For Sasha

1994 ENGINE PERFORMANCE

Self-Diagnostics

INTRODUCTION

If no faults were found while performing BASIC DIAGNOSTIC PROCEDURES, proceed with self-diagnostics. If no trouble codes or only pass codes are present after entering self-diagnostics, proceed to **H - TESTS W/O CODES** article in the ENGINE PERFORMANCE section for diagnosis by symptom (i.e., ROUGH IDLE, NO START, etc.).

DIAGNOSIS & TESTING

SYSTEM DIAGNOSIS

System diagnosis can be accomplished using an appropriate scan tester, a voltmeter or the Malfunction Indicator Light (MIL). See **RETRIEVING CODES** . Engine Control Module (ECM) monitors several different engine control system circuits. If an abnormal input signal occurs, a trouble code is stored in ECM memory and assigned a trouble code number. Each circuit has its own trouble code number and message. A specific trouble code indicates a particular system failure, but does not indicate that cause of failure is necessarily within system.

A trouble code does not condemn any specific component; it simply points out a probable malfunctioning area. If a trouble code is set, ECM will turn on MIL. System malfunctions encountered are identified as either hard failures or intermittent failures as determined by ECM.

Hard Failures

Hard failures cause MIL to glow and remain on until malfunction is repaired. If MIL comes on and remains on (MIL may flash) during vehicle operation, cause of malfunction may be determined by using trouble codes. See **TROUBLE CODES** . If a sensor fails, ECM will use a substitute value in its calculations to continue engine operation. In this condition, (limp-in mode) vehicle is functional, but loss of good driveability may result.

Intermittent Failures

Intermittent failures may cause MIL to flicker or glow and go out after intermittent trouble code goes away. However, corresponding trouble code will be retained in ECM memory. If related trouble code does not reoccur within a certain time frame, related trouble code will be erased from ECM memory. Intermittent failures may be caused by a sensor, connector or wiring problems. See INTERMITTENTS in **H - TESTS W/O CODES** article in the ENGINE PERFORMANCE Section.

SERVICE PRECAUTIONS

Before proceeding with diagnosis, following precautions must be observed:

- Ensure vehicle has a fully charged battery and functional charging system.
- Visually inspect connectors and circuit wiring being worked on.
- **DO NOT** disconnect battery or ECM. This will erase any trouble codes stored in ECM.

- **DO NOT** cause short circuits when performing electrical tests. This will set additional trouble codes, making diagnosis of original problem more difficult.
- **DO NOT** use a test light in place of a voltmeter.
- When checking for spark, ensure coil wire is NOT more than 1/4" from chassis ground. If coil wire is more than 1/4" from chassis ground, damage to vehicle electronics and/or ECM may result.
- **DO NOT** prolong testing of fuel injectors. Engine may hydrostatically (liquid) lock.
- When a vehicle has multiple trouble codes, always repair lowest number trouble code first.

RETRIEVING CODES

Manufacturers recommend using a scan tester to retrieve codes. If scan tester is not available, trouble codes may be retrieved using a voltmeter or Malfunction Indicator Light (MIL). See **RETRIEVING CODES** table for code retrieval method available by model and proceed to appropriate method.

RETRIEVING CODES

Application	Use Voltmeter	Use MIL
All Models	Yes	No

Using Scan Tester

1. Refer to manufacturer's operation manual for instructions in use of scan tester. Before entering on-board diagnostics, see **SERVICE PRECAUTIONS** . Turn ignition switch to OFF position. Locate Data Link Connector (DLC), next to fuse block. Connect power source terminal of scan tester to cigarette lighter socket.
2. Connect scan tester to DLC. Turn ignition switch to ON position. Read and record scan tester self-diagnostic output. Perform necessary repair(s). See **TROUBLE CODES** .

Using Voltmeter

1. Before entering on-board diagnostics, see **SERVICE PRECAUTIONS** . Turn ignition switch to OFF position. Locate Data Link Connector (DLC), next to fuse block. Connect volt-meter positive lead to DLC self-diagnostic test mode terminal and negative lead to either DLC ground terminal. See **Fig. 1** .
2. Turn ignition switch to ON position. Disclosure of ECM memory will begin. If 2 or more systems are non-functional, they are indicated by order of increasing code number. Indication is made by 12-volt pulses of voltmeter pointer. A constant repetition of short 12-volt pulses indicates system is normal. If system is abnormal, voltmeter will pulse between zero and 12 volts.
3. Signals will appear on voltmeter as long and short 12-volt pulses. Long pulses represent tens; short pulses represent ones. For example, 4 long pulses and 3 short pulses indicate Code 43. After recording trouble code(s), perform necessary repair(s) to indicated circuit(s). See **TROUBLE CODES** .

Using Malfunction Indicator Light (MIL)

1. Before entering on-board diagnostics, see **SERVICE PRECAUTIONS** . Turn ignition switch to OFF position. Locate Data Link Connector (DLC), next to fuse block. Connect Diagnostic Harness (MB99159) between DLC self-diagnostic output terminal and chassis ground. See **Fig. 1** .
2. Turn ignition switch to ON position. Disclosure of ECM memory will begin. If 2 or more systems are non-functional, they are indicated by order of increasing code number. Indication is made by MIL flashes. A constant repetition of short flashes indicates system is normal.

3. If system is abnormal, signals will appear on MIL as long and short flashes. Long flashes represent tens; short flashes represent ones. For example, 4 long flashes and 3 short flashes indicate Code 43. After recording trouble code(s), perform necessary repair(s) to indicated circuit(s). See **TROUBLE CODES** .

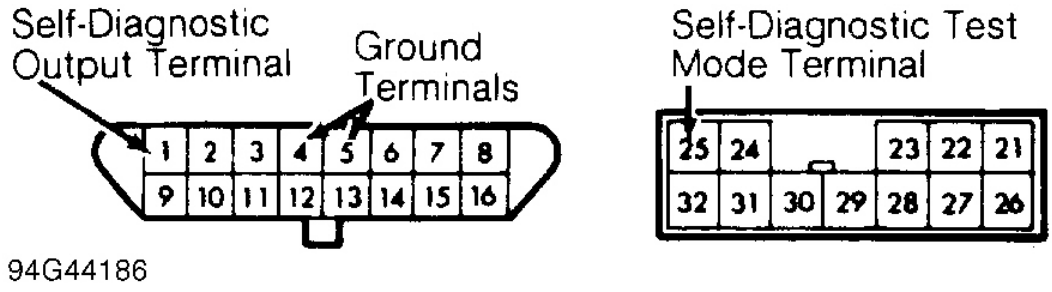

Fig. 1: Identifying Data Link Connector (DLC) Terminals
Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.

TROUBLE CODES

NOTE: Codes listed in TROUBLE CODE INDEX table are not used on all vehicles.

NOTE: If MIL stays on, ECM may be faulty.

TROUBLE CODE INDEX

Code	Description	Possible Cause
11	Heated Oxygen Sensor (HO2S) (4-Wire Oxygen Sensor)	Faulty O2S, Connector Or Harness, Low Or High Fuel Pressure, Defective Injector(s), Intake Air Leaks
12	Airflow Sensor	Faulty Airflow Sensor, Connector Or Harness
13	Intake Air Temperature Sensor	Faulty IAT Sensor, Connector Or Harness
14	Throttle Position Sensor	Faulty TP Sensor, Connector Or Harness, Closed Throttle Position Switch
21	Engine Coolant Temperature (ECT) Sensor	Faulty ECT Sensor, Connector Or Harness
22	Crankshaft Position (CKP) Sensor	Faulty Distributor Assembly (If Equipped), Faulty CKP Sensor, Connector Or Harness
23	Camshaft Position Sensor	Faulty Distributor Assembly (If Equipped), Faulty CMP Sensor, Connector Or Harness
24	Vehicle Speed Sensor	Faulty VSS, Connector Or Harness
25	Barometric Pressure Sensor	Faulty BARO Pressure Sensor, Connector Or Harness
32	MAP Sensor	Faulty MAP Sensor, Connector Or Harness
36	Ignition Timing Adjustment Signal	Connector Or Harness
41	Fuel Injector	Low Or High Injector Coil Resistance, Connector Or Harness
43	EGR Temperature Sensor	Faulty EGR Valve, Faulty EGR Temperature Sensor, Faulty

		EGR Solenoid, Faulty EGR Vacuum Control, Connector Or Harness
55	Idle Air Control Position Sensor	Faulty IAC Valve Position Sensor, Faulty IAC Motor Assembly, Faulty ECM, Connector Or Harness
59	Rear Oxygen Sensor (O2S)	Faulty O2S Sensor, Faulty O2S Sensor Heater, Faulty ECM, Connector Or Harness
69	Rear Oxygen Sensor (O2S)	Faulty O2S Sensor, Faulty O2S Sensor Heater, Faulty ECM, Connector Or Harness

CLEARING CODES

CAUTION: When battery is disconnected, vehicle computer and memory systems may lose memory data. Driveability problems may exist until computer systems have completed a relearn cycle. See COMPUTER RELEARN PROCEDURES article in the GENERAL INFORMATION Section before disconnecting battery.

To clear codes using a scan tester, refer to owners manual supplied with scan tester. If scan tester is not available, codes may also be cleared by disconnecting negative battery cable for at least 15 seconds, allowing ECM to clear trouble codes. Reconnect negative battery cable and check for codes to confirm repair.

ECM LOCATION

ECM LOCATION

Application	Location
All Models	Behind Right Side Of Instrument Panel

TERMINAL IDENTIFICATION

NOTE: The following terminals are shown as viewed from component side of connector.

TERMINAL IDENTIFICATION DIRECTORY

Connector	See Figure
Airflow Sensor	Fig. 2
CKP/CMP Sensor	Fig. 3
Coolant Temperature Sensor	Fig. 4
ECM	Fig. 5
EGR Temperature Sensor	Fig. 6
Fuel Injector	Fig. 7
Idle Air Control Valve Position Sensor	Fig. 8
Idle Speed Control Motor & Position Sensor	Fig. 9 & Fig. 10
Ignition Coil	Fig. 11
Induction Control Valve Position Sensor	Fig. 12
Knock Sensor	Fig. 13

MAP Sensor	Fig. 14
MFI Relay	Fig. 15
Oxygen Sensor (O2S)	Fig. 16
Throttle Position Sensor	Fig. 17
Traction Control Vacuum Solenoid	Fig. 18
Traction Control Vent Solenoid	Fig. 19
Transaxle Control Module	Fig. 20

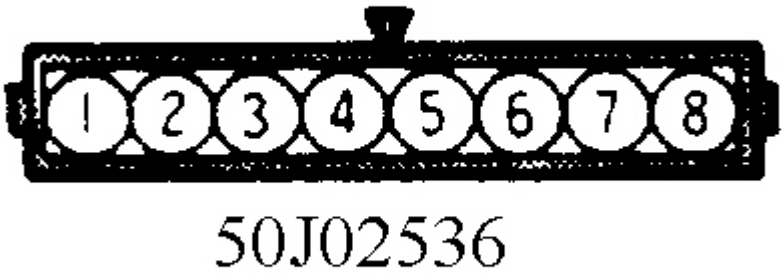

Fig. 2: Identifying Airflow Sensor Terminals
Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.

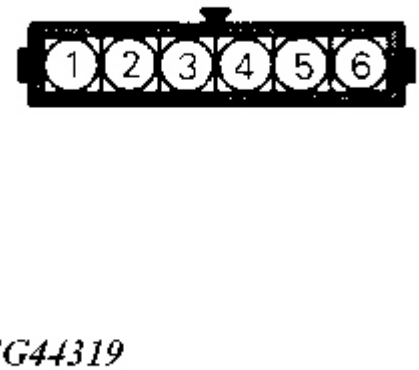

Fig. 3: Identifying CKP/CMP Sensor Terminals
Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.

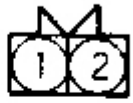

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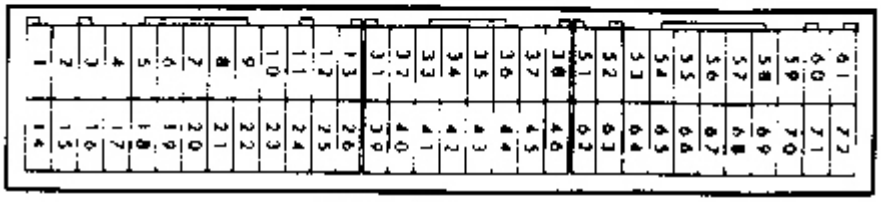
Fig. 4: Engine Coolant Temperature (ECT) Sensor Terminal ID
Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.



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MIRAGE & SUMMIT

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Fig. 5: Identifying ECM Terminals
Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.

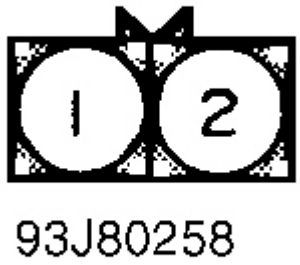

Fig. 6: Identifying EGR Temperature Sensor Terminals
Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.

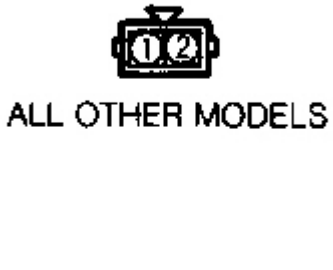

Fig. 7: Identifying Fuel Injector Terminals
Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.

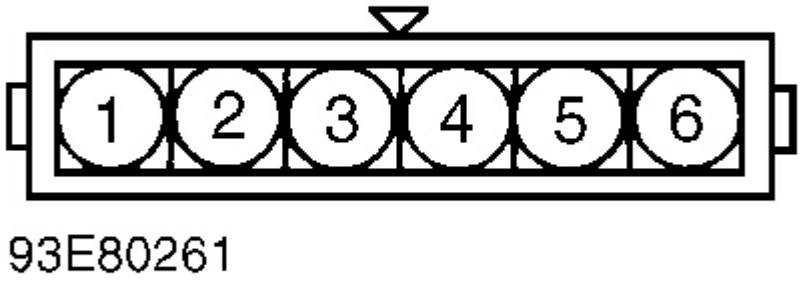

Fig. 8: Idle Air Control Valve Position Sensor Terminal ID
Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.

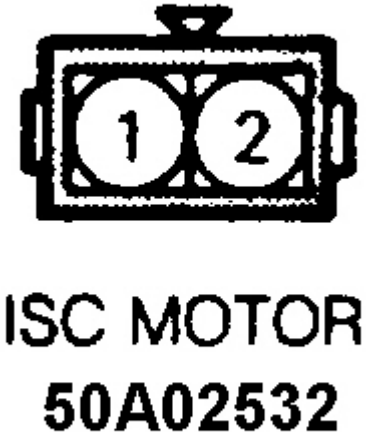

Fig. 9: Idle Speed Control Motor Sensor Terminal ID
Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.

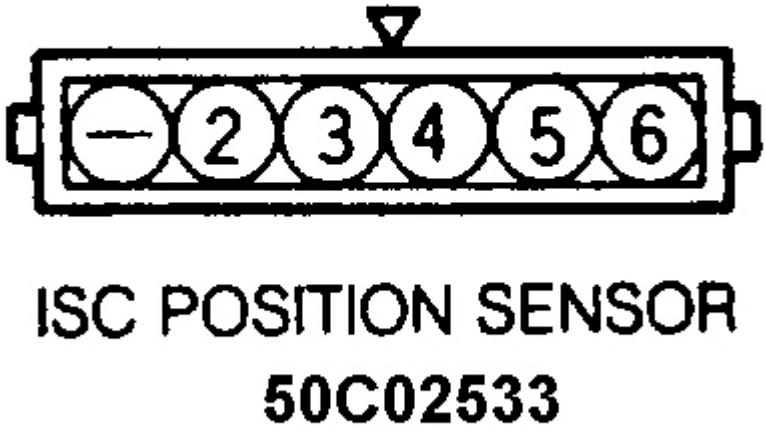

Fig. 10: Idle Speed Control Position Sensor Terminal ID
Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.

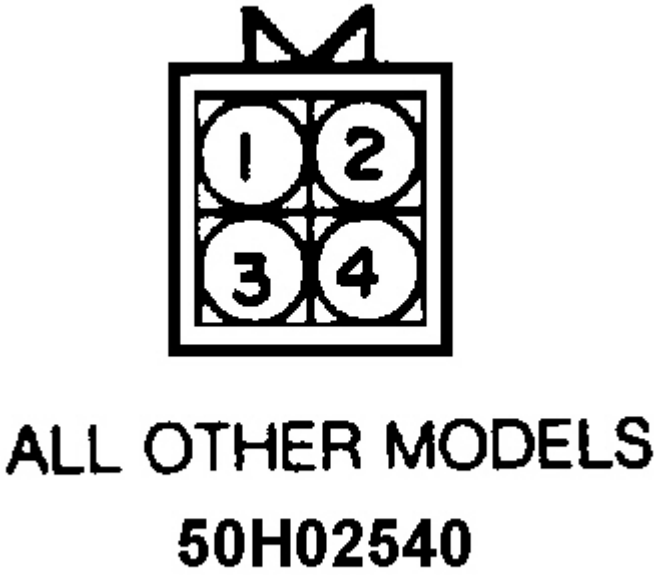

Fig. 11: Identifying Ignition Coil Terminals

Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.

Fig. 12: Induction Control Valve Position Sensor Terminal ID
Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.

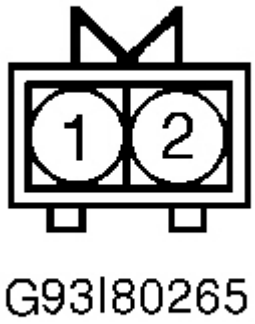

Fig. 13: Identifying Knock Sensor Terminals
Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.

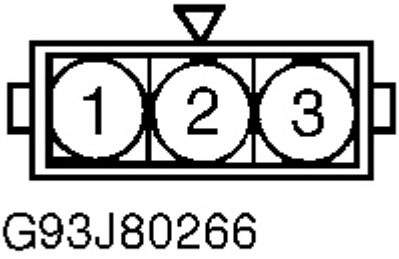

Fig. 14: Identifying Map Sensor Terminals
Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.

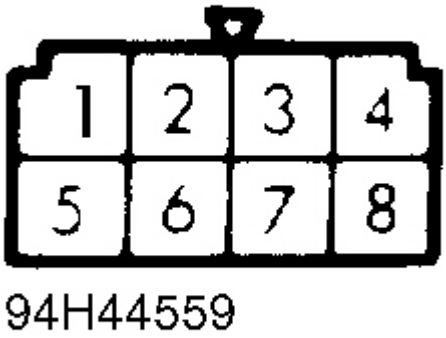

Fig. 15: Identifying MFI Relay Terminals
Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.

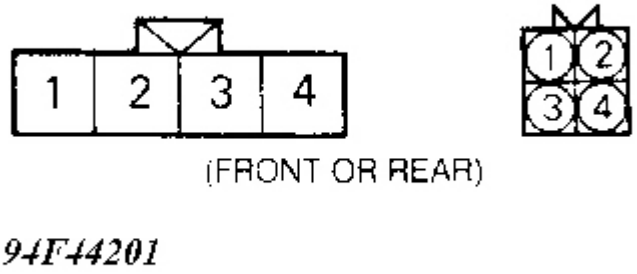

Fig. 16: Identifying Oxygen Sensor (O2S) Terminals
Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.

Fig. 17: Identifying Throttle Position Sensor Terminals
Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.

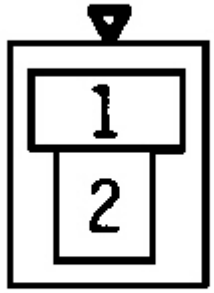

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Fig. 18: Identifying Traction Control Vacuum Solenoid Terminals
Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.

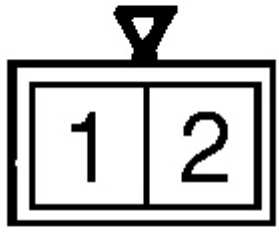

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Fig. 19: Identifying Traction Control Vent Solenoid Terminals
Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.

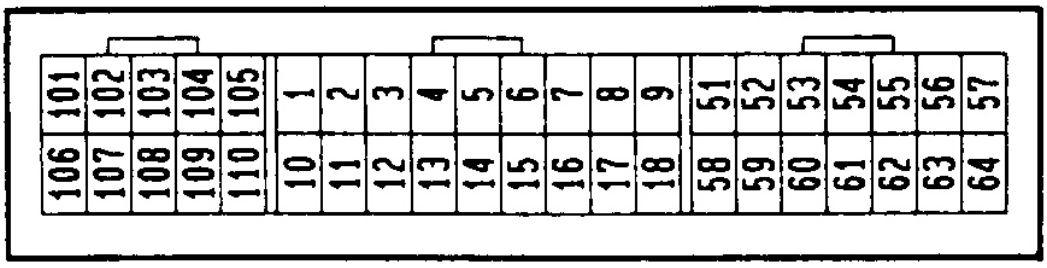

Fig. 20: Identifying Transaxle Control Module Terminals
Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.

DIAGNOSTIC TESTS

CAUTION: Ensure ignition switch is in OFF position when performing resistance tests.

NOTE: Perform all resistance and voltage tests using a Digital Volt-Ohmmeter (DVOM) with a minimum 10-megohm impedance, unless stated otherwise in test procedures.

NOTE: For wire color identification at ECM terminals, see appropriate pin voltage chart in J - PIN VOLTAGE CHARTS article in the ENGINE PERFORMANCE Section.

Clear trouble codes after each repair. See **CLEARING CODES** under SELF-DIAGNOSTIC SYSTEM. Recheck for codes to confirm repair. See **RETRIEVING CODES** under SELF-DIAGNOSTIC SYSTEM.

CODE 11: HEATED OXYGEN SENSOR (HO2S) (4-WIRE OXYGEN SENSOR)

NOTE: For component terminal identification, see TERMINAL IDENTIFICATION . For wiring diagrams, see L - WIRING DIAGRAMS article in the ENGINE PERFORMANCE Section.

1. If using scan tester, go to step 3). Disconnect HO2S connector. Install Test Harness (MB998464) between HO2S and HO2S connector. On all models, use DVOM to check resistance between specified HO2S connector heater terminals. See **HO2S CONNECTOR TERMINAL IDENTIFICATION** table. HO2S resistance should be 20 ohms at 68°F (20°C). If resistance is not as specified, replace HO2S. If resistance is as specified, go to next step.
2. Using jumper wires, apply 12 volts to specified HO2S connector heater terminals. See **HO2S CONNECTOR TERMINAL IDENTIFICATION** table. Using DVOM, check voltage between specified HO2S connector output terminals, while repeatedly racing engine. If voltage is not .6-1.0 volt, replace HO2S. If voltage is .6-1.0 volt, go to step 5).

HO2S CONNECTOR TERMINAL IDENTIFICATION

Application	(1) Heater Terminals No.	Output Terminals No.
1.5L	1 & 3	2 & 4
1.8L	2 & 4	1 & 3
(1) First terminal listed is positive. Second terminal listed is negative.		

3. Start and warm engine to operating temperature. Using scan tester, read HO2S voltage. While monitoring scan tester, accelerate to 4000 RPM. Suddenly decelerate. Scan tester should read .3 volt or less. Suddenly accelerate. Scan tester should read .5-1.0 volt. If voltage is not as specified, replace HO2S. If voltage is as specified, go to next step.
4. While monitoring scan tester, accelerate to 2000 RPM and decelerate to 700 RPM (idle). Scan tester should switch between .6-1.0 volt and .4 volt or less. If voltage is not as specified, replace HO2S. If voltage is as specified, go to next step.
5. Disconnect HO2S connector. Disconnect MFI relay connector. Using DVOM, check for continuity between specified HO2S connector terminals and MFI connector terminals. See **HO2S-TO-MFI WIRING HARNESS TERMINAL IDENTIFICATION** table. If continuity does not exist, repair wiring harness as necessary. If continuity exists, go to step 7).

HO2S-TO-MFI WIRING HARNESS TERMINAL IDENTIFICATION

Application	HO2S Terminal No.	MFI Terminal No.
1.5L	1	2
1.8L	2	2

6. Turn ignition switch to ON position. Using DVOM, check voltage between specified HO2S connector terminal and chassis ground. If system voltage does not exist, repair wiring harness as necessary. If system voltage exists, go to next step.
7. Using DVOM, check for continuity between specified HO2S connector terminals and ECM connector terminals. See **HO2S-TO-ECM WIRING HARNESS TERMINAL IDENTIFICATION** table. If continuity does not exist on either circuit, repair appropriate circuit for open or short to ground as necessary. If continuity exists, go to next step.

HO2S-TO-ECM WIRING HARNESS TERMINAL IDENTIFICATION

Application	HO2S Terminal No.	ECM Terminal No.
1.5L	3	56
	4	35
1.8L	3	5
	4	35

8. Disconnect HO2S connector. Using DVOM, check for continuity between specified HO2S connector terminal and chassis ground. See **HO2S CONNECTOR GROUND CIRCUIT IDENTIFICATION** table. If continuity does not exist, repair wiring harness as necessary. If no system or component malfunctions occur in preceding tests, condition required to set trouble code is not present at this time. Test is complete. Intermittent problem may exist. See **H - TESTS W/O CODES** article in the ENGINE PERFORMANCE Section.

HO2S CONNECTOR GROUND CIRCUIT IDENTIFICATION

Application	Terminal No.

1.5L	2
1.8L	1

9. Disconnect ECM connector. Turn ignition switch to ON position. Using DVOM, check voltage between ECM connector terminal No. 35 and chassis ground. If system voltage does not exist, repair wiring harness as necessary. If system voltage exists and no system or component malfunctions occur in preceding tests, condition required to set trouble code is not present at this time. Test is complete. Intermittent problem may exist. See **H - TESTS W/O CODES** article in the ENGINE PERFORMANCE Section.

CODE 12: AIRFLOW SENSOR

NOTE: For component terminal identification, see TERMINAL IDENTIFICATION . For wiring diagrams, see L - WIRING DIAGRAMS article in the ENGINE PERFORMANCE Section.

NOTE: Procedures are provided by manufacturer for component testing using an engine analyzer with oscilloscope capability. Refer to manufacturer's operation manual for instructions in use of oscilloscope. If using a scan tester, go to step 3).

1. If using scan tester, go to step 3). Disconnect Airflow Sensor (AFS) connector. Install Test Harness (MB991348) between AFS and AFS connector. Using engine analyzer with oscilloscope capability, connect special patterns probe to AFS connector terminal No. 3.
2. Start engine. Verify that wave form high frequency and low frequency patterns are of approximately the same length (time). See **Fig. 21** . Verify that wave length decreases and frequency increases as engine RPM increases. If conditions are not as specified, replace AFS. If conditions are as specified, go to step 4).

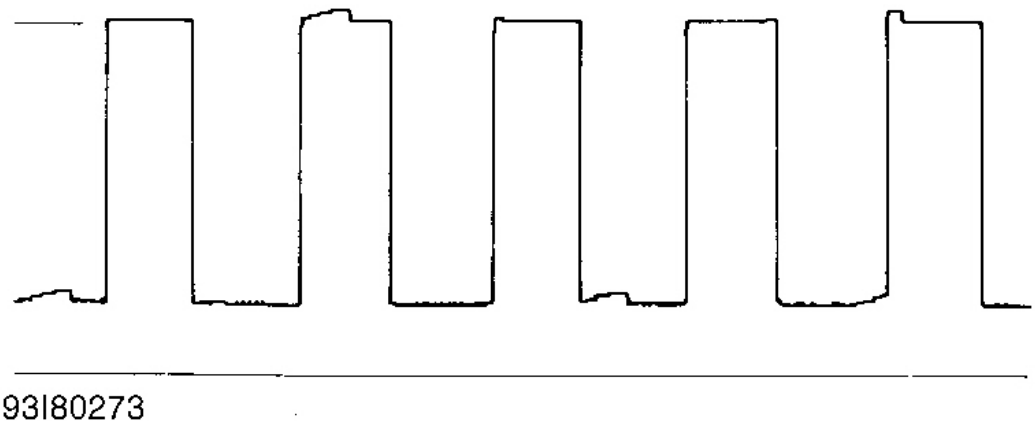

Fig. 21: Identifying Known-Good Airflow Sensor Wave Pattern
Courtesy of MITSUBISHI MOTOR SALES OF AMERICA

3. Warm vehicle to normal operating temperature. Ensure headlights and accessories are off. Ensure steering wheel is in straight-ahead position. Using scan tester, read Airflow Sensor (AFS) volume (frequency) value. See **AIRFLOW SENSOR VALUES** table. Frequency should increase when engine is raced. If values are not as specified, replace AFS. If values are as specified, go to next step.

AIRFLOW SENSOR VALUES

Application	Hz @ 700 RPM	Hz @ 2000 RPM
1.8L	23-49	51-91

4. Disconnect AFS connector and MFI relay connector. Using DVOM, check for continuity between AFS connector terminal No. 4 and MFI relay connector terminal No. 3. If continuity does not exist, repair wiring harness as necessary. If continuity exists, go to next step.
5. Using DVOM, check for continuity between chassis ground and AFS connector terminal No. 5. If continuity does not exist, repair wiring harness as necessary. If continuity exists, go to next step.
6. Disconnect AFS connector and ECM connector. Using DVOM, check for continuity between specified AFS connector terminal and ECM connector terminal. See **AFS-TO-ECM WIRING HARNESS TERMINAL IDENTIFICATION** table. If continuity does not exist on specified circuit (s), repair appropriate circuit for open or short to ground as necessary. If continuity exists, go to next step.

AFS-TO-ECM WIRING HARNESS TERMINAL IDENTIFICATION

Application	AFS Terminal No.	ECM Terminal No.
All Models	3	70
	7	19

7. Turn ignition switch to ON position. Using DVOM, check voltage between chassis ground and AFS harness connector terminal No. 3. If voltage is not 4.8-5.2 volts, replace ECM. If voltage is as specified, condition required to set trouble code is not present at this time. Test is complete. Intermittent problem may exist. See **H - TESTS W/O CODES** article in the ENGINE PERFORMANCE Section.
8. Disconnect AFS connector. Turn ignition switch to ON position. Using DVOM, check voltage between specified terminal and chassis ground. If system voltage does not exist, repair wiring harness as necessary. If system voltage exists, go to next step.
9. With ignition switch in ON position, use DVOM to check voltage between terminal No. 3 and chassis ground. If voltage is not 4.8-5.2 volts, repair wiring harness as necessary. If voltage is as specified, go to next step.
10. Using DVOM, check for continuity between AFS connector terminal No. 5 and chassis ground. If continuity does not exist, repair wiring harness as necessary. Go to next step.
11. Disconnect AFS connector and ECM connector. Using DVOM, check for continuity between AFS connector terminal No. 7 and ECM connector terminal No. 57. If continuity does not exist on specified circuit(s), repair appropriate circuit for open or short to ground as necessary. If continuity exists, condition required to set trouble code is not present at this time. Test is complete. Intermittent problem may exist. See **H - TESTS W/O CODES** article in the ENGINE PERFORMANCE Section.

CODE 13: INTAKE AIR TEMPERATURE SENSOR

NOTE: On all models except 1.5L engines, intake air temperature sensor is built into airflow sensor. For CODE 13 test purposes, airflow sensor will be referred to

as intake air temperature sensor. For component terminal identification, see AIRFLOW SENSOR under TERMINAL IDENTIFICATION . For component terminal identification on 1.5L engines, See Fig. 22 . For wiring diagrams, see the article L - WIRING DIAGRAMS in the ENGINE PERFORMANCE Section.

1. If using scan tester, go to step 3). Disconnect Intake Air Temperature (IAT) sensor connector. Using a thermometer, check engine compartment ambient temperature. Using DVOM, check resistance between specified IAT sensor terminals. See **IAT SENSOR TERMINAL IDENTIFICATION** table. Resistance should be 6000 ohms at 32°F (0°C), 2700 ohms at 68°F (20°C) or 400 ohms at 176° F (80°C). If resistance is not as specified, replace IAT sensor. If resistance is as specified, go to next step.

IAT SENSOR TERMINAL IDENTIFICATION

Application	Terminals No.
1.5L	1 & 2
1.8L	5 & 6

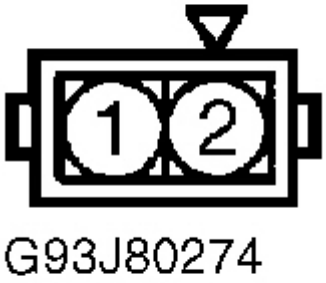

Fig. 22: Identifying IAT Component Terminals (1.5L)
Courtesy of MITSUBISHI MOTOR SALES OF AMERICA

2. Using a hair dryer, warm IAT sensor while monitoring DVOM. Resistance should decrease evenly as temperature rises. If resistance remains unchanged, replace IAT sensor. If resistance changes, go to step 4).
3. Turn ignition switch to ON or RUN position. Using a thermometer, check engine compartment ambient temperature. Using scan tester, read Intake Air Temperature (IAT) sensor temperature. See **IAT SENSOR TEMPERATURE** table. If temperatures are not as specified, replace IAT sensor. If temperatures are as specified, go to next step.

IAT SENSOR TEMPERATURE

Ambient Temperature	Standard Value
-4°F (-20°C)	-20°C
32°F (0°C)	0°C
68°F (20°C)	20°C

104°F (40°C	40°C
176°F (80°C)	80°C

4. Disconnect IAT sensor connector. Using DVOM, check for continuity between chassis ground and specified IAT sensor connector terminal. See **IAT SENSOR GROUND CIRCUIT TERMINAL IDENTIFICATION** table. If continuity does not exist, repair wiring harness as necessary. If continuity exists, go to next step.

IAT SENSOR GROUND CIRCUIT TERMINAL IDENTIFICATION

Application	Terminal No.
1.5L	1
1.8L	5

5. With IAT sensor connector and ECM connector disconnected, check for continuity between specified IAT sensor connector terminal and ECM connector terminal. See **IAT-TO-ECM WIRING HARNESS TERMINAL IDENTIFICATION** table. If continuity does not exist, repair wiring harness as necessary. If continuity exists, go to next step.

IAT-TO-ECM WIRING HARNESS TERMINAL IDENTIFICATION

Application	IAT Connector Terminal No.	ECM Connector Terminal No.
1.5L	2	52
1.8L	6	52

6. Turn ignition switch to ON position. Check voltage between chassis ground and specified IAT sensor connector. See **IAT SENSOR CONNECTOR VOLTAGE SUPPLY CIRCUIT TERMINAL IDENTIFICATION** table. If voltage is not 4.5-4.9 volts, replace ECM. If voltage is as specified, replace IAT sensor.

IAT SENSOR CONNECTOR VOLTAGE SUPPLY CIRCUIT TERMINAL IDENTIFICATION

Application	Terminal No.
1.5L	2
1.8L	6

CODE 14: THROTTLE POSITION SENSOR

NOTE: For component terminal identification, see TERMINAL IDENTIFICATION . For wiring diagrams, see L - WIRING DIAGRAMS article in the ENGINE PERFORMANCE Section.

1. If using scan tester, go to step 3). Disconnect Throttle Position Sensor (TPS) connector. Using DVOM, check resistance between TPS terminals No. 1 and No. 4. If resistance is not 3500-6500 ohms, replace TPS. If resistance is as specified, go to next step.
2. Check resistance between TPS terminals No. 2 & 4. While monitoring DVOM, slowly open throttle from idle to fully open position. If resistance does not change smoothly, replace TPS. If resistance changes smoothly, go to step 4).
3. Turn ignition switch to ON position. Using scan tester, read Throttle Position Sensor (TPS) voltage. With throttle at idle, voltage should read .3-1.0 volt. Voltage should increase while slowly opening

throttle. At wide open throttle, voltage should read 4.5-5.5 volts. If voltage is not as specified, replace TPS. If voltage is as specified, go to next step.

4. Disconnect TPS connector. Using DVOM, check continuity between chassis ground and terminal No. 4. If continuity does not exist, repair wiring harness as necessary. If continuity exists, go to next step.
5. Disconnect TPS connector and ECM connector. Check for continuity between specified TPS connector terminal and ECM connector terminal. See **TPS-TO-ECM WIRING HARNESS TERMINAL IDENTIFICATION** table. If continuity does not exist, repair wiring harness as necessary. If continuity exists, go to next step.

TPS-TO-ECM WIRING HARNESS TERMINAL IDENTIFICATION

Application	TPS Terminal No.	ECM Terminal No.
All Models	1	61
	2	64

6. Check voltage between chassis ground and TPS connector terminal No. 1. If voltage is not 4.8-5.2 volts, replace ECM. If voltage is as specified, condition required to set trouble code is not present at this time. Test is complete. Intermittent problem may exist. See **H - TESTS W/O CODES** article in the ENGINE PERFORMANCE Section.
7. Disconnect TPS connector. Turn ignition switch to ON position. Using DVOM, check voltage between chassis ground and specified TPS connector terminal. Refer to the **TPS-TO-ECM WIRING HARNESS TERMINAL IDENTIFICATION** table. If voltage is not 4.8-5.2 volts, repair wiring harness as necessary. If voltage is as specified, go to next step.
8. Check continuity between chassis ground and TPS connector terminal No. 4. If continuity does not exist, repair wiring harness as necessary. If continuity exists, go to next step.
9. With TPS connector and ECM connector disconnected, check for continuity between TPS connector terminal No. 2 and ECM connector terminal No. 9. If continuity does not exist, repair wiring harness as necessary. If continuity exists, condition required to set trouble code is not present at this time. Test is complete. Intermittent problem may exist. See **H - TESTS W/O CODES** article in the ENGINE PERFORMANCE Section.

CODE 21: ENGINE COOLANT TEMPERATURE (ECT) SENSOR

NOTE: For component terminal identification, see TERMINAL IDENTIFICATION . For wiring diagrams, see L - WIRING DIAGRAMS article in the ENGINE PERFORMANCE Section.

1. If using scan tester, go to step 2). Remove Engine Coolant Temperature (ECT) sensor from intake manifold. Submerge temperature sensing portion of ECT sensor in hot water. Using DVOM, check resistance across ECT sensor terminals. See **ECT SENSOR RESISTANCE SPECIFICATIONS** table. If resistance is not as specified, replace ECT sensor. If resistance is as specified, go to step 3).

ECT SENSOR RESISTANCE SPECIFICATIONS

Water Temperature	Approximate Ohms
32°F (0°C)	5800
68°F (20°C)	2400
104°F (40°C)	1100
176°F (80°C)	300

2. Turn ignition switch to ON or RUN position. Using a thermometer, check engine compartment ambient temperature. Using scan tester, read Engine Coolant Temperature (ECT) sensor voltage. See **ECT SENSOR VOLTAGE SPECIFICATIONS** table. If voltage is not within specifications, replace ECT sensor. If voltage is within specification, go to next step.

ECT SENSOR VOLTAGE SPECIFICATIONS

Ambient Temperature	Standard Value: °F (°C)
-4°F (-20°C)	-20°C
32°F (0°C)	0°C
68°F (20°C)	20°C
104°F (40°C	40°C
176°F (80°C)	80°C

3. Disconnect ECT sensor connector. Using DVOM, check continuity between chassis ground and specified connector terminal. See **ECT SENSOR GROUND CIRCUIT TERMINAL IDENTIFICATION** table. If continuity does not exist, repair wiring harness as necessary. If continuity exists, go to next step.

ECT SENSOR GROUND CIRCUIT TERMINAL IDENTIFICATION

Application	Terminal No.
1.5L	1
1.8L	2

4. Disconnect ECT sensor connector and ECM connector. Check continuity between specified ECT sensor connector terminals and ECM connector terminals. See **ECT SENSOR-TO-ECM WIRING HARNESS TERMINAL IDENTIFICATION** table. If continuity does not exist, repair wiring harness as necessary. If continuity exists, go to next step.

ECT SENSOR-TO-ECM WIRING HARNESS TERMINAL IDENTIFICATION

Application	ECT Sensor Terminal No.	ECM Terminal No.
1.5L	2	63
1.8L	1	63

5. Turn ignition switch to ON position. Check voltage between chassis ground and specified ECT sensor connector terminal. See **ECT SENSOR VOLTAGE CIRCUIT IDENTIFICATION** table. If voltage is not 4.5-4.9 volts, replace ECM. If voltage is as specified, condition required to set trouble code is not present at this time. Test is complete. Intermittent problem may exist. See **H - TESTS W/O CODES** article in the ENGINE PERFORMANCE Section.

ECT SENSOR VOLTAGE CIRCUIT IDENTIFICATION

Application	Terminal No.
1.5L	1
1.8L	2

CODE 22: CRANKSHAFT POSITION (CKP) SENSOR

NOTE: For component terminal identification, see TERMINAL IDENTIFICATION . For

wiring diagrams, see L - WIRING DIAGRAMS article in the ENGINE PERFORMANCE Section.

NOTE: Procedures are provided by manufacturer for component testing using an engine analyzer with oscilloscope capability. Refer to manufacturer's operation manual for instructions in use of oscilloscope. If using a scan tester, go to step 3).

1. If using a scan tester, go to step 3). Disconnect Crankshaft/Camshaft Position (CKP/CMP) sensor connector. Install Test Harness (MB991348) between sensor and connector. On all models, using engine analyzer with oscilloscope capability, connect special patterns probe to connector terminal No. 3.
2. Start engine. Compare oscilloscope wave pattern with known-good wave pattern. See **Fig. 23** . Verify that wave length (time) decreases as engine RPM increases. If a wave pattern is output and it fluctuates to left or right, check for loose timing belt or an abnormality in sensor pick-up disc. If a rectangular wave pattern is output even when engine is not started, substitute known-good CKP sensor. Repeat test. If wave pattern is still abnormal, go to step 5).

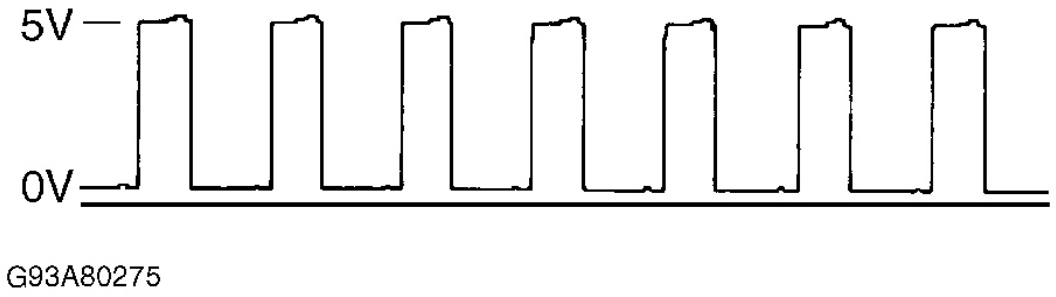

Fig. 23: Identifying Known-Good CKP Sensor Wave Pattern
Courtesy of MITSUBISHI MOTOR SALES OF AMERICA

3. Connect an engine tachometer. Crank engine. Ensure ignition coil primary current toggles on and off. Using tachometer and scan tester, compare cranking speed and scan tester read out. If engine fails to start and tachometer reads zero RPM when engine is cranked, check for broken timing belt or faulty CKP sensor. If CKP sensor is suspected, substitute known-good CKP sensor. Repeat test procedure. If engine fails to start, tachometer reads zero RPM, and ignition coil primary current fails to toggle on and off, check for faulty ignition coil, ignition circuit or power transistor. If engine starts and readouts agree, go to next step.
4. Ensure A/C switch is in ON position to activate closed throttle position switch. Allow engine to idle. Check coolant temperature. Using scan tester, read idle speed. See **IDLE RPM SPECIFICATIONS** table. If RPM is not to specification, check for faulty coolant temperature sensor, basic idle speed adjustment, or idle air control motor. If RPM is within specifications, go to next step.

IDLE RPM SPECIFICATIONS

Coolant Temperature	Engine RPM
-4°F (-20°C)	

1.5L	1460-1660
1.8L	1380-1580
32°F (0°C)	
1.5L	1350-1550
1.8L	1330-1530
68°F (20°C)	
1.5L	1180-1380
1.8L	1250-1450
104°F (40°C)	
1.5L	940-1140
1.8L	1000-1200
176°F (80°C)	
1.5L	650-850
1.8L	600-800

5. Disconnect CKP/CMP sensor connector and Ignition (IG) switch connector. Using DVOM, check for continuity between CKP/CMP sensor connector terminal No. 2 and IG switch connector terminal No. 3. See **Fig. 24** . If continuity does not exist, repair wiring harness as necessary. If continuity exists, go to next step.

Fig. 24: Identifying Ignition Switch Terminals
Courtesy of MITSUBISHI MOTOR SALES OF AMERICA

CKP SENSOR VOLTAGE TERMINAL IDENTIFICATION

Application	Terminal No.
All Models	3

6. With CKP/CMP sensor connector disconnected, check for continuity between chassis ground and CKP/CMP sensor connector terminal No. 1. If continuity does not exist, repair wiring harness as

necessary. If continuity exists, go to next step.

7. With CKP/CMP sensor connector and ECM connector disconnected, check for continuity between CKP/CMP sensor connector terminal No. 3 and ECM connector terminal No. 69. If continuity does not exist, repair wiring harness as necessary. If continuity exists, go to next step.
8. With ignition switch in ON position, check for voltage between chassis ground and CKP/CMP sensor connector terminal No. 3. If 4.8-5.2 volts do not exist, replace ECM. If voltage is to specification and CKP sensor is suspected, replace CKP sensor.

CODE 23: CAMSHAFT POSITION SENSOR

NOTE: For component terminal identification, see TERMINAL IDENTIFICATION . For wiring diagrams, see L - WIRING DIAGRAMS article in the ENGINE PERFORMANCE Section.

NOTE: Procedures are provided by manufacturer for component testing using an engine analyzer with oscilloscope capability. Refer to manufacturer's operation manual for instructions in use of oscilloscope. Manufacturer does not provide procedures for testing component using a scan tester.

1. Disconnect Crankshaft/Camshaft Position (CKP/CMP) sensor connector. Install Test Harness (MB991348) between sensor and connector. On all models, using engine analyzer with oscilloscope capability, connect special patterns probe to connector terminal No. 4.
2. Start engine. Compare oscilloscope wave pattern with known-good wave pattern. See **Fig. 25** . Verify that wave length (time) decreases as engine RPM increases. If a wave pattern is output and it fluctuates to left or right, check for loose timing belt or an abnormality in sensor pick-up disc. If a rectangular wave pattern is output even when engine is not started, substitute known-good CMP sensor. Repeat test. If wave pattern is still abnormal, go to next step.

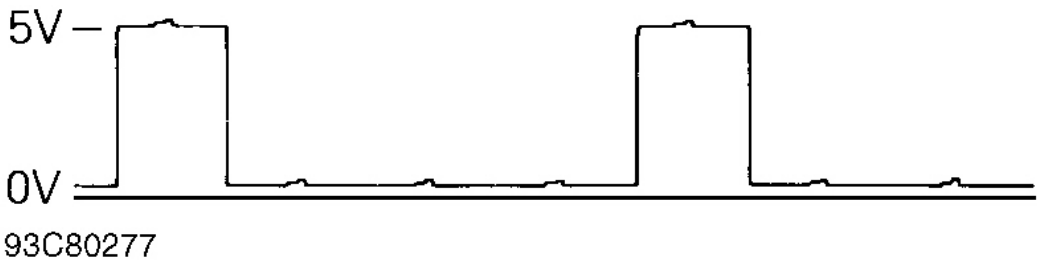

Fig. 25: Identifying Known-Good CMP Sensor Wave Pattern
Courtesy of MITSUBISHI MOTOR SALES OF AMERICA

3. Disconnect CKP/CMP sensor connector and Ignition (IG) switch connector. Using DVOM, check for continuity between CKP/CMP sensor connector terminal No. 2 and ignition switch connector terminal No. 3. See **Fig. 24** . If continuity does not exist, repair wiring harness as necessary. If continuity exists, go to next step.

CMP SENSOR VOLTAGE TERMINAL IDENTIFICATION

Application	Terminal No.
All Models	3

4. With CKP/CMP sensor connector disconnected, check for continuity between chassis ground and CKP/CMP sensor connector terminal No. 1. If continuity does not exist, repair wiring harness as necessary. If continuity exists, go to next step.
5. With CKP/CMP sensor connector and ECM connector disconnected, check for continuity between CKP/CMP sensor connector terminal No. 4 and ECM connector terminal No. 68. If continuity does not exist, repair wiring harness as necessary. If continuity exists, go to next step.
6. With ignition switch in ON position, check for voltage between chassis ground and CKP/CMP sensor connector terminal No. 4. If 4.8-5.2 volts do not exist, replace ECM. If voltage is as specified, condition required to set trouble code is not present at this time. Test is complete. Intermittent problem may exist. See **H - TESTS W/O CODES** article in the ENGINE PERFORMANCE Section.

CODE 24: VEHICLE SPEED SENSOR

NOTE: For component terminal identification, see TERMINAL IDENTIFICATION . For wiring diagrams, see L - WIRING DIAGRAMS article in the ENGINE PERFORMANCE Section.

1. Manufacturer does not provide Vehicle Speed Sensor (VSS) testing procedures using scan tester. VSS is located in speedometer. VSS component testing procedures using DVOM require removal of instrument panel. Removal and installation of instrument panel is basically an unbolt and bolt-on procedure.
2. Use DVOM to check continuity between indicated VSS terminals. See **Fig. 26** . Ensure continuity pulses on and off 4 times per speedometer shaft revolution. If continuity is not as specified, replace VSS. If continuity is as specified, go to step 4).
3. VSS is located at end of speedometer cable in transmission. Remove VSS. Connect battery, resistor (3-10 ohms) and voltmeter to indicated terminals. See **Fig. 26** . Ensure voltage pulses 4 times per speedometer shaft revolution. If voltage is not as specified, replace VSS. If voltage is as specified, go to next step.

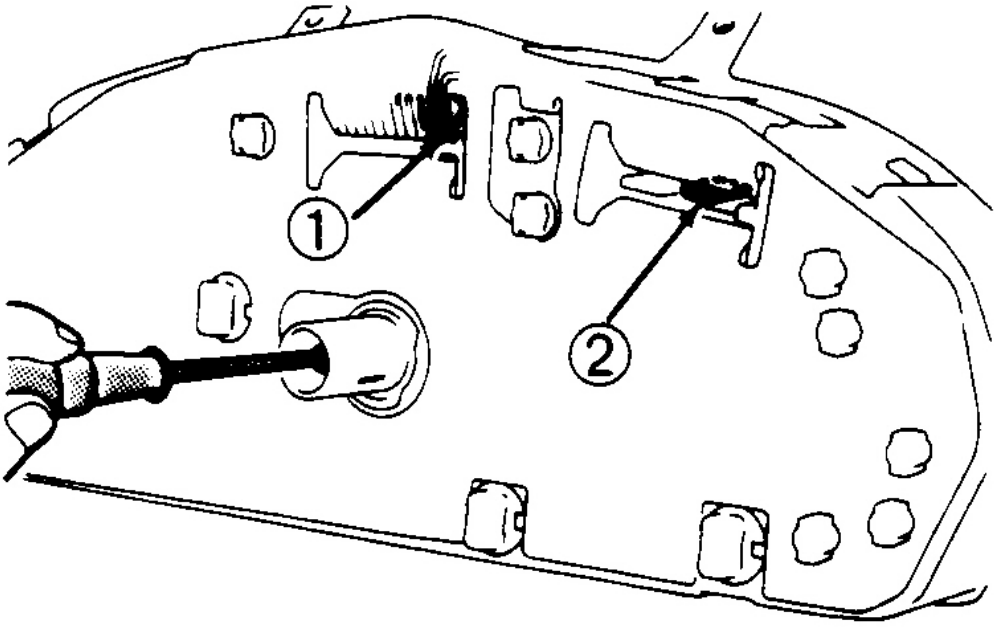

Fig. 26: Identifying VSS Test Terminals
Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.

4. Disconnect ECM connector. Using DVOM, check continuity between chassis ground and terminal No. 66. Move vehicle. Ensure continuity pulses on and off 4 times per tire revolution. If continuity is as specified: go to next step; If continuity is not as specified: go to step 7).
5. With ECM connector disconnected, disconnect VSS connector. Ground ECM connector VSS output terminal No. 66. Using DVOM, check for continuity between chassis ground and VSS connector terminal No. 43. If continuity does not exist, repair wiring harness as necessary. If continuity exists, go to next step.
6. With VSS connector disconnected, check for continuity between chassis ground and VSS connector terminal No. 12. If continuity does not exist, repair wiring harness as necessary. If continuity exists, go to next step.
7. With VSS connector and ECM connector disconnected, turn ignition switch to ON position. Using DVOM, check for voltage between chassis ground and VSS connector terminal No. 43. If voltage is not 4.5-4.9 volts, replace ECM. If voltage is as specified, condition required to set trouble code is not present at this time. Test is complete. Intermittent problem may exist. See **H - TESTS W/O CODES** article in the ENGINE PERFORMANCE Section.

CODE 25: BAROMETRIC PRESSURE SENSOR

NOTE: Barometric (BARO) pressure sensor is built into airflow sensor. For code 25 test purposes, the airflow sensor will be referred to as the BARO pressure

sensor. For component terminal identification, see AIRFLOW SENSOR under TERMINAL IDENTIFICATION . For wiring diagrams, see L - WIRING DIAGRAMS article in the ENGINE PERFORMANCE Section.

1. Manufacturer does not provide component testing procedure without scan tester. Turn ignition switch to ON position. Using scan tester, read sensor pressure. See **BARO PRESSURE SENSOR SPECIFICATIONS** table. If pressure is not as specified, replace BARO pressure sensor. If pressure is as specified, go to next step.

BARO PRESSURE SENSOR SPECIFICATIONS

Altitude: Ft. (M)	Pressure: In. Hg
0 (0)	29.92
1969 (600)	27.95
3937 (1200)	25.98
5906 (1800)	24.02

2. Disconnect BARO pressure sensor connector. Using DVOM, check for continuity between chassis ground and terminal No. 5. If continuity does not exist, repair wiring harness as necessary. If continuity exists, go to next step.
3. With BARO pressure sensor disconnected, disconnect ECM connector. Check for continuity between ECM connector terminal No. 65 and BARO pressure sensor connector terminal No. 2. If continuity does not exist, repair wiring harness as necessary. If continuity exists, go to next step.
4. With BARO pressure sensor connector and ECM connector disconnected, turn ignition switch to ON position. Check for voltage between chassis ground and BARO pressure sensor connector terminal No. 1. If voltage is not 4.8-5.2 volts, replace ECM. If voltage is as specified, condition required to set code is not present at this time. Test is complete. Intermittent problem may exist. See **H - TESTS W/O CODES** article in the ENGINE PERFORMANCE Section.
5. With BARO pressure sensor connector disconnected, turn ignition switch to ON position. Check for voltage between chassis ground and BARO pressure sensor connector terminal No. 1. If voltage is not 4.8-5.2 volts, repair wiring harness as necessary. If voltage is as specified, go to next step.
6. With BARO pressure sensor connector and ECM connector disconnected, ground ECM connector terminal No. 16. Using DVOM, check for continuity between chassis ground and specified BARO pressure sensor connector terminal No. 1. If continuity does not exist, repair wiring harness as necessary. If continuity exists, condition required to set code is not present at this time. Test is complete. Intermittent problem may exist. See the **H - TESTS W/O CODES** article in this section.

CODE 32: MAP SENSOR

NOTE: For component terminal identification, see TERMINAL IDENTIFICATION . For wiring diagrams, see L - WIRING DIAGRAMS article in this section.

1. Manufacturer does not provide component testing procedure without scan tester. Ensure coolant temperature is 176-203°F (80-95°C). Ensure all accessories are off, transmission is in Neutral, and ignition switch is in ON position. Using scan tester, read intake manifold plenum pressure. See **INTAKE MANIFOLD PLENUM PRESSURE SPECIFICATIONS** table. If conditions are not as specified, replace Manifold Absolute Pressure (MAP) sensor. If conditions are as specified, go to next step.

INTAKE MANIFOLD PLENUM PRESSURE SPECIFICATIONS

Engine State	Altitude Ft. (M)	Pressure: In. Hg
Off	0 (0)	29.92
Off	1969 (600)	27.95
Off	3937 (1200)	25.98
Off	5906 (1800)	24.02
Idle (750 RPM)	N/A	6.70-10.62
Suddenly Raced	N/A	(1)

(1) Pressure should increase.

2. Disconnect MAP sensor connector. Using DVOM, check continuity between chassis ground and MAP sensor connector terminal No. 3. If continuity does not exist, repair wiring harness as necessary. If continuity exists, go to next step.
3. With MAP sensor connector disconnected, disconnect ECM connector. Ground ECM connector terminal No. 70. Using DVOM, check continuity between chassis ground and MAP sensor connector terminal No. 2. If continuity does not exist, repair wiring harness as necessary. If continuity exists, go to next step.
4. With MAP sensor connector and ECM connector disconnected,turn ignition switch to ON position. Check voltage between chassis ground and MAP sensor connector terminal No. 1. If 4.8-5.2 volts do not exist, replace ECM. If voltage is as specified, condition required to set code is not present at this time. Test is complete. Intermittent problem may exist. See **H - TESTS W/O CODES** article in the ENGINE PERFORMANCE Section.

CODE 36: IGNITION TIMING ADJUSTMENT SIGNAL

NOTE: For component terminal identification, see TERMINAL IDENTIFICATION . For wiring diagrams, see L - WIRING DIAGRAMS article in the ENGINE PERFORMANCE Section.

Turn ignition switch to ON position. Using DVOM, check voltage at ignition timing adjustment terminal (located at firewall) with terminal grounded and ungrounded. With terminal grounded, voltage should be 0-1.0 volt. With terminal ungrounded, voltage should be 4.0-5.5 volts. If voltage is not as specified, repair ignition timing adjustment terminal wiring harness or connector as necessary. If voltage is as specified, replace ECM.

CODE 41: FUEL INJECTOR

NOTE: For component terminal identification, see TERMINAL IDENTIFICATION . For wiring diagrams, see L - WIRING DIAGRAMS article in the ENGINE PERFORMANCE Section.

1. Using a stethoscope or long-bladed screwdriver, listen for clicking sound from each injector while engine is running or being cranked. If no sound is heard from injector(s), check injector connections. If connections are not okay, repair connections as necessary. If connections are okay, go to next step.
2. Disconnect injector connector. Using DVOM, check resistance across injector terminals. If resistance is not 13-16 ohms, replace injector. If resistance is as specified, go to next step.
3. Using scan tester, read injector drive time while cranking engine. See **INJECTOR CRANKING**

DRIVE TIME SPECIFICATIONS table. Go to next step.

INJECTOR CRANKING DRIVE TIME SPECIFICATIONS

Coolant Temperature	Drive Time
32°F (0°C)	
1.5L	16.2-19.8 ms
1.8L	17.1-21.0 ms
68°F (20°C)	
1.5L	32.0-39.0 ms
1.8L	35.0-43.0 ms
176°F (80°C)	
1.5L	8.1-9.9 ms
1.8L	8.7-10.7 ms

4. Ensure coolant temperature is at 176-205°F (80-95°C), all accessories are off and transaxle is in Neutral position. Using scan tester, read injector drive time under specified engine conditions. See **INJECTOR OPERATING DRIVE TIME SPECIFICATIONS** table. Go to next step.

INJECTOR OPERATING DRIVE TIME SPECIFICATIONS

Engine State	Drive Time
750 RPM	
1.5L	1.7-2.9 ms
1.8L	2.5-3.7 ms
2000 RPM	
1.5L	1.5-2.7 ms
1.8L	2.1-3.3 ms
Suddenly Accelerated	(1)
(1) Drive time should increase.	

5. Allow engine to idle after warm up. Using scan tester, shut off injectors in sequence. Idle should change when good injectors are shut off. If idle state does not change, check injector connection, spark plug and cable, and cylinder compression. If conditions are not as specified in preceding steps, go to next step.
6. Disconnect MFI relay connector and injector connector at faulty injector. Using DVOM, check for continuity between MFI relay connector terminal No. 2 and injector connector terminal No. 2. If continuity does not exist, repair wiring harness as necessary. If continuity exists, go to next step.
7. Using a DVOM, check for continuity between injector connector terminal No. 2 and specified ECM connector terminal. See **INJECTOR-TO-ECM CIRCUIT IDENTIFICATION** table. If continuity does not exist, repair wiring harness as necessary. If continuity exists, condition required to set code is not present at this time. Intermittent problem may exist. See **H - TESTS W/O CODES** article in the ENGINE PERFORMANCE Section.

INJECTOR-TO-ECM CIRCUIT IDENTIFICATION

Application	Injector No.	ECM Terminal No.
All Models	1	1
	2	14

3	2
4	15

8. Disconnect injector connector at faulty injector. Turn ignition switch to ON position. Using DVOM, check for voltage between chassis ground and injector connector terminal No. 1. If battery voltage does not exist, repair wiring harness as necessary. If battery voltage exists, go to next step.
9. With injector connector disconnected, disconnect ECM connector. Check for continuity between injector connector terminal No. 2 and ECM connector terminal No. 51 for injector No. 1, No. 52 for injector No. 2, No. 60 for injector No. 3, or No. 61 for injector No. 4. If continuity does not exist, repair wiring harness as necessary. If continuity exists, condition required to set code is not present at this time. Test is complete. Intermittent problem may exist. See **H - TESTS W/O CODES** article in the ENGINE PERFORMANCE Section.
10. Turn ignition switch to ON position. With MFI relay connector connected, check for voltage between chassis ground and MFI relay connector terminals No. 4 and No. 5. If battery voltage does not exist, check MFI relay. If battery voltage exists: on turbo models, go to next step; on non-turbo models, go to step 13).
11. Disconnect MFI relay resistor connector. Turn ignition switch to ON position. Check for voltage between chassis ground and relay resistor connector terminal No. 3. If battery voltage does not exist, repair wiring harness between MFI relay and relay resistor. If battery voltage exists, go to next step.
12. With relay resistor connector disconnected and injector connector connected, check resistance between relay resistor terminals No. 3 and No. 1 for injector No. 1, No. 3 and No. 4 for injector No. 2, No. 3 and No. 5 for injector No. 3, or No. 3 and No. 6 for injector No. 4. If resistance is not 5.5-6.5 ohms at 68°F (20°C), replace relay resistor. If resistance is as specified, go to next step.
13. Disconnect injector connector at faulty injector. Using DVOM, check voltage between chassis ground and injector connector terminal No. 1. If battery voltage does not exist, repair wiring harness as necessary. If battery voltage exists, go to next step.
14. With injector connector disconnected, disconnect ECM connector. Ground ECM connector terminal No. 51 for injector No.1, No. 52 for injector No. 2, No. 60 for injector No. 3, or No. 61 for injector No. 4. Check for continuity between chassis ground and injector connector terminal No. 1. If continuity does not exist, repair wiring harness as necessary. If continuity exists, condition required to set code is not present at this time. Test is complete. Intermittent problem may exist. See **H - TESTS W/O CODES** article in the ENGINE PERFORMANCE Section.
15. Disconnect MFI relay resistor connector. Turn ignition switch to ON position. Using DVOM, check for voltage between chassis ground and resistor connector terminal No. 2. See **Fig. 27** . If battery voltage does not exist, repair wiring harness as necessary between MFI relay resistor connector and MFI relay. If battery voltage exists, reconnect MFI relay resistor connector. Go to next step.

Fig. 27: Identifying MFI Relay Resistor Terminals
Courtesy of MITSUBISHI MOTOR SALES OF AMERICA

16. If faulty injector is on rear injector bank, go to next step. Disconnect injector connector at faulty front injector. Turn ignition switch to ON position. Using DVOM, check voltage between chassis ground and injector connector terminal No. 1. If battery voltage does not exist, repair wiring harness as necessary between injector connector and MFI relay. If voltage exists, go to step 18).
17. Disconnect rear bank injector connector. Using DVOM, check voltage between chassis ground and injector connector terminal No. 1. If battery voltage does not exist, repair wiring harness as necessary between injector connector and MFI relay. If voltage exists, go to step 19).
18. With injector connector disconnected, disconnect ECM connector. Ground ECM connector terminal No. 1 for injector No. 1, No. 2 for injector No. 3, or No. 3 for injector No. 3. Using DVOM, check for continuity between chassis ground and injector connector terminal No. 2. If continuity does not exist, repair wiring harness as necessary between appropriate injector connector and ECM connector terminal. If continuity exists, condition required to set code is not present at this time. Test is complete. Intermittent problem may exist. See **H - TESTS W/O CODES** article in the ENGINE PERFORMANCE Section.
19. With rear bank injector connector disconnected, disconnect ECM connector. Ground ECM connector terminal No. 14 for injector No. 2, No. 15 for injector No. 4, or No. 16 for injector No. 6. Using DVOM, check for continuity between chassis ground and rear bank injector connector terminal No. 2 for injector No. 2, No. 3 for injector No. 4, or No. 4 for injector No. 6. If continuity does not exist, repair wiring harness between rear bank injector connector and ECM connector. If continuity exists, condition required to set code is not present at this time. Test is complete. Intermittent problem may exist. See **H - TESTS W/O CODES** article in the ENGINE PERFORMANCE Section.

CODE 43: EGR TEMPERATURE SENSOR

NOTE: For component terminal identification, see TERMINAL IDENTIFICATION . For wiring diagrams, see L - WIRING DIAGRAMS article in the ENGINE PERFORMANCE Section.

1. If using scan tester, go to step 2). Remove EGR temperature sensor from intake manifold. Submerge

temperature sensing portion of EGR temperature sensor in hot water. Using DVOM, check resistance across sensor terminals. Resistance should be 60,000-83,000 ohms at 122°F (50°C), 11,000-14,000 at 212°F (100°C). If resistance is not as specified, replace EGR temperature sensor. If resistance is as specified, go to step 3).

2. Warm engine to operating temperature. Allow engine to idle for 2 minutes. Squeeze green-striped hose between EGR valve and EGR solenoid. Using scan tester, read EGR temperature sensor temperature. At 700-750 RPM, scan tester should read 70°F (158°C) or less. At 3500-4000 RPM, scan tester should read 158°F (70°C) or more. If reading is not as specified, replace EGR temperature sensor. If reading is as specified, go to next step.
3. Disconnect EGR temperature sensor connector. Using DVOM, check continuity between chassis ground and EGR temperature sensor terminal No. 1. If continuity does not exist, repair wiring harness as necessary. If continuity exists, go to next step.
4. With EGR temperature sensor disconnected, disconnect ECM connector. Check for continuity between EGR temperature sensor connector terminal No. 2 and ECM connector terminal No. 53. If continuity does not exist, repair wiring harness as necessary. If continuity exists, go to next step.
5. With EGR temperature sensor connector and ECM connector disconnected, turn ignition switch to ON position. Check voltage between chassis ground and EGR connector terminal No. 1. Voltage should be 3.3-4.7 volts. If voltage is not as specified, replace ECM. If voltage is as specified, condition required to set code is not present at this time. Test is complete. Intermittent problem may exist. See **H - TESTS W/O CODES** article in the ENGINE PERFORMANCE Section.

CODE 55: IDLE AIR CONTROL POSITION SENSOR

NOTE: For component terminal identification, see TERMINAL IDENTIFICATION . For wiring diagrams, see L - WIRING DIAGRAMS article in the ENGINE PERFORMANCE Section.

1. Manufacturer does not provide component testing procedure without using scan tester. Ensure engine coolant temperature is 185-205°F (85-95°C). Place transmission in Park or Neutral. Turn off all accessories except A/C. Ensure A/C clutch is operating when A/C system is on. Allow engine to idle.
2. Using scan tester, read Idle Air Control (IAC) position sensor step. See **IAC POSITION SENSOR STEP SPECIFICATIONS** table. If scan tester does not read as specified, replace IAC position sensor. If readings are as specified, go to next step.

IAC POSITION SENSOR STEP SPECIFICATIONS

A/C Switch Position	Standard Step Value
Off	2-20
On	Increase From 8-50
(1)	Increase From 3-40

(1) For A/T models. Brakes applied, transmission selector in "D" and A/C on.

3. Disconnect ECM connector and IAC position sensor connector. Ground specified ECM connector terminal and using DVOM, check continuity between chassis ground and specified IAC connector terminal. See **ECM-TO-IAC HARNESS CIRCUIT IDENTIFICATION** table. If continuity does not exist, repair wiring harness as necessary. If continuity exists, go to next step.

ECM-TO-IAC HARNESS CIRCUIT IDENTIFICATION

Application	ECM Terminal No.	IAC Terminal No.
All Models	5	4
	18	2
	61	1

4. With IAC position sensor connector disconnected, check continuity between chassis ground and IAC position sensor connector terminal No. 3. If continuity does not exist, repair wiring harness as necessary. If continuity exists, go to next step.
5. With IAC position sensor connector disconnected and ECM connector connected, turn ignition switch to ON position. Check for voltage between chassis ground and IAC connector terminals No. 2 and No. 4. If voltage is not 4.8-5.2 volts on either circuit, replace ECM. If voltage is as specified, go to next step.
6. Check voltage between chassis ground and IAC position sensor connector terminal No. 1. If voltage is not 4.8-5.2 volts, replace ECM. If voltage is as specified, condition required to set code is not present at this time. Test is complete. Intermittent problem may exist. See **H - TESTS W/O CODES** article in the ENGINE PERFORMANCE Section.

CODES 59 & 69: REAR OXYGEN SENSOR (O2S)

NOTE: For component terminal identification, see TERMINAL IDENTIFICATION . For wiring diagrams, see L - WIRING DIAGRAMS article in the ENGINE PERFORMANCE Section.

1. If using scan tester, go to next step. Disconnect O2S connector. Using DVOM, check continuity between O2S terminals No. 3 and No. 4. If continuity does not exist, replace O2S. If continuity exists, go to step 3).
2. With an assistant, road test vehicle. Drive vehicle with wide open throttle in 2nd gear (M/T) or "L" position (A/T). Using scan tester, read O2S voltage. If O2S voltage is not .6-1.0 volt at 3500 RPM, replace O2S. If voltage is as specified, go to next step.
3. Disconnect O2S connector and MFI relay connector. Using DVOM, check for continuity between O2S connector terminal No. 3 and MFI relay connector No. 2. If continuity does not exist, repair wiring harness as necessary. If continuity exists, go to next step.
4. With O2S connector disconnected, disconnect ECM connector. Check for continuity between O2S connector terminal No. 1 and ECM connector terminal No. 55. If continuity does not exist, repair wiring harness as necessary. If continuity exists, go to next step.
5. With O2S connector disconnected, check for continuity between chassis ground and O2S connector terminals No. 2 and No. 4. If continuity does not exist on either circuit, repair wiring harness as necessary. If continuity exists and preceding test procedure did not discover any trouble codes, replace O2S.

SUMMARY

If no hard trouble codes (or only pass codes) are present, driveability symptoms exist, or intermittent codes exist, proceed to **H - TESTS W/O CODES** article in the ENGINE PERFORMANCE Section for diagnosis by symptom (i.e., ROUGH IDLE, NO START, etc.) or intermittent diagnostic procedures.