

I - SYSTEM/COMPONENT TESTS

1998 Toyota Supra

1998 ENGINE PERFORMANCE

Toyota - System & Component Testing - 6-Cylinder

Supra

INTRODUCTION

Before testing separate components or systems, perform procedures in appropriate F - BASIC TESTING article. Since many computer-controlled and monitored components set a diagnostic trouble code if they malfunction, also perform procedures in appropriate G - TESTS W/CODES article.

NOTE: Testing individual components does not isolate short or open circuits. Perform all voltage tests with a Digital Volt-Ohmmeter (DVOM) with a minimum 10-megohm input impedance, unless stated otherwise in test procedure. Use ohmmeter to isolate shorted or open wiring harness.

AIR INDUCTION SYSTEMS

ELECTRONIC THROTTLE CONTROL SYSTEM (ETCS)

NOTE: The ETCS may also be referred to as the Electronic Throttle Control System-Intelligent (ETCS-I or ETCS-i).

Non-Turbo

For testing of throttle body and components, see THROTTLE BODY under IDLE CONTROL SYSTEM.

INTAKE AIR CONTROL VALVE SYSTEM

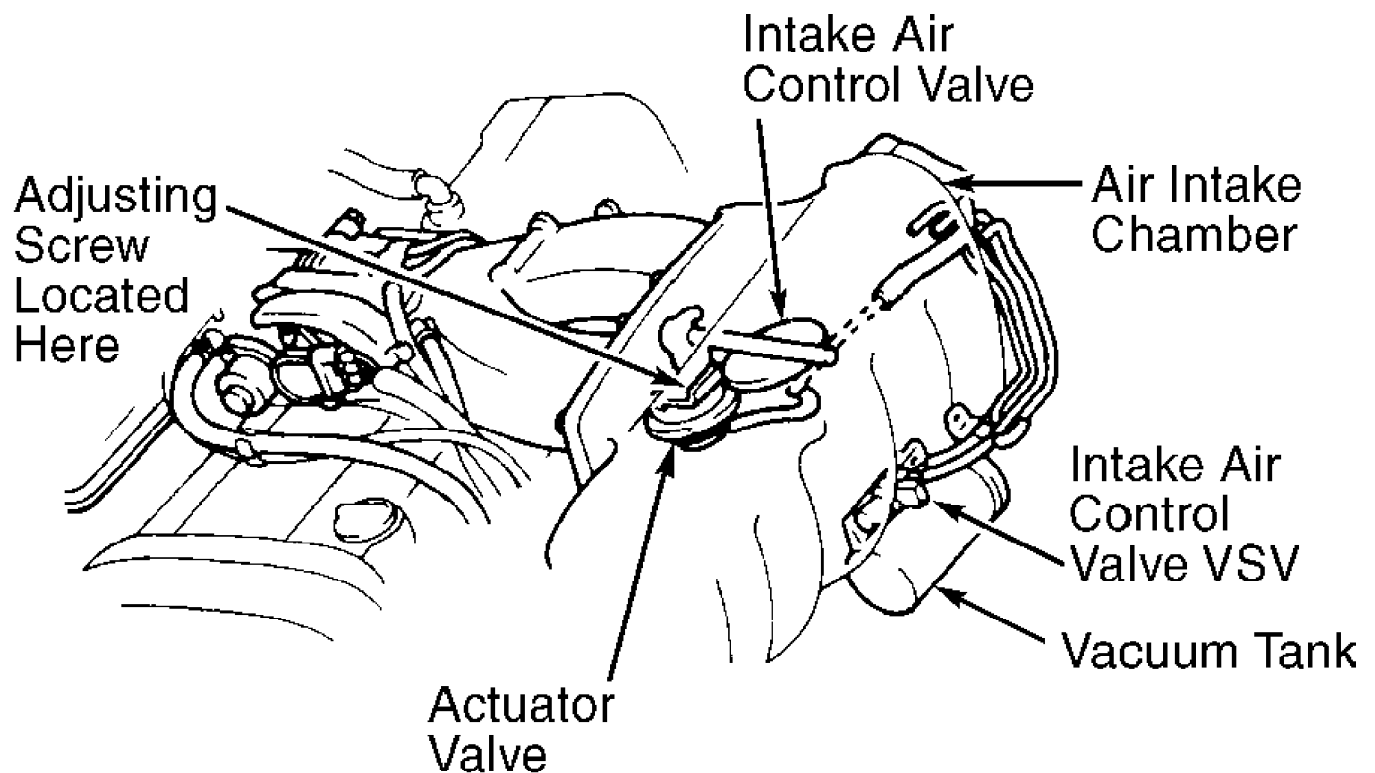
NOTE: Intake Air Control Valve (IACV) system may also be referred to as Acoustic Control Induction System (ACIS).

NOTE: Turbo models use an intake air control valve located on air inlet pipe to the turbocharger. For testing of intake air control valve, see TURBOCHARGERS under AIR INDUCTION SYSTEMS.

Non-Turbo

1) Using 3-way connector, connect vacuum gauge in vacuum line to the actuator valve. Actuator valve is located on side of air intake chamber. See Fig. 1. Start engine. With engine idling, ensure no vacuum reading is obtained.

2) Fully open throttle and ensure vacuum reading momentarily reads at least 9.8 in. Hg and actuator valve rod pulls downward. If actuator valve rod fails to pull downward, proceed to next step.



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Fig. 1: Identifying Intake Air Control Valve, Adjusting Screw, Intake Air Control VSV & Vacuum Tank (Non-Turbo)
 Courtesy of Toyota Motor Sales, U.S.A., Inc.

3) Disconnect vacuum hose from actuator valve located on side of air intake chamber. It may be necessary to remove air intake chamber for access to actuator valve.

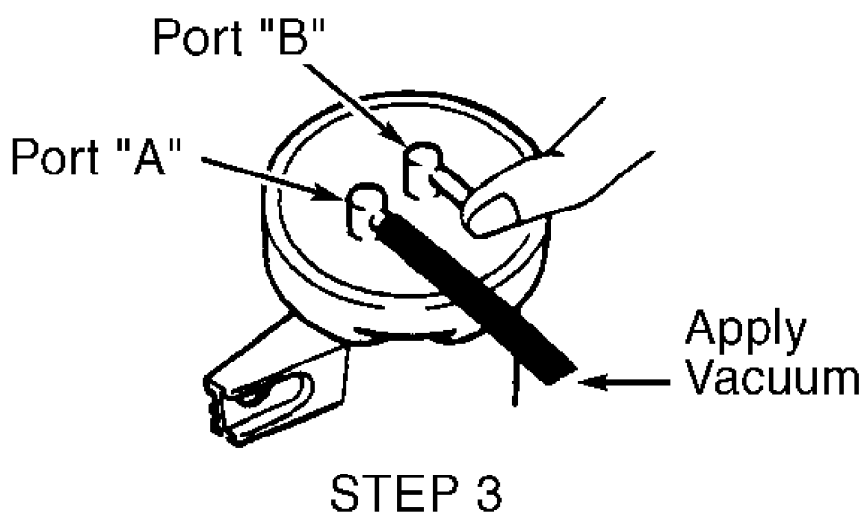
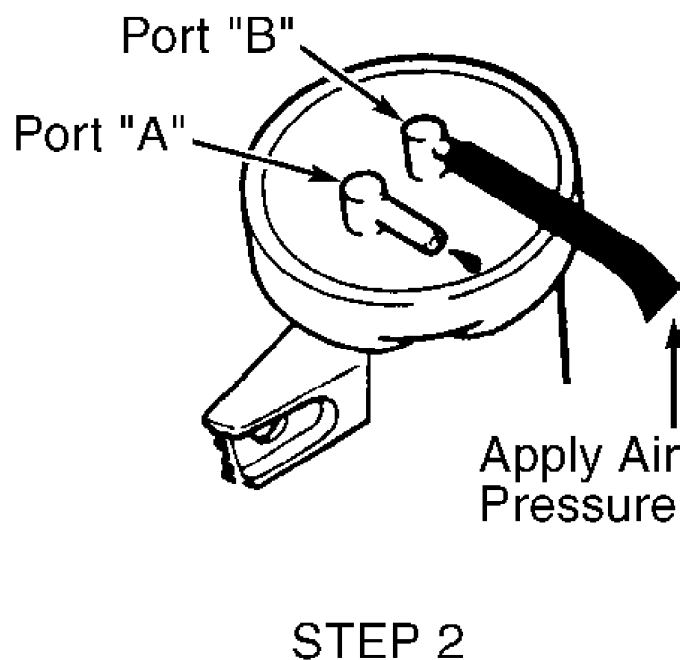
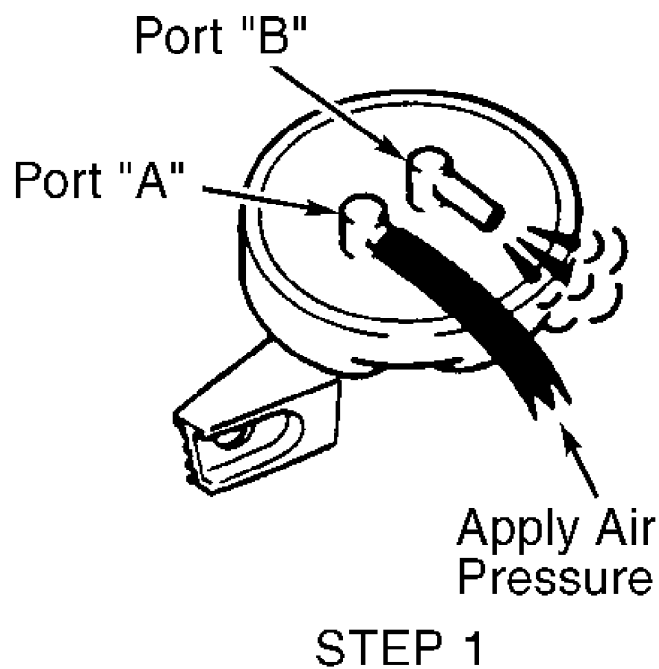
4) Using vacuum pump, apply approximately 16 in. Hg of vacuum to actuator valve. Ensure actuator valve rod pulls downward and remains pulled downward for at least one minute.

NOTE: If actuator valve rod does not move downward, it may be necessary to rotate adjusting screw near the shaft located in the air intake chamber. See Fig. 1.

5) Replace actuator valve if defective. If actuator valve operates correctly, reconnect vacuum hose. Proceed to next step.

6) Disconnect vacuum hoses from vacuum tank. Vacuum tank is located below air intake chamber. See Fig. 1. Apply air pressure to port "A" on vacuum tank. Ensure air flows from port "B". Perform STEP 1. See Fig. 2. Apply air pressure to port "B". Ensure air does not flow from port "A". Perform STEP 2. See Fig. 2.

7) Plug port "B" on vacuum tank. Using vacuum pump, apply approximately 16 in. Hg of vacuum to port "A". Perform STEP 3. See Fig. 2. Ensure vacuum reading holds for at least one minute. Replace vacuum tank if defective and recheck system operation. If vacuum tank is okay, reconnect vacuum hoses. Proceed to next step.



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Fig. 2: Testing Vacuum Tank (Non-Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

8) Disconnect electrical connector from intake air control valve Vacuum Switching Valve (VSV). Intake air control valve VSV is located near vacuum tank. See Fig. 1. It may be necessary to remove vacuum tank for access to intake air control valve VSV.

9) Using ohmmeter, ensure continuity exists between electrical terminals on intake air control valve VSV and resistance is 39-45 ohms at 68°F (20°C). Ensure no continuity exists between each electrical terminal and body of intake air control valve VSV.

10) To test intake air control valve VSV operation, apply air pressure to port "B". Ensure air flows from the filter. Perform STEP 1. See Fig. 3. Apply battery voltage and ground to electrical terminals on intake air control valve VSV. Apply air pressure to port

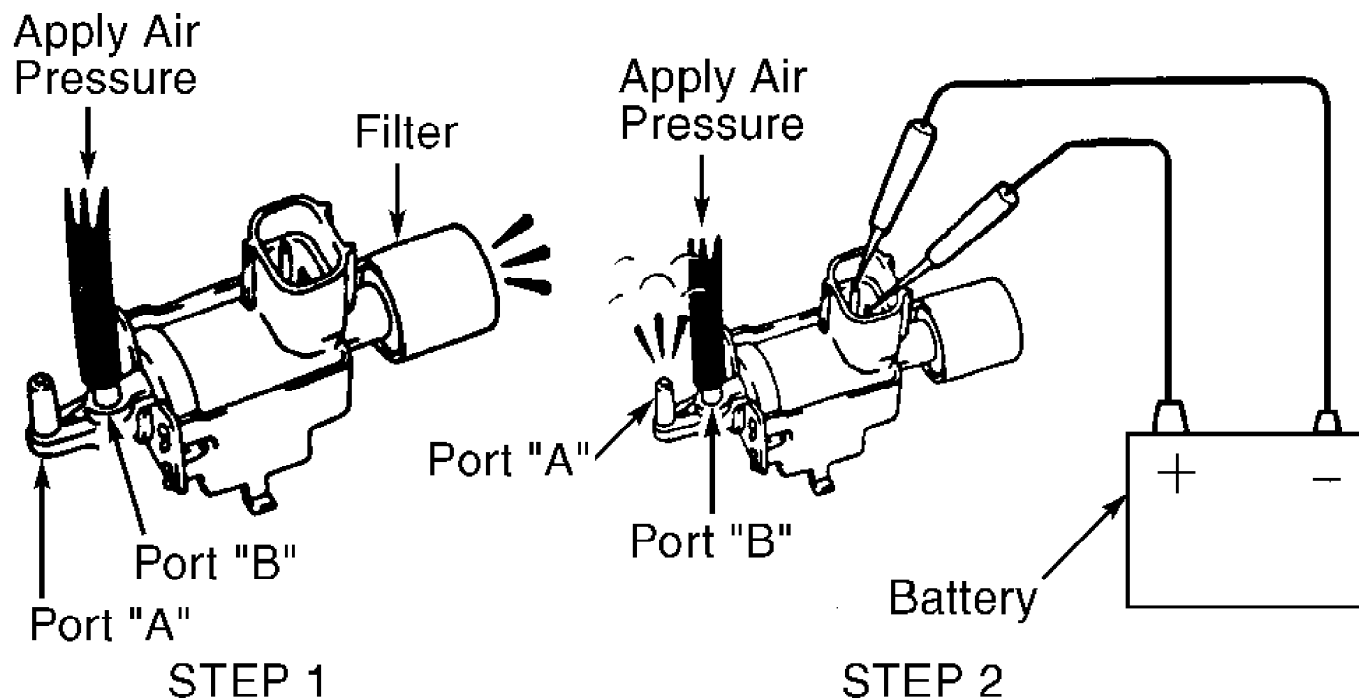
"B". Ensure air flows from port "A". Perform STEP 2. See Fig. 3. Replace intake air control valve VSV if defective. Recheck system operation.

11) If intake air control valve VSV is okay, reinstall intake air control valve VSV. Ensure ignition is off. Remove passenger's side door scuff plate.

12) Remove carpet below instrument panel on passenger's side for access to Engine Control Module (ECM). The ECM is located on the floor panel, below the glove box and ECM protector. Remove ECM protector.

13) Turn ignition on. Using voltmeter, check voltage between ground and ACIS (+) terminal (Green/Yellow wire) on ECM. See Fig. 4. This is the wire from ECM to intake air control valve VSV.

14) Voltage should be 9-14 volts. If voltage is not within specification, check for defective EFI main relay or wiring harness between EFI main relay, intake air control valve VSV and ECM. See EFI MAIN RELAY under MOTORS & RELAYS. See appropriate wiring diagram in L - WIRING DIAGRAMS article. If EFI main relay and wiring harness are okay, substitute another ECM and recheck system operation.



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Fig. 3: Testing Intake Air Control Valve VSV (Non-Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

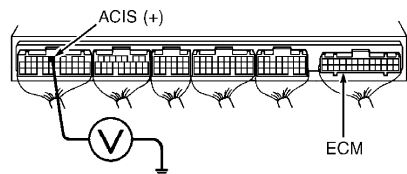


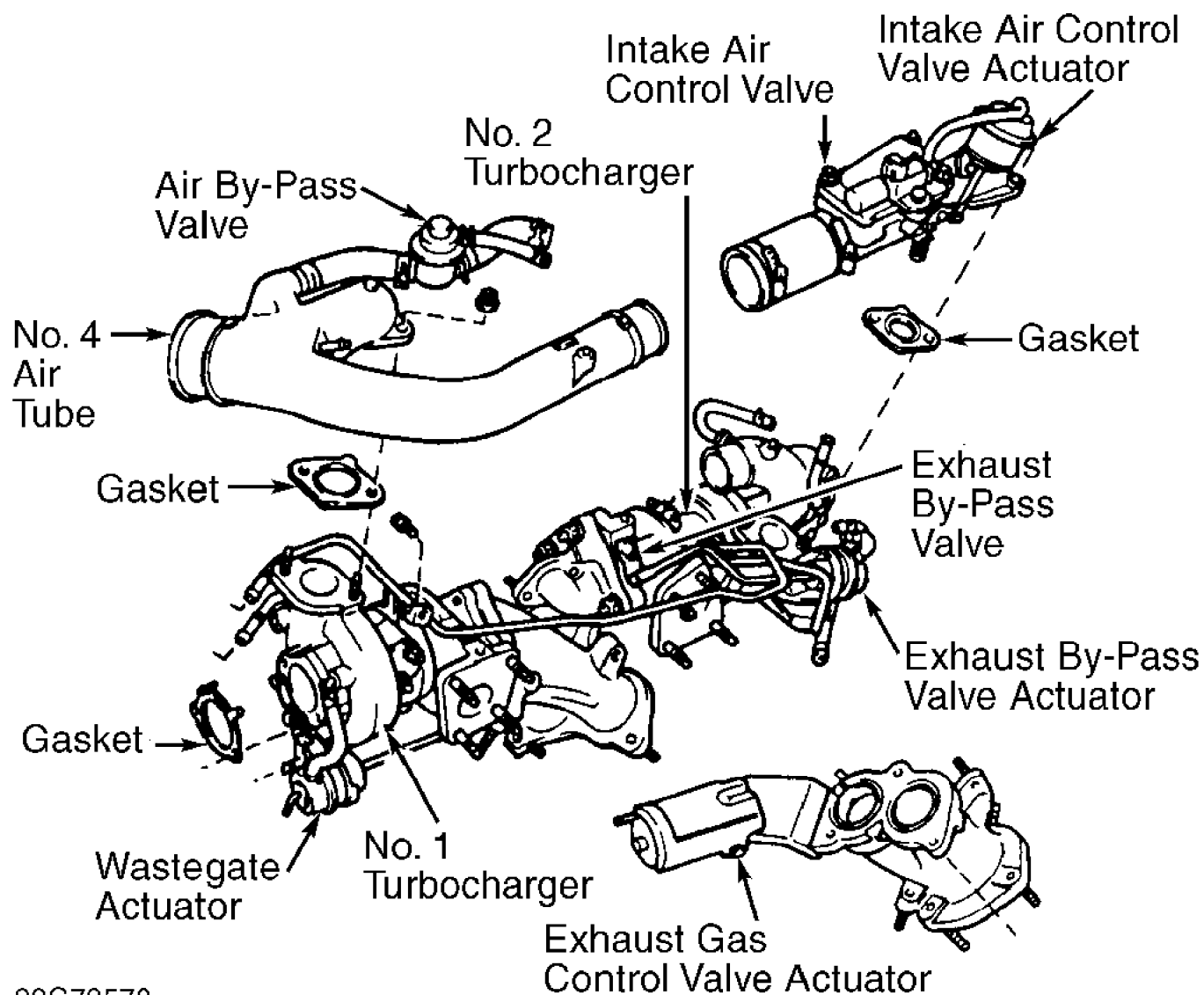
Fig. 4: Checking Voltage At ACIS (+) Terminal On ECM (Non-Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

TURBOCHARGERS

NOTE: No. 1 and 2 turbochargers are used along with various operating valves, actuators, intake air control valve and vacuum switching valves. See Fig. 5. For description of system operation, see TURBOCHARGERS under AIR INDUCTION SYSTEM in E - THEORY/OPERATION article.

Initial Checks

1) Check air intake system for cracks or restrictions.
Inspect exhaust system for leaks or restrictions.
2) Check air intake system and exhaust system for signs of oil leaks from turbocharger. Oil leaks may be caused by worn oil seals in the turbocharger.



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Fig. 5: Identifying Turbochargers & Components (Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

NOTE: Turbo pressure may be referred to as boost pressure.

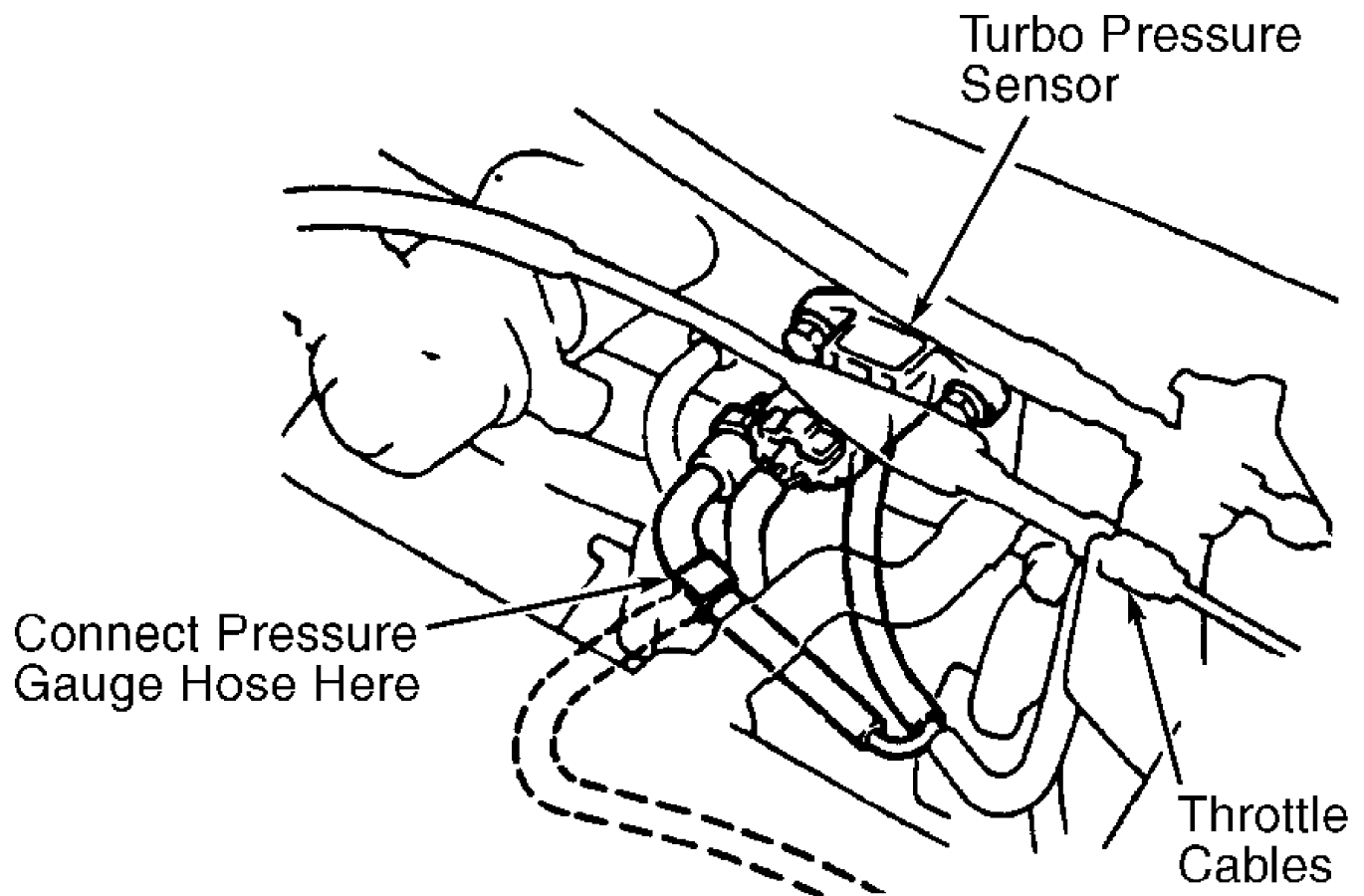
Turbo Pressure Check

1) Ensure intake air hoses are connected. Install hose, 3-way connector and pressure gauge between intake manifold gas filter and

turbo pressure sensor. See Fig. 6. Turbo pressure sensor is mounted on intake manifold, near throttle cables and contains a Black 3-pin electrical connector.

2) Drive vehicle with engine at 5600 RPM or more with throttle fully open and transmission in 1st gear on M/T or "L" range on A/T. Note turbo pressure. Turbo pressure should be 8.8-10.8 psi (.62-.76 kg/cm²).

3) If turbo pressure is less than specified, check intake air and exhaust systems for leaks. If no leaks exist, replace turbocharger assemblies. If turbo pressure exceeds specification, check wastegate actuator hose for leaks or cracks. If no leaks or cracks exist, replace turbocharger assemblies. Remove test equipment.



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Fig. 6: Connecting Pressure Gauge Hose For Checking Turbo Pressure (Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

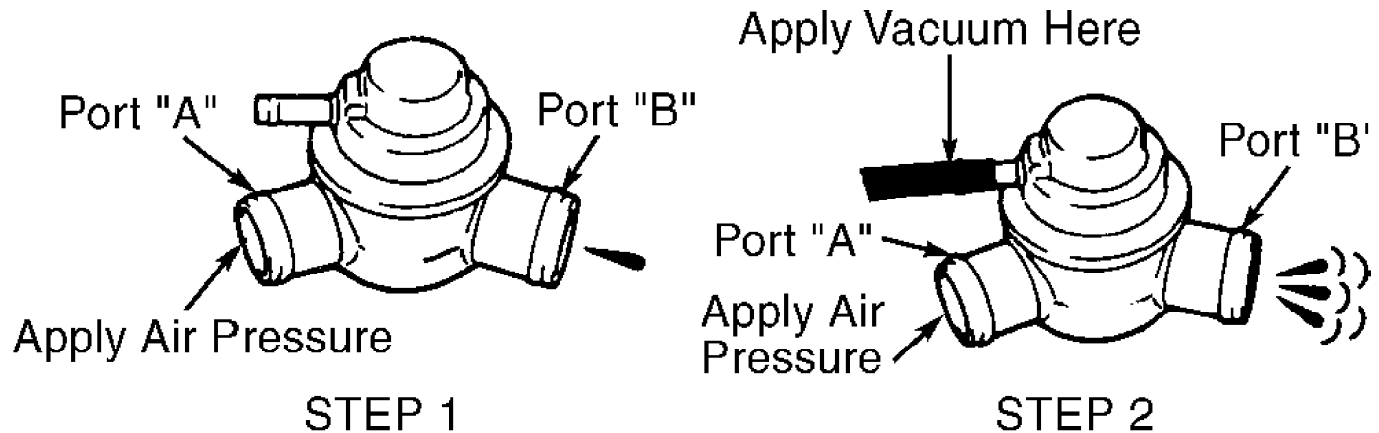
NOTE: If a problem exists in the turbo pressure, turbo pressure sensor, intake control valve circuit, wastegate valve control circuit, exhaust gas control valve circuit or exhaust by-pass valve control circuit, a Diagnostic Trouble Code (DTC) will be stored in the Engine Control Module (ECM). For diagnosis of DTCs, see appropriate G - TESTS W/CODES article.

Air By-Pass Valve

1) Disconnect hoses from air by-pass valve. Air by-pass valve

is located on No. 4 air tube. See Fig. 5. Apply air pressure to port "A". Ensure air does not pass from port "B". Perform STEP 1. See Fig. 7.

2) Using vacuum pump, apply vacuum to air by-pass valve. Apply air pressure to port "A". Ensure air flows from port "B". Perform STEP 2. See Fig. 7. Replace air by-pass valve if defective. Disconnect vacuum pump. Reconnect hoses.



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Fig. 7: Testing Air By-Pass Valve (Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

Exhaust By-Pass Valve Actuator & Exhaust By-Pass Valve

1) Disconnect hoses from exhaust by-pass valve actuator. See Fig. 5. Place plug on one hose fitting on exhaust by-pass valve actuator.

2) Using Pressure Gauge/Pump (SST 09992-00242), apply about 14.7 psi (1.03 kg/cm²) of pressure to other hose fitting on exhaust by-pass valve actuator. Ensure exhaust by-pass valve actuator rod moves and exhaust by-pass valve opens.

CAUTION: DO NOT apply more than 16.6 psi (1.17 kg/cm²) pressure to exhaust by-pass valve actuator.

3) Replace No. 2 turbocharger assembly if exhaust by-pass valve actuator rod does not move or exhaust by-pass valve fails to open. Remove pressure gauge/pump and plug. Reconnect hoses.

Exhaust Gas Control Valve Actuator

1) Disconnect hose from exhaust gas control valve actuator. See Fig. 5. Using Pressure Gauge/Pump (SST 09992-00242), apply about 7.1 psi (.50 kg/cm²) of pressure to exhaust gas control valve actuator. Ensure exhaust gas control valve actuator rod and valve moves.

2) Replace exhaust gas control valve assembly if exhaust gas control valve actuator rod does not move or valve fails to open. Remove pressure gauge/pump and reconnect hose.

Intake Air Control Valve Actuator

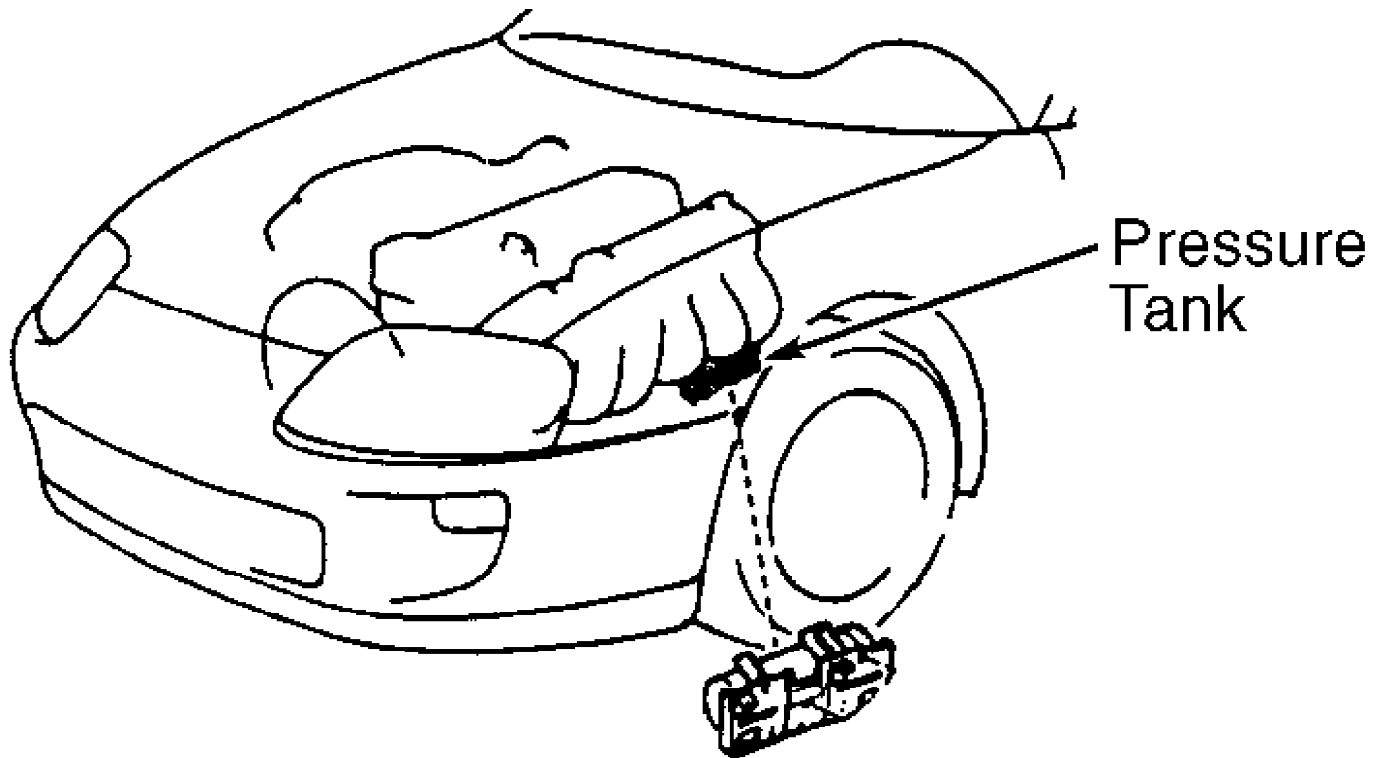
1) Disconnect hose from intake air control valve actuator. See Fig. 5. Using Pressure Gauge/Pump (SST 09992-00242), apply about 7.8 psi (.55 kg/cm²) of pressure to intake air control valve actuator.

2) Ensure intake air control valve actuator rod moves and intake air valve opens. Replace intake air control valve assembly if intake air control valve actuator rod does not move or valve fails to open. Remove pressure gauge/pump and reconnect hose.

Pressure Tank

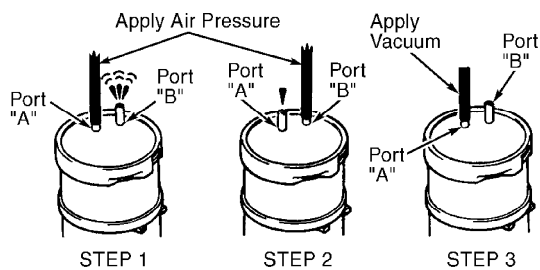
1) Disconnect hoses from pressure tank. Pressure tank is located below air intake chamber. See Fig. 8. Apply air pressure to port "A" on pressure tank. Ensure air flows from port "B" on pressure tank. Perform STEP 1. See Fig. 9.

2) Apply air pressure to port "B" on pressure tank. Ensure air does not flow from port "A" on pressure tank. Perform STEP 2. See Fig. 9. Using vacuum pump, apply about 18 in. Hg of vacuum to port "A" on pressure tank. Perform STEP 3. See Fig. 9. Ensure vacuum reading holds for at least one minute. Replace pressure tank if defective. Remove vacuum pump and reconnect hoses.



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Fig. 8: Locating Pressure Tank (Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.



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Fig. 9: Testing Pressure Tank (Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

Wastegate Actuator & Wastegate Valve

1) Disconnect hose on wastegate actuator from housing on

turbocharger and plug hose. Disconnect hose from end of wastegate actuator. See Fig. 5.

2) Using Pressure Gauge/Pump (SST 09992-00242), apply about 17.8 psi (1.25 kg/cm²) of pressure to wastegate actuator. Ensure wastegate actuator rod moves and wastegate valve opens.

CAUTION: DO NOT apply more than 19.8 psi (1.39 kg/cm²) pressure to wastegate actuator.

3) Replace No. 1 turbocharger assembly if wastegate actuator rod does not move or wastegate valve fails to open. Remove pressure gauge/pump and reconnect hoses.

Impeller Wheel Rotation

Rotate impeller wheel in air intake side of each turbocharger and verify smooth rotation. Replace turbocharger if impeller wheel binds, drags or does not rotate smoothly.

Turbine Shaft End Play & Turbine Shaft Radial Play

1) Remove turbochargers from exhaust manifold. See appropriate N - REMOVE/INSTALL/OVERHAUL article.

2) To check turbine shaft end play, install dial indicator with stem resting against end of turbine shaft on turbocharger. See Fig. 10.

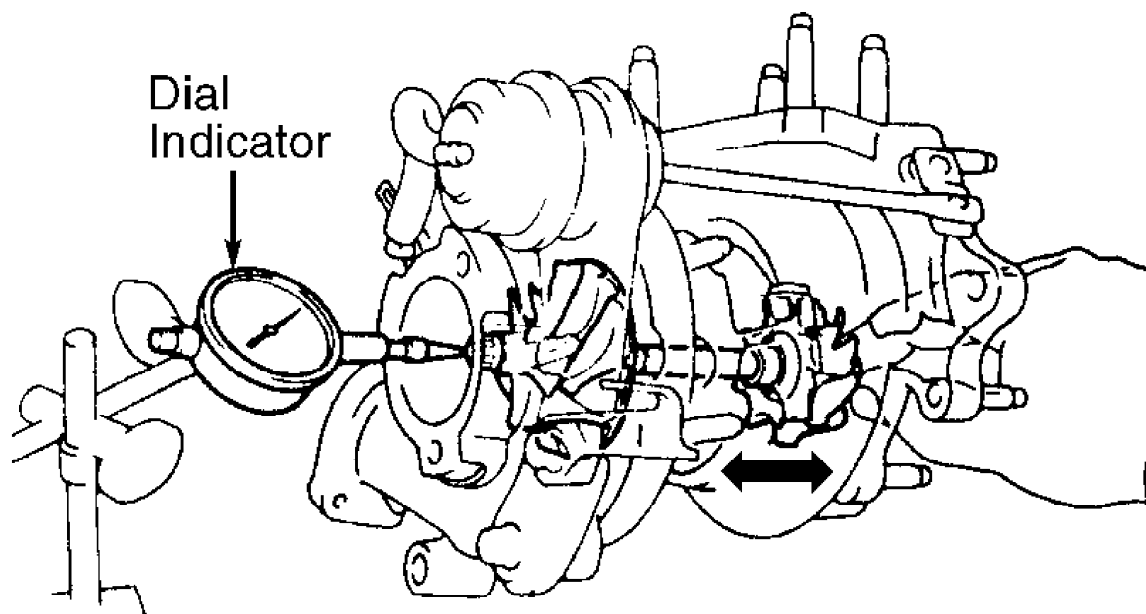
3) Move turbine shaft back and forth while noting turbine shaft end play on dial indicator. See Fig. 10. Remove dial indicator.

4) To check turbine shaft radial play, install dial indicator with stem extending into oil drain tube hole and against center of turbine shaft. See Fig. 10.

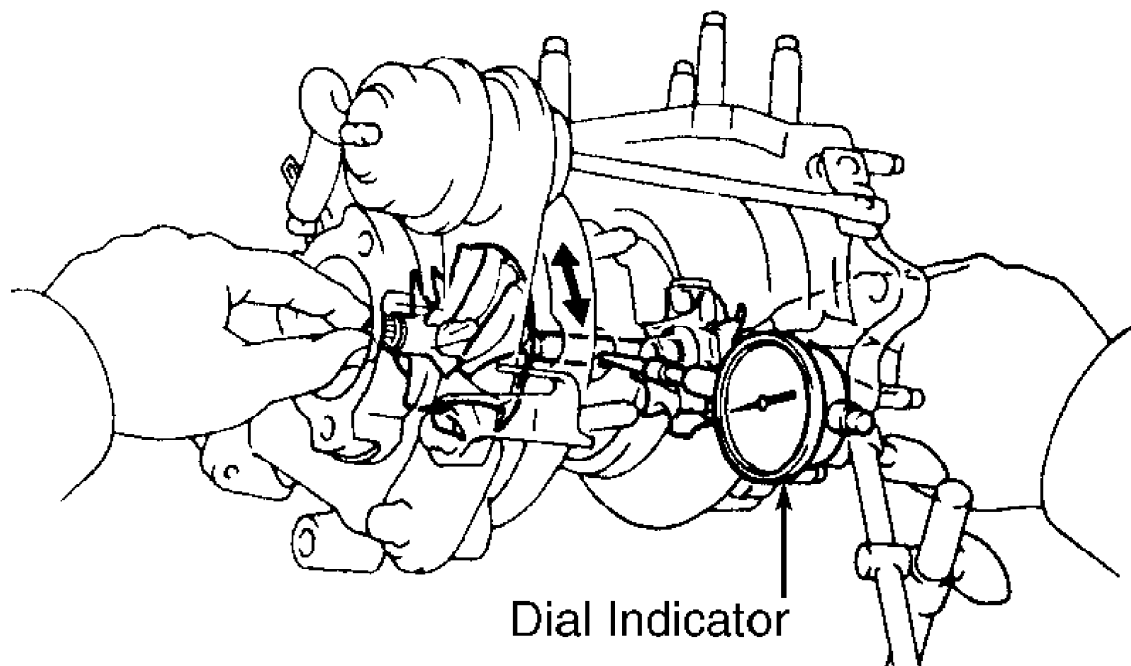
5) Move turbine shaft inward and outward while noting turbine shaft radial play on dial indicator. See Fig. 10 Repeat procedure on both turbochargers. Replace turbocharger if turbine shaft end play or turbine shaft radial play exceeds specification. See TURBOCHARGER SPECIFICATIONS table. Reinstall turbochargers.

TURBOCHARGER SPECIFICATIONS TABLE

Measurement	In. (mm)
Turbine Shaft End Play .....	.0043 (.110)
Turbine Shaft Radial Play0068 (.173)



CHECKING TURBINE SHAFT END PLAY



CHECKING TURBINE SHAFT RADIAL PLAY

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Fig. 10: Checking Turbine Shaft End Play & Turbine Shaft Radial Play
On Turbocharger (Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

NOTE: For testing of exhaust by-pass valve Vacuum Switching Valve

(VSV), exhaust gas control valve VSV, intake air control valve VSV and wastegate VSV, see EXHAUST GAS CONTROL VALVE VSV, EXHAUST BY-PASS VALVE VSV, INTAKE AIR CONTROL VALVE VSV & WASTEGATE VSV under ENGINE SENSORS, SWITCHES & VALVES.

VARIABLE VALVE TIMING (VVT) SYSTEM

NOTE: The VVT system may also be referred to as the Variable Valve Timing Intelligent (VVT-I or VVT-i) system.

Non-Turbo

For testing of VVT system and oil control valve, see OIL CONTROL VALVE & VVT SYSTEM under ENGINE SENSORS, SWITCHES & VALVES.

COMPUTERIZED ENGINE CONTROLS

ENGINE CONTROL MODULE

Power & Ground Circuits

For testing of Engine Control Module (ECM) power and ground circuits, see J - PIN VOLTAGE CHARTS article. The ECM is located below passenger's side of instrument panel, underneath carpet on the floor, below glove box.

ENGINE SENSORS, SWITCHES & VALVES

ACCELERATOR PEDAL POSITION SENSOR

Non-Turbo

For testing of accelerator pedal position sensor, see THROTTLE BODY under IDLE CONTROL SYSTEM.

AIRFLOW METER

NOTE: Airflow meter may be referred to as Mass Airflow (MAF) meter.

Non-Turbo

1) Airflow meter is located at passenger's side front corner of engine compartment, attached to air intake hose near upper cap on air cleaner assembly. Remove airflow meter. See appropriate N - REMOVE/INSTALL/OVERHAUL article.

2) Using ohmmeter, check resistance between terminals E2 and THA on airflow meter. Perform STEP 1. See Fig. 11. Resistance should be within specification in relation to the temperature. See AIRFLOW METER RESISTANCE table. Replace airflow meter if resistance is not within specification.

3) To check airflow meter operation, ensure electrical connector is installed on airflow meter. Connect voltmeter positive lead to terminal VG and negative lead to terminal E2G on airflow meter with electrical connector installed. Perform STEP 2. See Fig. 11.

4) Turn ignition on. Apply air pressure into airflow meter and note voltage reading. Perform STEP 2. See Fig. 11. While air pressure is being applied, voltage reading should fluctuate. Replace airflow meter if voltage does not fluctuate. Turn ignition off. Remove voltmeter.

Turbo

1) Airflow meter is located at passenger's side front corner of engine compartment, between air intake hose and the upper cap on air cleaner assembly. Remove airflow meter. See appropriate N -

REMOVE/INSTALL/OVERHAUL article.

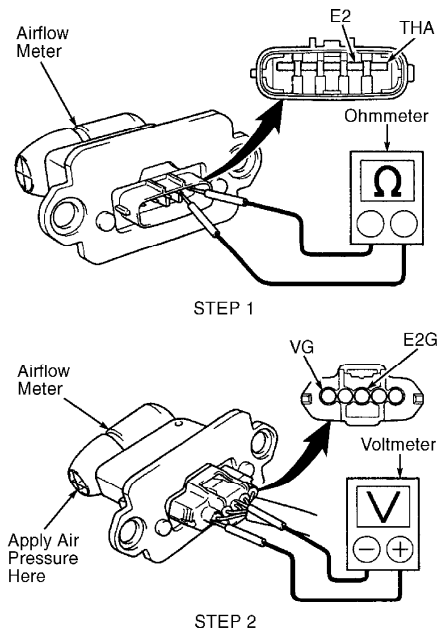
2) Using ohmmeter, check resistance between terminals E2 and THA on airflow meter. Perform STEP 1. See Fig. 12. Resistance should be within specification in relation to the temperature. See AIRFLOW METER RESISTANCE table. Replace airflow meter if resistance is not within specification.

3) To check airflow meter operation, ensure electrical connector is installed on airflow meter. Connect voltmeter positive lead to terminal VG and negative lead to terminal E2I on airflow meter with electrical connector installed. Perform STEP 2. See Fig. 12.

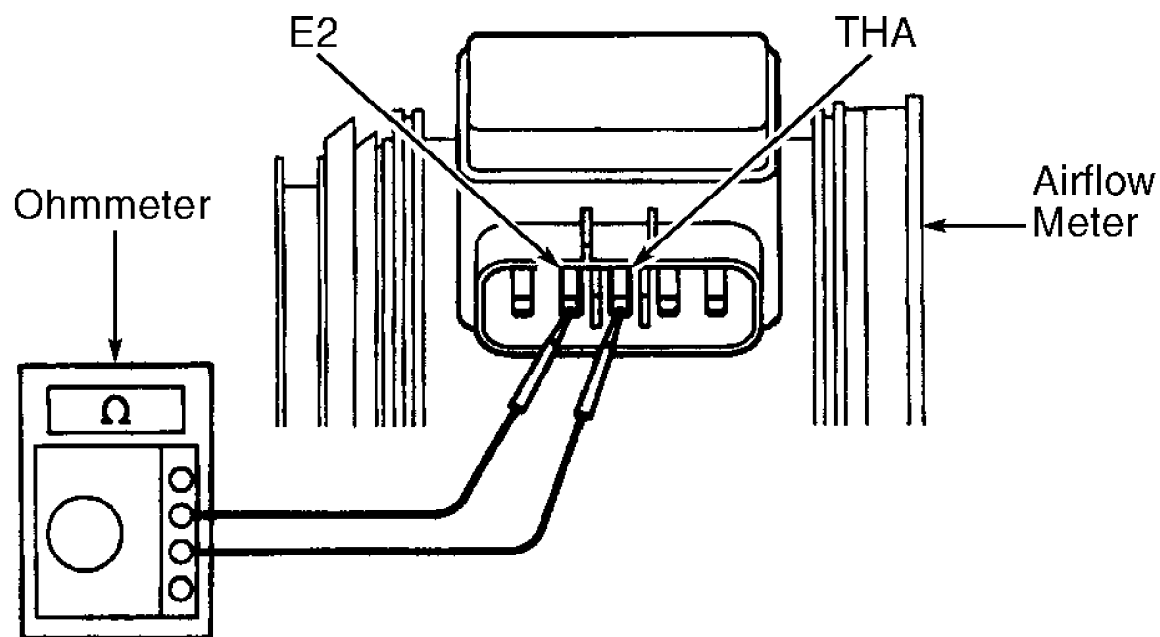
4) Turn ignition on. Apply air pressure into airflow meter and note voltage reading. Perform STEP 2. See Fig. 12. While air pressure is being applied, voltage reading should fluctuate. Replace airflow meter if voltage does not fluctuate. Turn ignition off. Remove voltmeter.

AIRFLOW METER RESISTANCE TABLE

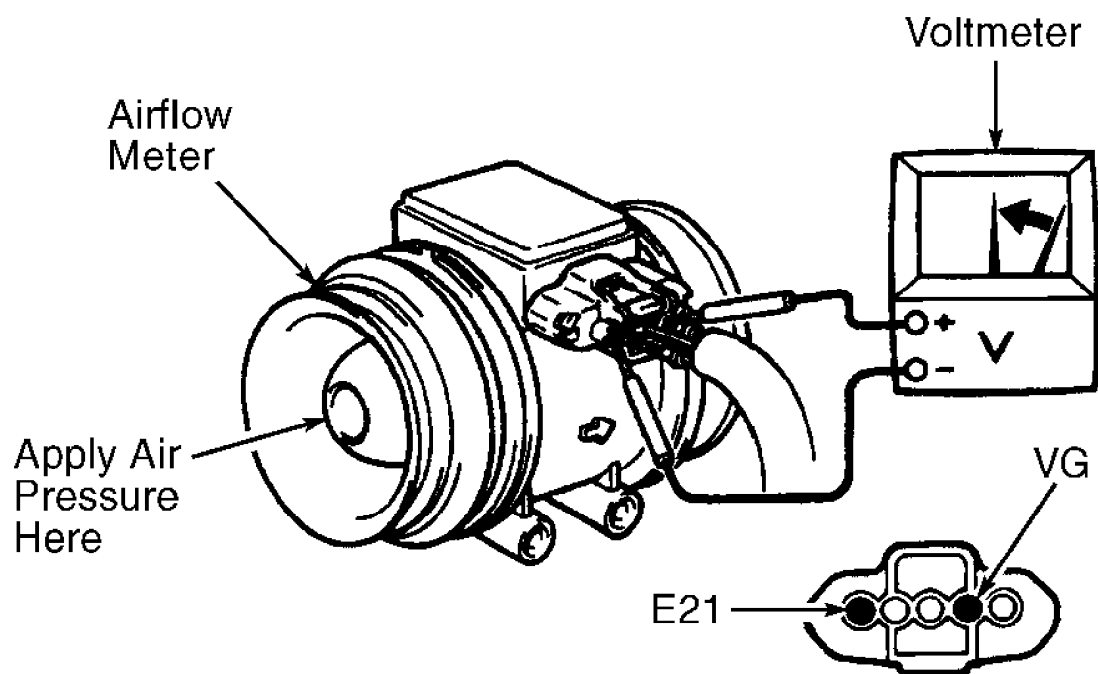
Application & Terminals		Ohms
Non-Turbo		
E2 & THA		
-4°F (-20°C)	.....	13,600-18,400
68°F (20°C)	.....	2210-2690
140°F (60°C)	.....	493-667
Turbo		
E2 & THA		
-4°F (-20°C)	10,000-20,000
32°F (0°C)	4000-7000
68°F (20°C)	2000-3000
104°F (40°C)	900-1300
140°F (60°C)	400-700



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Fig. 11: Testing Airflow Meter (Non-Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.



STEP 1



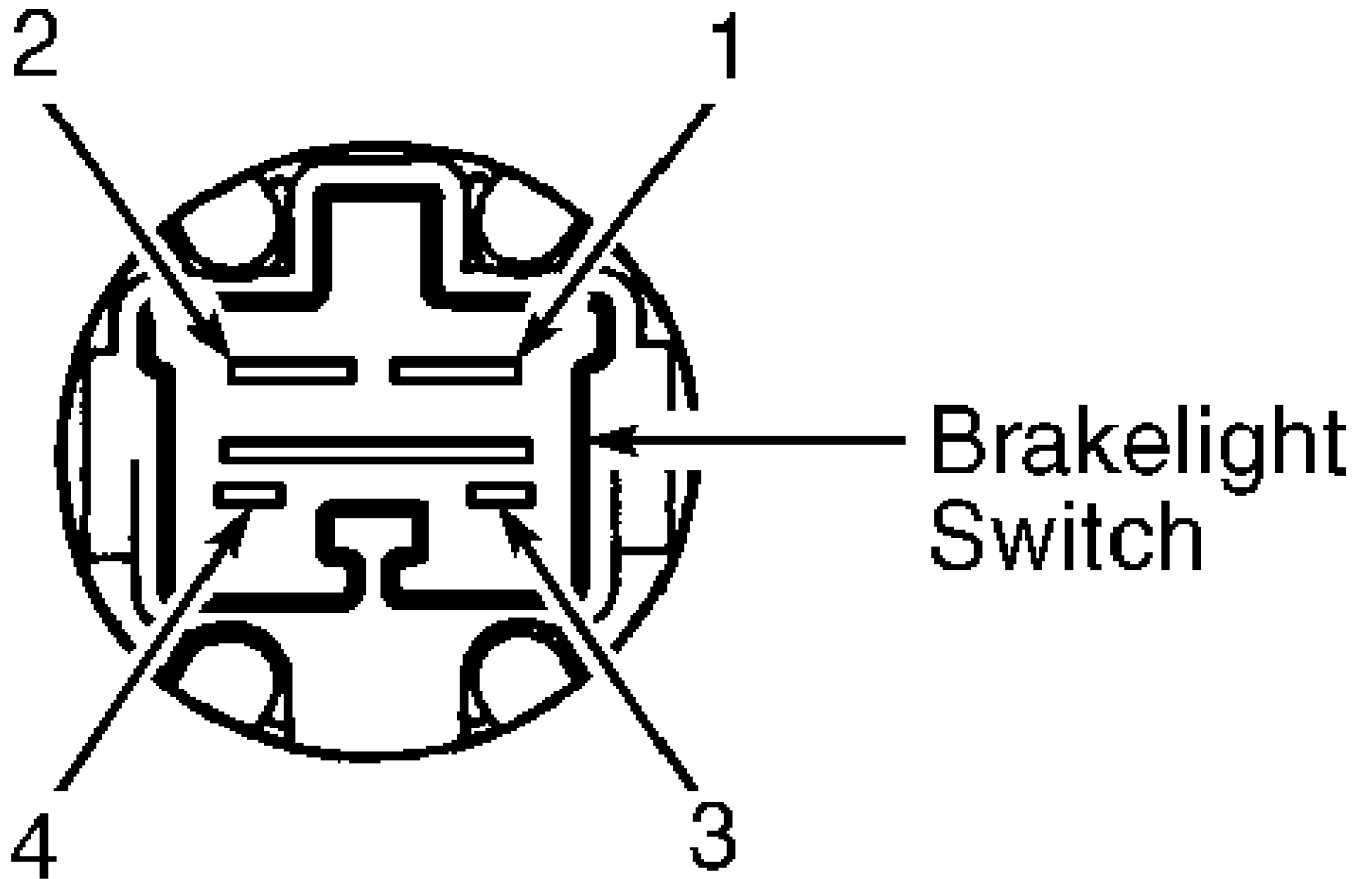
STEP 2

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Fig. 12: Testing Airflow Meter (Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

BRAKELIGHT SWITCH

1) Disconnect electrical connector at brakelight switch. Brakelight switch is located near top of brake pedal. Note terminal identification on brakelight switch. See Fig. 13.

2) Using ohmmeter, check that continuity exists between terminals No. 1 and 2 with brake pedal depressed. Check that continuity exists between terminals No. 3 and 4 with brake pedal released. Adjust or replace brakelight switch if operation is not as described.



98C11447

Fig. 13: Identifying Brakelight Switch Terminals
Courtesy of Toyota Motor Sales, U.S.A., Inc.

CAMSHAFT POSITION SENSOR

For testing of camshaft position sensor(s), see appropriate F - BASIC TESTING article.

CRANKSHAFT POSITION SENSOR

For testing crankshaft position sensor, see appropriate F - BASIC TESTING article.

EGR GAS TEMPERATURE SENSOR

Turbo

1) Remove EGR gas temperature sensor. The EGR gas temperature is screwed into a gas passage, near bottom of EGR valve and contains a Gray 2-pin electrical connector. Place probe end of EGR gas temperature sensor and thermometer in container of oil.

2) Attach ohmmeter between electrical terminals on EGR gas temperature sensor. Heat oil and note resistance at specified temperature. See EGR GAS TEMPERATURE SENSOR RESISTANCE table. Replace EGR gas temperature sensor if resistance is not within specification. Reinstall EGR gas temperature sensor and tighten to 15 ft. lbs. (20 N. m).

EGR GAS TEMPERATURE SENSOR RESISTANCE TABLE

Temperature °F (°C)	Ohms
122 (50)	64,000-97,000
212 (100)	11,000-16,000
302 (150)	2000-4000

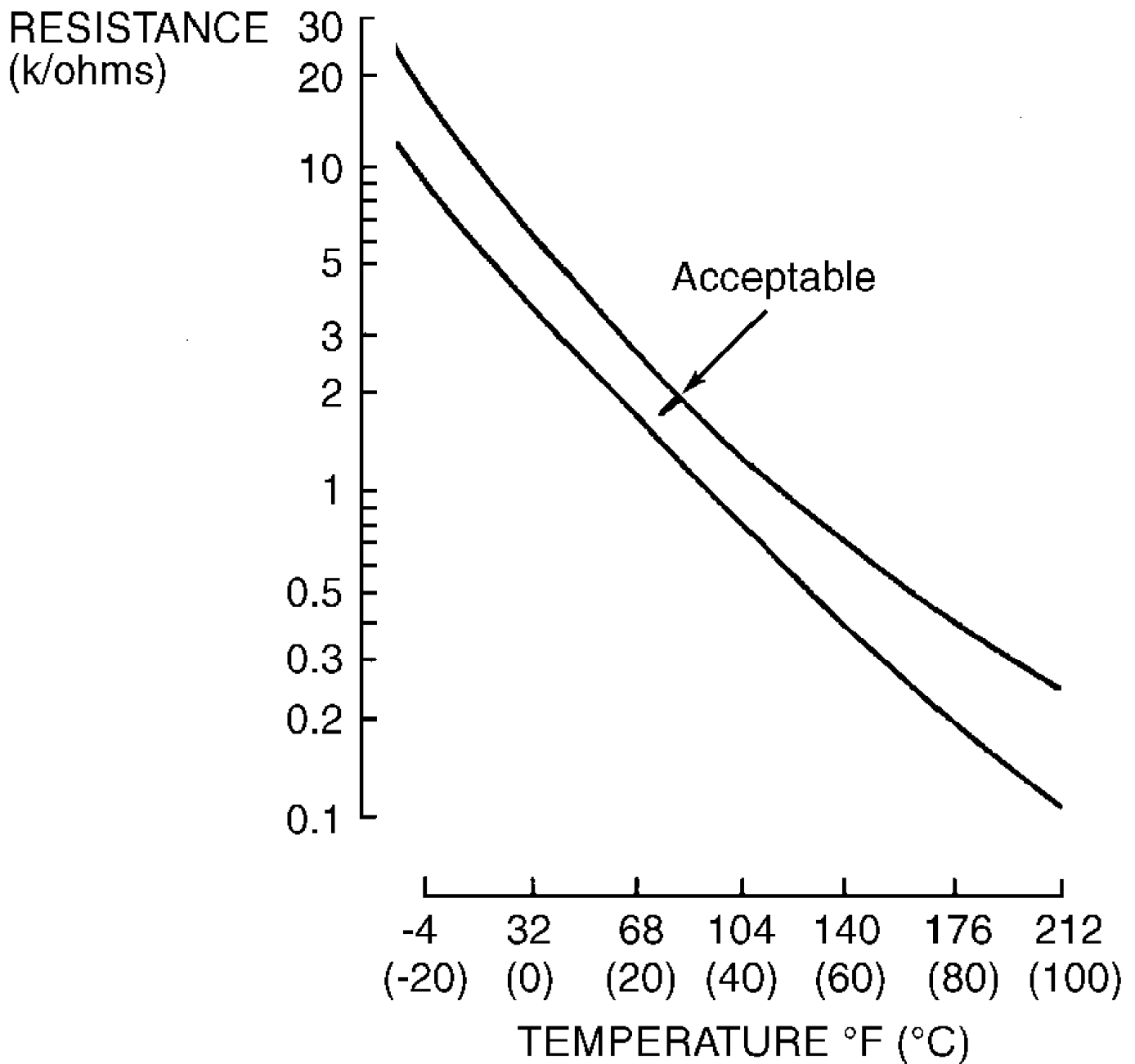
ENGINE COOLANT TEMPERATURE (ECT) SENSOR

1) Ensure ignition is off. Disconnect electrical connector from ECT sensor. See ENGINE COOLANT TEMPERATURE (ECT) SENSOR LOCATION table. Drain cooling system. Remove ECT sensor and gasket.

2) Place probe end of ECT sensor and thermometer in container of water. Attach ohmmeter between electrical terminals on ECT sensor. Heat water and note that resistance is within specification in relation to temperature. See Fig. 14. Replace ECT sensor if resistance is not within specification. Using NEW gasket, reinstall ECT sensor.

ENGINE COOLANT TEMPERATURE (ECT) SENSOR LOCATION TABLE

Model	Location
Non-Turbo	Front Sensor On Driver's Side Front Of Cylinder Head, Near Power Steering Pump & Contains Green 2-Pin Electrical Connector With Blue & White/Black Wires
Turbo	On Coolant Pipe At Passenger's Side Front Corner Of Cylinder Head & Contains Dark Gray 2-Pin Electrical Connector With Blue/Yellow & White/Black Wires



95D32501

Fig. 14: Testing Engine Coolant Temperature (ECT) Sensor
Courtesy of Toyota Motor Sales, U.S.A., Inc.

HEATED OXYGEN SENSOR

Non-Turbo

1) Four heated oxygen sensors are used. On front exhaust manifold, one heated oxygen sensor is mounted on exhaust manifold above catalytic converter (bank No. 1 sensor No. 1) and another heated oxygen sensor is mounted on exhaust manifold below catalytic converter (bank No. 1 sensor No. 2). On rear exhaust manifold, one heated oxygen sensor is mounted on exhaust manifold above catalytic converter (bank No. 2 sensor No. 1) and another heated oxygen sensor is mounted on

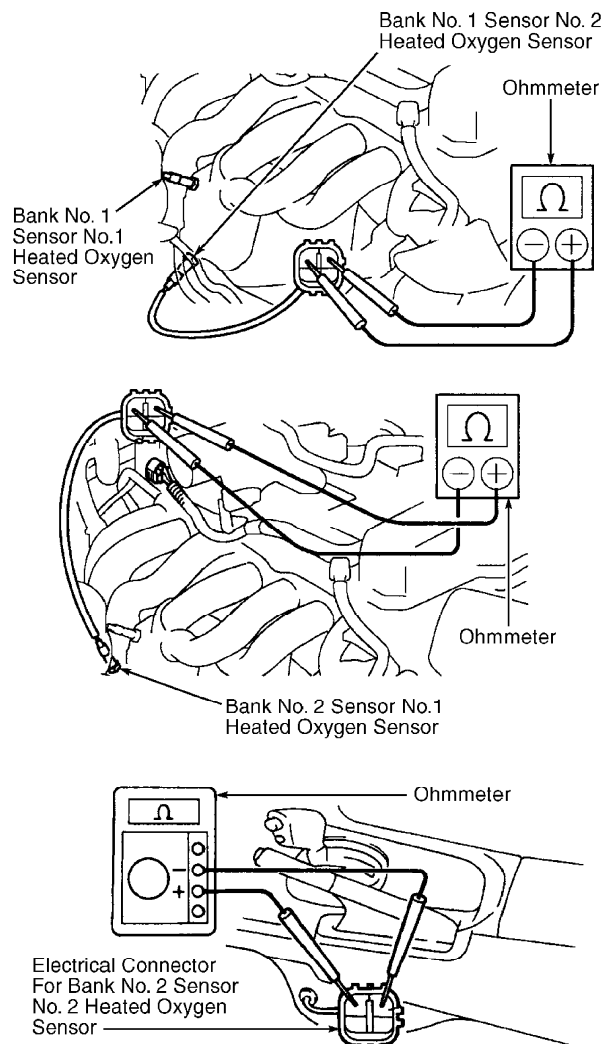
pipe behind catalytic converter (bank No. 2 sensor No. 2).

2) If a problem exists with any one of the heated oxygen sensors, a Diagnostic Trouble Code (DTC) will be stored in the Engine Control Module (ECM). For diagnosis of DTCs, see appropriate G - TESTS W/CODES article.

NOTE: Electrical connector for heated oxygen sensor mounted on pipe behind catalytic converter (bank No. 2 sensor No. 2) is located below driver's side of center console, just below emergency brake lever. See Fig. 15.

3) To test the heater on heated oxygen sensor, disconnect electrical connector from appropriate heated oxygen sensor. See Fig. 15.

4) Using ohmmeter, check resistance between specified terminals on heated oxygen sensor. See Fig. 15. Replace heated oxygen sensor if resistance is not 11-16 ohms at 68°F (20°C).



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Fig. 15: Testing Heater On Heated Oxygen Sensor (Non-Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

Turbo

1) One heated oxygen sensor is mounted on exhaust gas control

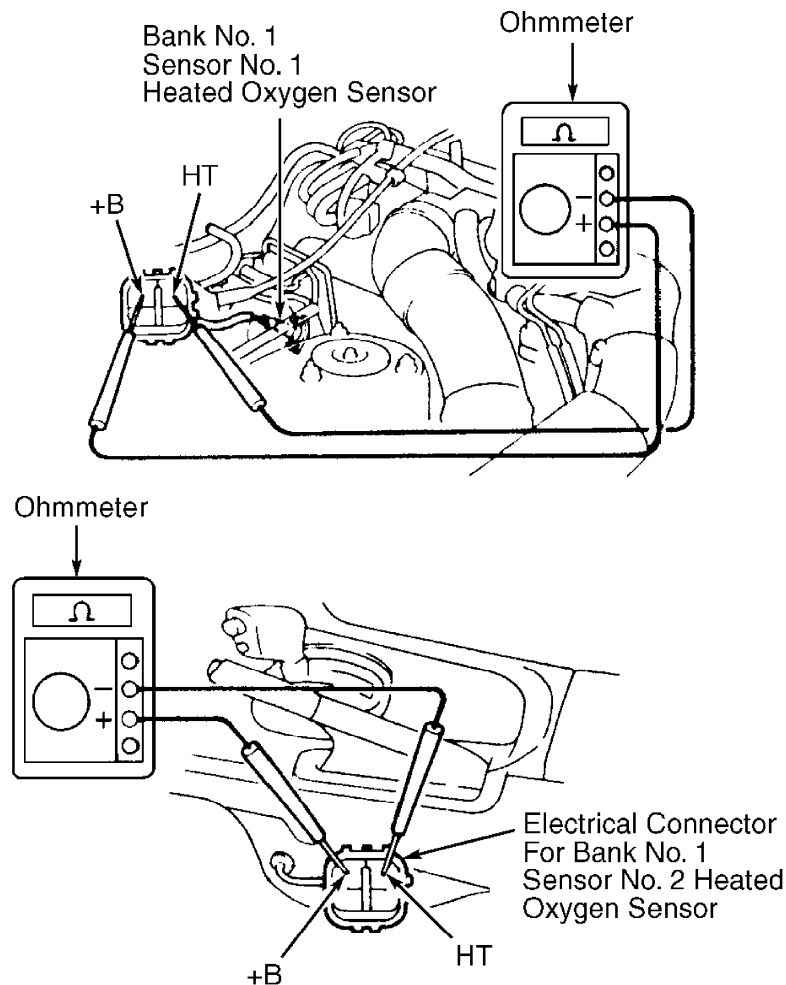
valve assembly on rear of turbocharger (bank No. 1 sensor No. 1). Another heated oxygen sensor is located on exhaust pipe in front of rear catalytic converter (bank No. 1 sensor No. 2).

2) If a problem exists with any one of the heated oxygen sensors, a Diagnostic Trouble Code (DTC) will be stored in the Engine Control Module (ECM). For diagnosis of DTCs, see appropriate G - TESTS W/CODES article.

NOTE: Electrical connector for heated oxygen sensor on exhaust pipe in front of rear catalytic converter (bank No. 1 sensor No. 2) is located below driver's side of center console, just below emergency brake lever. See Fig. 16.

3) To test the heater on heated oxygen sensor, disconnect electrical connector from appropriate heated oxygen sensor. See Fig. 16.

4) Using ohmmeter, check resistance between specified terminals on heated oxygen sensor. See Fig. 16. Replace heated oxygen sensor if resistance is not 11-16 ohms at 68°F (20°C).



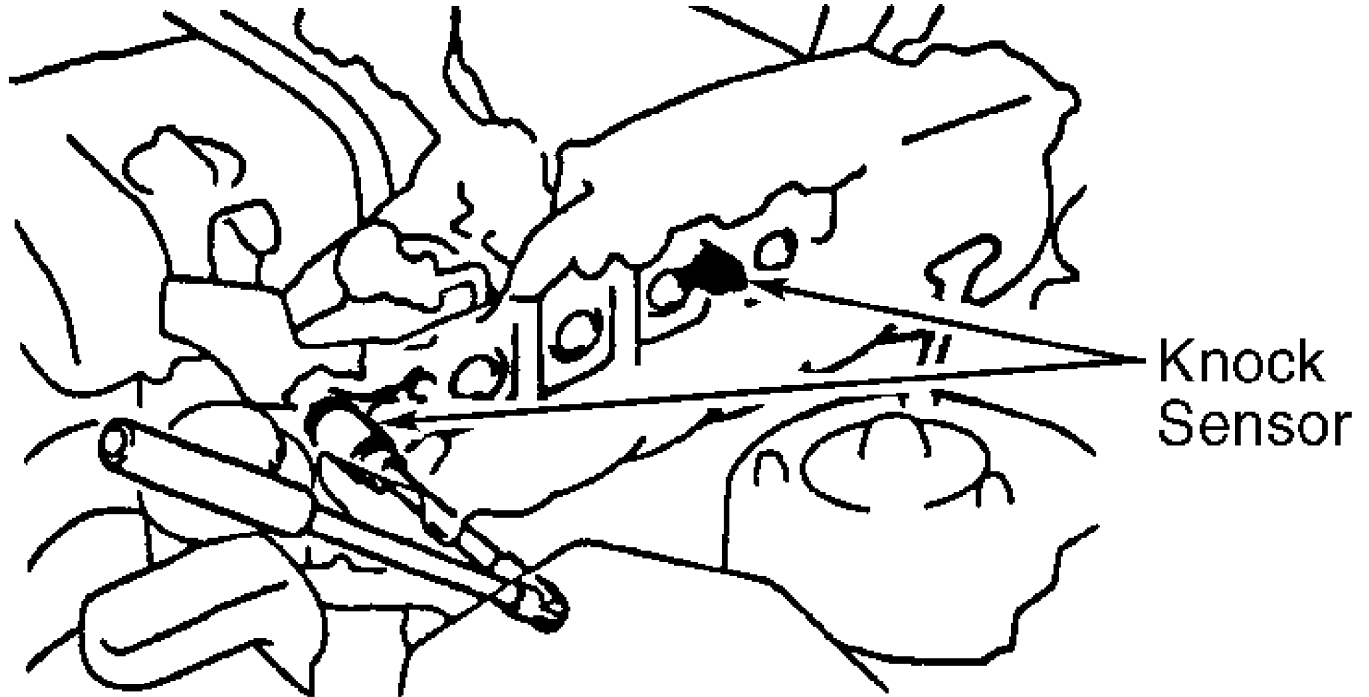
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Fig. 16: Testing Heater On Heated Oxygen Sensor (Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

KNOCK SENSOR

1) Knock sensors are located on driver's side of the cylinder block, just below cylinder head. See Fig. 17. Manufacturer recommends removing knock sensor from cylinder block before testing. See appropriate N - REMOVE/INSTALL/OVERHAUL article.

2) Using ohmmeter, check that no continuity exists between electrical terminal on knock sensor and body of knock sensor. Replace knock sensor if continuity exists.



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Fig. 17: Locating Knock Sensors
Courtesy of Toyota Motor Sales, U.S.A., Inc.

OIL CONTROL VALVE & VVT SYSTEM

NOTE: Oil control valve may also be referred to as OCV or camshaft timing oil control valve. The VVT system may also be referred to as the Variable Valve Timing Intelligent (VVT-I or VVT-i) system.

Non-Turbo

1) Disconnect electrical connector at oil control valve. Oil control valve is located on driver's side front corner of valve cover, just in front of oil filler cap on valve cover. See Fig. 18.

2) Using ohmmeter, check resistance between electrical terminals on oil control valve. See Fig. 18. Resistance should be 5.5-12.0 ohms at 68°F (20°C). If resistance is within specification, go to next step. If resistance is not within specification, replace oil control valve.

3) Reinstall electrical connector on oil control valve. To check VVT system operation, start engine and warm engine to normal operating temperature.

4) Apply battery voltage to White/Red wire at oil control valve with engine idling. Engine should stall or idle should become rough with battery voltage applied to oil control valve. If engine stalls or idle becomes rough, oil control valve and VVT system is

operating properly. If engine does not stall or idle becomes rough, go to next step.

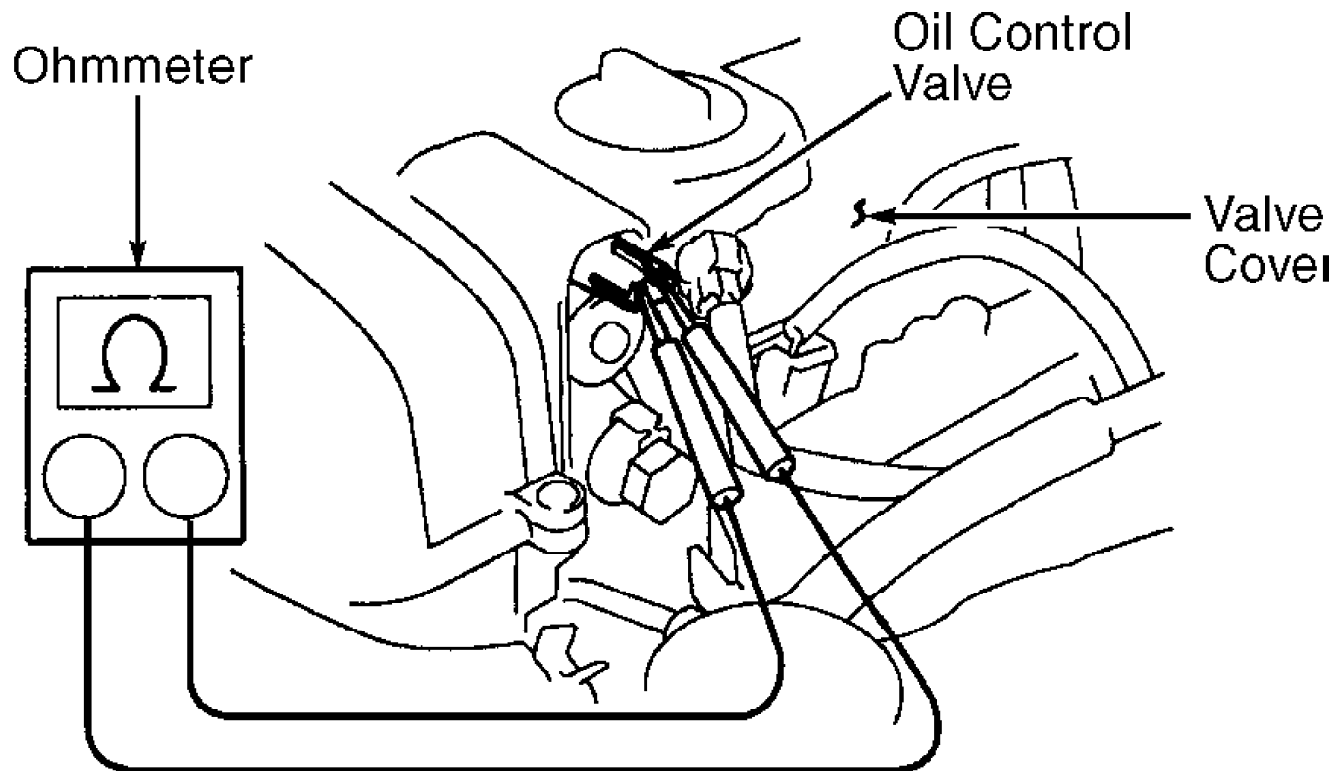
5) Oil control valve operation should be checked. Remove oil control valve. See appropriate N - REMOVE/INSTALL/OVERHAUL article.

6) Connect positive battery terminal to terminal No. 1 on oil control valve. See Fig. 19. Momentarily connect negative battery terminal to terminal No. 2 on oil control valve while noting operation of valve at center of oil control valve. See Fig. 19. Disconnect negative battery terminal and note operation of valve at center of oil control valve.

7) With battery voltage applied, the valve at center of oil control valve should move toward end of oil control valve, opposite electrical connector. See Fig. 19. With battery voltage disconnected, the valve at center of oil control valve should move inward, toward end of oil control valve with the electrical connector. See Fig. 19.

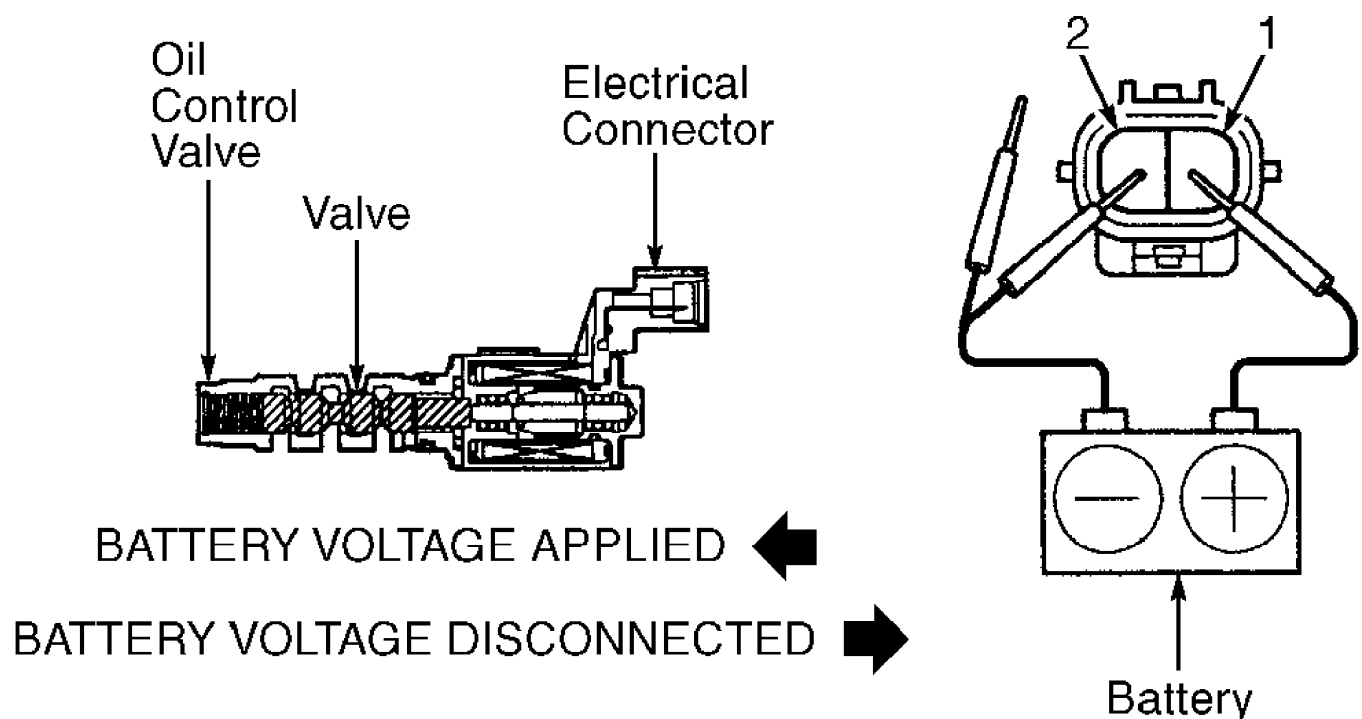
8) If oil control valve operates as specified, reinstall oil control valve. Go to next step. If oil control valve does not operate as specified, replace oil control valve and recheck system operation.

9) If oil control valve operates as specified, but VVT system does not operate properly, the intake camshaft sprocket, intake camshaft, Engine Control Module (ECM) or wiring circuit to oil control valve may be defective. Intake camshaft sprocket may also be referred to as VVT controller. If a problem exists in oil control valve or VVT system, Diagnostic Trouble Code (DTCs) may be stored in the ECM. For diagnosis of DTCs, see appropriate G - TESTS W/CODES article.



98E11449

Fig. 18: Locating & Testing Oil Control Valve Resistance (Non-Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.



98111450

Fig. 19: Testing Oil Control Valve Operation (Non-Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

PARK/NEUTRAL POSITION (PNP) SWITCH

A/T Models

1) Disconnect electrical connector from Park/Neutral Position (PNP) switch. PNP switch is mounted on side of transmission. Note terminal identification. See Fig. 20.

2) Using ohmmeter, check for continuity between specified terminals with shift lever in proper positions. See PARK/NEUTRAL POSITION SWITCH SPECIFICATIONS table. If proper continuity cannot be obtained, adjust or replace PNP switch as necessary.

PARK/NEUTRAL POSITION SWITCH SPECIFICATIONS TABLE

Shift Lever Position	Continuity Between Terminals No.
Park	4 & 7; 5 & 6
Reverse	4 & 8
Neutral	4 & 10; 5 & 6
Drive	4 & 9
2	2 & 4
Low	3 & 4

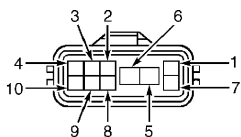


Fig. 20: Identifying Park/Neutral Position Switch Terminals
Courtesy of Toyota Motor Sales, U.S.A., Inc.

POWER STEERING PRESSURE SWITCH

Non-Turbo

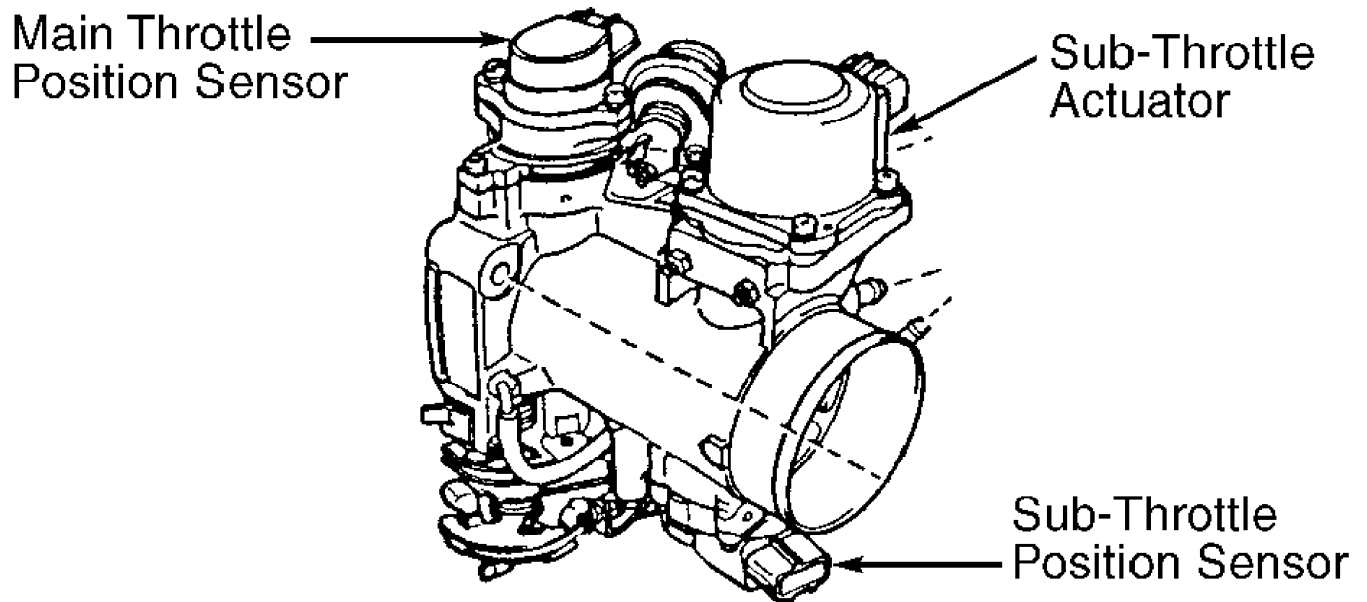
Testing information is not available at time of publication.

SUB-THROTTLE ACTUATOR

Turbo

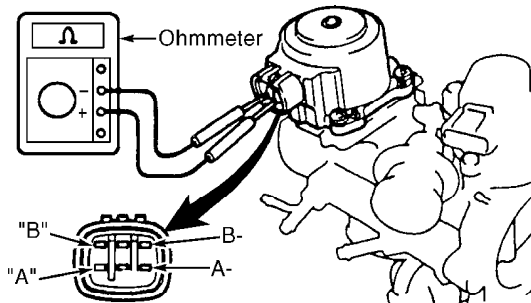
1) Disconnect electrical connector from sub-throttle actuator. Sub-throttle actuator is located on throttle body. See Fig. 21.

2) Using ohmmeter, check resistance between terminals "A" and A-, and "B" and B- on sub-throttle actuator. See Fig. 22. Resistance should be .40-.48 ohms at 68°F (20°C). Replace sub-throttle actuator if resistance is not within specification.



93H79639

Fig. 21: Locating Sub-Throttle Actuator, Sub-Throttle Position Sensor & Main Throttle Position Sensor (Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.



98J11451

Fig. 22: Testing Sub-Throttle Actuator Resistance (Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

SUB-THROTTLE POSITION SENSOR

Turbo

1) Disconnect electrical connector from sub-throttle actuator and sub-throttle position sensor. See Fig. 21.

2) Remove screws and sub-throttle actuator. Ensure no clearance exists between throttle stop screw and throttle valve gear with sub-throttle valve fully closed. Perform STEP 1. See Fig. 23.

3) With sub-throttle valve fully closed, insert specified thickness feeler gauge between throttle stop screw and throttle valve gear and then use ohmmeter to check resistance between specified terminals. See SUB-THROTTLE POSITION SENSOR RESISTANCE SPECIFICATIONS table. Perform STEPS 2 and 3. See Fig. 23.

4) Replace or adjust sub-throttle position sensor if resistance is not within specification. For adjustment procedures, see appropriate D - ADJUSTMENTS article. Reinstall sub-throttle actuator and electrical connectors.

SUB-THROTTLE POSITION SENSOR RESISTANCE SPECIFICATIONS TABLE

Application	Clearance In. (mm)	Terminals	Ohmmeter Reading
Turbo	Fully Closed ...	VTA & E2	300-6300
	.016 (.41)	IDL & E2	500 Or Less
	.019 (.48)	IDL & E2 ..	No Continuity
	Fully Open	VTA & E2	2000-10,800
		VC & E2	3500-6500

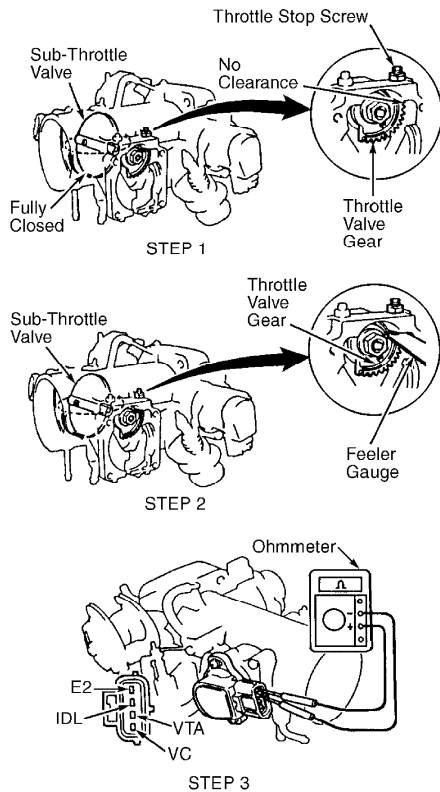


Fig. 23: Testing Sub-Throttle Position Sensor (Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

THROTTLE CONTROL MOTOR

Non-Turbo

For testing of throttle control motor, see THROTTLE BODY under IDLE CONTROL SYSTEM.

THROTTLE POSITION SENSOR

Non-Turbo

For testing of throttle position sensor, see THROTTLE BODY under IDLE CONTROL SYSTEM.

Turbo

1) Ensure ignition is off. Disconnect electrical connector from Throttle Position (TP) sensor. TP sensor is located on throttle body and may also be referred to as main TP sensor. See Fig. 21.

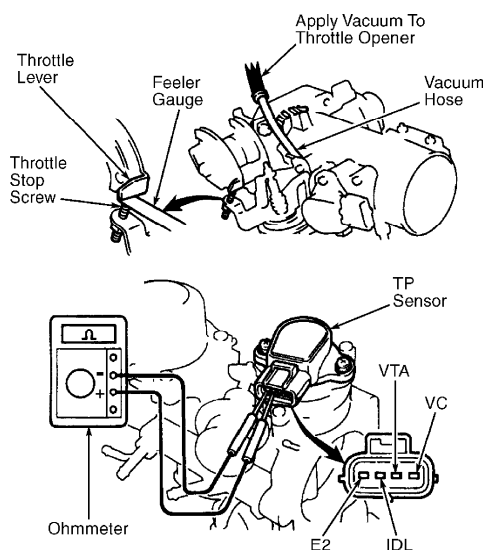
2) Disconnect vacuum hose and apply vacuum to throttle opener. See Fig. 24. Note terminal identification on TP sensor. See Fig. 24.

3) Insert specified thickness feeler gauge between throttle stop screw and throttle lever, and check resistance or continuity. See TP SENSOR RESISTANCE SPECIFICATIONS table. See Fig. 24. Replace or adjust TP sensor if not within specification. For adjustment procedures, see appropriate D - ADJUSTMENTS article.

TP SENSOR RESISTANCE SPECIFICATIONS TABLE

Application	Clearance In. (mm)	Terminals	Ohmmeter Reading
Turbo (1)	Fully Closed	...	VTA & E2
	.027 (.69)	.....	IDL & E2
	.032 (.81)	.....	IDL & E2
	Fully Open	.....	VTA & E2
			VC & E2
		
			340-6300
			500 Or Less
			No Continuity
			2400-11,200
			3100-7200

(1) - Apply vacuum to throttle opener before testing TP sensor.



98A11452
Fig. 24: Testing TP Sensor (Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

TURBO PRESSURE SENSOR

Turbo

1) Ensure ignition is off. To test turbo pressure sensor supply voltage, disconnect electrical connector from turbo pressure sensor. Turbo pressure sensor is mounted on intake manifold, near cable bracket. See Fig. 25. Turbo pressure sensor contains a Black 3-pin electrical connector with White/Black, Black/Yellow and Blue/Red wires.

2) Turn ignition on. Using voltmeter, check voltage between terminals VC and E2 of wiring harness side of the turbo pressure sensor electrical connector. The VC and E2 terminals are the outer terminals on each side of the electrical connector. DO NOT use the center terminal. Voltage should be 4.5-5.5 volts.

3) If voltage is not within specification, check wiring circuit. See appropriate wiring diagram in L - WIRING DIAGRAMS article. If voltage is within specification, turn ignition off. Reinstall electrical connector on turbo pressure sensor.

4) To test turbo pressure sensor output voltage, disconnect vacuum hose from turbo pressure sensor. Ensure ignition is off. Disconnect negative battery cable. Remove passenger's side door scuff plate.

5) Remove carpet below instrument panel on passenger's side for access to Engine Control Module (ECM). The ECM is located on the floor panel, below the glove box and ECM protector. Remove ECM protector. Remove nuts and separate ECM from floor panel. Loosen bolt and disconnect electrical connectors from ECM.

6) Install Check Harness (SST 09990-01000) between ECM and ECM electrical connectors. See Fig. 26. Reinstall negative battery cable.

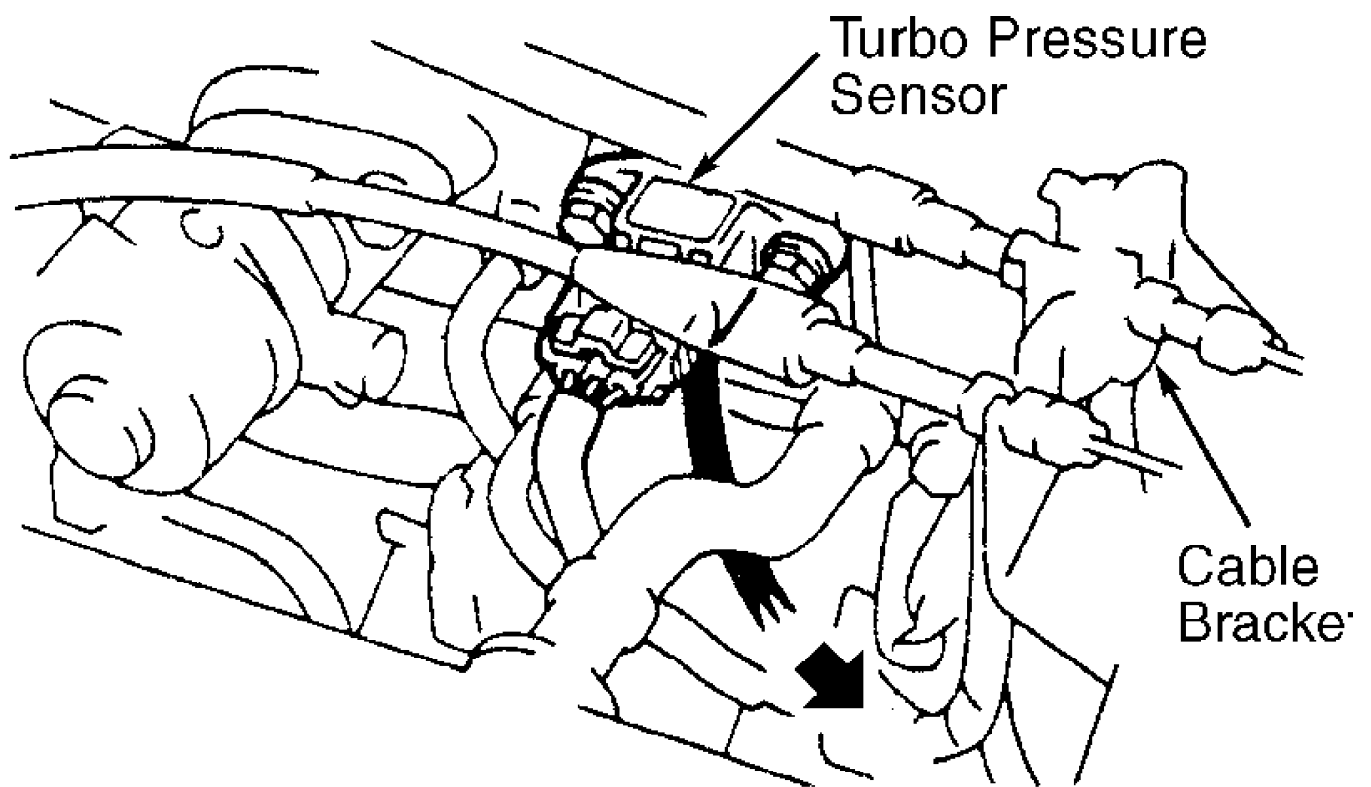
7) Turn ignition on. Connect voltmeter between terminals PIM and E2 on check harness. See Fig. 26. Measure and record turbo pressure sensor output voltage under ambient atmospheric pressure.

8) Using vacuum pump, apply vacuum in specified increments and measure turbo pressure sensor output voltage drop at each increment. See TURBO PRESSURE SENSOR OUTPUT VOLTAGE SPECIFICATIONS table.

TURBO PRESSURE SENSOR OUTPUT VOLTAGE SPECIFICATIONS TABLE

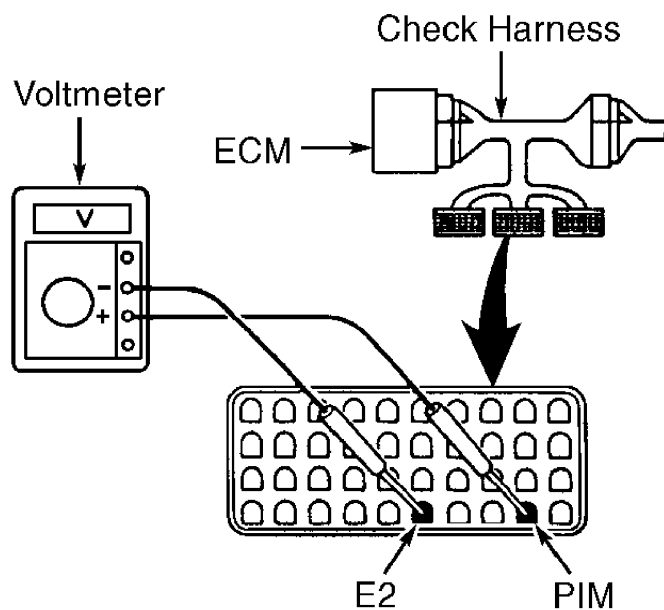
Applied Vacuum In. Hg	Output Voltage Drop
3.94 .....	.15-.35
7.87 .....	.40-.60
11.81 .....	.65-.85
15.75 .....	.90-1.10
19.69	1.15-1.35

9) Replace turbo pressure sensor if turbo sensor output voltage drop is not within specification. Turn ignition off. Disconnect negative battery cable. Remove check harness. Reinstall all electrical connectors, ECM, vacuum hose and negative battery cable.



95C32633

Fig. 25: Locating Turbo Pressure Sensor (Turbo)
 Courtesy of Toyota Motor Sales, U.S.A., Inc.



93G79646

Fig. 26: Installing Check Harness & Checking Turbo Pressure Sensor
 Output Voltage (Turbo)
 Courtesy of Toyota Motor Sales, U.S.A., Inc.

EXHAUST GAS CONTROL VALVE VSV, EXHAUST BY-PASS VALVE VSV,

INTAKE AIR CONTROL VALVE VSV & WASTEGATE VSV

Turbo

1) Disconnect electrical connector and hoses from appropriate Vacuum Switching Valve (VSV). For appropriate VSV location, see VACUUM SWITCHING VALVE (VSV) LOCATIONS table. See Fig. 27.

VACUUM SWITCHING VALVE (VSV) LOCATIONS TABLE

Application	Location
Exhaust By-Pass Valve VSV	Passenger's Side Rear Corner Of Engine, Near Turbocharger & Contains Blue 2-Pin Electrical Connector With Black/Red & Green/Red Wires
Exhaust Gas Control Valve VSV	Rear VSV On Bracket At Front Corner Of Engine, Below Air Intake & Contains Black 2-Pin Electrical Connector With Black/Red & Green/Yellow Wires
Intake Air Control Valve VSV	Rear Corner Of Engine, Above Turbocharger & Contains Black 2-Pin Electrical Connector With Black/Red & Green/Black Wires
Wastegate VSV	Front VSV On Bracket At Front Corner Of Engine, Below Air Intake & Contains Blue 2-Pin Electrical Connector With Black/Red & Blue/White Wires

2) Remove VSV. Using ohmmeter, check that continuity exists between electrical terminals on VSV and that resistance is within specification. See VACUUM SWITCHING VALVE RESISTANCE SPECIFICATIONS table. Replace VSV if no continuity exists or resistance is not within specification.

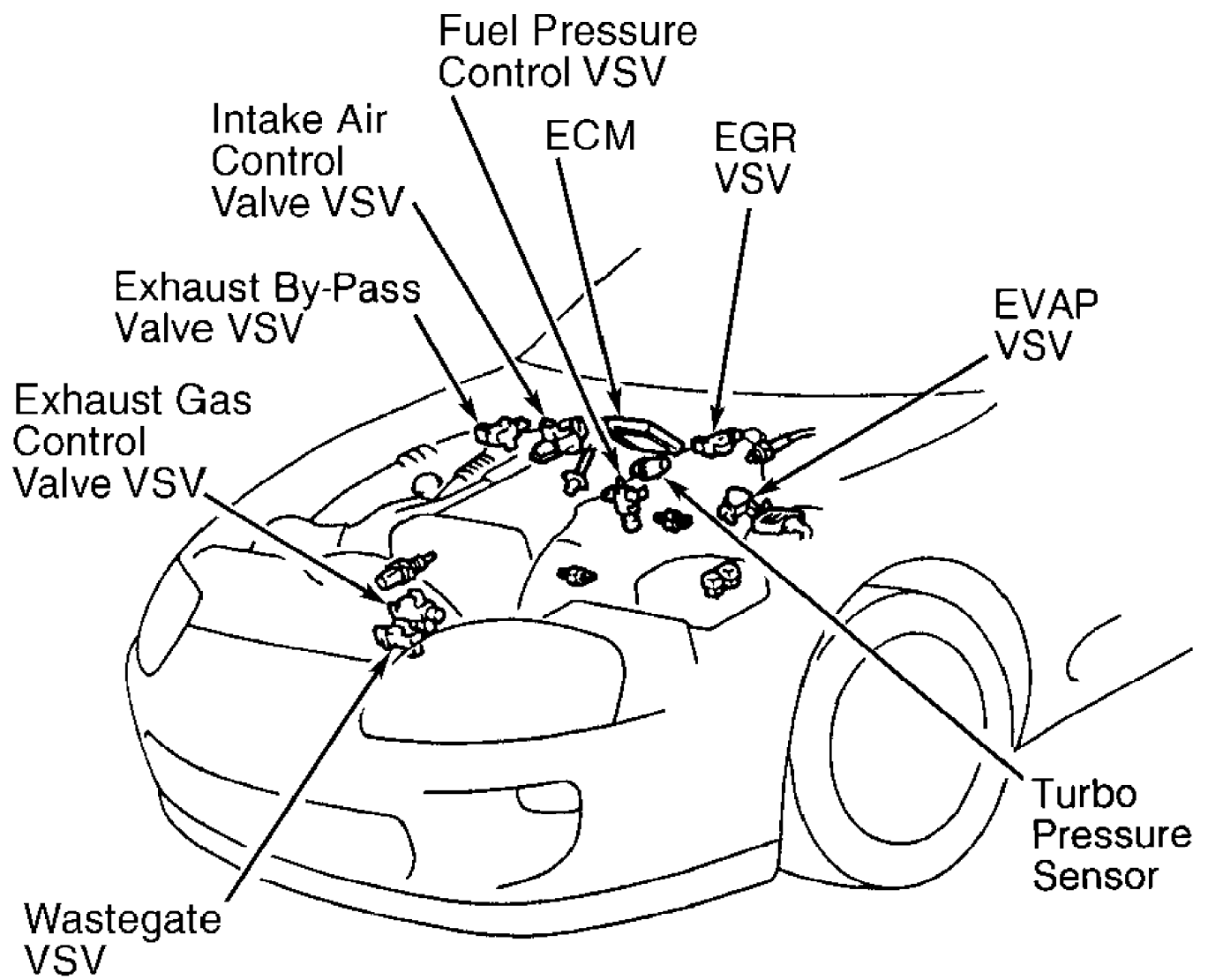
VACUUM SWITCHING VALVE RESISTANCE SPECIFICATIONS TABLE

Application	Ohms @ 68 °F (20 °C)
Exhaust By-Pass Valve VSV	22.0-26.0
Exhaust Gas Control Valve VSV	38.5-44.5
Intake Air Control Valve VSV	38.5-44.5
Wastegate VSV	22.0-26.0

3) Using ohmmeter, ensure no continuity exists between each electrical terminal and body of VSV. Replace VSV if continuity exists between electrical terminal and body of VSV.

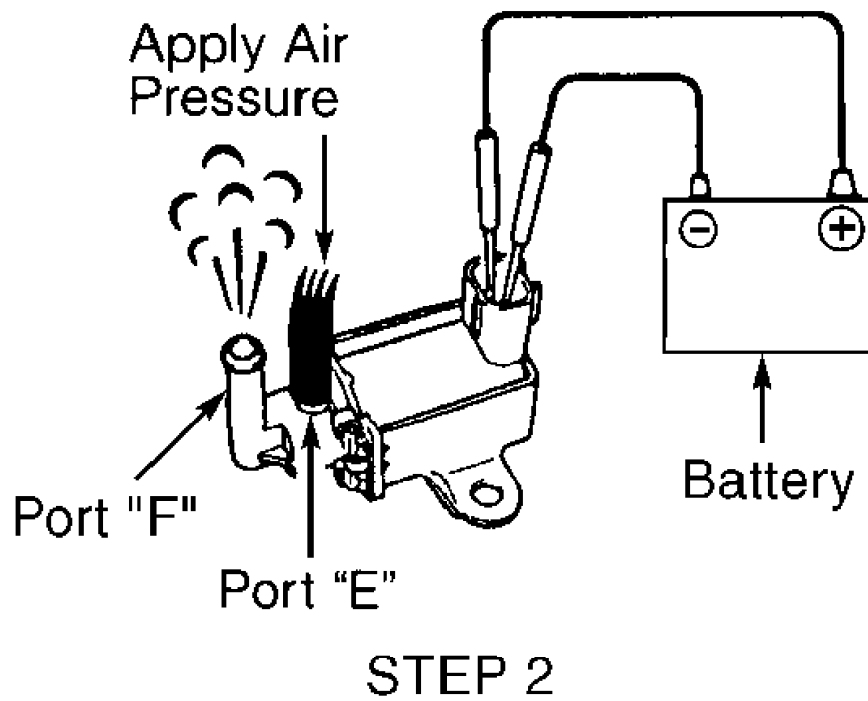
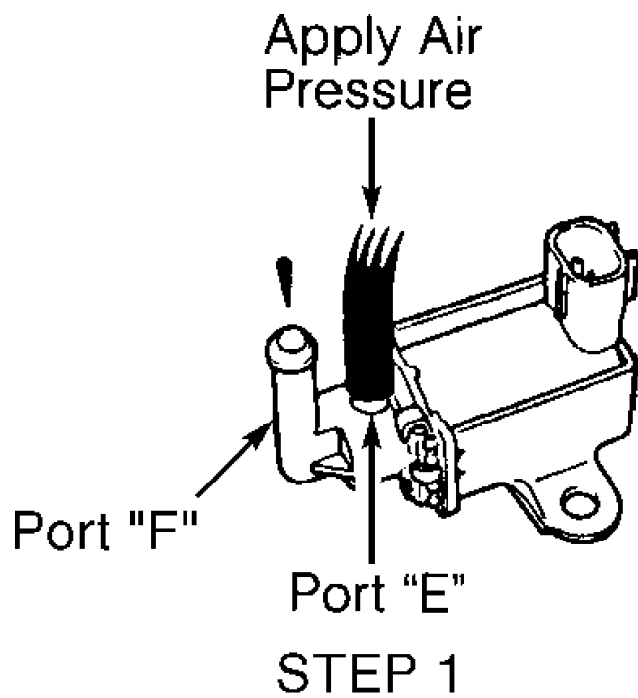
4) On exhaust by-pass valve VSV or wastegate VSV, apply air pressure to port "E". Ensure no air flows from port "F". Perform STEP 1. See Fig. 28. Apply battery voltage and ground to electrical terminals on VSV. Apply air pressure to port "E". Ensure air flows from port "F". Perform STEP 2. See Fig. 28. Replace VSV if defective.

5) On exhaust gas control valve VSV or intake air control valve VSV, apply air pressure to port "E". Ensure air flows from the filter. Perform STEP 1. See Fig. 29. Apply battery voltage and ground to electrical terminals on VSV. Apply air pressure to port "E". Ensure air flows from port "F" and not from the filter. Perform STEP 2. See Fig. 29. Replace VSV if defective.



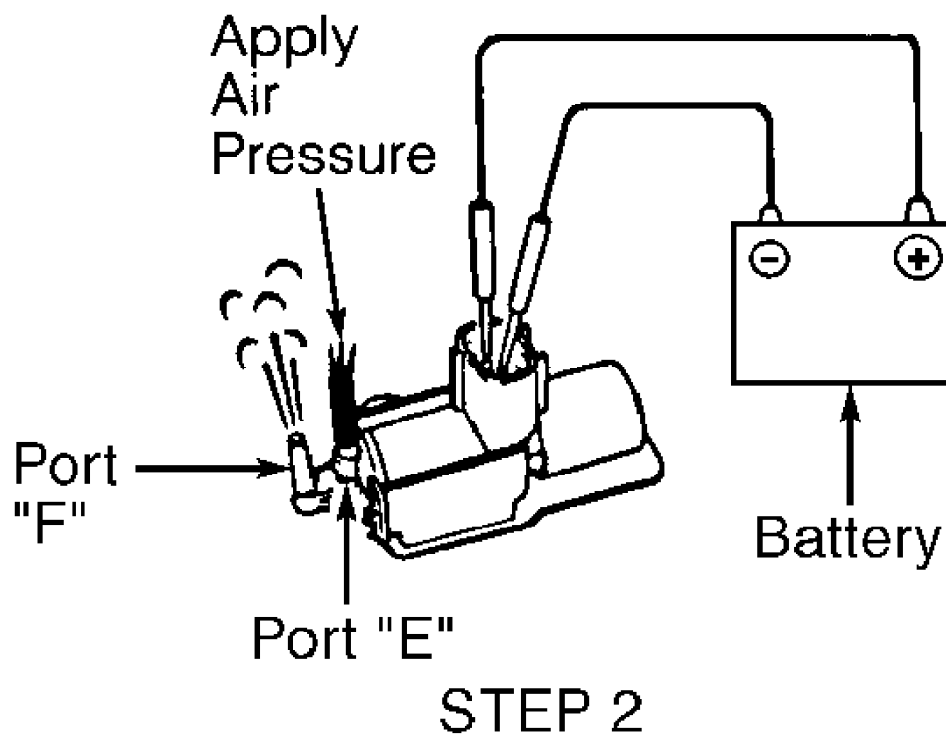
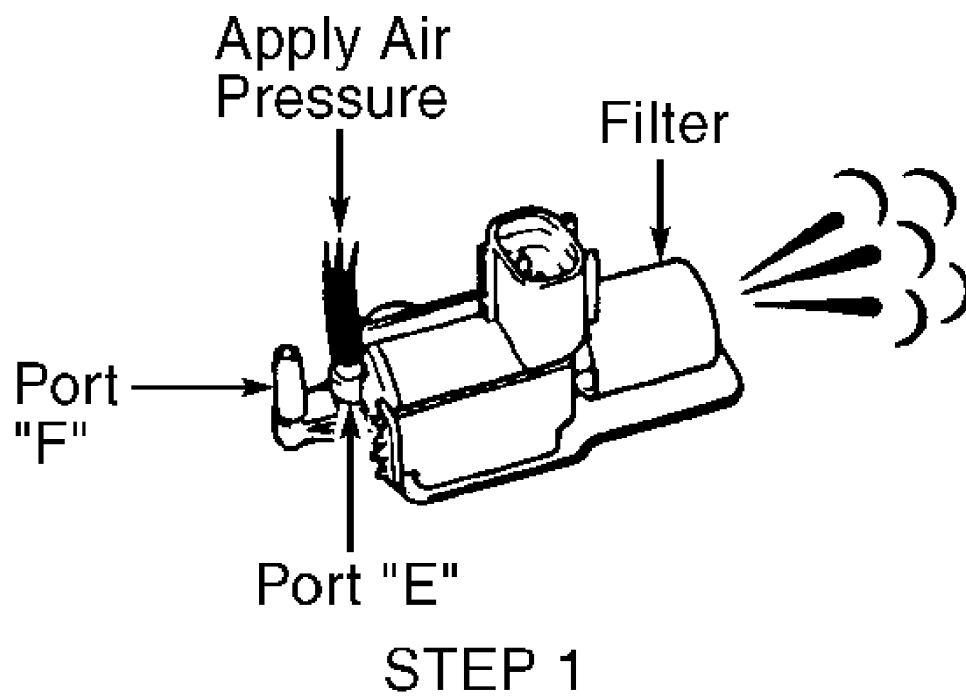
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Fig. 27: Locating Typical Vacuum Switching Valves, Turbo Pressure Sensor & ECM (Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.



97G06397

Fig. 28: Testing Typical Exhaust By-Pass Valve VSV & Wastegate VSV (Turbo)
 Courtesy of Toyota Motor Sales, U.S.A., Inc.



97A06399

Fig. 29: Testing Typical Exhaust Gas Control VSV & Intake Air Control Valve VSV (Turbo)
 Courtesy of Toyota Motor Sales, U.S.A., Inc.

VAPOR PRESSURE SENSOR

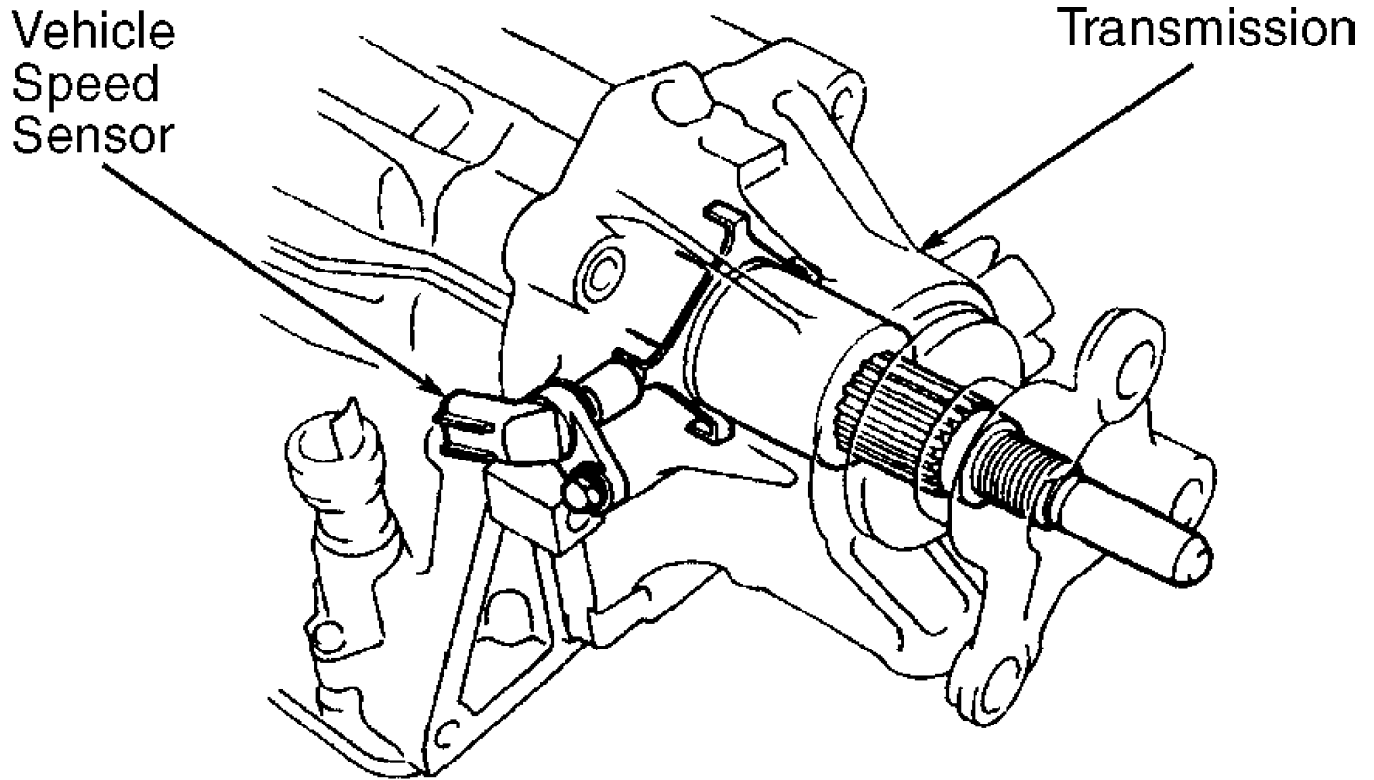
Non-Turbo

For testing of vapor pressure sensor, see FUEL EVAPORATIVE SYSTEM under EMISSION SYSTEMS & SUB-SYSTEMS.

VEHICLE SPEED SENSOR

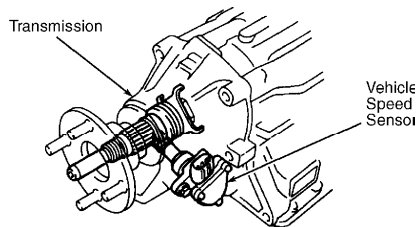
1) Vehicle speed sensor is located on transmission. See Figs. 30-31. Connect voltmeter and battery voltage to vehicle speed sensor terminals. See Fig. 32.

2) While rotating vehicle speed sensor shaft, ensure voltage changes from zero to at least 11 volts. Voltage should change 4 times per revolution of the shaft. Replace vehicle speed sensor if voltage does not change as specified.



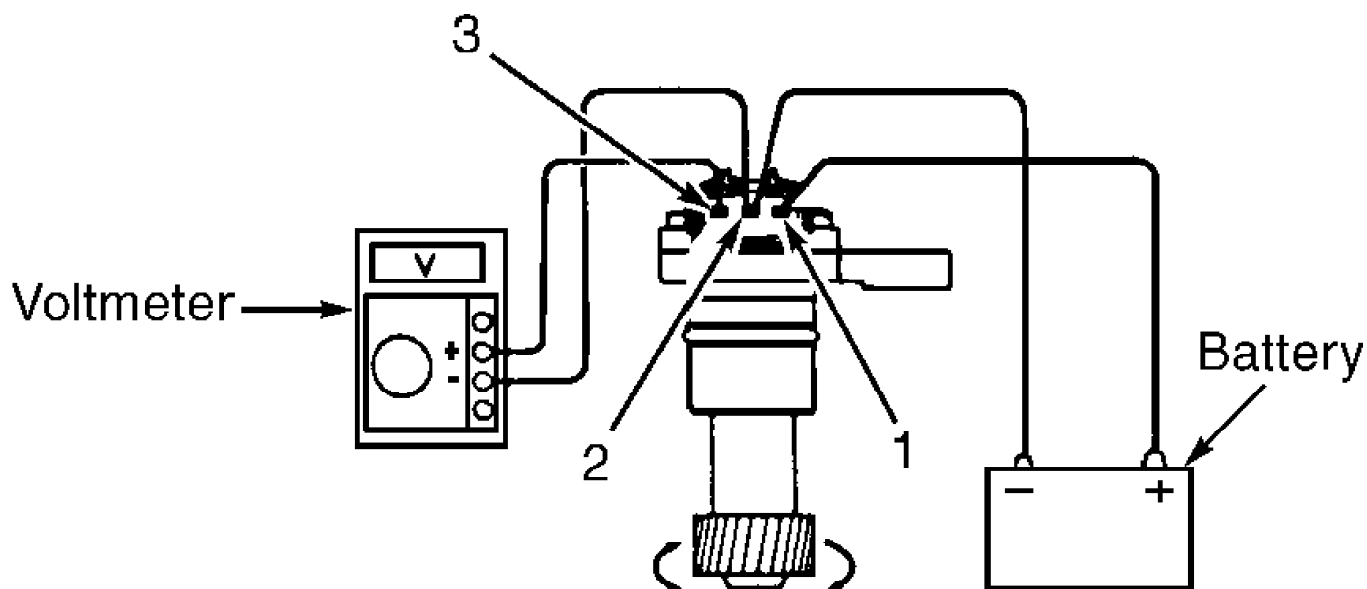
98J11501

Fig. 30: Locating Vehicle Speed Sensor (Non-Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.



98B11503

Fig. 31: Locating Vehicle Speed Sensor (Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.



95B32459

Fig. 32: Testing Vehicle Speed Sensor
Courtesy of Toyota Motor Sales, U.S.A., Inc.

CONTROL UNITS

FUEL PUMP ELECTRONIC CONTROL UNIT

Non-Turbo & Turbo
See FUEL DELIVERY under FUEL SYSTEM.

MOTORS & RELAYS

THROTTLE CONTROL MOTOR

Non-Turbo
For testing of throttle control motor, see THROTTLE BODY
under IDLE CONTROL SYSTEM.

EFI MAIN RELAY

NOTE: EFI main relay is used on all models. Turbo models also use a EFI No. 2 relay along with EFI main relay. For testing of EFI No. 2 relay, see EFI NO. 2 RELAY under MOTORS & RELAYS.

1) Ensure ignition is off. Remove EFI main relay from fuse/relay box at driver's side front corner of engine compartment, near the battery.

2) To test EFI main relay continuity, use ohmmeter to check for continuity and no continuity between specified terminals. See Fig. 33.

3) To test EFI main relay operation, apply battery voltage and ground to specified terminals on EFI main relay and use ohmmeter to check for continuity between specified terminals. See Fig. 33. Replace EFI main relay if defective.

EFI NO. 2 RELAY

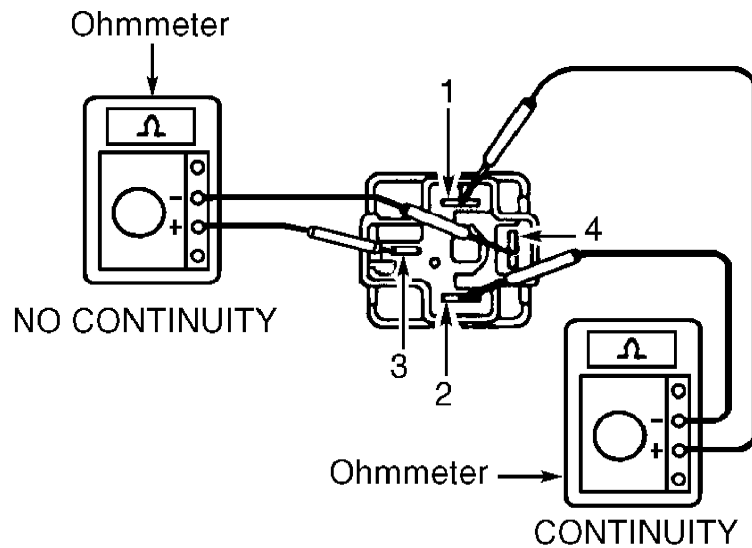
NOTE: EFI No. 2 relay may also be referred to as No. 2 EFI relay.

Turbo

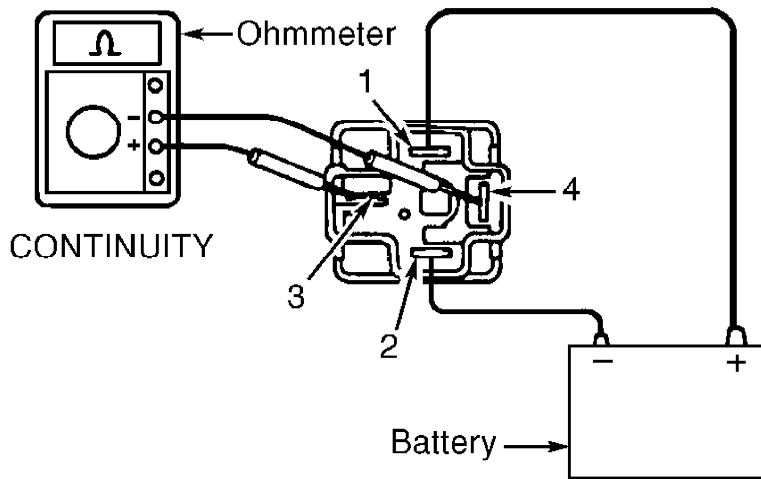
1) Ensure ignition is off. Remove EFI No. 2 relay from fuse/relay box at driver's side front corner of engine compartment, near battery.

2) To test EFI No. 2 relay continuity, use ohmmeter to check for continuity and no continuity between specified terminals. See Fig. 33.

3) To test EFI No. 2 relay operation, apply battery voltage and ground to specified terminals on EFI No. 2 relay and use ohmmeter to check for continuity between specified terminals. See Fig. 33. Replace EFI No. 2 relay if defective.



CHECKING CONTINUITY



CHECKING OPERATION

97E06400

Fig. 33: Testing EFI Main Relay (Non-Turbo & Turbo) Or EFI No. 2 Relay (Turbo)

Courtesy of Toyota Motor Sales, U.S.A., Inc.

FUEL SYSTEM

FUEL DELIVERY

EFI Main Relay

See EFI MAIN RELAY under MOTORS & RELAYS.

EFI No. 2 Relay (Turbo)

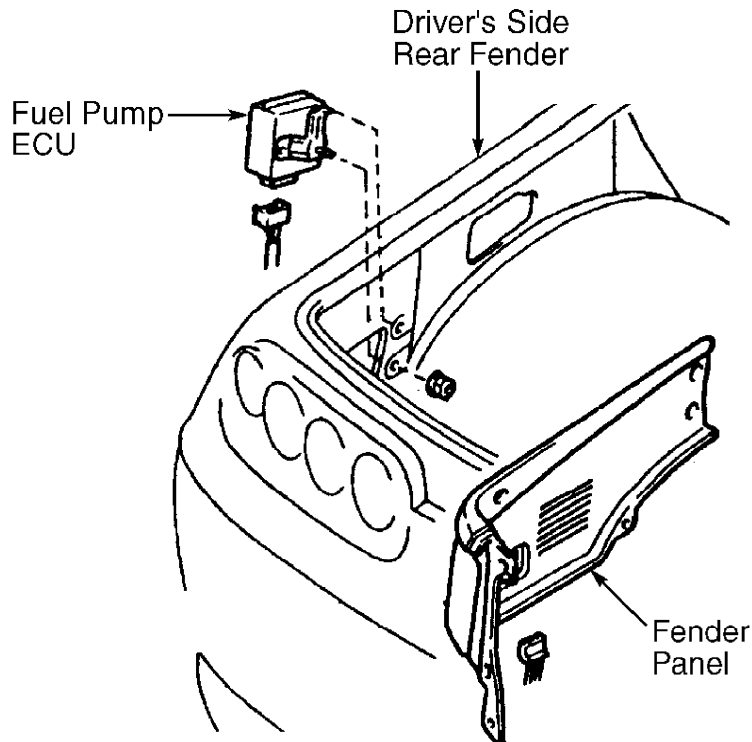
See EFI NO. 2 RELAY under MOTORS & RELAYS.

Fuel Pump Electronic Control Unit (Non-Turbo)

Fuel pump Electronic Control Unit (ECU) is used for controlling fuel pump. Fuel pump ECU is located in driver's side rear corner of trunk. See Fig. 34. Manufacturer does not list a Diagnostic Trouble Code (DTC) if a problem exists with the fuel pump ECU or wiring harness. For checking of fuel pump control circuit and fuel pump ECU control circuit, see CHECKING FUEL PUMP OPERATION USING SCAN TOOL under FUEL PUMP OPERATION under FUEL SYSTEM in appropriate F - BASIC TESTING article.

Fuel Pump Electronic Control Unit (Turbo)

Fuel pump Electronic Control Unit (ECU) is used for controlling fuel pump. Fuel pump ECU is located in driver's side rear corner of trunk. See Fig. 34. If problem exists with fuel pump ECU or wiring circuit, a Diagnostic Trouble Code (DTC) P1200 will be stored in Engine Control Module (ECM). For diagnosis of DTC, see appropriate G - TESTS W/CODES article.



97F06504

Fig. 34: Locating Typical Fuel Pump ECU
Courtesy of Toyota Motor Sales, U.S.A., Inc.

Fuel Pump Pressure

For fuel pump pressure testing, see appropriate F - BASIC

TESTING article.

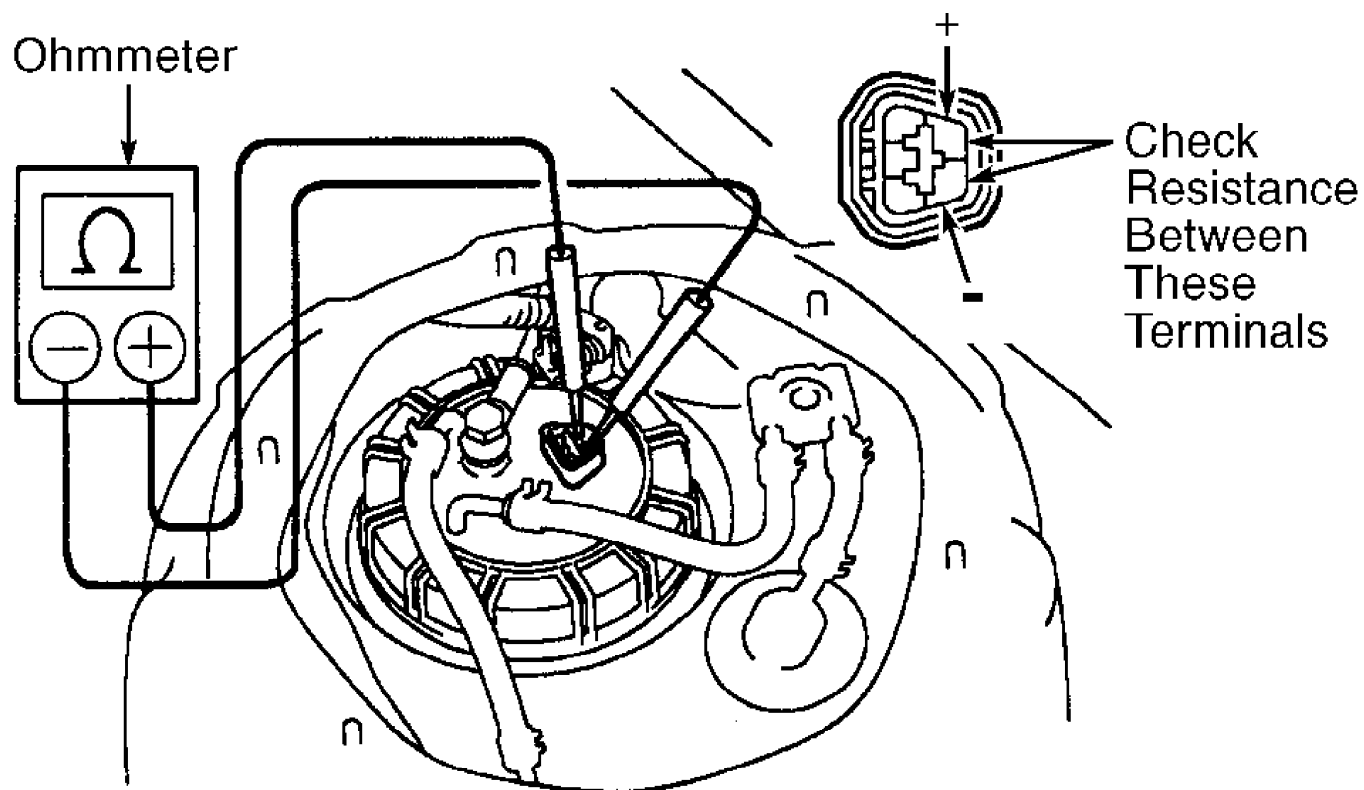
Fuel Pump Resistance & Operation

1) Remove carpet, spare tire cover, spare tire and cover plate on trunk floor panel for access to electrical connector at fuel pump. Disconnect electrical connector from fuel pump.

2) To test fuel pump resistance, use ohmmeter to check resistance between specified terminals on fuel pump. See Fig. 35. Replace fuel pump if resistance is not .20-3.00 ohms at 68°F (20°C) on non-turbo models, or .10-3.00 ohms at 68°F (20°C) on turbo models.

CAUTION: When testing fuel pump operation, DO NOT apply battery voltage to fuel pump for more than 10 seconds or fuel pump may be damaged. When testing fuel pump operation, keep fuel pump away from battery as far as possible.

3) To test fuel pump operation, apply battery voltage and ground to (+) and (-) terminals on fuel pump. See Fig. 35. DO NOT apply battery voltage to fuel pump for more than 10 seconds. Keep fuel pump away from battery as far as possible. Replace fuel pump if fuel pump does not operate.



98C11504

Fig. 35: Testing Typical Fuel Pump Resistance & Operation
Courtesy of Toyota Motor Sales, U.S.A., Inc.

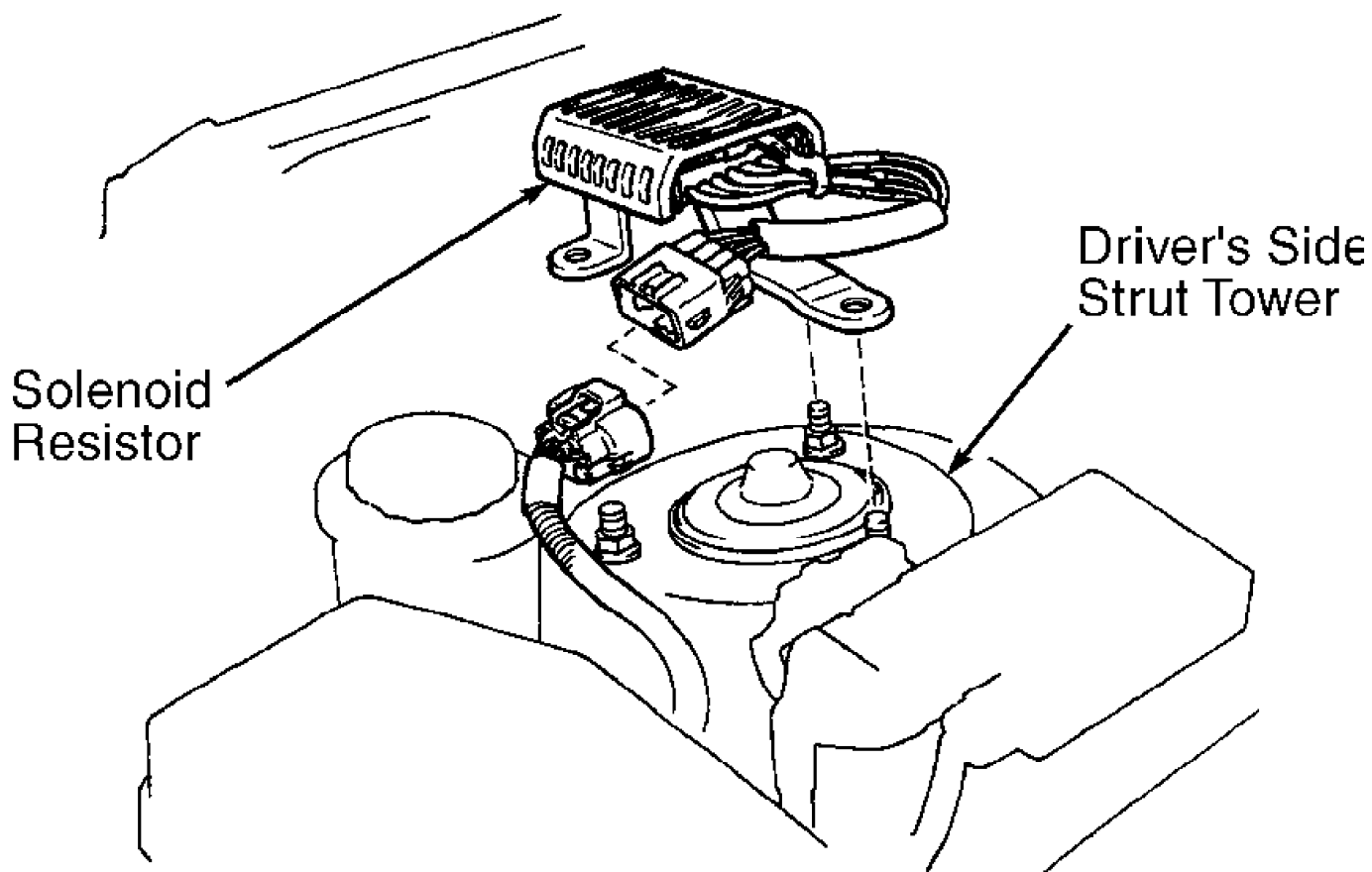
FUEL CONTROL

NOTE: Solenoid resistor may also be referred to as fuel injector resistor or SFI resistor.

Solenoid Resistor (Turbo)

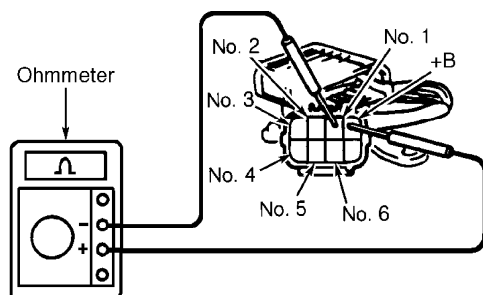
1) Solenoid resistor is bolted on top of driver's side front strut tower. See Fig. 36. Ensure ignition is off.

2) Disconnect electrical connector at solenoid resistor. Using ohmmeter, check resistance between electrical terminal +B and remaining electrical terminals on solenoid resistor. See Fig. 37. Replace solenoid resistor if resistance is not 6 ohms at 68°F (20°C).



98D11505

Fig. 36: Locating Solenoid Resistor (Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.



95H33685

Fig. 37: Testing Solenoid Resistor (Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

Fuel Injectors (Non-Turbo)

1) Start engine and allow engine to idle. Using stethoscope,

check for fuel injector operating sound. Fuel injector operating sound should be heard. If fuel injector operating sound is not heard, defective wiring circuit may exist between fuel injector and Engine Control Module (ECM). The ECM is located below passenger's side of instrument panel, underneath carpet on the floor. If necessary to check wiring circuit, see appropriate wiring diagram in L - WIRING DIAGRAMS article.

2) Ensure ignition is off. Disconnect electrical connector at fuel injector. Using ohmmeter, check resistance between electrical terminals on fuel injector. Replace fuel injector if resistance is not within specification. See FUEL INJECTOR RESISTANCE table.

3) To check fuel injector volume, remove fuel injector. See appropriate N - REMOVE/INSTALL/OVERHAUL article.

4) Disconnect fuel inlet hose from end of fuel filter. Using Union (09405-09015), delivery hose, Adapter (09268-41110) and Clamp (09268-41300) from Fuel Injector Measuring Kit (09268-41047), and "O" ring, install fuel injector on end of fuel filter. See Figs. 38-39. Tighten union bolt to 22 ft. lbs. (30 N.m).

5) Place fuel injector into a clean graduated container. Place vinyl tube on end of fuel injector to prevent fuel spillage.

6) Connect scan tool to data link connector No. 3. See Fig. 40. Turn ignition on. DO NOT start engine. Turn scan tool on. Select ACTIVE TEST MODE on scan tool. Using scan tool manufacturer's instructions, activate fuel pump.

NOTE: Fuel pump may also be operated to pressurize fuel system by applying battery voltage to electrical terminals on fuel pump. For operating of fuel pump, see FUEL PUMP RESISTANCE & OPERATION under FUEL DELIVERY under FUEL SYSTEM.

7) Connect Fuel Injector Tester (09842-30070) to fuel injector for 15 seconds. See Fig. 41. Measure fuel injector volume. Test each fuel injector 2-3 times. Replace fuel injector if fuel injector volume is not within specification. See FUEL INJECTOR VOLUME SPECIFICATIONS table.

NOTE: Ensure difference between fuel injector volume on all fuel injectors is within specification. See FUEL INJECTOR VOLUME SPECIFICATIONS table.

8) Disconnect fuel injector tester. Ensure fuel leakage from end of fuel injector does not exceed one drop in 12 minutes. Replace fuel injector if leakage exceeds specification. Remove test equipment. Using NEW gaskets, reinstall fuel inlet hose on fuel filter. Tighten union bolt to 22 ft. lbs. (30 N.m).

Fuel Injectors (Turbo)

1) Start engine and allow engine to idle. Using stethoscope, check for fuel injector operating sound. Fuel injector operating sound should be heard. If fuel injector operating sound is not heard, defective wiring circuit may exist between fuel injector and Engine Control Module (ECM). The ECM is located below passenger's side of instrument panel, underneath carpet on the floor. If necessary to check wiring circuit, see appropriate wiring diagram in L - WIRING DIAGRAMS article.

2) Ensure ignition is off. Disconnect electrical connector at fuel injector. Using ohmmeter, check resistance between electrical terminals on fuel injector. Replace fuel injector if resistance is not within specification. See FUEL INJECTOR RESISTANCE table.

3) To check fuel injector volume, remove fuel injector. See appropriate N - REMOVE/INSTALL/OVERHAUL article. Using NEW insulator, reinstall fuel injector on delivery pipe (if removed).

4) Disconnect fuel inlet hose from end of fuel filter. Using

Unions (09405-09015) and delivery hose from Fuel Injector Measuring Kit (09268-41046), install delivery hose between fuel filter and delivery pipe. See Figs. 38-39. Tighten union bolts to 22 ft. lbs. (30 N.m).

5) Using Union (SST 09268-41071), connect return hose to fuel pressure regulator. See Figs. 38-39.

6) Place fuel injector into a clean graduated container. Place vinyl tube on end of fuel injector to prevent fuel spillage.

7) Connect scan tool to data link connector No. 3. See Fig. 40. Turn ignition on. DO NOT start engine. Turn scan tool on. Select ACTIVE TEST MODE on scan tool. Using scan tool manufacturer's instructions, activate fuel pump.

NOTE: Fuel pump may also be operated to pressurize fuel system by applying battery voltage to electrical terminals on fuel pump. For operating of fuel pump, see FUEL PUMP RESISTANCE & OPERATION under FUEL DELIVERY under FUEL SYSTEM.

8) Connect Fuel Injector Tester (09842-30060) to fuel injector for 15 seconds. See Fig. 41.

9) Measure fuel injector volume. Test each fuel injector 2-3 times. Replace fuel injector if fuel injector volume is not within specification. See FUEL INJECTOR VOLUME SPECIFICATIONS table.

NOTE: Ensure difference between fuel injector volume on all fuel injectors is within specification. See FUEL INJECTOR VOLUME SPECIFICATIONS table.

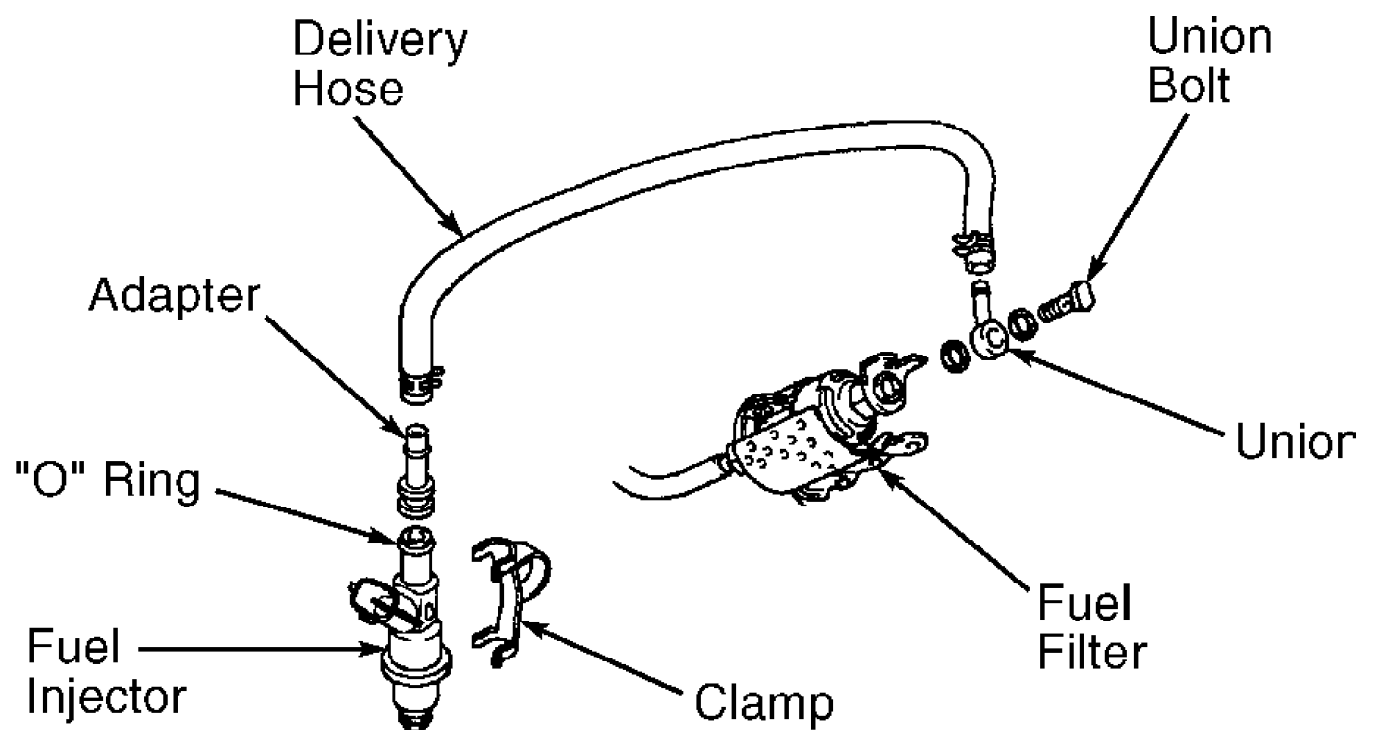
10) Disconnect fuel injector tester. Ensure fuel leakage from end of fuel injector does not exceed one drop in 3 minutes. Replace fuel injector if leakage exceeds specification. Remove test equipment. Using NEW gaskets, reinstall fuel inlet hose on fuel filter. Tighten union bolt to 22 ft. lbs. (30 N.m).

FUEL INJECTOR RESISTANCE TABLE

Application	Ohms @ 68°F (20°C)
Non-Turbo	13.4-14.2
Turbo	1.95

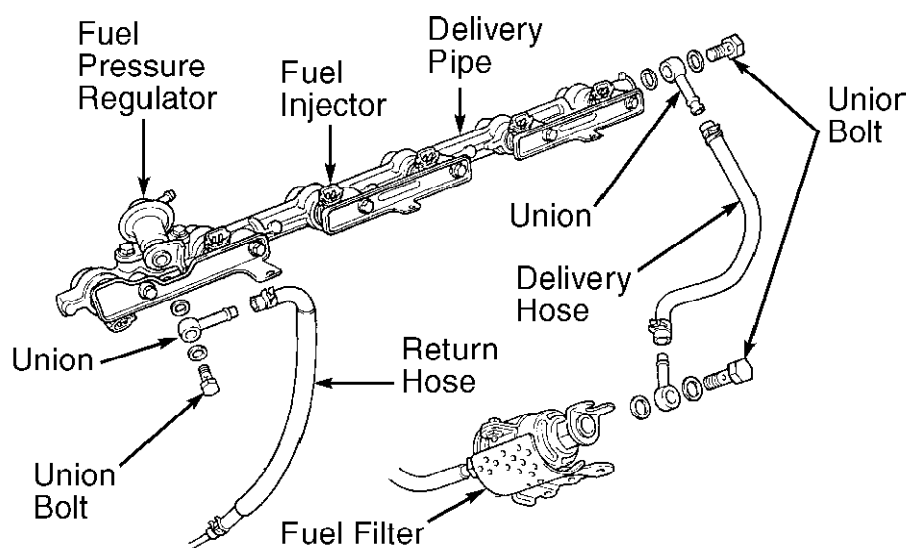
FUEL INJECTOR VOLUME SPECIFICATIONS TABLE

Application	Cu. In. (cc)
Volume	
Non-Turbo	3.7-4.5 (60-73)
Turbo	7.1-8.4 (116-137)
Maximum Difference Between Each Fuel Injector	
Non-Turbo .....	.8 (13)
Turbo .....	.6 (10)



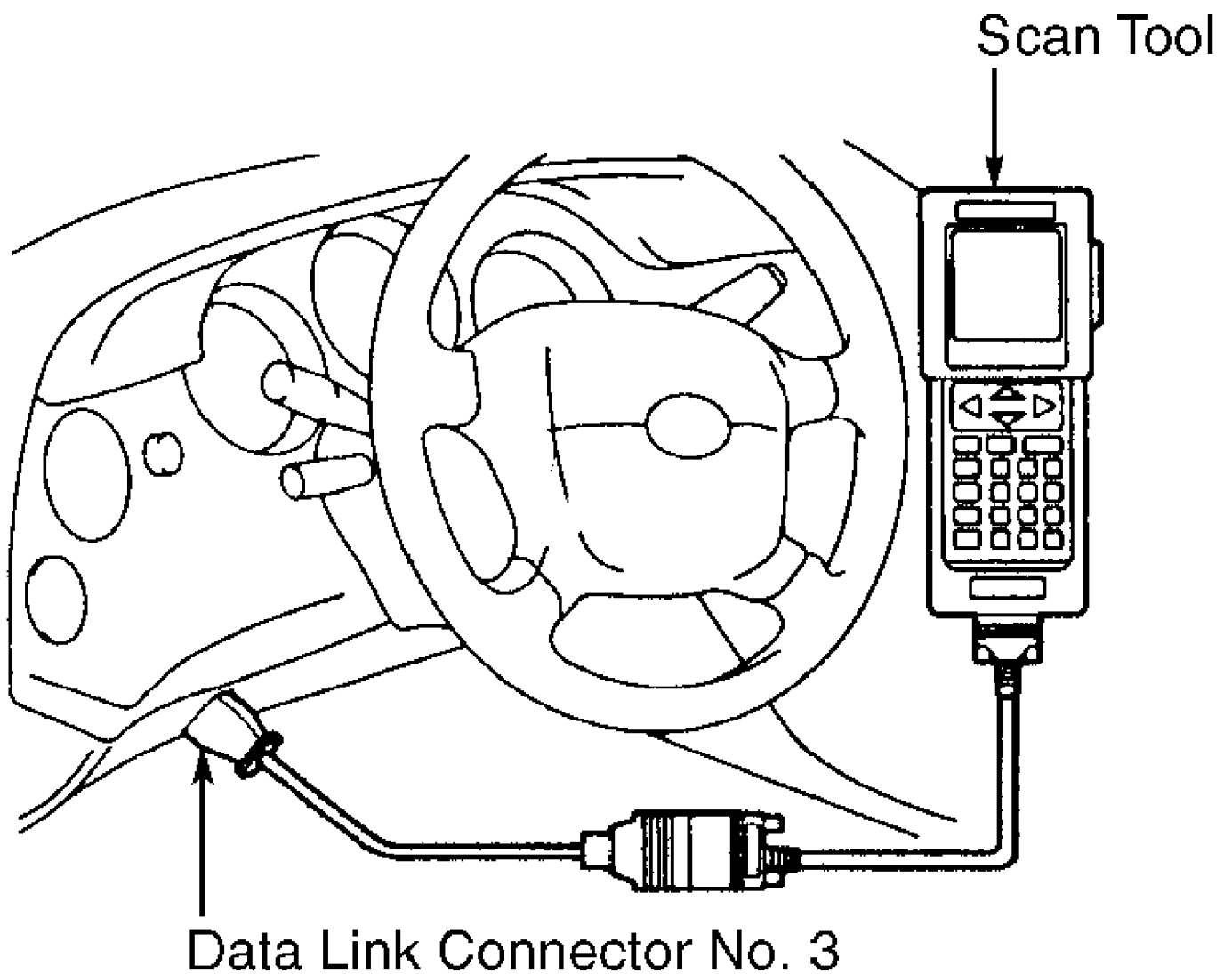
98B11453

Fig. 38: Connections For Testing Fuel Injector (Non-Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.



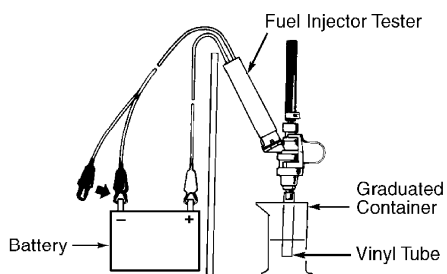
98C11454

Fig. 39: Connections For Testing Fuel Injector (Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.



97128876

Fig. 40: Connecting Scan Tool To DLC No. 3
Courtesy of Toyota Motor Sales, U.S.A., Inc.



95J33687
Fig. 41: Connecting Fuel Injector Tester
Courtesy of Toyota Motor Sales, U.S.A., Inc.

Fuel Cut System

1) Connect scan tool to data link connector No. 3. See

Fig. 40. Scan tool is used to monitor engine RPM.

2) Start engine and warm engine to normal operating temperature. Ensure the A/C and all accessories are off. Gradually increase engine RPM to 3000 RPM.

3) Using stethoscope, check for fuel injector operating sound. Ensure when throttle lever is released, fuel injector stops operating momentarily and then resumes operating (fuel return RPM).

4) Ensure fuel return RPM is within specification. See FUEL CUT SYSTEM SPECIFICATIONS table. Shut engine off. Remove scan tool.

FUEL CUT SYSTEM SPECIFICATIONS (1) TABLE

Application	Fuel Return RPM
Non-Turbo	1000
Turbo	1100

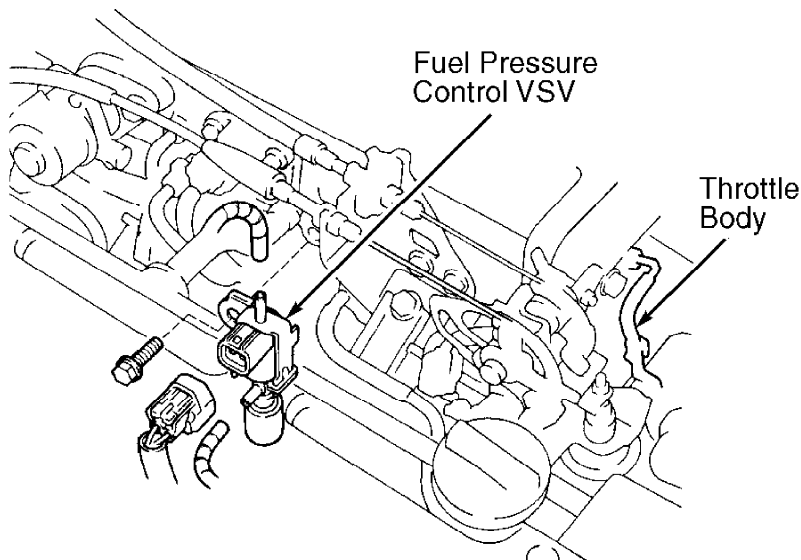
(1) - Check with engine at normal operating temperature and with A/C and all accessories off.

NOTE: Fuel pressure control system may also be referred to as fuel pressure-up system.

Fuel Pressure Control System (Turbo)

1) Fuel pressure control system uses a fuel pressure control Vacuum Switching Valve (VSV). Fuel pressure control VSV is supplied voltage through EFI main relay.

2) The Engine Control Module (ECM) will activate VSV by controlling ground circuit for approximately 90-180 seconds when restarting engine at normal operating temperature. Remove fuel pressure control VSV. Fuel pressure control VSV is located at driver's side of engine, near throttle body and contains a Blue 2-pin electrical connector. See Fig. 42.



97J06450

Fig. 42: Locating Fuel Pressure Control VSV (Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

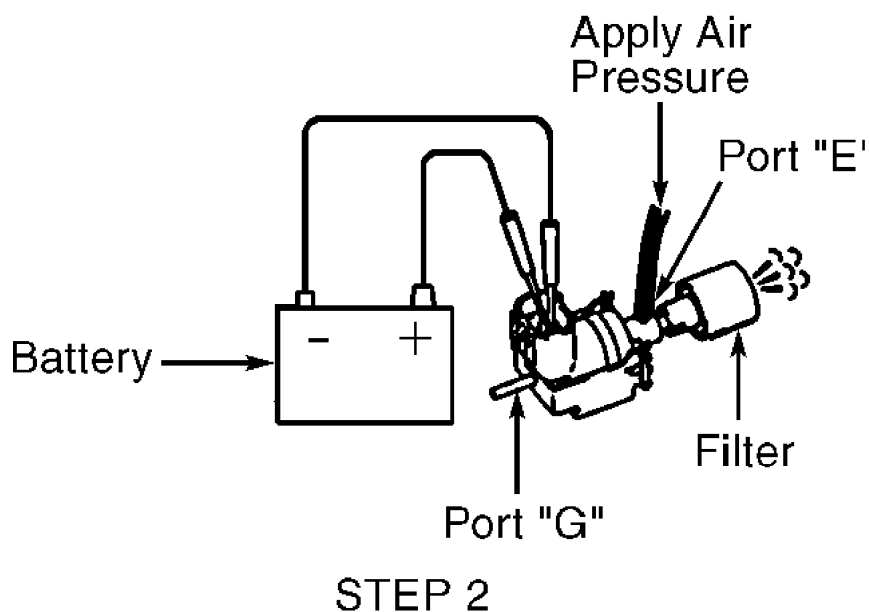
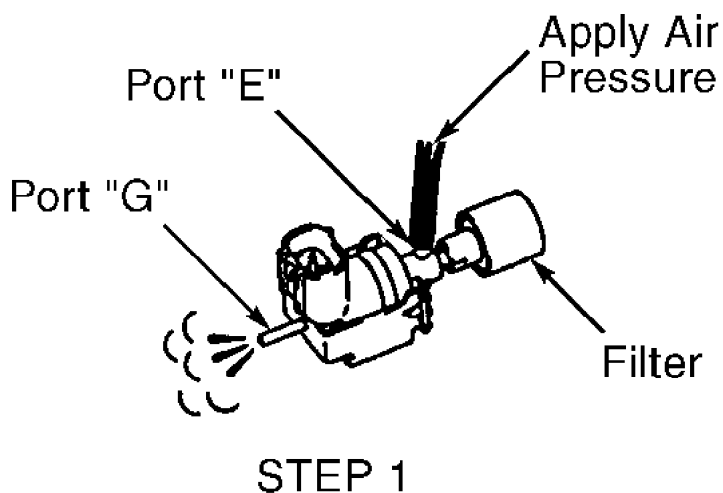
3) Using ohmmeter, ensure continuity exists between electrical terminals on fuel pressure control VSV and resistance is

33-39 ohms at 68°F (20°C). Replace fuel pressure control VSV if no continuity exists or resistance is not within specification.

4) Ensure no continuity exists between each electrical terminal and body of fuel pressure control VSV. Replace fuel pressure control VSV if continuity exists between electrical terminal and body of fuel pressure control VSV.

5) To test fuel pressure control VSV operation, apply air pressure to port "E". Ensure air flows from port "G" and not from the filter. Perform STEP 1. See Fig. 43.

6) Apply battery voltage and ground to electrical terminals on fuel pressure control VSV. Apply air pressure to port "E". Ensure air flows from filter and not from port "G". Perform STEP 2. See Fig. 43. Replace fuel pressure control VSV if defective.



97F06448

Fig. 43: Testing Fuel Pressure Control VSV (Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

IDLE AIR CONTROL (IAC) VALVE

NOTE: Turbo models use IAC valve for controlling idle speed control system. Non-turbo models use Electronic Throttle Control System (ETCS) for controlling idle control system. For testing of ETCS, see THROTTLE BODY under IDLE CONTROL SYSTEM.

Turbo

1) IAC valve is located on rear of air intake chamber, near valve cover. See Fig. 44. Listen for clicking sound at IAC valve immediately after engine is shut off. If no clicking sound is heard, check IAC valve resistance and operation.

2) To test IAC valve resistance, ensure ignition is off. Disconnect electrical connector from IAC valve. Using ohmmeter, check resistance between specified terminals on IAC valve. See IAC VALVE RESISTANCE SPECIFICATIONS table. See Fig. 44. Replace IAC valve if resistance is not within specification.

IAC VALVE RESISTANCE SPECIFICATIONS TABLE

Terminals	Ohms
Turbo	
B1 To All Other Terminals	
Cold (1)	15-25
Hot (2)	20-30
B2 To All Other Terminals	
Cold (1)	15-25
Hot (2)	20-30

(1) - Cold is with temperature of 14-122°F (-10-50°C).

(2) - Hot is with temperature of 122-212°F (50-100°C).

3) To test IAC valve operation, remove IAC valve. See appropriate N - REMOVE/INSTALL/OVERHAUL article. Apply battery voltage to terminals B1 and B2. See Fig. 45. Repeatedly ground terminals in sequence, and ensure IAC valve closes and opens. See IAC VALVE GROUNDING SEQUENCE table. See Fig. 45. Replace IAC valve if defective.

IAC VALVE GROUNDING SEQUENCE TABLE

Application	Terminal Grounding Sequence
To Close IAC Valve	S1-S2-S3-S4-S1
To Open IAC Valve	S4-S3-S2-S1-S4

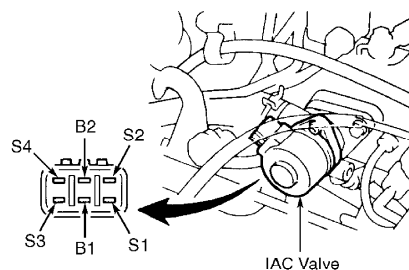
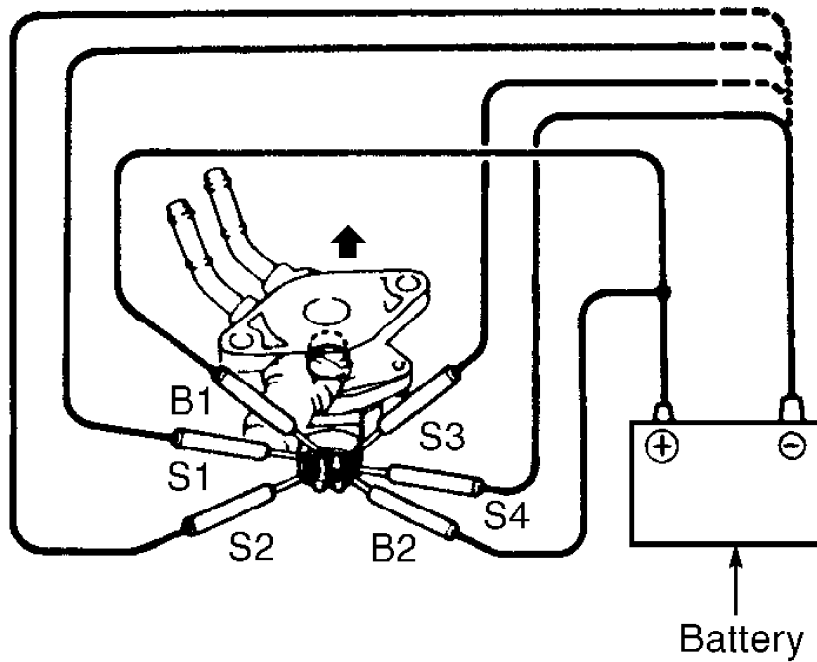
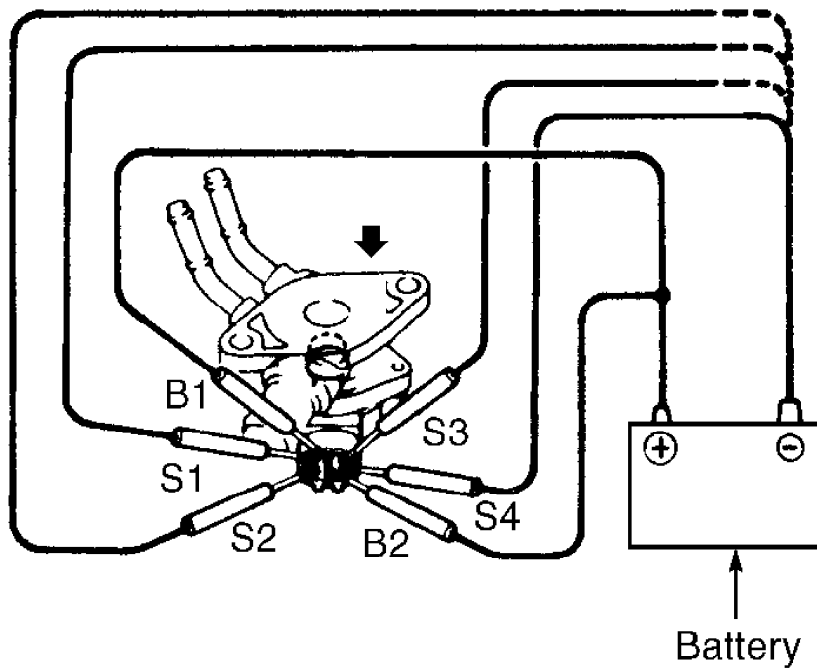


Fig. 44: Locating IAC Valve & Identifying IAC Valve Terminals (Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.



CLOSING IAC VALVE



OPENING IAC VALVE

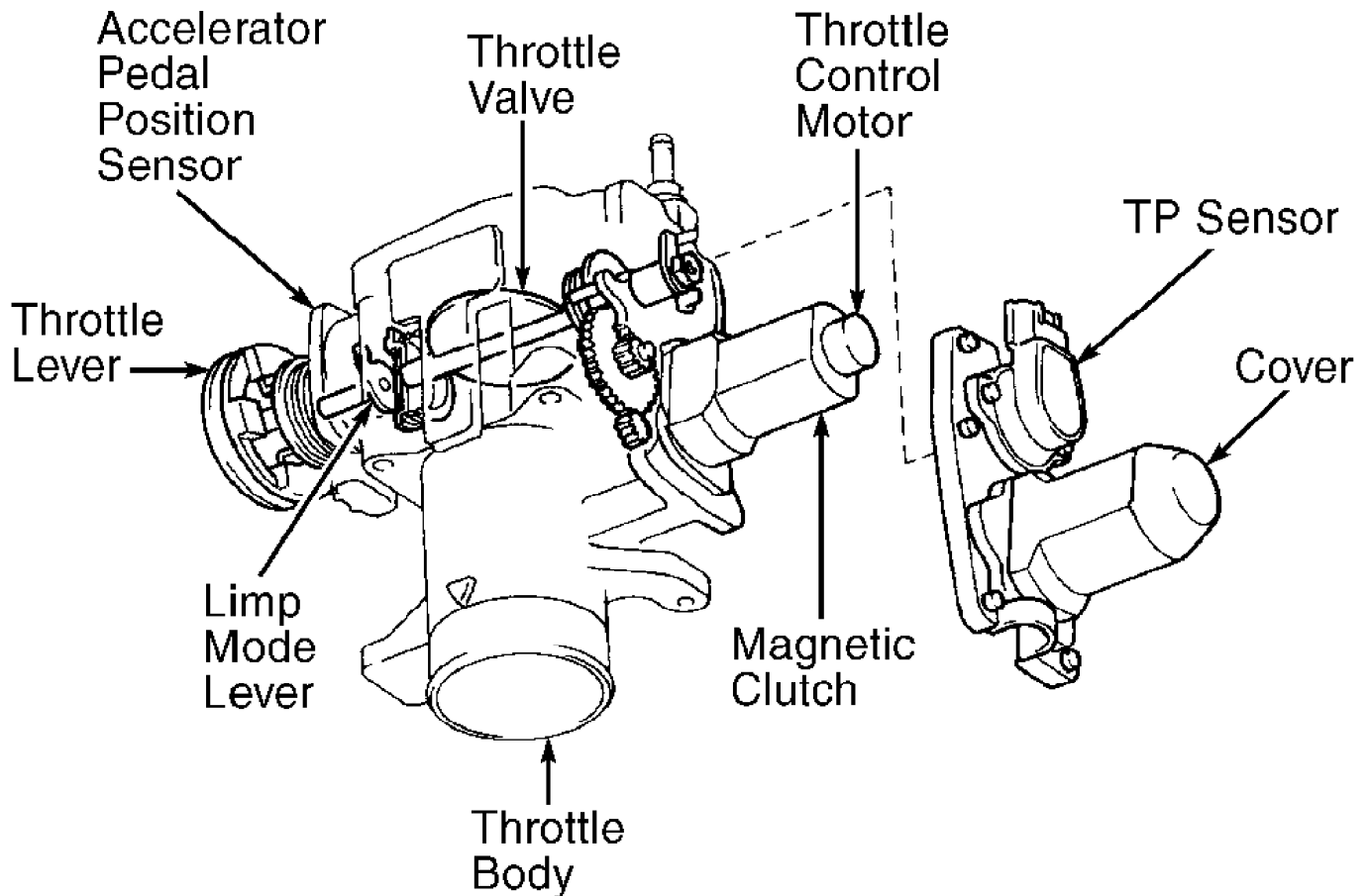
97F06453
Fig. 45: Testing IAC Valve Operation (Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

THROTTLE BODY

NOTE: Non-turbo models use Electronic Throttle Control System (ETCS) for controlling idle speed. ETCS consists of throttle body, accelerator pedal position sensor, Throttle Position (TP) sensor, throttle control motor, magnetic clutch and Engine Control Module (ECM).

Non-Turbo

1) Ensure throttle cable and throttle lever on throttle body moves smoothly. Note location of throttle control motor on throttle body. See Fig. 46.



98F01629

Fig. 46: Locating ETCS Components On Throttle Body (Non-Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

2) Turn ignition on. Rotate throttle lever on throttle body to full throttle while listening for operating sound at throttle control motor and that no grinding noise is heard at throttle control motor and throttle body. Throttle lever will also rotate accelerator pedal position sensor.

3) If throttle control motor operating sound is heard, go to next step. If throttle control motor operating sound is not heard, throttle control motor, wiring harness or Engine Control Module (ECM) may be defective. The ECM is located below passenger's side of instrument panel, underneath carpet on the floor. Go to step 11) for testing of throttle control motor.

4) To test operation of Throttle Position (TP) sensor and accelerator pedal position sensor, connect scan tool to data link connector No. 3. See Fig. 40. Scan tool is used to read throttle valve

opening which is displayed as a percentage.

5) Rotate throttle lever on throttle body to full throttle while reading throttle valve opening on scan tool which is accessed by THROTTLE POS under CURRENT DATA. Throttle valve opening should be at least 60 percent.

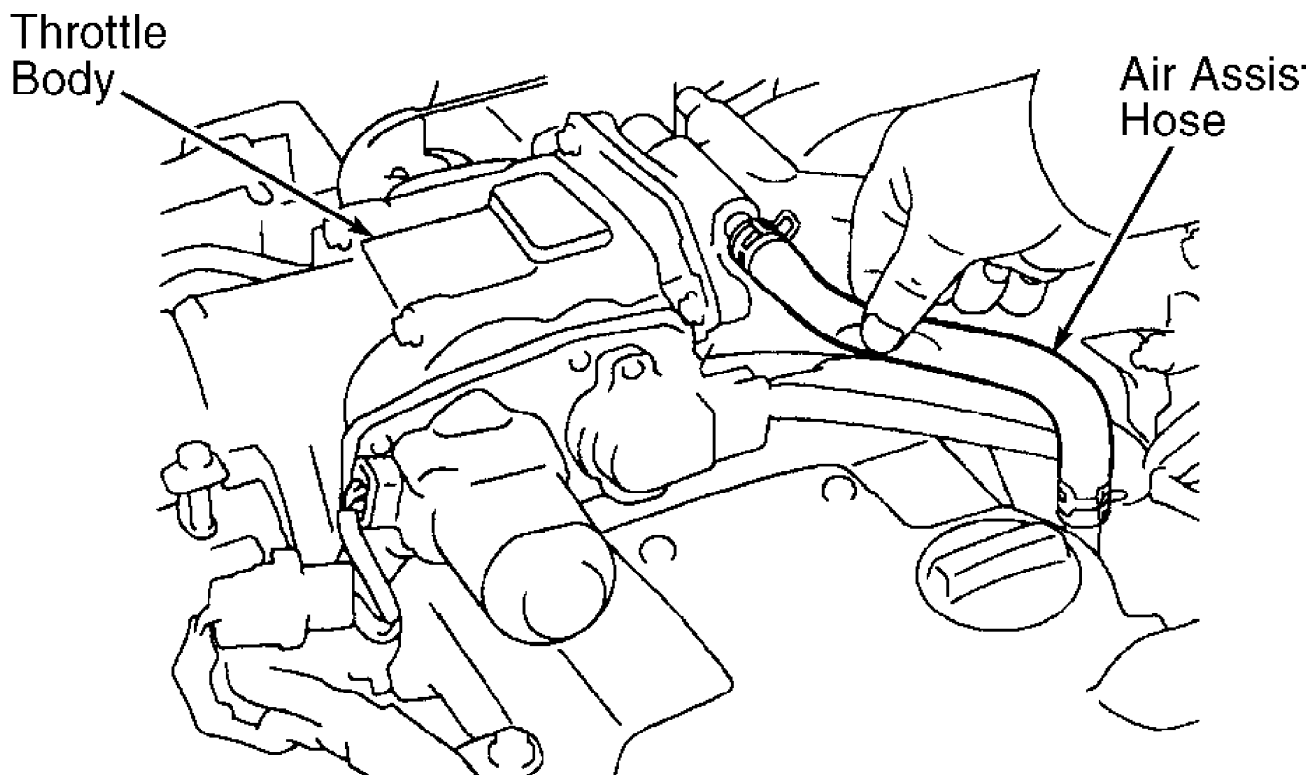
6) If throttle valve opening is at least 60 percent, go to next step. If throttle valve opening is not at least 60 percent, problem may exist in TP sensor, accelerator pedal position sensor, wiring circuit or ECM. Go to steps 13) and 14) for testing of TP sensor and accelerator pedal position sensor.

7) Start engine and allow engine to idle. Check operation of Malfunction Indicator Light (MIL) on instrument panel. If MIL is not illuminated, go to next step. If MIL is illuminated, a Diagnostic Trouble Code (DTC) may be stored in the ECM. For diagnosis of DTC, see appropriate G - TESTS W/CODES article.

8) To test operation of air assist system, allow engine to warm to normal operating temperature. Apply parking brake. Place transmission in Neutral. Ensure A/C is off.

9) Using scan tool, note engine idle speed with and A/C turned off, and then with A/C turned on. Engine idle speed should be 650-750 RPM with A/C turned off and 700-800 RPM with A/C turned on.

10) With engine idling, pinch air assist hose closed and note engine idle speed. See Fig. 47. Engine idle speed should decrease and then return to the original engine idle speed. If engine idle speed does not decrease and then return to normal idle speed, throttle body, wiring circuit or ECM may be defective.



98D11455

Fig. 47: Locating Air Assist Hose (Non-Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

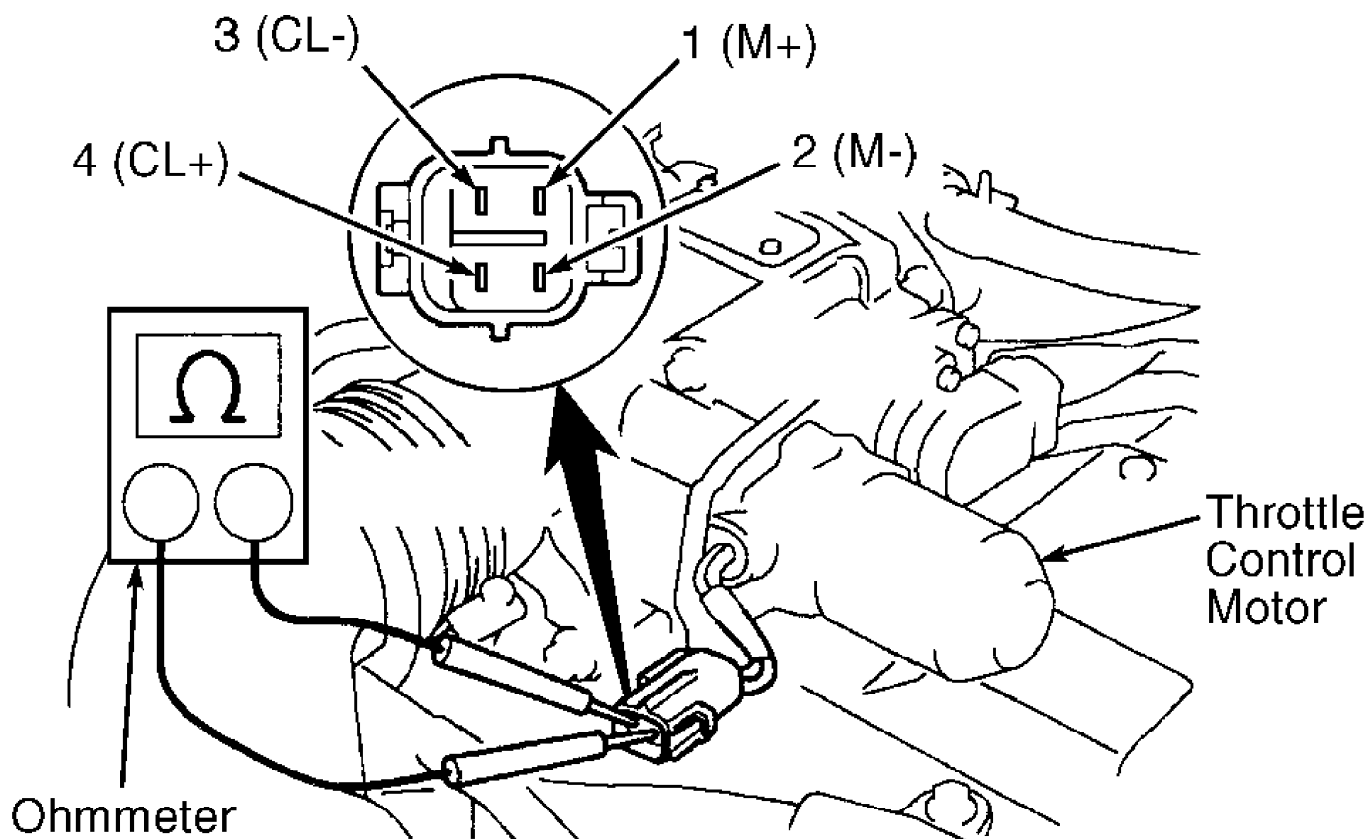
11) To test throttle control motor, disconnect electrical connector at throttle control motor and note terminal identification.

See Fig. 48.

12) Using ohmmeter, check resistance between specified terminals. See THROTTLE CONTROL MOTOR RESISTANCE table. If resistance is within specification, reinstall electrical connector. If resistance is not within specification, replace throttle control motor. See appropriate N - REMOVE/INSTALL/OVERHAUL article.

THROTTLE CONTROL MOTOR RESISTANCE TABLE

Terminals	Ohms @ 68°F (20°C)
1 (M+) & 2 (M-) .....	.3-100.0
3 (CL-) & 4 (CL+)	4.2-5.2



98E11456

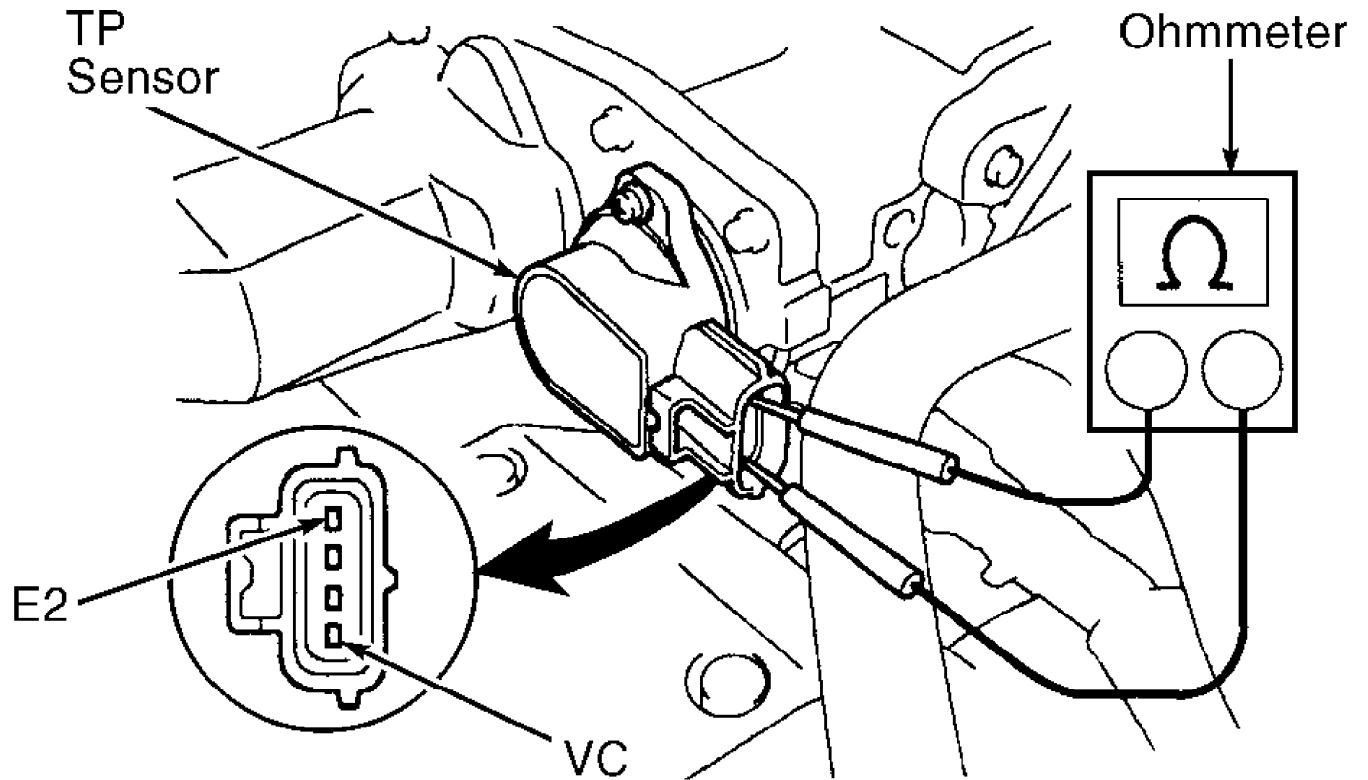
Fig. 48: Identifying Terminals & Testing Throttle Control Motor (Non-Turbo)

Courtesy of Toyota Motor Sales, U.S.A., Inc.

13) To test TP sensor, disconnect electrical connector at TP sensor. See Fig. 46. Using ohmmeter, check resistance between terminals VC and E2 on TP sensor. See Fig. 49. Replace TP sensor if resistance is not 1.2-3.2 ohms at 68°F (20°C). See appropriate N - REMOVE/INSTALL/OVERHAUL article.

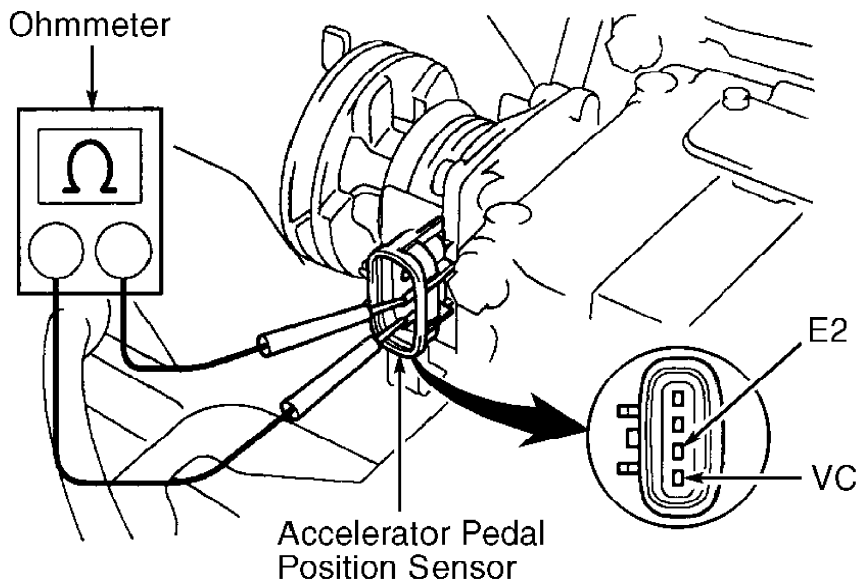
14) To test accelerator pedal position sensor, disconnect electrical connector at accelerator pedal position sensor. See Fig. 46. Using ohmmeter, check resistance between terminals VC and E2 on accelerator pedal position sensor. See Fig. 50. Replace accelerator pedal position sensor if resistance is not 1.2-3.2 ohms at 68°F

(20°C). See appropriate N - REMOVE/INSTALL/OVERHAUL article.



98F11457

Fig. 49: Identifying Terminals & Testing TP Sensor (Non-Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.



98G11458

Fig. 50: Identifying Terminals & Testing Accelerator Pedal Position
Sensor (Non-Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

IGNITION SYSTEM

NOTE: For basic ignition checks, see appropriate F - BASIC TESTING article.

TIMING CONTROL SYSTEMS

Knock Sensor

See KNOCK SENSOR under ENGINE SENSORS, SWITCHES & VALVES.

EMISSION SYSTEMS & SUB-SYSTEMS

EXHAUST GAS RECIRCULATION (EGR) SYSTEM TEST

NOTE: EGR system is only used on turbo models. When testing EGR system refer to Figs. 51-52 for EGR system component location.

NOTE: When testing EGR system, it may be necessary to monitor engine RPM. Engine RPM may be monitored by connecting scan tool to data link connector No. 3. See Fig. 40.

Turbo

1) Remove cap and filters from top of EGR vacuum modulator. Ensure filters are clean and in good condition. Clean filters with compressed air (if necessary).

NOTE: Filters must be installed in EGR vacuum modulator with coarse side facing upward, away from EGR vacuum modulator.

2) Reinstall filters and cap. Using 3-way connector, install vacuum gauge in vacuum hose between top of EGR valve and EGR vacuum modulator. Start engine. Ensure engine runs idles smoothly to ensure proper seating of EGR valve.

3) To check operation of EGR Vacuum Switching Valve (VSV) with engine cold, ensure engine coolant temperature is less than 122°F (50°C) on A/T models or 149°F (65°C) on M/T models. Block all 4 wheels. Apply parking brake. Start engine and allow engine to idle. Apply service brakes.

4) On A/T models, place transmission in Drive. Increase and maintain engine speed at 1600-1800 RPM. Ensure no vacuum reading is obtained on vacuum gauge with engine at 1600-1800 RPM. Proceed to step 6).

5) On M/T models, place transmission in Neutral. Increase and maintain engine speed at 3500-4000 RPM. Ensure no vacuum reading is obtained on vacuum gauge with engine at 3500-4000 RPM. Go to next step.

6) To check operation of EGR VSV with engine warm, operate engine until engine coolant temperature is greater than 122°F (50°C) on A/T models or 149°F (65°C) on M/T models. Ensure parking brake and service brakes are applied.

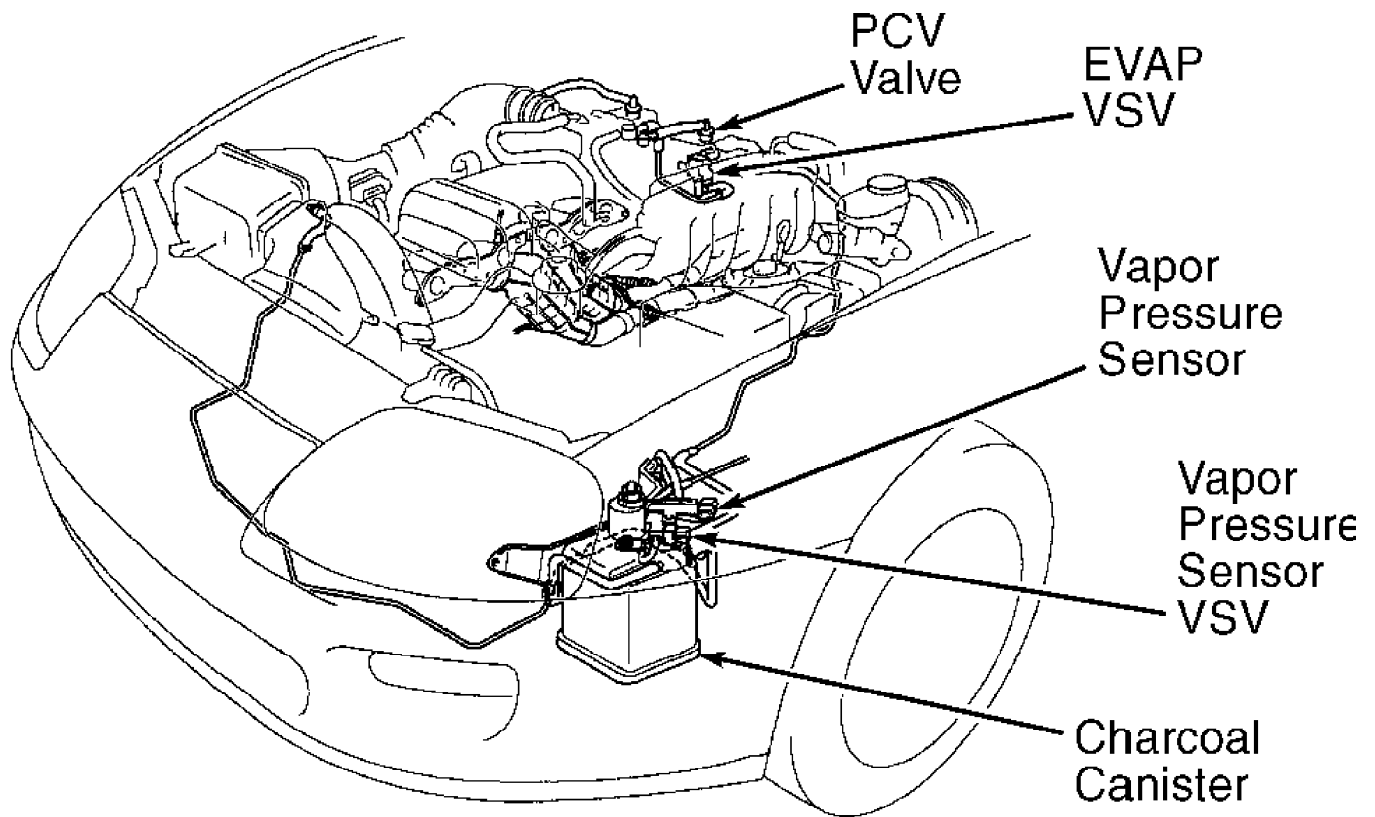
7) On A/T models, place transmission in Drive. Increase and maintain engine speed at 1600-1800 RPM. Ensure low vacuum is now obtained with engine at 1600-1800 RPM. Go to step 9).

8) On M/T models, place transmission in Neutral. Increase and maintain engine speed at 3500-4000 RPM. Ensure low vacuum is momentarily obtained with engine at 3500-4000 RPM. Go to next step.

9) Allow engine to idle. To check EGR valve operation, remove vacuum gauge and plug vacuum hose at top of EGR valve.

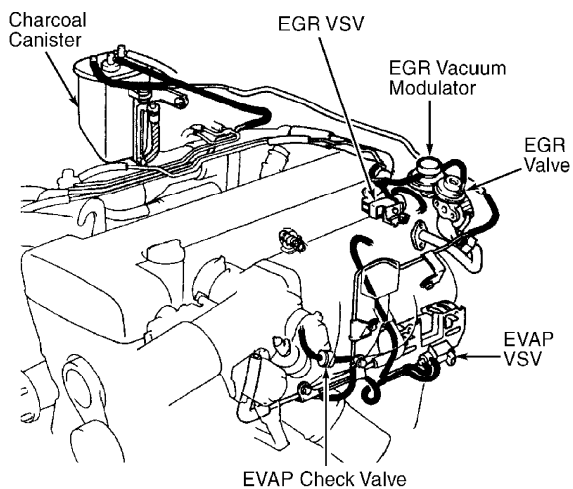
10) Using vacuum pump, apply vacuum directly to EGR valve with engine idling. Engine should run rough or stall if EGR valve is

operating properly. If EGR system does not operate as described, each individual component should be tested. Reconnect vacuum hose at EGR valve.



98H11459

Fig. 51: Locating Emission System Components (Non-Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.



95E34458

Fig. 52: Locating Emission System Components (Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

EGR GAS TEMPERATURE SENSOR

Turbo

See EGR GAS TEMPERATURE SENSOR under ENGINE SENSORS, SWITCHES & VALVES.

EGR VACUUM MODULATOR

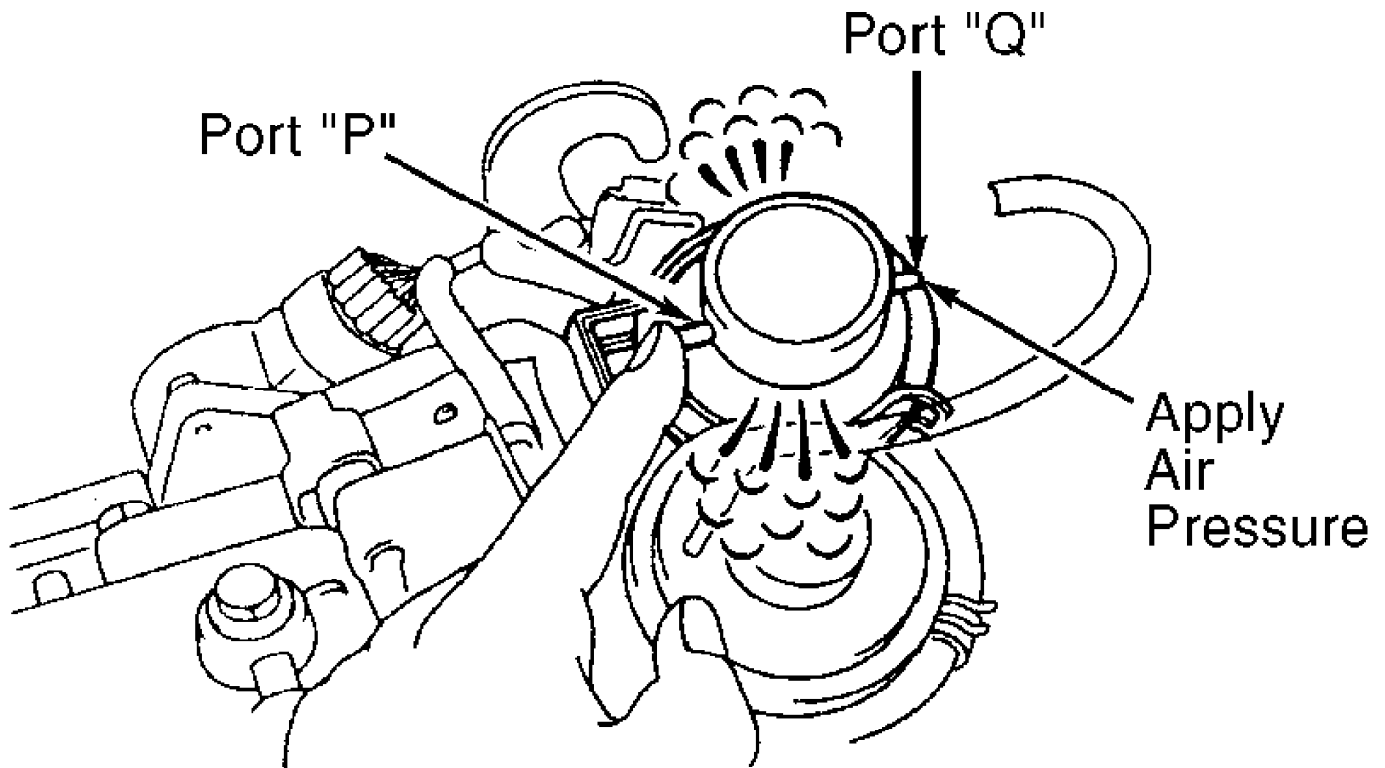
NOTE: When testing EGR vacuum modulator, it may be necessary to monitor engine RPM. Engine RPM may be monitored by connecting scan tool to data link connector No. 3. See Fig. 40.

Turbo

1) Disconnect the 2 vacuum hoses from EGR vacuum modulator. Plug port "P" on EGR vacuum modulator. See Fig. 53.

2) Apply air pressure to port "Q" on vacuum modulator. See Fig. 53. Air should flow freely through air filter side of EGR vacuum modulator.

3) Start engine. Increase engine to 3500 RPM. Repeat test procedures in steps 1) and 2). Strong resistance of airflow should be felt. Replace EGR vacuum modulator if resistance is not felt. Reconnect vacuum hoses to proper locations.



97H06454

Fig. 53: Identifying Ports & Testing EGR Vacuum Modulator (Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

EGR VACUUM SWITCHING VALVE (VSV)

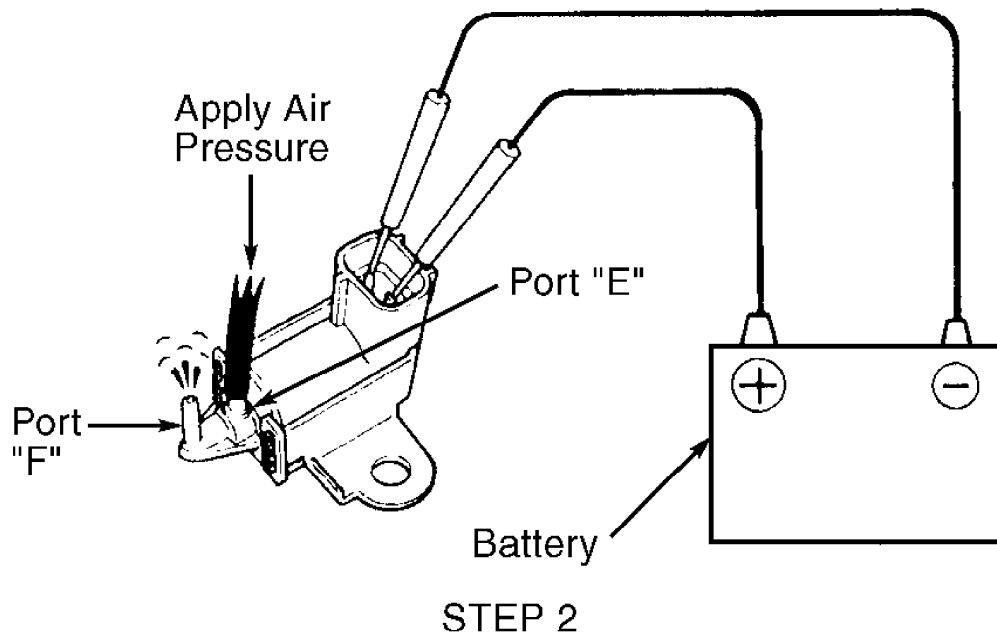
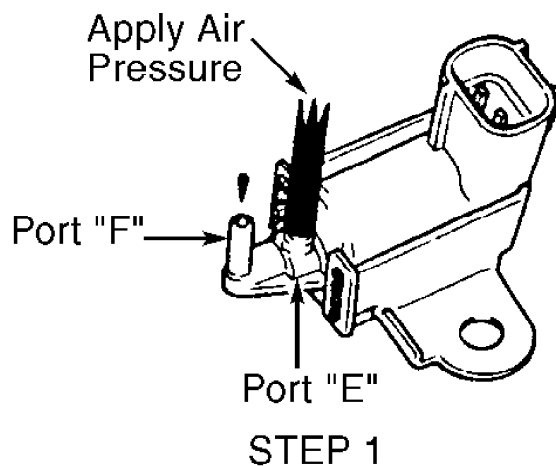
Turbo

1) Disconnect vacuum hoses and electrical connector from EGR VSV. EGR VSV is located near air intake chamber and contains a Black 2-pin electrical connector. See Figs. 51-52.

2) Using ohmmeter, check that continuity exists between electrical terminals on EGR VSV and that resistance is 30-34 ohms at 68°F (20°C). Replace EGR VSV if no continuity exists or resistance is not within specification.

3) Using ohmmeter, check that no continuity exists between each electrical terminal and body of EGR VSV body. Replace EGR VSV if continuity exists between any electrical terminal and body of EGR VSV.

4) To test EGR VSV operation, apply air pressure to port "E". Ensure air does not flow from port "F". Perform STEP 1. See Fig. 54. Apply battery voltage and ground to electrical terminals on EGR VSV. Apply air pressure to port "E". Ensure air flows from port "F". Perform STEP 2. See Fig. 54. Replace EGR VSV if defective.



97E06457

Fig. 54: Testing EGR VSV (Turbo) Or EVAP VSV (Non-Turbo & Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

EGR VALVE

Turbo

1) Remove EGR valve. See appropriate N - REMOVE/INSTALL/OVERHAUL article.

2) Inspect EGR valve for restricted passages caused by carbon deposits. Using vacuum pump, apply vacuum directly to EGR valve and ensure valve opens. Release vacuum and ensure valve closes. Replace EGR valve if defective.

FUEL EVAPORATION SYSTEM

NOTE: Charcoal canister may also be referred to as EVAP canister.

Charcoal Canister (Non-Turbo)

1) Remove charcoal canister. Charcoal canister is located at driver's side front corner of engine compartment. See Figs. 51-52. Inspect charcoal canister for cracks or damage.

2) Check for clogged filter and/or stuck check valve and diaphragm by applying .26 psi (.018 kg/cm²) air pressure to port "A" while holding port "B" closed. See Figs. 55-56. Ensure air flows freely from port "D".

3) Apply .26 psi (.018 kg/cm²) air pressure to port "A" while holding port "B" and "D" closed. See Figs. 55-56. Ensure air does not flow from port "C".

4) Using vacuum pump, apply one in. Hg of vacuum to port "B". Ensure vacuum does not decrease when port "C" is closed, and that vacuum decreases when port "C" is opened.

5) While holding port "C" closed, use vacuum pump to apply .29 in. Hg of vacuum to port "A". Ensure air flows into port "B". Replace charcoal canister if defective.

Charcoal Canister (Turbo)

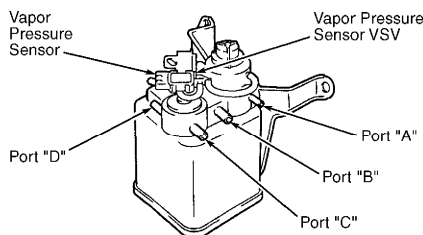
1) Remove charcoal canister. Charcoal canister is located at passenger corner of engine compartment. See Figs. 51-52. Inspect charcoal canister for cracks or damage.

2) Check for clogged filter and/or stuck check valve by applying .68 psi (.048 kg/cm²) air pressure to port "A". See Figs. 55-56. Ensure air flows freely from other ports on charcoal canister.

3) Apply .68 psi (.048 kg/cm²) air pressure to port "B". See Figs. 55-56. Ensure air does not flow from any other ports on charcoal canister.

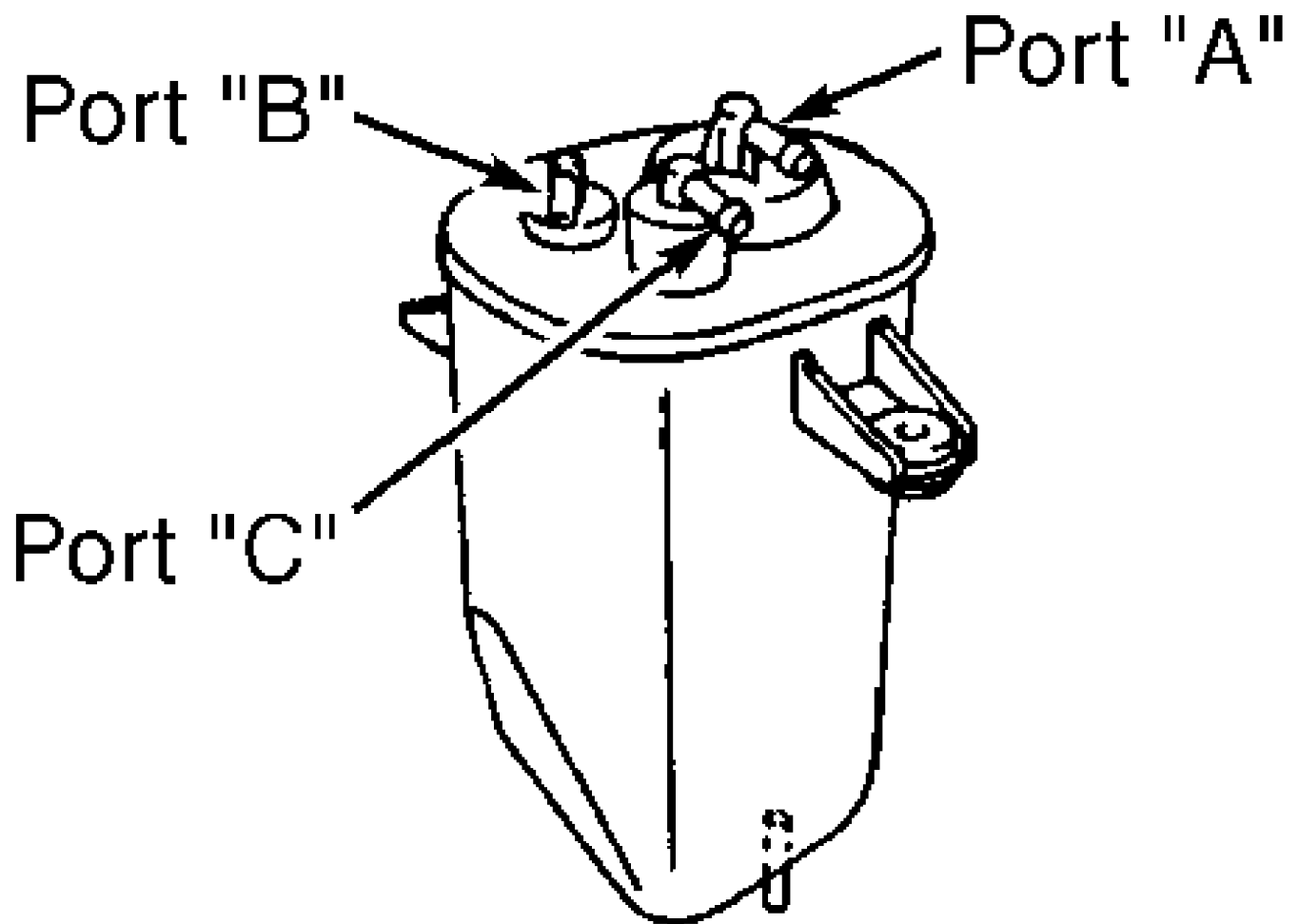
4) Apply .68 psi (.048 kg/cm²) air pressure to port "C". See Figs. 55-56. Ensure air does not flow from any other ports on charcoal canister. Replace charcoal canister if defective.

5) To clean charcoal canister filter, apply 43 psi (3 kg/cm²) air pressure to port "A" while holding ports "B" and "C" closed. Air should flow from bottom port on charcoal canister. Ensure no activated carbon comes out of charcoal canister. DO NOT attempt to wash out charcoal canister.



98A11460

Fig. 55: Identifying Charcoal Canister Ports (Non-Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.



95H34725

Fig. 56: Identifying Charcoal Canister Ports (Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

EVAP Check Valve (Turbo)

1) Remove EVAP check valve from vacuum hose. See Figs. 51-52. Apply air pressure to Blue colored side of EVAP check valve. Air should flow through EVAP check valve.

2) Apply air pressure to Black colored side of EVAP check valve. Air should not flow through EVAP check valve. Replace EVAP check valve if defective. The EVAP check valve should be installed with Black colored side toward the throttle body.

EVAP Vacuum Switching Valve

1) On non-turbo models, EVAP VSV is located at rear inside corner of air intake chamber. See Figs. 51-52. EVAP VSV uses a Blue 2-pin electrical connector with Yellow and Black/Red wires.

2) On turbo models, EVAP VSV is located below rear corner of air intake chamber. See Figs. 51-52. EVAP VSV uses a Brown 2-pin electrical connector with Violet and Black/Red wires.

3) On all models, use ohmmeter to check that continuity exists between electrical terminals on EVAP VSV and that resistance is within specification. See EVAP VSV RESISTANCE table. Replace EVAP VSV if no continuity exists or resistance is not within specification.

EVAP VSV RESISTANCE TABLE

Application	Ohms @ 68°F (20°C)
Non-Turbo	27-33
Turbo	30-34

4) Using ohmmeter, ensure no continuity exists between each electrical terminal and body of EVAP VSV. Replace EVAP VSV if continuity exists between any electrical terminal and body of EVAP VSV.

5) To test EVAP VSV operation, apply air pressure to port "E". Ensure air does not flow from port "F". Perform STEP 1. See Fig. 54.

6) Apply battery voltage and ground to electrical terminals on EVAP VSV. Apply air pressure to port "E". Ensure air flows from port "F". Perform STEP 2. See Fig. 54. Replace EVAP VSV if defective.

Vapor Pressure Sensor (Non-Turbo)

1) Vapor pressure sensor is located on top of charcoal canister at driver's side front corner of engine compartment. See Figs. 51-52.

2) Remove lower engine cover for access to vapor pressure sensor. Ensure ignition is off. To test vapor pressure sensor supply voltage, disconnect electrical connector at vapor pressure sensor.

3) Turn ignition on. Using voltmeter, check voltage between terminals VC and E2 on wiring harness side of electrical connector for vapor pressure sensor. Perform STEP 1. See Fig. 57. Supply voltage should be 4.5-5.5 volts.

4) If supply voltage is not within specification, check wiring circuit. See appropriate wiring diagram in L - WIRING DIAGRAMS article. If supply voltage is within specification, turn ignition off. Reinstall electrical connector on vapor pressure sensor. Go to next step.

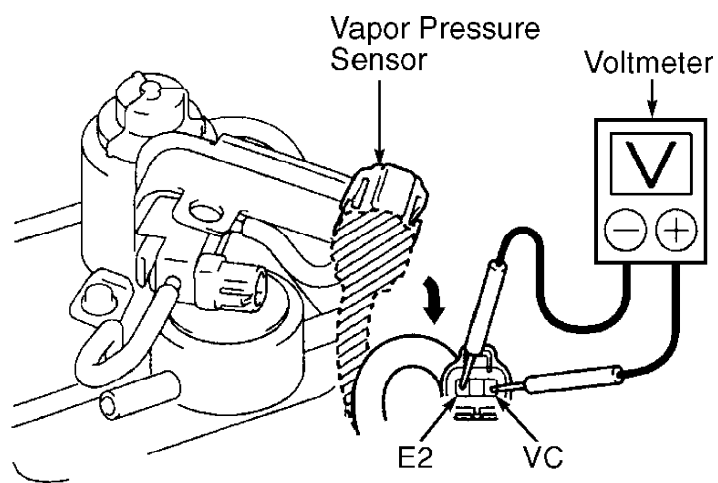
5) To test vapor pressure sensor output voltage, turn ignition on. Remove passenger's side door scuff plate. Remove carpet below instrument panel on passenger's side for access to Engine Control Module (ECM). The ECM is located on the floor panel, below the ECM protector.

6) Turn ignition on. Disconnect vacuum hose from vapor pressure sensor and connect voltmeter between terminals PTNK (Yellow/Black wire) and E2 (White/Black wire) on ECM. Perform STEP 2. See Fig. 57.

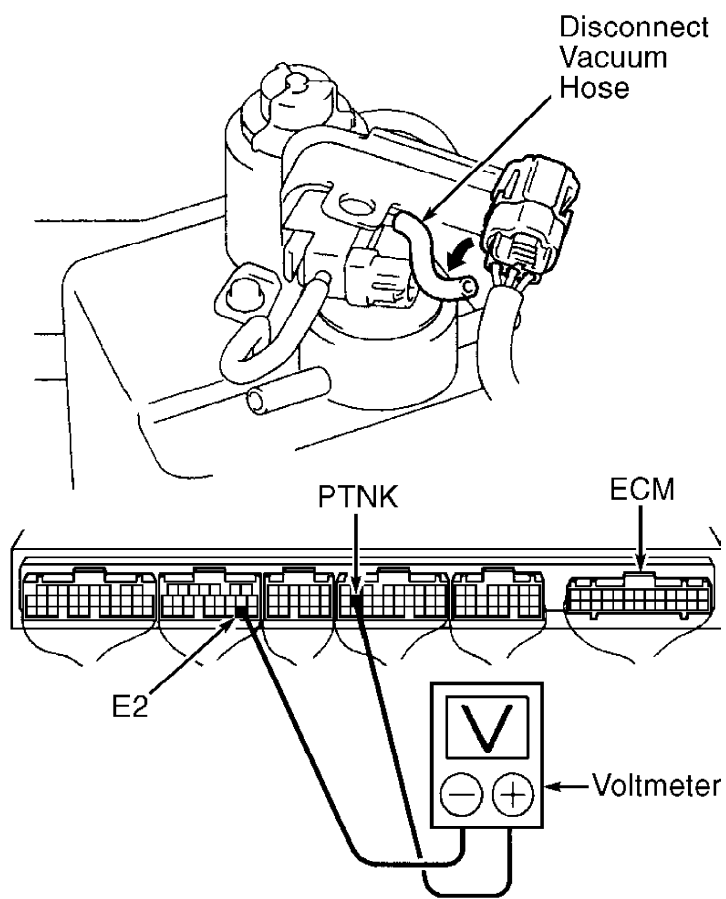
7) Using vacuum pump, apply .59 in. Hg of vacuum to vapor pressure sensor. Ensure output voltage is 1.3-2.1 volts.

8) Release vacuum from vapor pressure sensor. Ensure output voltage is 3.0-3.6 volts.

9) Apply .22 psi (.015 kg/cm²) to vapor pressure sensor. Ensure output voltage is 4.2-4.8 volts. Replace vapor sensor if output voltage is not within specification. Reconnect vacuum hose and reinstall components.



STEP 1



STEP 2

98B11461

Fig. 57: Testing Vapor Pressure Sensor (Non-Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

Vapor Pressure Sensor Vacuum Switching Valve (Non-Turbo)
1) Vapor pressure sensor Vacuum Switching Valve (VSV) is

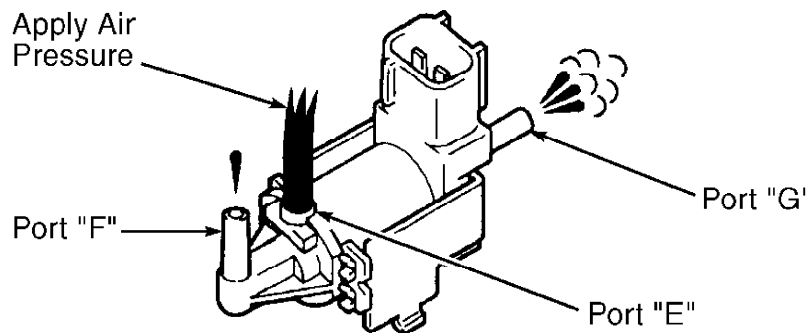
located on top of charcoal canister at driver's side front corner of engine compartment. See Figs. 51-52. Remove lower engine cover for access to vapor pressure sensor VSV. Remove vapor pressure sensor VSV.

2) Using ohmmeter, check that continuity exists between electrical terminals on vapor pressure VSV and that resistance is 37-44 ohms at 68°F (20°C). Replace vapor pressure sensor VSV if no continuity exists or resistance is not within specification.

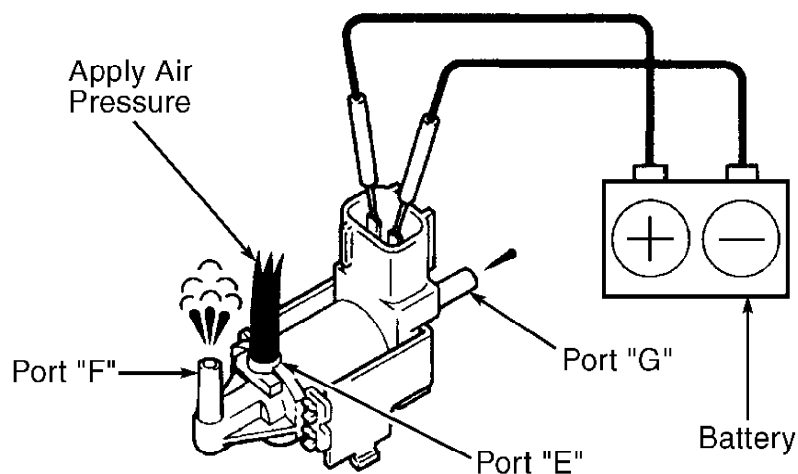
3) Using ohmmeter, ensure no continuity exists between each electrical terminal and body of vapor pressure sensor VSV. Replace vapor pressure sensor VSV if continuity exists between any electrical terminal and body of vapor pressure sensor VSV.

4) To test vapor pressure sensor VSV operation, apply air pressure to port "E". Ensure air does not flow from port "F", but flows from port "G". Perform STEP 1. See Fig. 58.

5) Apply battery voltage and ground to electrical terminals on vapor pressure sensor VSV. Apply air pressure to port "E". Ensure air flows from port "F", but not from port "G". Perform STEP 2. See Fig. 58. Replace vapor pressure sensor VSV if defective.



STEP 1



STEP 2

98C11462

Fig. 58: Testing Vapor Pressure Sensor VSV (Non-Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

POSITIVE CRANKCASE VENTILATION (PCV)

1) Remove PCV valve from valve cover. Apply air pressure to PCV valve at cylinder head side of PCV valve. Ensure air flows easily through PCV valve.

2) Apply air pressure to PCV valve at intake manifold side of PCV valve. Ensure air flows through PCV valve with some resistance. Replace PCV valve if valve does not function as described.

THROTTLE CONTROLS

DASHPOT CONTROL SYSTEM

Turbo

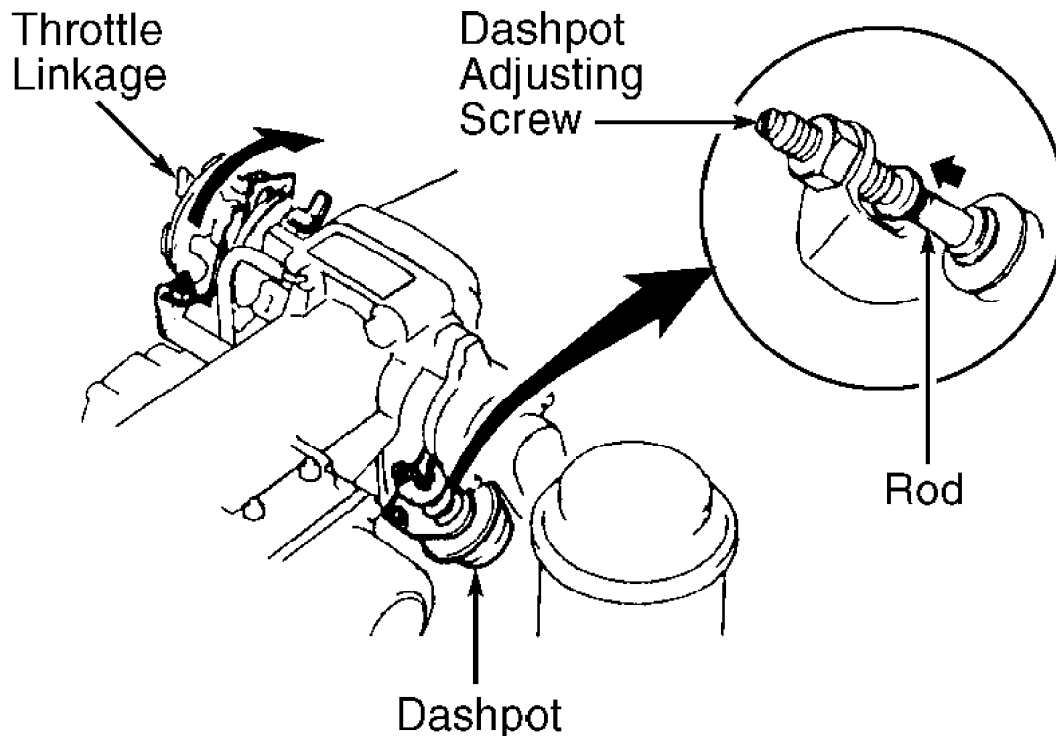
1) Start engine and warm engine to normal operating temperature. Ensure idle speed is within specification. See IDLE SPEED & MIXTURE in appropriate D - ADJUSTMENTS article. Shut engine off.

2) Disconnect control cables from throttle body. Dashpot is located on throttle body, near throttle cables. See Fig. 59.

3) Start engine. With engine idling, rotate throttle linkage on throttle body until dashpot adjusting screw starts to separate from rod on dashpot. See Fig. 59. Note engine speed at this position.

4) Engine speed should be 2100-2700 RPM. If engine speed is not as specified, rotate dashpot adjusting screw until specified engine speed is obtained.

5) To check throttle body Vacuum Transmitting Valve (VTV) operation, operate engine at 3500 RPM. Release throttle. Ensure engine returns to proper idle speed in a few seconds. Reconnect control cables at throttle body.



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Fig. 59: Locating Dashpot, Rod & Dashpot Adjusting Screw (Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

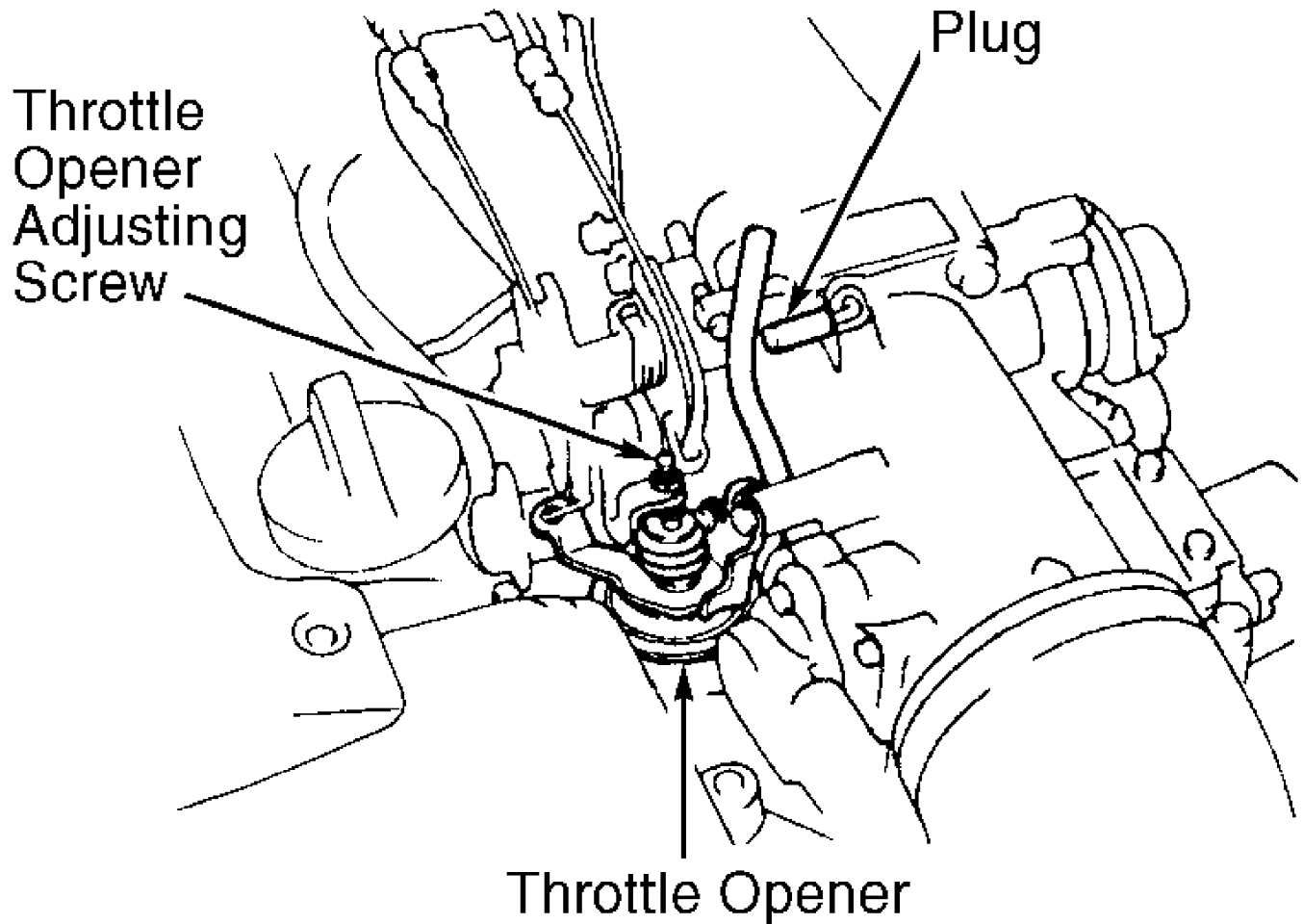
THROTTLE OPENER

Turbo

1) Start engine and warm engine to normal operating temperature. Ensure idle speed is within specification. See IDLE SPEED & MIXTURE in appropriate D - ADJUSTMENTS article. Shut engine off.

2) Disconnect vacuum hose for throttle opener at throttle body and install plug on throttle body. See Fig. 60. Start engine. Maintain engine speed at 2500 RPM. Release throttle and note engine speed. Engine speed should be 1300-1700 RPM.

3) If engine speed is not within specification, rotate throttle opener adjusting screw until correct engine speed is obtained. See Fig. 60. Reinstall vacuum hose on throttle body.



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Fig. 60: Locating Throttle Opener & Components (Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.