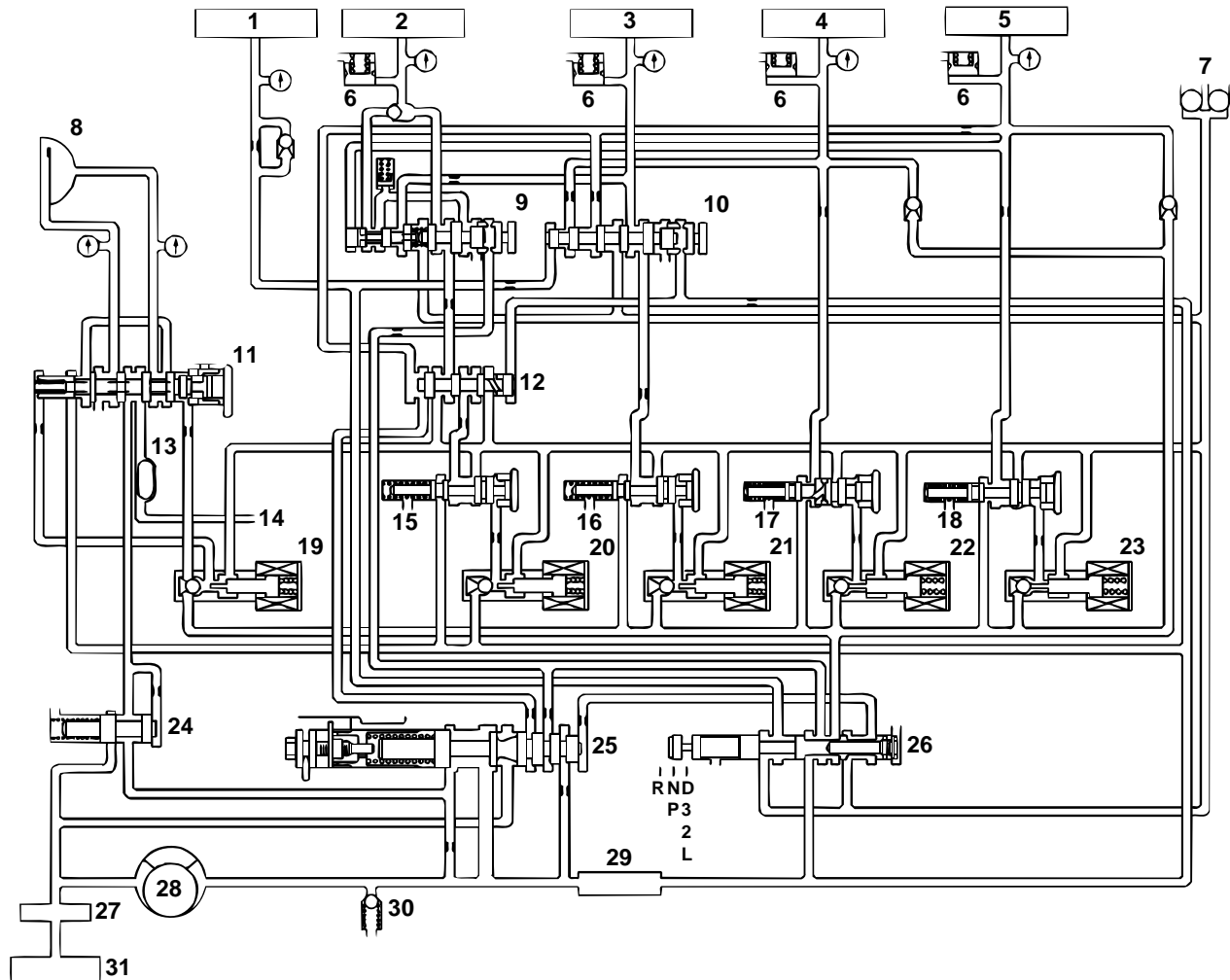
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 [] : TORQUE CONVERTER CLUTCH PRESSURE

[] : TORQUE CONVERTER AND LUBRICATION PRESSURE
 [] : TORQUE CONVERTER CLUTCH SOLENOID VALVE PRESSURE

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|---|---|
| 1. REVERSE CLUTCH | 17. UNDERDRIVE PRESSURE CONTROL VALVE |
| 2. LOW-REVERSE BRAKE | 18. OVERDRIVE PRESSURE CONTROL VALVE |
| 3. SECOND BRAKE | 19. TORQUE CONVERTER CLUTCH SOLENOID VALVE |
| 4. UNDERDRIVE CLUTCH | 20. LOW-REVERSE SOLENOID VALVE |
| 5. OVERDRIVE CLUTCH | 21. SECOND SOLENOID VALVE |
| 6. ACCUMULATOR | 22. UNDERDRIVE SOLENOID VALVE |
| 7. CHECK BALL | 23. OVERDRIVE SOLENOID VALVE |
| 8. TORQUE CONVERTER CLUTCH | 24. TORQUE CONVERTER PRESSURE CONTROL VALVE |
| 9. FAIL SAFE VALVE A | 25. REGULATOR VALVE |
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| 13. A/T FLUID COOLER | 29. OIL STRAINER |
| 14. LUBRICATION | 30. RELIEF VALVE |
| 15. LOW-REVERSE PRESSURE CONTROL VALVE | 31. OIL PAN |
| 16. SECOND PRESSURE CONTROL VALVE | |

3RD GEAR



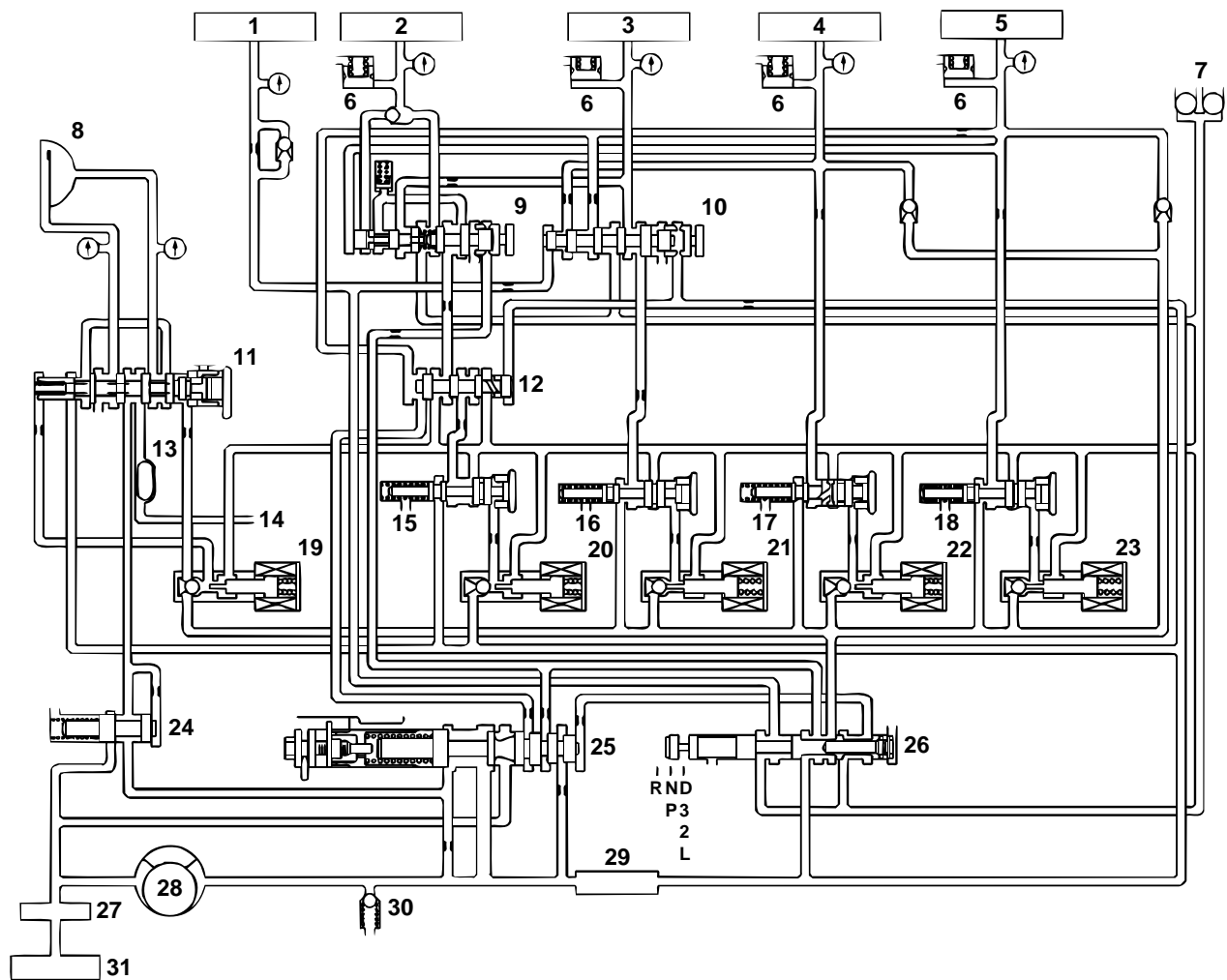
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 : OIL PUMP SUCTION PRESSURE
 : TORQUE CONVERTER CLUTCH PRESSURE

: TORQUE CONVERTER AND LUBRICATION PRESSURE
 : TORQUE CONVERTER CLUTCH SOLENOID VALVE PRESSURE

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|---|---|
| 1. REVERSE CLUTCH | 17. UNDERDRIVE PRESSURE CONTROL VALVE |
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| 5. OVERDRIVE CLUTCH | 21. SECOND SOLENOID VALVE |
| 6. ACCUMULATOR | 22. UNDERDRIVE SOLENOID VALVE |
| 7. CHECK BALL | 23. OVERDRIVE SOLENOID VALVE |
| 8. TORQUE CONVERTER CLUTCH | 24. TORQUE CONVERTER PRESSURE CONTROL VALVE |
| 9. FAIL SAFE VALVE A | 25. REGULATOR VALVE |
| 10. FAIL SAFE VALVE B | 26. MANUAL VALVE |
| 11. TORQUE CONVERTER CLUTCH CONTROL VALVE | 27. OIL FILTER |
| 12. SWITCH VALVE | 28. OIL PUMP |
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| 15. LOW-REVERSE PRESSURE CONTROL VALVE | 31. OIL PAN |
| 16. SECOND PRESSURE CONTROL VALVE | |

4TH GEAR



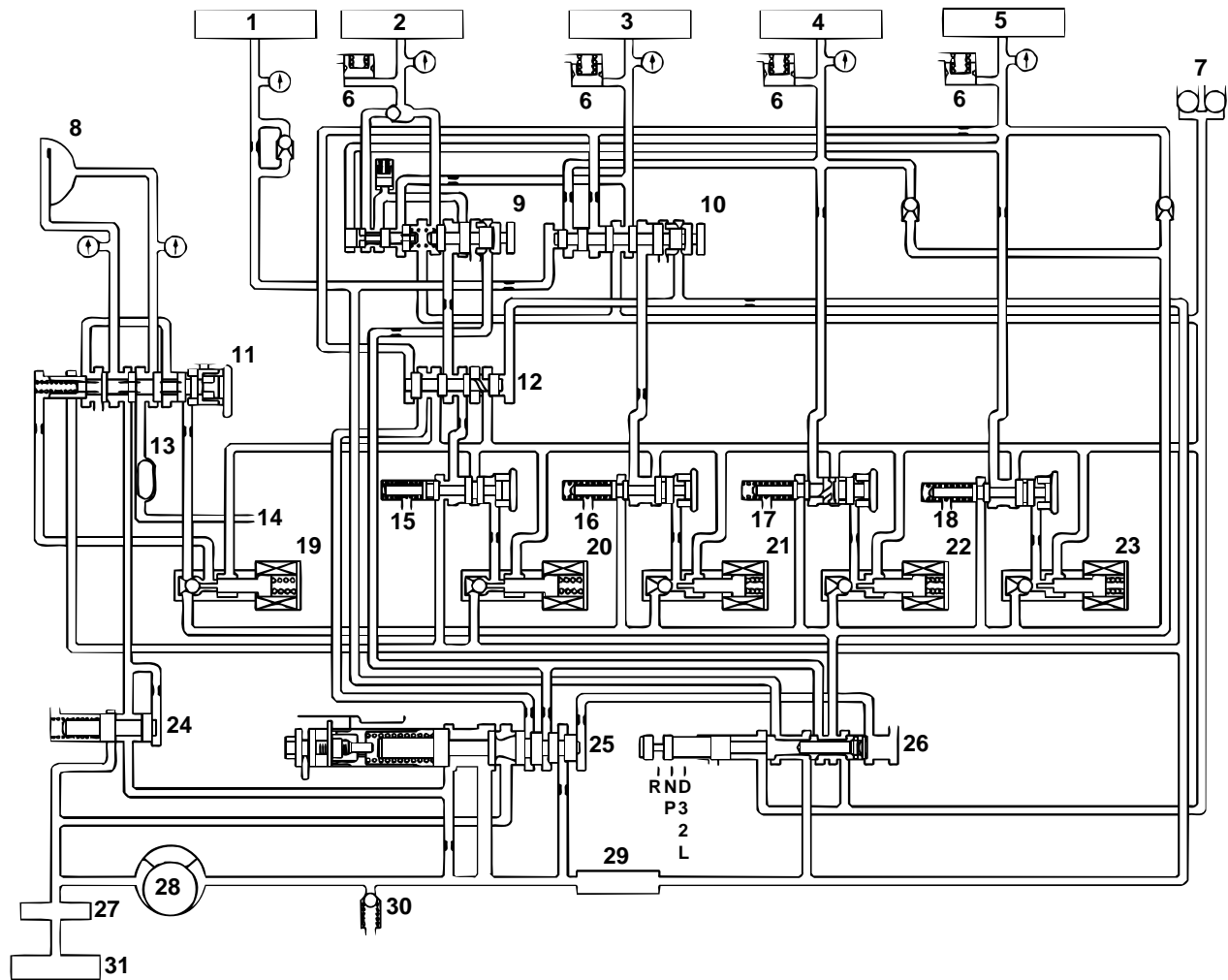
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 [] : TORQUE CONVERTER CLUTCH PRESSURE

[] : TORQUE CONVERTER AND LUBRICATION PRESSURE
 [] : TORQUE CONVERTER CLUTCH SOLENOID VALVE PRESSURE

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|---|---|
| 1. REVERSE CLUTCH | 17. UNDERDRIVE PRESSURE CONTROL VALVE |
| 2. LOW-REVERSE BRAKE | 18. OVERDRIVE PRESSURE CONTROL VALVE |
| 3. SECOND BRAKE | 19. TORQUE CONVERTER CLUTCH SOLENOID VALVE |
| 4. UNDERDRIVE CLUTCH | 20. LOW-REVERSE SOLENOID VALVE |
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| 6. ACCUMULATOR | 22. UNDERDRIVE SOLENOID VALVE |
| 7. CHECK BALL | 23. OVERDRIVE SOLENOID VALVE |
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| 12. SWITCH VALVE | 28. OIL PUMP |
| 13. A/T FLUID COOLER | 29. OIL STRAINER |
| 14. LUBRICATION | 30. RELIEF VALVE |
| 15. LOW-REVERSE PRESSURE CONTROL VALVE | 31. OIL PAN |
| 16. SECOND PRESSURE CONTROL VALVE | |

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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|---|---|
| 1. REVERSE CLUTCH | 17. UNDERDRIVE PRESSURE CONTROL VALVE |
| 2. LOW-REVERSE BRAKE | 18. OVERDRIVE PRESSURE CONTROL VALVE |
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| 14. LUBRICATION | 30. RELIEF VALVE |
| 15. LOW-REVERSE PRESSURE CONTROL VALVE | 31. OIL PAN |
| 16. SECOND PRESSURE CONTROL VALVE | |

: LINE PRESSURE

: OIL PUMP SUCTION PRESSURE

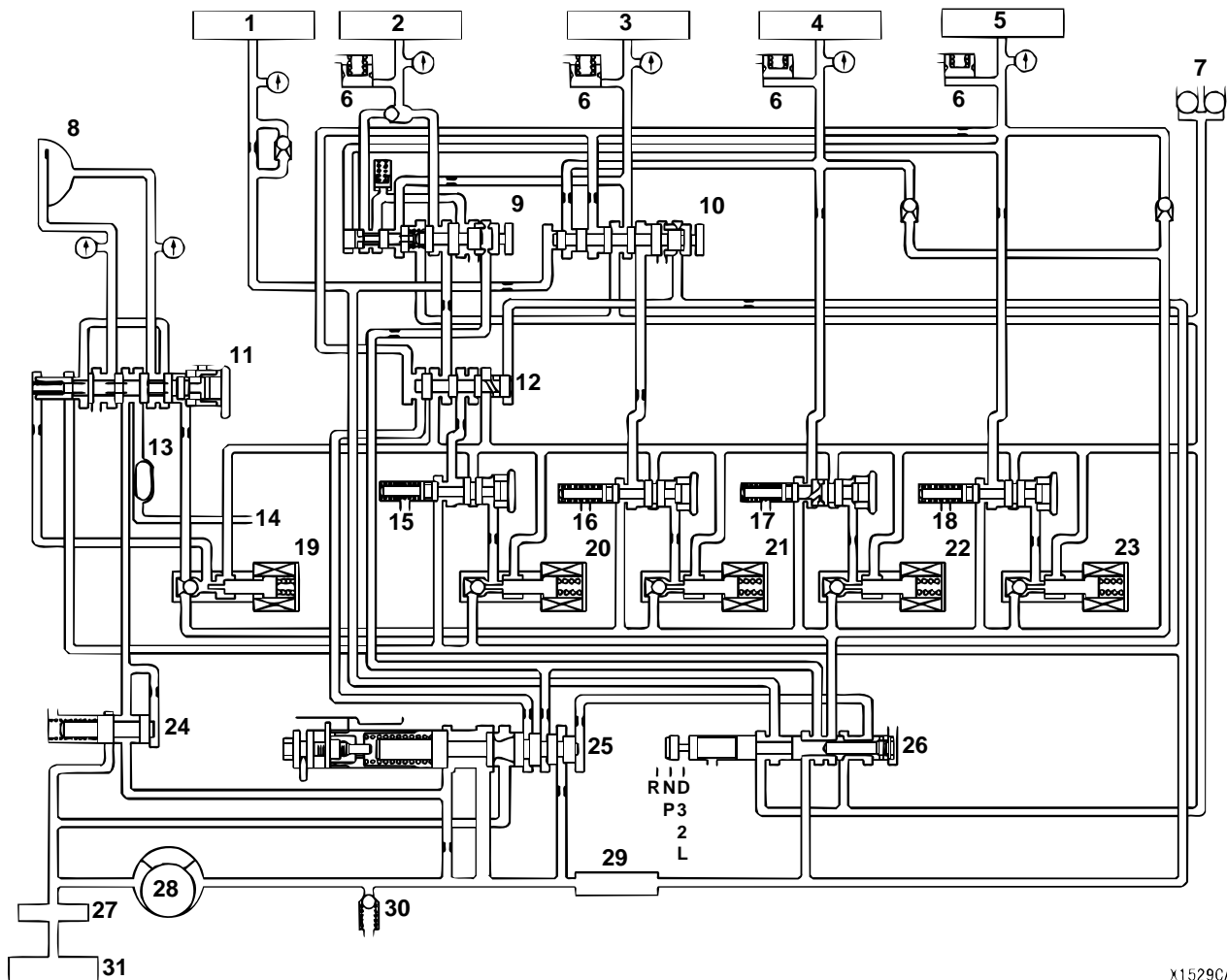
: TORQUE CONVERTER CLUTCH PRESSURE

☐ : TORQUE CONVERTER AND LUBRICATION PRESSURE

☐ : TORQUE CONVERTER CLUTCH SOLENOID VALVE PRESSURE

- ## TSB Revision

FAIL-SAFE (IN CASE OF FAIL-SAFE VALVE B OPERATION)



X15290A

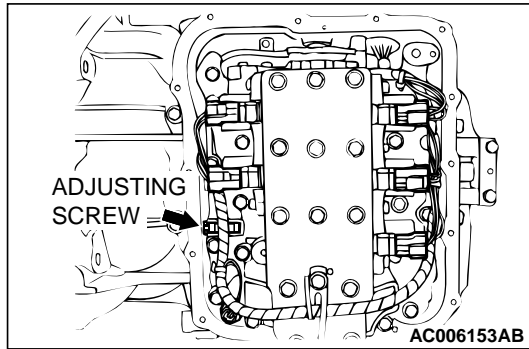
: LINE PRESSURE
 : OIL PUMP SUCTION PRESSURE
 : TORQUE CONVERTER CLUTCH PRESSURE

: TORQUE CONVERTER AND LUBRICATION PRESSURE
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| 15. LOW-REVERSE PRESSURE CONTROL VALVE | 31. OIL PAN |
| 16. SECOND PRESSURE CONTROL VALVE | |

LINE PRESSURE ADJUSTMENT

M1231001700189



1. Drain the A/T fluid.
NOTE: The hydraulic pressure test must be performed before attempting any adjustments.
2. Remove the valve body cover.
3. Turn the adjusting screw shown in the illustration to adjust the line pressure to the standard value. The pressure increases when the screw is turned counterclockwise.
NOTE: When adjusting the line pressure, adjust to the middle of the standard value range.
Standard value: 1.01 – 1.05 MPa (147 – 152 psi)
4. Install the valve body cover. Pour in one quart A/T fluid.
5. Repeat the hydraulic pressure test. (Refer to [P.23Ab-13.](#))
Readjust the line pressure if necessary.

DIAGNOSTIC TROUBLE CODE CHART

M1231007900169

CODE	DIAGNOSIS ITEM		REFERENCE PAGE
11	TP sensor system	Short circuit	P.23Ac-2
12		Open circuit	P.23Ac-18
14		Sensor out of adjustment	P.23Ac-35
15	A/T fluid temperature sensor system	Open circuit	P.23Ac-56
16		Short circuit	P.23Ac-68
21	Crankshaft position sensor system	Open circuit	P.23Ac-77
22	Input shaft speed sensor system	Short circuit/open circuit	P.23Ac-100
23	Output shaft speed sensor system	Short circuit/open circuit	P.23Ac-119
26	Stoplight switch system	Short circuit	P.23Ac-138
27	Park/Neutral position switch system	Open circuit	P.23Ac-147
28		Short circuit	P.23Ac-182
31	Low-reverse solenoid valve system	Short circuit/open circuit	P.23Ac-200
32	Underdrive solenoid valve system	Short circuit/open circuit	P.23Ac-210
33	Second solenoid valve system	Short circuit/open circuit	P.23Ac-219
34	Overdrive solenoid valve system	Short circuit/open circuit	P.23Ac-228
36	Torque converter clutch solenoid system	Short circuit/open circuit	P.23Ac-237
41	1st gear incorrect ratio		P.23Ac-247
42	2nd gear incorrect ratio		P.23Ac-247
43	3rd gear incorrect ratio		P.23Ac-247
44	4th gear incorrect ratio		P.23Ac-247
46	Reverse gear incorrect ratio		P.23Ac-247

CODE	DIAGNOSIS ITEM		REFERENCE PAGE
52	Torque converter clutch solenoid system	Defective system	P.23Ac-258
53		Clutch stuck on	P.23Ac-263
54	A/T control relay system	Short circuit to ground/open circuit	P.23Ac-268

SYMPTOM CHART

M1231030500033

SYMPTOM		INSPECTION PROCEDURE NO.	REFERENCE PAGE
Communication with scan tool is not possible	Communication with all systems is impossible	-	Group 13A, Symptom Procedures P.13Ad-2
	Communication with the PCM only is impossible	-	Group 13A, Symptom Procedures P.13Ad-5
Driving impossible	Engine does not start	1	P.23Ad-2
	Does not move forward	2	P.23Ad-4
	Does not move backward	3	P.23Ad-6
	Does not move (forward or backward)	4	P.23Ad-8
Malfunction when moving selector into gear	Engine stalls when moving selector lever from "N" to "D" or "N" to "R"	5	P.23Ad-9
	Shift shock when shifting from "N" to "D" and long delay	6	P.23Ad-11
	Shift shock when shifting from "N" to "R" and long delay	7	P.23Ad-14
	Shift shock when shifting from "N" to "D" or "N" to "R" and long delay	8	P.23Ad-16
Malfunction when shifting	Shift shock and slipping	9	P.23Ad-18
Does not shift properly	Early or late shifting in all gears	10	P.23Ad-20
	Early or late shifting in some gears	11	P.23Ad-23
Does not shift	No diagnostic trouble codes	12	P.23Ad-25
Malfunction while driving	Poor acceleration	13	P.23Ad-30
	Vibration	14	P.23Ad-32
Vehicle shifts differently with A/C engaged		15	P.23Ad-34
Transaxle won't downshift under load with auto-cruise engaged		16	P.23Ad-45
Vehicle speed signal system		17	P.23Ad-53

SYMPTOM CHART

<A/T FAULTY OPERATION PREVENTION MECHANISM>

M1232003200042

SYMPTOM	INSPECTION PROCEDURE	REFERENCE PAGE
Selector lever can be moved from "P" to "R" position without depressing brake pedal when ignition key is at any position other than "LOCK" (OFF) position.	1	P.23Ad-60
Selector lever cannot be moved from "P" to "R" position with brake pedal depressed when ignition key is at any position other than "LOCK" (OFF) position.	2	P.23Ad-61
Selector lever can be moved from "P" to "R" position with brake pedal depressed when ignition key is at "LOCK" (OFF) position.	3	P.23Ad-62
Selector lever cannot be moved from "P" to "R" position smoothly.	4	P.23Ad-63
Selector lever cannot be moved from "P" to "R" position.	5	P.23Ad-64
Ignition key cannot be turned to "LOCK" (OFF) position when selector lever is at "P" position.	6	P.23Ad-65
Ignition key can be turned to "LOCK" (OFF) position when selector lever is at any position other than "P" position.	7	P.23Ad-67

DATA LIST REFERENCE TABLE

M1231008100177

MUT-II SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION
2ND SOL DUTY	33	Second solenoid valve duty %	Selector lever position: L	Driving at constant speed of 10 km/h (6.2 mph) in 1st gear	100 %
			Selector lever position: 2	Driving at constant speed of 30 km/h (19 mph) in 2nd gear	0 %
			Selector lever position: 3	Driving at constant speed of 50 km/h (31 mph) in 3rd gear	100 %
			Selector lever position: D	Driving at constant speed of 50 km/h (31 mph) in 4th gear	0 %
A/T CONT RLY	54	A/T control relay output voltage	Ignition switch: ON		Battery voltage
A/T TMP SNSR	15	A/T fluid temperature sensor	Warmed up	Drive for 15 minutes or more so that the A/T fluid temperature becomes 70 – 80 °C (158 – 176 °F)	Gradually rises to 70 – 80 °C (158 – 176 °F)

MUT-II SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION
CRANK SENSOR	21	Crankshaft position sensor	Engine: Idling (after warmed up) Selector lever position: P	Accelerator pedal: Fully closed	600 – 900 r/min
				Accelerator pedal: Depressed	Gradually rises from the above value
DUAL PRESS SW	65	Dual pressure switch	Engine: Idling Selector lever position: P, N	A/C switch: ON (while the A/C compressor is in operation)	ON
				A/C switch: OFF	OFF
ENGINE LOAD	57	Engine load (volumetric efficiency)	Selector lever position: P, N	Accelerator pedal: Fully closed → depressed	Data changes
INP SHFT SNSR	22	Input shaft speed sensor	Gear range: 3rd gear	Driving at constant speed of 50 km/h (31 mph)	1,600 – 1,900 r/ min
L/R SOL DUTY	31	Low-reverse solenoid valve duty %	Selector lever position: L	Driving at constant speed of 10 km/h (6.2 mph) in 1st gear	0 %
			Selector lever position: 2	Driving at constant speed of 30 km/h (19 mph) in 2nd gear	100 %
			Selector lever position: 3	Driving at constant speed of 50 km/h (31 mph) in 3rd gear	100 %
			Selector lever position: D	Driving at constant speed of 50 km/h (31 mph) in 4th gear	100 %
O/D SOL DUTY	34	Overdrive solenoid valve duty %	Selector lever position: L	Driving at constant speed of 10 km/h (6.2 mph) in 1st gear	100 %
			Selector lever position: 2	Driving at constant speed of 30 km/h (19 mph) in 2nd gear	100 %
			Selector lever position: 3	Driving at constant speed of 50 km/h (31 mph) in 3rd gear	0 %
			Selector lever position: D	Driving at constant speed of 50 km/h (31 mph) in 4th gear	0 %
OD OFF SIGNAL	66	Overdrive off signal (Auto-cruise ECM signal)	While auto-cruise is engaged	Level road	OFF
				Uphill grade	ON
OUT SHFT SNSR	23	Output shaft speed sensor	Gear range: 3rd gear	Driving at constant speed of 50 km/h (31 mph)	1,600 – 1,900 r/ min

MUT-II SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION
PNP SWITCH	61	Park/Neutral position switch	Ignition switch: ON	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
SHIFT POS	63	Shift position	Selector lever position: L	Driving at constant speed of 10 km/h (6.2 mph) in 1st gear	1st
			Selector lever position: 2	Driving at constant speed of 30 km/h (19 mph) in 2nd gear	2nd
			Selector lever position: 3	Driving at constant speed of 50 km/h (31 mph) in 3rd gear	3rd
			Selector lever position: D	Driving at constant speed of 50 km/h (31 mph) in 4th gear	4th
			Selector lever position: R	Driving at constant speed of 5 km/h (3.1 mph) in reverse gear	REV
			Selector lever position: P, N		PN
STOPLIGHT SW	26	Stoplight switch	Ignition switch: ON	Brake pedal: Depressed	ON
				Brake pedal: Released	OFF
TCC SLIPPAGE	52	Torque converter clutch amount of slippage	Warmed up Selector lever position: 3 Driving at speed of 60 km/h (37 mph) in 3rd gear	Driving at constant speed of 60 km/h (37 mph) Release accelerator pedal (at less than 50 km/h (31 mph)	-10 to 10 r/min
					The value should fluctuate when the accelerator is released.

MUT-II SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION
TCC SOL DUTY	36	Torque converter clutch solenoid valve duty %	Warmed up Selector lever position: 3	Driving at constant speed of 60 km/h (37 mph)	70 – 90 %
			Driving at speed of 60 km/h (38 mph) in 3rd gear	Release accelerator pedal (at less than 50 km/h (31 mph))	70 – 90 % → 0 % Decreases gradually as the vehicle speed decreases
TP SENSOR	11	TP sensor	Ignition switch: ON Engine: Stopped Selector lever position: P	Accelerator pedal: Fully closed	535 – 735 mV
				Accelerator pedal: Depressed	Gradually rises from the above value
				Accelerator pedal: Fully open	4,500 – 5,500 mV
U/D SOL DUTY	32	Underdrive solenoid valve duty %	Selector lever position: L	Driving at constant speed of 10 km/h (6.2 mph) in 1st gear	0 %
			Selector lever position: 2	Driving at constant speed of 30 km/h (19 mph) in 2nd gear	0 %
			Selector lever position: 3	Driving at constant speed of 50 km/h (31 mph) in 3rd gear	0 %
			Selector lever position: D	Driving at constant speed of 50 km/h (31 mph) in 4th gear	100 %
VSS	29	Vehicle speed signal	Selector lever position: 3	Idling in 1st gear (vehicle stopped)	0 km/h (0 mph)
				Driving at constant speed of 50 km/h (31 mph)	50 km/h (31 mph)

ACTUATOR TEST REFERENCE TABLE

M1231008200163

MUT-II SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	TEST CONTENT	INSPECTION REQUIREMENT	NORMAL CONDITION
2ND SOL	03	Second solenoid valve	Drive the solenoid valve specified by the scan tool (MUT-II) at 50 % duty for five seconds. No other solenoid valve should be energized.	<ul style="list-style-type: none">• Ignition switch: ON• Selector lever position: P• Engine: stopped• Throttle opening voltage: Less than one volt	The solenoid should click when activated
A/T RELAY	12	A/T control relay	Actuator test in scope mode, data list No. 54. Control relay is OFF for three seconds.		Data list No. 54 <ul style="list-style-type: none">• During test: 0 V• Normal: Battery voltage [12 V]
L/R SOL	01	Low-reverse solenoid valve	Drive the solenoid valve specified by the scan tool (MUT-II) at 50 % duty for five seconds. No other solenoid valve should be energized.		The solenoid should click when activated
O/D SOL	04	Overdrive solenoid valve			
TCC SOL	06	Torque converter clutch solenoid valve			
U/D SOL	02	Underdrive solenoid valve			

INVECS-II CANCEL COMMAND

M1231009500167

MUT-II SCAN TOOL DISPLAY	ITEM NO.	ITEM	CONTENT	REMARKS
Std. SIFT PATN	14	Standard shift pattern	Stops the INVECS-II control and shifts gears according to the standard shift pattern.	Use this function when performing procedure 8 in the road tests. (Refer to P.23Ab-7) The INVECS-II cancel command will last until the ignition switch is turned from "ON" to "LOCK"(OFF) or vice versa.

PCM TERMINAL VOLTAGE REFERENCE CHART FOR TRANSAXLE OPERATION

M1231008400167

1	2	3	4			5	6		7	8	41	42	43			44	45	46	71	72	73	74			75	76	77	101	102	103	104			105	106	107														
9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	47	48	49	50	51	52	53	54	55	56	57	78	79	80	81	82	83	84	85	86	87	88	89	108	109	110	111	112	113	114	115	116	117	118	119	120
24	25	26	27	28	29	30	31	32	33	34	35	58	59	60	61	62	63	64	65	66	90	91	92	93	94	95	96	97	98	121	122	123	124	125	126	127	128	129	130											

ACX01182 AB

TERMINAL NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION
45	Crankshaft position sensor	Engine: Idling		1.5 – 2.5 V
46	TP sensor supplied voltage	Ignition switch: ON		4.9 – 5.1 V
50	A/T control relay	Ignition switch: LOCK (OFF)		1 V or less
		Ignition switch: ON		10 – 12 V
57	Throttle position sensor ground	Always		0.5 V or less
75	Auto-cruise signal	Ignition switch: ON		Battery voltage
76	Ground	Always		1 V or less
77	Solenoid valve power supply	Ignition switch: LOCK (OFF)		1 V or less
		Ignition switch: ON		Battery voltage
78	TP sensor	Ignition switch: ON (check for smooth voltage increase as throttle is moved from idle position to wide open throttle)	Idle	0.6 – 0.8 V
			Wide open throttle	4.5 – 5.5 V
88	Ground	Always		1 V or less
89	Solenoid valve power supply	Ignition switch: LOCK (OFF)		1 V or less
		Ignition switch: ON		Battery voltage
97	Ground	Always		1 V or less
101	Park/Neutral position switch: P	<ul style="list-style-type: none"> Ignition switch: ON Selector lever position: P 		Battery voltage
		<ul style="list-style-type: none"> Ignition switch: ON Selector lever position: Other than above 		1 V or less
102	Park/Neutral position switch: D	<ul style="list-style-type: none"> Ignition switch: ON Selector lever position: D 		Battery voltage
		<ul style="list-style-type: none"> Ignition switch: ON Selector lever position: Other than above 		1 V or less
103	Input shaft speed sensor	<ul style="list-style-type: none"> Measure between terminals 16 and 103 with an oscilloscope. Engine: 2,000 r/min Gear range: 3rd gear 		Refer to P.23Ab-35 , Inspection Procedure Using an Oscilloscope.

TERMINAL NO.	INSPECTION ITEM	INSPECTION REQUIREMENT	NORMAL CONDITION
104	Output shaft speed sensor	<ul style="list-style-type: none"> Measure between terminals 16 and 104 with an oscilloscope. Engine: 2,000 r/min Gear range: 3rd gear 	Refer to P.23Ab-35 , Inspection Procedure Using an Oscilloscope.
106	Second solenoid valve	<ul style="list-style-type: none"> Gear range: 2nd gear 	Battery voltage
		<ul style="list-style-type: none"> Engine: Idling Selector lever position: P 	6 – 9 V
107	Torque converter clutch solenoid valve	<ul style="list-style-type: none"> Engine: Idling Gear range: 1st gear 	Battery voltage
108	Park/Neutral position switch: R	<ul style="list-style-type: none"> Ignition switch: ON Selector lever position: R 	Battery voltage
		<ul style="list-style-type: none"> Ignition switch: ON Selector lever position: Other than above 	1 V or less
109	Park/Neutral position switch: 3	<ul style="list-style-type: none"> Ignition switch: ON Selector lever position: 3 	Battery voltage
		<ul style="list-style-type: none"> Ignition switch: ON Selector lever position: Other than above 	1 V or less
110	Park/Neutral position switch: L	<ul style="list-style-type: none"> Ignition switch: ON Selector lever position: L 	Battery voltage
		<ul style="list-style-type: none"> Ignition switch: ON Selector lever position: Other than above 	1 V or less
120	Underdrive solenoid valve	<ul style="list-style-type: none"> Engine: Idling Gear range: 1st gear 	Battery voltage
		<ul style="list-style-type: none"> Engine: Idling Selector lever position: P 	6 – 9 V
121	Park/Neutral position switch: N	<ul style="list-style-type: none"> Ignition switch: ON Selector lever position: N 	Battery voltage
		<ul style="list-style-type: none"> Ignition switch: ON Selector lever position: Other than above 	1 V or less
122	Park/Neutral position switch: 2	<ul style="list-style-type: none"> Ignition switch: ON Selector lever position: 2 	Battery voltage
		<ul style="list-style-type: none"> Ignition switch: ON Selector lever position: Other than above 	1 V or less
123	Stoplight switch	<ul style="list-style-type: none"> Ignition switch: ON Brake pedal: Depressed 	Battery voltage
		<ul style="list-style-type: none"> Ignition switch: ON Brake pedal: Released 	1 V or less
124	A/T fluid temperature sensor	A/T fluid temperature: 20°C (68°F)	3.8 – 4.0 V
		A/T fluid temperature: 40°C (104°F)	3.2 – 3.4 V
		A/T fluid temperature: 80°C (176°F)	1.7 – 1.9 V

TERMINAL NO.	INSPECTION ITEM	INSPECTION REQUIREMENT	NORMAL CONDITION
129	Low-reverse solenoid valve	• Selector lever position: P	Battery voltage
		• Engine: Idling • Gear range: 2nd gear	6 – 9 V
130	Overdrive solenoid valve	• Gear range: 3rd gear	Battery voltage
		• Engine: Idling • Selector lever position: P	6 – 9 V

PCM TERMINAL RESISTANCE AND CONTINUITY INSPECTION CHART

M1231013400141

107	120	130
106	119	129
105	118	128
104	117	127
103	116	126
102	115	125
101	114	124
100	113	123
99	112	122
98	111	121
97	110	120
96	109	119
95	108	118
94	107	117
93	106	116
92	105	115
91	104	114
90	103	113
89	102	112
88	101	111
87	100	110
86	99	109
85	98	108
84	97	107
83	96	106
82	95	105
81	94	104
80	93	103
79	92	102
78	91	101
77	90	100
76	89	99
75	88	98
74	87	97
73	86	96
72	85	95
71	84	94
70	83	93
69	82	92
68	81	91
67	80	90
66	79	89
65	78	88
64	77	87
63	76	86
62	75	85
61	74	84
60	73	83
59	72	82
58	71	81
57	70	80
56	69	79
55	68	78
54	67	77
53	66	76
52	65	75
51	64	74
50	63	73
49	62	72
48	61	71
47	60	70
46	59	69
45	58	68
44	57	67
43	56	66
42	55	65
41	54	64
40	53	63
39	52	62
38	51	61
37	50	60
36	49	59
35	48	58
34	47	57
33	46	56
32	45	55
31	44	54
30	43	53
29	42	52
28	41	51
27	40	50
26	39	49
25	38	48
24	37	47
23	36	46
22	35	45
21	34	44
20	33	43
19	32	42
18	31	41
17	30	40
16	29	39
15	28	38
14	27	37
13	26	36
12	25	35
11	24	34
10	23	33
9	22	32
8	21	31
7	20	30
6	19	29
5	18	28
4	17	27
3	16	26
2	15	25
1	14	24

ACX01978AC

NOTE: The PCM connectors should be disconnected for this inspection.

TERMINAL NO.	INSPECTION ITEM	NORMAL CONDITION (CHECK CONDITION)
57 – 124	A/T fluid temperature sensor	16.7 – 20.5 kΩ [at 0 °C (32 °F)]
		7.3 – 8.9 kΩ [at 20 °C (68 °F)]
		3.4 – 4.2 kΩ [at 40 °C (104 °F)]
		1.9 – 2.2 kΩ [at 60 °C (140 °F)]
		1.0 – 1.2 kΩ [at 80 °C (176 °F)]
		0.57 – 0.69 kΩ [at 100 °C (212 °F)]

INSPECTION PROCEDURE USING AN OSCILLOSCOPE

M1231008500175

TERMINAL NO.	INSPECTION ITEM	INSPECTION REQUIREMENT	NORMAL CONDITION (WAVEFORM SAMPLE)
45	Crankshaft position sensor	Selector lever position: N	Idling (Vehicle stopped)
103	Input shaft speed sensor	Selector lever position: 3	Driving at constant speed of 50 km/h (31 mph) in 3rd gear (1,600 – 1,900 r/min)
104	Output shaft speed sensor		
80	Vehicle speed signal		Waveform C

TERMINAL NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION (WAVEFORM SAMPLE)
129	Low-reverse solenoid valve	<ul style="list-style-type: none"> Ignition switch: ON Selector lever position: P Engine: Stopped Throttle (Accelerator) opening angle: Less than 1 Volt 	Force drive each solenoid valve (Actuator test)	Waveform D
120	Underdrive solenoid valve			
106	Second solenoid valve			
130	Overdrive solenoid valve			
107	Torque converter clutch control solenoid			

Waveform sample