2002 ENGINE PERFORMANCE

Removal, Overhaul & Installation - 4-Cylinder

INTRODUCTION

NOTE: Before performing removal, overhaul and installation procedures, check for any related Technical Service Bulletins (TSBs).

WARNING: On Prius, read service precautions before proceeding with service procedure. See SERVICE PRECAUTIONS .

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.

Removal, overhaul and installation procedures are covered in this article. If component removal and installation is primarily an unbolt and bolt-on procedure, only a torque specification may be furnished.

SERVICE PRECAUTIONS

PRIUS

WARNING: When performing any inspection or service procedure on this vehicle, ensure following service precautions are followed to prevent personal injury or death due to the extremely high voltage.

The following service precautions must be followed:

- Ensure ignition is off and ignition key is removed from ignition before performing any inspection or service procedure in engine compartment, as engine may automatically start and shut off when ignition is on and READY light is illuminated. READY light is displayed just above the shift lever position indicator on instrument cluster at center of instrument panel.
- Read all service and warning labels in engine compartment before performing any procedures in engine compartment.
- All high-voltage wiring harness connectors contain Orange connectors. DO NOT touch any wiring harness that contains Orange connectors.
- High-voltage battery and other high-voltage components may be identified by HIGH VOLTAGE caution labels on them. DO NOT touch these components.
- If necessary to inspect or service high-voltage system, ensure ignition is off. Remove service plug and wait at least 5 minutes to ensure high voltage is fully discharged before touching any high-voltage wiring harness, connectors or components. Service plug is located on service plug assembly at driver's side front corner of trunk compartment, near high-voltage battery. See **Fig. 1** . Ensure service plug is stored in a

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location in which no one may install service plug while technician is working on the vehicle.

- If necessary to touch any high-voltage wiring harness, connectors or components, ensure service plug is removed and battery voltage or less exists at electrical connector. Use Toyota insulated gloves when touching any high-voltage wiring harness, connectors or components. Ensure insulated gloves are dry and in good condition and that no holes exist in insulated gloves by applying air to insulated glove before touching any high-voltage wiring harness, connectors or components.
- DO NOT wear any metal objects while working on vehicle which may accidently drop and cause a short circuit.
- If any high-voltage wiring harness connector is disconnected, ensure terminal on wiring harness connector is wrapped with tape to prevent wiring harness connector from contacting any surface.
- If servicing high-voltage system, place sign on roof of vehicle to indicate to other technicians that high-voltage system is being serviced.

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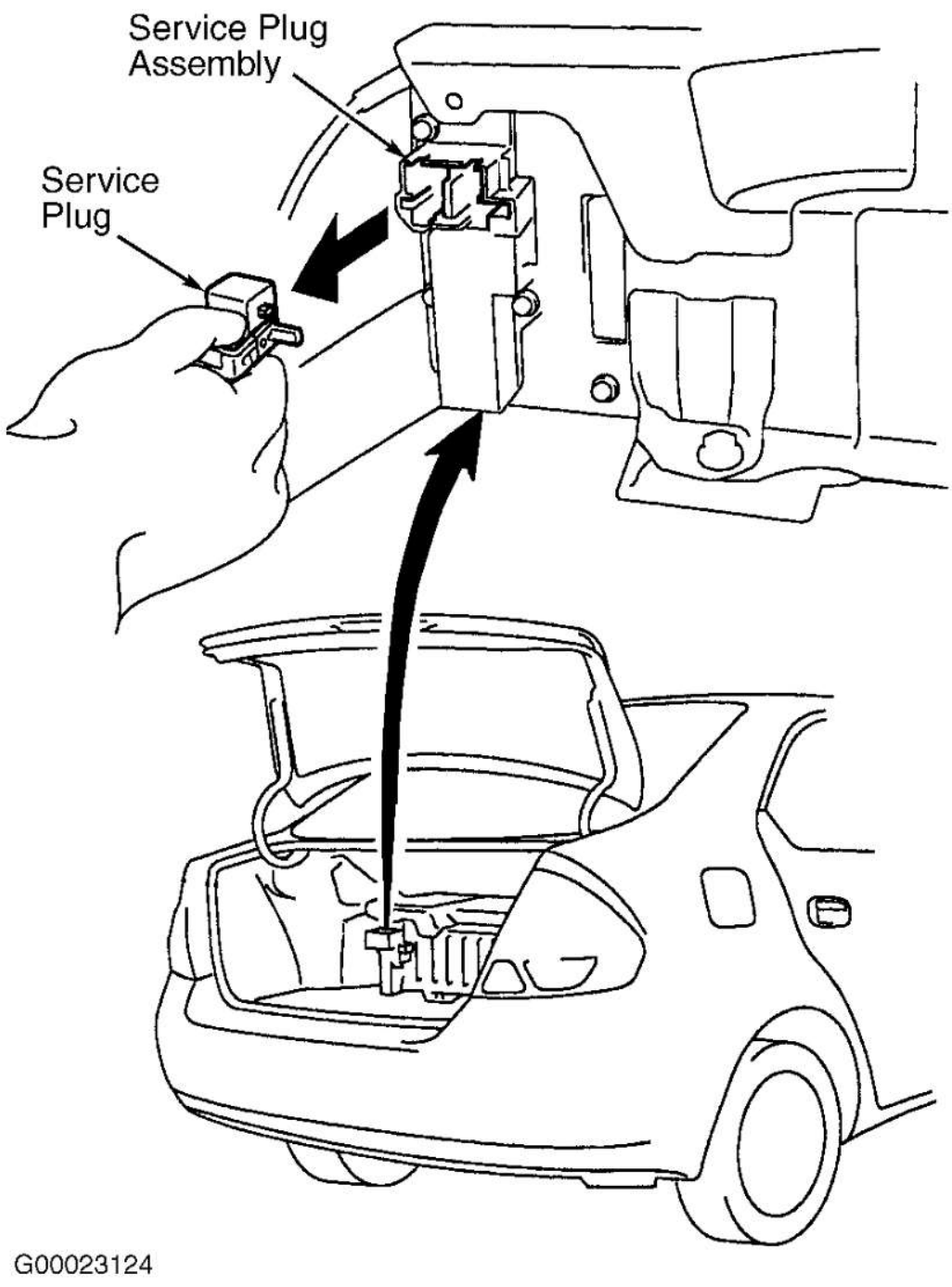


Fig. 1: Locating Service Plug & Service Plug Assembly (Prius)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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PROGRAMMING

POWER SUN ROOF REINITIALIZATION PROCEDURE

Camry

NOTE: Following procedure should be performed if battery is disconnected and reconnected, or battery is discharged and recharged to provide proper automatic operation and jam protection operation of power sun roof.

1. Ensure ignition is on. Depress and hold TILT UP side of power sun roof switch until power sun roof tilts all the way upward and then tilts downward a little. Power sun roof switch is located on headliner, just in front of power sun roof.
2. Check proper operation of open/closing and tilt up/down function for power sun roof using power sun roof switch. Power sun roof should operate anytime ignition is on, or for 43 seconds after ignition is off provided both front doors are closed. It will stop operating if any front door is opened. Depressing SLIDE OPEN side of power sun roof switch for one second should open power sun roof. Depressing TILT UP side of power sun roof switch for one second should close power sun roof. To tilt power sun roof upward, depress and hold TILT UP side of power sun roof switch for one second. To tilt power sun roof downward, depress and hold SLIDE OPEN side of power sun roof switch for one second.

Celica

NOTE: Following procedure should be performed if battery is disconnected and reconnected, or battery is discharged and recharged to provide proper automatic operation and jam protection operation of power sun roof.

Close power sun roof using power sun roof switch and continue to depress power sun roof switch briefly after power sun roof is fully closed. Power sun roof switch is located on headliner, just in front of power sun roof.

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AIR INDUCTION SYSTEMS

ACOUSTIC CONTROL INDUCTION SYSTEM VACUUM SWITCHING VALVE

NOTE: Acoustic Control Induction System (ACIS) Vacuum Switching Valve (VSV) may also be referred to as intake air control valve system VSV.

Removal & Installation (Celica)

Acoustic Control Induction System (ACIS) VSV is located on lower side of air cleaner case. See **Fig. 2** . Remove necessary components for access to ACIS VSV. Remove ACIS VSV. To install, reverse removal procedure.

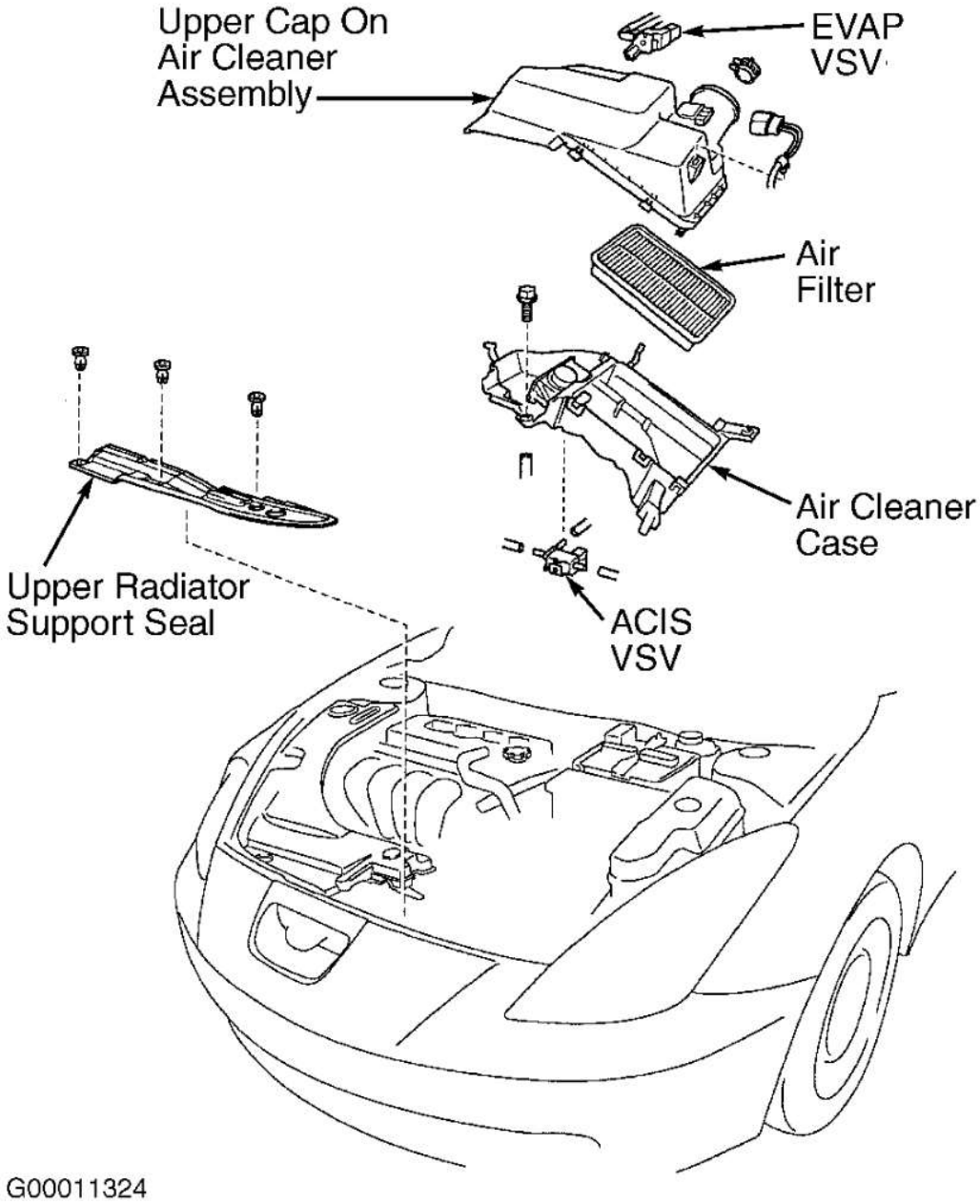


Fig. 2: Locating Acoustic Control Induction System Vacuum Switching Valve & Components (Celica)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

COMPUTERIZED ENGINE CONTROLS

NOTE: **When battery is disconnected, vehicle computer and memory systems may lose**

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memory data. Driveability problems may exist until computer systems have completed a relearn cycle.

NOTE: On Camry and Celica, it may be possible that power sun roof may not operate properly if battery is disconnected and reconnected, or battery is discharged and recharged. If power sun roof does not operate properly, perform power sun roof reinitialization procedure. See appropriate POWER SUN ROOF REINITIALIZATION PROCEDURE under PROGRAMMING.

ENGINE CONTROL MODULE

NOTE: On Camry, Camry Solara, Highlander, MR2 and RAV4, an engine immobilizer system may be used. On models equipped with engine immobilizer system, if Engine Control Module (ECM) is replaced, ECM must be programmed with proper ignition key code for engine immobilizer system. Models equipped with engine immobilizer system may be identified by looking at the ignition key. On models equipped with engine immobilizer system, the top of the ignition key is thicker than a standard ignition key, as a transponder chip is incorporated into the top of the ignition key. For programming procedures, see COMPUTER RELEARN PROCEDURES article in GENERAL INFORMATION, or appropriate ENGINE IMMOBILIZER SYSTEMS article in ACCESSORIES & EQUIPMENT.

Removal & Installation (Camry, Camry Solara, Celica, ECHO, Highlander, RAV4 & Tacoma)

Ensure ignition is off. Remove necessary components to access Engine Control Module (ECM). Remove ECM. See **ECM LOCATION** table. To install, reverse removal procedure.

Removal & Installation (Corolla)

Ensure ignition is off. Note location of Engine Control Module (ECM). See **ECM LOCATION** table. Remove lower center finish panel and necessary components for access to ECM. See **Fig. 3** . Remove ECM. To install, reverse removal procedure.

Removal & Installation (MR2)

Ensure ignition is off. Note location of Engine Control Module (ECM). See **ECM LOCATION** table. Remove luggage compartment lids, luggage compartments, quarter trim panels, lower trim covers, partition board and cover for access to ECM. See **Fig. 4** . For additional information on removal of luggage compartment components, see **FUEL PUMP** under FUEL SYSTEMS. Remove ECM. To install, reverse removal procedure.

Removal & Installation (Prius)

WARNING: Read service precautions before proceeding with service procedure. See SERVICE PRECAUTIONS .

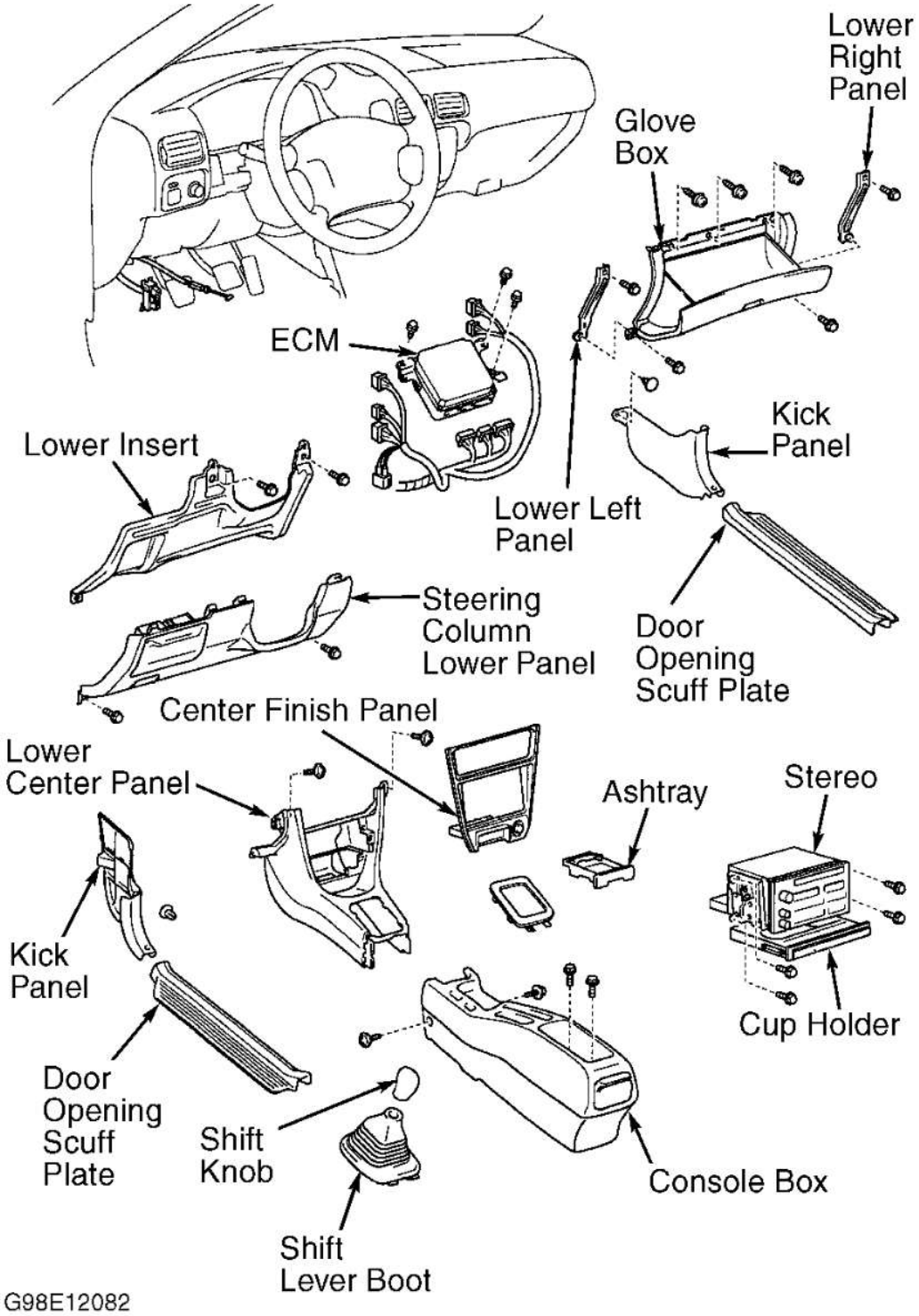
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Ensure ignition is off. Remove necessary components to access Engine Control Module (ECM). Remove ECM. See **ECM LOCATION** table. To install, reverse removal procedure.

ECM LOCATION

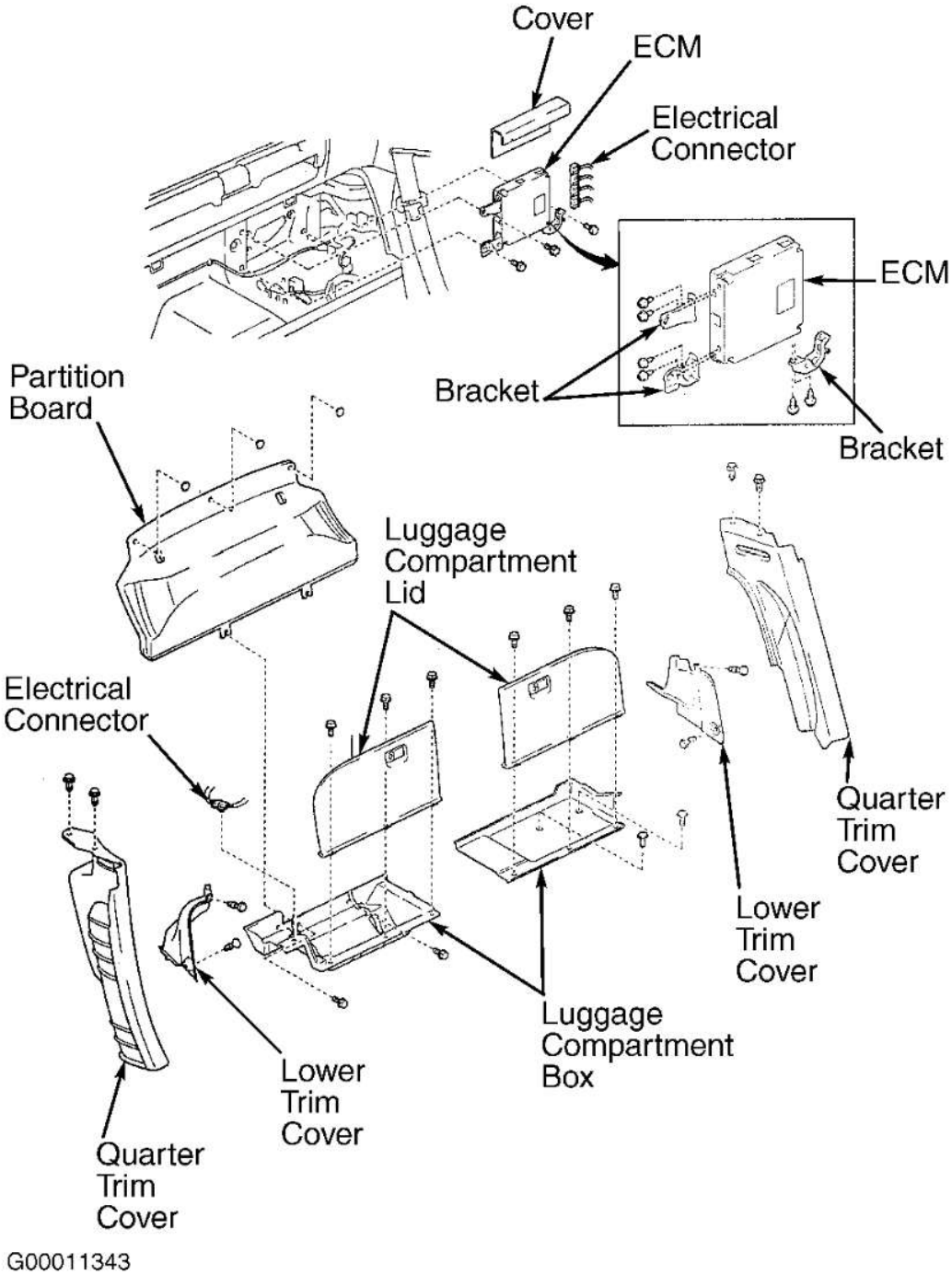
Model	(1) Location
Camry & Camry Solara	Behind Glove Box
Celica	In Engine Compartment, Below Cover, Just In Front Of Battery, Next To Driver's Side Strut Tower
Corolla	Behind Stereo On Instrument Panel, Just In Front Of Center Console
ECHO & Highlander	Behind Glove Box
MR2	On Inside Of Firewall, Directly Behind Driver's Seat & Luggage Compartment
Prius	Behind Glove Box
RAV4	Behind Passenger's Side Kick Panel, Just Below Instrument Panel
Tacoma	Behind Glove Box
(1) For illustration of ECM location, see **THEORY & OPERATION** article.	

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Fig. 3: Locating Engine Control Module & Components (Corolla)
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Fig. 4: Locating Engine Control Module & Components (MR2)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

ENGINE SENSORS & SWITCHES

ACCELERATOR PEDAL POSITION SENSOR

Removal & Installation (Camry)

Accelerator pedal position sensor is located near top of accelerator pedal. Service information is not available from manufacturer.

Removal & Installation (Camry Solara)

1. Accelerator pedal position sensor is located near top of accelerator pedal and must be replaced along with accelerator pedal as an assembly. See **Fig. 5** . Disconnect electrical connector at accelerator pedal position sensor. Remove accelerator pedal bracket retaining bolts and accelerator pedal along with accelerator pedal position sensor.
2. To install, reverse removal procedure. Tighten accelerator pedal bracket retaining bolts to specification. See **TORQUE SPECIFICATIONS** .

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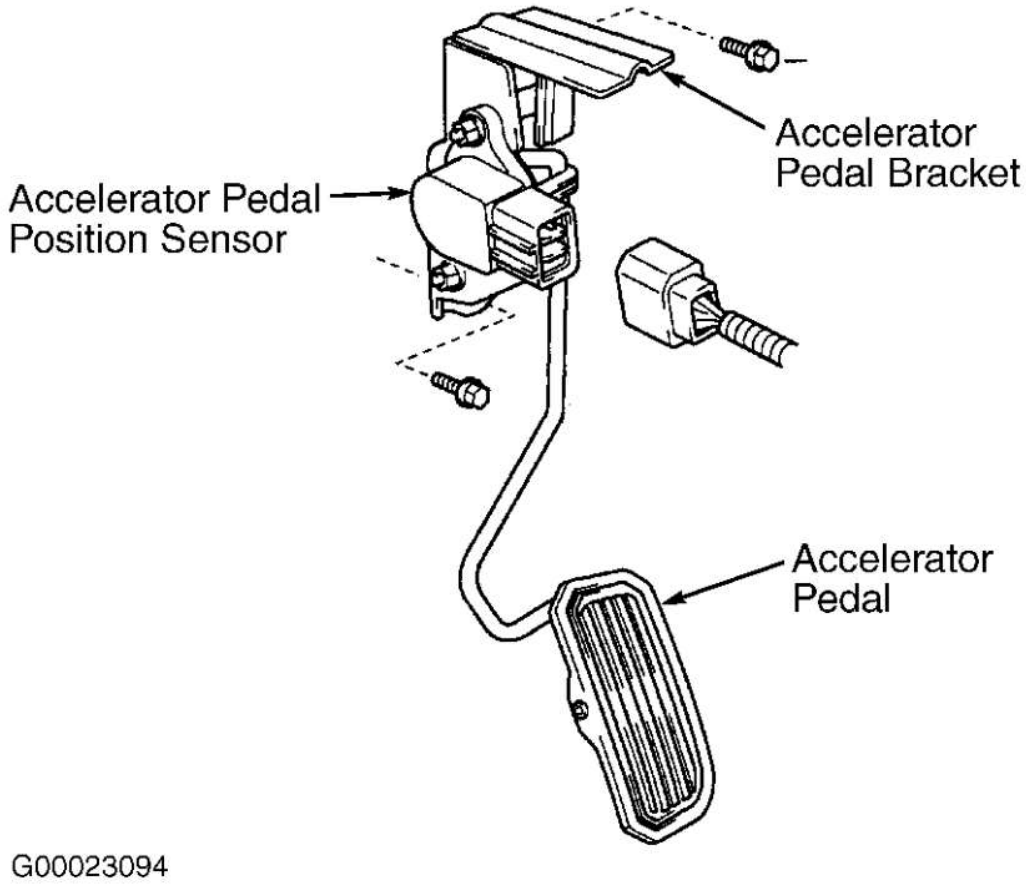


Fig. 5: Locating Accelerator Pedal Position Sensor (Camry Solara)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal & Installation (MR2 With Sequential Manual Transaxle)

There are 2 types of manual transaxles used. On models with a standard type manual transaxle, the driver operates the clutch and shifts the transaxle. On models with sequential manual transaxle, the transaxle is electronically controlled and the clutch is operated and transaxle is shifted hydraulically by moving the shift lever forward or backward. Sequential manual transaxle may be identified by shift lever pattern which consists of "R", "N", "S" and "+" in place of the conventional type shift lever pattern and there is no clutch pedal. For servicing of accelerator pedal position sensor, see **THROTTLE BODY** under FUEL SYSTEMS.

Removal & Installation (Prius)

WARNING: Read service precautions before proceeding with service procedure. See SERVICE PRECAUTIONS .

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1. Accelerator pedal position sensor is located near top of accelerator pedal and must be replaced along with accelerator pedal as an assembly. See **Fig. 6** . Disconnect electrical connector at accelerator pedal position sensor. Remove accelerator pedal retaining bolts and accelerator pedal along with accelerator pedal position sensor.
2. To install, reverse removal procedure. Tighten accelerator pedal retaining bolts to specification. See **TORQUE SPECIFICATIONS** .

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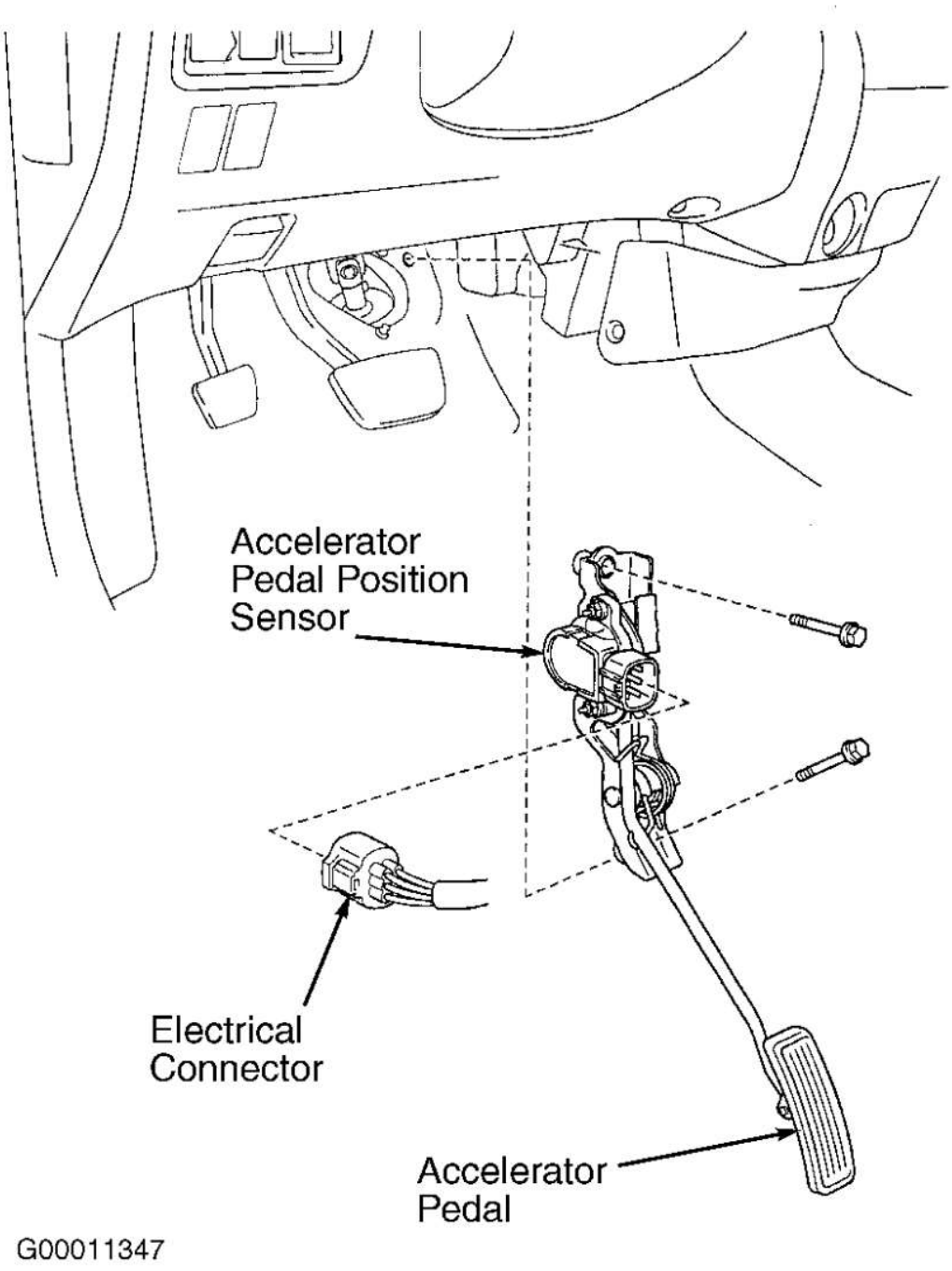


Fig. 6: Locating Accelerator Pedal Position Sensor (Prius)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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A/C COMPRESSOR LOCK SENSOR

Removal & Installation (Camry, Camry Solara With Manual A/C, Celica, Highlander, MR2 & RAV4)

A/C compressor lock sensor is located near front of A/C compressor with electrical connector located near generator. Service information is not available from manufacturer. It may be necessary to replace A/C compressor along with A/C compressor lock sensor as an assembly. Consult local parts department for parts availability. For servicing of A/C compressor, see appropriate article in AIR CONDITIONING & HEATING.

A/C EVAPORATOR TEMPERATURE SENSOR

Removal & Installation (Camry With Manual A/C & Camry Solara With Manual A/C)

A/C evaporator temperature sensor is located in evaporator case, next to evaporator core. For servicing of A/C evaporator temperature sensor, see appropriate article in AIR CONDITIONING & HEATING.

AIR/FUEL SENSOR

NOTE: Air/Fuel (A/F) sensor may also be referred to as Air/Fuel (A/F) ratio sensor.

Removal & Installation (Camry, Camry Solara, Highlander & RAV4)

1. On Camry and Camry Solara, a heated Air/Fuel (A/F) sensor is mounted on exhaust manifold above catalytic converter. On Highlander and RAV4, there are 2 heated A/F sensors mounted on exhaust manifold above catalytic converter. On all models, disconnect electrical connector for A/F sensor. Remove heat insulator for access to A/F sensor. Unscrew A/F sensor from exhaust manifold.
2. To install, reverse removal procedure. Tighten A/F sensor to specification (if available). See **TORQUE SPECIFICATIONS** .

Removal & Installation (Tacoma)

1. Heated Air/Fuel (A/F) sensor is mounted on exhaust pipe in front of catalytic converter. Disconnect electrical connector for A/F sensor. Remove retaining nuts, A/F sensor and gasket from exhaust pipe.
2. To install, reverse removal procedure using NEW gasket. Tighten A/F sensor retaining nuts to specification. See **TORQUE SPECIFICATIONS** .

AIRFLOW METER

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

Removal & Installation (Camry, Camry Solara, Celica, Corolla, ECHO, Highlander, MR2, Prius & RAV4)

WARNING: On Prius, read service precautions before proceeding with service procedure. See SERVICE PRECAUTIONS .

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Ensure ignition is off. Disconnect electrical connector at airflow meter. Airflow meter is bolted to upper cap on air cleaner assembly. Remove bolts, airflow meter and "O" ring. To install reverse removal procedure using NEW "O" ring.

Removal & Installation (Tacoma)

1. Ensure ignition is off. Disconnect electrical connector at airflow meter. Airflow meter is located between air intake hose and upper cap on air cleaner assembly and is mounted on upper cap on air cleaner assembly.
2. Disconnect necessary hoses for removal of upper cap on air cleaner assembly. Loosen clamp on air intake hose at airflow meter. Loosen retaining clips that retain upper cap on air cleaner assembly.
3. Remove upper cap on air cleaner assembly with airflow meter from air cleaner assembly. Remove airflow meter retaining nuts, airflow meter and gasket from upper cap.
4. To install, reverse removal procedure using NEW gasket. Tighten airflow meter retaining nuts to specification. See **TORQUE SPECIFICATIONS** .

BRAKELIGHT SWITCH

NOTE: Brakelight switch may also be referred to as stoplight switch.

Removal & Installation (Camry)

1. Remove necessary components for access to brakelight switch. Brakelight switch is located near top of brake pedal. Disconnect electrical connector at brakelight switch. Loosen lock nut on brakelight switch. Remove brakelight switch from mounting bracket.
2. Install brakelight switch in mounting bracket. Install electrical connector on brakelight switch. Depress brake pedal .20-.39" (5.0-10.0 mm) and hold in this position. Rotate brakelight switch inward until stoplights go off. Tighten lock nut. Release brake pedal.
3. Depress brake pedal .20-.39" (5.0-10.0 mm) and ensure brakelights come on. Release brake pedal. Ensure brakelights go off.

Removal & Installation (Camry Solara, Corolla, ECHO, Highlander, MR2, Prius & RAV4

WARNING: On Prius, read service precautions before proceeding with service procedure. See SERVICE PRECAUTIONS .

1. Remove necessary components for access to brakelight switch. Brakelight switch is located near top of brake pedal. Disconnect electrical connector at brakelight switch. Loosen lock nut on brakelight switch. Remove brakelight switch from mounting bracket.
2. Install brakelight switch in mounting bracket. Install electrical connector on brakelight switch. Depress brake pedal .20-.59" (5.0-15.0 mm) and hold in this position. Rotate brakelight switch inward until stoplights go off. Tighten lock nut. Release brake pedal.
3. Depress brake pedal .20-.59" (5.0-15.0 mm) and ensure brakelights come on. Release brake pedal. Ensure brakelights go off.

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Removal & Installation (Celica)

1. Remove necessary components for access to brakelight switch. Brakelight switch is located near top of brake pedal. Disconnect electrical connector at brakelight switch. Rotate brakelight switch counterclockwise and remove brakelight switch from mounting bracket.
2. Install brakelight switch in mounting bracket until brakelight switch contacts the cushion. Rotate brakelight switch clockwise approximately 1/4 turn to install brakelight switch in mounting bracket. Using feeler gauge, measure clearance between cushion and brakelight switch to determine the protrusion of the rod on brakelight switch. See **Fig. 7** . Clearance should be .020-.102" (.50-2.60 mm). Depress brake pedal and ensure brakelights come on. Release brake pedal. Ensure brakelights go off.

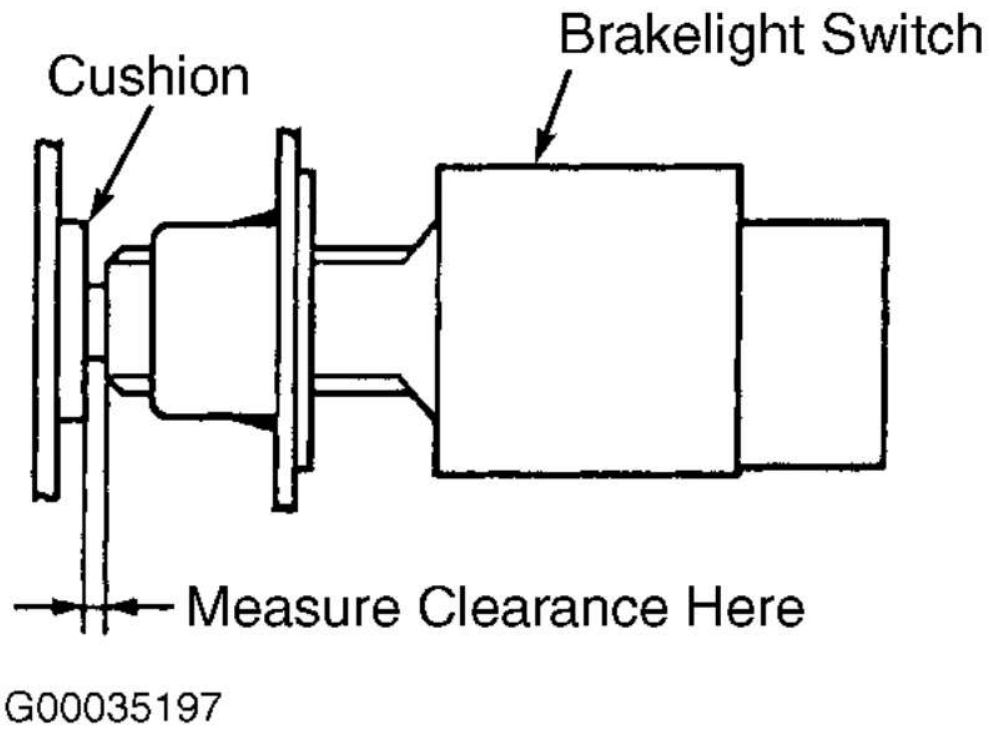


Fig. 7: Measuring Clearance At Brakelight Switch (Celica)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal & Installation (Tacoma)

Brakelight switch is located near top of brake pedal. Service information is not available from manufacturer.

CAMSHAFT POSITION SENSOR

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NOTE: **On Camry, Camry Solara, Celica, Corolla, ECHO, Highlander, MR2, Prius and RAV4, camshaft position sensor may also be referred to Variable Valve Timing (VVT) sensor.**

Removal & Installation

See **CAMSHAFT POSITION SENSOR** under IGNITION SYSTEMS.

CRANKSHAFT POSITION SENSOR

Removal & Installation

See **CRANKSHAFT POSITION SENSOR** under IGNITION SYSTEMS.

EGR GAS TEMPERATURE SENSOR

Removal & Installation (Tacoma 2.7L 4-Cyl. 3RZ-FE)

1. Disconnect electrical connector at EGR gas temperature sensor. EGR gas temperature sensor is located near EGR valve. See **Fig. 8** .
2. It may be necessary to remove EGR valve for access to EGR gas temperature sensor. See **EGR VALVE** under EMISSION SYSTEMS & SUB-SYSTEMS. Remove EGR gas temperature sensor. To install, reverse removal procedure.

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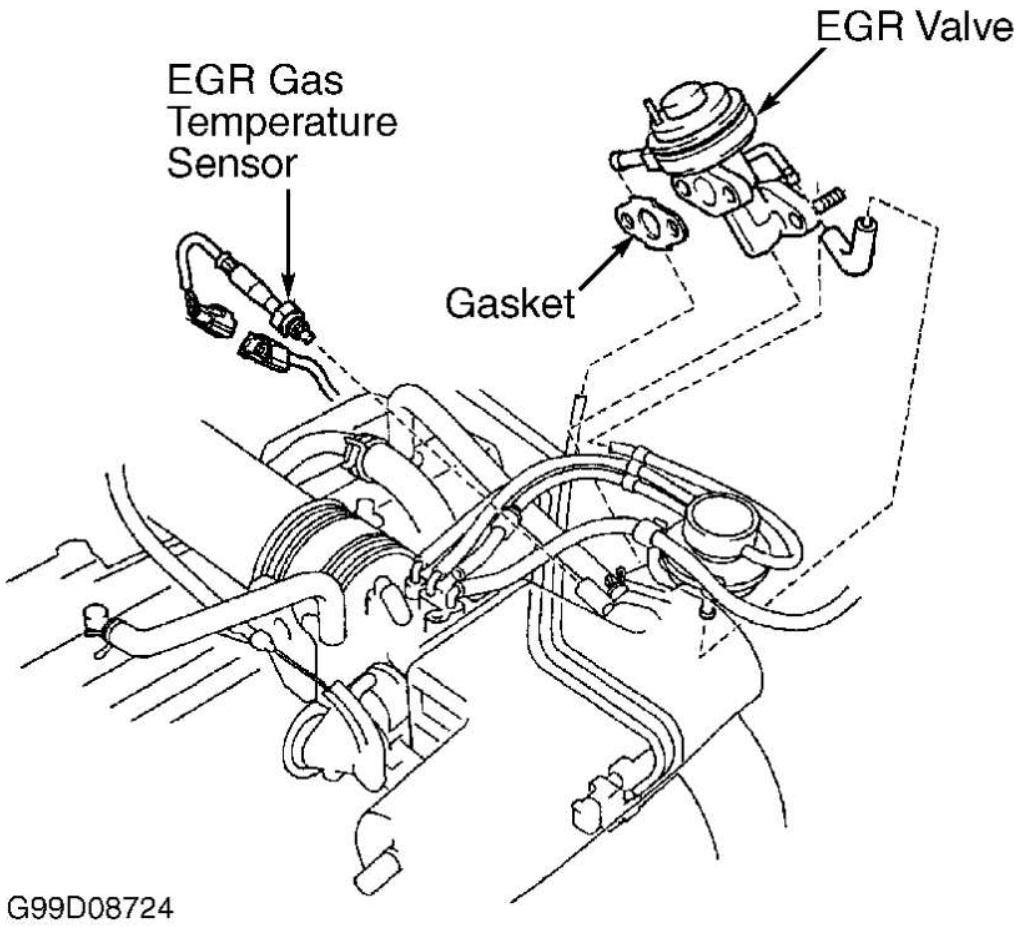


Fig. 8: Locating EGR Gas Temperature Sensor (Tacoma 2.7L 4-Cyl. 3RZ-FE)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

ENGINE COOLANT TEMPERATURE SENSOR

Removal & Installation (Camry, Camry Solara, Corolla, Highlander, RAV4 & Tacoma)

1. Ensure ignition is off. Disconnect electrical connector at Engine Coolant Temperature (ECT) sensor. See **ENGINE COOLANT TEMPERATURE SENSOR LOCATION** table.
2. Drain cooling system. Remove ECT sensor and gasket. To install, reverse removal procedure using NEW gasket. Tighten ECT sensor to specification (if available). See **TORQUE SPECIFICATIONS** . Fill cooling system.

Removal & Installation (Celica)

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1. Ensure ignition is off. Remove No. 2 cylinder head cover located on top of engine, above ignition coils and valve cover. Disconnect electrical connector at Engine Coolant Temperature (ECT) sensor. See **ENGINE COOLANT TEMPERATURE SENSOR LOCATION** table.
2. Drain cooling system. Remove ECT sensor and gasket. To install, reverse removal procedure using NEW gasket. Reinstall No. 2 cylinder head cover. Fill and bleed cooling system. See **COOLING SYSTEM BLEEDING** under COOLING SYSTEM.

Removal & Installation (ECHO)

1. Ensure ignition is off. Remove No. 2 cylinder head cover located on top of engine, above ignition coils and valve cover. Remove air cleaner assembly for access to Engine Coolant Temperature (ECT) sensor. See **ENGINE COOLANT TEMPERATURE SENSOR LOCATION** table. Disconnect electrical connector at ECT sensor.
2. Drain cooling system. Remove ECT sensor and gasket. To install, reverse removal procedure using NEW gasket. Reinstall air cleaner assembly and No. 2 cylinder head cover. Fill cooling system.

Removal & Installation (MR2)

1. Ensure ignition is off. Disconnect electrical connector at Engine Coolant Temperature (ECT) sensor. See **ENGINE COOLANT TEMPERATURE SENSOR LOCATION** table.
2. Drain cooling system. Remove ECT sensor and gasket. To install, reverse removal procedure using NEW gasket. Tighten ECT sensor to specification. See **TORQUE SPECIFICATIONS** . Fill and bleed cooling system. See **COOLING SYSTEM BLEEDING** under COOLING SYSTEM.

ENGINE COOLANT TEMPERATURE SENSOR LOCATION

Model	Location
Camry & Camry Solara	On Flywheel End Of Cylinder Head & Contains Dark Gray Electrical Connector With Green/Yellow & Brown Wires
Celica	On Flywheel End Of Cylinder Head & Contains Gray Electrical Connector With Green & Brown Wires
Corolla	On Flywheel End Of Cylinder Head & Contains Dark Gray Electrical Connector With White & Brown Wires
ECHO	On Flywheel End Of Cylinder Head & Contains Gray Electrical Connector With Red/Blue & Brown Wires
Highlander	On Flywheel End Of Cylinder Head & Contains Dark Gray 2-Pin Electrical Connector With White/Blue & White Wires
MR2	On Flywheel End Of Cylinder Head & Contains Dark Gray 2-Pin Electrical Connector With Red/Blue & Brown Wires
RAV4	On Flywheel End Of Cylinder Head & Contains Dark Gray 2-Pin Electrical Connector With White & Brown Wires
Tacoma	On Coolant Housing At Rear Of Cylinder Head & Contains Dark Gray 2-Pin Electrical Connector With Green/Red & Blue/Black Wires

Removal & Installation (Prius)

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WARNING: Service procedure should only be performed by authorized dealer.

ECT sensor is located on flywheel end of cylinder head and contains a Dark Gray 2-pin electrical connector with White and Brown wires. Manufacturer states that converter and inverter assembly must be removed for access to ECT sensor. The converter and inverter assembly are involved with the high-voltage system used on this vehicle and service procedure should only be performed by authorized dealer.

HEATED OXYGEN SENSOR

NOTE: On Camry, Camry Solara, Highlander, RAV4 and Tacoma, an Air/Fuel (A/F) sensor is used. For servicing of A/F sensor, see AIR/FUEL SENSOR .

Removal & Installation (All Models)

WARNING: On Prius, read service precautions before proceeding with service procedure. See SERVICE PRECAUTIONS .

1. Servicing of heated oxygen sensor is just primarily an unbolt and bolt-on procedure. For heated oxygen sensor location, see **HEATED OXYGEN SENSOR LOCATION** table. It may be necessary to remove heat insulator for access to heated oxygen sensor. On MR2, it may be necessary to remove air cleaner assembly for access to heated oxygen sensor on exhaust pipe assembly.
2. On all models, disconnect electrical connector for heated oxygen sensor. Remove retaining nuts or unscrew heated oxygen sensor. Remove heated oxygen sensor and gasket (if equipped). To install, reverse removal procedure using NEW gasket (if equipped). Tighten heated oxygen sensor or retaining nuts to specification (if available). See **TORQUE SPECIFICATIONS** .

HEATED OXYGEN SENSOR LOCATION

Model	Location
Camry & Camry Solara	On Exhaust Pipe After Catalytic Converter
Celica, Corolla & ECHO	One On Exhaust Pipe In Front Of Catalytic Converter & One On Exhaust Pipe After Catalytic Converter
Highlander	Two Oxygen Sensors Are Mounted On Exhaust Manifold Below Catalytic Converters
MR2	Two Oxygen Sensors Are Mounted On Exhaust Manifold Above Catalytic Converters & One On Exhaust Pipe Behind Catalytic Converter
Prius	One On Exhaust Pipe In Front Of Catalytic Converter & One On Exhaust Pipe After Catalytic Converter
RAV4	Two Oxygen Sensors Are Mounted On Exhaust Manifold Below Catalytic Converters
Tacoma	On Exhaust Pipe After Catalytic Converter

IGNITION SWITCH

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Removal & Installation (All Models)

Ignition switch is located at bottom of upper steering column bracket. See **Fig. 9** . If necessary to remove steering column for access to ignition switch, see appropriate STEERING COLUMNS article in STEERING. Remove screws and ignition switch. To install, reverse removal procedure.

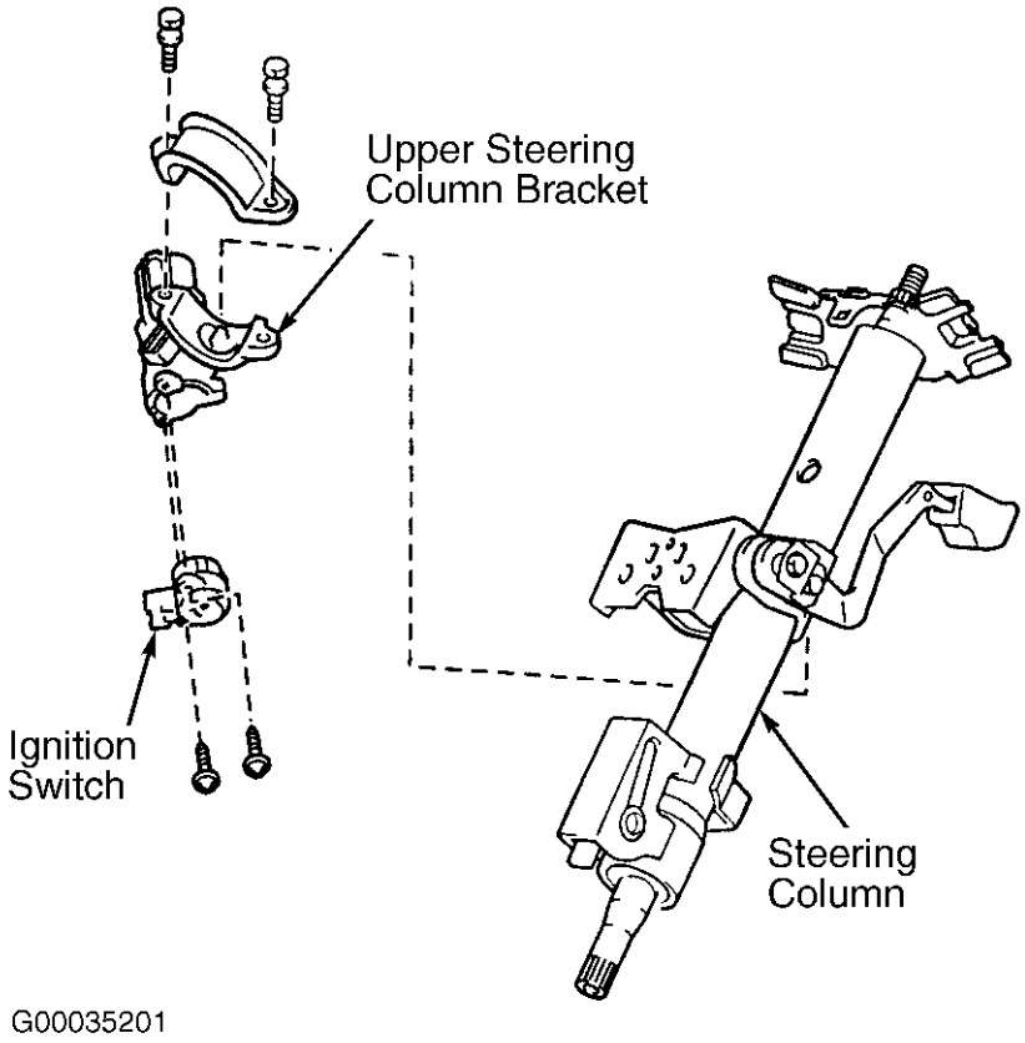


Fig. 9: Locating Typical Ignition Switch
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

KNOCK SENSOR

NOTE: Knock sensor may also be referred to as knock sensor No. 1.

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Removal & Installation (Camry)

Knock sensor is located on side of cylinder block, just below intake manifold. See **Fig. 10** . Service information is not available from manufacturer. It may be necessary to remove engine with transaxle to gain access for removal of intake manifold. For engine removal, see appropriate article in ENGINES. It may be necessary to remove intake manifold for access to knock sensor. Use Socket (SST 09816-30010) when servicing knock sensor. Tighten knock sensor and intake manifold bolts/nuts (if removed) to specification. See **TORQUE SPECIFICATIONS** .

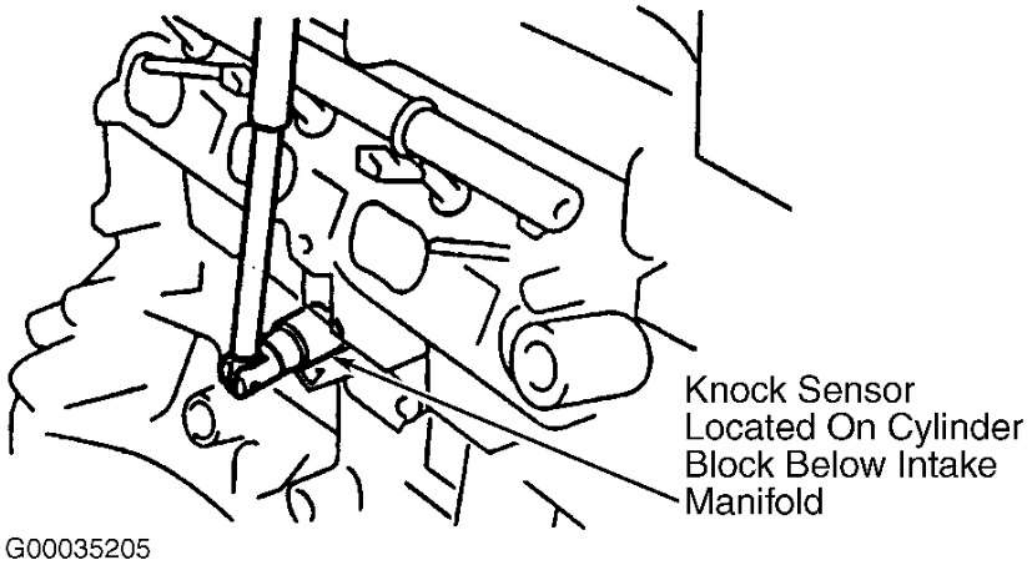


Fig. 10: Locating Knock Sensor (Camry & Highlander)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal (Camry Solara)

1. Knock sensor is located on side of cylinder block. See **Fig. 11** . Manufacturer states to remove engine with transaxle for access to knock sensor. See appropriate article in ENGINES.
2. Disconnect necessary hoses for removal of intake manifold with throttle body. Remove engine wiring harness from engine wiring harness clamp. Remove bolts/nuts, engine wiring harness brackets, intake manifold with throttle body, gasket and intake manifold insulator. See **Fig. 11** . Using Socket (SST 09816-30010), remove knock sensor from cylinder block.

Installation

Install and tighten knock sensor to specification. See **TORQUE SPECIFICATIONS** . To install intake manifold, reverse removal procedure using NEW gasket. Tighten intake manifold bolts/nuts to specification. See **TORQUE SPECIFICATIONS** . Reinstall engine.

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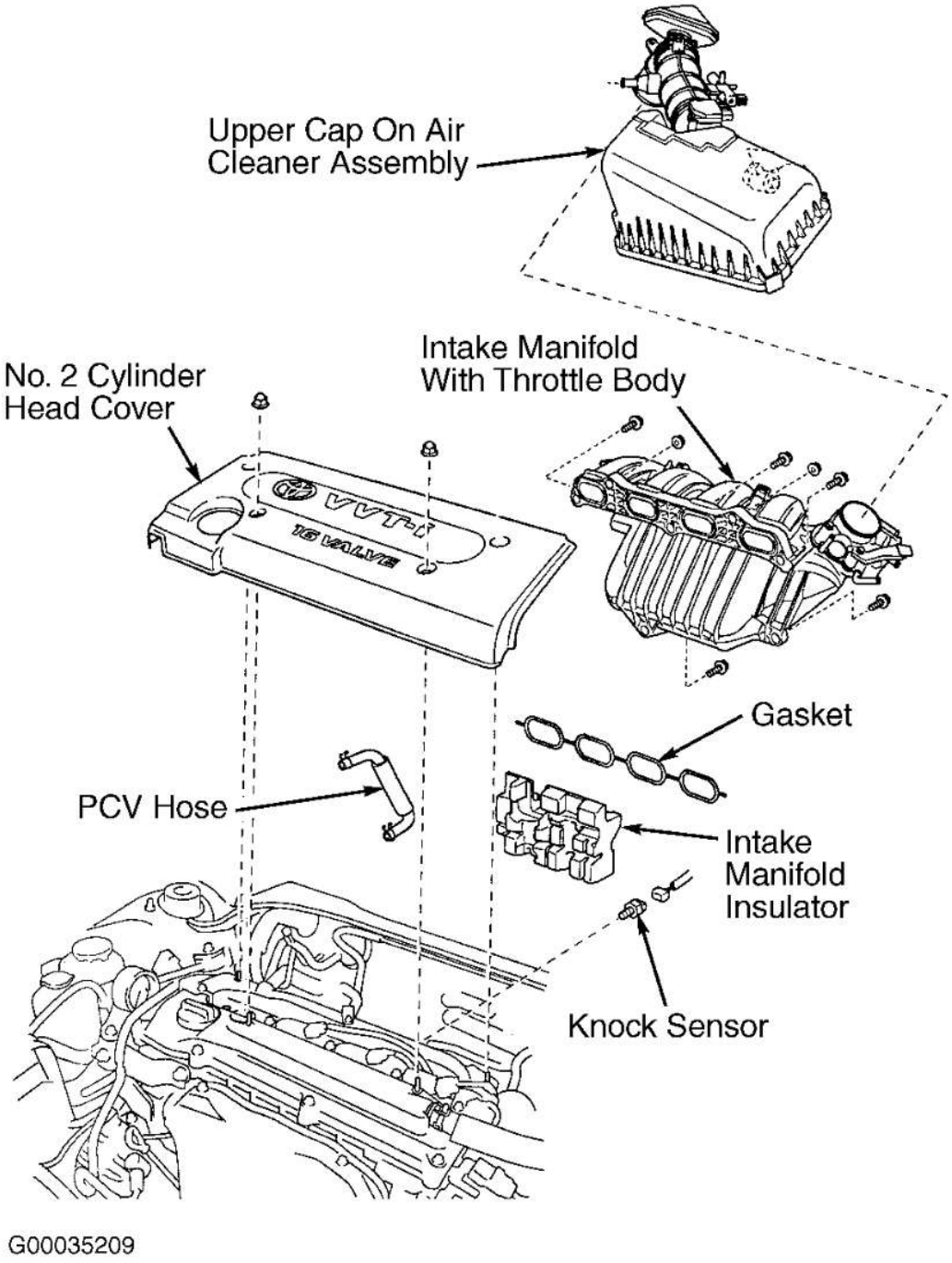


Fig. 11: Locating Knock Sensor & Identifying Intake Manifold & Components (Camry Solara)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal (Celica)

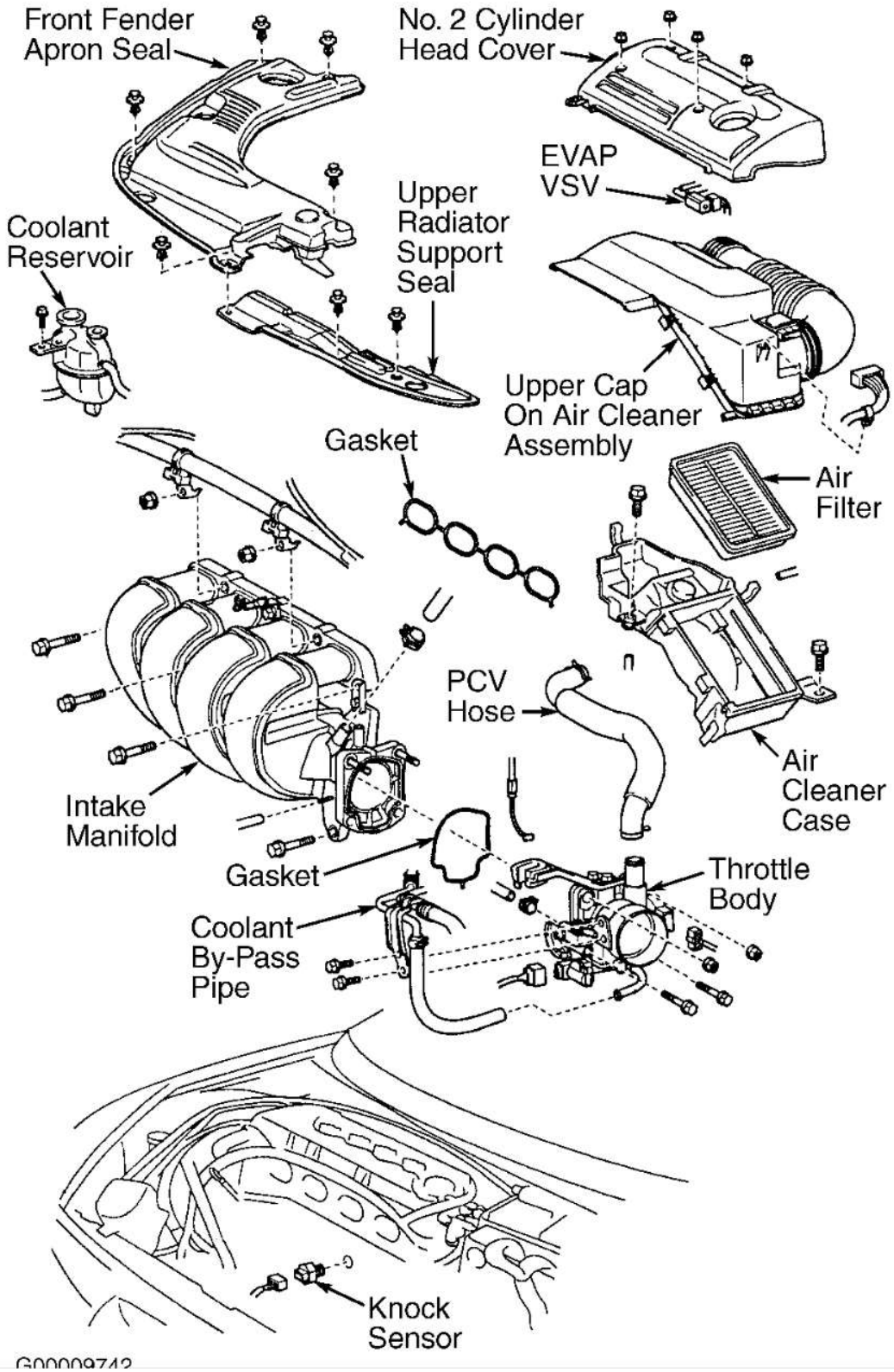
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1. Manufacturer states throttle body and intake manifold must be removed for access to knock sensor. Knock sensor is located on side of cylinder block. See **Fig. 12** and **Fig. 13** . Remove throttle body. See **THROTTLE BODY** under FUEL SYSTEMS.
2. Remove coolant reservoir and air cleaner case. Disconnect necessary hoses for removal of intake manifold. On 1.8L 2ZZ-GE models, remove bolts/nuts and intake manifold support from rear of intake manifold. On all models, remove bolts/nuts, intake manifold and gasket from cylinder head.
3. Disconnect electrical connector at knock sensor. On 1.8L 1ZZ-FE models, using Socket (SST 09816-30010), remove knock sensor from cylinder block. On 1.8L 2ZZ-GE models, note position electrical connector fitting on knock sensor in relation to the cylinder block for installation reference. Remove knock sensor retaining nut from stud at center of knock sensor. See **Fig. 13** . Remove knock sensor from stud on cylinder block.

Installation

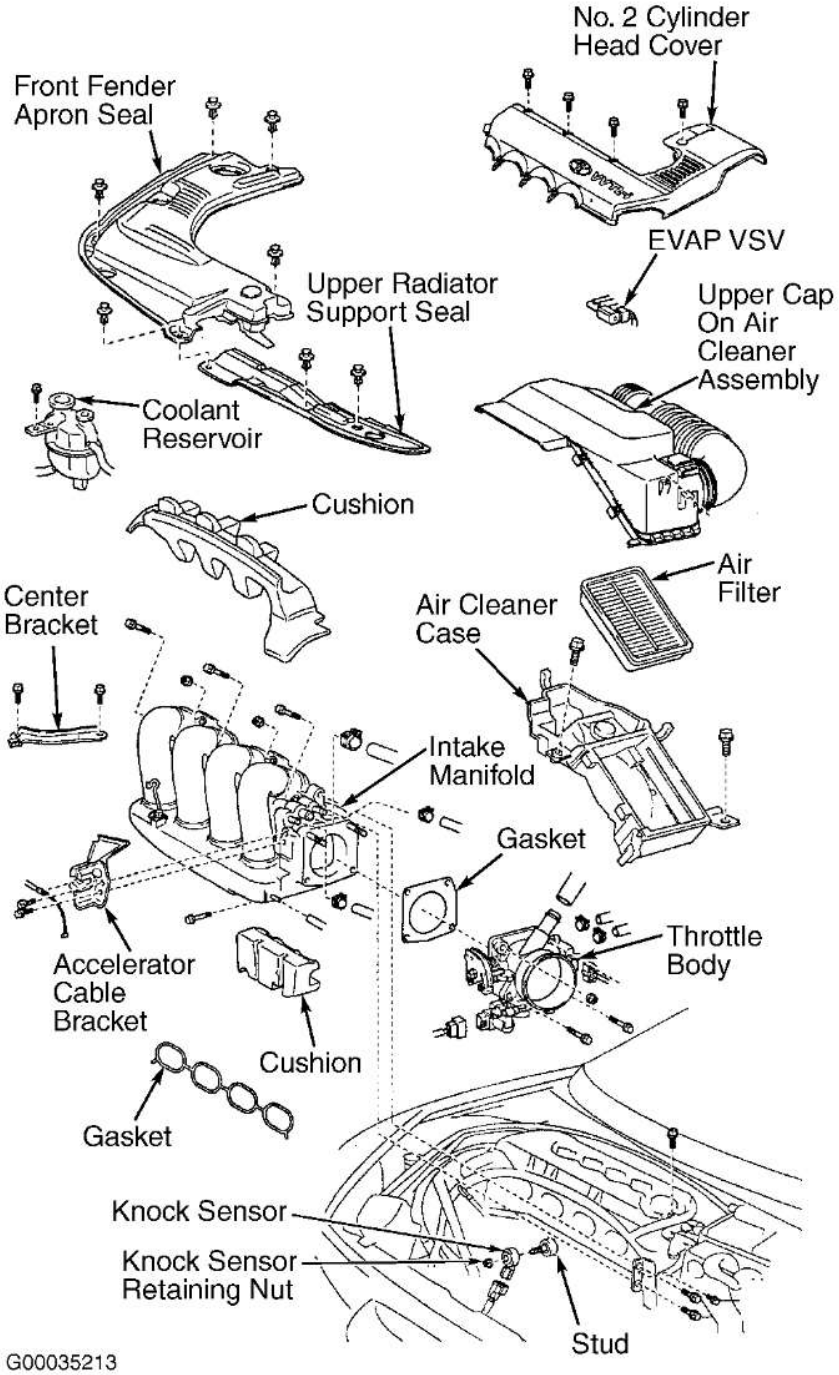
1. On 1.8L 1ZZ-FE models, install and tighten knock sensor to specification. See **TORQUE SPECIFICATIONS** . On 1.8L 2ZZ-GE models, install knock sensor on stud on cylinder block. Ensure electrical connector fitting on knock sensor is positioned in original location in relation to the cylinder block. Install and tighten knock sensor retaining nut to specification. See **TORQUE SPECIFICATIONS** . On all models, reinstall electrical connector on knock sensor. To install remaining components, reverse removal procedure using NEW gaskets.
2. On 1.8L 2ZZ-GE models, note intake manifold bolt/nut identification before tightening intake manifold bolts/nuts to specification. See **Fig. 14** . On all models, ensure gasket for throttle body is installed with protrusion area facing proper direction. See **THROTTLE BODY** under FUEL SYSTEMS. Tighten bolts/nuts to specification. See **TORQUE SPECIFICATIONS** . Fill and bleed cooling system. See **COOLING SYSTEM BLEEDING** under COOLING SYSTEM.

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Fig. 12: Locating Knock Sensor & Identifying Intake Manifold & Components (Celica 1.8L 1ZZ-FE)
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Fig. 13: Locating Knock Sensor & Identifying Intake Manifold & Components (Celica 1.8L 2ZZ-GE)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

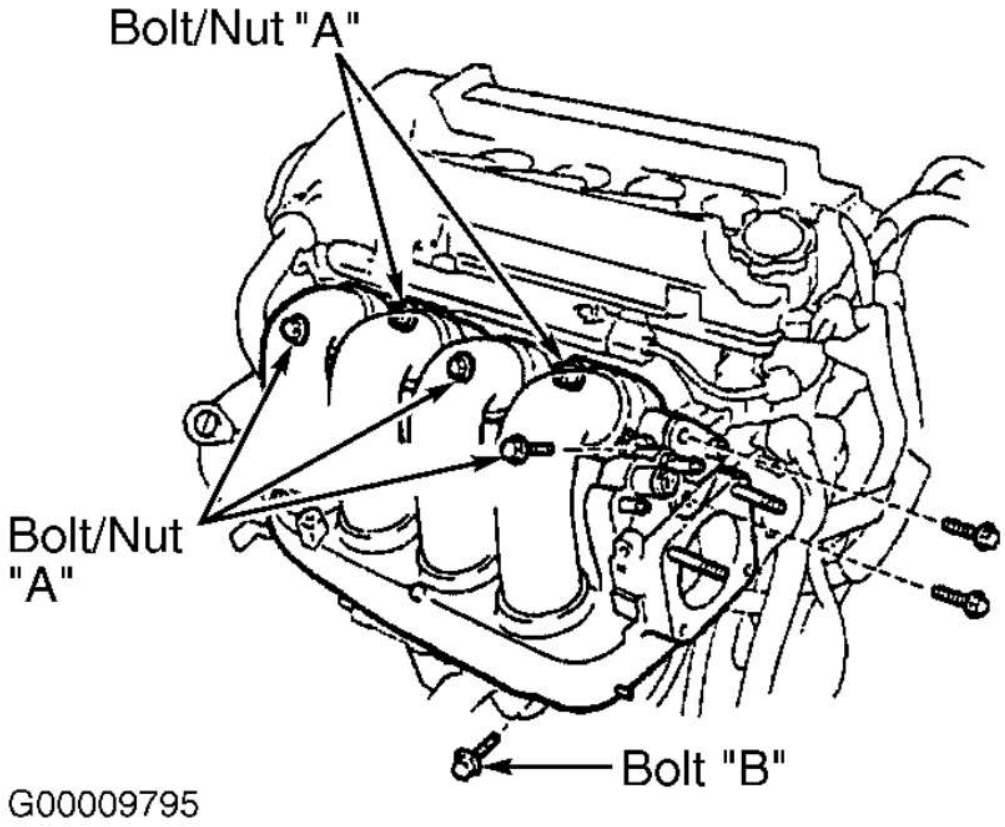


Fig. 14: Identifying Intake Manifold Bolts/Nuts (Celica 1.8L 2ZZ-GE)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal (Corolla)

1. Manufacturer states throttle body and intake manifold must be removed for access to knock sensor. Knock sensor is located on side of cylinder block. See **Fig. 15** . Remove throttle body. See **THROTTLE BODY** under FUEL SYSTEMS.
2. Remove No. 2 cylinder head cover located on top of engine, above ignition coils and valve cover. See **Fig. 15** . Disconnect necessary electrical connectors so engine wiring harness protector and engine wiring harness may be disconnected from engine wiring harness brackets. See **Fig. 15** .
3. Remove bolts and disconnect engine wiring harness protector and engine wiring harness from engine wiring harness brackets. Disconnect necessary hoses for removal of intake manifold. Remove bolts from

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intake manifold support. Remove bolts/nuts, engine wiring harness brackets, intake manifold and gasket from cylinder head.

4. Disconnect electrical connector at knock sensor. Using Socket (SST 09816-30010), remove knock sensor from cylinder block.

Installation

Install and tighten knock sensor to specification. See **TORQUE SPECIFICATIONS** . To install remaining components, reverse removal procedure using NEW gaskets. Ensure gasket for throttle body is installed with protrusion area facing proper direction. See **THROTTLE BODY** under FUEL SYSTEMS. Tighten bolts/nuts to specification. See **TORQUE SPECIFICATIONS** . Fill cooling system.

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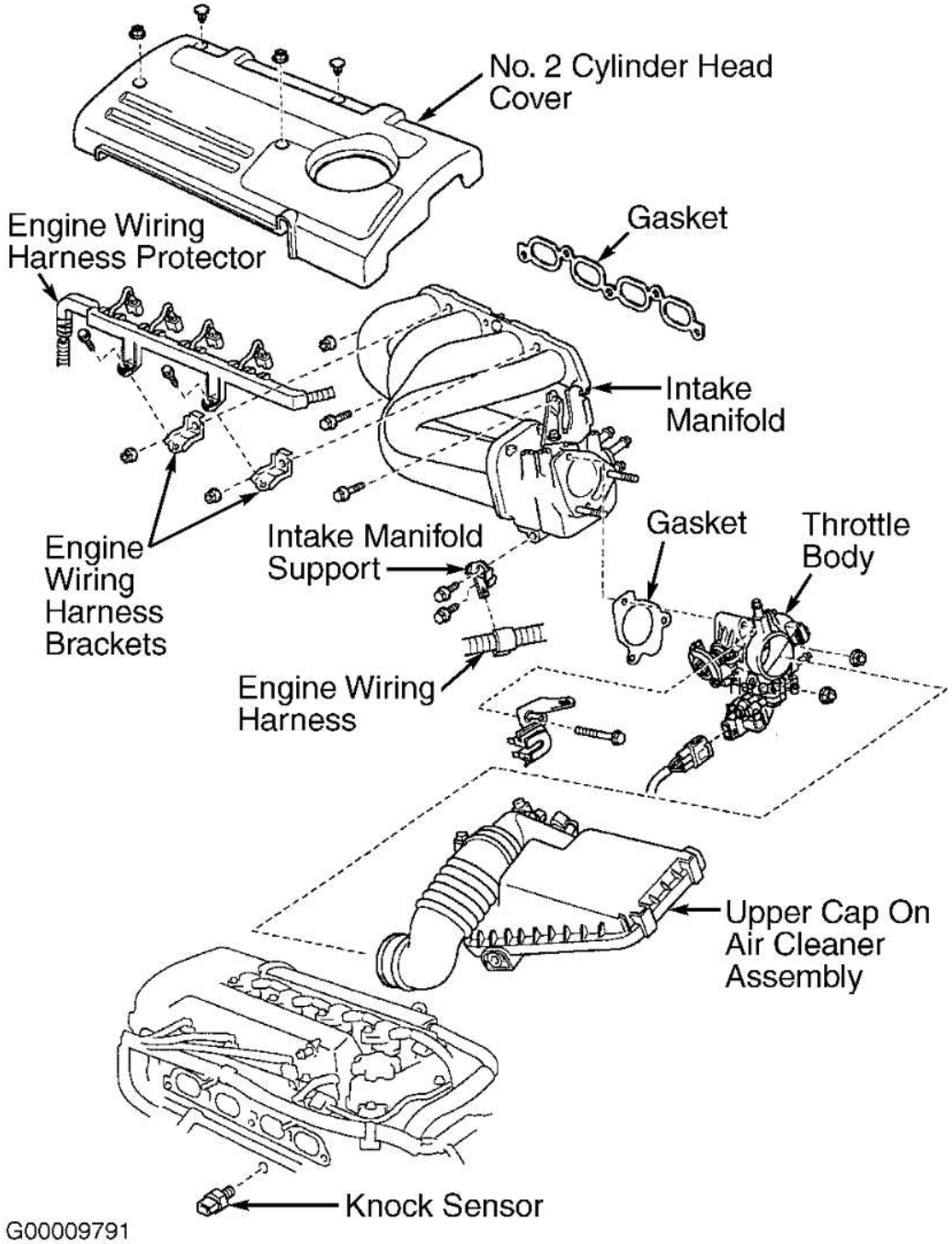


Fig. 15: Locating Knock Sensor & Identifying Intake Manifold & Components (Corolla)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal (ECHO)

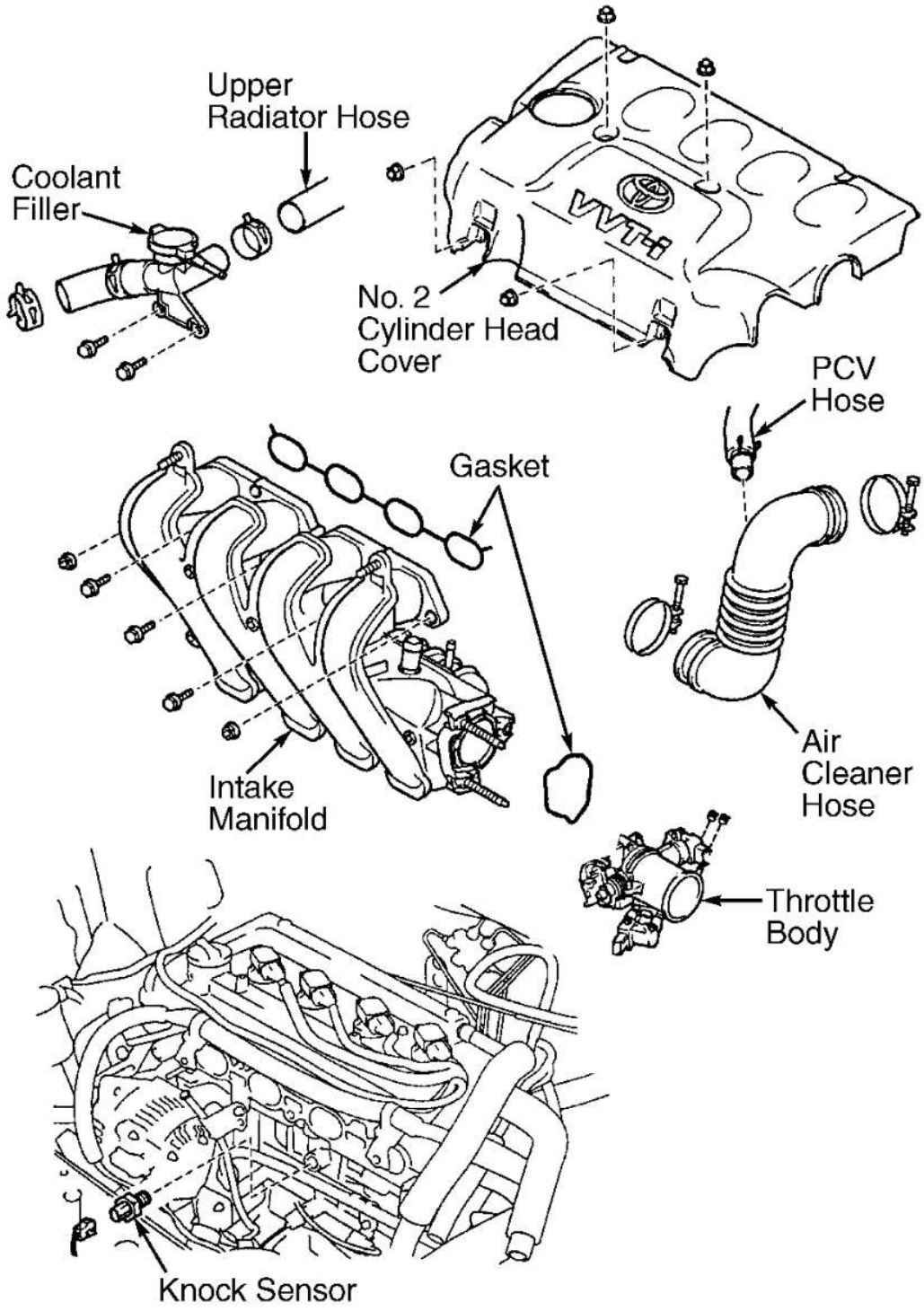
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1. Manufacturer states throttle body and intake manifold must be removed for access to knock sensor. Knock sensor is located on side of cylinder block. See **Fig. 16** . Remove throttle body. See **THROTTLE BODY** under FUEL SYSTEMS.
2. Remove coolant filler and No. 2 cylinder head cover located on top of engine, above ignition coils and valve cover (if necessary) for access to intake manifold. See **Fig. 16** . Disconnect necessary hoses for removal of intake manifold. Remove bolts/nuts, intake manifold and gasket from cylinder head.
3. Disconnect electrical connector at knock sensor. Using Socket (SST 09816-30010), remove knock sensor from cylinder block.

Installation

Install and tighten knock sensor to specification. See **TORQUE SPECIFICATIONS** . To install remaining components, reverse removal procedure using NEW gaskets. Tighten bolts/nuts to specification. See **TORQUE SPECIFICATIONS** . Fill cooling system.

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Fig. 16: Locating Knock Sensor & Identifying Intake Manifold & Components (ECHO)
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Removal & Installation (Highlander)

Knock sensor is located on side of cylinder block, just below intake manifold. See **Fig. 10** . Service information is not available from manufacturer. It may be necessary to remove engine with transaxle to gain access for removal of intake manifold. For engine removal, see appropriate article in ENGINES. It may be necessary to remove intake manifold for access to knock sensor. Use Socket (SST 09816-30010) when servicing knock sensor. Tighten knock sensor and intake manifold bolts/nuts (if removed) to specification. See **TORQUE SPECIFICATIONS** .

Removal (MR2)

1. Knock sensor is located on side of cylinder block. See **Fig. 17** . Manufacturer states to remove engine and transaxle for access to knock sensor. See appropriate article in ENGINES.
2. Disconnect coolant hoses from throttle body and vacuum hoses from intake manifold. Remove engine wiring harness from engine wiring harness brackets. Remove bolts/nuts, engine wiring harness brackets, intake manifold with throttle body and gasket. Using Socket (SST 09817-16011), remove knock sensor from cylinder block.

Installation

Install and tighten knock sensor to specification. See **TORQUE SPECIFICATIONS** . To install intake manifold, reverse removal procedure using NEW gasket. Tighten intake manifold bolts/nuts to specification. See **TORQUE SPECIFICATIONS** . Reinstall engine. Fill and bleed cooling system. See **COOLING SYSTEM BLEEDING** under COOLING SYSTEM.

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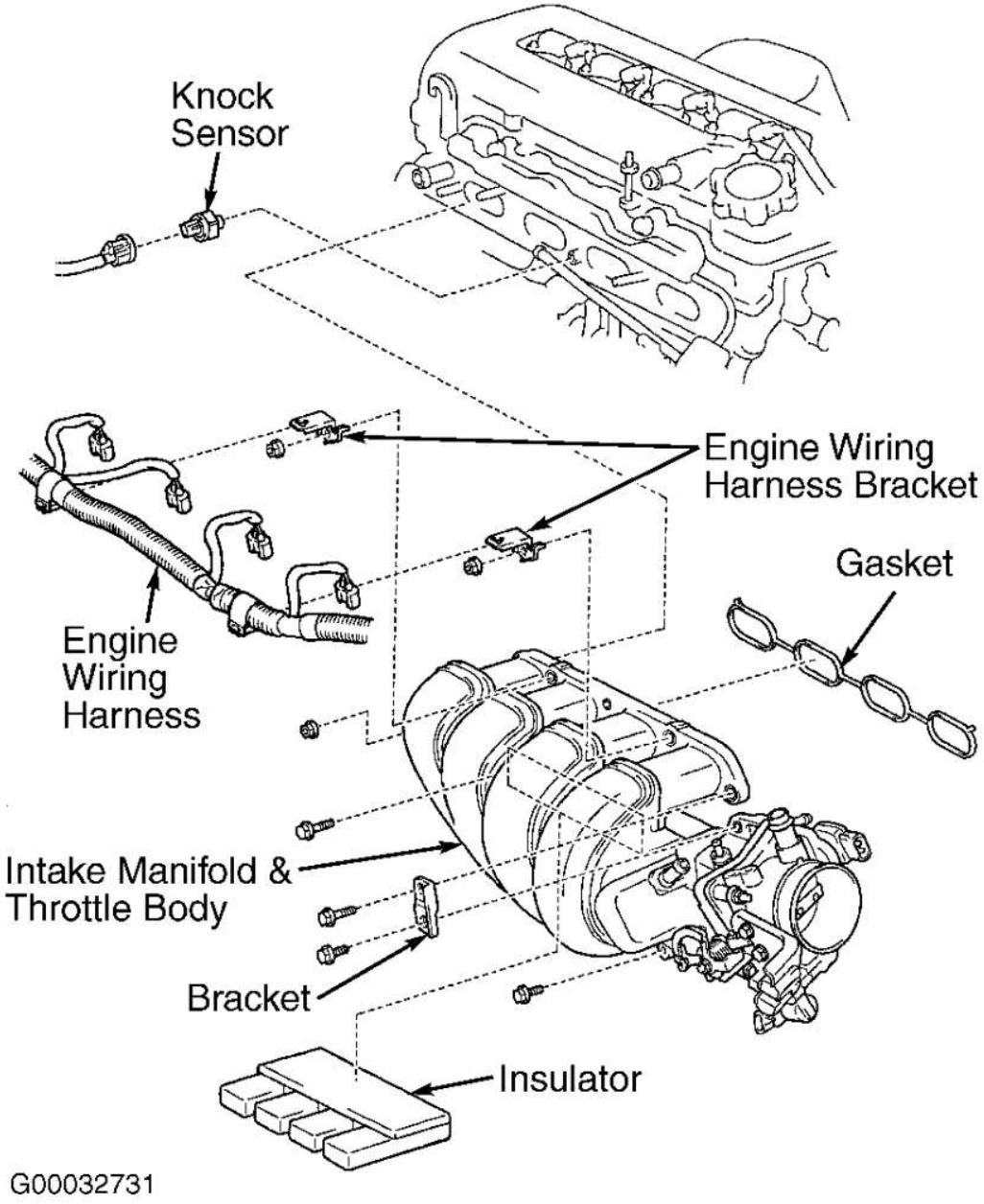


Fig. 17: Locating Knock Sensor & Identifying Typical Intake Manifold & Components (MR2)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal (Prius)

WARNING: Read service precautions before proceeding with service procedure. See

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SERVICE PRECAUTIONS .

1. Manufacturer states throttle body and intake manifold must be removed for access to knock sensor. Knock sensor is located on side of cylinder block. See **Fig. 18** .
2. Ensure service plug is removed from service plug assembly. See **SERVICE PRECAUTIONS** . Remove throttle body. See **THROTTLE BODY** under FUEL SYSTEMS. Remove engine oil dipstick and tube with "O" ring if necessary for access to intake manifold.
3. Remove bolts/nuts, intake manifold and gasket from cylinder head. Disconnect electrical connector at knock sensor. Using Socket (SST 09816-30010), remove knock sensor from cylinder block.

Installation

Install and tighten knock sensor to specification. See **TORQUE SPECIFICATIONS** . To install remaining components, reverse removal procedure using NEW gaskets and "O" ring on dipstick tube. Tighten bolts/nuts to specification. See **TORQUE SPECIFICATIONS** . Fill and bleed cooling system. See **COOLING SYSTEM BLEEDING** under COOLING SYSTEM.

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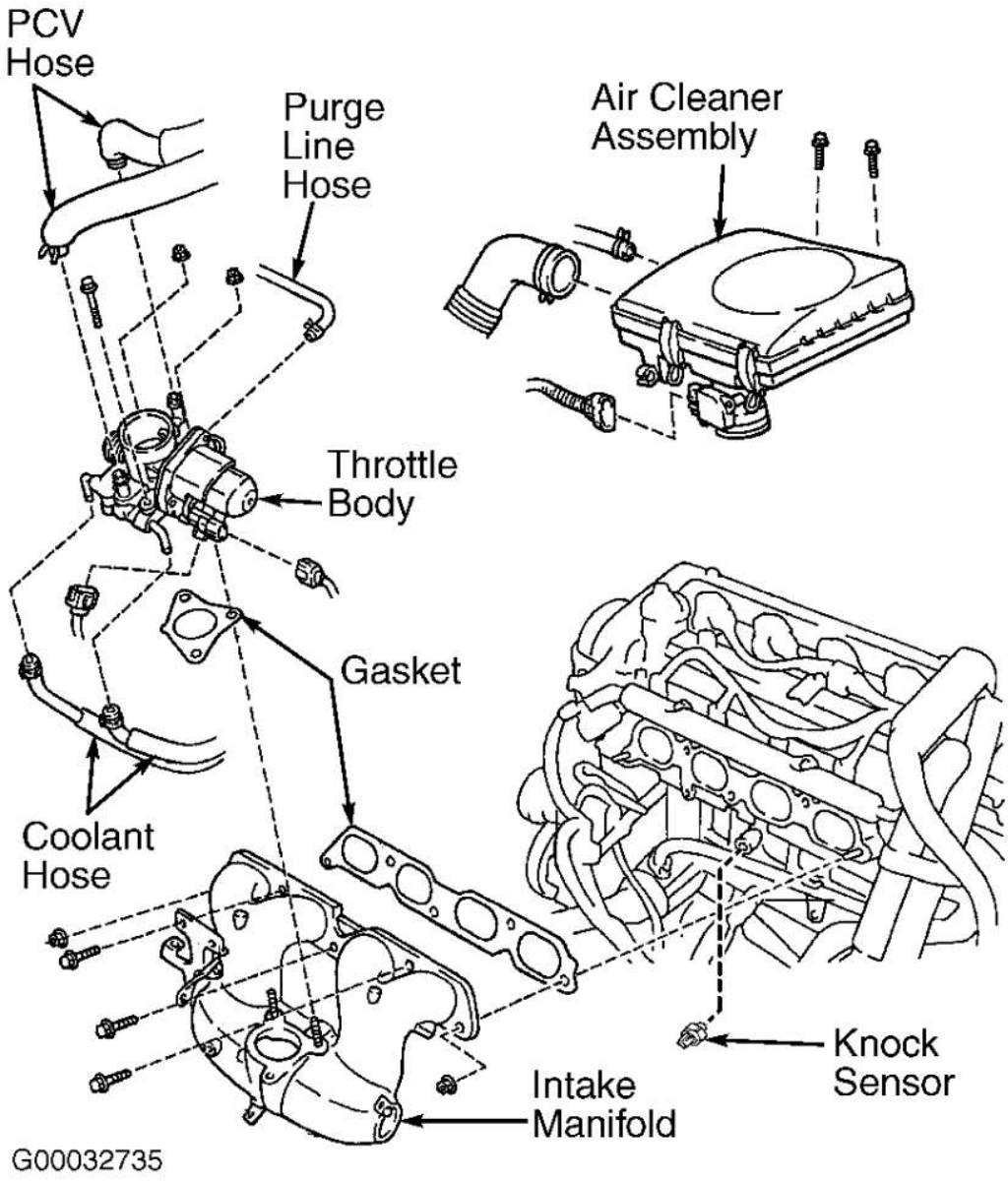


Fig. 18: Locating Knock Sensor & Identifying Intake Manifold & Components (Prius)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal (RAV4)

1. Knock sensor is located on side of cylinder block. See **Fig. 19** . Manufacturer states to remove engine and transaxle for access to knock sensor. See appropriate article in ENGINES.
2. Disconnect necessary hoses, electrical connectors and engine wiring harness for removal of intake

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manifold with throttle body. Remove bolts/nuts, intake manifold with throttle body, gasket and intake manifold insulator. Using Socket (SST 09816-30010), remove knock sensor from cylinder block.

Installation

Install and tighten knock sensor to specification. See **TORQUE SPECIFICATIONS** . To install intake manifold, reverse removal procedure using NEW gasket. Tighten intake manifold bolts/nuts to specification. See **TORQUE SPECIFICATIONS** . Reinstall engine.

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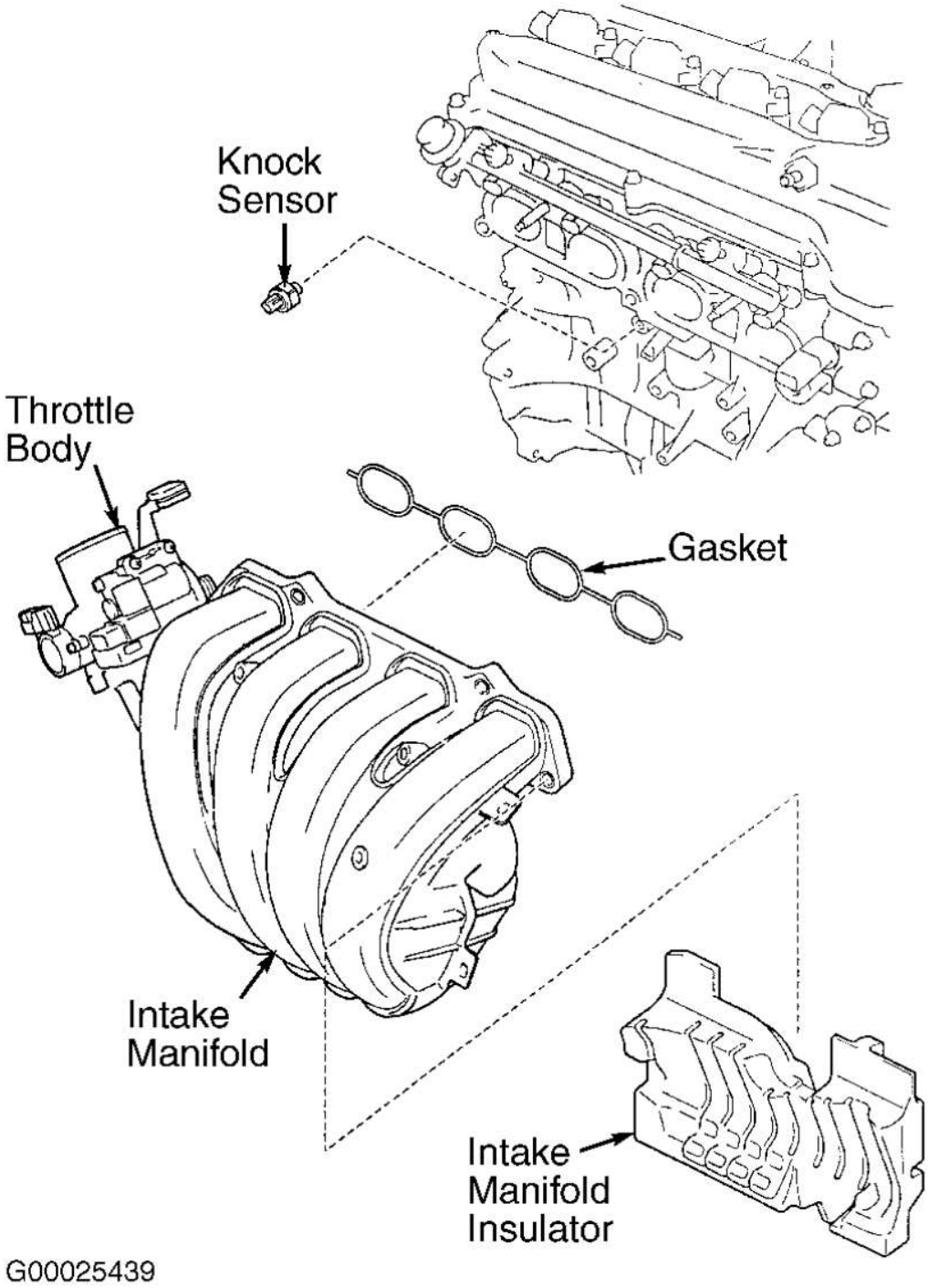


Fig. 19: Locating Knock Sensor & Identifying Intake Manifold & Components (RAV4)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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Removal & Installation (Tacoma)

1. Remove starter and fuel filter mounting bolts to access knock sensor. Knock sensor is located on side of cylinder block. See **Fig. 20** .
2. Disconnect electrical connector at knock sensor. Using Socket (SST 09816-30010), remove knock sensor from cylinder block.
3. To install, reverse removal procedure. Tighten knock sensor, fuel filter mounting bolts and starter bolts to specification. See **TORQUE SPECIFICATIONS** .

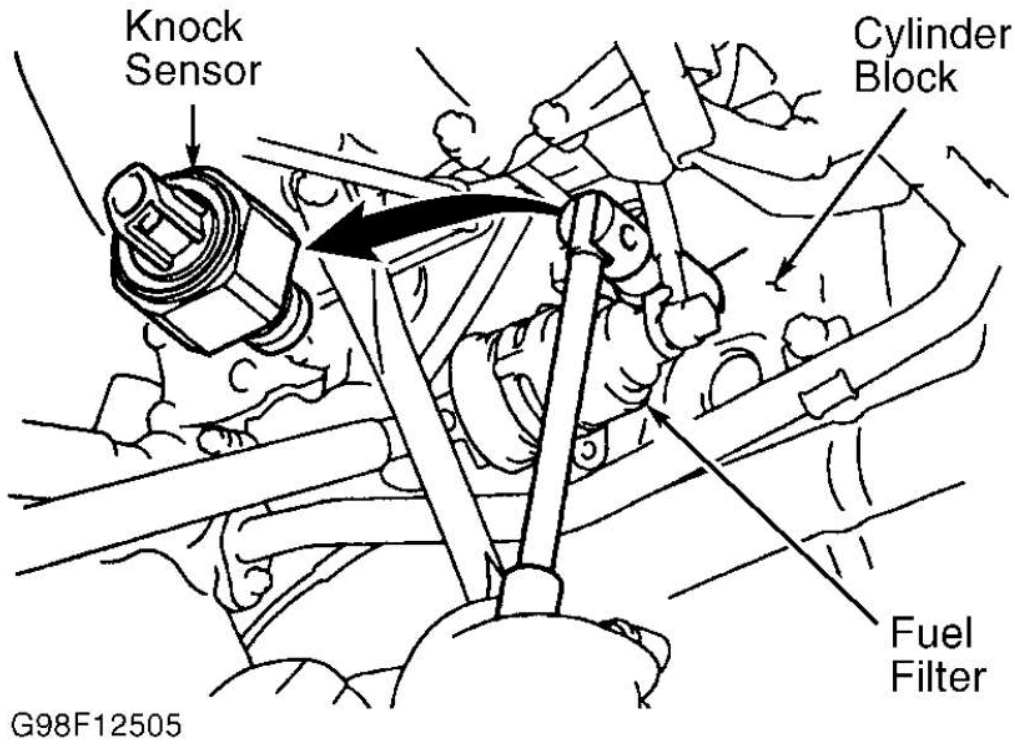


Fig. 20: Locating Knock Sensor (Tacoma)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

PARK/NEUTRAL POSITION SWITCH

NOTE: Park/Neutral Position (PNP) is used only on A/T models.

Removal (Camry, Camry Solara, Celica, Corolla, ECHO, Highlander & RAV4)

1. The Park/Neutral Position (PNP) switch is located on side of transaxle. See **Fig. 21** . Remove necessary components for access to PNP switch.

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2. Disconnect electrical connector at PNP switch. Disconnect shift cable on transaxle for access to PNP switch. Remove nut, washer and control lever from transaxle.
3. Bend tabs upward on lock plate, away from PNP switch retaining nut. Remove PNP switch retaining nut, lock plate, PNP switch retaining bolts and PNP switch.

Installation

1. Using NEW lock plate, install PNP switch on transaxle. Install and tighten PNP switch retaining nut and PNP switch retaining bolts to specification. See **TORQUE SPECIFICATIONS** . Bend over tab on lock plate against PNP switching retaining nut.
2. Reinstall control lever, washer and nut on PNP switch. Tighten nut for control lever to specification. See **TORQUE SPECIFICATIONS** . Reconnect shift cable on control lever. Check that engine starts only with shift lever in Park and Neutral. If PNP switch adjustment is required, go to next step.
3. Ensure parking brake is applied. Place shift lever in Neutral. It may be necessary to remove control lever for access to PNP switch retaining bolts. Loosen PNP switch retaining bolts.
4. Rotate PNP switch so neutral base line aligns with the groove. See **Fig. 22** -**Fig. 26** . Tighten PNP switch retaining bolts to specification. See **TORQUE SPECIFICATIONS** .
5. Ensure continuity exists between specified terminals on PNP switch in relation to shift lever position. See **PARK/NEUTRAL POSITION SWITCH** under ENGINE SENSORS & SWITCHES in SYSTEM & COMPONENT TESTING - 4-CYLINDER article. Reinstall electrical connector.

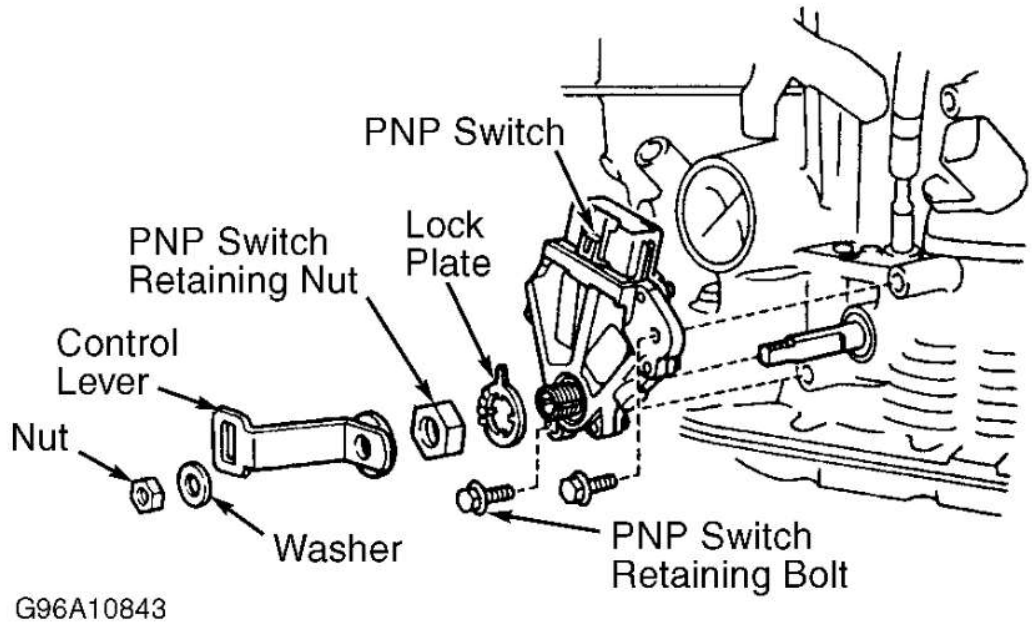


Fig. 21: Locating Typical Park/Neutral Position Switch & Components
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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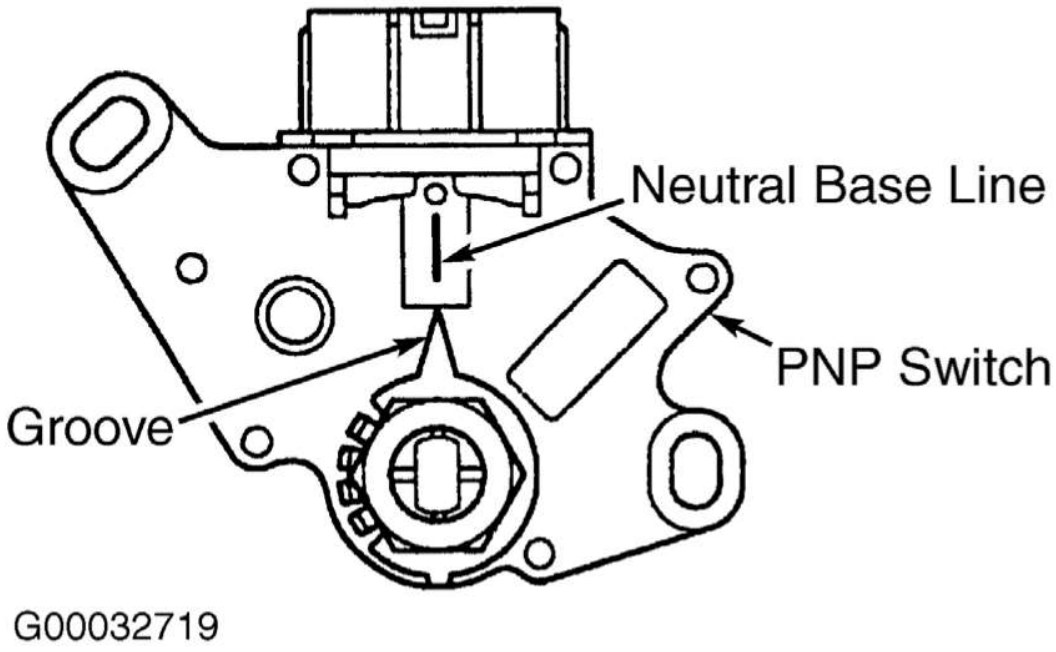


Fig. 22: Adjusting Park/Neutral Position Switch (Camry, Camry Solara, Highlander & RAV4)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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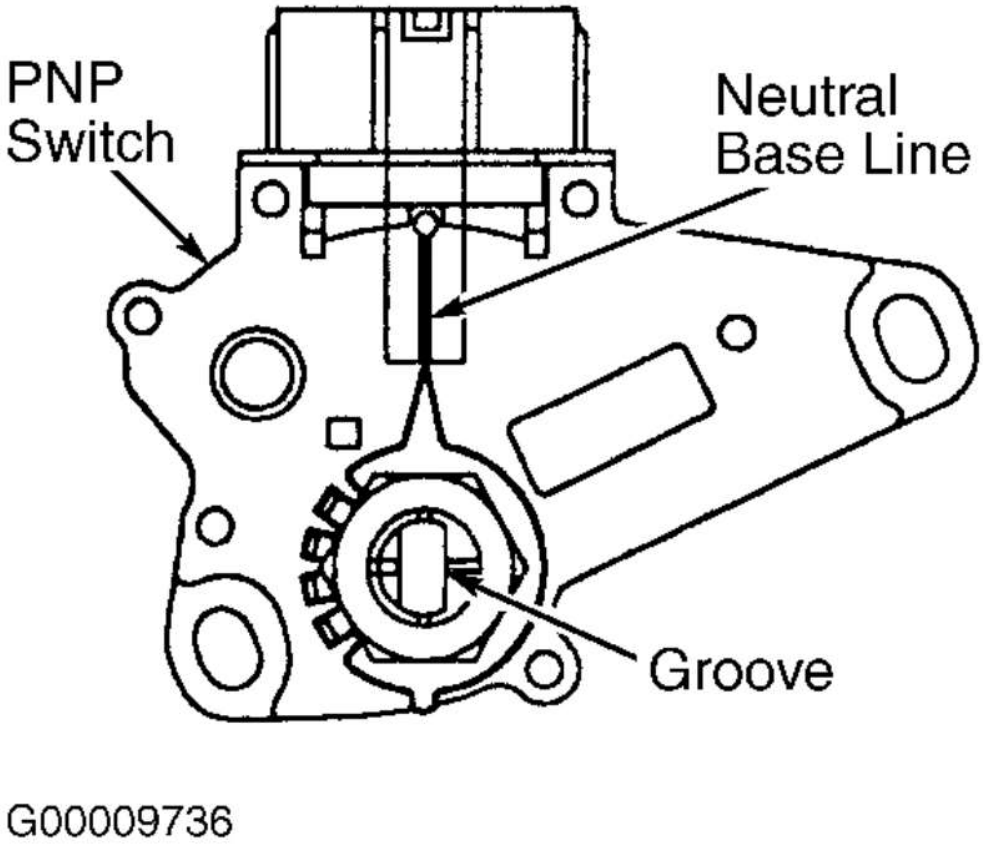


Fig. 23: Adjusting Park/Neutral Position Switch (Celica 1.8L 1ZZ-FE & ECHO)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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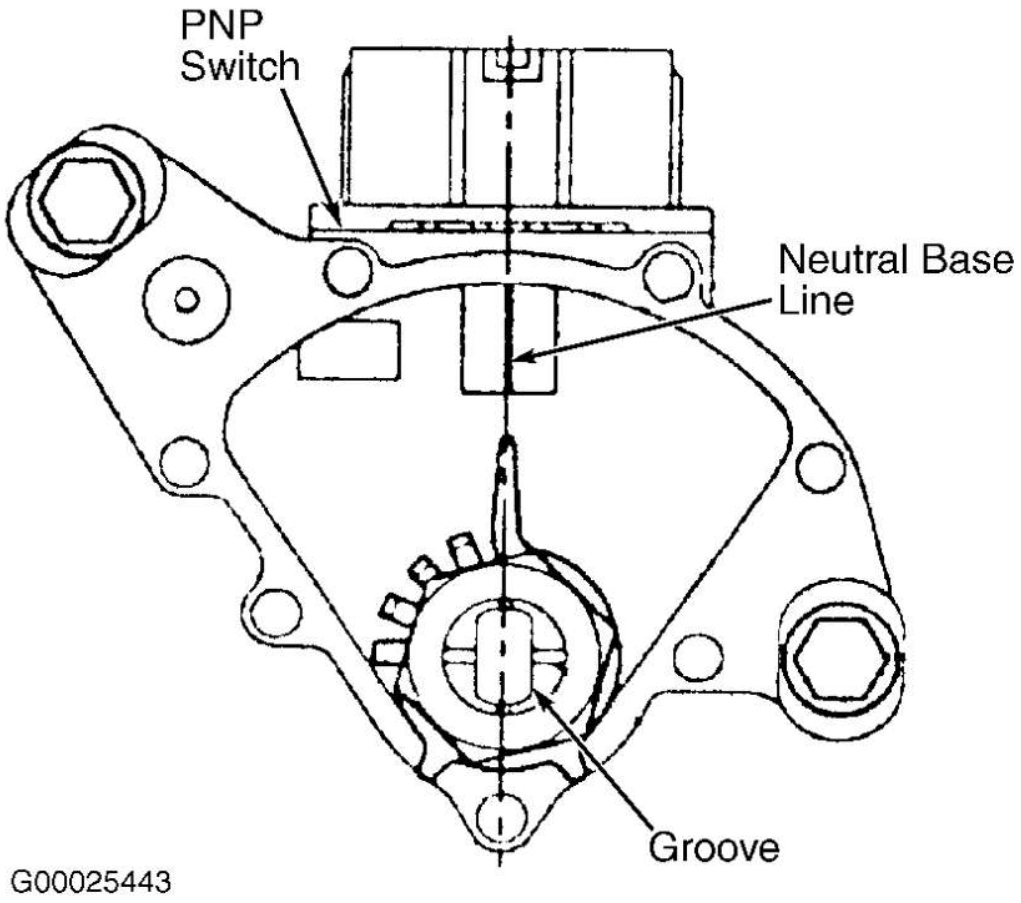


Fig. 24: Adjusting Park/Neutral Position Switch (Celica 1.8L 2ZZ-GE)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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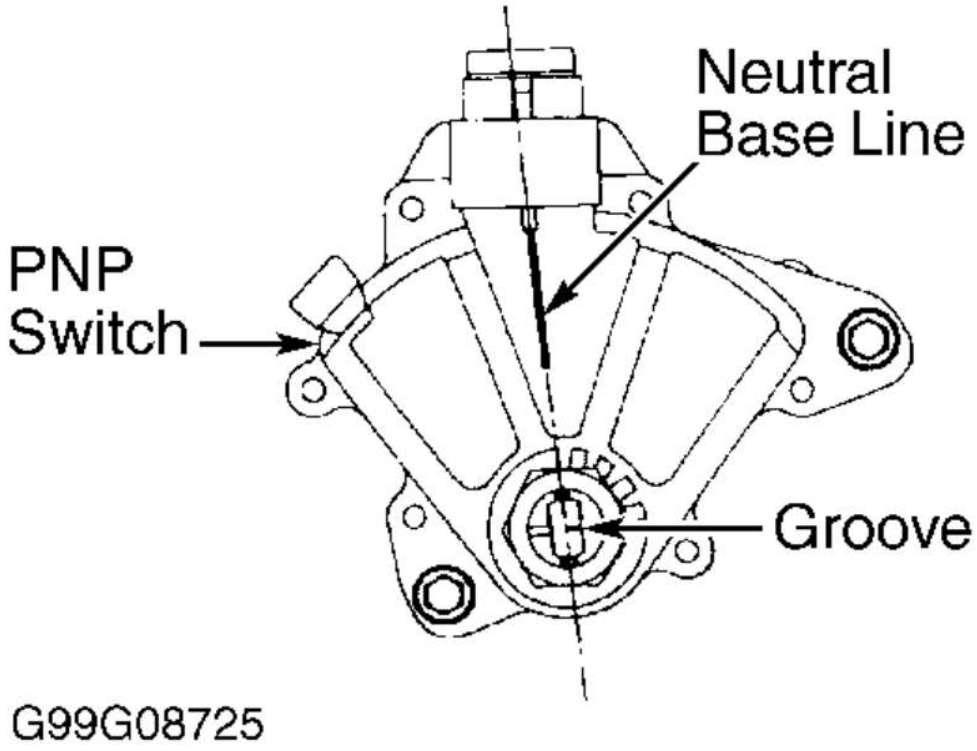


Fig. 25: Adjusting Park/Neutral Position Switch (Corolla With 3-Speed A/T)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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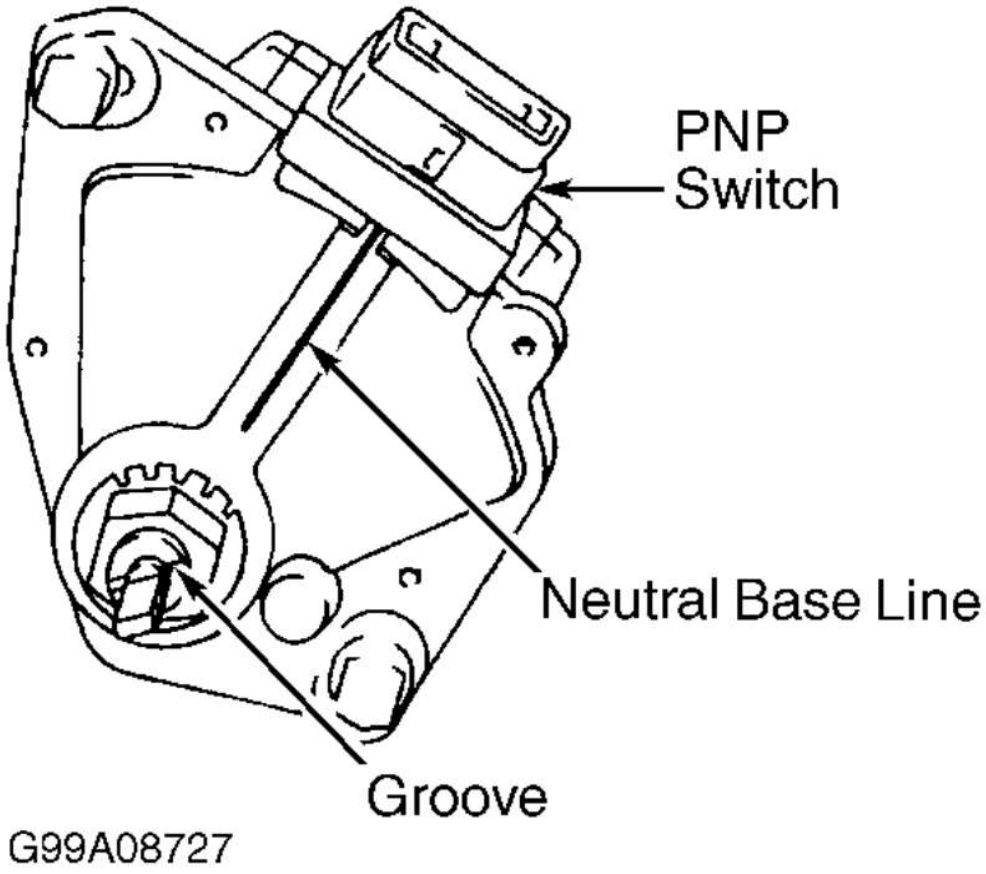


Fig. 26: Adjusting Park/Neutral Position Switch (Corolla With 4-Speed A/T)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal (Tacoma)

1. The Park/Neutral Position (PNP) switch is located on side of transmission. See **Fig. 21** . Remove front exhaust pipe with heat insulator (if necessary) and disconnect transmission oil cooler line for access to PNP switch.
2. Remove transmission oil cooler line elbow with "O" ring for access to PNP switch (if necessary). Disconnect electrical connector at PNP switch.
3. Bend tabs upward on lock plate, away from PNP switch retaining nut. Remove PNP switch retaining nut, lock plate, PNP switch retaining bolt and PNP switch.

Installation

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1. Using NEW lock plate, install PNP switch on transmission. Install and tighten PNP switch retaining nut and PNP switch retaining bolt to specification. See **TORQUE SPECIFICATIONS** . Bend over tab on lock plate against PNP switching retaining nut.
2. Using NEW "O" ring, install transmission oil cooler line elbow (if removed) and tighten to specification. See **TORQUE SPECIFICATIONS** . Install transmission oil cooler line (if removed) and tighten nut to specification. See **TORQUE SPECIFICATIONS** .
3. Check that engine starts only with shift lever in Park and Neutral. If PNP switch adjustment is required, go to next step.
4. Ensure parking brake is applied. Place shift lever in Neutral. Loosen PNP switch retaining bolt. Rotate PNP switch so neutral base line aligns with the groove. See **Fig. 27** and **Fig. 28** . Tighten PNP switch retaining bolt to specification. See **TORQUE SPECIFICATIONS** .
5. Ensure continuity exists between specified terminals on PNP switch in relation to shift lever position. See **PARK/NEUTRAL POSITION SWITCH** under ENGINE SENSORS & SWITCHES in SYSTEM & COMPONENT TESTING - 4-CYLINDER article. Reinstall electrical connector.

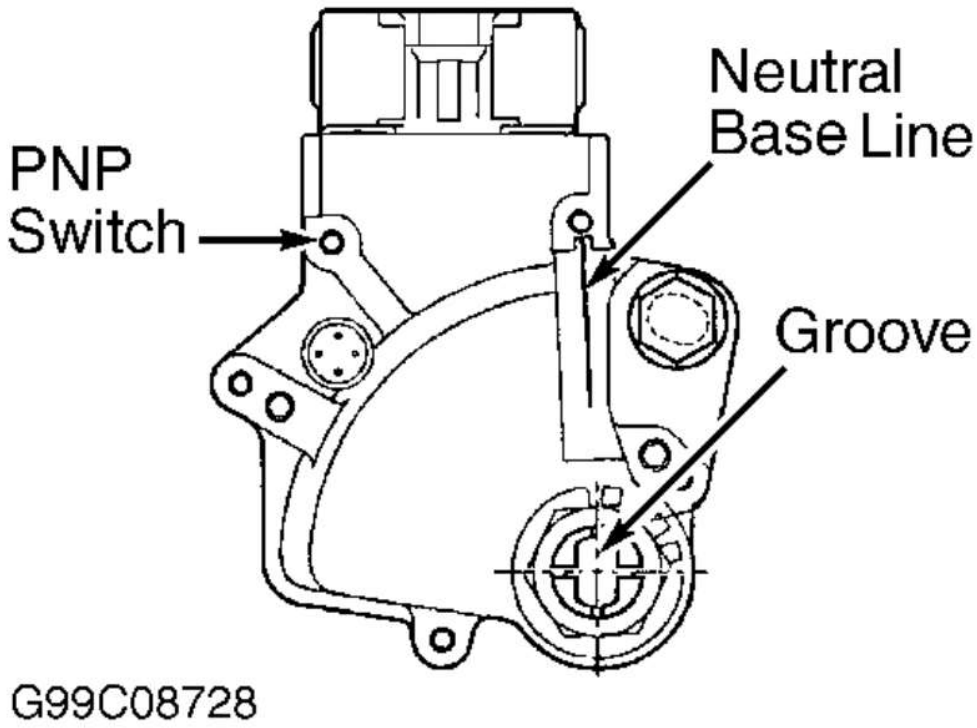


Fig. 27: Adjusting Park/Neutral Position Switch (Tacoma 2.4L 2RZ-FE)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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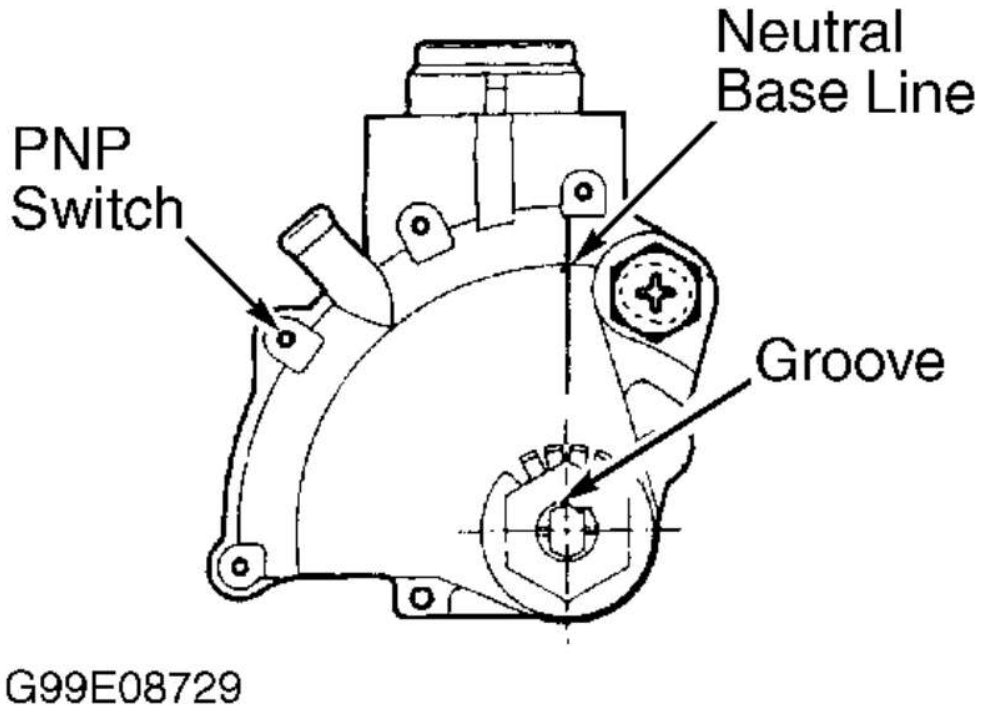


Fig. 28: Adjusting Park/Neutral Position Switch (Tacoma 2.7L 3RZ-FE)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

POSITIVE TEMPERATURE COEFFICIENT HEATER

Removal & Installation (ECHO)

Positive Temperature Coefficient (PTC) heater is located in the heater core. See **Fig. 29** . For servicing of PTC heater, see appropriate HEATER SYSTEMS article in AIR CONDITIONING & HEATING.

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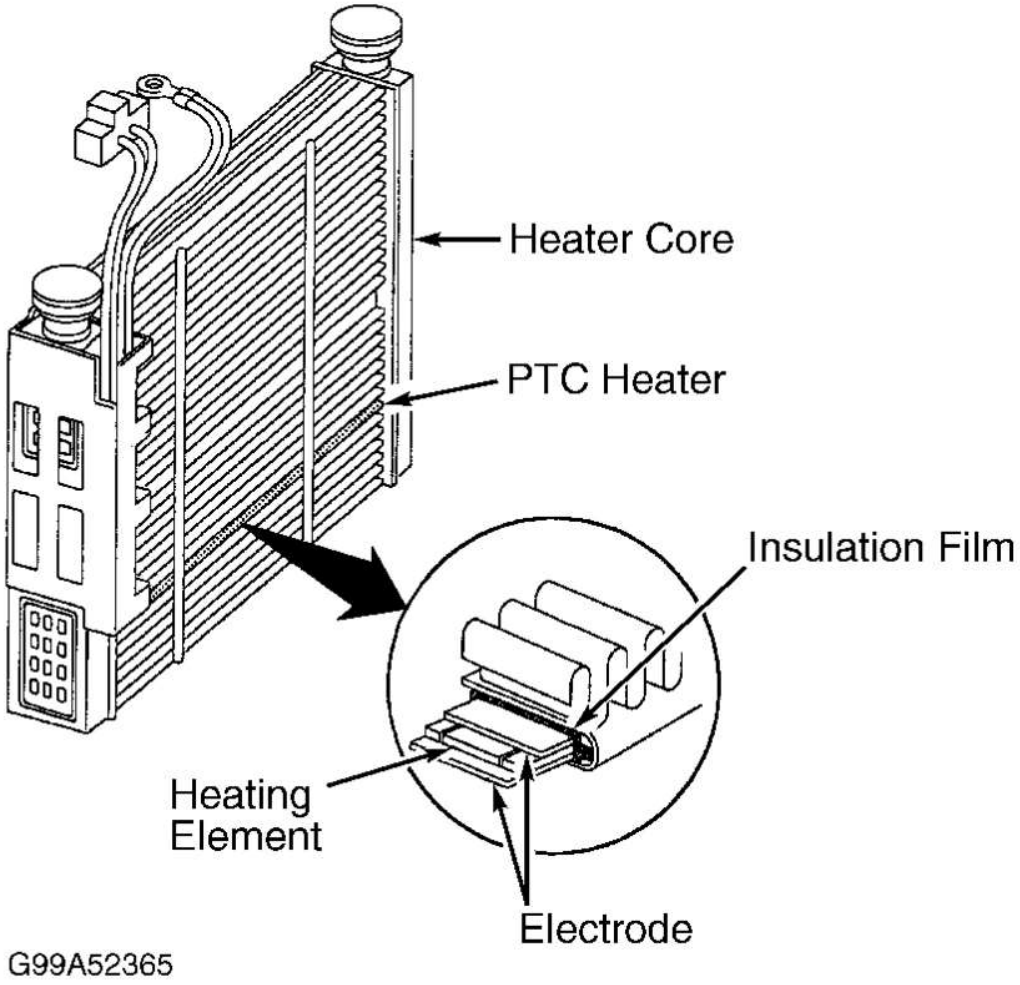


Fig. 29: Locating Positive Temperature Coefficient Heater (ECHO)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

POWER STEERING PRESSURE SENSOR

NOTE: Power steering pressure sensor may also be referred to as power steering oil pressure sensor.

Removal & Installation (ECHO)

1. Power steering pressure sensor is located on side of power steering pump and contains a 3-pin electrical connector. Disconnect electrical connector at power steering pressure sensor. Remove power steering pressure sensor with "O" ring from power steering pump.

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2. To install, reverse removal procedure using NEW "O" ring. Coat "O" ring with Dexron-III ATF before installing power steering pressure sensor. Tighten power steering pressure sensor to specification. See **TORQUE SPECIFICATIONS** . Fill power steering pump with Dexron-III ATF.

POWER STEERING PRESSURE SWITCH

NOTE: Power steering pressure switch may also be referred to as power steering oil pressure switch.

CAUTION: When servicing power steering pressure switch, use care not to drop power steering pressure switch or switch may be damaged.

Removal & Installation (Camry, Camry Solara, Celica, Highlander & RAV4)

1. Power steering pressure switch is screwed into side of power steering pump, near pressure hose fitting. It may be necessary to remove power steering pump for access to power steering pressure switch. Disconnect electrical connector at power steering pressure switch. Remove power steering pressure switch with "O" ring (if equipped) from power steering pump.
2. To install, reverse removal procedure using NEW "O" ring (if equipped). Coat "O" ring with Dexron-III ATF before installing power steering pressure switch. Tighten power steering pressure switch to specification. See **TORQUE SPECIFICATIONS** . Fill power steering pump with Dexron-III ATF.

Removal & Installation (Corolla)

1. Power steering pressure switch is screwed into end of union bolt that secures pressure hose on power steering pump. Disconnect electrical connector at power steering pressure switch. Remove power steering pressure switch.
2. To install, reverse removal procedure. Tighten power steering pressure switch to specification. See **TORQUE SPECIFICATIONS** . Fill power steering pump with Dexron-III ATF.

Removal & Installation (Tacoma)

Service information is not available from manufacturer.

THROTTLE POSITION SENSOR

NOTE: On MR2, there are 2 types of throttle bodies and TP sensors used depending on type of transaxle used. On models with a standard type manual transaxle, the driver operates the clutch and shifts the transaxle. On models with sequential manual transaxle, the transaxle is electronically controlled and the clutch is operated and transaxle is shifted hydraulically by moving the shift lever forward or backward. Sequential manual transaxle may be identified by shift lever pattern which consists of "R", "N", "S" and "+" in place of the conventional type shift lever pattern and no clutch pedal is used.

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Removal & Installation (Camry & Camry Solara)

Throttle Position (TP) sensor is incorporated into the throttle body. Service information is not available from manufacturer.

Removal & Installation (Celica, Corolla, ECHO, MR2 With Standard Type Manual Transaxle, RAV4 & Tacoma)

Throttle Position (TP) sensor is mounted on throttle body. Service information is not available from manufacturer.

Removal & Installation (Highlander)

1. Throttle Position (TP) sensor is mounted on throttle body. Manufacturer lists procedure with throttle body removed. If necessary to remove throttle body for access to TP sensor, see **THROTTLE BODY** under FUEL SYSTEMS. Remove retaining screws and TP sensor from throttle body.
2. To install, ensure throttle valve on throttle body is fully closed. Position TP sensor at 45 degrees so it aligns with shaft on throttle valve and install on throttle body. See **Fig. 30** . Rotate TP sensor to the right 45 degress. Install and tighten retaining screws.

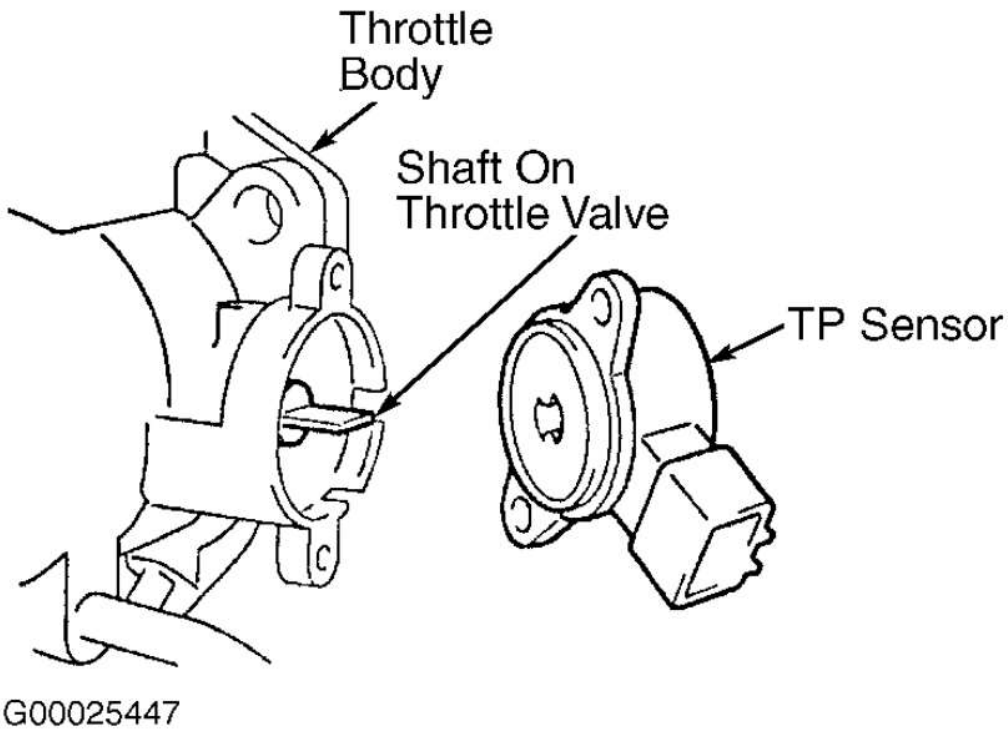


Fig. 30: Installing Throttle Position Sensor (Highlander)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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Removal & Installation (MR2 With Sequential Manual Transaxle & Prius)

For servicing of Throttle Position (TP) sensor, see **THROTTLE BODY** under FUEL SYSTEMS.

VACUUM SENSOR FOR HYDROCARBON ADSORBER CATALYST SYSTEM

Removal & Installation (Prius)

WARNING: Read service precautions before proceeding with service procedure. See SERVICE PRECAUTIONS .

Vacuum for sensor for Hydrocarbon Adsorber Catalyst (HCAC) system is located at passenger's side front corner of the engine and contains Black 3-pin connector with Brown, Violet/White and Yellow/Red wires. See **Fig. 31** . Servicing of vacuum sensor is just primarily an unbolt and bolt-on procedure.

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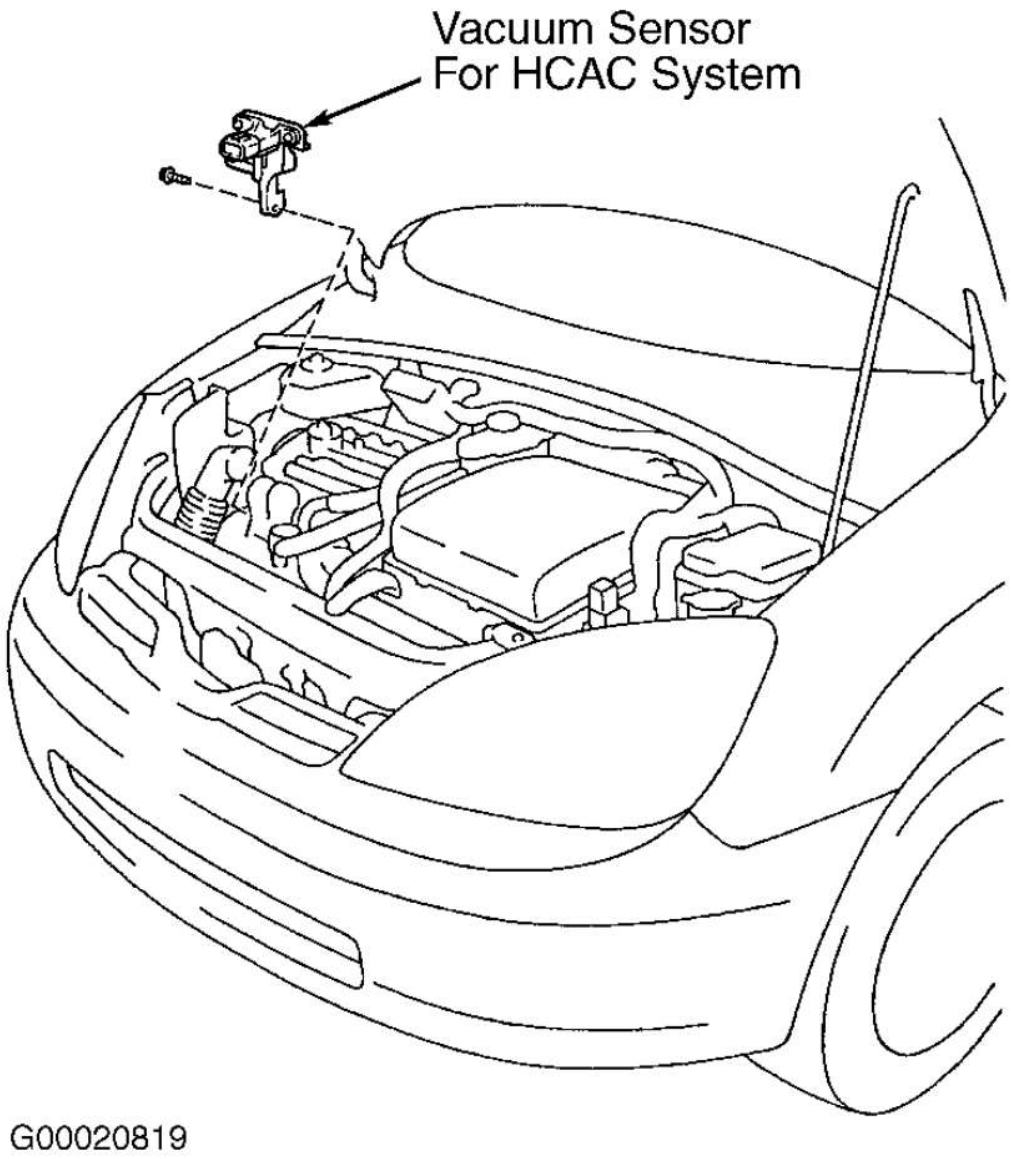


Fig. 31: Locating Vacuum Sensor For HCAC System (Prius)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

VAPOR PRESSURE SENSOR

Removal & Installation

For servicing of vapor pressure sensor, see **VAPOR PRESSURE SENSOR** under EMISSION SYSTEMS &

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SUB-SYSTEMS.

VARIABLE VALVE TIMING SENSOR

NOTE: Variable Valve Timing (VVT) sensor may also be referred to as camshaft position sensor.

Removal & Installation (Camry, Camry Solara, Celica, Corolla, ECHO, Highlander, MR2, Prius & RAV4)

For VVT sensor servicing, see **CAMSHAFT POSITION SENSOR** under IGNITION SYSTEMS.

VEHICLE SPEED SENSOR

Removal & Installation (Camry)

Vehicle speed sensor is mounted on transaxle and contains a Black 3-pin electrical connector with Blue, Pink and Red/Blue wires. Service information is not available from manufacturer.

Removal (Camry Solara, Celica, Corolla, ECHO & RAV4)

1. Vehicle speed sensor is mounted on transaxle and contains a 3-pin electrical connector. See **Fig. 32** . Remove necessary components for access to vehicle speed sensor. Disconnect electrical connector at vehicle speed sensor.
2. Remove retaining bolt and vehicle speed sensor with "O" ring from transaxle. If necessary to remove drive gear assembly from vehicle speed sensor, remove retaining clip from outside of vehicle speed sensor. Retaining clip is located just below "O" ring groove on vehicle speed sensor. Remove drive gear from vehicle speed sensor.

Installation

To install, reverse removal procedure using NEW "O" ring. Coat "O" ring with Dexron-III ATF (A/T models) or gear oil (M/T models) before installing on vehicle speed sensor. Tighten retaining bolt to specification. See **TORQUE SPECIFICATIONS** .

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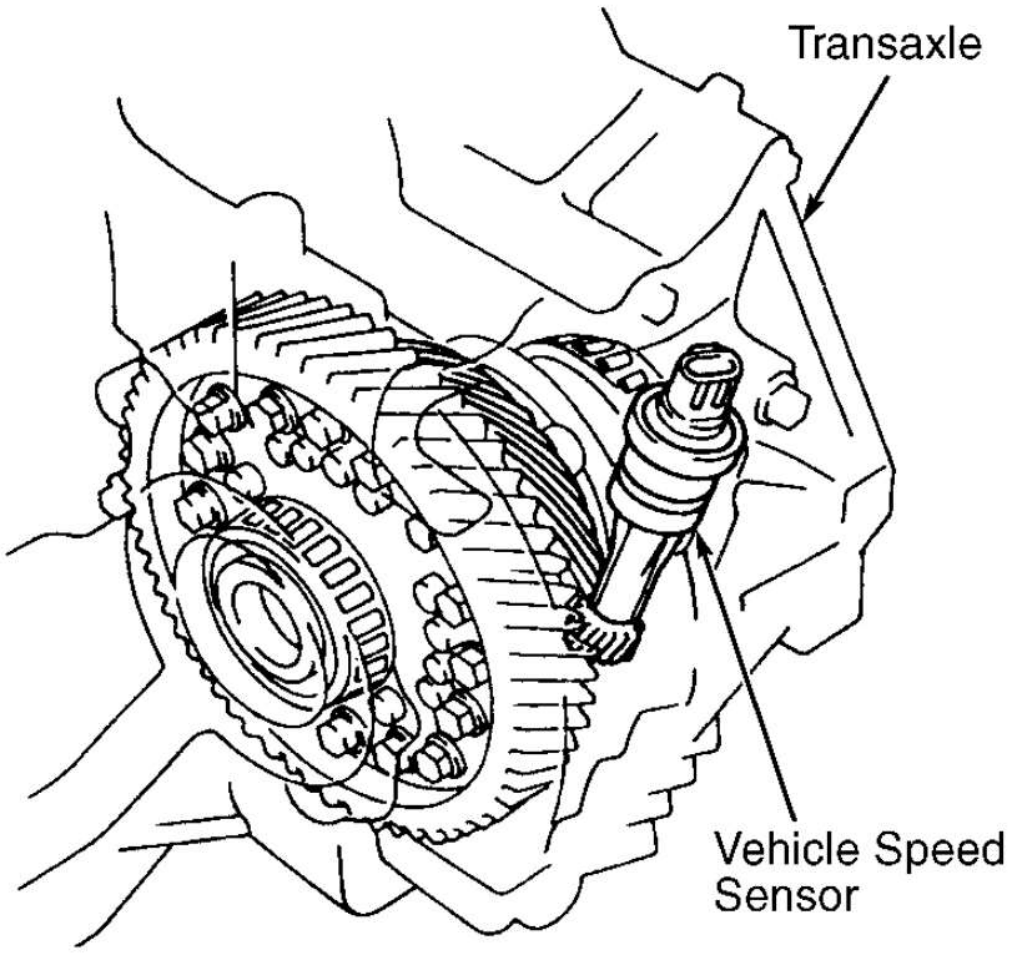


Fig. 32: Locating Typical Vehicle Speed Sensor (Camry Solara, Celica, Corolla, ECHO & RAV4)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal & Installation (Highlander)

Vehicle speed sensor is not used. Wheel speed sensors on each wheel deliver an input signal to skid control Electronic Control Unit (ECU). Skid control ECU converts input signals from wheel speed sensors to a 4-pulse input signal to the instrument cluster. Instrument cluster then converts 4-pulse input signal to a rectangular waveform and then sends input signal to Engine Control Module (ECM). ECM determines vehicle speed by using input signal.

Removal & Installation (MR2)

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Vehicle speed sensor is not used. Wheel speed sensors on each wheel deliver an input signal to Anti-Lock Brake System (ABS) Electronic Control Unit (ECU). ABS ECU converts input signals from wheel speed sensors to a 4-pulse input signal to the instrument cluster. Instrument cluster then converts 4-pulse input signal to a rectangular waveform and then sends input signal to Engine Control Module (ECM). ECM determines vehicle speed by using input signal.

Removal & Installation (Prius)

Vehicle speed sensor is not used. Wheel speed sensors on each wheel deliver an input signal to brake Electronic Control Unit (ECU) for the Anti-Lock Brake System (ABS). Brake ECU converts input signals from wheel speed sensors to a 4-pulse input signal to the instrument cluster. Instrument cluster then converts 4-pulse input signal to a rectangular waveform and then sends input signal to Engine Control Module (ECM). ECM determines vehicle speed by using input signal.

Removal (Tacoma)

1. Vehicle speed sensor is mounted near rear of transmission or transfer case and contains a 3-pin electrical connector with Blue, Green/Red and Pink wires. See **Fig. 33** .
2. Disconnect electrical connector at vehicle speed sensor. Remove retaining bolt and vehicle speed sensor with "O" ring. Remove drive gear from vehicle speed sensor (if necessary).

Installation

To install, reverse removal procedure using NEW "O" ring. Coat "O" ring with Dexron-III ATF (A/T models) or gear oil (M/T models) before installing on vehicle speed sensor. Tighten retaining bolt to specification. See **TORQUE SPECIFICATIONS** .

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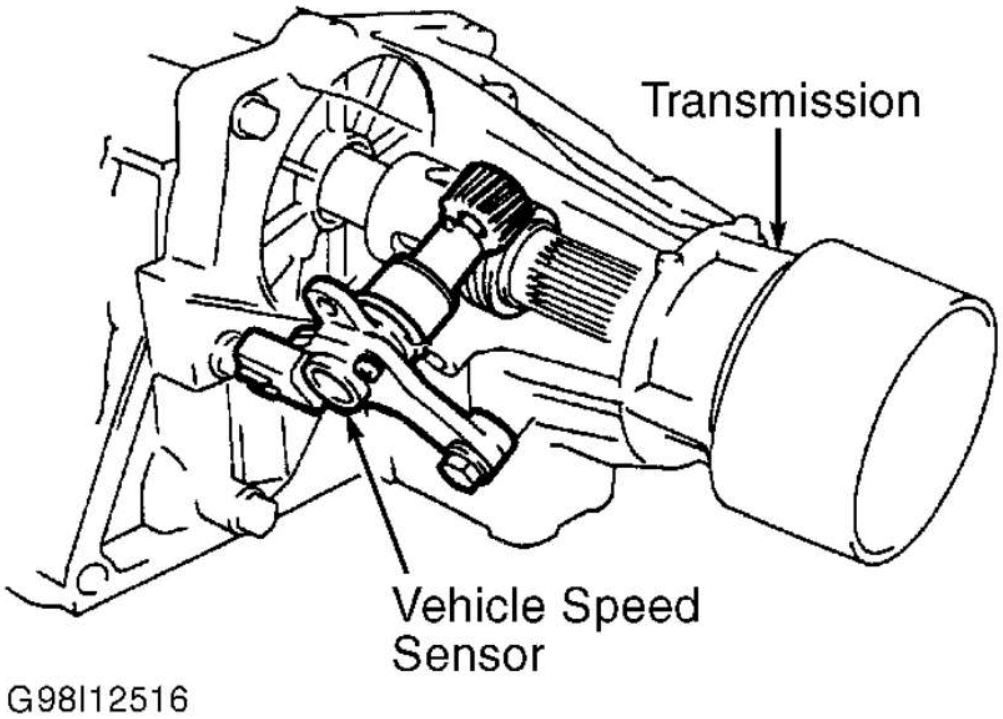


Fig. 33: Locating Typical Vehicle Speed Sensor (Tacoma)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

COOLING SYSTEM

COOLING SYSTEM BLEEDING

NOTE: On Celica, MR2 and Prius, whenever cooling system is drained, special cooling system bleeding procedure must be performed. On all other models, no special cooling system bleeding procedure is required.

Celica

1. This procedure assumes cooling system has been completely drained by loosening radiator drain plug on bottom of radiator and engine drain plug on coolant drain union located on driver's side rear corner of cylinder block.
2. Remove front fender apron seal and upper radiator support seal for access to coolant reservoir. See **Fig. 12** . Remove coolant reservoir bolts and coolant reservoir hose retaining clamp bolts. Raise and support coolant reservoir and secure to hood latch assembly.

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3. Remove cooling system bleeder plug. This is a thumb-type plug on top of coolant reservoir, near coolant reservoir cap. Add approximately 4 qts. (3.7L) of 50/50 mixture of distilled water and coolant to coolant reservoir until coolant level is at FULL mark on coolant reservoir. DO NOT use plain water or alcohol based coolant. Continue to add water/coolant mixture as necessary. If cooling system does not require approximate refill capacity to maintain coolant in coolant reservoir at the FULL mark, air exists in system or system was not properly drained. See **COOLING SYSTEM APPROXIMATE REFILL CAPACITY (CELICA)** table.
4. If cooling system will not take additional coolant, squeeze lower radiator hose several times while using your finger to block cooling system bleeder plug opening. Continue to do this while slowly adding coolant. Start engine with coolant reservoir cap and cooling system bleeder plug removed. Ensure A/C is turned off. Operate engine until cooling fan comes on and goes off one time. Add additional coolant to coolant reservoir as necessary.
5. Install cooling system bleeder plug. Install and tighten coolant reservoir cap about 2 1/2 turns until "click" sound is heard. Increase engine speed to 3000 RPM for 5 seconds and then allow engine to idle for 5 seconds. Repeat this procedure for at least 15 minutes. Shut engine off and allow engine to completely cool. With engine completely cooled, coolant level in coolant reservoir should be between LOW and FULL marks. The next time engine operates and is at normal operating temperature, coolant level in coolant reservoir should be above the FULL mark.
6. Reinstall coolant reservoir, front fender apron seal and upper radiator support seal. Check for coolant leaks.

COOLING SYSTEM APPROXIMATE REFILL CAPACITY (CELICA)

Engine Application	Qts. (L)
1.8L 1ZZ-FE	
A/T	5.9 (5.6)
MT	6.0 (5.7)
1.8L 2ZZ-GE	
A/T	6.1 (5.8)
M/T	6.2 (5.9)

MR2

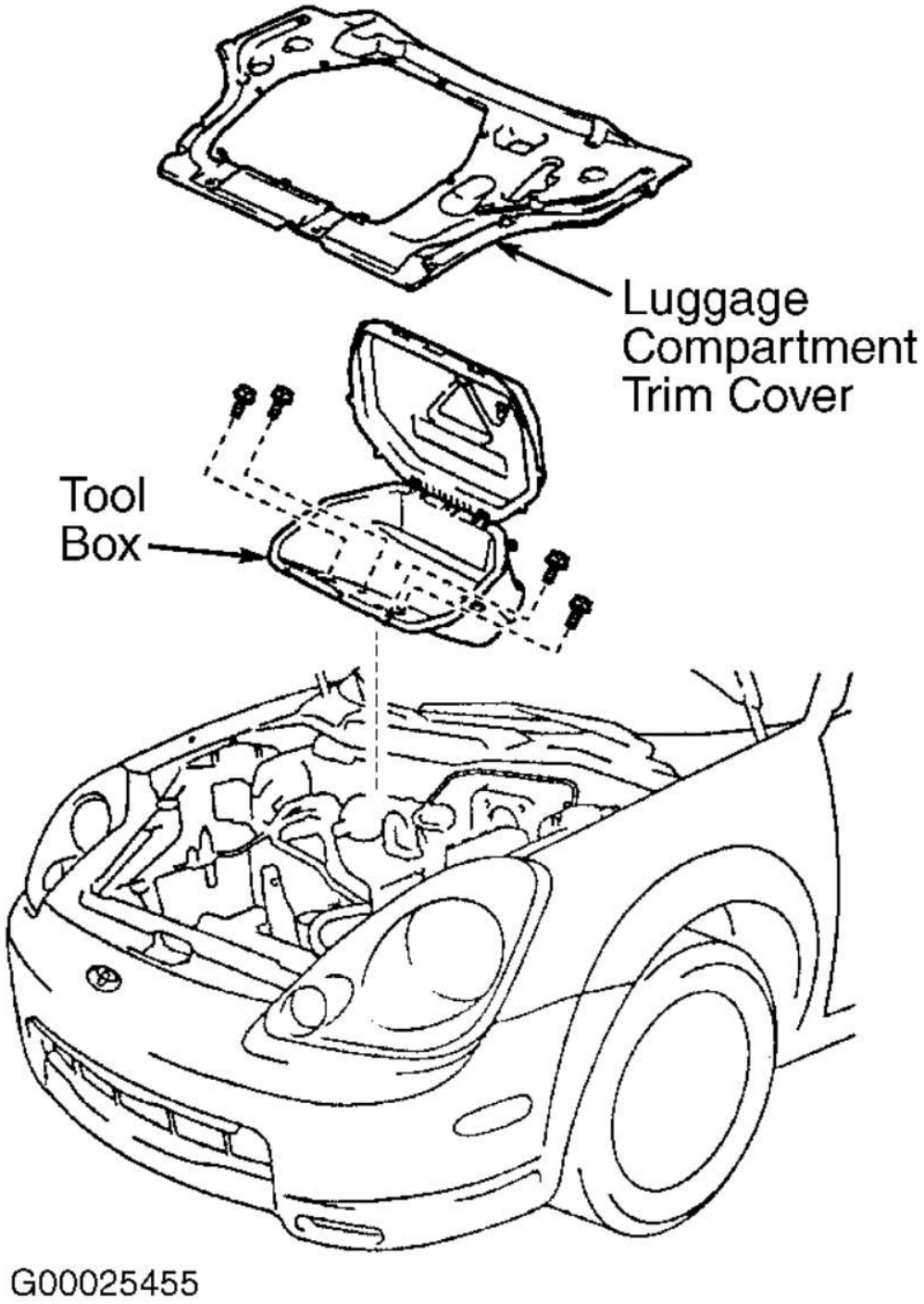
1. Remove tool box and luggage compartment trim cover. See **Fig. 34** . Connect air bleed hoses to heater coolant valve air drain plug and radiator air drain plug. See **Fig. 35** . Suspend opposite end of air bleed hoses from the hood. Ensure air bleed hoses are not pinched or restricted. Rotate heater coolant valve air drain plug and radiator air drain plug counterclockwise to open position.
2. Slowly add a 50/50 mixture of distilled water and coolant to coolant reservoir so that coolant lever in coolant reservoir remains at least 1/2 full all the time while adding coolant to coolant reservoir. Coolant reservoir is located at driver's side rear corner of engine compartment. See **Fig. 35** . DO NOT use plain water or alcohol based coolant. Approximate capacity is 11.0 qts. (10.4L). Air should bleed from air bleed hoses on heater coolant valve air drain plug and radiator air drain plug. Ensure coolant level in both air bleed hoses and coolant reservoir are at the same level. See **Fig. 35** .
3. If coolant level in air bleed hoses is lower than level at coolant reservoir, air still exists in cooling system. Check for pinched or restricted air bleed hoses and repeat step 2 . When proper coolant level is obtained in air bleed hoses, close heater coolant valve air drain plug and radiator air drain plug. Install cap on

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coolant reservoir until "click" sound is heard and cap is in the lock position. Remove air bleed hoses.

4. Start engine and ensure air is bleeding into coolant reservoir. Warm engine to normal operating temperature. Check that coolant level in coolant reservoir is above the FULL mark. Shut engine off and allow engine to completely cool. Ensure coolant level in coolant reservoir is between LOW and FULL marks. Add coolant if necessary. Reinstall luggage compartment trim cover and tool box.

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Fig. 34: Locating Tool Box & Luggage Compartment Trim Cover (MR2)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

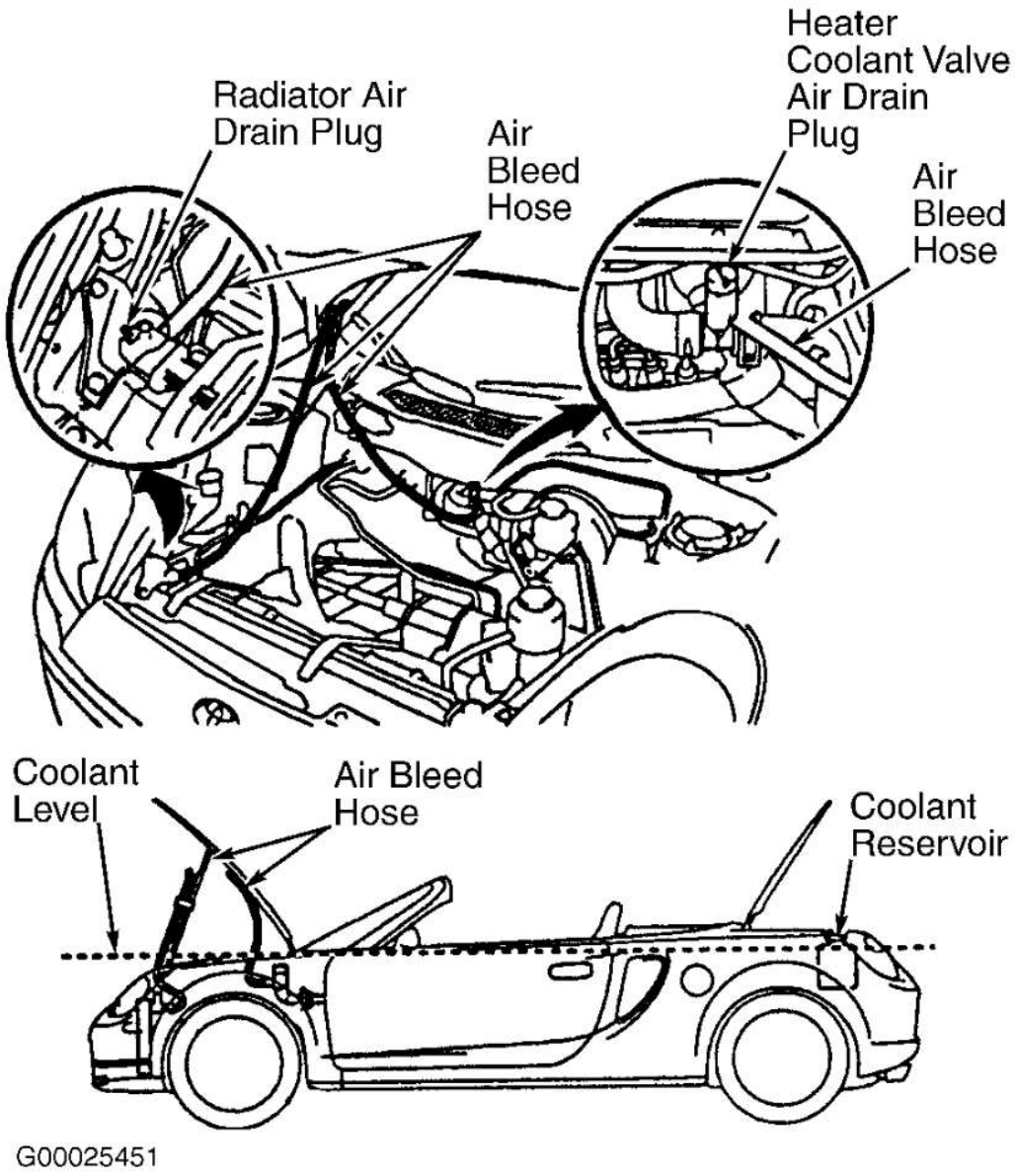


Fig. 35: Installing Air Bleed Hoses & Locating Coolant Reservoir (MR2)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Prius

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WARNING: Read service precautions before proceeding with service procedure. See SERVICE PRECAUTIONS .

1. Slowly add a 50/50 mixture of distilled water and coolant to radiator. DO NOT use plain water or alcohol based coolant. Approximate capacity is 5.2 qts. (4.9L).
2. Install radiator cap. Start engine and allow engine to idle. Accelerate engine and then engine allow to idle. Repeat this procedure several times for approximately 2 minutes. Shut engine off. Remove radiator cap and check coolant level. Coolant level should be even with rim of radiator filler neck. If coolant level decreases when pinching the upper or lower radiator hose closed several times, add coolant as necessary. Once correct coolant level is obtained, install radiator cap and go to next step.
3. It is necessary to put transit in inspection mode so engine will run continuously. To put transit in inspection mode, perform the following steps within 60 seconds:
   - Ensure ignition is off and then turn ignition on.
   - Ensure transaxle is in Park and then fully depress accelerator pedal 2 times.
   - Place transaxle in Neutral and then fully depress accelerator pedal 2 times.
   - Place transaxle back in Park and then fully depress accelerator pedal 2 times.
4. Check that master warning light on instrument cluster at center of instrument panel is flashing to indicate inspection mode operation. See **Fig. 36** . Master warning light may also be referred to as hybrid system error warning light.
5. Start engine and operate engine until cooling fan starts to turn with engine speed less than 2500 RPM. Shut engine off immediately after cooling fan starts to turn. Allow engine to cool until engine coolant temperature is less than 122°F (50°C). Remove radiator cap and recheck coolant level.
6. If proper coolant level exists, shut engine off. Go to next step. If coolant level has dropped, add coolant and repeat steps 3 -6 . Once proper coolant level exists, shut engine off. Go to next step.
7. Air must be bleed from heater water pump which circulates coolant through the heater core. The heater water pump may also be referred to as water pump motor (A/C). Turn ignition on with engine off. Place blower speed control dial in LO position and temperature control dial to MAX HOT position. Operate heater water pump until constant coolant flow sound exists at heater core. Ensure there is no sound of air in the coolant flow. Once constant sound of coolant flow exists through heater core, fill coolant reservoir to the maximum level.

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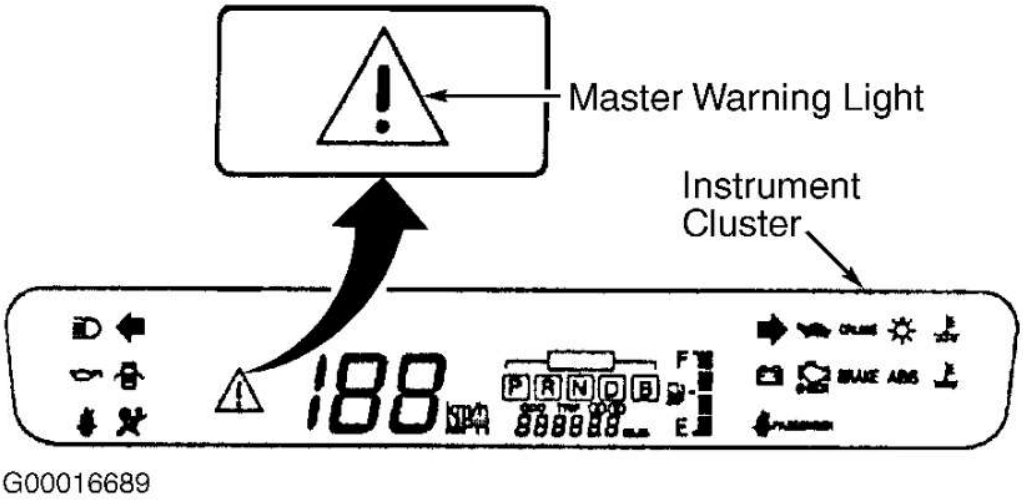


Fig. 36: Locating Master Warning Light (Prius)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

IGNITION SYSTEMS

CAMSHAFT POSITION SENSOR

NOTE: On Camry, Camry Solara, Celica, Corolla, ECHO, Highlander, MR2, Prius and RAV4, camshaft position sensor may also be referred to Variable Valve Timing (VVT) sensor.

Removal & Installation (Camry & Highlander)

Camshaft position sensor is located on end of cylinder head at flywheel end of engine. See **Fig. 37** . Service information is not available from manufacturer except for camshaft position sensor bolt torque specification. See **TORQUE SPECIFICATIONS** .

Removal & Installation (Camry Solara, Celica, Corolla, ECHO, MR2 & RAV4)

1. Note location of camshaft position sensor. See **CAMSHAFT POSITION SENSOR LOCATION** table. See **Fig. 37** -**Fig. 42** . On Celica and MR2, remove No. 2 cylinder head cover located on top of engine, above ignition coils and valve cover for access to camshaft position sensor. On MR2, remove suspension upper brace. Suspension upper brace fits between strut towers and is bolted to top of each strut tower.
2. On all models, disconnect electrical connector at camshaft position sensor. Remove bolt and camshaft position sensor with "O" ring (if equipped) from cylinder head.
3. To install, reverse removal procedure using NEW "O" ring (if equipped). Tighten camshaft position sensor bolt to specification. See **TORQUE SPECIFICATIONS** . On MR2, tighten suspension upper

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brace bolt/nut to specification. See **TORQUE SPECIFICATIONS** .

CAMSHAFT POSITION SENSOR LOCATION

Application	Location
Camry Solara, ECHO & RAV4	On End Of Cylinder Head At Flywheel End Of Engine
Celica, Corolla & MR2	Just Above Intake Manifold On Cylinder Head, At Flywheel End Of Engine

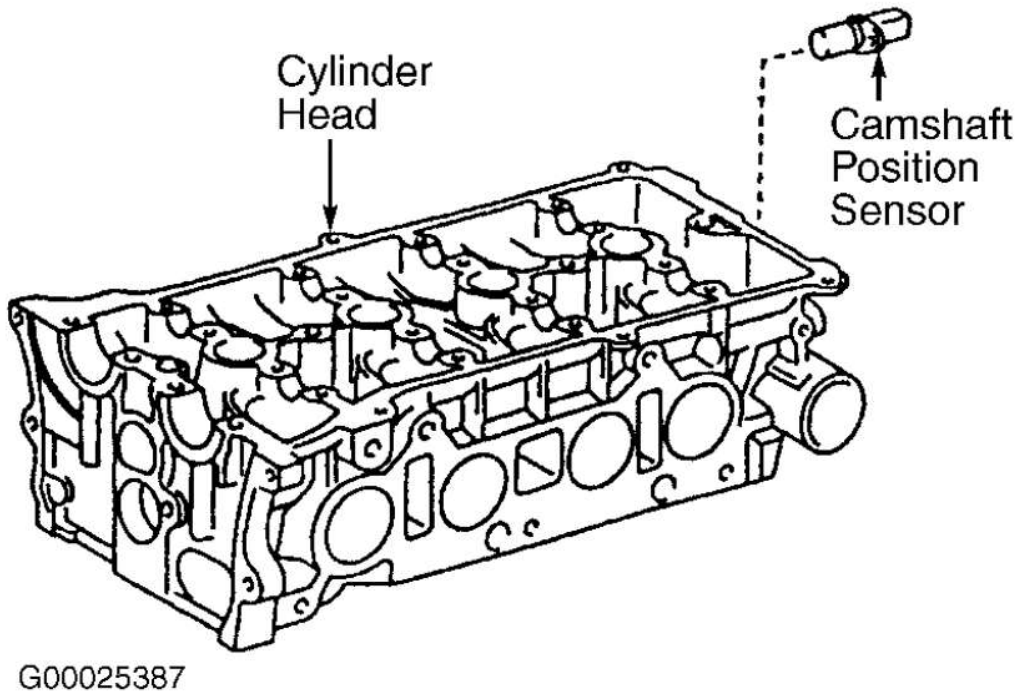


Fig. 37: Locating Typical Camshaft Position Sensor (Camry, Camry Solara & Highlander)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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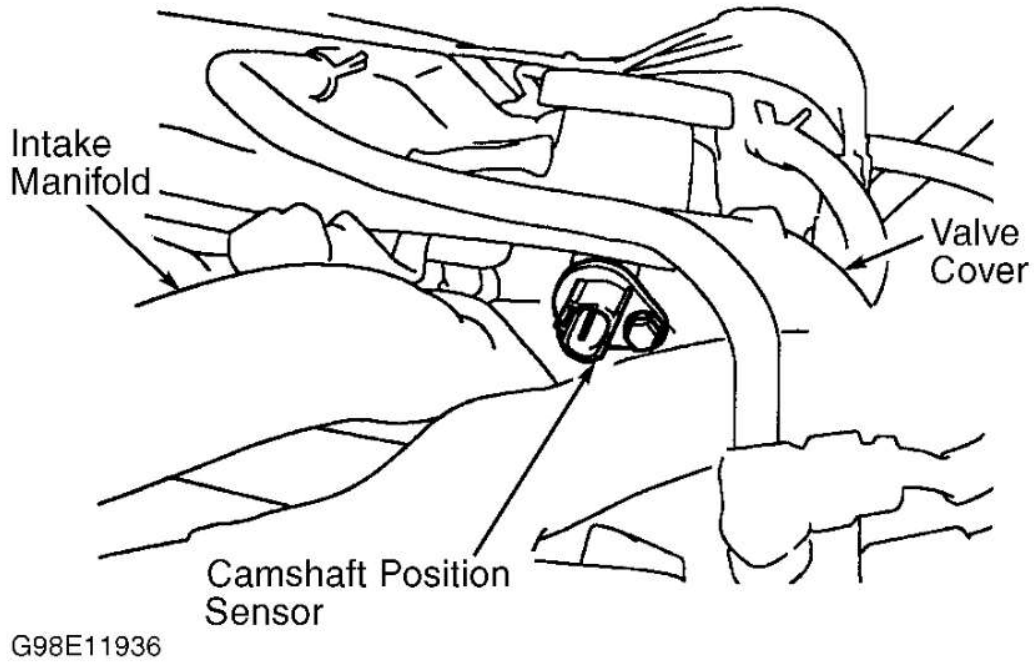


Fig. 38: Locating Camshaft Position Sensor (Celica 1.8L 1ZZ-FE & Corolla)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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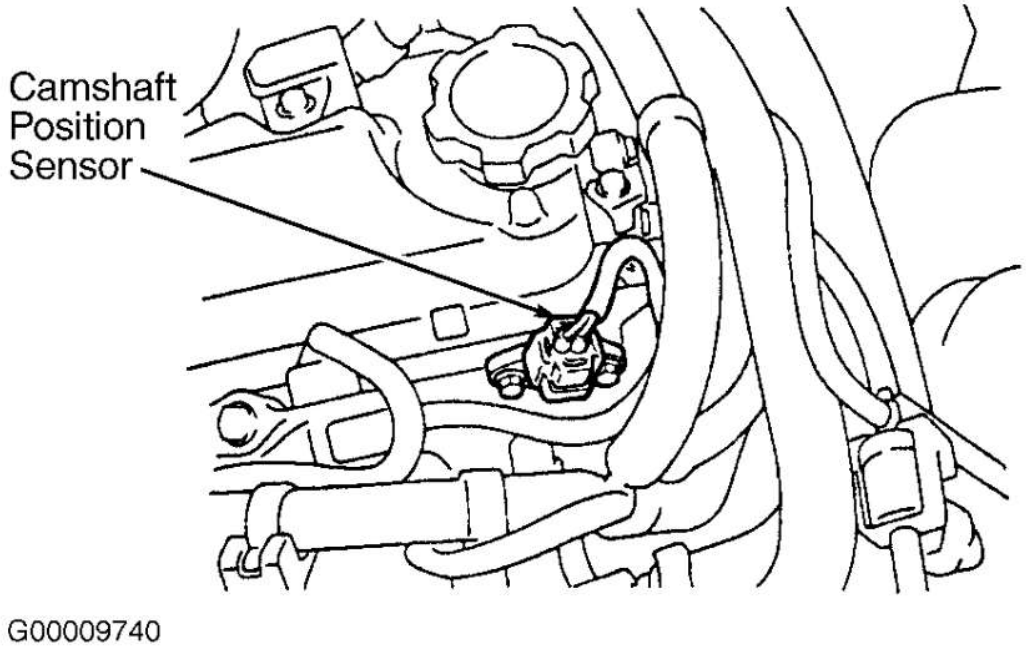


Fig. 39: Locating Camshaft Position Sensor (Celica 1.8L 2ZZ-GE)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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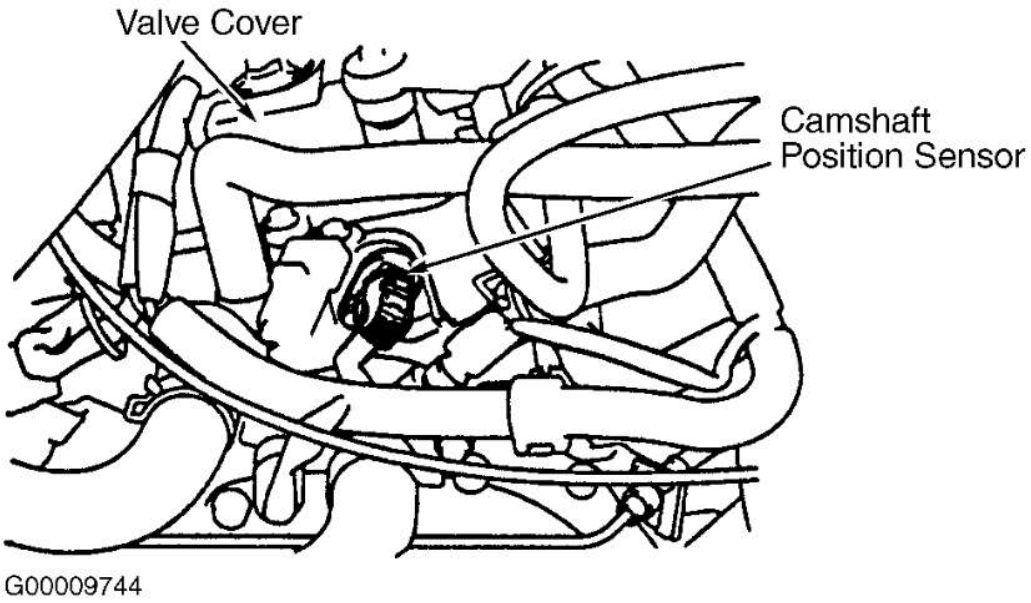


Fig. 40: Locating Camshaft Position Sensor (ECHO)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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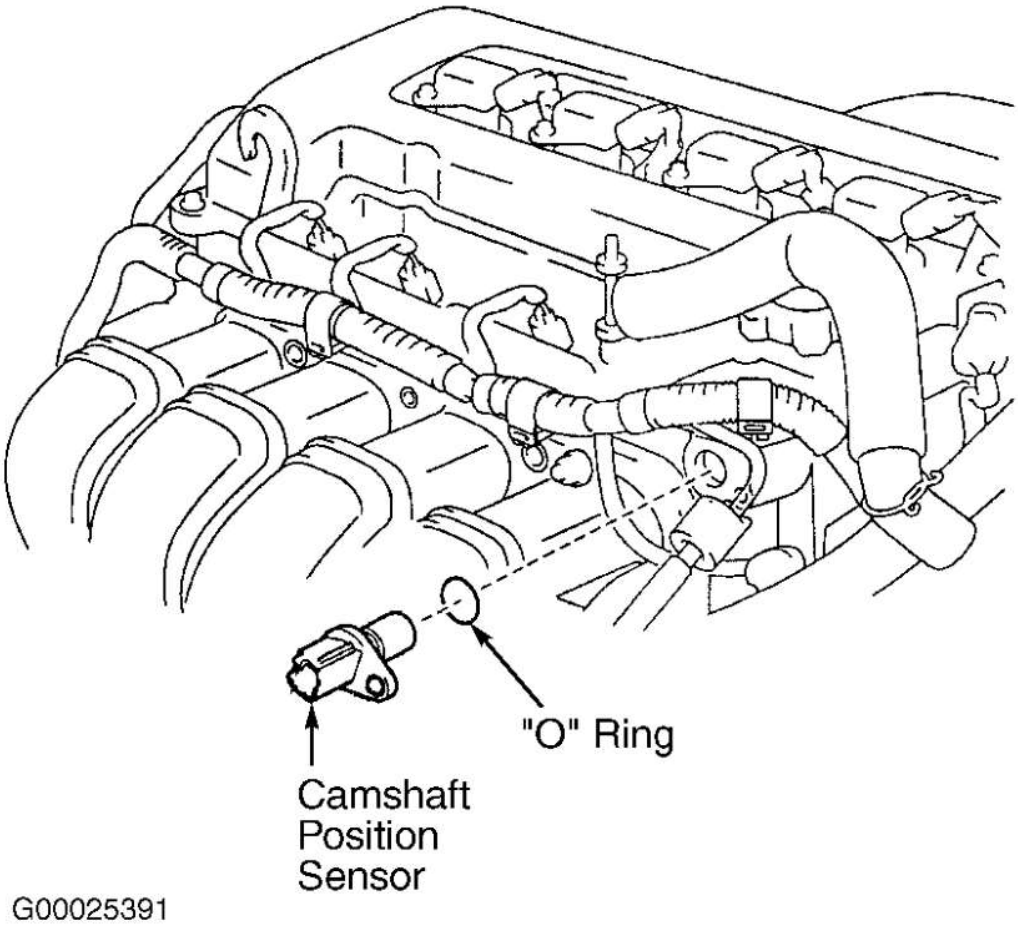


Fig. 41: Locating Camshaft Position Sensor (MR2)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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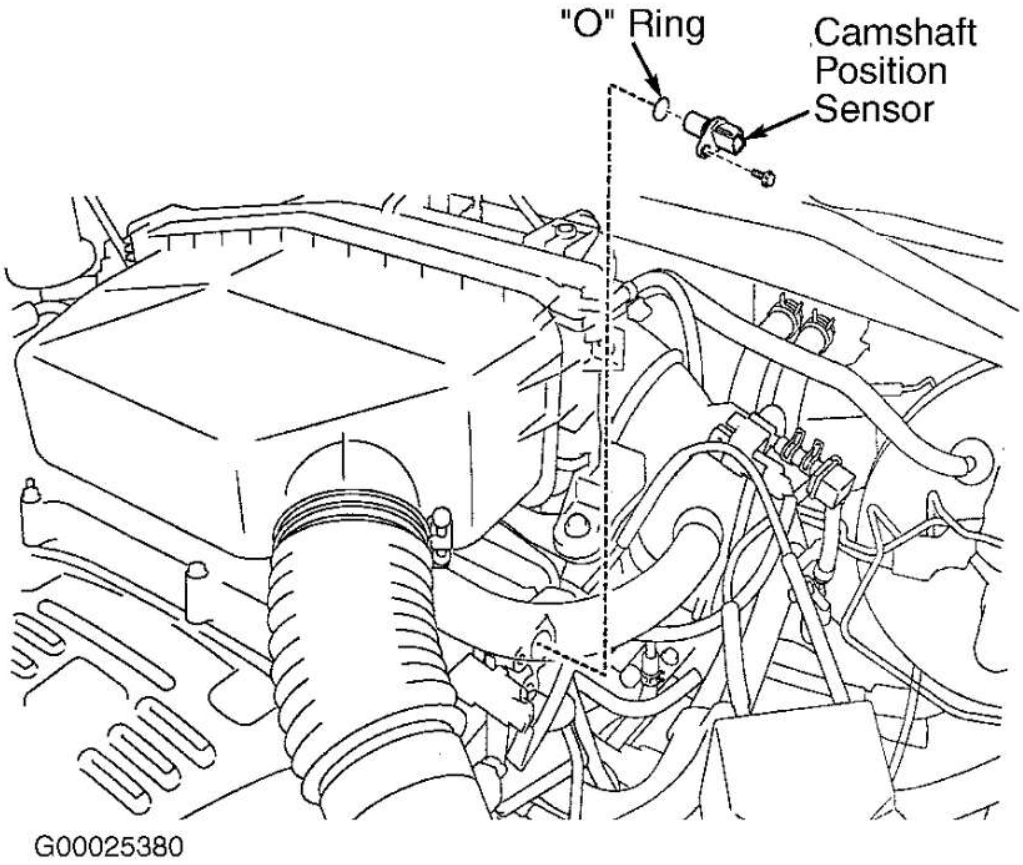


Fig. 42: Locating Camshaft Position Sensor (RAV4)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal & Installation (Prius)

WARNING: Service procedure should only be performed by authorized dealer.

Camshaft position sensor is located on end of cylinder head at flywheel end of engine and contains a Black 2-pin electrical connector with Green and Red wires. Manufacturer states that converter and inverter assembly must be removed for access to camshaft position sensor. See **CONVERTER AND INVERTER ASSEMBLY** in HYBRID VEHICLE CONTROL SYSTEM article.

Removal & Installation (Tacoma)

1. Camshaft position sensor is located on cylinder head, just in front of intake manifold. See **Fig. 43** .
2. Remove throttle body. See **THROTTLE BODY** under FUEL SYSTEMS. Disconnect electrical

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connector at camshaft position sensor. Remove bolt and camshaft position sensor from cylinder head.

3. To install, reverse removal procedure. Tighten camshaft position sensor bolt to specification. See **TORQUE SPECIFICATIONS** .

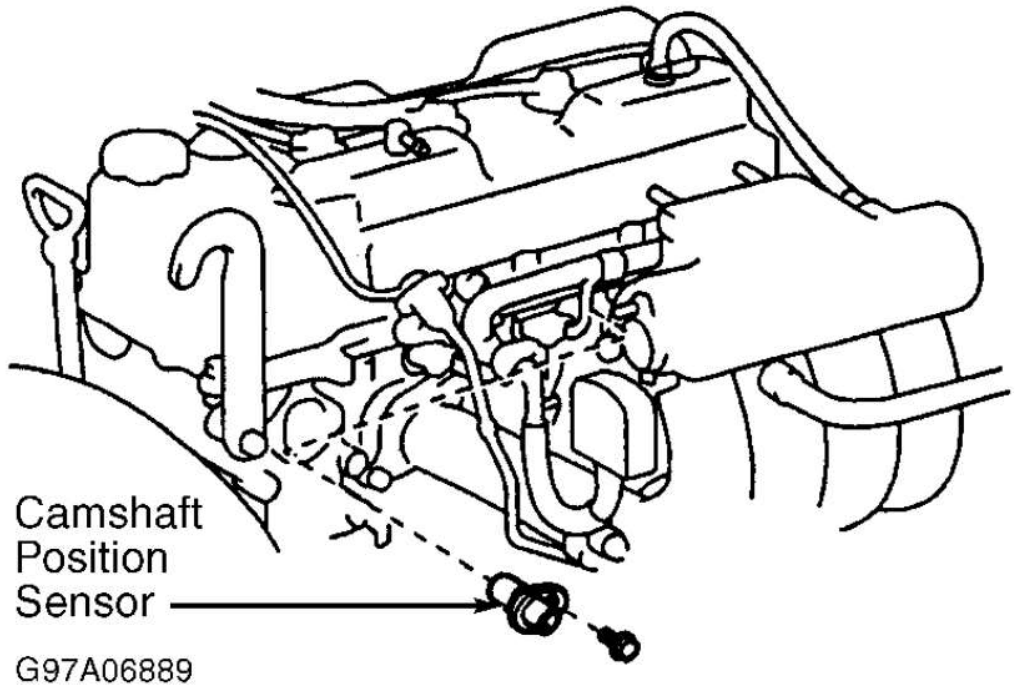


Fig. 43: Locating Camshaft Position Sensor (Tacoma)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

CRANKSHAFT POSITION SENSOR

Removal & Installation (Camry, Camry Solara & Highlander)

1. Crankshaft position sensor is located on side of timing chain cover. See **Fig. 44** . Remove necessary components for access to crankshaft position sensor. Disconnect electrical connector for crankshaft position sensor. Remove bolt and crankshaft position sensor.
2. To install, reverse removal procedure. Tighten crankshaft position sensor bolt to specification. See **TORQUE SPECIFICATIONS** .

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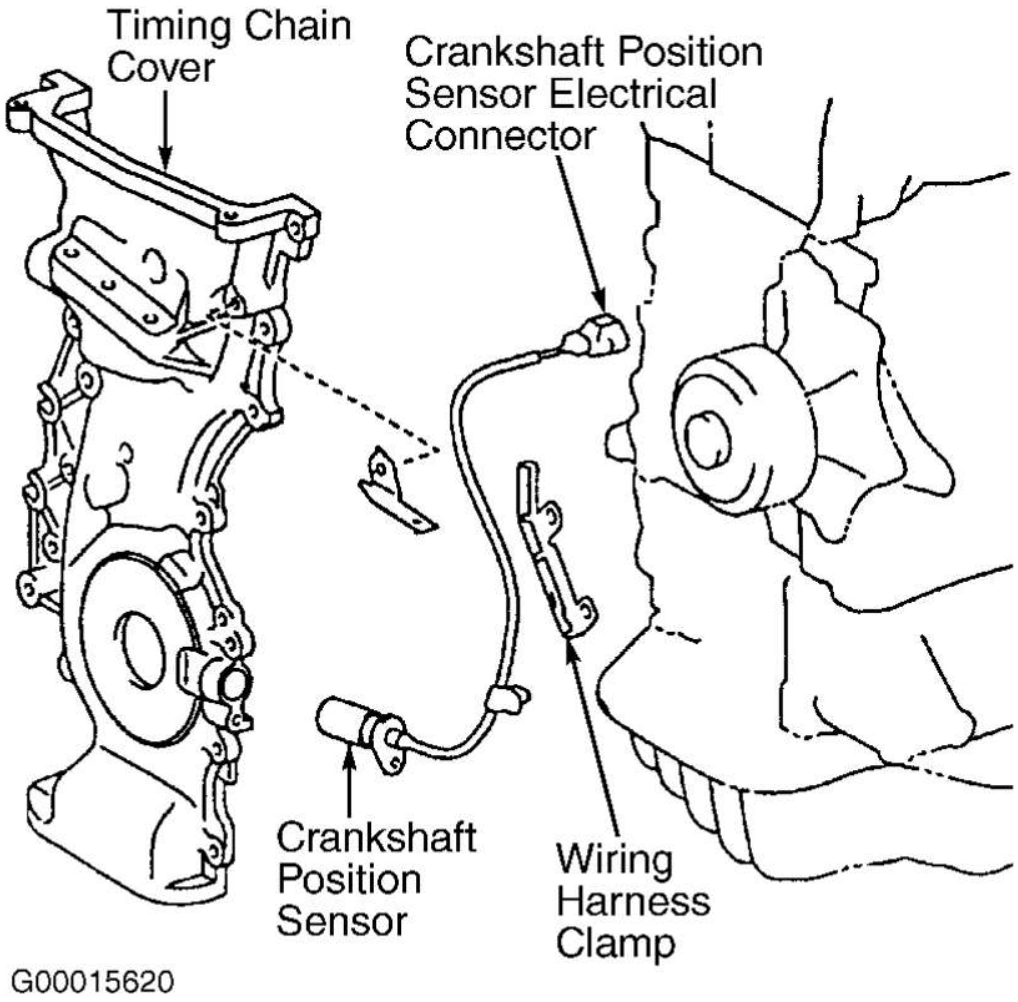


Fig. 44: Locating Crankshaft Position Sensor (Camry, Camry Solara & Highlander)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal (Celica)

1. Crankshaft position sensor is located on front of engine, near crankshaft pulley. See **Fig. 45** . Manufacturer states throttle body and intake manifold must be removed for access to crankshaft position sensor.
2. Remove throttle body. See **THROTTLE BODY** under FUEL SYSTEMS. Remove coolant reservoir and air cleaner case. Disconnect necessary hoses for removal of intake manifold. On 1.8L 2ZZ-GE models, remove bolts/nuts and intake manifold support from rear of intake manifold. On all models, remove bolts/nuts, intake manifold and gasket from cylinder head.
3. Disconnect electrical connector for crankshaft position sensor. Remove bolts and crankshaft position

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sensor.

Installation

1. Install crankshaft position sensor. Install and tighten crankshaft position sensor bolts to specification. See **TORQUE SPECIFICATIONS** . To install remaining components, reverse removal procedure using NEW gaskets.
2. On 1.8L 2ZZ-GE models, note intake manifold bolt/nut identification before tightening intake manifold bolts/nuts to specification. See **Fig. 14** . On all models, ensure gasket for throttle body is installed with protrusion area facing proper direction. See **THROTTLE BODY** under FUEL SYSTEMS. Tighten bolts/nuts to specification. See **TORQUE SPECIFICATIONS** . Fill and bleed cooling system. See **COOLING SYSTEM BLEEDING** under COOLING SYSTEM.

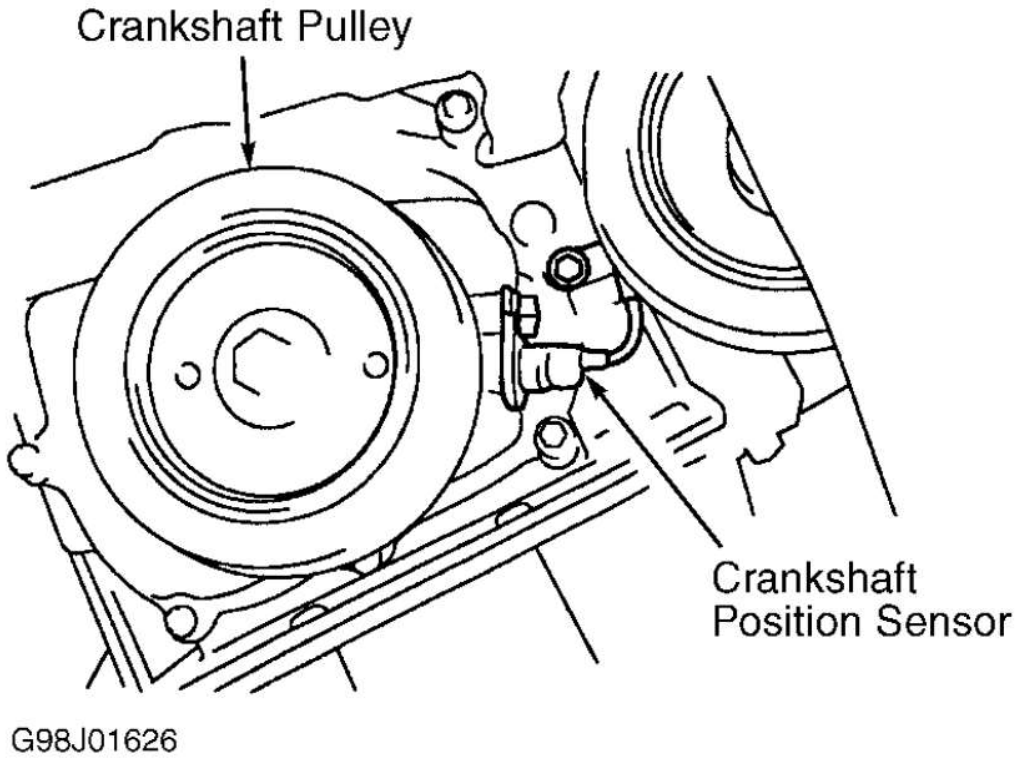


Fig. 45: Locating Typical Crankshaft Position Sensor (Celica, Corolla, MR2 & RAV4)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal (Corolla)

1. Crankshaft position sensor is located on front of engine, near crankshaft pulley. See **Fig. 45** . Manufacturer states throttle body and intake manifold must be removed for access to crankshaft position

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sensor. Remove throttle body. See **THROTTLE BODY** under FUEL SYSTEMS.

2. Remove No. 2 cylinder head cover located on top of engine, above ignition coils and valve cover. See **Fig. 15** . Disconnect necessary electrical connectors so engine wiring harness protector and engine wiring harness may be disconnected from engine wiring harness brackets. See **Fig. 15** .
3. Remove bolts and disconnect engine wiring harness protector and engine wiring harness from engine wiring harness brackets. Disconnect necessary hoses for removal of intake manifold. Remove bolts from intake manifold support. Remove bolts/nuts, engine wiring harness brackets, intake manifold and gasket from cylinder head. Disconnect electrical connector for crankshaft position sensor. Remove bolts and crankshaft position sensor.

Installation

Install crankshaft position sensor. Install and tighten crankshaft position sensor bolts to specification. See **TORQUE SPECIFICATIONS** . To install remaining components, reverse removal procedure using NEW gaskets. Ensure gasket for throttle body is installed with protrusion area facing proper direction. See **THROTTLE BODY** under FUEL SYSTEMS. Tighten bolts/nuts to specification. See **TORQUE SPECIFICATIONS** . Fill cooling system.

Removal & Installation (ECHO)

1. Crankshaft position sensor is located on front of engine, near crankshaft pulley. See **Fig. 46** . Raise and support vehicle. Remove passenger's side lower engine cover for access to crankshaft position sensor. Disconnect electrical connector for crankshaft position sensor. Remove bolt and crankshaft position sensor.
2. To install, reverse removal procedure. Tighten crankshaft position sensor bolt to specification. See **TORQUE SPECIFICATIONS** . Reinstall passenger's side lower engine cover.

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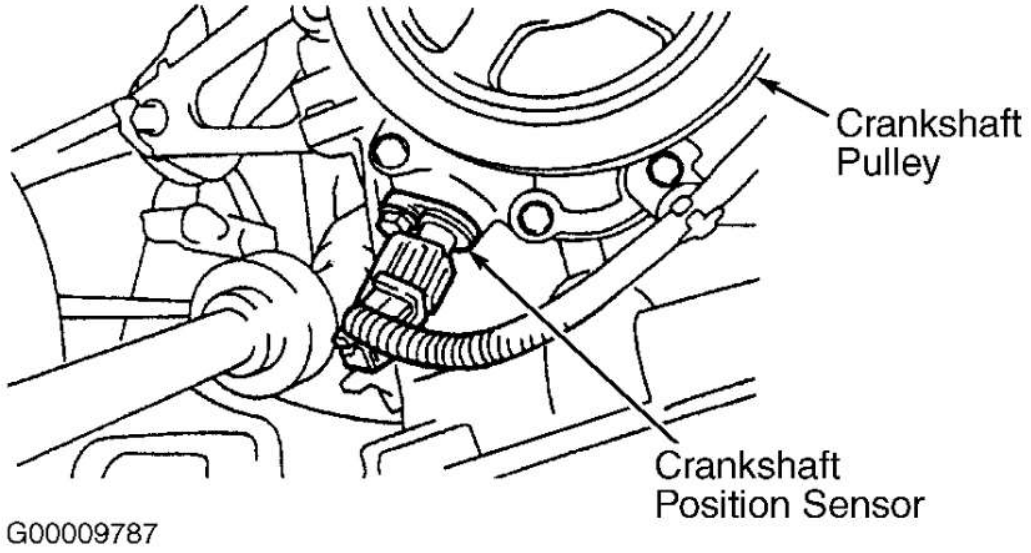


Fig. 46: Locating Typical Crankshaft Position Sensor (ECHO & Prius)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal & Installation (MR2)

1. Crankshaft position sensor is located on front of engine, near crankshaft pulley. See **Fig. 45** . Raise and support vehicle. Remove lower engine cover. A/C compressor must be removed for access to crankshaft position sensor.
2. Rotate automatic belt tensioner clockwise as viewed from front of engine to release tension from accessory drive belt. Remove accessory drive belt. Remove bolts and A/C compressor with hoses attached for access to crankshaft position sensor. Disconnect electrical connector for crankshaft position sensor. Remove bolt and crankshaft position sensor with "O" ring.
3. To install, reverse removal procedure using NEW "O" ring. Tighten crankshaft position sensor bolt and A/C compressor bolts to specification. See **TORQUE SPECIFICATIONS** .

Removal & Installation (Prius)

WARNING: Read service precautions before proceeding with service procedure. See SERVICE PRECAUTIONS .

1. Crankshaft position sensor is located on front of engine, near crankshaft pulley. See **Fig. 46** . Raise and support vehicle. Remove passenger's side lower engine cover. Disconnect electrical connector for crankshaft position sensor. Remove bolt and crankshaft position sensor.
2. To install, reverse removal procedure. Tighten crankshaft position sensor bolt to specification. See **TORQUE SPECIFICATIONS** . Reinstall passenger's side lower engine cover.

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Removal & Installation (RAV4)

1. Crankshaft position sensor is located on front of engine, near crankshaft pulley. See **Fig. 45** . Raise and support vehicle. Remove lower engine cover for access to crankshaft position sensor.
2. Disconnect electrical connector for crankshaft position sensor. Remove bolt and crankshaft position sensor with "O" ring. To install, reverse removal procedure using NEW "O" ring. Tighten crankshaft position sensor bolt to specification. See **TORQUE SPECIFICATIONS** .

Removal & Installation (Tacoma)

1. Crankshaft position sensor is located near crankshaft pulley, just above oil pan on driver's side of engine. See **Fig. 47** . Raise and support vehicle. Remove lower engine cover.
2. Disconnect negative battery cable. Disconnect electrical connectors at generator. Remove accessory drive belt, generator and generator mounting bracket. Disconnect electrical connector at crankshaft position sensor. Remove bolts and crankshaft position sensor with "O" ring.
3. To install, reverse removal procedure using NEW "O" ring. Tighten bolts to specification. See **TORQUE SPECIFICATIONS** .

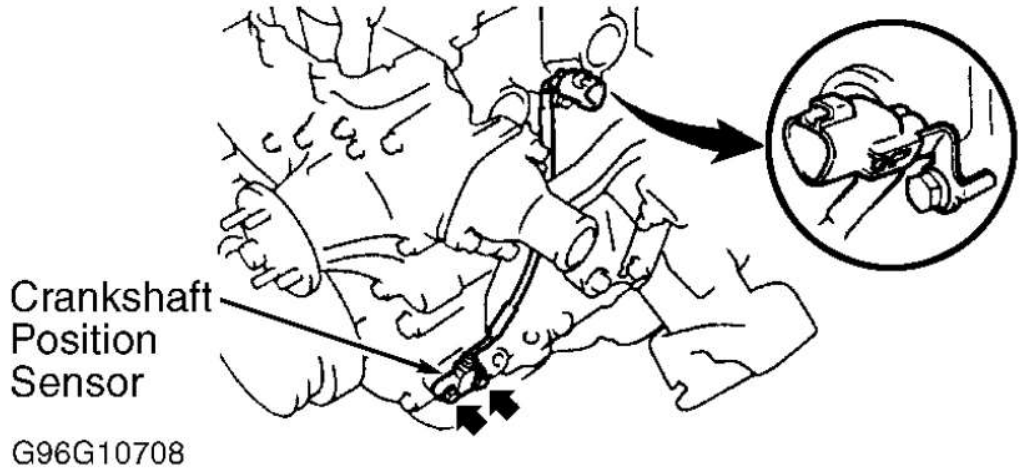


Fig. 47: Locating Crankshaft Position Sensor (Tacoma)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

IGNITION COIL

Removal & Installation (Camry, Camry Solara, Celica, Corolla, ECHO & Highlander)

1. Remove No. 2 cylinder head cover located on top of engine, above ignition coils for access to ignition coil. Disconnect electrical connector at ignition coil mounted on valve cover.

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2. Note location of ignition coil for installation reference. Remove ignition coil bolt and ignition coil from valve cover.
3. To install, reverse removal procedure. Tighten ignition coil bolt to specification. See **TORQUE SPECIFICATIONS** .

Removal & Installation (MR2)

1. Remove suspension upper brace. Suspension upper brace fits between strut towers and is bolted to top of each strut tower. Remove No. 2 cylinder head cover located on top of engine, above ignition coils for access to ignition coil. Disconnect electrical connector at ignition coil mounted on valve cover.
2. Note location of ignition coil for installation reference. Remove ignition coil bolt, ignition coil and dust seal from valve cover.
3. To install, reverse removal procedure. Tighten ignition coil bolt and suspension upper brace bolt/nut to specification. See **TORQUE SPECIFICATIONS** .

Removal & Installation (Prius)

WARNING: Read service precautions before proceeding with service procedure. See SERVICE PRECAUTIONS .

1. Remove air cleaner assembly on top of engine for access to ignition coil. Disconnect electrical connector at ignition coil mounted on valve cover.
2. Note location of ignition coil for installation reference. Remove ignition coil bolt and ignition coil from valve cover.
3. To install, reverse removal procedure. Tighten ignition coil bolt to specification. See **TORQUE SPECIFICATIONS** .

Removal & Installation (RAV4)

1. Remove upper cap on air cleaner assembly for access to ignition coil. Disconnect electrical connector at ignition coil mounted on valve cover.
2. Note location of ignition coil for installation reference. Remove ignition coil bolt and ignition coil from valve cover.
3. To install, reverse removal procedure. Tighten ignition coil bolt to specification. See **TORQUE SPECIFICATIONS** .

Removal & Installation (Tacoma)

1. Remove necessary components for access to ignition coil mounted on valve cover. Disconnect electrical connector at ignition coil. Note location of ignition coil for installation reference. Remove ignition coil bolt and ignition coil from valve cover.
2. To install, reverse removal procedure. Tighten ignition coil bolt to specification. See **TORQUE SPECIFICATIONS** .

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FUEL SYSTEMS

FUEL SYSTEM PRESSURE RELEASE

WARNING: ALWAYS release fuel pressure before disconnecting any fuel injection-related component. DO NOT allow fuel to contact engine or electrical components.

Camry

1. Ensure ignition is off. Remove circuit opening relay from fuse/relay box. See **Fig. 48** . Fuse/relay box is located at driver's side front corner of engine compartment.
2. Start engine and allow engine to idle until engine stalls. Attempt to start engine again to ensure engine will not start. Turn ignition off. Disconnect negative battery cable. Remove fuel tank cap to release any pressure from fuel tank.
3. Place suitable container under fuel line connection. Cover fuel line connection with shop towel. Slowly loosen or disconnect fuel line connection, allowing fuel pressure to be released. Once fuel pressure is released, fuel system components may be serviced.
4. Reinstall circuit opening relay and negative battery cable. Start engine and check operation of Malfunction Indicator Light (MIL) on instrument panel with engine running. MIL is displayed as engine icon on instrument panel. It may be possible that Diagnostic Trouble Code (DTC) P0171 may have been stored in Engine Control Module (ECM) and MIL may be illuminated with engine running due to the lean condition caused by operating engine with circuit opening relay removed. If MIL is illuminated, DTCs must be cleared from ECM. See CLEARING DIAGNOSTIC TROUBLE CODES under SELF-DIAGNOSTIC SYSTEM in appropriate SELF-DIAGNOSTICS article.

NOTE: It may be possible that power sun roof may not operate properly after battery was disconnected. If power sun roof does not operate properly, perform power sun roof reinitialization procedure. See appropriate POWER SUN ROOF REINITIALIZATION PROCEDURE under PROGRAMMING.

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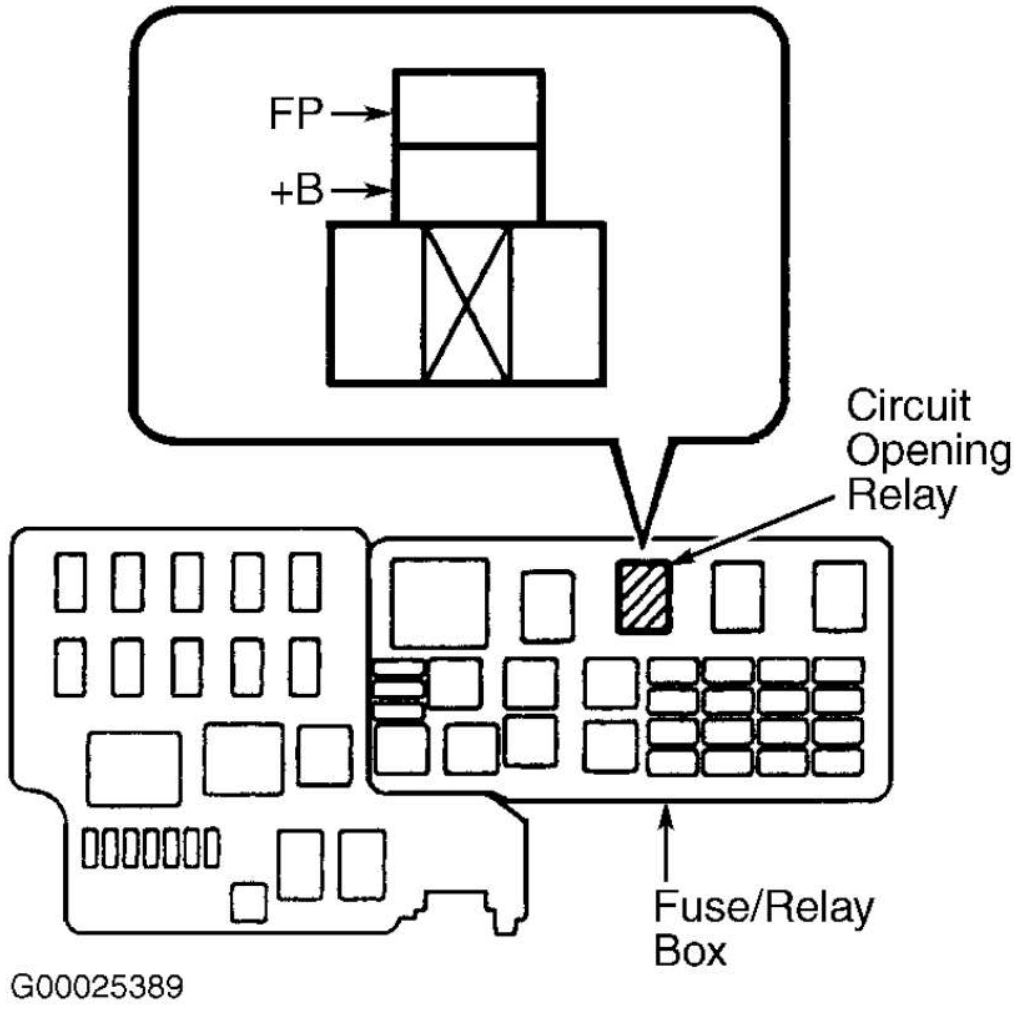


Fig. 48: Locating Circuit Opening Relay (Camry)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Camry Solara, Celica, Corolla, ECHO, Highlander, MR2, Prius, RAV4 & Tacoma

WARNING: On Prius, read service precautions before proceeding with service procedure. See SERVICE PRECAUTIONS .

1. On all models, disconnect electrical connector for fuel pump. See **FUEL PUMP ELECTRICAL CONNECTOR LOCATION** table. This is electrical connector for fuel pump and fuel gauge sending unit. Electric fuel pump is located in the fuel tank.

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FUEL PUMP ELECTRICAL CONNECTOR LOCATION

Application	Connector Location
Camry Solara, Celica, Corolla & ECHO	Under Cover Plate, Below Rear Seat Cushion
Highlander	Under Cover Plate, Below Driver's Side & Passenger's Side Rear Seats
MR2	(1) Under Cover Plate, Below Luggage Compartment Boxes Behind The Seats
Prius	Under Cover Plate, Below Rear Seat Cushion
RAV4	Under Cover Plate, Below Driver's Side Rear Seat
Tacoma	On Top Of Fuel Tank, At Fuel Pump
(1) For additional information for removal of luggage compartment boxes, see **FUEL PUMP** .	

2. Start engine and allow engine to idle until engine stalls. Turn ignition off. Disconnect negative battery cable.
3. Place suitable container under fuel line connection. Cover fuel line connection with shop towel. Slowly loosen or disconnect fuel line connection, allowing fuel pressure to be released. Once fuel pressure is released, fuel system components may be serviced. Reinstall electrical connector for fuel pump and negative battery cable.

NOTE: On Celica, it may be possible that power sun roof may not operate properly after battery was disconnected. If power sun roof does not operate properly, perform power sun roof reinitialization procedure. See appropriate POWER SUN ROOF REINITIALIZATION PROCEDURE under PROGRAMMING.

FUEL FILTER

Removal & Installation (All Models)

Manufacturer does not list procedure for servicing of external fuel filters. Fuel filter(s) may be used on the fuel pump assembly. For servicing of fuel filter(s) on fuel pump assembly, see **FUEL PUMP** .

FUEL FILTER ON FUEL PUMP

Removal & Installation (All Models)

For servicing of fuel filter(s) on fuel pump assembly, see **FUEL PUMP** .

FUEL PUMP

NOTE: When servicing fuel pump, use care to cover all fuel line fittings and connections to prevent dirt from entering fuel pump or fuel lines.

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Removal (Camry)

1. Release fuel pressure. See **FUEL SYSTEM PRESSURE RELEASE** .
2. Remove rear seat cushion and cover plate on floor panel for access to fuel pump if not previously done. Disconnect electrical connector from top of fuel pump. This is electrical connector for fuel pump and fuel gauge sending unit. Electric fuel pump is located in fuel tank.
3. Ensure area around disconnect fitting and fuel supply line on top of fuel pump is clean. Remove retaining clip from disconnect fitting on fuel supply line at top of fuel pump. See **Fig. 49** . Disconnect fuel supply line from top of fuel pump. DO NOT bend or twist fuel supply line or disconnect fitting during removal. Use care not to damage the nylon fuel supply line and disconnect fitting during removal, as there are "O" rings inside the disconnect fitting.
4. Remove fuel pump retaining plate-to-fuel tank bolts and fuel pump retaining plate. Remove fuel pump assembly and gasket from fuel tank. Use care not to damage fuel filter on bottom of fuel pump and fuel gauge sending unit when removing fuel pump.

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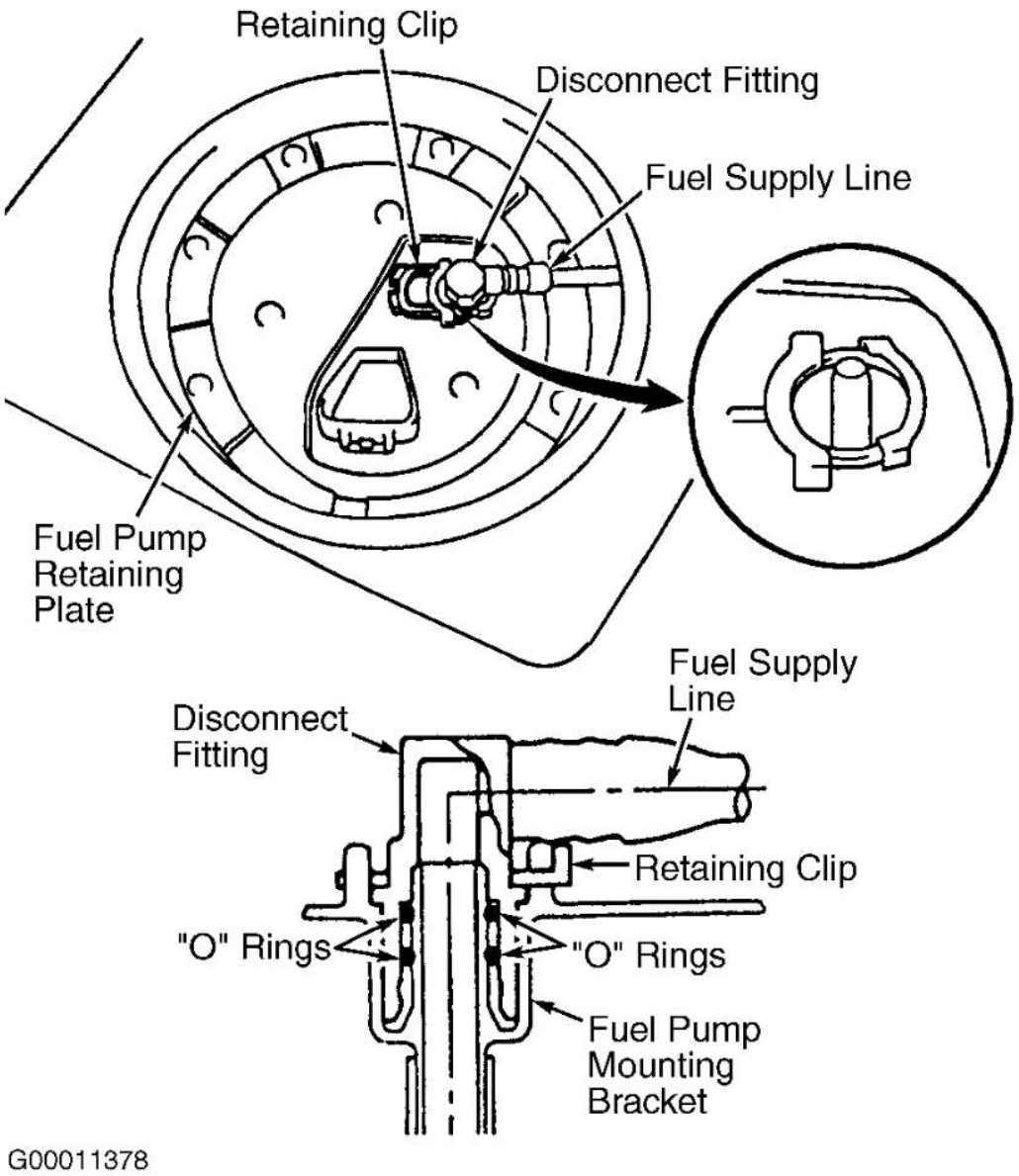


Fig. 49: Locating Retaining Clip, Disconnect Fitting, Fuel Supply Line & Fuel Pump Retaining Plate (Camry & Highlander)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Disassembly & Reassembly

1. Using screwdriver, release snap fit areas on No. 2 fuel suction support and remove No. 2 fuel suction support from bottom of fuel pump. See **Fig. 50** . Remove rubber cushion from bottom of fuel pump.
2. Remove fuel pressure regulator with "O" ring. See **Fig. 50** . Disconnect lead wire at fuel pump. Remove

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fuel pump with fuel filter from fuel filter assembly. See **Fig. 50** . Using small screwdriver, remove retaining clip that holds fuel filter on bottom of fuel pump. Remove fuel filter from bottom of fuel pump.

3. Using screwdriver, release snap fit areas on fuel suction plate subassembly and separate fuel suction plate subassembly from fuel filter assembly. See **Fig. 50** . If necessary to remove fuel gauge sending unit, unlock fuel gauge sending unit. Slide fuel gauge sending unit downward and remove.
4. To reassemble, reverse disassembly procedure using NEW retaining clip on fuel filter and NEW "O" ring. Coat "O" ring with gasoline before installing. Ensure fuel gauge sending unit is fully locked in place by pushing fuel gauge sending unit downward.

Installation

To install, reverse removal procedure using NEW gasket. Tighten fuel pump retaining plate-to-fuel tank bolts to specification. See **TORQUE SPECIFICATIONS** . Ensure areas are clean before installing fuel supply line at fuel pump and retaining clip is properly installed and fuel supply line cannot be pulled from fuel pump assembly. Operate fuel pump and check for fuel leaks. See **FUEL PUMP OPERATION** under FUEL SYSTEMS in BASIC DIAGNOSTIC PROCEDURES - 4-CYLINDER article.

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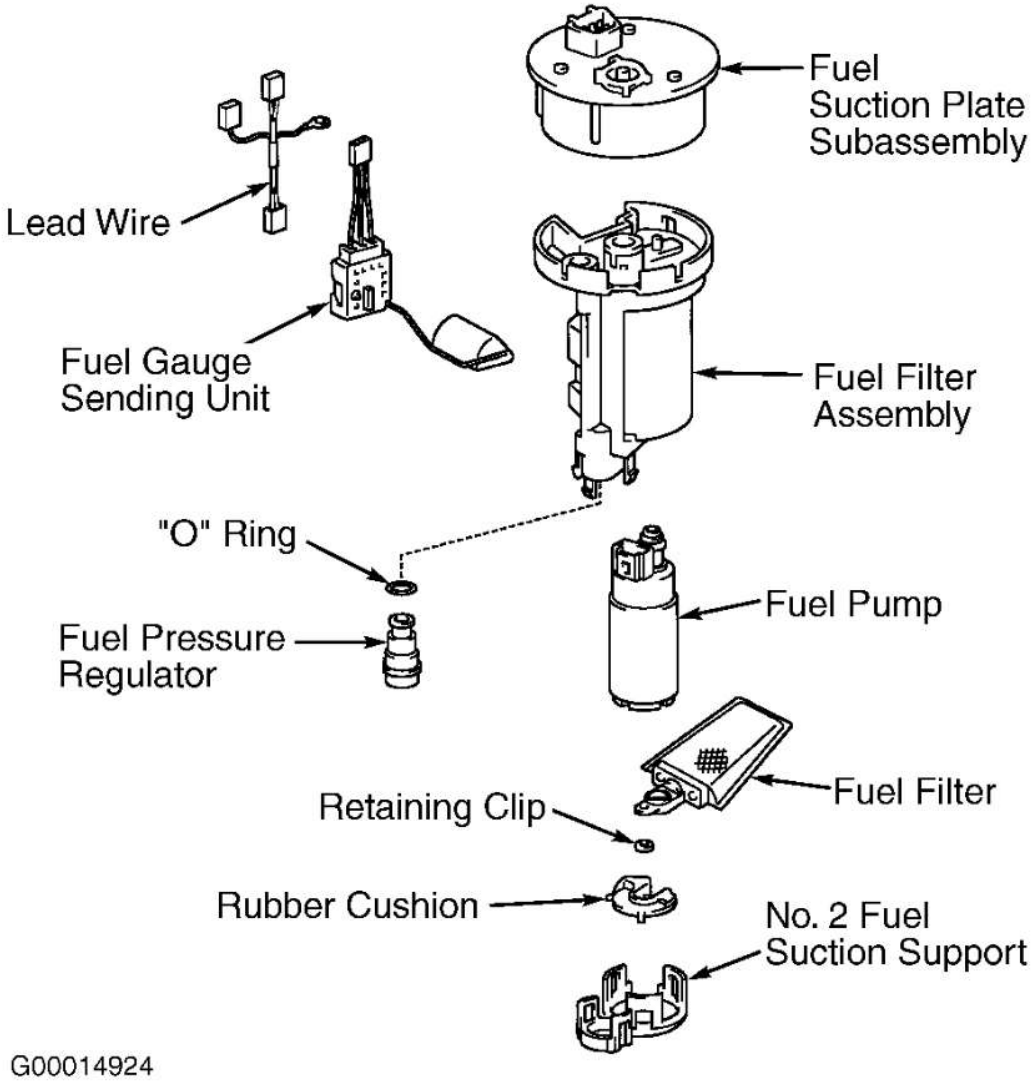


Fig. 50: Exploded View Of Fuel Pump & Components (Camry)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal (Camry Solara)

1. Release fuel pressure. See **FUEL SYSTEM PRESSURE RELEASE** .
2. Remove rear seat cushion and cover plate on floor panel for access to fuel pump if not previously done. Disconnect electrical connector from top of fuel pump. This is electrical connector for fuel pump and fuel gauge sending unit. Electric fuel pump is located in the fuel tank.
3. Remove bolts and fuel pump protector cover located on fuel tank, above fuel pump. Ensure area around disconnect fitting on fuel line at fuel pump is clean. Depress both sides of retainer and pull fuel line with

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disconnect fitting from outlet tube on the fuel pump. See **Fig. 51** .

4. Remove fuel pump retaining plate-to-fuel tank bolts. Remove fuel pump retaining plate, fuel pump and gasket from fuel tank. Use care not to damage fuel filter on bottom of fuel pump and fuel gauge sending unit when removing fuel pump.

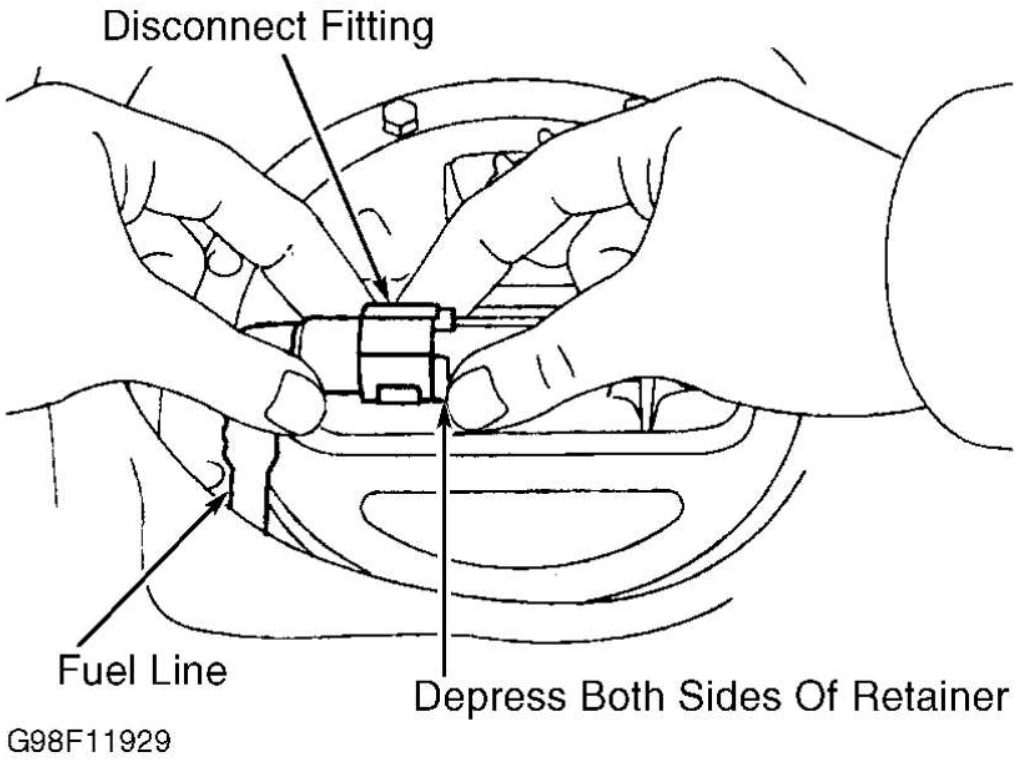


Fig. 51: Disconnecting Fuel Line At Fuel Pump (Camry Solara)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Disassembly & Reassembly

1. Note location of fuel pump mounting bracket. See **Fig. 52** . Using screwdriver, release snap fit areas on fuel pump mounting bracket and remove fuel pump mounting bracket with round fuel filter from fuel pump. See **Fig. 53** .
2. Disconnect electrical connector at fuel pump. Disconnect fuel gauge sending unit wire from bottom of fuel pump mounting bracket. Using screwdriver, release snap fit areas on fuel pump in proper sequence and remove cover bracket and rubber cushion from bottom of fuel pump. See **Fig. 53** .
3. Using small screwdriver, remove retaining clip that holds fuel filter on bottom of fuel pump. See **Fig. 52** . Remove fuel filter from fuel pump. To reassemble, reverse disassembly procedure using NEW retaining clip on fuel filter.

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Installation

1. Using NEW gasket, install fuel pump in fuel tank. Tighten fuel pump retaining plate-to-fuel tank bolts to specification. See **TORQUE SPECIFICATIONS** .

CAUTION: DO NOT reuse old retainer when installing fuel line on outlet tube at fuel pump. Always use a NEW retainer.

2. Ensure areas are clean before installing fuel line at fuel pump. Apply light coat of engine oil on tip of outlet tube at fuel pump to allow for ease of disconnect fitting and fuel line installation. Using NEW retainer, install fuel line on outlet tube at fuel pump until "click" sound is heard. DO NOT reuse old retainer. Pull on fuel line to ensure fuel line is properly locked on the fuel pump.
3. To install remaining components, reverse removal procedure. Tighten fuel pump protector cover bolts to specification. See **TORQUE SPECIFICATIONS** .
4. Operate fuel pump and check for fuel leaks. See **FUEL PUMP OPERATION** under FUEL SYSTEMS in BASIC DIAGNOSTIC PROCEDURES - 4-CYLINDER article.

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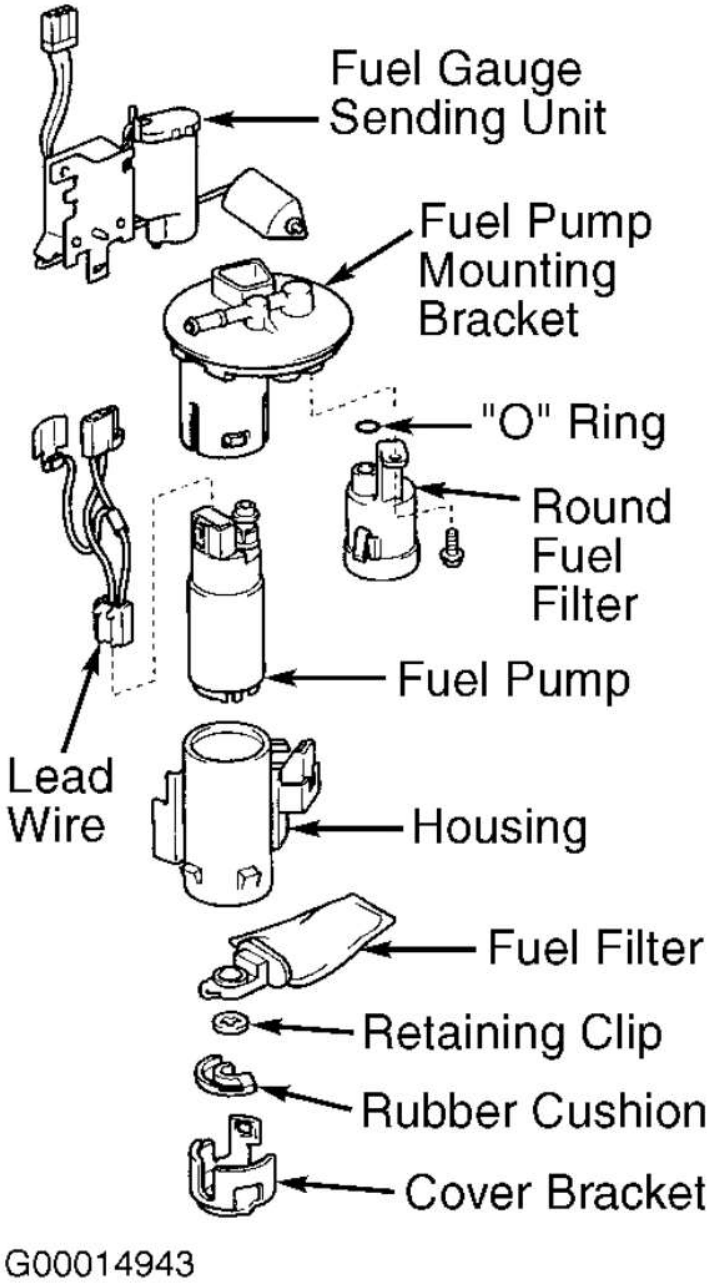


Fig. 52: Exploded View Of Fuel Pump & Components (Camry Solara)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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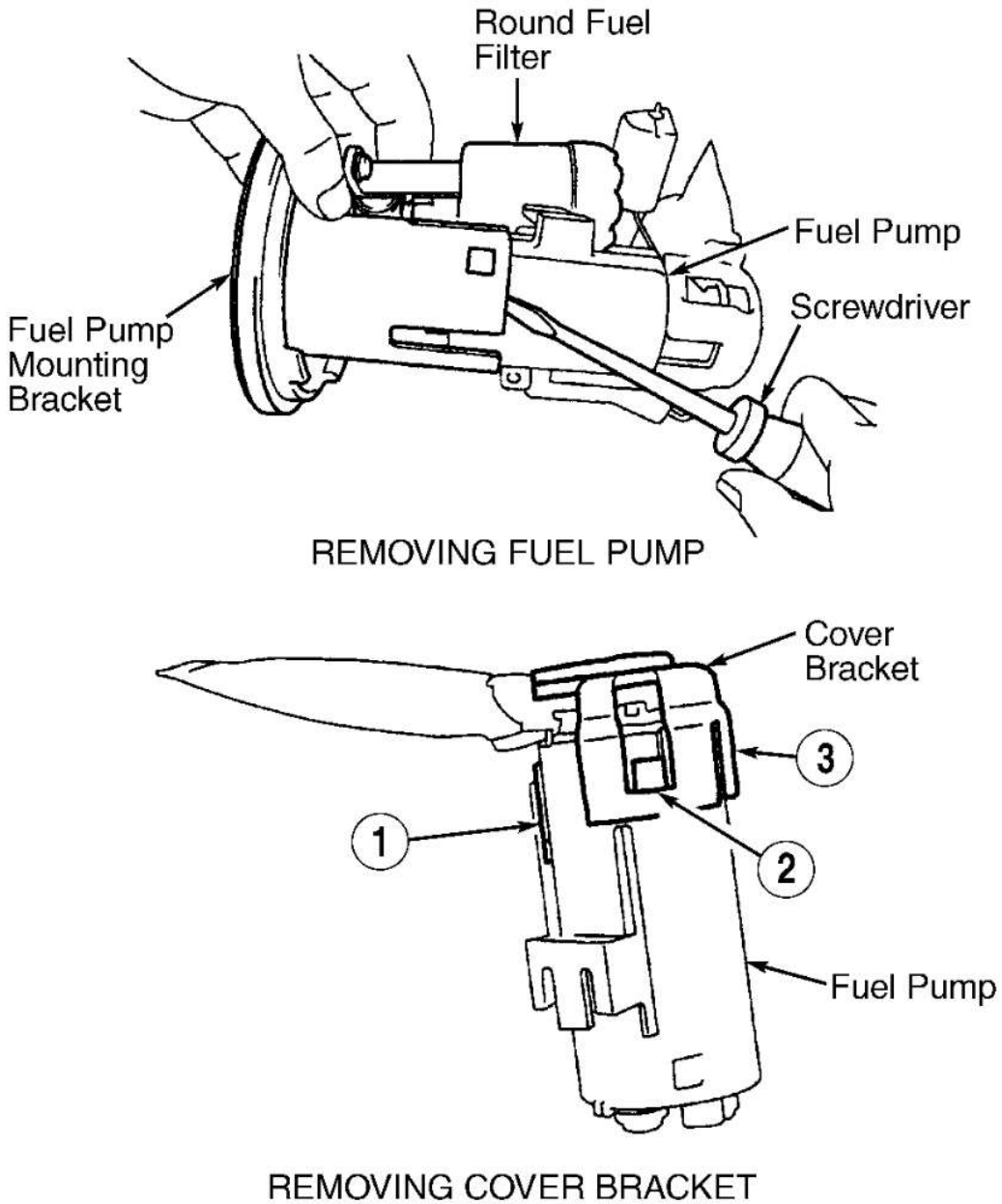


Fig. 53: Removing Fuel Pump & Cover Bracket (Camry Solara)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal (Celica)

1. Release fuel pressure. See **FUEL SYSTEM PRESSURE RELEASE** .

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2. Remove rear seat cushion and cover plate on floor panel for access to fuel pump if not previously done. Disconnect electrical connector from top of fuel pump. This is electrical connector for fuel pump and fuel gauge sending unit. Electric fuel pump is located in the fuel tank. Disconnect electrical connector at vapor pressure sensor. See **Fig. 54** .
3. Ensure area around emission tube and fuel line at fuel pump is clean. Remove retaining clip from fuel line at fuel pump. See **Fig. 54** . Disconnect fuel line from fuel pump. Disconnect emission tube.
4. Remove fuel pump retaining plate-to-fuel tank bolts. Remove fuel pump retaining plate, fuel pump and gasket from fuel tank. Use care not to damage fuel filter on bottom of fuel pump and fuel gauge sending unit when removing fuel pump.

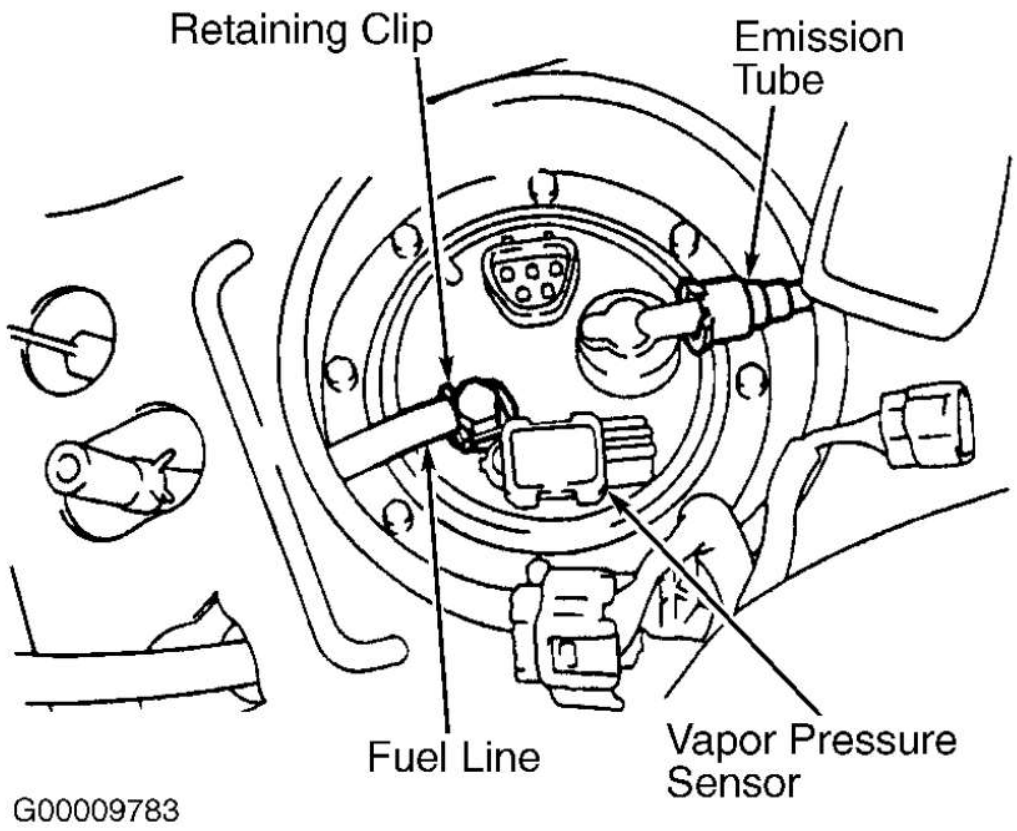


Fig. 54: Locating Emission Tube, Fuel Line, Retaining Clip & Vapor Pressure Sensor (Celica)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Disassembly & Reassembly

1. Using screwdriver, pry No. 2 fuel suction support from bottom of fuel pump. See **Fig. 55** . Remove rubber cushion.

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2. Disconnect lead wire for fuel gauge sending unit. Press lock on main fuel filter and slide fuel gauge sending unit from main fuel filter. See **Fig. 56** . Main fuel filter may also be referred to as fuel pump filter. Using screwdriver, remove No. 1 fuel suction support from main fuel filter. See **Fig. 57** . Use care not to damage No. 1 fuel suction support and main fuel filter during removal.
3. Disconnect lead wire from fuel pump and No. 1 fuel suction support. Remove retaining clip and vapor pressure sensor from No. 1 fuel suction support. Remove fuel pump from main fuel filter. Remove fuel pressure regulator with "O" ring from main fuel filter. Using small screwdriver, remove retaining clip that holds fuel filter on bottom of fuel pump. Remove fuel filter from fuel pump.
4. To reassemble, reverse disassembly procedure using NEW retaining clip on fuel filter and NEW "O" ring on fuel pressure regulator. Coat "O" ring with gasoline before installing fuel pressure regulator. Install fuel gauge sending unit on main fuel filter so fuel gauge sending unit installation distance between float fulcrum and No. 1 fuel suction support is 5.91" (150.0 mm). See **Fig. 58** .

Installation

1. To install, reverse removal procedure using NEW gasket. Tighten fuel pump retaining plate-to-fuel tank bolts to specification. See **TORQUE SPECIFICATIONS** . Ensure areas are clean before installing fuel line at fuel pump and retaining clip is properly installed and fuel line cannot be pulled from fuel pump assembly.
2. Operate fuel pump and check for fuel leaks. See **FUEL PUMP OPERATION** under FUEL SYSTEMS in BASIC DIAGNOSTIC PROCEDURES - 4-CYLINDER article.

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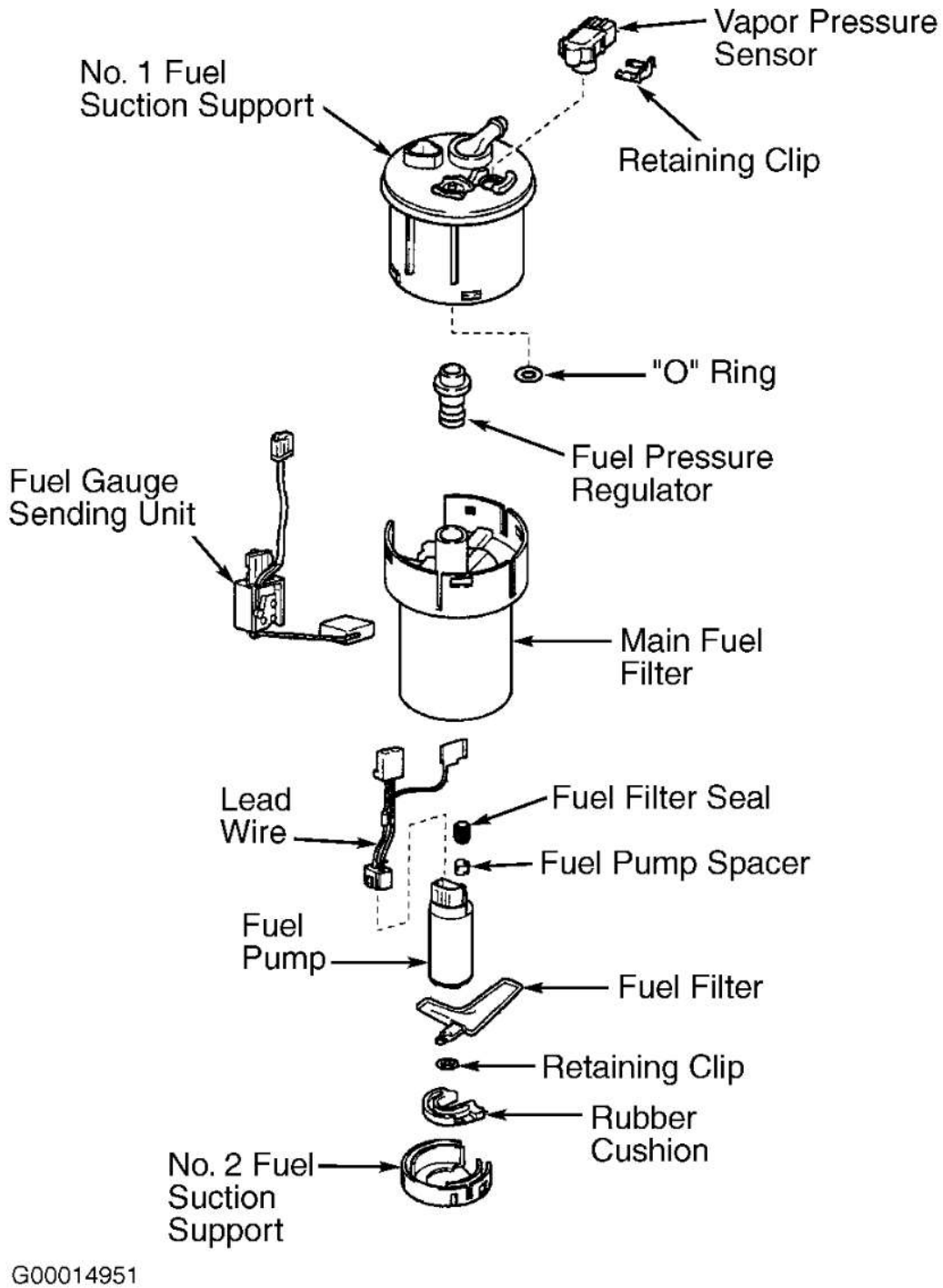


Fig. 55: Exploded View Of Fuel Pump & Components (Celica)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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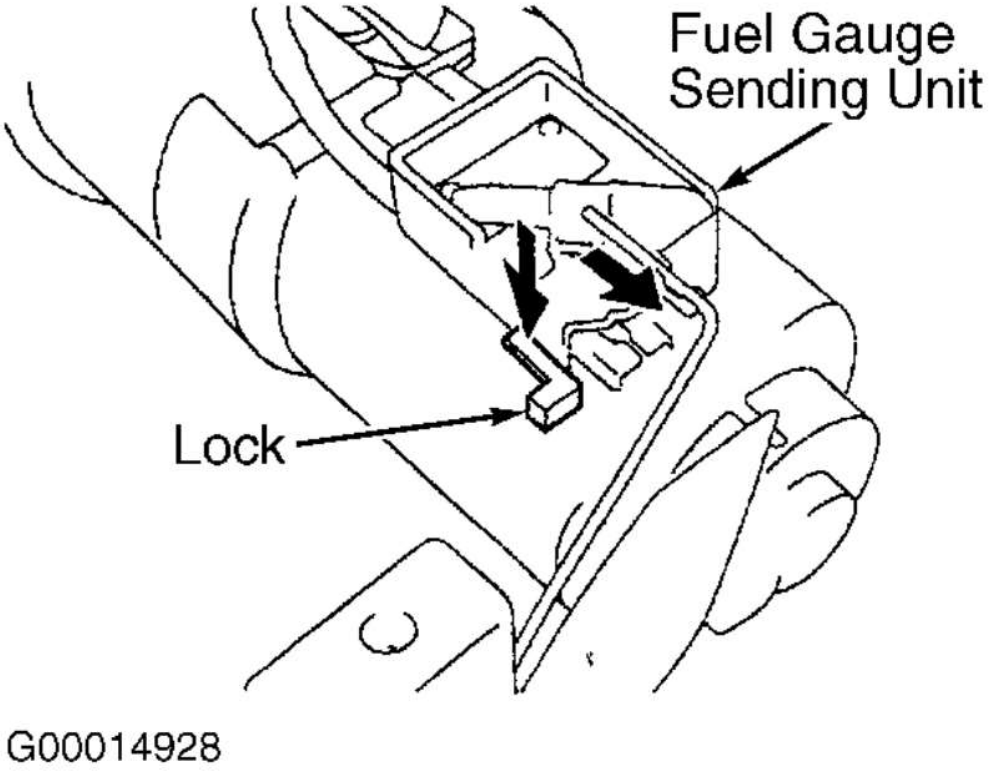


Fig. 56: Removing Fuel Gauge Sending Unit (Celica)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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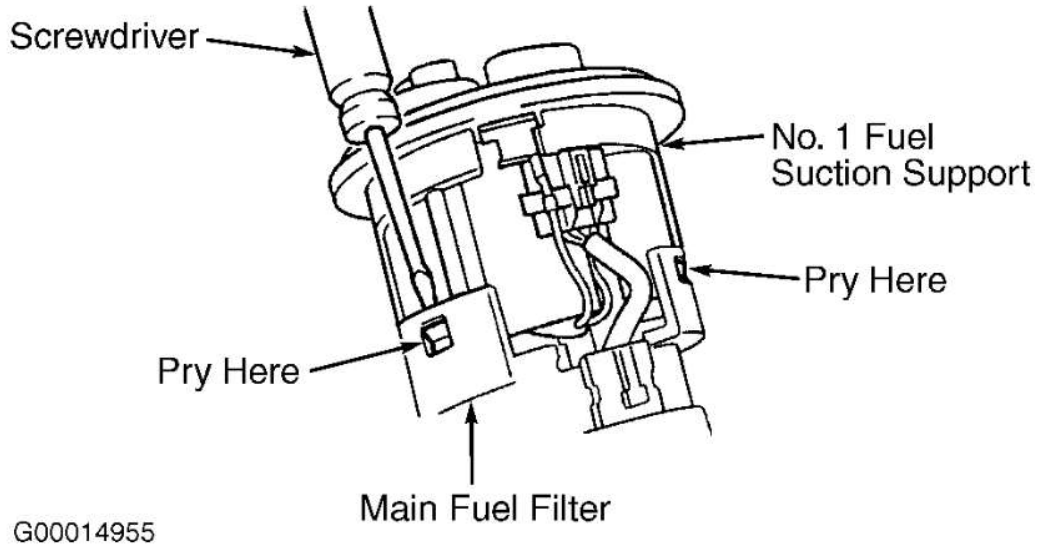


Fig. 57: Removing No. 1 Fuel Suction Support (Celica)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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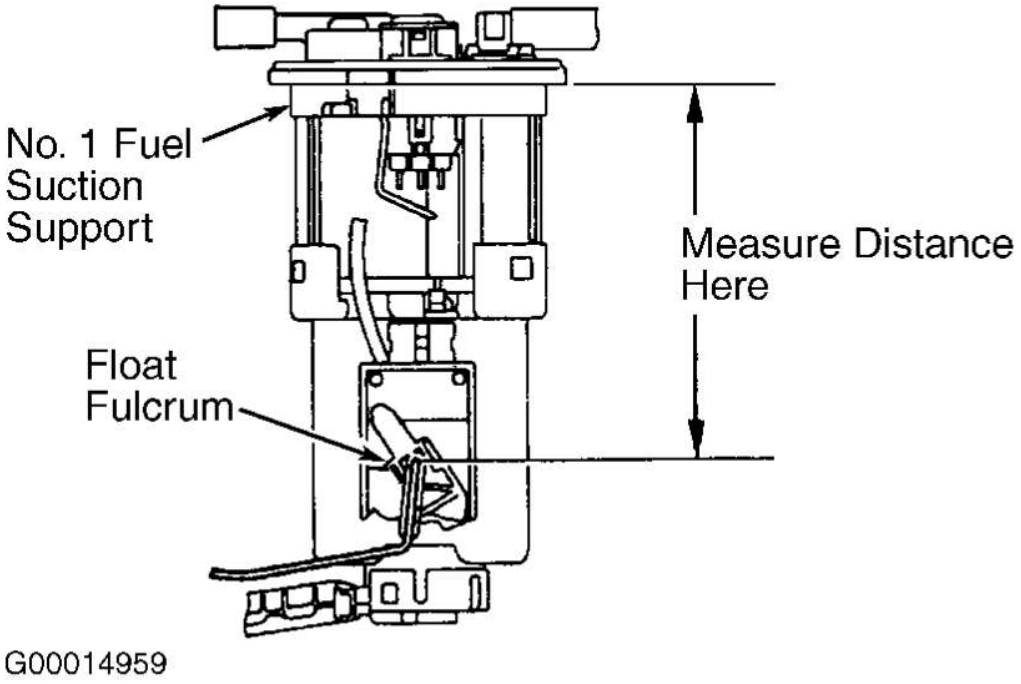


Fig. 58: Measuring Fuel Gauge Sending Unit Installation Distance (Celica)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal (Corolla)

1. Release fuel pressure. See **FUEL SYSTEM PRESSURE RELEASE** .
2. Remove rear seat cushion and cover plate on floor panel for access to fuel pump if not previously done. Disconnect electrical connector from top of fuel pump. This is electrical connector for fuel pump and fuel gauge sending unit. Electric fuel pump is located in fuel tank.
3. Ensure area around fuel line at fuel pump is clean. Remove retaining clip from fuel line at fuel pump. See **Fig. 59** . Disconnect fuel line from fuel pump.
4. Remove fuel pump retaining plate-to-fuel tank bolts. Remove fuel pump retaining plate, fuel pump and gasket from fuel tank. Use care not to damage fuel filter on bottom of fuel pump and fuel gauge sending unit when removing fuel pump.

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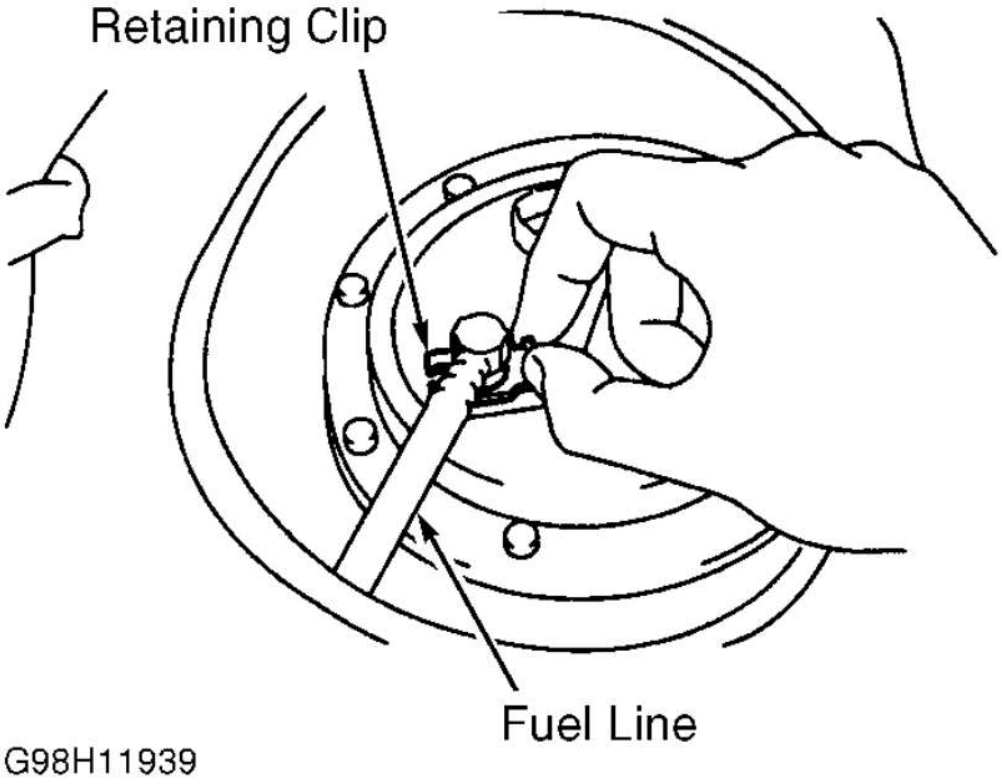


Fig. 59: Removing Retaining Clip At Fuel Line (Corolla)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Disassembly & Reassembly

1. Using screwdriver, pry No. 2 fuel suction support from bottom of fuel pump. See **Fig. 60** . Remove rubber cushion. Remove fuel pressure regulator with "O" ring from main fuel filter.

CAUTION: Use care when removing retaining clip as not to damage the No. 1 fuel suction support.

2. Using small screwdriver, remove retaining clip that holds fuel filter on bottom of fuel pump. Remove fuel filter from fuel pump. DO NOT damage No. 1 fuel suction support when removing retaining clip.
3. Using small screwdriver, pry No. 1 fuel suction support from fuel pump mounting bracket and fuel gauge sending unit. Use care not to damage No. 1 fuel suction support and fuel pump mounting bracket. Fuel pump mounting bracket may also be referred to as fuel suction plate.
4. Remove fuel filter cushion from bottom of main fuel filter. Fuel filter cushion may also be referred to as

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No. 2 fuel filter cushion. Remove main fuel filter with fuel pump from fuel pump mounting bracket. Disconnect electrical connector from fuel pump. Remove fuel pump from main fuel filter.

5. To reassemble, reverse disassembly procedure using NEW "O" ring on fuel pressure regulator and NEW retaining clip on fuel filter. Coat "O" ring with gasoline before installing fuel pressure regulator.

Installation

1. To install, reverse removal procedure using NEW gasket. Tighten fuel pump retaining plate-to-fuel tank bolts to specification. See **TORQUE SPECIFICATIONS** . Ensure areas are clean before installing fuel line at fuel pump and retaining clip is properly installed and fuel line cannot be pulled from fuel pump assembly.
2. Operate fuel pump and check for fuel leaks. See **FUEL PUMP OPERATION** under FUEL SYSTEMS in BASIC DIAGNOSTIC PROCEDURES - 4-CYLINDER article.

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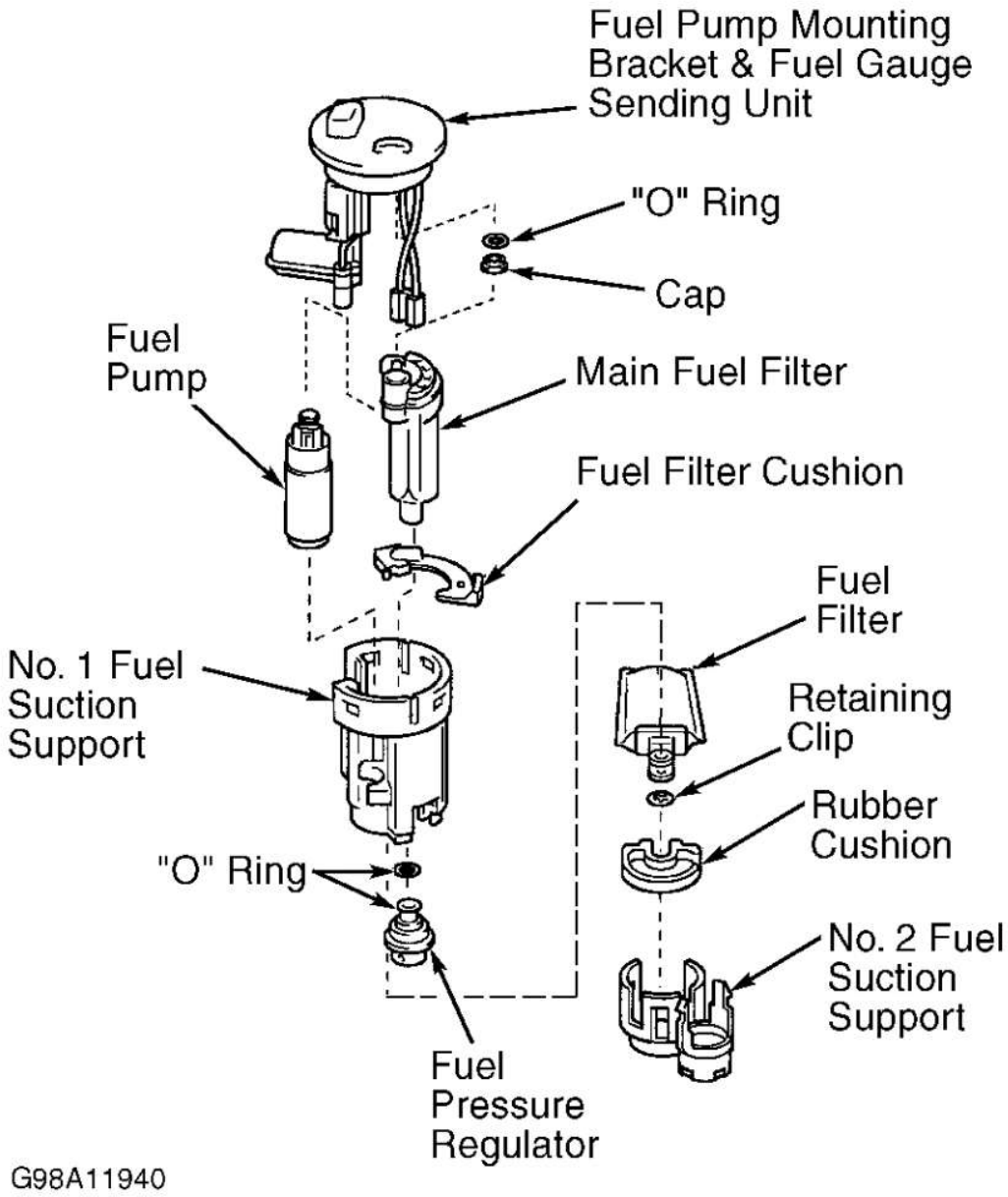


Fig. 60: Exploded View Of Fuel Pump & Components (Corolla)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal (ECHO)

1. Release fuel pressure. See **FUEL SYSTEM PRESSURE RELEASE** .
2. Remove rear seat cushion and cover plate on floor panel for access to fuel pump if not previously done.

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Disconnect electrical connector from top of fuel pump. This is electrical connector for fuel pump and fuel gauge sending unit. Electric fuel pump is located in the fuel tank. Disconnect electrical connector at vapor pressure sensor. See **Fig. 61** .

3. Ensure area around emission tube and fuel line at fuel pump is clean. Remove retaining clip from fuel line at fuel pump. See **Fig. 61** . Disconnect fuel line from fuel pump. Disconnect emission tube.
4. Remove fuel pump retaining plate-to-fuel tank bolts. Remove fuel pump retaining plate, fuel pump and gasket from fuel tank. Use care not to damage fuel filter on bottom of fuel pump and fuel gauge sending unit when removing fuel pump.

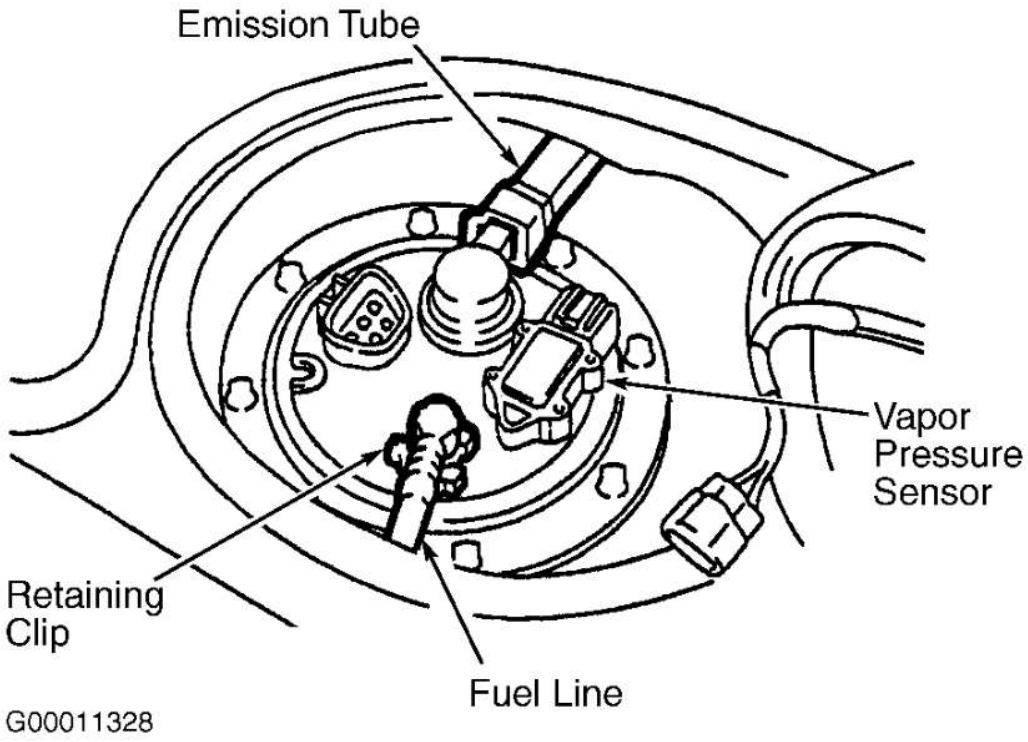


Fig. 61: Locating Emission Tube, Fuel Line, Retaining Clip & Vapor Pressure Sensor (ECHO)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Disassembly & Reassembly

1. Using screwdriver, pry No. 2 fuel suction support from bottom of fuel pump. See **Fig. 62** . Remove rubber cushion and fuel pressure regulator with "O" ring.
2. Disconnect electrical connector for fuel gauge sending unit. Using screwdriver, remove No. 1 fuel suction support from fuel filter. See **Fig. 63** . Use care not to damage No. 1 fuel suction support during removal. Remove "O" ring from No. 1 fuel suction support. Disconnect lead wire from fuel pump.
3. Remove retaining clip and vapor pressure sensor from No. 1 fuel suction support. Remove fuel pump

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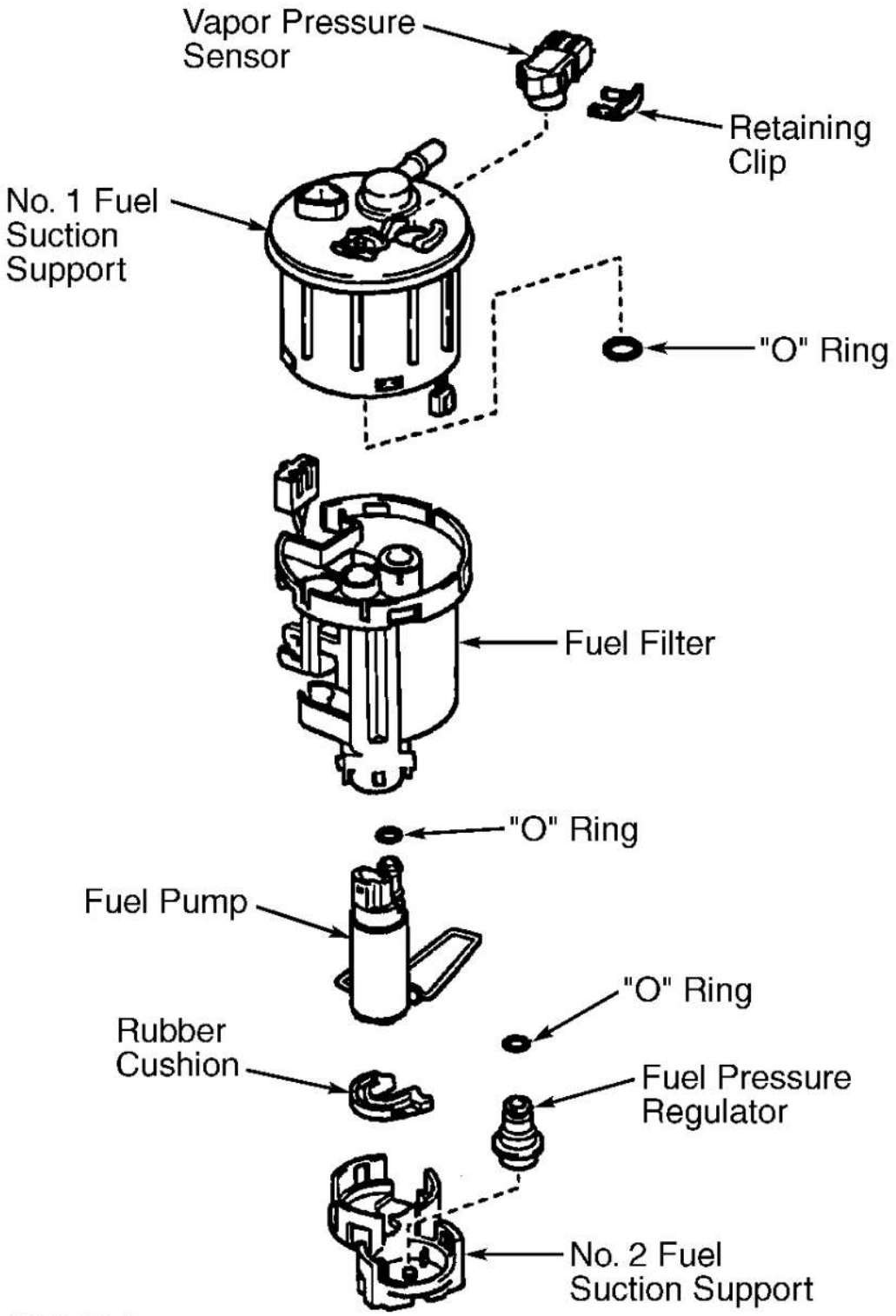
with "O" ring from fuel filter. Remove "O" ring from fuel pump.

4. To reassemble, reverse disassembly procedure using NEW "O" rings. Coat "O" rings with gasoline before installing.

Installation

1. To install, reverse removal procedure using NEW gasket. Tighten fuel pump retaining plate-to-fuel tank bolts to specification. See **TORQUE SPECIFICATIONS** . Ensure areas are clean before installing fuel line at fuel pump and retaining clip is properly installed and fuel line cannot be pulled from fuel pump assembly.
2. Operate fuel pump and check for fuel leaks. See **FUEL PUMP OPERATION** under FUEL SYSTEMS in BASIC DIAGNOSTIC PROCEDURES - 4-CYLINDER article.

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Fig. 62: Exploded View Of Fuel Pump & Components (ECHO)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

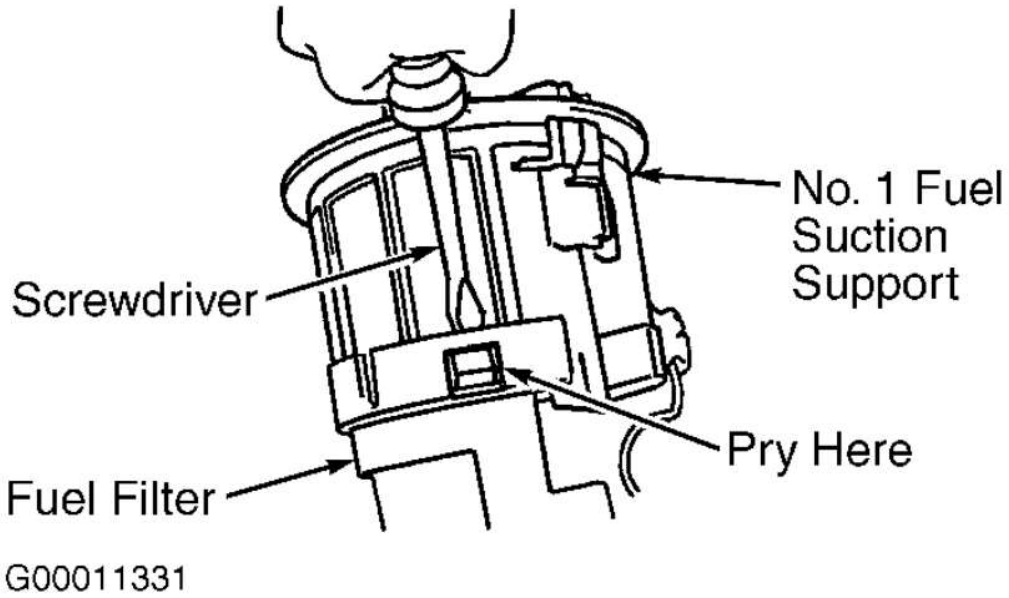


Fig. 63: Removing No. 1 Fuel Suction Support (ECHO)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal (Highlander)

1. Release fuel pressure. See **FUEL SYSTEM PRESSURE RELEASE** .
2. Remove driver's side and passenger's side rear seats and cover plate on floor panel for access to fuel pump if not previously done. Disconnect electrical connector from top of fuel pump. This is electrical connector for fuel pump and fuel gauge sending unit. Electric fuel pump is located in fuel tank.
3. Ensure area around disconnect fitting and fuel supply line on top of fuel pump is clean. Remove retaining clip from disconnect fitting on fuel supply line at top of fuel pump. See **Fig. 49** . Disconnect fuel supply line from top of fuel pump. DO NOT bend or twist fuel supply line or disconnect fitting during removal. Use care not to damage the nylon fuel supply line and disconnect fitting during removal, as there are "O" rings inside the disconnect fitting.
4. Remove fuel pump retaining plate-to-fuel tank bolts and fuel pump retaining plate. Lift fuel pump assembly upward and disconnect necessary fuel line and then remove fuel pump assembly from fuel tank. Use care not to damage fuel filter on bottom of fuel pump and fuel gauge sending unit when removing fuel pump.

Disassembly & Reassembly

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1. Using screwdriver, release snap fit areas on No. 2 fuel suction support and remove No. 2 fuel suction support from bottom of fuel pump. See **Fig. 64** . Remove rubber cushion from bottom of fuel pump.
2. Remove fuel pressure regulator with jet pump assembly and "O" ring. See **Fig. 64** . Using small screwdriver, remove retaining clip that holds fuel filter on bottom of fuel pump. Remove fuel filter from fuel pump.
3. Using screwdriver, release snap fit areas on No. 1 fuel suction support and remove No. 1 fuel suction support from fuel pump mounting bracket. See **Fig. 64** . Disconnect fuel pump electrical connector from top of fuel pump. Remove fuel pump with main fuel filter. Remove fuel pump from main fuel filter. If necessary to remove fuel gauge sending unit from fuel pump mounting bracket, disengage fuel gauge sending unit. Slide fuel gauge sending unit downward and remove from fuel pump mounting bracket.
4. To reassemble, reverse disassembly procedure using NEW retaining clip on fuel filter and NEW "O" rings. Coat "O" ring with gasoline before installing. Ensure fuel gauge sending unit is fully seated in fuel pump mounting bracket.

Installation

To install, reverse removal procedure. Ensure areas are clean before installing fuel supply line at fuel pump and retaining clip is properly installed and fuel supply line cannot be pulled from fuel pump assembly. Operate fuel pump and check for fuel leaks. See **FUEL PUMP OPERATION** under FUEL SYSTEMS in BASIC DIAGNOSTIC PROCEDURES - 4-CYLINDER article.

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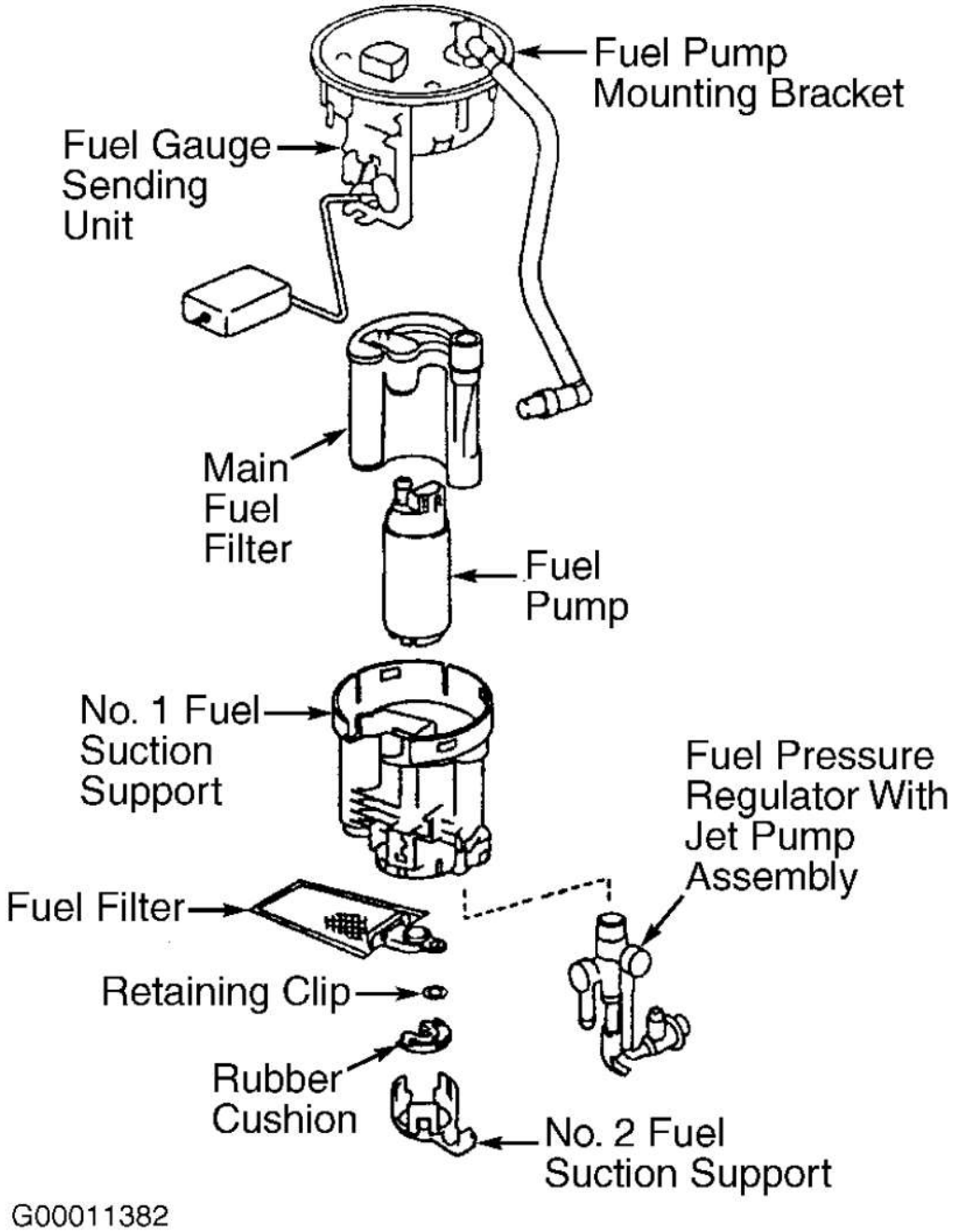


Fig. 64: Exploded View Of Fuel Pump & Components (Highlander)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal (MR2)

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1. Release fuel pressure. See **FUEL SYSTEM PRESSURE RELEASE** .
2. Apply tape to end of screwdriver to prevent scratching interior components. Using screwdriver, remove door opening scuff plates, lower trim covers and quarter trim covers. See **Fig. 4** . Remove luggage compartment lids, luggage compartment boxes and cover plate on floor panel for access to fuel pump if not previously done. Disconnect electrical connector from top of fuel pump. This is electrical connector for fuel pump and fuel gauge sending unit. Electric fuel pump is located in fuel tank.
3. Remove bolts and fuel pump protector cover located on fuel tank, above fuel pump. Disconnect electrical connector at vapor pressure sensor. See **Fig. 65** . Ensure area around emission tube and fuel line at fuel pump is clean. Remove retaining clip from fuel line at fuel pump. See **Fig. 65** . Disconnect fuel line from fuel pump. Disconnect emission tube.
4. Remove fuel pump retaining plate-to-fuel tank bolts and fuel pump retaining plate. Remove fuel pump assembly with gasket from fuel tank. Use care not to damage fuel filter on bottom of fuel pump and fuel gauge sending unit when removing fuel pump.

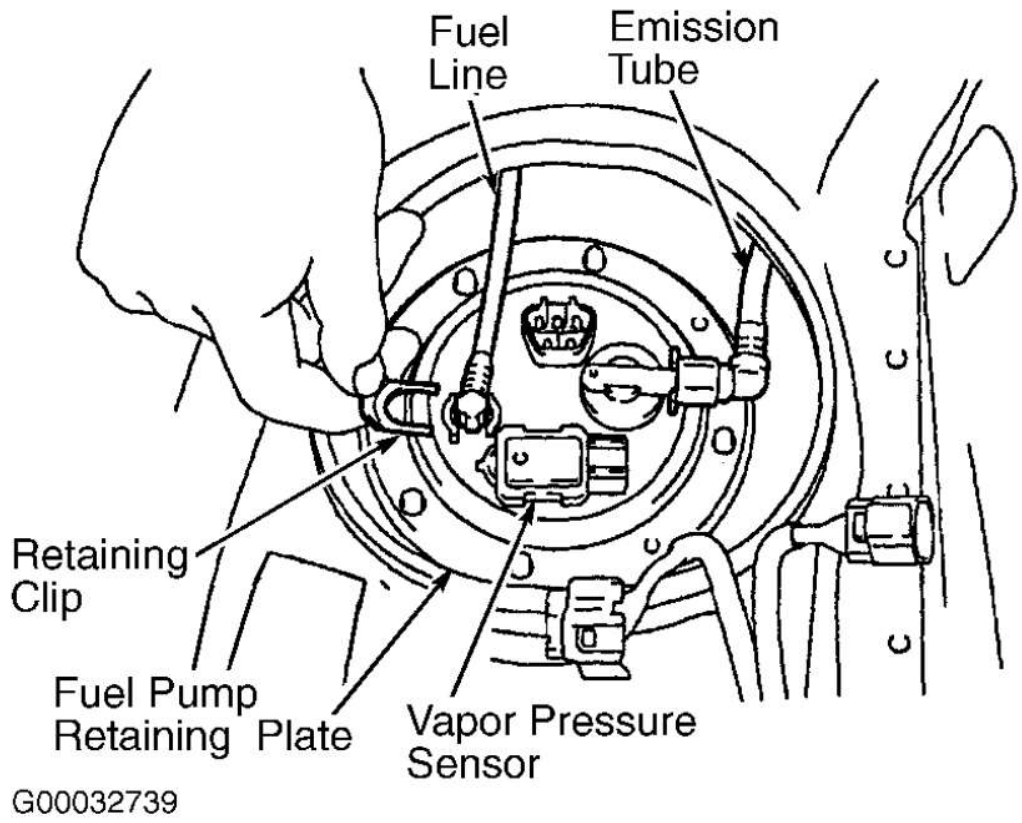


Fig. 65: Locating Vapor Pressure Sensor, Retaining Clip, Disconnect Fitting, Fuel Line & Fuel Pump Retaining Plate (MR2)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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Disassembly & Reassembly

1. Using screwdriver, pry No. 2 fuel suction support from bottom of fuel pump. See **Fig. 66** . Remove rubber cushion from bottom of fuel pump.
2. Disconnect lead wire from bottom of No. 1 fuel suction support. No. 1 fuel suction support may also be referred to as fuel suction plate. Using screwdriver, release snap fit areas on No. 1 fuel suction support and remove No. 1 fuel suction support from main fuel filter. See **Fig. 67** . Use care not to damage No. 1 fuel suction support and main fuel filter. Main fuel filter may also be referred to as fuel filter assembly.
3. Disconnect electrical connector for fuel pump from bottom of No. 1 fuel suction support. Remove fuel pump from main fuel filter. See **Fig. 66** . Using small screwdriver, remove retaining clip that holds fuel filter on bottom of fuel pump. Remove fuel filter from fuel pump. Remove fuel pressure regulator with "O" ring from top of main fuel filter. See **Fig. 66** . Remove "O" ring from fuel pressure regulator.
4. To reassemble, reverse disassembly procedure using NEW retaining clip on fuel filter and NEW "O" ring. Coat "O" ring with gasoline before installing fuel pressure regulator.

Installation

1. To install, reverse removal procedure using NEW gasket. Ensure fuel pump assembly is positioned so reference mark aligns with specified bolt hole and emission tube fitting is pointing toward front of vehicle. See **Fig. 68** .
2. Tighten fuel pump retaining plate-to-fuel tank bolts and fuel pump protector cover bolts to specification. See **TORQUE SPECIFICATIONS** . Ensure areas are clean before installing fuel line at fuel pump and retaining clip is properly installed and fuel line cannot be pulled from fuel pump assembly. Operate fuel pump and check for fuel leaks. See **FUEL PUMP OPERATION** under FUEL SYSTEMS in BASIC DIAGNOSTIC PROCEDURES - 4-CYLINDER article. Reinstall luggage compartment components.

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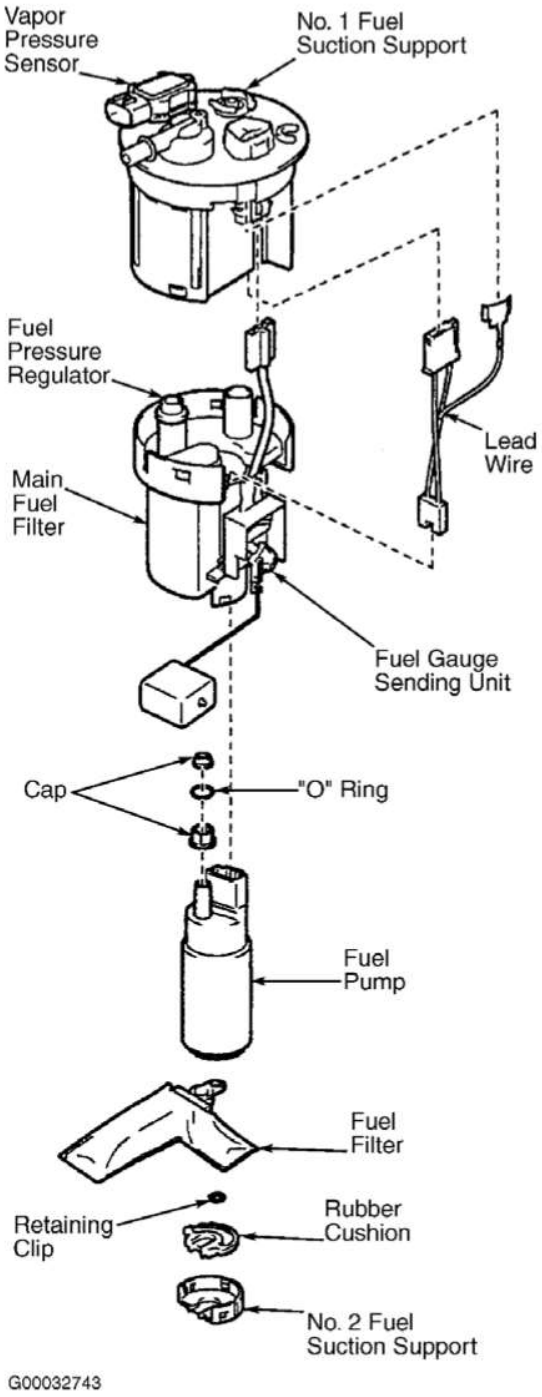


Fig. 66: Exploded View Of Fuel Pump & Components (MR2)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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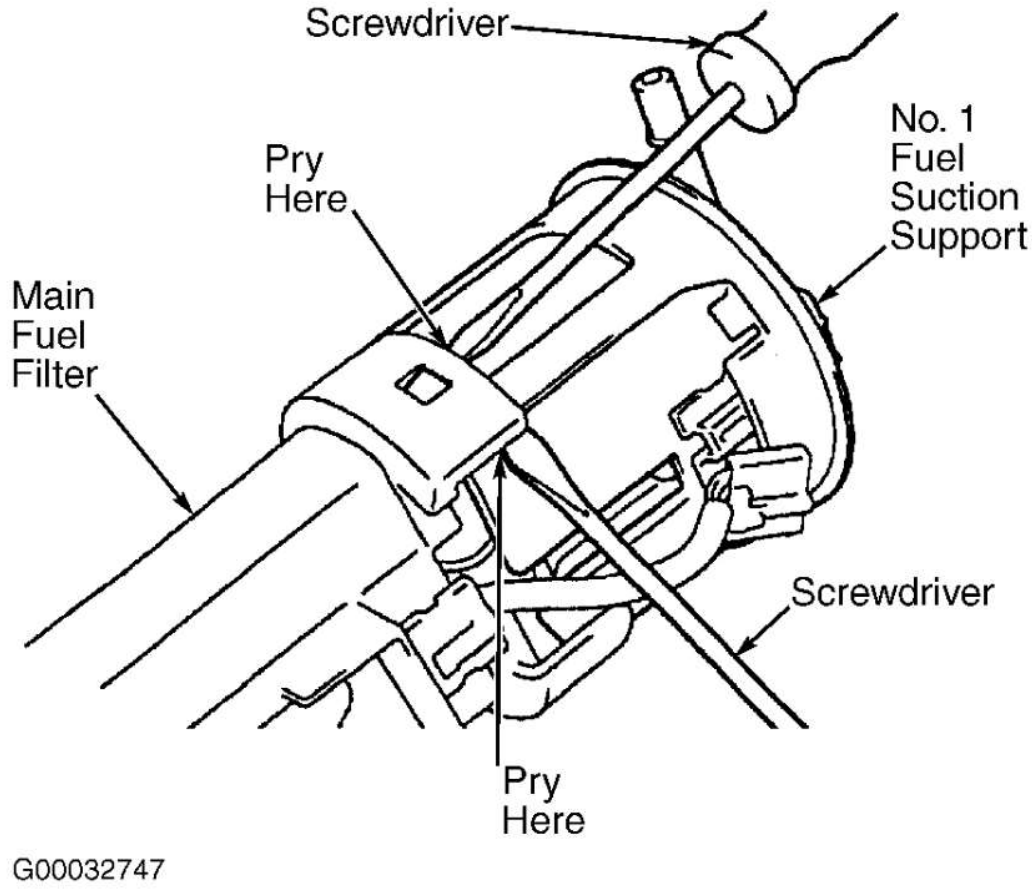


Fig. 67: Removing No. 1 Fuel Suction Support (MR2)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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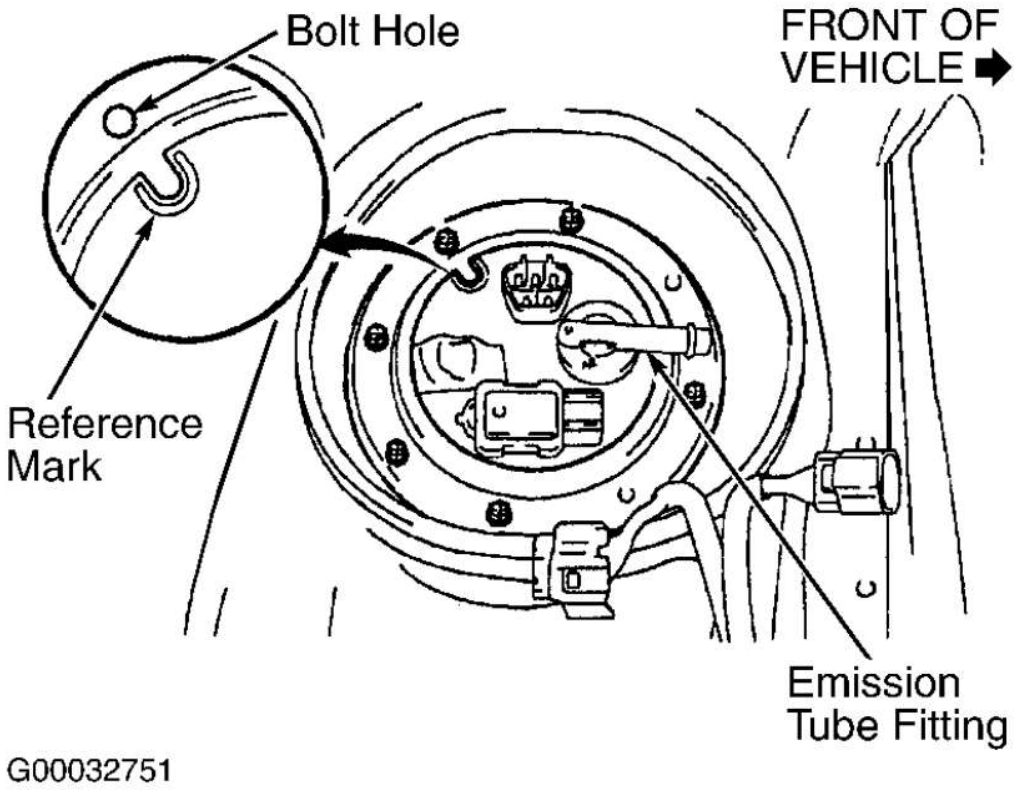


Fig. 68: Installing Fuel Pump Assembly (MR2)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal (Prius)

WARNING: Read service precautions before proceeding with service procedure. See SERVICE PRECAUTIONS .

1. It may be necessary to replace fuel pump and fuel tank as an assembly. Consult local parts department for parts availability. To remove fuel tank, release fuel pressure. See **FUEL SYSTEM PRESSURE RELEASE** .
2. Remove rear seat cushion and cover plate on floor panel for access to fuel pump if not previously done. Disconnect electrical connector from top of fuel pump. This is electrical connector for fuel pump and fuel gauge sending unit. Electric fuel pump is located in the fuel tank.
3. Raise and support vehicle. Remove exhaust pipe assembly and tailpipe for access to fuel tank. Drain gasoline from fuel tank into approved container. Disconnect fuel filler tube and any remaining hoses for fuel tank removal. Support fuel tank with transmission jack. Remove fuel tank retaining bolts and fuel tank.

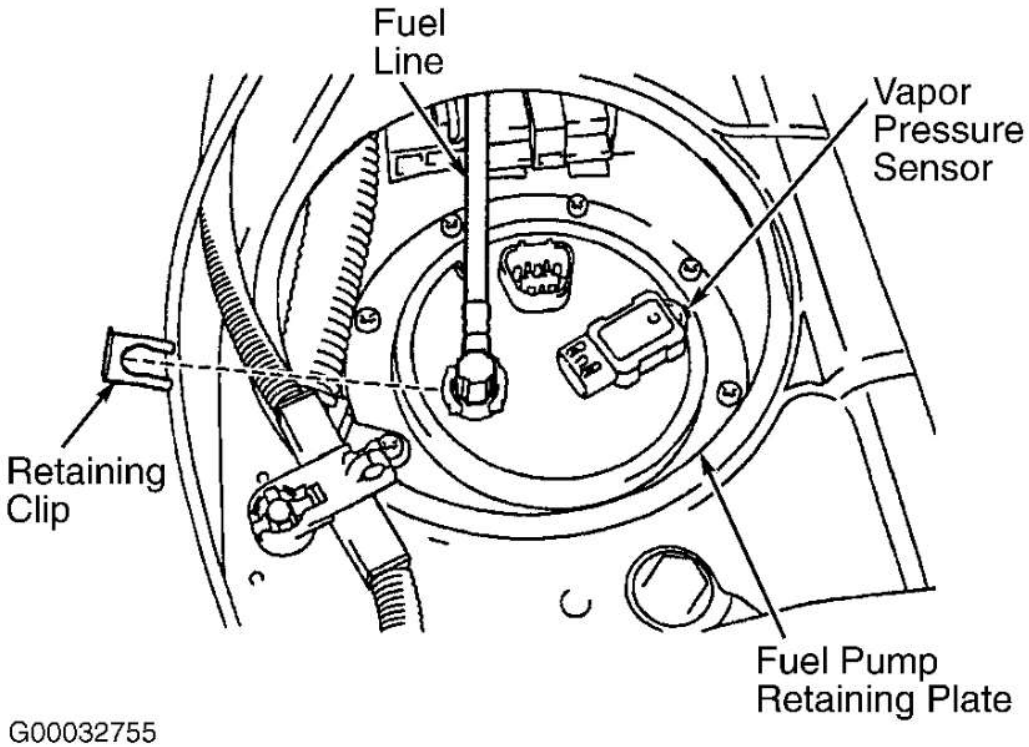
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Installation

To install, reverse removal procedure using NEW gasket on exhaust pipe at exhaust manifold. Tighten fuel tank retaining bolts and exhaust pipe-to-exhaust manifold bolts to specification. See **TORQUE SPECIFICATIONS** . Operate fuel pump and check for fuel leaks. See **FUEL PUMP OPERATION** under FUEL SYSTEMS in BASIC DIAGNOSTIC PROCEDURES - 4-CYLINDER article.

Removal (RAV4)

1. Release fuel pressure. See **FUEL SYSTEM PRESSURE RELEASE** . Remove driver's side rear seat and cover plate on floor panel for access to electrical connector for fuel pump if not previously done.
2. Disconnect electrical connector from top of fuel pump. This is electrical connector for fuel pump and fuel gauge sending unit. Electric fuel pump is located in fuel tank. Disconnect electrical connector at vapor pressure sensor. See **Fig. 69** .
3. Ensure area around fuel line at fuel pump is clean. Remove retaining clip from fuel line at fuel pump. See **Fig. 69** . Disconnect fuel line from fuel pump. Remove fuel pump retaining plate-to-fuel tank bolts and fuel pump retaining plate.
4. Lift fuel pump assembly upward and disconnect fuel line from fuel pressure regulator and then remove fuel pump assembly with gasket from fuel tank. Use care not to damage fuel filter on bottom of fuel pump and fuel gauge sending unit when removing fuel pump.



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Fig. 69: Locating Retaining Clip, Fuel Line, Fuel Pump Retaining Plate & Vapor Pressure Sensor (RAV4)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Disassembly & Reassembly

1. Using screwdriver, pry No. 2 fuel suction support from bottom of fuel pump. See **Fig. 70** . Remove rubber cushion from bottom of fuel pump.
2. Disconnect lead wire from bottom of No. 1 fuel suction support. No. 1 fuel suction support may also be referred to as fuel suction plate. Using screwdriver, release snap fit areas on No. 1 fuel suction support and remove No. 1 fuel suction support from main fuel filter. See **Fig. 71** . Use care not to damage No. 1 fuel suction support and main fuel filter. Main fuel filter may also be referred to as fuel filter assembly.
3. Disconnect electrical connector for fuel pump from bottom of No. 1 fuel suction support. Remove fuel pump from main fuel filter. See **Fig. 70** . Using small screwdriver, remove retaining clip that holds fuel filter on bottom of fuel pump. Remove fuel filter from fuel pump. Remove fuel pressure regulator with "O" ring from top of main fuel filter. See **Fig. 70** . Remove "O" ring from fuel pressure regulator.
4. To reassemble, reverse disassembly procedure using NEW retaining clip on fuel filter and NEW "O" ring. Coat "O" ring with gasoline before installing fuel pressure regulator.

Installation

1. To install, reverse removal procedure using NEW gasket. Ensure fuel pump assembly is positioned so reference mark aligns with specified bolt hole and fuel pump is properly positioned in fuel tank. See **Fig. 72** .
2. Tighten fuel pump retaining plate-to-fuel tank bolts to specification. See **TORQUE SPECIFICATIONS** . Ensure areas are clean before installing fuel line at fuel pump and retaining clip is properly installed and fuel line cannot be pulled from fuel pump assembly. Operate fuel pump and check for fuel leaks. See **FUEL PUMP OPERATION** under FUEL SYSTEMS in BASIC DIAGNOSTIC PROCEDURES - 4-CYLINDER article.

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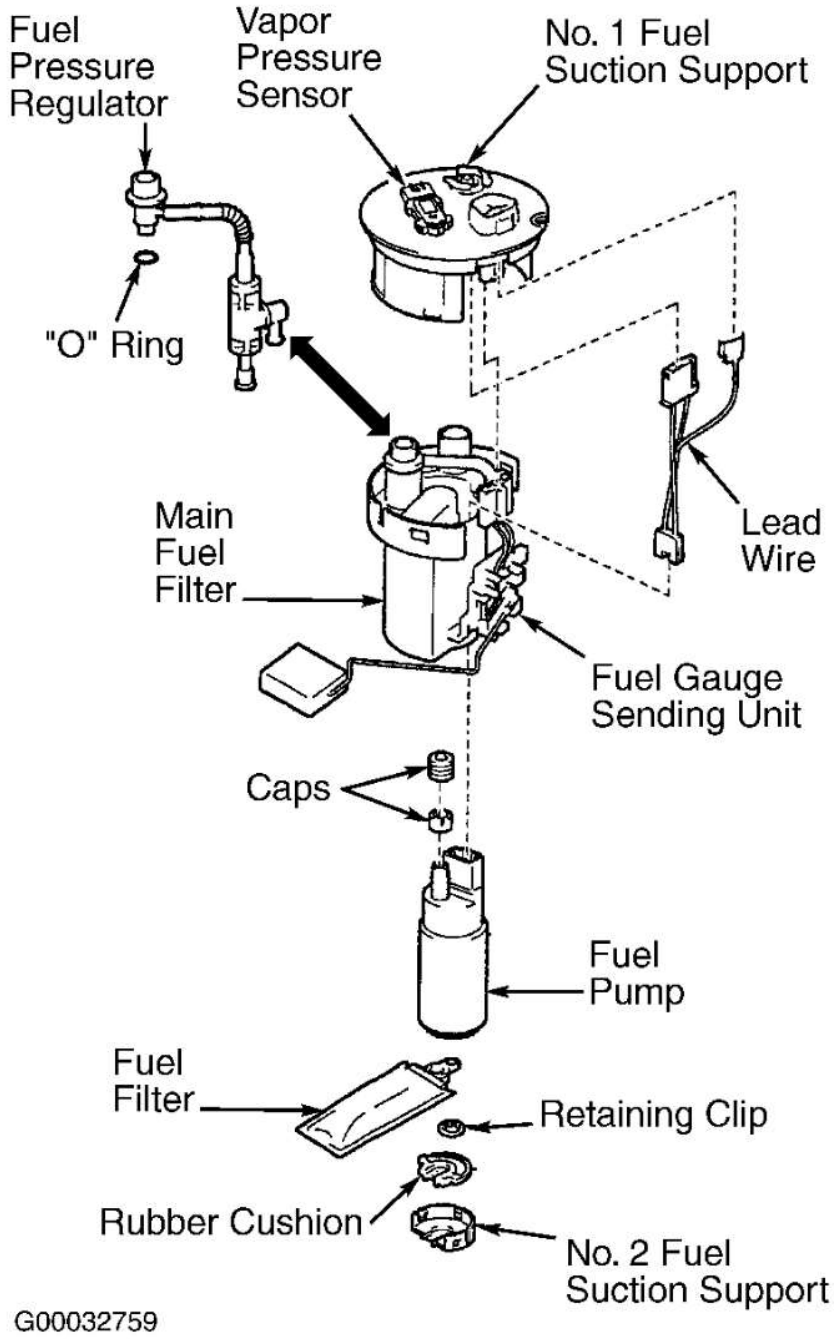


Fig. 70: Exploded View Of Fuel Pump & Components (RAV4)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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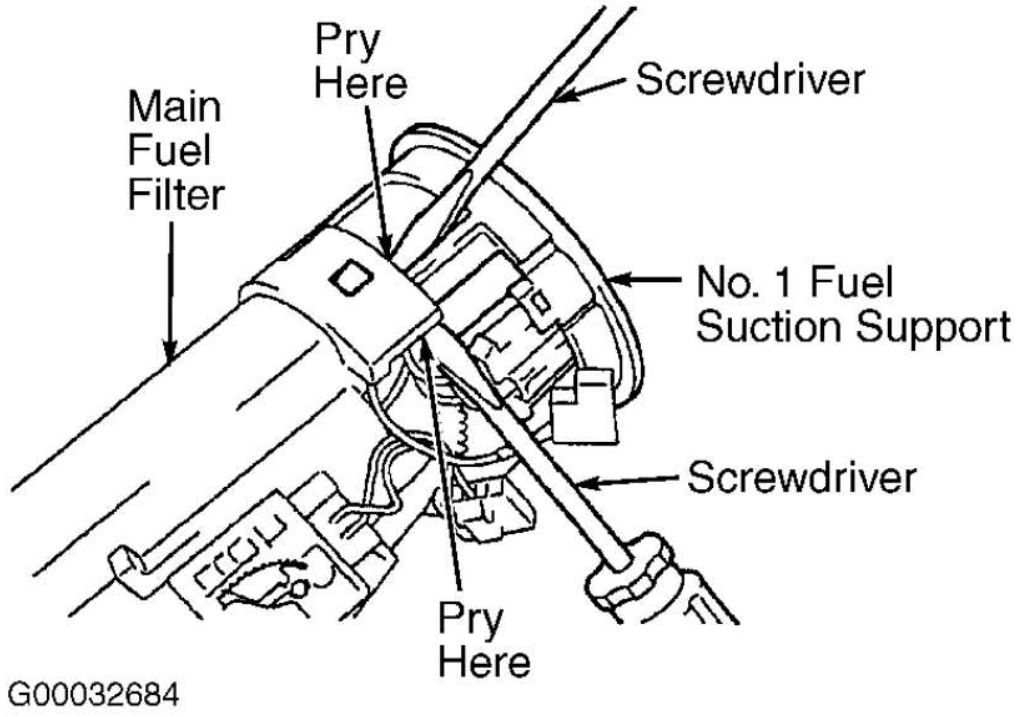


Fig. 71: Removing No. 1 Fuel Suction Support (RAV4)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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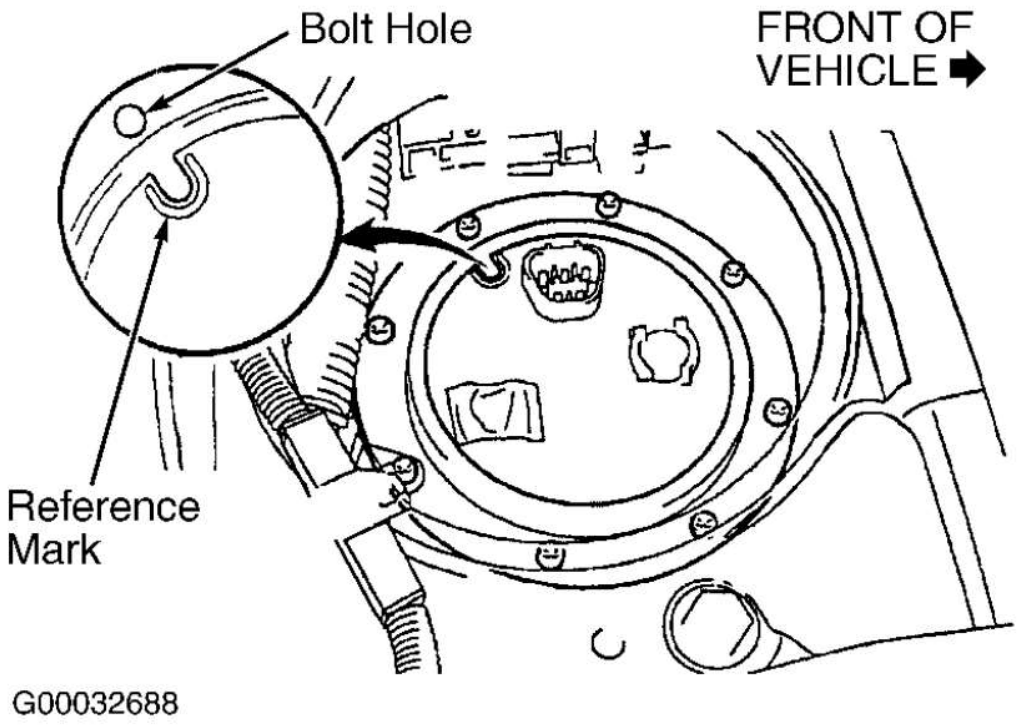


Fig. 72: Installing Fuel Pump Assembly (RAV4)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal (Tacoma)

1. Release fuel pressure. See **FUEL SYSTEM PRESSURE RELEASE** .
2. Electric fuel pump is located in fuel tank. Fuel tank must be removed for servicing of fuel pump. Raise and support vehicle. Remove necessary covers for access to fuel tank. Drain gasoline from fuel tank into approved container.
3. Disconnect fuel filler tube and any remaining hoses for fuel tank removal. Support fuel tank with transmission jack. Remove fuel tank straps. Slightly lower fuel tank for access to fuel supply and fuel return lines at the fuel pump.
4. Disconnect electrical connector from top of fuel pump. This is electrical connector for fuel pump and fuel gauge sending unit. Disconnect electrical connector from vapor pressure sensor. See **Fig. 73** .
5. Ensure area around fuel supply and fuel return lines on top of fuel pump is clean. Disconnect fuel supply and fuel return lines from top of fuel pump. Remove fuel tank. Remove fuel pump mounting bracket-to-fuel tank bolts. Remove fuel pump assembly and gasket from fuel tank. Use care not to damage fuel filter on bottom of fuel pump and fuel gauge sending unit when removing fuel pump.

Disassembly & Reassembly

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1. Disconnect electrical connector on lead wire from the fuel pump. See **Fig. 73** . Pull bottom of fuel pump from fuel pump mounting bracket.
2. Disconnect fuel hose at top of fuel pump. Remove fuel pump with rubber cushion from fuel pump mounting bracket. Remove rubber cushion from bottom of fuel pump. Using small screwdriver, remove retaining clip that holds fuel filter on bottom of fuel pump. Remove fuel filter from fuel pump. To reassemble, reverse disassembly procedure using NEW retaining clip on fuel filter.

Installation

1. To install, reverse removal procedure using NEW gasket. Tighten fuel pump mounting bracket-to-fuel tank bolts to specification. See **TORQUE SPECIFICATIONS** .
2. Operate fuel pump and check for fuel leaks before installing fuel tank. See **FUEL PUMP OPERATION** under FUEL SYSTEMS in BASIC DIAGNOSTIC PROCEDURES - 4-CYLINDER article. Before installing fuel tank, ensure insulator cushions are installed in proper areas on top of fuel tank. See **Fig. 74** .

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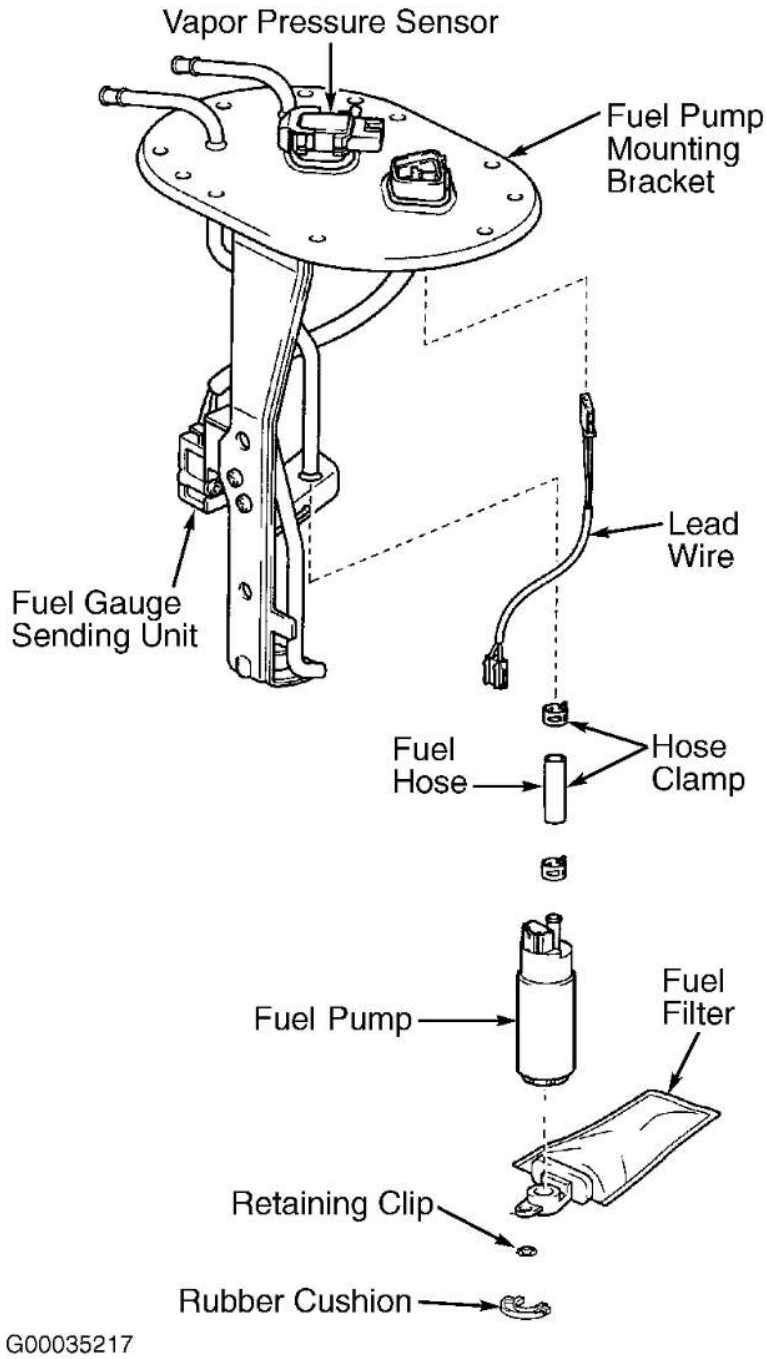


Fig. 73: Exploded View Of Fuel Pump & Components (Tacoma)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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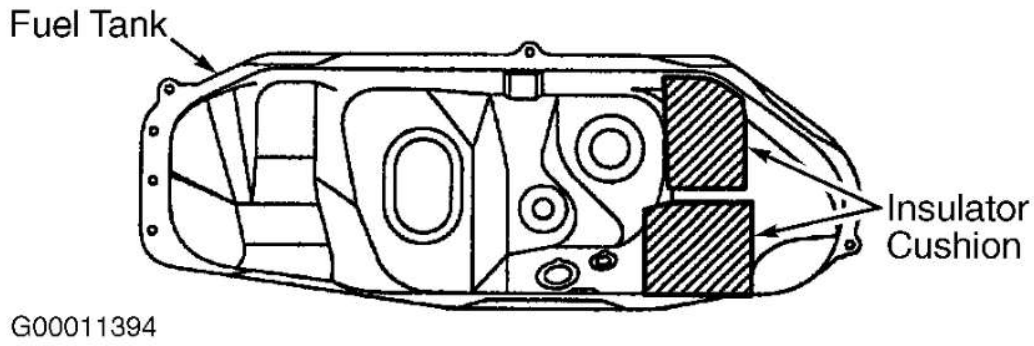


Fig. 74: Locating Insulator Cushions On Fuel Tank (Tacoma)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

FUEL PRESSURE REGULATOR

Removal & Installation (Camry)

1. Fuel pressure regulator is located on fuel pump assembly in the fuel tank. See **Fig. 50** . Remove fuel pump from fuel tank. See **FUEL PUMP** .
2. Using screwdriver, release snap fit areas on No. 2 fuel suction support and remove No. 2 fuel suction support from bottom of fuel pump. See **Fig. 50** . Remove rubber cushion from bottom of fuel pump.
3. Remove fuel pressure regulator with "O" ring. See **Fig. 50** . Remove "O" ring from fuel pressure regulator.
4. To install, reverse removal procedure using NEW "O" ring. Coat "O" ring with gasoline before installing fuel pressure regulator. Reinstall fuel pump.

Removal (Camry Solara)

1. Fuel pressure regulator is located on fuel pump assembly in the fuel tank. See **Fig. 75** . Remove fuel pump from fuel tank. See **FUEL PUMP** .
2. Remove round fuel filter retaining screw and round fuel filter with "O" ring from fuel pressure regulator. See **Fig. 75** .
3. Remove fuel pressure regulator retaining screw. Remove fuel pressure regulator with "O" ring from fuel pump mounting bracket. Remove "O" ring from fuel pressure regulator.

Installation

To install, reverse removal procedure using NEW "O" rings. Coat "O" ring with gasoline before installing fuel pressure regulator and round fuel filter. Tighten fuel pressure regulator retaining screw and round fuel filter retaining screw to specification. See **TORQUE SPECIFICATIONS** . Reinstall fuel pump.

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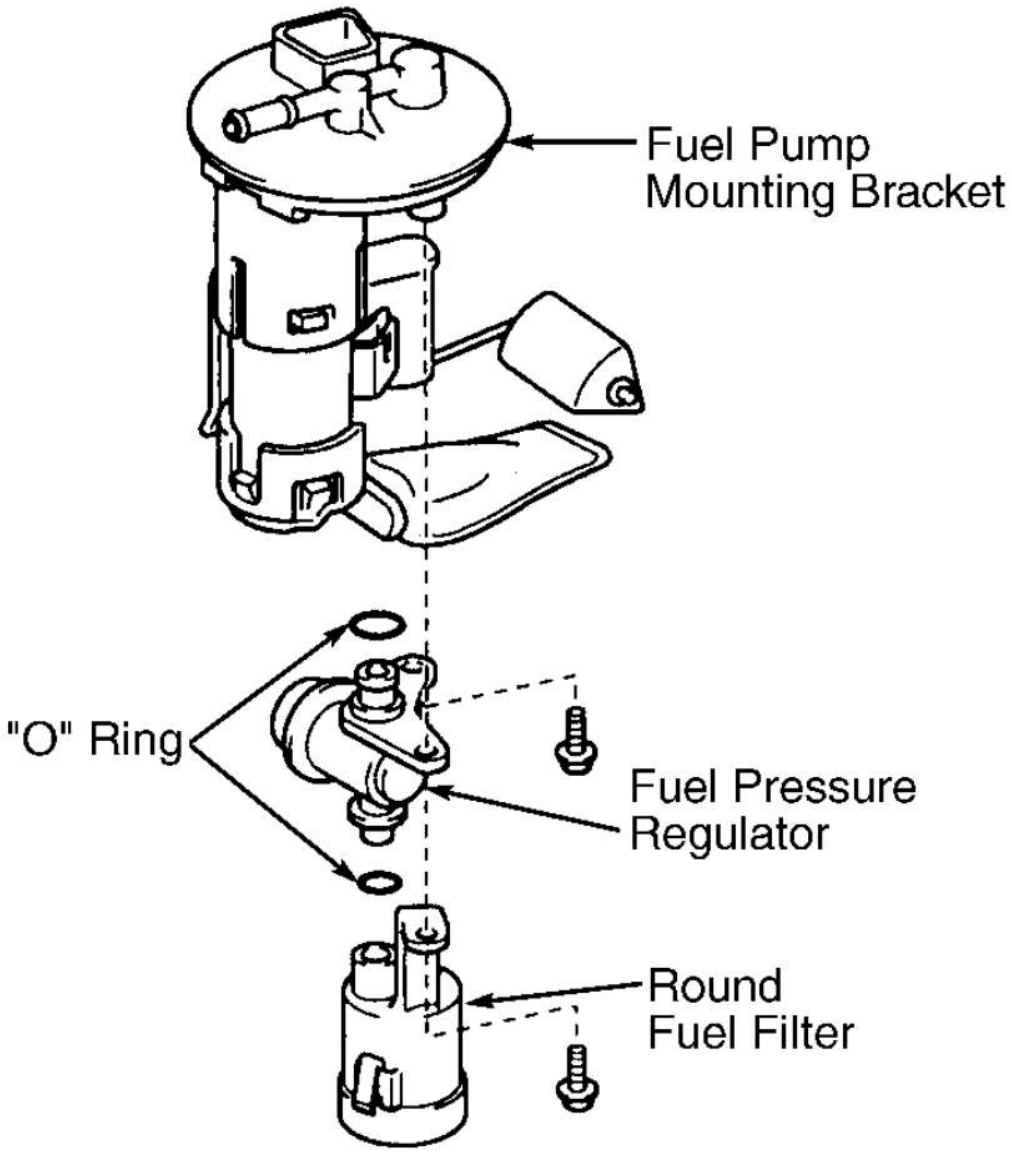


Fig. 75: Locating Fuel Pressure Regulator (Camry Solara)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal & Installation (Celica)

1. Fuel pressure regulator is located on fuel pump assembly in the fuel tank. See **Fig. 55** . Remove fuel pump from fuel tank. See **FUEL PUMP** .

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2. Using screwdriver, remove No. 1 fuel suction support from main fuel filter. See **Fig. 57** . Use care not to damage No. 1 fuel suction support during removal. Disconnect lead wire from fuel pump and No. 1 fuel suction support. Remove fuel pressure regulator with "O" ring from main fuel filter.
3. To install, reverse removal procedure using NEW "O" ring on fuel pressure regulator. Coat "O" ring with gasoline before installing fuel pressure regulator. Reinstall fuel pump.

Removal & Installation (Corolla & ECHO)

1. Fuel pressure regulator is located on fuel pump assembly in the fuel tank. See **Fig. 60** and **Fig. 62** . Remove fuel pump from fuel tank. See **FUEL PUMP** .
2. Using screwdriver, pry No. 2 fuel suction support from bottom of fuel pump. See **Fig. 60** and **Fig. 62** . Remove rubber cushion. Remove fuel pressure regulator with "O" ring.
3. To install, reverse removal procedure using NEW "O" ring on fuel pressure regulator. Coat "O" ring with gasoline before installing fuel pressure regulator. Reinstall fuel pump.

Removal & Installation (Highlander)

1. Fuel pressure regulator contains the jet pump assembly and is located on fuel pump assembly in the fuel tank. See **Fig. 64** . Remove fuel pump from fuel tank. See **FUEL PUMP** .
2. Using screwdriver, release snap fit areas on No. 2 fuel suction support and remove No. 2 fuel suction support from bottom of fuel pump. See **Fig. 64** . Remove rubber cushion from bottom of fuel pump. Remove fuel pressure regulator with jet pump assembly and "O" ring. Remove "O" ring from fuel pressure regulator with jet pump assembly.
3. To install, reverse removal procedure using NEW "O" ring on fuel pressure regulator with jet pump assembly. Coat "O" ring with gasoline before installing fuel pressure regulator with jet pump assembly. Reinstall fuel pump.

Removal & Installation (MR2)

1. Fuel pressure regulator is located on fuel pump assembly in the fuel tank. See **Fig. 66** . Remove fuel pump from fuel tank. See **FUEL PUMP** .
2. Disconnect lead wire from bottom of No. 1 fuel suction support. Using screwdriver, release snap fit areas on No. 1 fuel suction support and remove No. 1 fuel suction support from main fuel filter. See **Fig. 67** . Use care not to damage No. 1 fuel suction support and main fuel filter.
3. Disconnect electrical connector for fuel pump from bottom of No. 1 fuel suction support. Remove fuel pressure regulator with "O" ring from top of main fuel filter. See **Fig. 66** . Remove "O" ring from fuel pressure regulator.
4. To install, reverse removal procedure using NEW "O" ring on fuel pressure regulator. Coat "O" ring with gasoline before installing fuel pressure regulator. Reinstall fuel pump.

Removal & Installation (Prius)

WARNING: Read service precautions before proceeding with service procedure. See SERVICE PRECAUTIONS .

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Fuel pressure regulator is located on fuel pump assembly in the fuel tank. Manufacturer does not provide information for servicing of fuel pressure regulator. It may be necessary to replace fuel pressure regulator along with fuel pump and fuel tank as an assembly. Consult local parts department for parts availability. For servicing of fuel pump and fuel tank as an assembly, see **FUEL PUMP** .

Removal & Installation (RAV4)

1. Fuel pressure regulator is located on fuel pump assembly in the fuel tank. See **Fig. 70** . Remove fuel pump from fuel tank. See **FUEL PUMP** .
2. Disconnect lead wire from bottom of No. 1 fuel suction support. Using screwdriver, release snap fit areas on No. 1 fuel suction support and remove No. 1 fuel suction support from main fuel filter. See **Fig. 71** . Use care not to damage No. 1 fuel suction support and main fuel filter.
3. Disconnect electrical connector for fuel pump from bottom of No. 1 fuel suction support. Disconnect tube on fuel pressure regulator from clamp. Remove fuel pressure regulator with "O" ring from top of main fuel filter. See **Fig. 70** . Remove "O" ring from fuel pressure regulator.
4. To install, reverse removal procedure using NEW "O" ring on fuel pressure regulator. Coat "O" ring with gasoline before installing fuel pressure regulator. Reinstall fuel pump.

Removal (Tacoma)

1. Release fuel pressure. See **FUEL SYSTEM PRESSURE RELEASE** . Disconnect air hose and fuel return hose from fuel pressure regulator. Fuel pressure regulator is located on end of fuel rail at front of engine.
2. Remove bolts and fuel pressure regulator with "O" ring from fuel rail. Remove "O" ring from fuel pressure regulator.

Installation

1. To install, reverse removal procedure using NEW "O" ring. Coat "O" ring with gasoline before installing fuel pressure regulator in fuel rail.
2. Tighten fuel pressure regulator bolts to specification. See **TORQUE SPECIFICATIONS** . Operate fuel pump and check for fuel leaks. See **FUEL PUMP OPERATION** under FUEL SYSTEMS in BASIC DIAGNOSTIC PROCEDURES - 4-CYLINDER article.

FUEL RAILS & FUEL INJECTORS

Removal (Camry)

1. Release fuel pressure. See **FUEL SYSTEM PRESSURE RELEASE** . Remove upper cap on air cleaner assembly with air cleaner hose. Remove No. 2 cylinder head cover located on top of engine, above ignition coils and valve cover. See **Fig. 76** .
2. Remove fuel pipe clamp from end of fuel pipe at fuel pipe fitting. See **Fig. 77** . Fuel pipe goes from end of fuel rail to fuel pipe fitting. Ensure area around fuel pipe and disconnect fitting is clean.

CAUTION: Use care when disconnecting fuel pipe, as some residual fuel

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pressure may still exist in the fuel system.

3. Depress both tabs and pull fuel pipe with disconnect fitting from fuel pipe fitting. See **Fig. 77** . Remove ventilation hose No. 2. See **Fig. 76** . Remove engine wiring harness for access to fuel rail and fuel injectors. Note location of electrical connectors on fuel injectors for installation reference. Disconnect electrical connectors at fuel injectors.

CAUTION: When removing fuel rail, use care not to allow fuel injectors to fall from fuel rail.

4. Remove fuel rail-to-cylinder head bolts. Remove fuel rail with fuel injectors as an assembly. Remove the 2 spacers from cylinder head. Remove fuel injectors from fuel rail. Remove "O" ring and grommet from fuel injector. Grommet may also be referred to as an insulator.

Installation

1. To install, reverse removal procedure using NEW grommets and "O" rings. Coat "O" ring with gasoline before installing "O" ring on fuel injector.
2. Coat fuel rail "O" ring contact area with gasoline before installing fuel injector on fuel rail. Use twisting motion when installing fuel injector on fuel rail. Ensure electrical connector on each fuel injector is facing downward, toward intake manifold and the 2 spacers are installed on cylinder head before installing fuel rail.
3. Install fuel rail with fuel injectors on cylinder head with fuel rail-to-cylinder head bolts loosely installed. Ensure fuel injectors rotate smoothly. If fuel injectors do not rotate smoothly, check for improper "O" ring installation and replace "O" ring on fuel injector.
4. Ensure electrical connector on each fuel injector is facing downward, toward intake manifold. Tighten fuel rail-to-cylinder head bolts to specification. See **TORQUE SPECIFICATIONS** . To install remaining components, reverse removal procedure. Install fuel pipe on fuel pipe fitting. Pull on fuel pipe to ensure fuel pipe is properly locked on fuel pipe fitting. Reinstall fuel pipe clamp. Operate fuel pump and check for fuel leaks. See **FUEL PUMP OPERATION** under FUEL SYSTEMS in BASIC DIAGNOSTIC PROCEDURES - 4-CYLINDER article.

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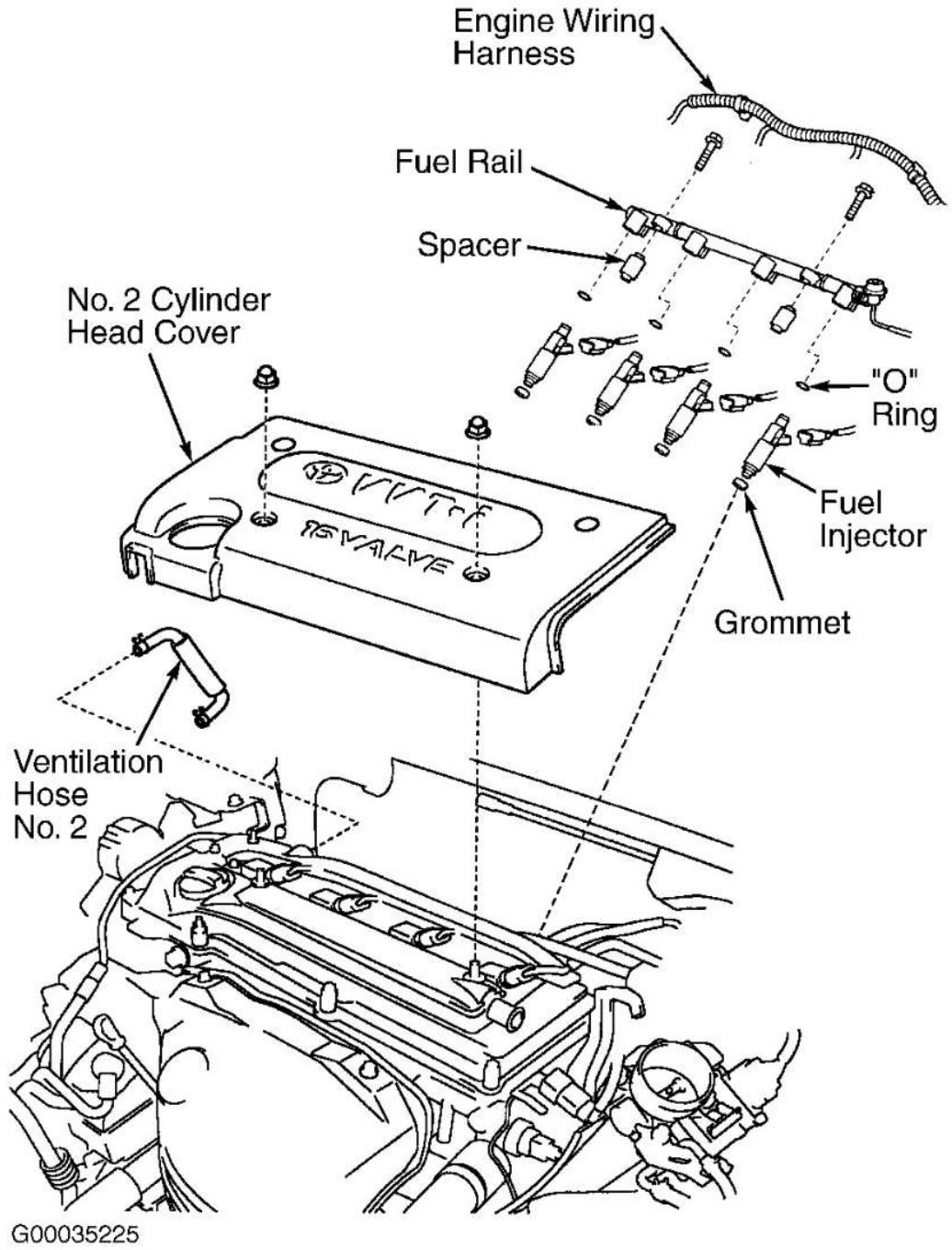
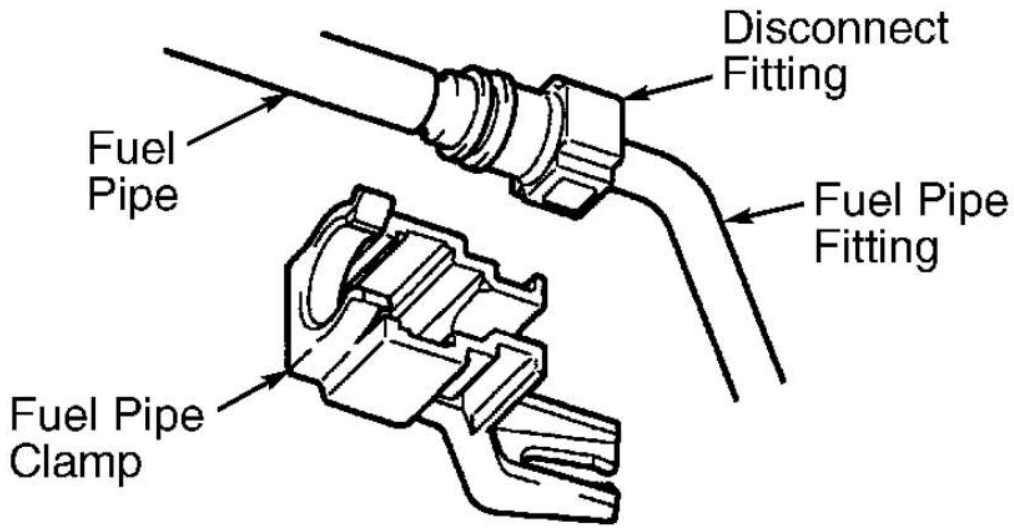
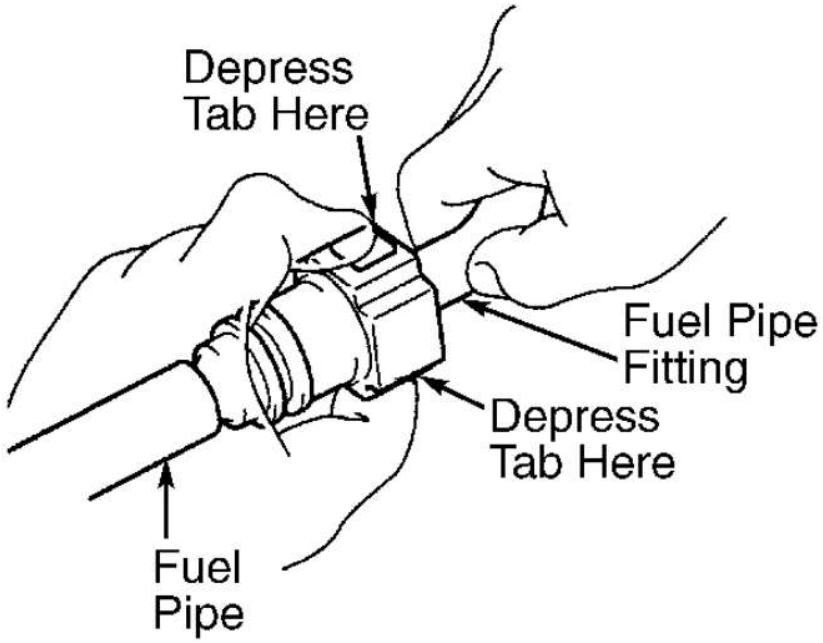


Fig. 76: Exploded View Of Fuel Rail & Components (Camry & Camry Solara)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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STEP 1



STEP 2

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Fig. 77: Locating Fuel Pipe Clamp & Disconnecting Fuel Pipe From Fuel Pipe Fitting (Camry)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal (Camry Solara)

1. Release fuel pressure. See **FUEL SYSTEM PRESSURE RELEASE** . Remove No. 2 cylinder head cover located on top of engine, above ignition coils and valve cover. See **Fig. 76** .
2. Remove ventilation hose No. 2. See **Fig. 76** . Ventilation hose No. 2 may also be referred to as PCV hose. Remove engine wiring harness for access to fuel rail and fuel injectors. Note location of electrical connectors on fuel injectors for installation reference. Disconnect electrical connectors at fuel injectors.

CAUTION: When removing fuel rail, use care not to allow fuel injectors to fall from fuel rail.

3. Remove fuel rail-to-cylinder head bolts. Remove fuel rail with fuel injectors as an assembly. Remove the 2 spacers from cylinder head. Remove fuel injectors from fuel rail. Remove "O" ring and grommet from fuel injector.

Installation

1. To install, reverse removal procedure using NEW grommets and "O" rings. Coat "O" ring with gasoline before installing "O" ring on fuel injector.
2. Coat fuel rail "O" ring contact area with gasoline before installing fuel injector on fuel rail. Use twisting motion when installing fuel injector on fuel rail. Ensure electrical connector on each fuel injector is facing downward, toward intake manifold and the 2 spacers are installed on cylinder head before installing fuel rail. Coat grommet contact surfaces with gasoline before installing fuel rail with fuel injectors.
3. Install fuel rail with fuel injectors on cylinder head with fuel rail-to-cylinder head bolts loosely installed. Ensure fuel injectors rotate smoothly. If fuel injectors do not rotate smoothly, check for improper "O" ring installation and replace "O" ring on fuel injector.
4. Ensure electrical connector on each fuel injector is facing downward, toward intake manifold. Tighten fuel rail-to-cylinder head bolts to specification. See **TORQUE SPECIFICATIONS** . To install remaining components, reverse removal procedure. Operate fuel pump and check for fuel leaks. See **FUEL PUMP OPERATION** under FUEL SYSTEMS in BASIC DIAGNOSTIC PROCEDURES - 4-CYLINDER article.

Removal (Celica & Corolla)

1. Release fuel pressure. See **FUEL SYSTEM PRESSURE RELEASE** . Remove No. 2 cylinder head cover located on top of engine, above ignition coils and valve cover. See **Fig. 78** and **Fig. 79** .
2. Remove fuel pipe clamp from end of fuel pipe at end of fuel rail. Perform STEP 1 in illustration. See **Fig. 80** and **Fig. 81** . Ensure area around fuel pipe and disconnect fitting is clean.

CAUTION: Use care when disconnecting fuel pipe, as some residual fuel pressure may still exist in the fuel system.

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3. Depress both sides of retainer and pull fuel pipe with disconnect fitting from fuel pipe fitting. Perform STEP 2 in illustration. See **Fig. 80** and **Fig. 81** . Note location of electrical connectors on fuel injectors for installation reference. Disconnect electrical connectors at fuel injectors.

CAUTION: When removing fuel rail, use care not to allow fuel injectors to fall from fuel rail.

4. Remove bolt from fuel pipe clamp at the cylinder head. See **Fig. 78** and **Fig. 79** . Remove fuel rail-to-cylinder head bolts. Remove fuel rail with fuel injectors as an assembly. Remove the 2 spacers from cylinder head. Remove fuel injectors from fuel rail. Remove "O" ring and grommet from fuel injector.

Installation

1. To install, reverse removal procedure using NEW grommets and "O" rings. Coat "O" ring with gasoline before installing "O" ring on fuel injector.
2. Coat fuel rail "O" ring contact area with gasoline before installing fuel injector on fuel rail. Use twisting motion when installing fuel injector on fuel rail. Ensure electrical connector on each fuel injector is facing toward valve cover and the 2 spacers are installed on cylinder head before installing fuel rail. Coat grommet contact surfaces with gasoline before installing fuel rail with fuel injectors.
3. Install fuel rail with fuel injectors on cylinder head with fuel rail-to-cylinder head bolts loosely installed. Ensure fuel injectors rotate smoothly. If fuel injectors do not rotate smoothly, check for improper "O" ring installation and replace "O" ring on fuel injector.
4. Ensure electrical connector on each fuel injector is facing toward valve cover. Tighten fuel rail-to-cylinder head bolts and fuel pipe clamp-to-cylinder head bolt to specification. See **TORQUE SPECIFICATIONS** . Install No. 2 cylinder head cover.

CAUTION: DO NOT reuse old retainer when installing fuel pipe on fuel pipe fitting. Always use a NEW retainer.

5. Apply light coat of engine oil on tip of fuel pipe fitting to allow for ease of disconnect fitting and fuel pipe installation. Using NEW retainer, install fuel pipe on fuel pipe fitting until "click" sound is heard. DO NOT reuse old retainer. Pull on fuel pipe to ensure fuel pipe is properly locked on fuel pipe fitting.
6. Reinstall fuel pipe clamp. Operate fuel pump and check for fuel leaks. See **FUEL PUMP OPERATION** under FUEL SYSTEMS in BASIC DIAGNOSTIC PROCEDURES - 4-CYLINDER article.

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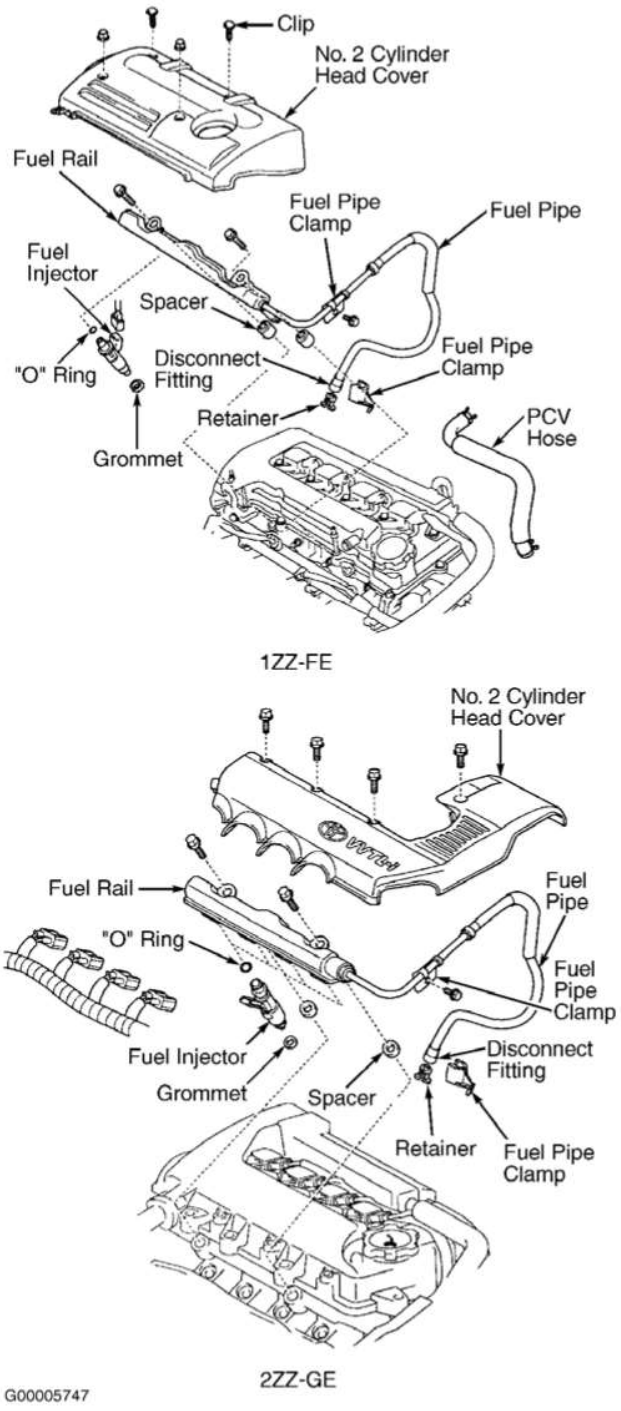


Fig. 78: Exploded View Of Fuel Rail & Components (Celica)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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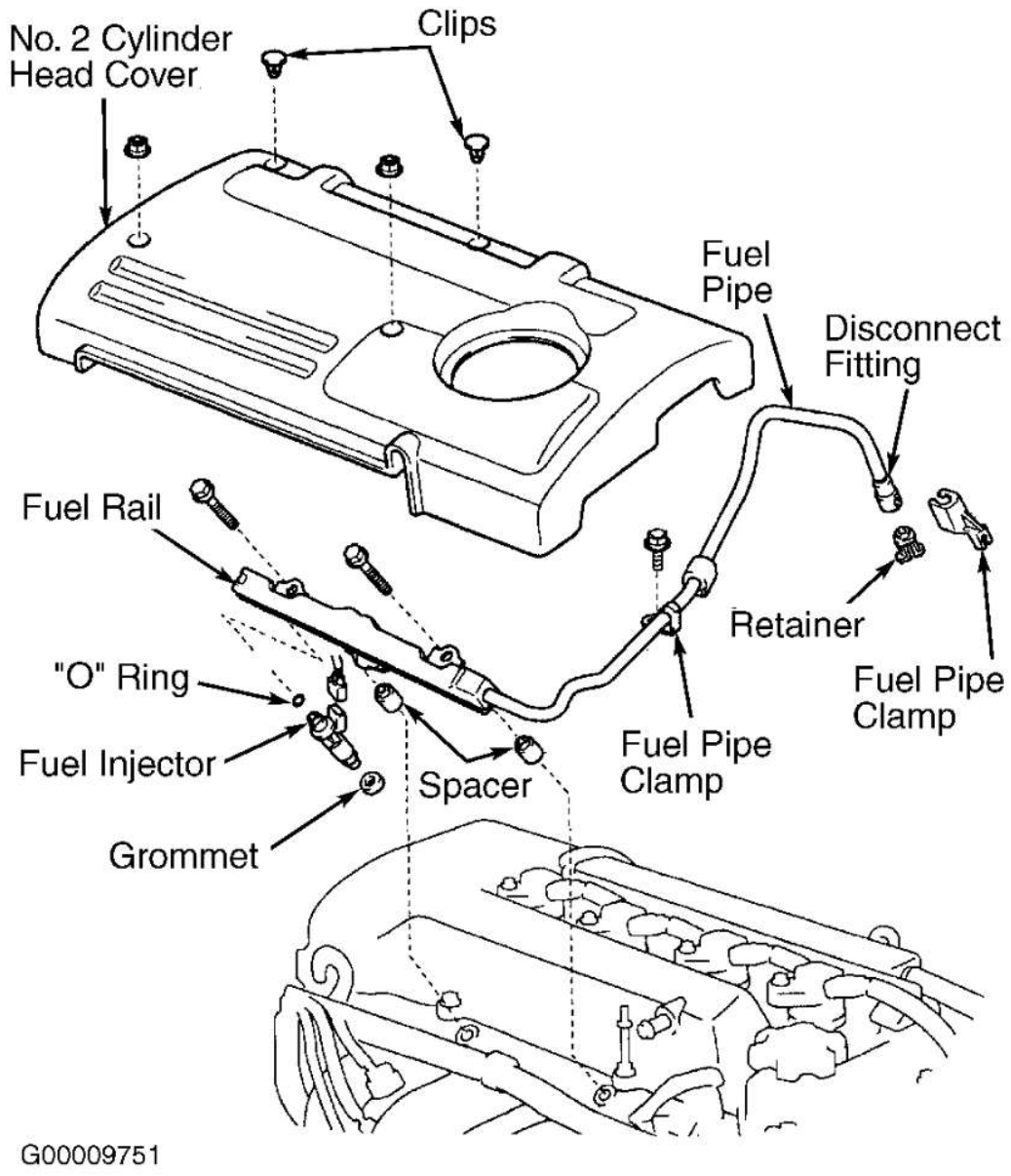


Fig. 79: Exploded View Of Fuel Rail & Components (Corolla)
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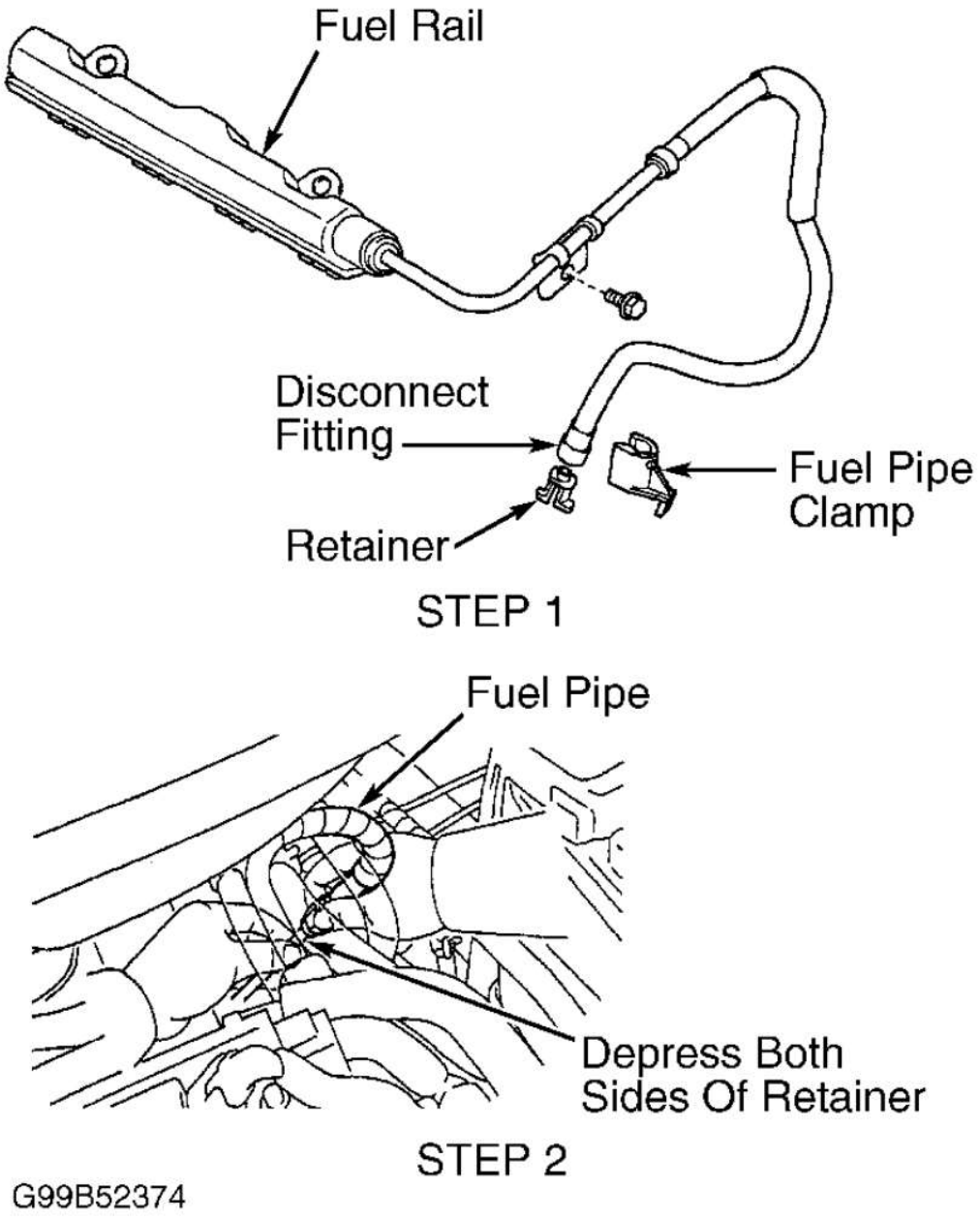


Fig. 80: Disconnecting Fuel Pipe From Fuel Pipe Fitting (Celica)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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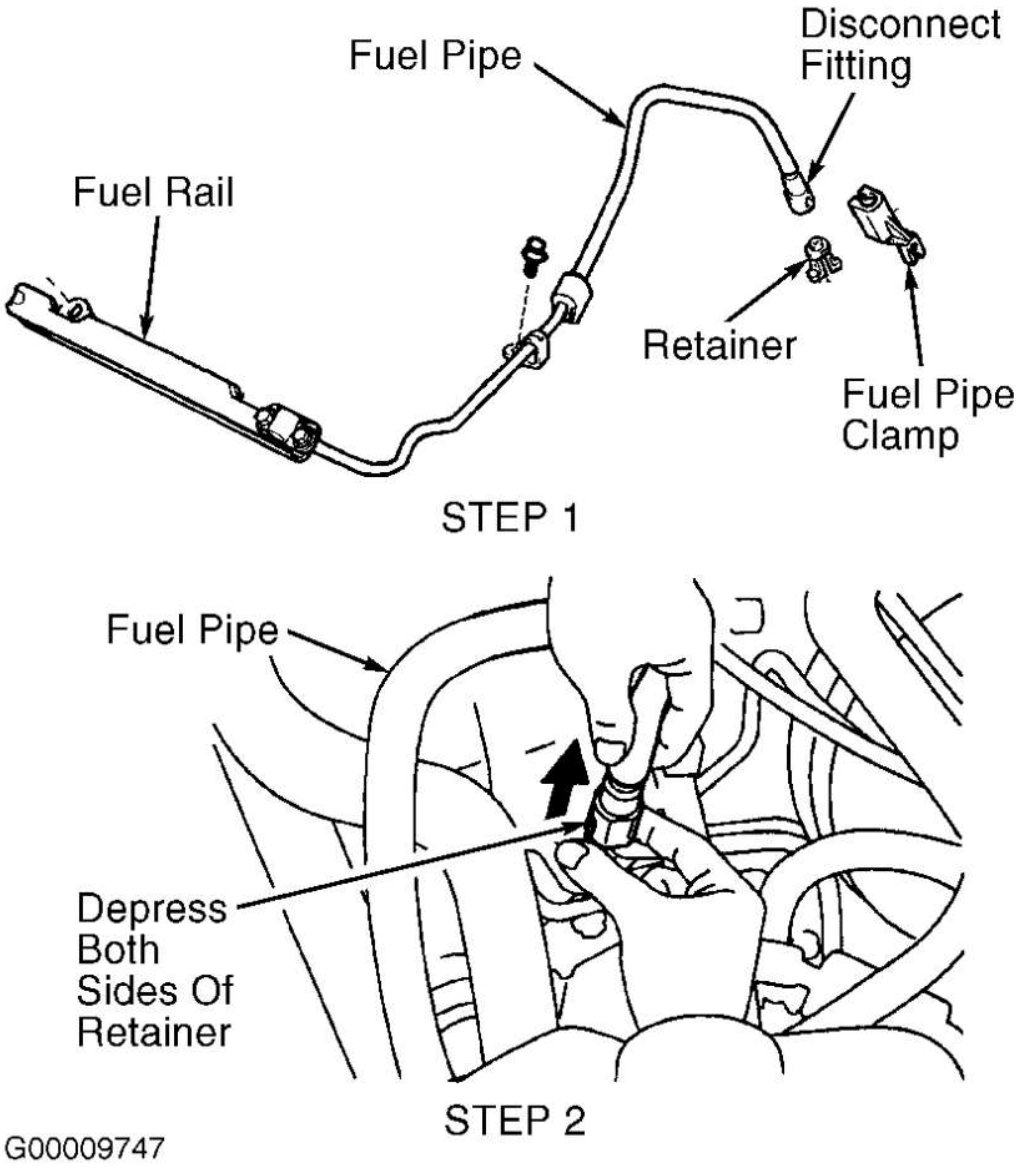


Fig. 81: Disconnecting Fuel Pipe From Fuel Pipe Fitting (Corolla)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal (ECHO)

1. Release fuel pressure. See **FUEL SYSTEM PRESSURE RELEASE** . Remove No. 2 cylinder head cover located on top of engine, above ignition coils and valve cover, ignition coils, valve cover and gasket. See **Fig. 82** .

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2. Remove fuel pipe clamp from end of fuel pipe at end of fuel rail. Perform STEP 1 in illustration. See **Fig. 83** . Ensure area around fuel pipe and disconnect fitting is clean.

CAUTION: Use care when disconnecting fuel pipe, as some residual fuel pressure may still exist in the fuel system.

3. Depress both sides of retainer and pull fuel pipe with disconnect fitting from fuel pipe fitting. Perform STEP 2 in illustration. See **Fig. 83** . Note location of electrical connectors on fuel injectors for installation reference. Disconnect electrical connectors at fuel injectors.

CAUTION: When removing fuel rail, use care not to allow fuel injectors to fall from fuel rail.

4. Remove bolt from fuel pipe clamp at the cylinder head. See **Fig. 82** . Remove fuel rail-to-cylinder head bolts. Remove fuel rail with fuel injectors as an assembly. Remove the 2 spacers from cylinder head. Remove fuel injectors from fuel rail. Remove "O" ring and grommet from fuel injector.

Installation

1. To install, reverse removal procedure using NEW grommets and "O" rings. Coat "O" ring with gasoline before installing "O" ring on fuel injector.
2. Coat fuel rail "O" ring contact area with gasoline before installing fuel injector on fuel rail. Use twisting motion when installing fuel injector on fuel rail. Ensure electrical connector on each fuel injector is facing toward valve cover and the 2 spacers are installed on cylinder head before installing fuel rail. Coat grommet contact surfaces with gasoline before installing fuel rail with fuel injectors.
3. Install fuel rail with fuel injectors on cylinder head with fuel rail-to-cylinder head bolts loosely installed. Ensure fuel injectors rotate smoothly. If fuel injectors do not rotate smoothly, check for improper "O" ring installation and replace "O" ring on fuel injector.
4. Ensure electrical connector on each fuel injector is facing toward valve cover. Tighten fuel rail-to-cylinder head bolts and fuel pipe clamp-to-cylinder head bolt to specification. See **TORQUE SPECIFICATIONS** .
5. Apply sealant at specified areas on cylinder head before installing gasket and valve cover. See **Fig. 84** . Using NEW seal washers, install valve cover bolts/nuts. Tighten valve cover bolts/nuts to specification in sequence. See **TORQUE SPECIFICATIONS** . See **Fig. 85** . Install ignition coils and tighten ignition coil bolts to specification. See **TORQUE SPECIFICATIONS** . Install No. 2 cylinder head cover.

CAUTION: DO NOT reuse old retainer when installing fuel pipe on fuel pipe fitting. Always use a NEW retainer.

6. Apply light coat of engine oil on tip of fuel pipe fitting to allow for ease of disconnect fitting and fuel pipe installation. Using NEW retainer, install fuel pipe on fuel pipe fitting until "click" sound is heard. DO NOT reuse old retainer. Pull on fuel pipe to ensure fuel pipe is properly locked on fuel pipe fitting.
7. Reinstall fuel pipe clamp. Operate fuel pump and check for fuel leaks. See **FUEL PUMP OPERATION**

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under FUEL SYSTEMS in BASIC DIAGNOSTIC PROCEDURES - 4-CYLINDER article.

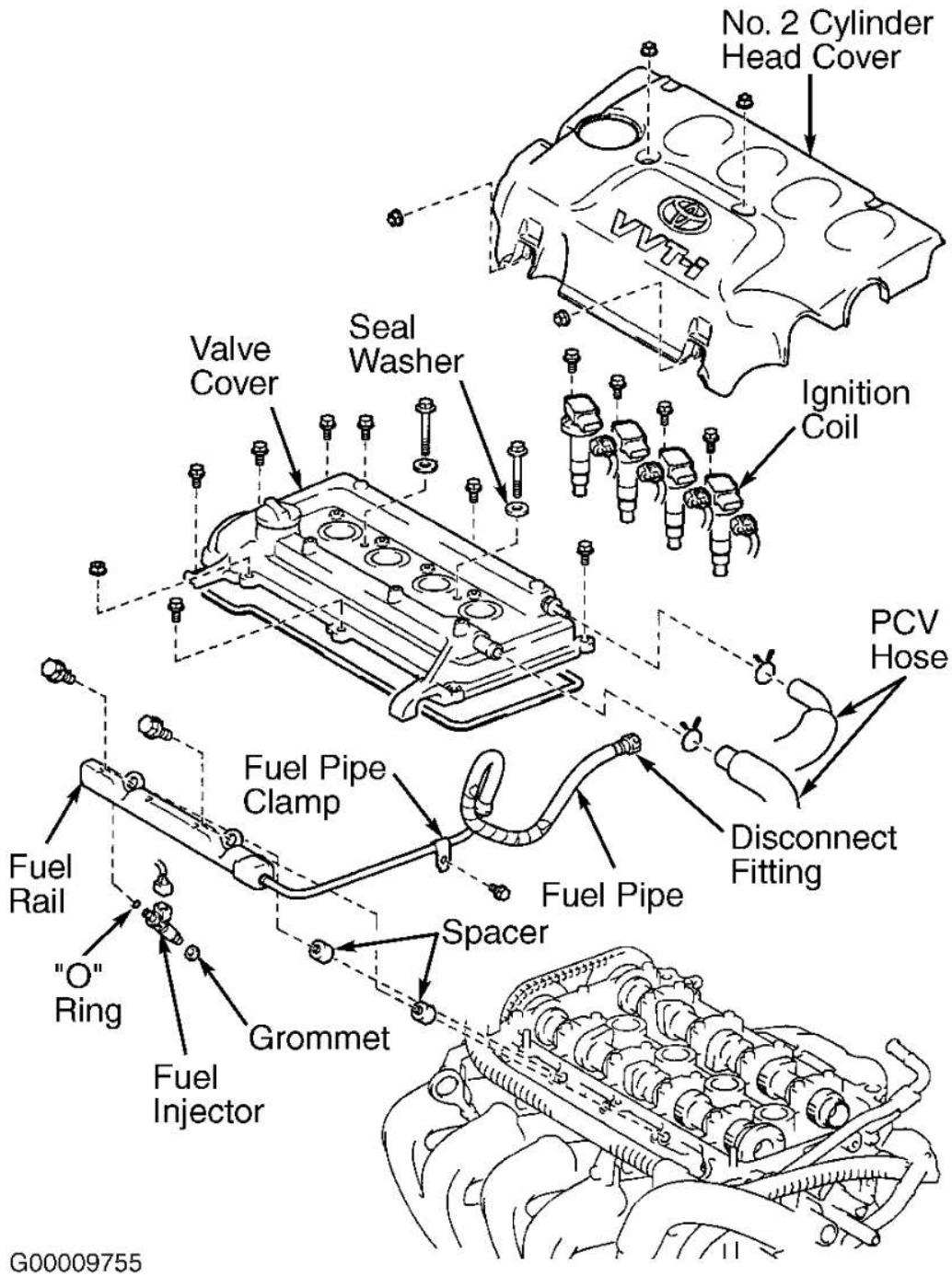


Fig. 82: Exploded View Of Fuel Rail & Components (ECHO)

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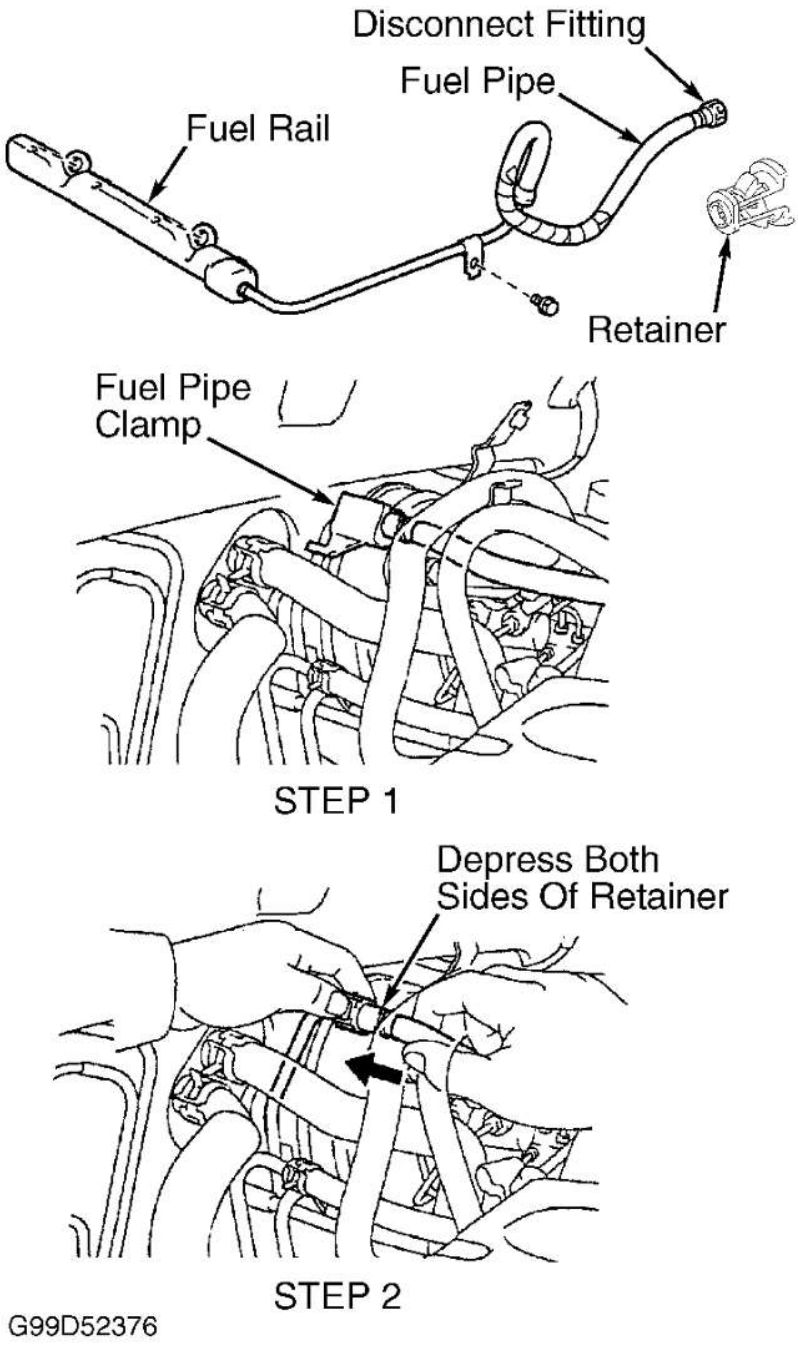


Fig. 83: Disconnecting Fuel Pipe From Fuel Pipe Fitting (ECHO)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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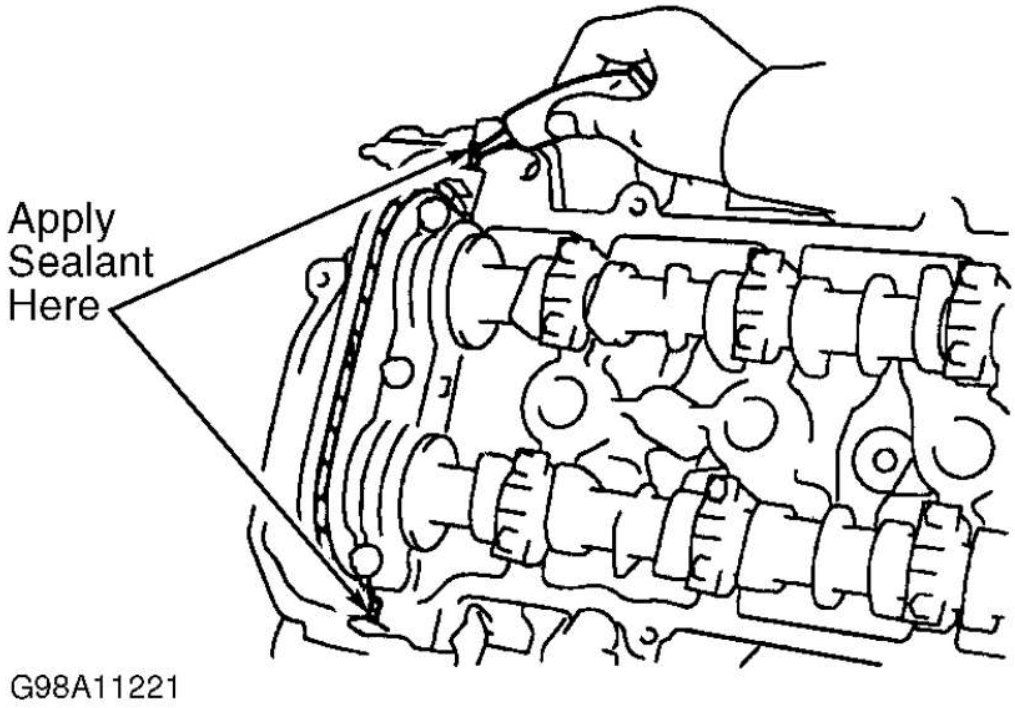


Fig. 84: Identifying Valve Cover Sealant Application Areas (ECHO & Prius)
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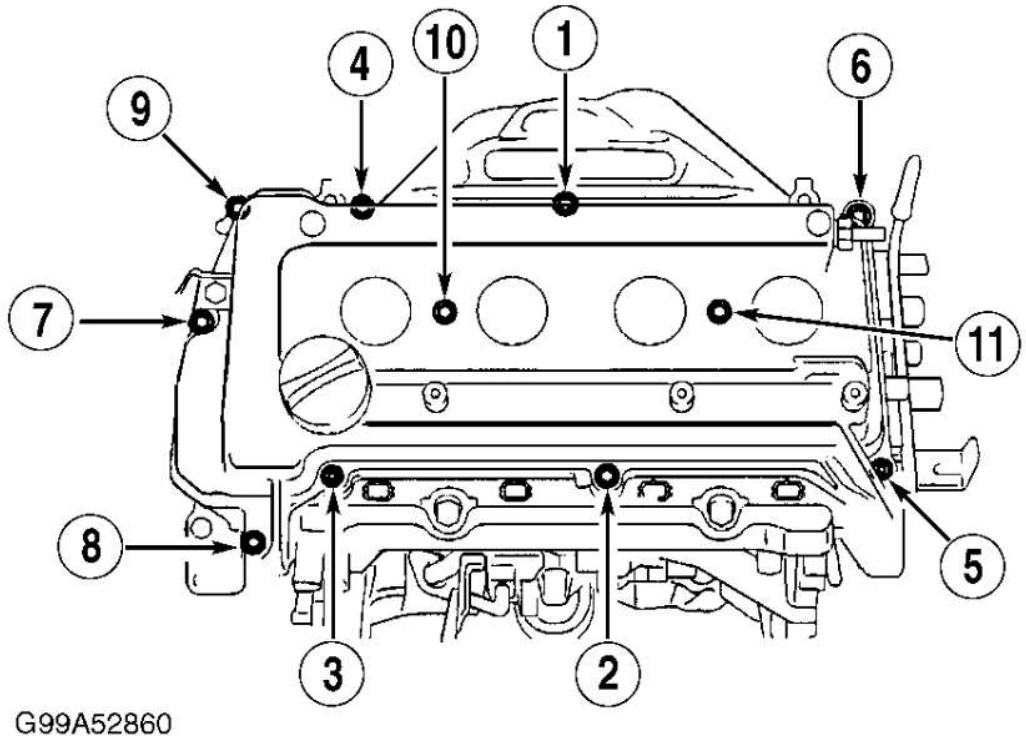


Fig. 85: Valve Cover Bolt/Nut Tightening Sequence (ECHO & Prius)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal (Highlander)

1. Release fuel pressure. See **FUEL SYSTEM PRESSURE RELEASE** . Remove upper cap on air cleaner assembly with air cleaner hose. Remove fuel pipe clamp from end of fuel pipe at fuel pipe fitting. See **Fig. 86** .

CAUTION: Use care when disconnecting fuel pipe, as some residual fuel pressure may still exist in the fuel system.

2. Ensure area around fuel pipe and disconnect fitting is clean. Depress both tabs and pull fuel pipe with disconnect fitting from fuel pipe fitting. See **Fig. 86** .
3. Note location of electrical connectors on fuel injectors for installation reference. Disconnect electrical connectors at fuel injectors. Remove clamps and engine wiring harness for access to fuel rail.

CAUTION: When removing fuel rail, use care not to allow fuel injectors to fall from fuel rail.

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4. Remove fuel rail-to-cylinder head bolts. Remove fuel rail with fuel injectors as an assembly. Remove the 2 spacers from cylinder head. Remove fuel injectors from fuel rail. Remove "O" ring and insulator from fuel injector.

Installation

1. To install, reverse removal procedure using NEW insulators and "O" rings. Coat "O" ring with gasoline before installing "O" ring on fuel injector.
2. Coat fuel rail "O" ring contact area with gasoline before installing fuel injector on fuel rail. Use twisting motion when installing fuel injector on fuel rail. Ensure electrical connector on each fuel injector is facing downward, toward intake manifold and the 2 spacers are installed on cylinder head before installing fuel rail.
3. Install fuel rail with fuel injectors on cylinder head with fuel rail-to-cylinder head bolts loosely installed. Ensure fuel injectors rotate smoothly. If fuel injectors do not rotate smoothly, check for improper "O" ring installation and replace "O" ring on fuel injector.
4. Ensure electrical connector on each fuel injector is facing downward, toward intake manifold. Tighten fuel rail-to-cylinder head bolts to specification. See **TORQUE SPECIFICATIONS** . Install fuel pipe on fuel pipe fitting. Pull on fuel pipe to ensure fuel pipe is properly locked on fuel pipe fitting. Reinstall fuel pipe clamp. Operate fuel pump and check for fuel leaks. See **FUEL PUMP OPERATION** under FUEL SYSTEMS in BASIC DIAGNOSTIC PROCEDURES - 4-CYLINDER article.

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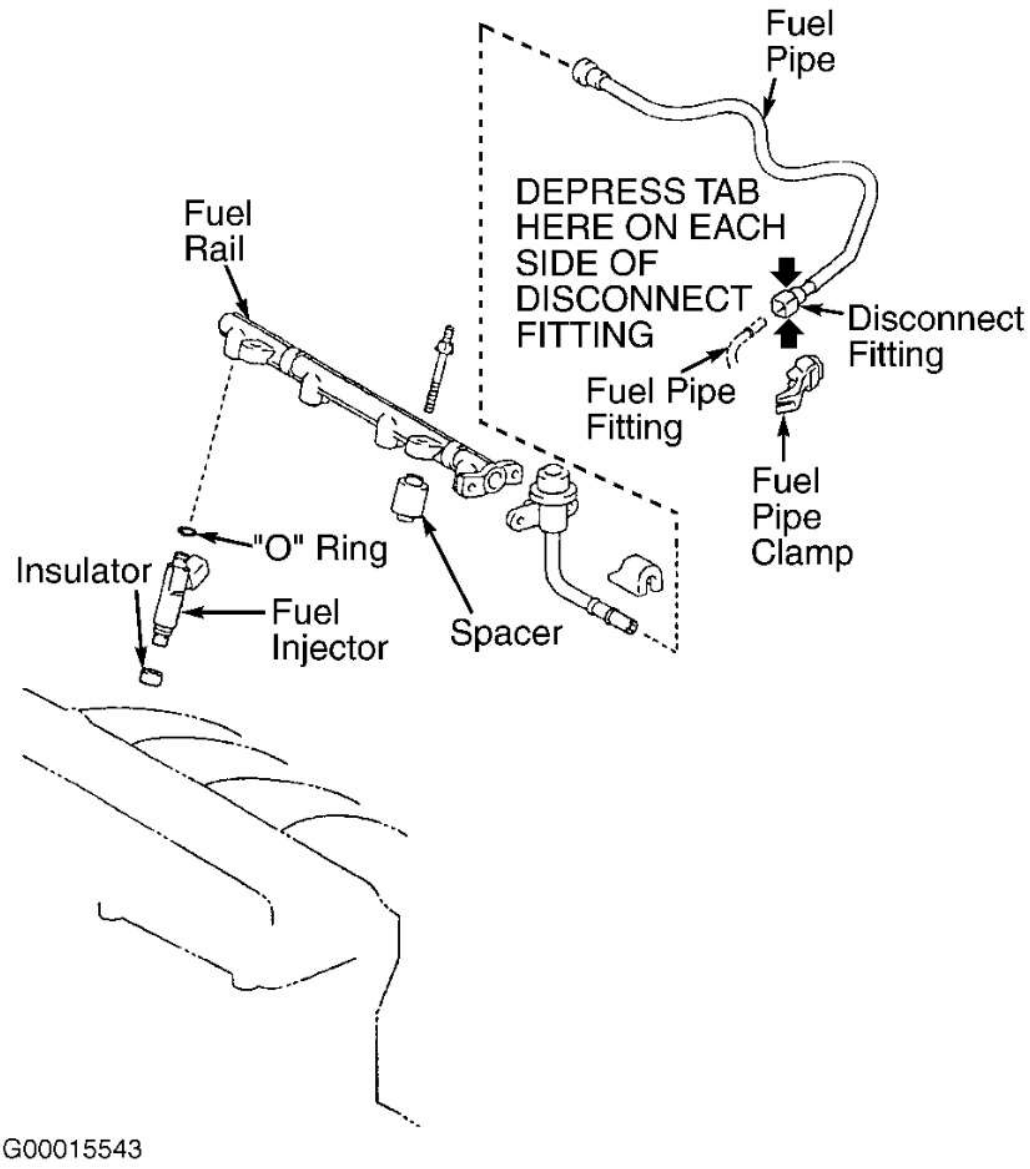


Fig. 86: Exploded View Of Fuel Rail & Components (Highlander)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal (MR2)

1. Release fuel pressure. See **FUEL SYSTEM PRESSURE RELEASE** . Remove suspension upper brace and No. 2 cylinder head cover located on top of engine, above ignition coils and valve cover. See **Fig. 87** .
2. Remove PCV hose and engine wiring harness for access to fuel rail. Note location of electrical connectors

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on fuel injectors for installation reference. Disconnect electrical connectors at fuel injectors.

CAUTION: When removing fuel rail, use care not to allow fuel injectors to fall from fuel rail.

3. Remove fuel rail-to-cylinder head bolts. Remove fuel rail with fuel injectors as an assembly. Remove the 2 spacers and 4 grommets from cylinder head. Remove fuel injectors from fuel rail. Remove "O" ring from fuel injector.

Installation

1. To install, reverse removal procedure using NEW grommets and "O" rings. Coat "O" ring with gasoline before installing "O" ring on fuel injector.
2. Coat fuel rail "O" ring contact area with gasoline before installing fuel injector on fuel rail. Use twisting motion when installing fuel injector on fuel rail. Ensure electrical connector on each fuel injector is facing toward valve cover and the 2 spacers and 4 grommets are installed on cylinder head before installing fuel rail.
3. Install fuel rail with fuel injectors on cylinder head with fuel rail-to-cylinder head bolts loosely installed. Ensure fuel injectors rotate smoothly. If fuel injectors do not rotate smoothly, check for improper "O" ring installation and replace "O" ring on fuel injector.
4. Ensure electrical connector on each fuel injector is facing toward valve cover. Tighten fuel rail-to-cylinder head bolts and suspension upper brace bolts/nuts to specification. See **TORQUE SPECIFICATIONS** .
5. Operate fuel pump and check for fuel leaks. See **FUEL PUMP OPERATION** under FUEL SYSTEMS in BASIC DIAGNOSTIC PROCEDURES - 4-CYLINDER article.

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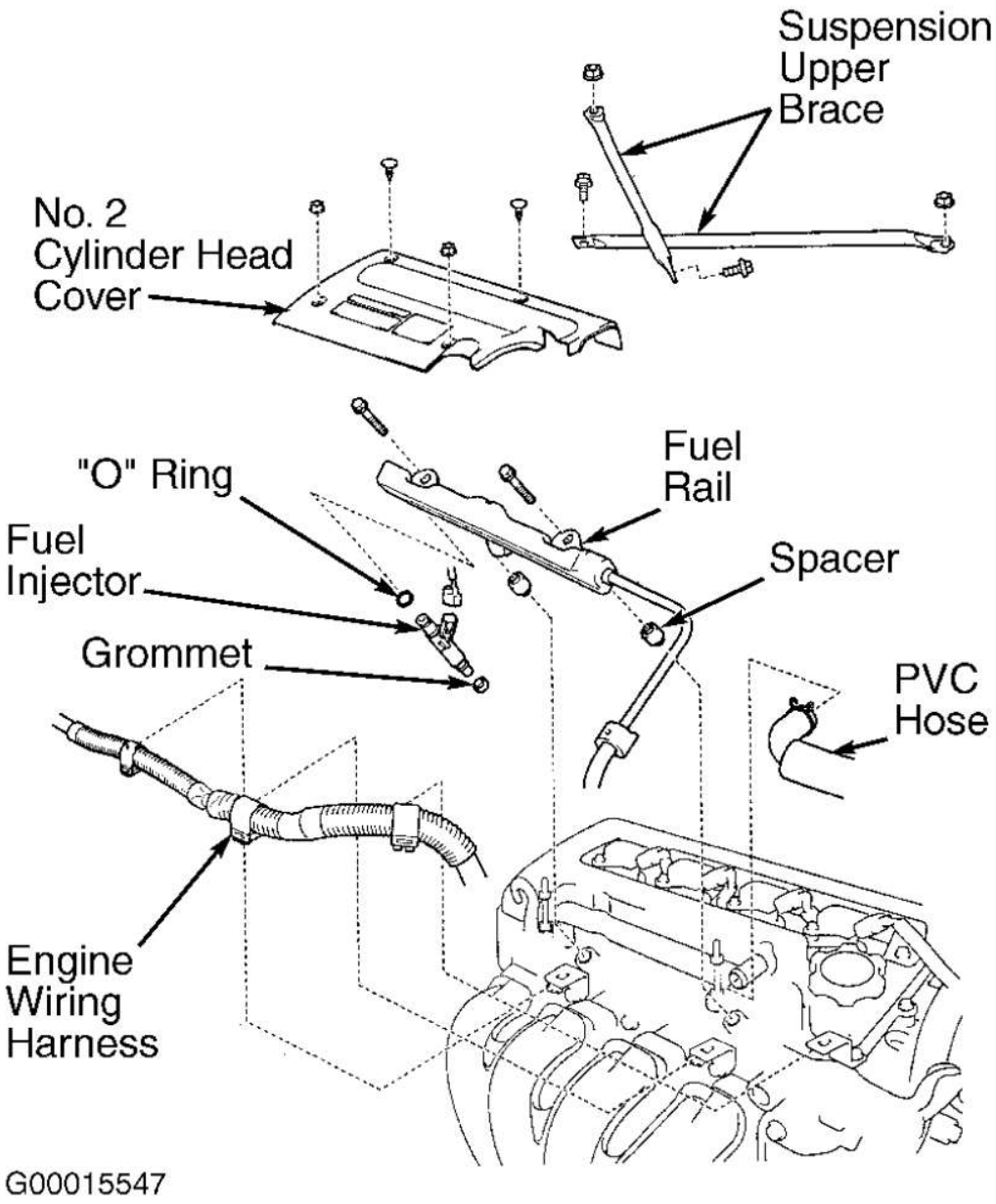


Fig. 87: Exploded View Of Fuel Rail & Components (MR2)
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Removal (Prius)

WARNING: Read service precautions before proceeding with service procedure. See SERVICE PRECAUTIONS .

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1. Release fuel pressure. See **FUEL SYSTEM PRESSURE RELEASE** . Remove air cleaner assembly on top of engine for access to ignition coils and valve cover. Remove ignition coils, valve cover and gasket. See **Fig. 88** .
2. Ensure area around fuel pipe at end of fuel rail and disconnect fitting is clean. See **Fig. 89** .

CAUTION: Use care when disconnecting fuel pipe, as some residual fuel pressure may still exist in the fuel system.

3. Depress both sides of retainer and pull fuel pipe with disconnect fitting from fuel pipe fitting. See **Fig. 89** .
4. Note location of electrical connectors on fuel injectors for installation reference. Disconnect electrical connectors at fuel injectors.

CAUTION: When removing fuel rail, use care not to allow fuel injectors to fall from fuel rail.

5. Remove bolt from fuel pipe clamp at the cylinder head. See **Fig. 88** . Remove fuel rail-to-cylinder head bolts. Remove fuel rail with fuel injectors as an assembly. Remove the 2 spacers from cylinder head. Remove fuel injectors from fuel rail. Remove "O" ring and grommet from fuel injector.

Installation

1. To install, reverse removal procedure using NEW grommets and "O" rings. Coat "O" ring with gasoline before installing "O" ring on fuel injector.
2. Coat fuel rail "O" ring contact area with gasoline before installing fuel injector on fuel rail. Use twisting motion when installing fuel injector on fuel rail. Ensure electrical connector on each fuel injector is facing toward valve cover and the 2 spacers are installed on cylinder head before installing fuel rail. Coat grommet contact surfaces with gasoline before installing fuel rail with fuel injectors.
3. Install fuel rail with fuel injectors on cylinder head with fuel rail-to-cylinder head bolts loosely installed. Ensure fuel injectors rotate smoothly. If fuel injectors do not rotate smoothly, check for improper "O" ring installation and replace "O" ring on fuel injector.
4. Ensure electrical connector on each fuel injector is facing toward valve cover. Tighten fuel rail-to-cylinder head bolts and fuel pipe clamp-to-cylinder head bolt to specification. See **TORQUE SPECIFICATIONS** .
5. Apply sealant at specified areas on cylinder head before installing gasket and valve cover. See **Fig. 84** . Using NEW seal washers, install valve cover bolts/nuts. Tighten valve cover bolts/nuts to specification in sequence. See **TORQUE SPECIFICATIONS** . See **Fig. 85** . Install ignition coils and tighten ignition coil bolts to specification. See **TORQUE SPECIFICATIONS** .

CAUTION: DO NOT reuse old retainer when installing fuel pipe on fuel pipe fitting. Always use a NEW retainer.

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6. Apply light coat of engine oil on tip of fuel pipe fitting to allow for ease of disconnect fitting and fuel pipe installation. Using NEW retainer, install fuel pipe on fuel pipe fitting until "click" sound is heard. DO NOT reuse old retainer. Pull on fuel pipe to ensure fuel pipe is properly locked on fuel pipe fitting.
7. Reinstall air cleaner assembly. Operate fuel pump and check for fuel leaks. See **FUEL PUMP OPERATION** under FUEL SYSTEMS in BASIC DIAGNOSTIC PROCEDURES - 4-CYLINDER article.

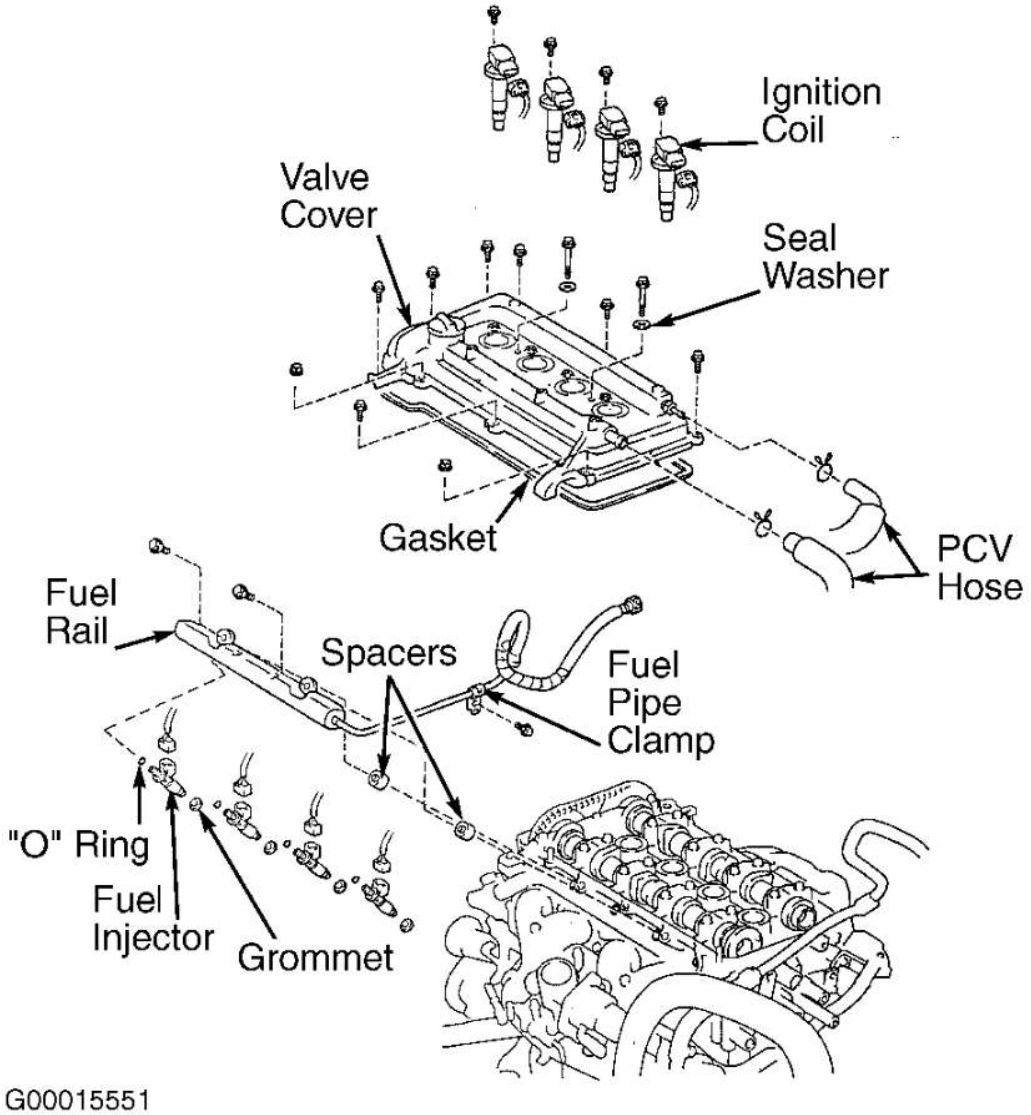


Fig. 88: Exploded View Of Fuel Rail & Components (Prius)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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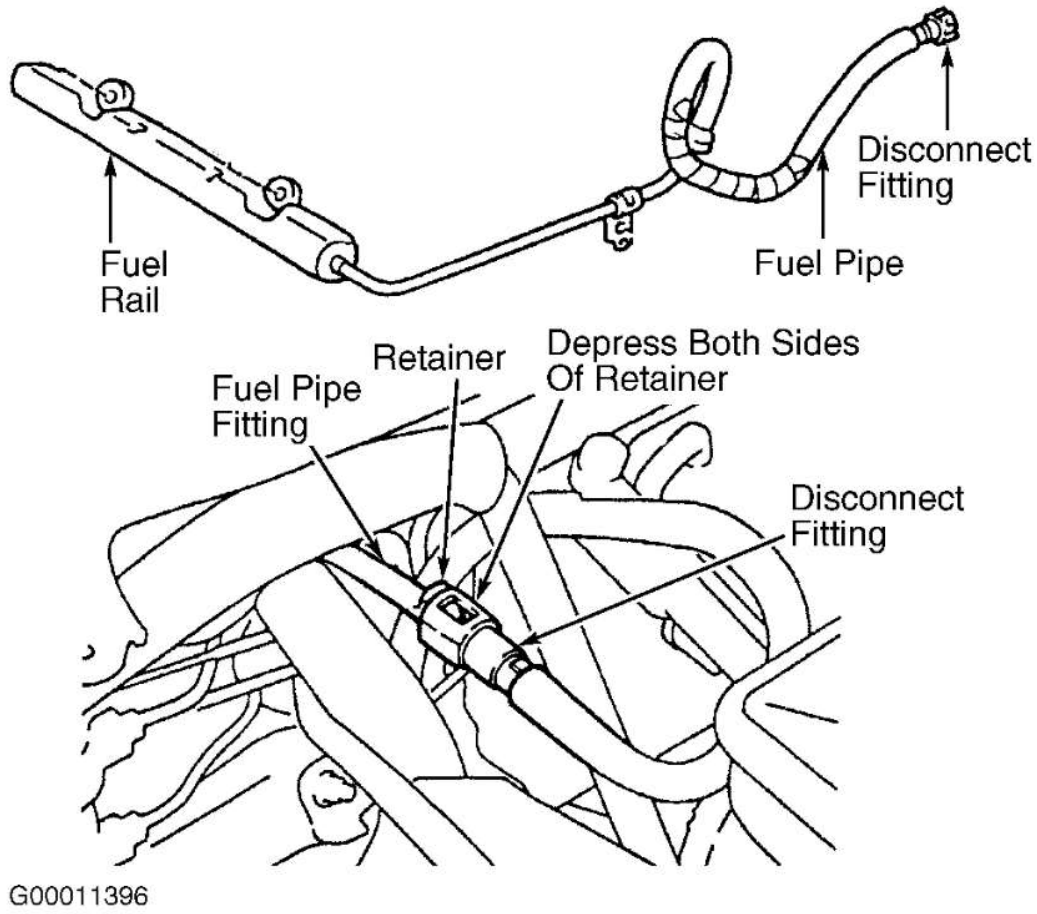


Fig. 89: Locating Fuel Pipe, Disconnect Fitting & Disconnecting Fuel Pipe From Fuel Pipe Fitting (Prius)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal (RAV4)

1. Release fuel pressure. See **FUEL SYSTEM PRESSURE RELEASE** . Disconnect PCV hose from valve cover for access to fuel rail. See **Fig. 90** .
2. Remove air cleaner assembly for access to fuel rail. Note location of electrical connectors on fuel injectors for installation reference. Disconnect electrical connectors at fuel injectors.

CAUTION: When removing fuel rail, use care not to allow fuel injectors to fall from fuel rail.

3. Remove fuel rail-to-cylinder head bolts. Remove fuel rail with fuel injectors as an assembly. Remove the 2 spacers and 4 grommets from cylinder head. Remove fuel injectors from fuel rail. Remove "O" ring

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from fuel injector.

Installation

1. To install, reverse removal procedure using NEW grommets and "O" rings. Coat "O" ring with gasoline before installing "O" ring on fuel injector.
2. Coat fuel rail "O" ring contact area with gasoline before installing fuel injector on fuel rail. Use twisting motion when installing fuel injector on fuel rail. Ensure electrical connector on each fuel injector is facing away from valve cover and the 2 spacers and 4 grommets are installed on cylinder head before installing fuel rail.
3. Install fuel rail with fuel injectors on cylinder head with fuel rail-to-cylinder head bolts loosely installed. Ensure fuel injectors rotate smoothly. If fuel injectors do not rotate smoothly, check for improper "O" ring installation and replace "O" ring on fuel injector.
4. Ensure electrical connector on each fuel injector is facing away from valve cover. Tighten fuel rail-to-cylinder head bolts to specification. See **TORQUE SPECIFICATIONS** . Operate fuel pump and check for fuel leaks. See **FUEL PUMP OPERATION** under FUEL SYSTEMS in BASIC DIAGNOSTIC PROCEDURES - 4-CYLINDER article.

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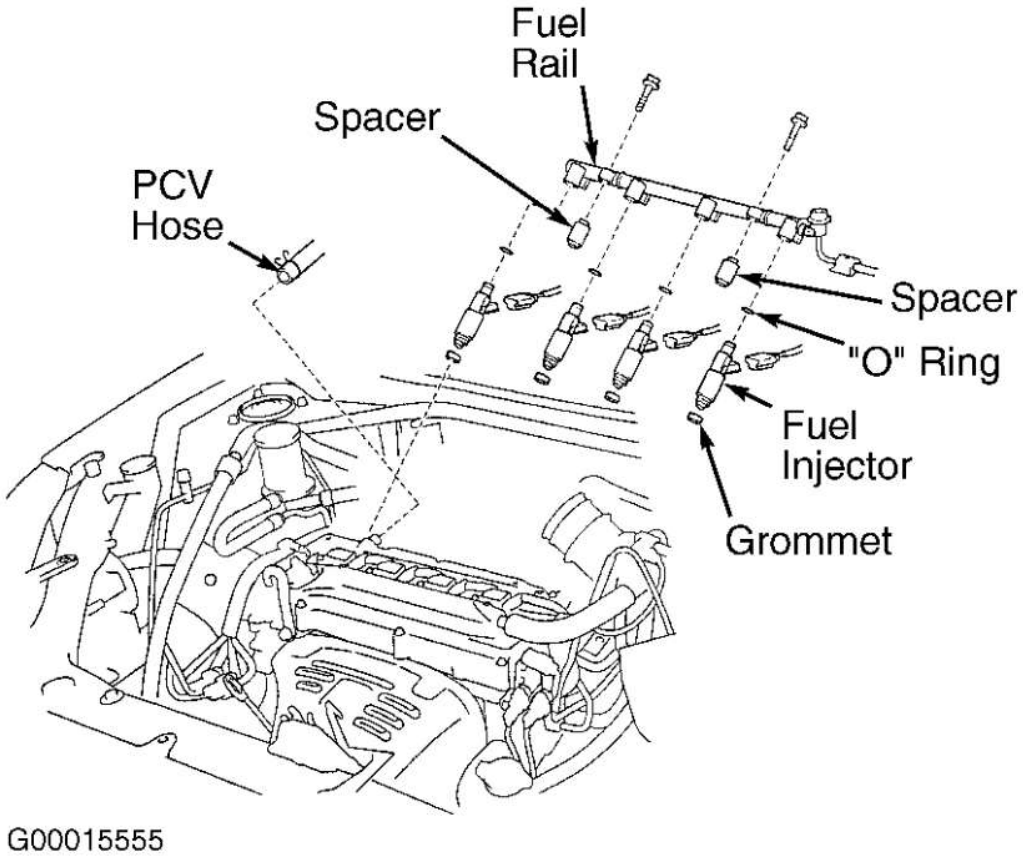


Fig. 90: Exploded View Of Fuel Rail & Components (RAV4)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal (Tacoma)

1. Release fuel pressure. See **FUEL SYSTEM PRESSURE RELEASE** . Remove air cleaner hose and intake air connector for access to fuel rail and fuel injectors. See **Fig. 91** .
2. Note location of electrical connectors on fuel injectors for installation reference. Disconnect electrical connectors at fuel injectors. Disconnect air hose and fuel return hose from fuel pressure regulator.
3. Remove union bolt with gaskets and disconnect fuel inlet pipe from fuel rail. See **Fig. 91** .

CAUTION: When removing fuel rail, use care not to allow fuel injectors to fall from fuel rail.

4. Remove fuel rail-to-cylinder head bolts. Remove fuel rail with fuel injectors. Remove 4 insulators from spacers on cylinder head. See **Fig. 92** . Remove fuel injectors from fuel rail. Remove "O" ring and

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grommet (except Calif. emission vehicles only) from fuel injector. See **Fig. 91** .

Installation

1. To install, reverse removal procedure using NEW grommets, "O" rings, insulators and gaskets. Coat "O" ring with gasoline before installing "O" ring on fuel injector. Coat fuel rail "O" ring contact area with gasoline before installing fuel injector on fuel rail.
2. Use twisting motion when installing fuel injector on fuel rail. Ensure electrical connector on each fuel injector is facing toward intake manifold and the 4 insulators are installed on spacers on the cylinder head. See **Fig. 92** .
3. With fuel rail installed, loosely install fuel rail-to-cylinder head bolts. Ensure fuel injectors rotate smoothly. If fuel injectors fail to rotate smoothly, check for improper "O" ring installation and replace "O" ring on fuel injector.
4. Ensure electrical connector on each fuel injector is facing toward intake manifold. Tighten fuel rail-to-cylinder head bolts and fuel inlet pipe-to-fuel rail union bolt to specification. See **TORQUE SPECIFICATIONS** . Operate fuel pump and check for fuel leaks. See **FUEL PUMP OPERATION** under FUEL SYSTEMS in BASIC DIAGNOSTIC PROCEDURES - 4-CYLINDER article.

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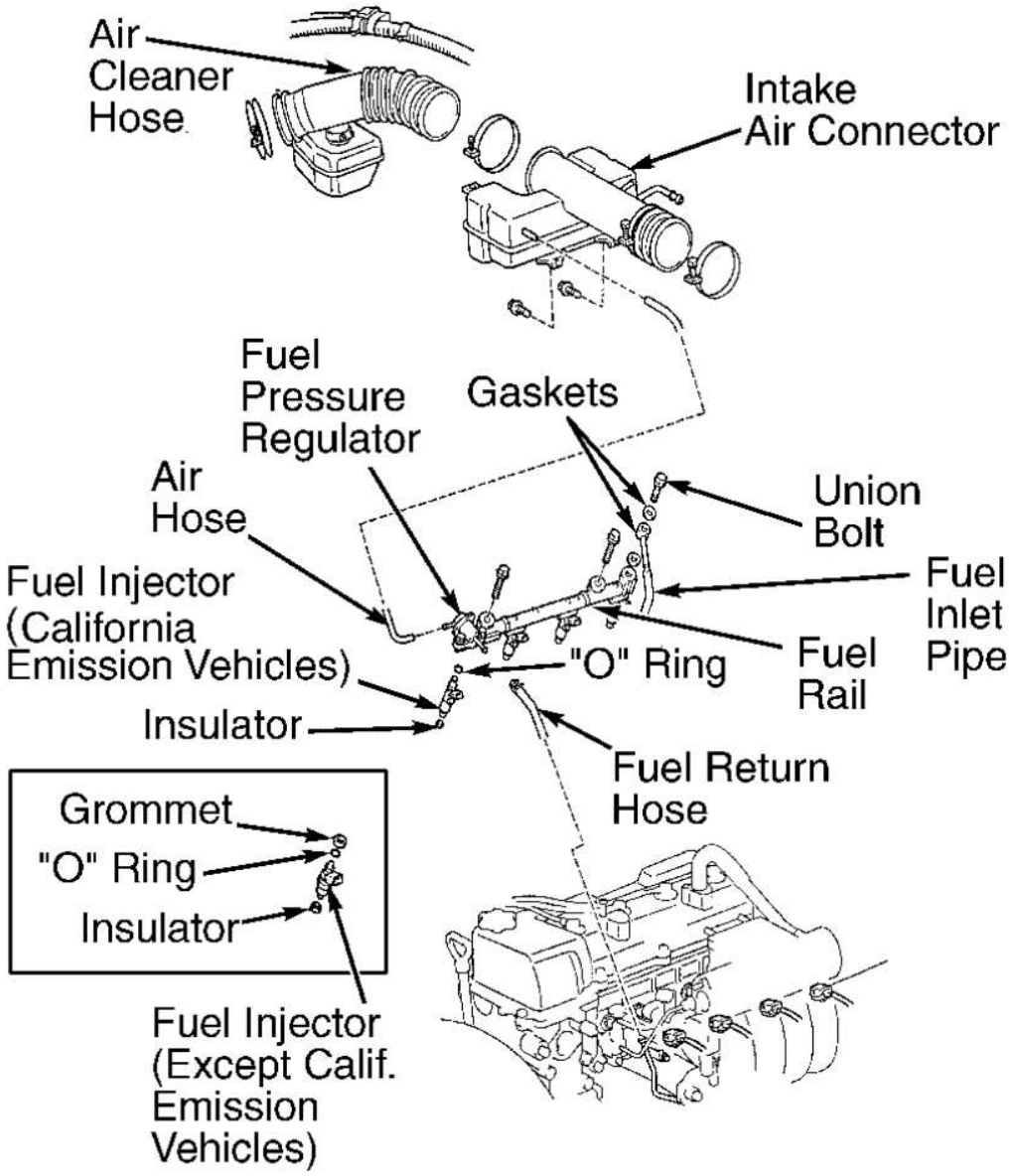


Fig. 91: Exploded View Of Fuel Rail & Components (Tacoma)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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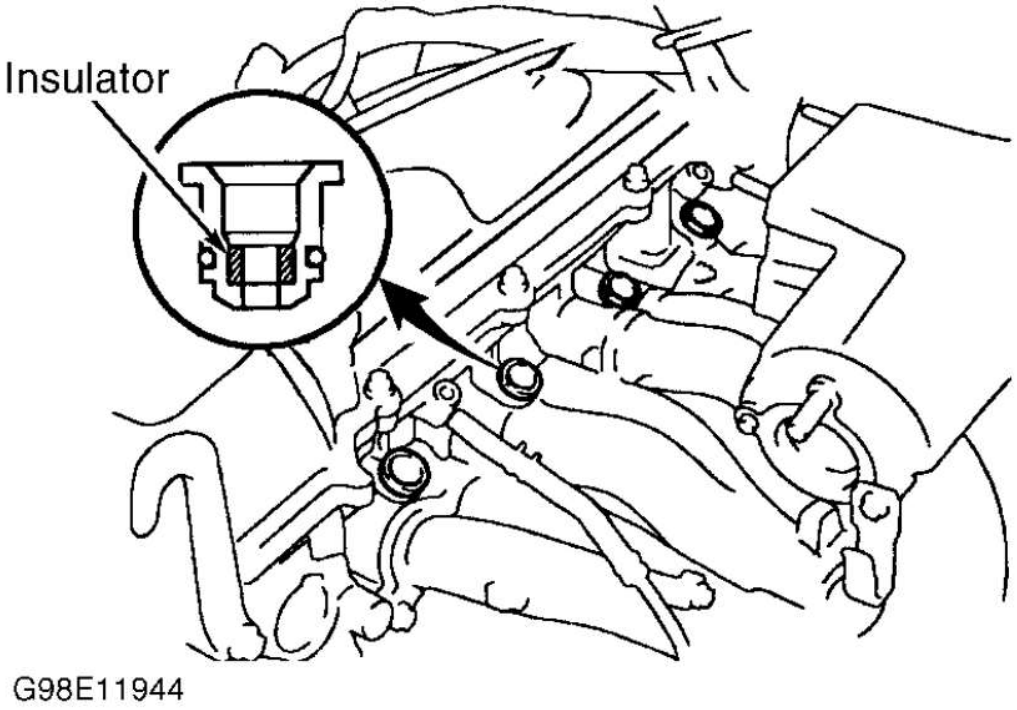


Fig. 92: Locating Insulators (Tacoma)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

THROTTLE BODY

Removal & Installation (Camry & Camry Solara)

1. Drain cooling system. Remove upper cap on air cleaner assembly with air cleaner hose. Disconnect coolant hoes, vacuum hose and electrical connector at throttle body. Remove bolts, throttle body and gasket from intake manifold.
2. Manufacturer does not provide information for servicing of throttle control motor and Throttle Position (TP) sensor. To install, reverse removal procedure using NEW gasket. Ensure gasket for throttle body is installed so protrusion (if equipped) aligns with groove on intake manifold. See **Fig. 93** . Tighten throttle body bolts to specification. See **TORQUE SPECIFICATIONS** . Fill cooling system.

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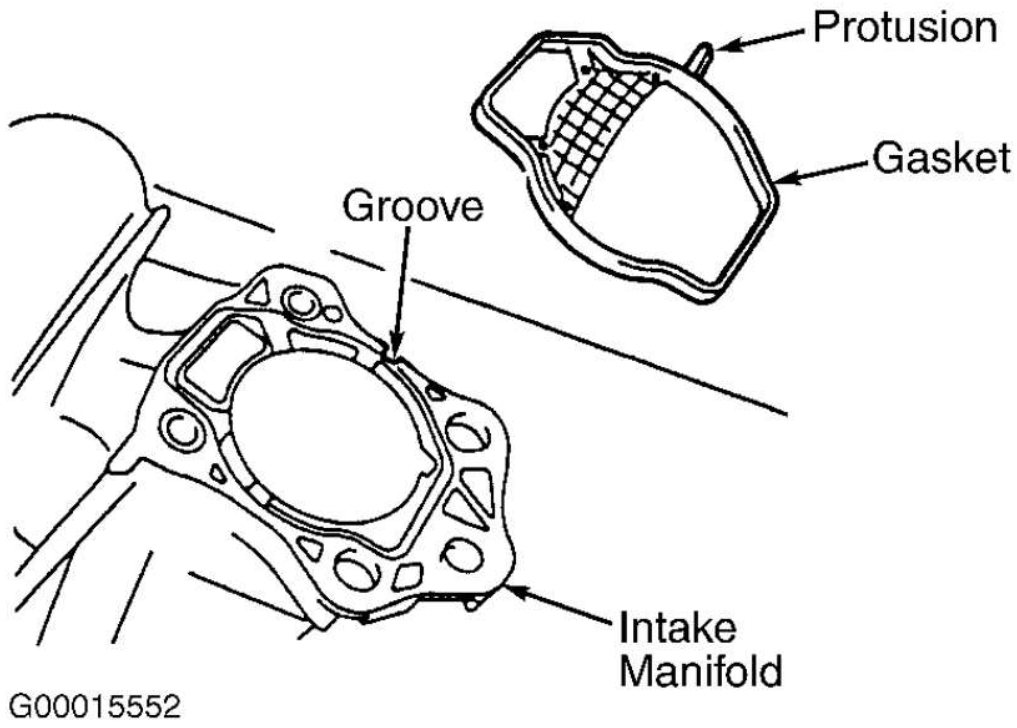


Fig. 93: Installing Gasket For Throttle Body (Camry, Camry Solara, Highlander & RAV4)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal (Celica & Corolla)

1. Drain cooling system. On Celica, remove No. 2 cylinder head cover located on top of engine, above ignition coils and valve cover. See **Fig. 78** . On all models, remove upper cap on air cleaner assembly with air cleaner hose.
2. Disconnect control cable(s), coolant hoses, PCV hose and electrical connectors at throttle body. Remove bolts/nuts, throttle body and gasket from intake manifold. Remove retaining screws, Idle Air Control (IAC) valve and gasket from bottom of throttle body (if necessary).

Installation

1. To install, reverse removal procedure using NEW gasket. Ensure gasket for throttle body is installed with protrusion facing proper direction. See **Fig. 94** and **Fig. 95** .
2. Tighten throttle body bolts/nuts to specification. See **TORQUE SPECIFICATIONS** . On Celica, fill and bleed cooling system. See **COOLING SYSTEM BLEEDING** under COOLING SYSTEM. On Corolla, fill cooling system.

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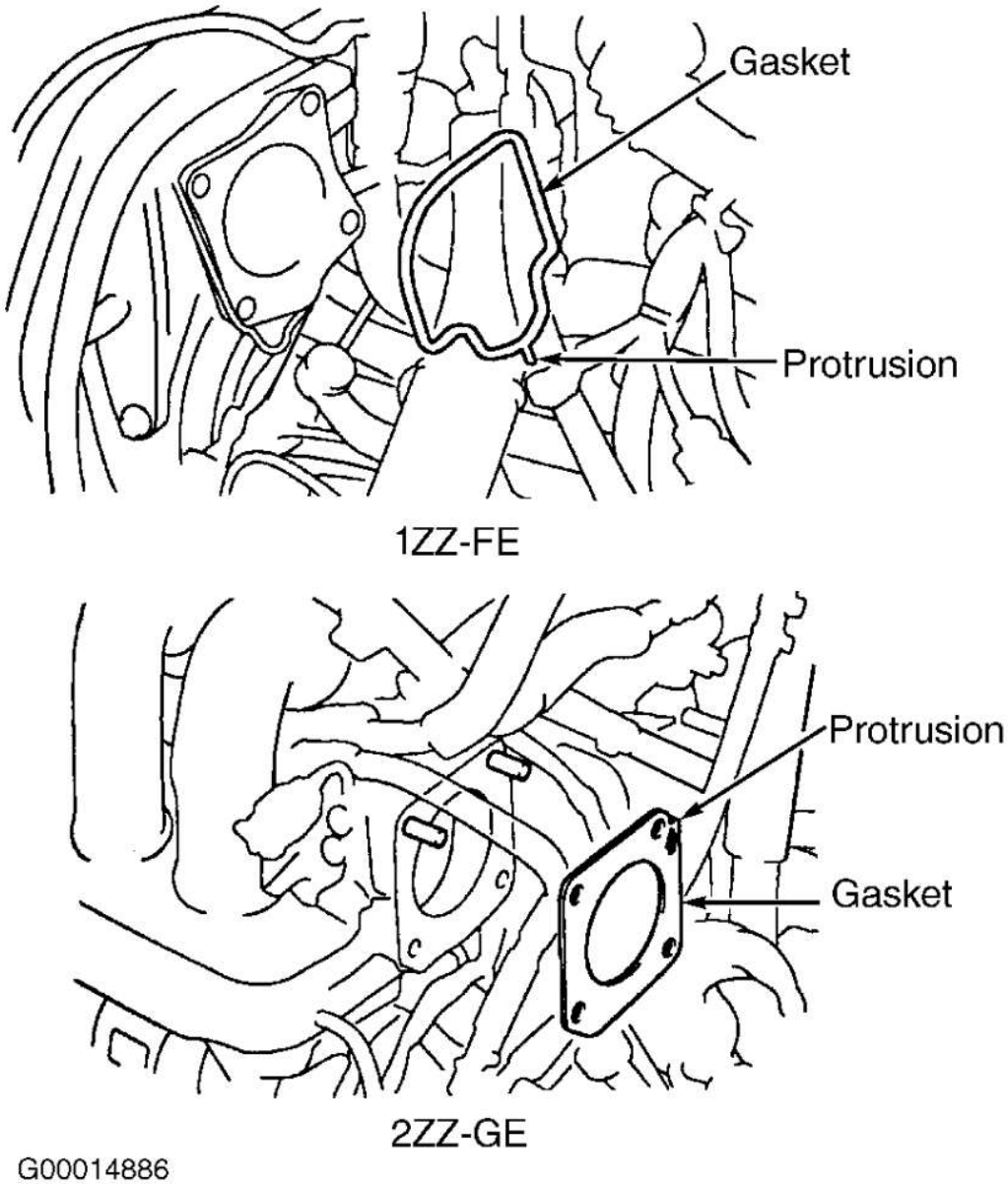


Fig. 94: Installing Gasket For Throttle Body (Celica)
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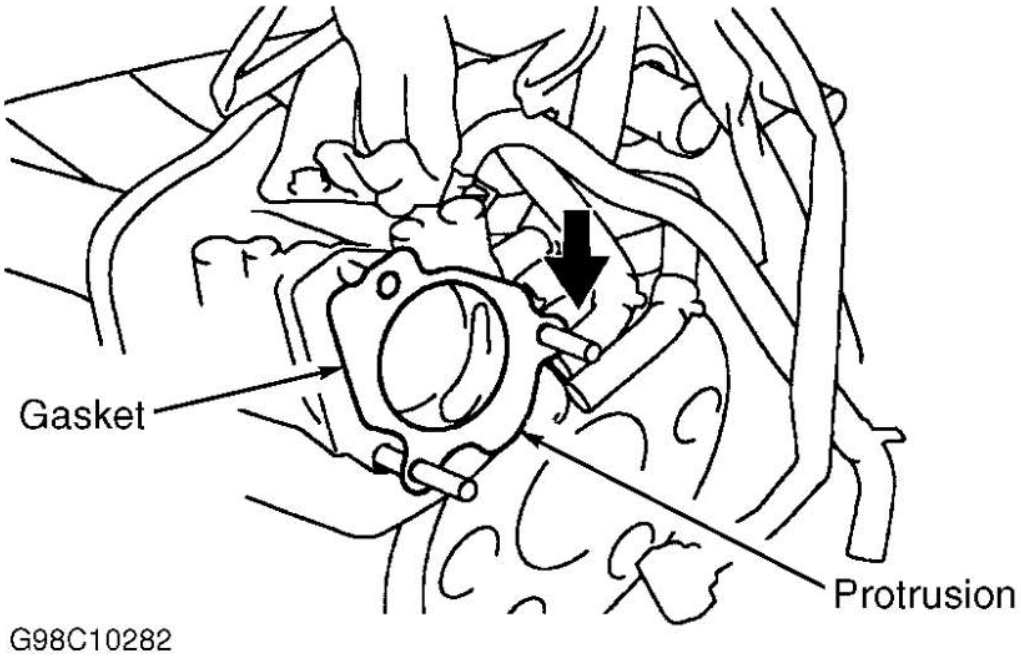


Fig. 95: Installing Gasket For Throttle Body (Corolla)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal & Installation (ECHO)

1. Drain cooling system. Remove air cleaner hose that fits between throttle body and air cleaner assembly. Disconnect control cable(s), coolant hoses, PCV hose and electrical connectors at throttle body. Remove bolts/nuts, throttle body and gasket from intake manifold. Remove retaining screws, Idle Air Control (IAC) valve and gasket from bottom throttle body (if necessary).
2. To install, reverse removal procedure using NEW gasket. Tighten throttle body bolts/nuts to specification. See **TORQUE SPECIFICATIONS** . Fill cooling system.

Removal (Highlander)

1. Drain cooling system. Remove upper cap on air cleaner assembly with air cleaner hose. Disconnect control cable(s), coolant hoses, vacuum hose and electrical connectors at throttle body. Remove bolts, throttle body and gasket from intake manifold.
2. Remove retaining screws, Idle Air Control (IAC) valve and gasket from bottom of throttle body (if necessary). Remove retaining screws and Throttle Position (TP sensor) from throttle body (if necessary).

Installation

1. To install, reverse removal procedure using NEW gasket. If installing TP sensor, ensure throttle valve on

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throttle body is fully closed. Position TP sensor at 45 degrees to so it aligns with shaft on throttle valve and install on throttle body. See **Fig. 30** . Rotate TP sensor to the right 45 degress and install and tighten retaining screws.

2. Ensure gasket for throttle body is installed so protrusion aligns with groove on intake manifold. See **Fig. 93** . Tighten throttle body bolts to specification. See **TORQUE SPECIFICATIONS** . Fill cooling system.

Removal & Installation (MR2 With Standard Type Manual Transaxle)

NOTE: On MR2 there are 2 types of throttle bodies used depending on type of transaxle used. On models with a standard type manual transaxle, the driver operates the clutch and shifts the transaxle. On models with sequential manual transaxle, the transaxle is electronically controlled and the clutch is operated and transaxle is shifted hydraulically by moving the shift lever forward or backward. Sequential manual transaxle may be identified by shift lever pattern which consists of "R", "N", "S" and "+" in place of the conventional type shift lever pattern and no clutch pedal is used.

1. Drain cooling system. Remove suspension upper brace. Suspension upper brace fits between strut towers and is bolted to top of each strut tower. Remove air cleaner hose that fits between throttle body and air cleaner assembly.
2. Disconnect control cable(s), coolant hoses, PCV hose and electrical connectors at throttle body. Remove bolts/nuts, throttle body and gaskets from intake manifold. Remove retaining screws, Idle Air Control (IAC) valve and gasket from bottom of throttle body (if necessary).
3. To install, reverse removal procedure using NEW gaskets. Ensure gaskets for throttle body are installed in proper sequence, as 2 gaskets are used and that protrusion on the one gasket is properly positioned. See **Fig. 96** .
4. Tighten throttle body bolts/nuts and suspension upper brace bolts/nuts to specification. See **TORQUE SPECIFICATIONS** . Fill and bleed cooling system. See **COOLING SYSTEM BLEEDING** under COOLING SYSTEM.

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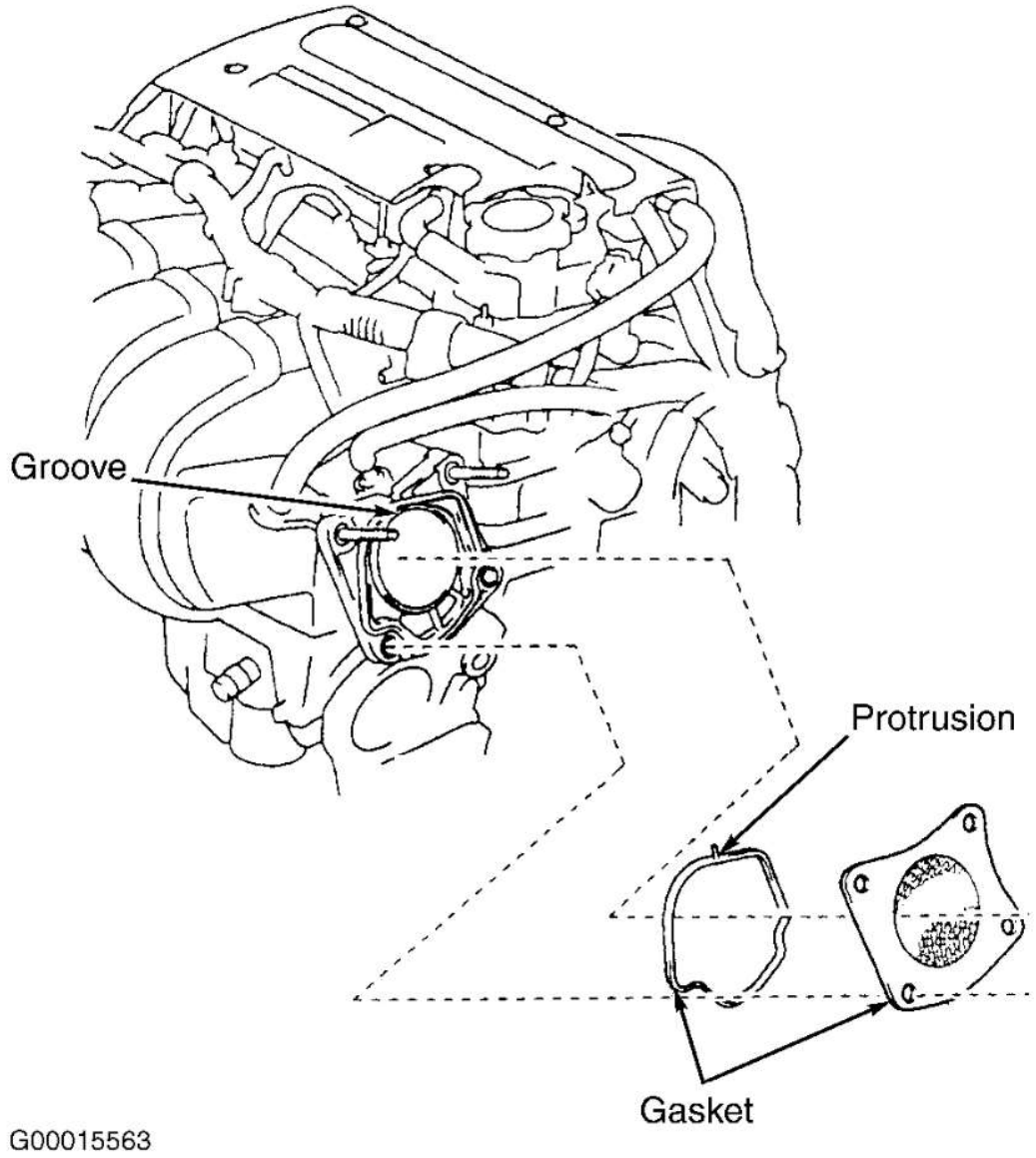


Fig. 96: Installing Gaskets For Throttle Body (MR2)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal (MR2 With Sequential Manual Transaxle)

1. Drain cooling system. Remove suspension upper brace. Suspension upper brace fits between strut towers and is bolted to top of each strut tower. Remove air cleaner hose that fits between throttle body and air cleaner assembly.
2. Disconnect control cable(s), coolant hoses, PCV hose and electrical connectors at throttle body. Remove

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bolts/nuts, throttle body support bracket near bottom of throttle body, throttle body and gaskets from intake manifold. Throttle Position (TP) sensor and accelerator pedal position sensor may be serviced. Throttle control motor is nonserviceable. If throttle control motor is defective, throttle body must be replaced.

Disassembly

1. If necessary to remove TP sensor, remove TP sensor retaining screws and TP sensor from throttle body. See **Fig. 97** . Use care not to drop or damage TP sensor.
2. If necessary to remove accelerator pedal position sensor, remove retaining bolts and accelerator pedal position sensor from throttle body. See **Fig. 97** . Use care not to drop or damage accelerator pedal position sensor.

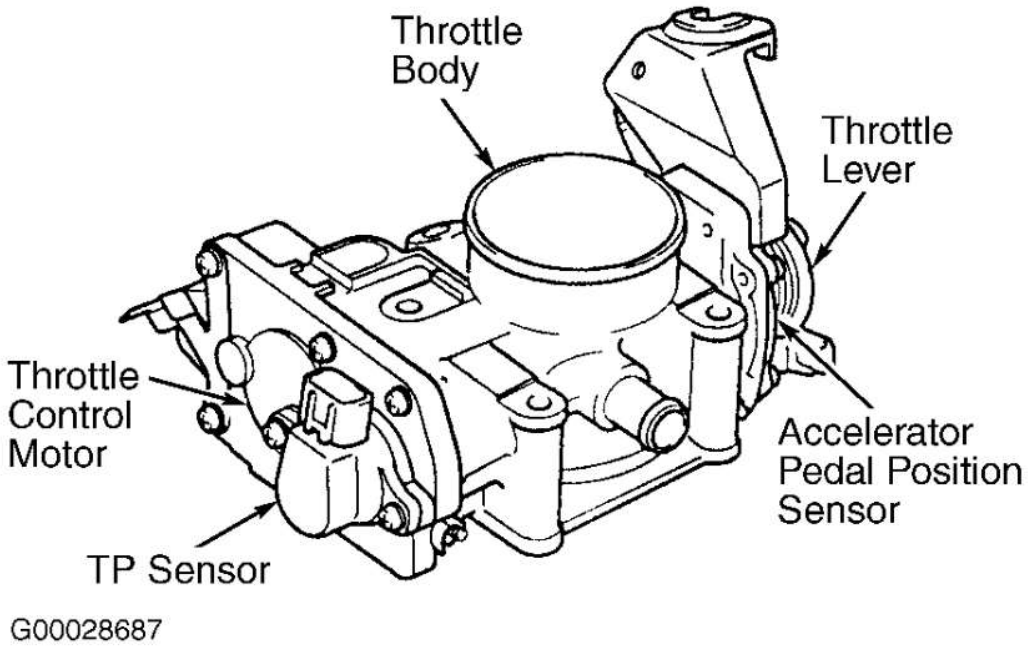


Fig. 97: Locating Accelerator Pedal Position Sensor, Throttle Position Sensor & Throttle Control Motor (MR2 With Sequential Manual Transaxle)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Reassembly

1. To install accelerator pedal position sensor, install accelerator pedal position sensor on throttle body. Tighten accelerator pedal position sensor bolts to specification. See **TORQUE SPECIFICATIONS** .
2. To check accelerator pedal position sensor operation after installation on throttle body, install electrical connector on accelerator pedal position sensor. Connect Toyota hand-held tester or scan tool to data link

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connector No. 3. See **Fig. 98** .

3. Turn ignition on. DO NOT depress accelerator pedal or rotate accelerator pedal position sensor after turning ignition on. Using hand-held tester or scan tool, check that ACCEL POS#1 (VPA) voltage of the CURRENT DATA is .3-.9 volt. This is the standard accelerator pedal position sensor voltage. Turn ignition off. Disconnect electrical connector at accelerator pedal position sensor.
4. To install TP sensor, ensure throttle valve opening on throttle body is about 4 degrees. Install TP sensor on throttle body so it is at position No. 1 (15 degrees) and loosely install TP sensor retaining screws. See **Fig. 99** . Rotate TP sensor counterclockwise to position No. 2 until it contacts throttle valve and slightly tighten TP sensor retaining screws. See **Fig. 99** .

NOTE: Ensure electrical connector is not installed on accelerator pedal position sensor when checking TP sensor adjustment.

5. To check TP sensor adjustment after installation on throttle body, install electrical connector on TP sensor. Ensure electrical connector is NOT installed on accelerator pedal position sensor. Connect Toyota hand-held tester or scan tool to data link connector No. 3. See **Fig. 98** . Turn ignition on. DO NOT depress accelerator pedal or rotate accelerator pedal position sensor after turning ignition on when adjusting TP sensor.
6. Using hand-held tester or scan tool, read the throttle valve opening which is displayed as a percentage. Throttle valve opening may be read by accessing THROTTLE POS under CURRENT DATA on hand-held tester or scan tool.
7. While reading throttle valve opening, rotate TP sensor clockwise and counterclockwise until throttle valve opening is 15.2 percent, as this is the center of the standard throttle valve opening of 14.4-16.0 percent. Tighten TP sensor retaining screws to specification. See **TORQUE SPECIFICATIONS** . When TP sensor retaining screws are tightened, this may cause the throttle valve opening to change. Ensure throttle valve opening remains at 15.2 percent after TP sensor retaining screws are tightened. Readjust TP sensor if necessary.
8. Ensure throttle valve on throttle body is fully closed. Using hand-held tester or scan tool, read the throttle valve opening again. With throttle valve fully closed, throttle valve opening should be 10-14 percent.
9. If throttle valve opening is not within specification with throttle valve fully closed, repeat steps 5 through 8 until correct throttle valve opening is obtained. Turn ignition off. Remove hand-held tester or scan tool. Disconnect electrical connector at TP sensor.

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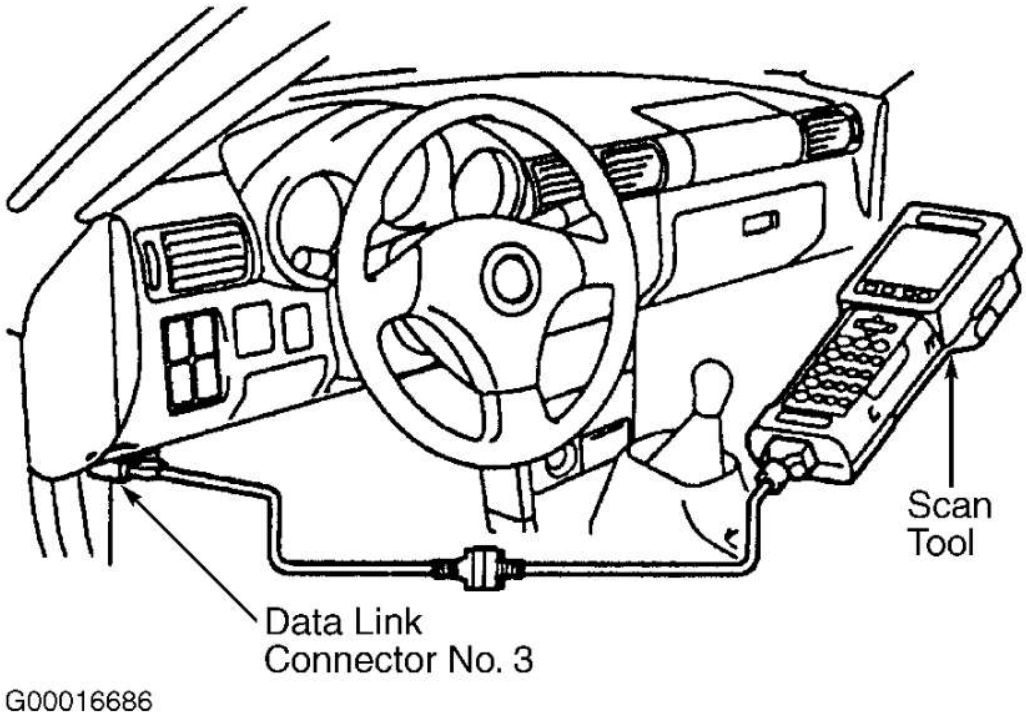


Fig. 98: Locating Data Link Connector No. 3 (MR2 With Sequential Manual Transaxle)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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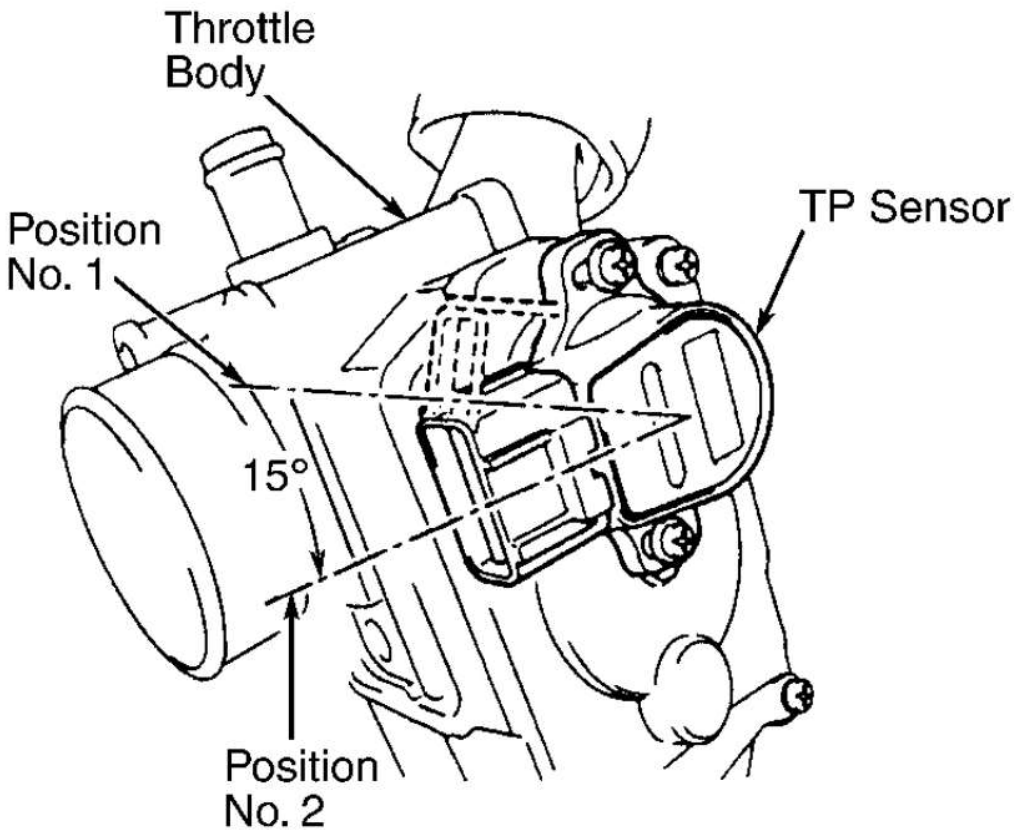


Fig. 99: Installing Throttle Position Sensor (MR2 With Sequential Manual Transaxle)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Installation

1. To install, reverse removal procedure using NEW gaskets. Ensure gaskets for throttle body are installed in proper sequence, as 2 gaskets are used and that protrusion on the one gasket is properly positioned. See **Fig. 96** .
2. Tighten throttle body bolts/nuts, throttle body support bracket bolts and suspension upper brace bolts/nuts to specification. See **TORQUE SPECIFICATIONS** . Fill and bleed cooling system. See **COOLING SYSTEM BLEEDING** under COOLING SYSTEM.

Removal (Prius)

WARNING: Read service precautions before proceeding with service procedure. See SERVICE PRECAUTIONS .

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Drain cooling system. Remove air cleaner assembly on top of engine for access to throttle body. Disconnect coolant hoses, PCV hose and electrical connectors at throttle body. Remove bolts/nuts, throttle body and gasket from intake manifold. Throttle Position (TP) sensor may be serviced. Throttle control motor is nonserviceable. If throttle control motor is defective, throttle body must be replaced.

Disassembly & Reassembly

1. If necessary to remove TP sensor, remove TP sensor retaining screws and TP sensor from throttle body. See **Fig. 100** . Use care not to drop or damage TP sensor.
2. To install TP sensor, ensure throttle valve opening on throttle body is about 3.5 degrees. Install TP sensor on throttle body so it is at position No. 1 (15 degrees) and loosely install TP sensor retaining screws. See **Fig. 101** . Rotate TP sensor counterclockwise to position No. 2 until it contacts throttle valve and slightly tighten TP sensor retaining screws. See **Fig. 101** .

NOTE: Ensure electrical connector is not installed on throttle control motor when checking TP sensor adjustment.

3. To check TP sensor adjustment after installation on throttle body, install electrical connector on TP sensor. Ensure electrical connector is NOT installed on throttle control motor. Connect Toyota hand-held tester to data link connector No. 3. See **Fig. 102** . Turn ignition on. DO NOT depress accelerator pedal after turning ignition on when adjusting TP sensor.
4. Using hand-held tester, read the throttle valve opening which is displayed as a percentage. Throttle valve opening may be read by accessing THROTTLE POS under CURRENT DATA on hand-held tester.
5. While reading throttle valve opening, rotate TP sensor counterclockwise until throttle valve opening is 14.8 percent, as this is the center of the standard throttle valve opening of 14.0-15.6 percent. Tighten TP sensor retaining screws to specification. See **TORQUE SPECIFICATIONS** . When TP sensor retaining screws are tightened, this may cause the throttle valve opening to change. Ensure throttle valve opening remains at 14.8 percent after TP sensor retaining screws are tightened. Readjust TP sensor if necessary.
6. Ensure throttle valve on throttle body is fully closed. Using hand-held tester, read the throttle valve opening again. With throttle valve fully closed, throttle valve opening should be 10-14 percent.
7. If throttle valve opening is not within specification with throttle valve fully closed, repeat steps 5 and 6 until correct throttle valve opening is obtained. Turn ignition off. Remove hand-held tester. Disconnect electrical connector at TP sensor.

Installation

To install, reverse removal procedure using NEW gasket. Tighten throttle body bolts/nuts to specification. See **TORQUE SPECIFICATIONS** . Fill and bleed cooling system. See **COOLING SYSTEM BLEEDING** under COOLING SYSTEM.

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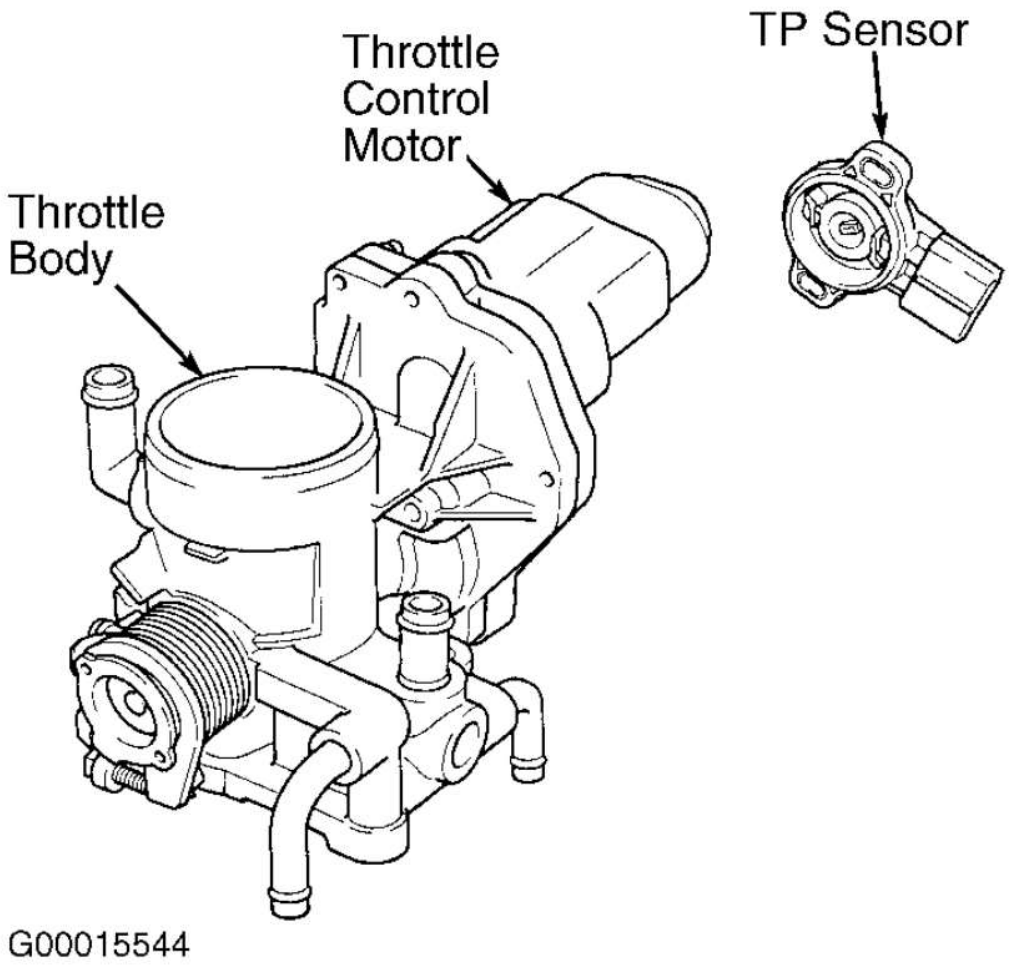


Fig. 100: Locating Throttle Position Sensor & Throttle Control Motor (Prius)
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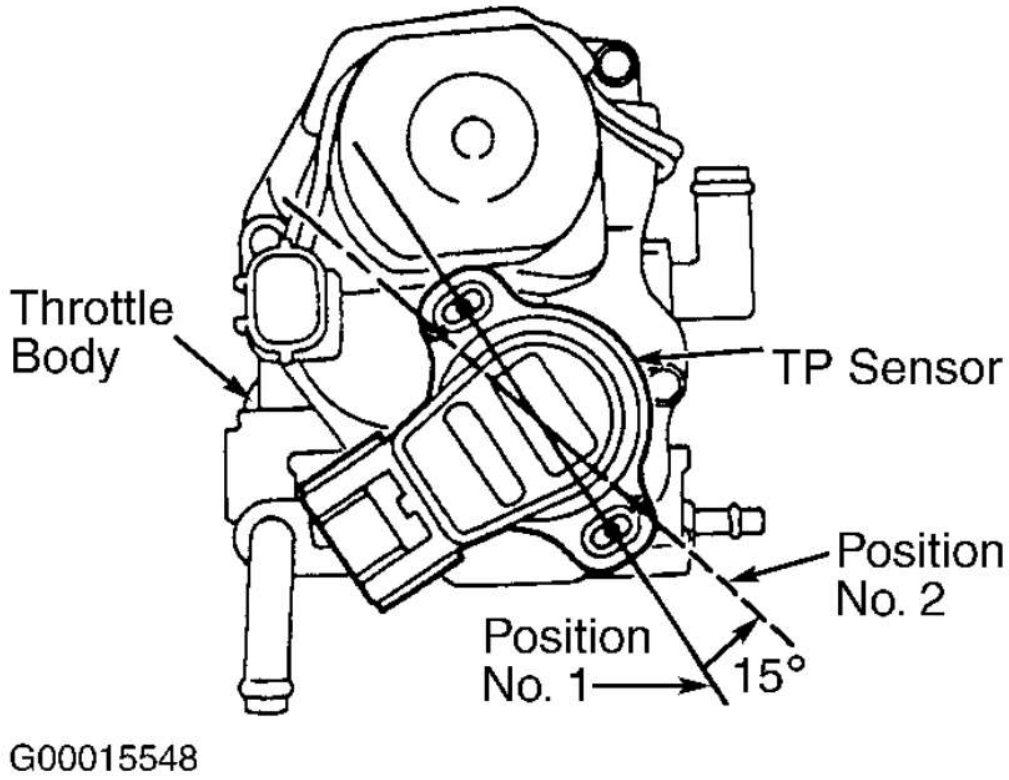


Fig. 101: Installing Throttle Position Sensor (Prius)
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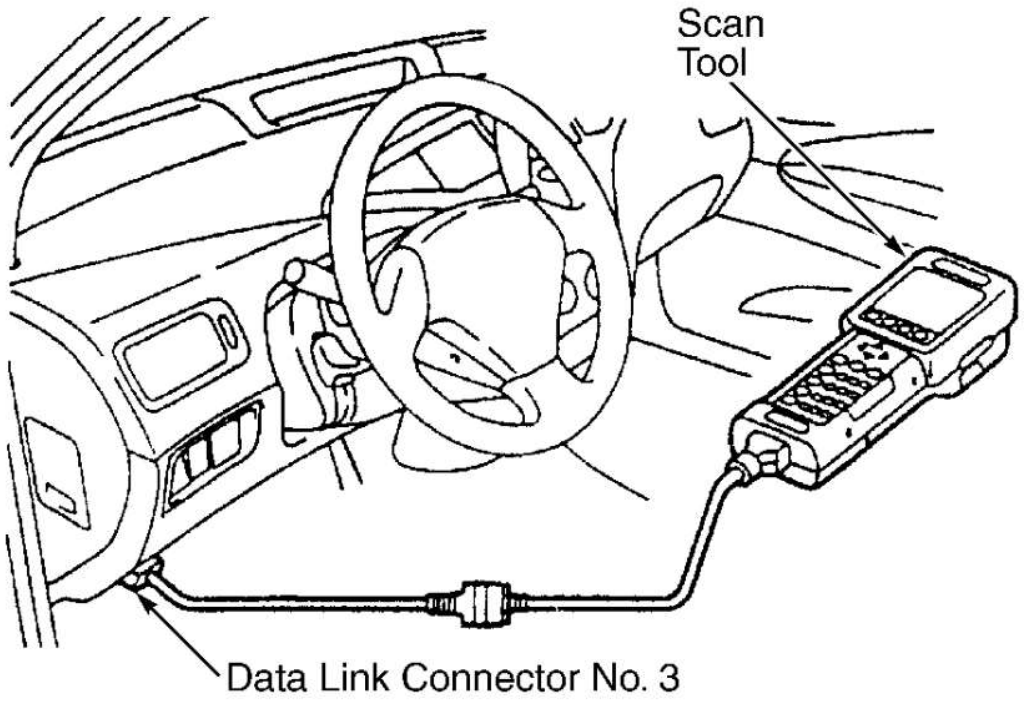


Fig. 102: Locating Data Link Connector No. 3 (Prius)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal & Installation (RAV4)

1. Drain cooling system. Remove air cleaner hose that fits between throttle body and air cleaner assembly. Disconnect control cable(s), coolant hoses, vacuum hose and electrical connectors at throttle body. Remove bolts, throttle body and gasket from intake manifold. Remove retaining screws, Idle Air Control (IAC) valve and gasket from side of throttle body (if necessary).
2. To install, reverse removal procedure using NEW gasket. Ensure gasket for throttle body is installed so protrusion on gasket aligns with groove on intake manifold. See **Fig. 93** . Tighten throttle body bolts to specification. See **TORQUE SPECIFICATIONS** . Fill cooling system.

Removal & Installation (Tacoma)

1. Drain cooling system. Remove air cleaner hose and intake air connector. See **Fig. 91** .
2. Disconnect control cable(s), PCV hose, air hose, vacuum hoses and electrical connectors at throttle body. Remove bolts/nuts, throttle body and gasket from intake manifold. Disconnect remaining coolant hoses from bottom of throttle body. Remove throttle body. Remove screws, Idle Air Control (IAC) valve and gasket from bottom of throttle body (if necessary).

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3. To install, reverse removal procedure using NEW gasket. Tighten throttle body bolts/nuts to specification. See **TORQUE SPECIFICATIONS** . Fill cooling system

IDLE AIR CONTROL VALVE

Removal & Installation (Celica, Corolla, ECHO, Highlander, MR2 With Standard Type Manual Transaxle, RAV4 & Tacoma)

Idle Air Control (IAC) valve is located on throttle body. See **THROTTLE BODY** for servicing of IAC valve.

EMISSION SYSTEMS & SUB-SYSTEMS

CANISTER CLOSED VALVE VACUUM SWITCHING VALVE

Removal & Installation (Camry, Camry Solara, Celica, Corolla, Highlander, MR2, RAV4 & Tacoma)

Canister Closed Valve Vacuum Switching Valve (CCV VSV) servicing procedure is just primarily an unbolt and bolt-on procedure. For illustration of CCV VSV, see **EMISSION SYSTEMS & SUB-SYSTEMS** in SYSTEM & COMPONENT TESTING - 4-CYLINDER article.

Removal & Installation (ECHO)

Canister Closed Valve Vacuum Switching Valve (CCV VSV) is located on charcoal canister. See **Fig. 103** . Charcoal canister is located near fuel tank. Remove charcoal canister. Remove bracket for access to CCV VSV if necessary. See **Fig. 103** . Remove screw and CCV VSV with "O" ring from charcoal canister. To install, reverse removal procedure using NEW "O" ring.

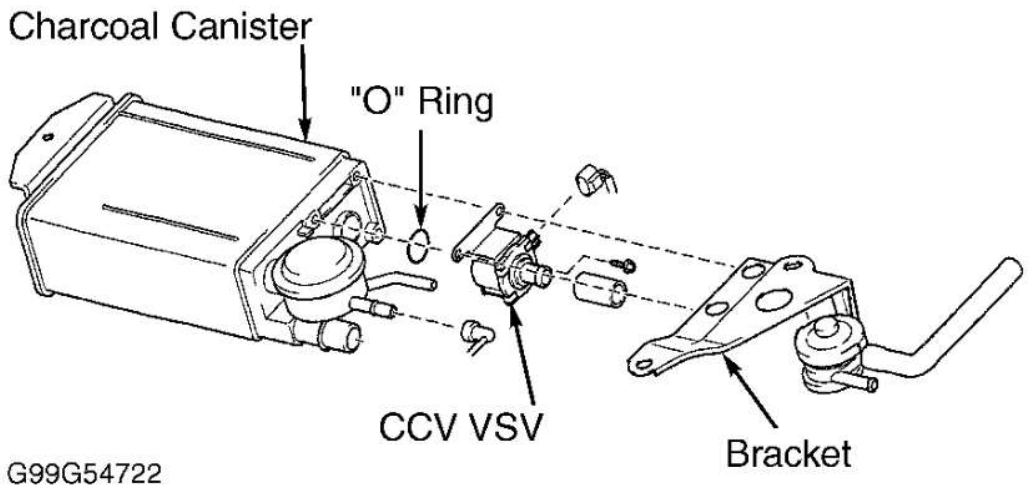


Fig. 103: Locating Canister Closed Valve Vacuum Switching Valve (ECHO)

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Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal (Prius)

WARNING: Read service precautions before proceeding with service procedure. See SERVICE PRECAUTIONS .

1. Canister Closed Valve Vacuum Switching Valve (CCV VSV) is located on top of fuel tank. See **Fig. 104** . Fuel tank must be removed for access to CCV VSV. Release fuel pressure. See **FUEL SYSTEM PRESSURE RELEASE** .
2. Remove rear seat cushion and cover plate on floor panel for access to fuel pump if not previously done. Disconnect electrical connector from top of fuel pump. This is electrical connector for fuel pump and fuel gauge sending unit. Electric fuel pump is located in the fuel tank.
3. Raise and support vehicle. Remove exhaust pipe assembly and tailpipe for access to fuel tank. Drain gasoline from fuel tank into approved container. Disconnect fuel filler tube and any remaining hoses for fuel tank removal. Support fuel tank with transmission jack. Remove fuel tank retaining bolts and fuel tank.
4. Disconnect necessary hoses and electrical connectors for removal of CCV VSV and fresh air valve. Remove bolt and separate fresh air valve from CCV VSV. See **Fig. 104** . Remove bolts for CCV VSV and remove CCV VSV along with trap filter and seal packing. Remove bolts and separate CCV VSV from trap filter.

Installation

To install, reverse removal procedure using NEW seal packing on trap filter and gasket on exhaust pipe at exhaust manifold. Tighten fuel tank retaining bolts and exhaust pipe-to-exhaust manifold bolts to specification. See **TORQUE SPECIFICATIONS** . Operate fuel pump and check for fuel leaks. See **FUEL PUMP OPERATION** under FUEL SYSTEMS in BASIC DIAGNOSTIC PROCEDURES - 4-CYLINDER article.

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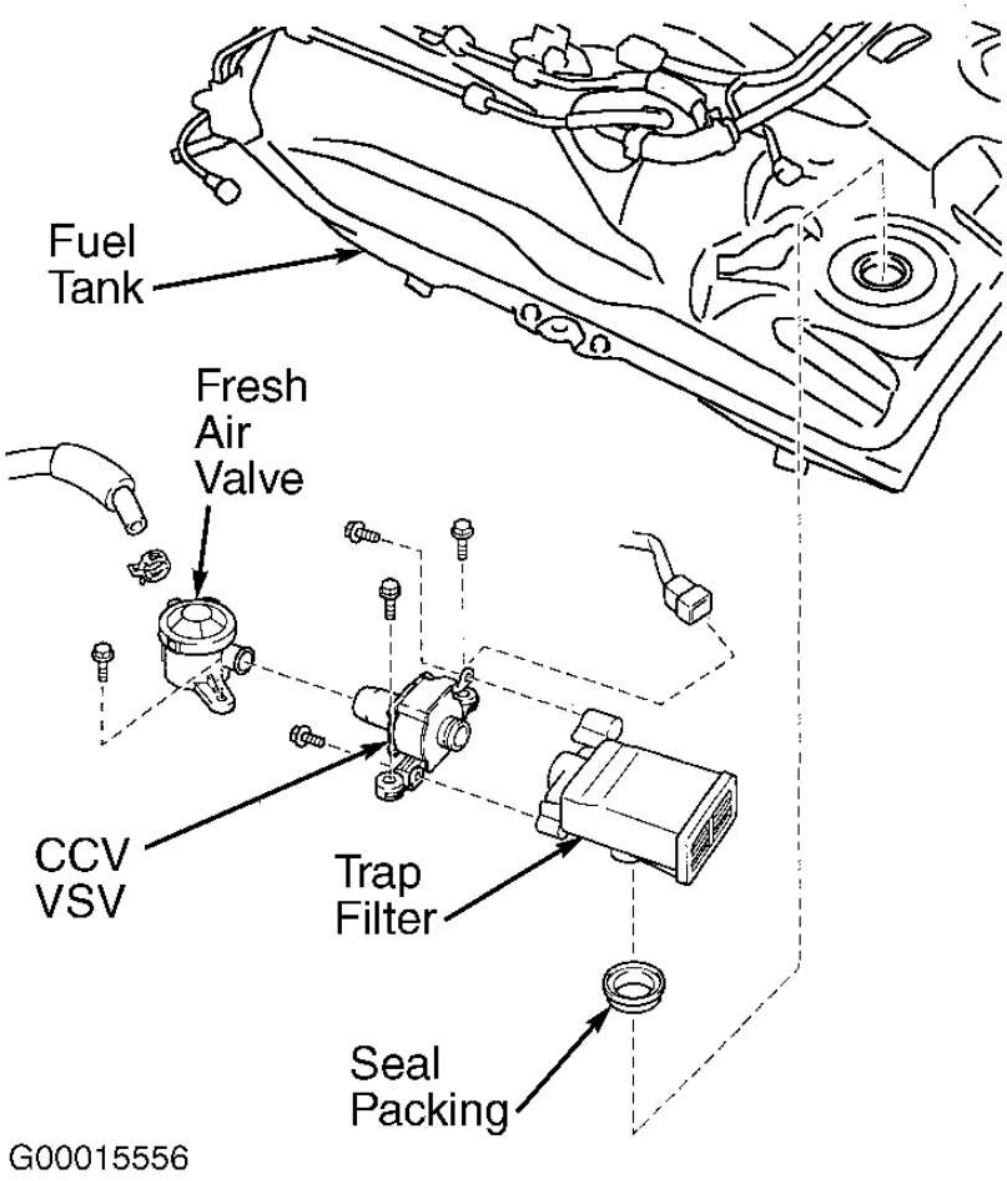


Fig. 104: Locating Canister Closed Valve Vacuum Switching Valve, Fresh Air Valve & Trap Filter (Prius)
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CHARCOAL CANISTER

Removal & Installation (All Models)

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WARNING: On Prius, read service precautions before proceeding with service procedure. See SERVICE PRECAUTIONS .

Charcoal canister is located near fuel tank. For illustration of charcoal canister location, see **EMISSION SYSTEMS & SUB-SYSTEMS** in SYSTEM & COMPONENT TESTING - 4-CYLINDER article. Service information is not available from manufacturer.

EGR GAS TEMPERATURE SENSOR

Removal & Installation (Tacoma 2.7L 4-Cyl. 3RZ-FE)

See **EGR GAS TEMPERATURE SENSOR** under ENGINE SENSORS & SWITCHES.

EGR VACUUM SWITCHING VALVE

Removal & Installation (Tacoma 2.7L 3RZ-FE)

EGR Vacuum Switching Valve (VSV) servicing procedure is just primarily an unbolt and bolt-on procedure. EGR VSV is located on bracket, near throttle body and contains Green 2-pin electrical connector with White/Red and Red/Black wires.

EGR VALVE

Removal & Installation (Tacoma 2.7L 3RZ-FE)

EGR valve servicing procedure is just primarily an unbolt and bolt-on procedure using a NEW gasket. Tighten EGR valve retaining nuts and EGR pipe bolts/nuts to specification. See **TORQUE SPECIFICATIONS** .

EVAP VACUUM SWITCHING VALVE

Removal & Installation (All Models)

WARNING: On Prius, read service precautions before proceeding with service procedure. See SERVICE PRECAUTIONS .

EVAP Vacuum Switching Valve (VSV) servicing procedure is just primarily an unbolt and bolt-on procedure. See **EVAP VACUUM SWITCHING VALVE LOCATION** table. For illustration of EVAP VSV location, see **EMISSION SYSTEMS & SUB-SYSTEMS** in SYSTEM & COMPONENT TESTING - 4-CYLINDER article.

EVAP VACUUM SWITCHING VALVE LOCATION

Application	Location
Camry	On Air Cleaner Housing & Contains Blue or Black 2-Pin Electrical Connector With Black/White & Black/Red Wires
Camry	On Air Intake Hose, Near Air Cleaner Assembly & Contains Black 2-Pin Electrical

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Solara	Connector With Black/White & Black/Red Wires
Celica	On Bracket At Rear Of Air Cleaner Housing & Contains Black 2-Pin Electrical Connector With Green/Orange & Black/White Wires
Corolla	On Bracket At Rear Of Air Cleaner Housing & Contains Black 2-Pin Electrical Connector With Blue/Black & Black Wires
ECHO	On Bracket At Side Of Air Cleaner Housing & Contains Blue 2-Pin Electrical Connector With Black/Yellow & White/Green Wires
Highlander	On Rear Of Air Cleaner Housing & Contains Blue 2-Pin Electrical Connector With Black/White & Black/Red Wires
MR2	On Air Intake Hose, Near Air Cleaner Assembly & Contains Blue 2-Pin Electrical Connector With Black/Red & White Wires
Prius	At Passenger's Side Front Corner Of Engine Compartment, Near Air Intake Hose & Contains Blue 2-Pin Electrical Connector With Red/Blue & Black Wires
RAV4	On Air Intake Hose, Near Air Cleaner Assembly & Contains Black 2-Pin Electrical Connector With Black/Red & Pink Wires
Tacoma	On Bracket Bolted To Inside Of Driver's Side Front Fender Panel & Contains Black 2-Pin Electrical Connector With White/Green & White/Red Wires

FRESH AIR VALVE

Removal & Installation (Prius)

WARNING: Read service precautions before proceeding with service procedure. See SERVICE PRECAUTIONS .

Fresh air valve is located on top of fuel tank. See **Fig. 104** . For servicing of fresh air valve, see **CANISTER CLOSED VALVE VACUUM SWITCHING VALVE** .

HYDROCARBON ADSORBER CATALYST VACUUM SWITCHING VALVE

Removal & Installation (Prius)

WARNING: Read service precautions before proceeding with service procedure. See SERVICE PRECAUTIONS .

Hydrocarbon Adsorber Catalyst (HCAC) Vacuum Switching Valve (VSV) servicing procedure is just primarily an unbolt and bolt-on procedure. HCAC VSV is located on bracket bolted to timing chain end of engine and uses a Brown 2-pin electrical connector with Black and Black/White wires. See **Fig. 105** .

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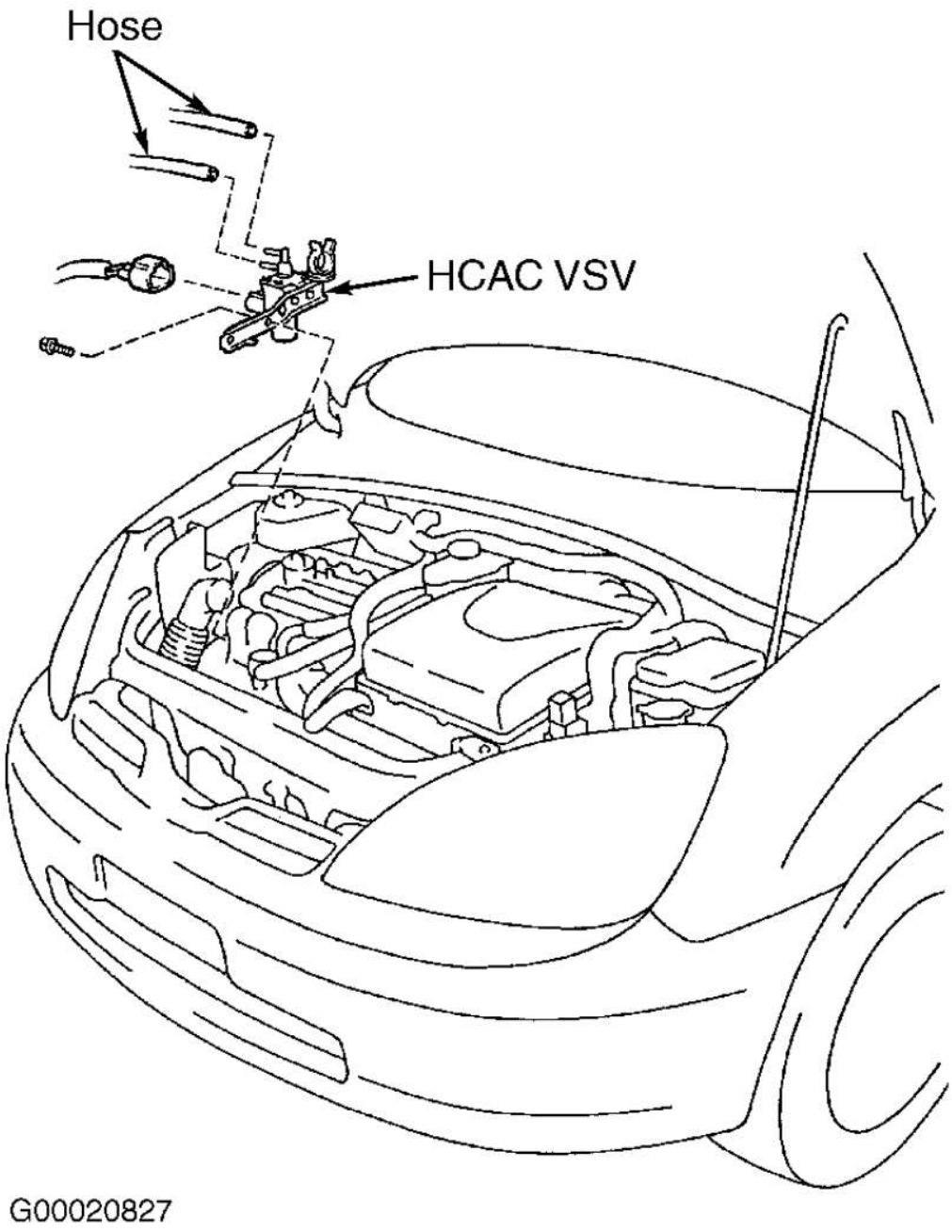


Fig. 105: Locating Hydrocarbon Adsorber Catalyst Vacuum Switching Valve (Prius)
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PRESSURE SWITCHING VALVE VACUUM SWITCHING VALVE

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Removal & Installation (Camry, Camry Solara, Celica, Corolla, Highlander, MR2, RAV4 & Tacoma)

Pressure switching valve Vacuum Switching Valve (VSV) servicing procedure is just primarily an unbolt and bolt-on procedure. See **PRESSURE SWITCHING VALVE VSV LOCATION** table. For illustration of pressure switching valve VSV location, see **EMISSION SYSTEMS & SUB-SYSTEMS** in SYSTEM & COMPONENT TESTING - 4-CYLINDER article.

PRESSURE SWITCHING VALVE VSV LOCATION

Application	Location
Camry	On Bracket At Charcoal Canister Near Fuel Tank & Contains Blue 2-Pin Electrical Connector With Violet & Black/Red Wires
Camry Solara	On Bracket At Charcoal Canister Near Fuel Tank & Contains Blue 2-Pin Electrical Connector With White/Red & Red Wires
Celica	On Bracket At Charcoal Canister Near Fuel Tank & Contains Blue 2-Pin Electrical Connector With Green/Orange & Black/White Wires
Corolla	On Bracket At Charcoal Canister Near Fuel Tank & Contains Black 2-Pin Electrical Connector With Red & Black Wires
Highlander	On Bracket At Charcoal Canister Near Fuel Tank & Contains Blue 2-Pin Electrical Connector With White & Green/Yellow Wires
MR2	Below Driver's Side Luggage Compartment, On Bracket At Charcoal Canister Near Fuel Tank & Contains Blue 2-Pin Electrical Connector With Blue/White & Black/Red Wires
RAV4	On Bracket At Charcoal Canister Near Fuel Tank & Contains Blue 2-Pin Electrical Connector With Green/Orange & Black/Red Wires
Tacoma	On Bracket At Charcoal Canister Near Fuel Tank & Contains Blue 2-Pin Electrical Connector With Green/Black & White/Red Wires

PURGE FLOW SWITCHING VALVE VACUUM SWITCHING VALVE

Removal & Installation (Prius)

WARNING: Read service precautions before proceeding with service procedure. See SERVICE PRECAUTIONS .

1. Purge flow switching valve Vacuum Switching Valve (VSV) is located on bracket at charcoal canister on top of fuel tank and contains Blue 2-pin electrical connector with Black and Black/Red wires. See **Fig. 106** . Manufacturer states fuel tank must be removed for access to purge flow switching valve VSV. Release fuel pressure. See **FUEL SYSTEM PRESSURE RELEASE** .
2. Remove rear seat cushion and cover plate on floor panel for access to fuel pump if not previously done. Disconnect electrical connector from top of fuel pump. This is electrical connector for fuel pump and fuel gauge sending unit. Electric fuel pump is located in the fuel tank.
3. Raise and support vehicle. Remove exhaust pipe assembly and tailpipe for access to fuel tank. Drain gasoline from fuel tank into approved container. Disconnect fuel filler tube and any remaining hoses for fuel tank removal. Support fuel tank with transmission jack. Remove fuel tank retaining bolts and fuel tank.

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4. Disconnect necessary hoses and electrical connector for removal of purge flow switching valve VSV. Remove retaining bolts and purge flow switching valve. To install, reverse removal procedure using NEW gasket on exhaust pipe at exhaust manifold. Tighten fuel tank retaining bolts and exhaust pipe-to-exhaust manifold bolts to specification. See **TORQUE SPECIFICATIONS** . Operate fuel pump and check for fuel leaks. See **FUEL PUMP OPERATION** under FUEL SYSTEMS in BASIC DIAGNOSTIC PROCEDURES - 4-CYLINDER article.

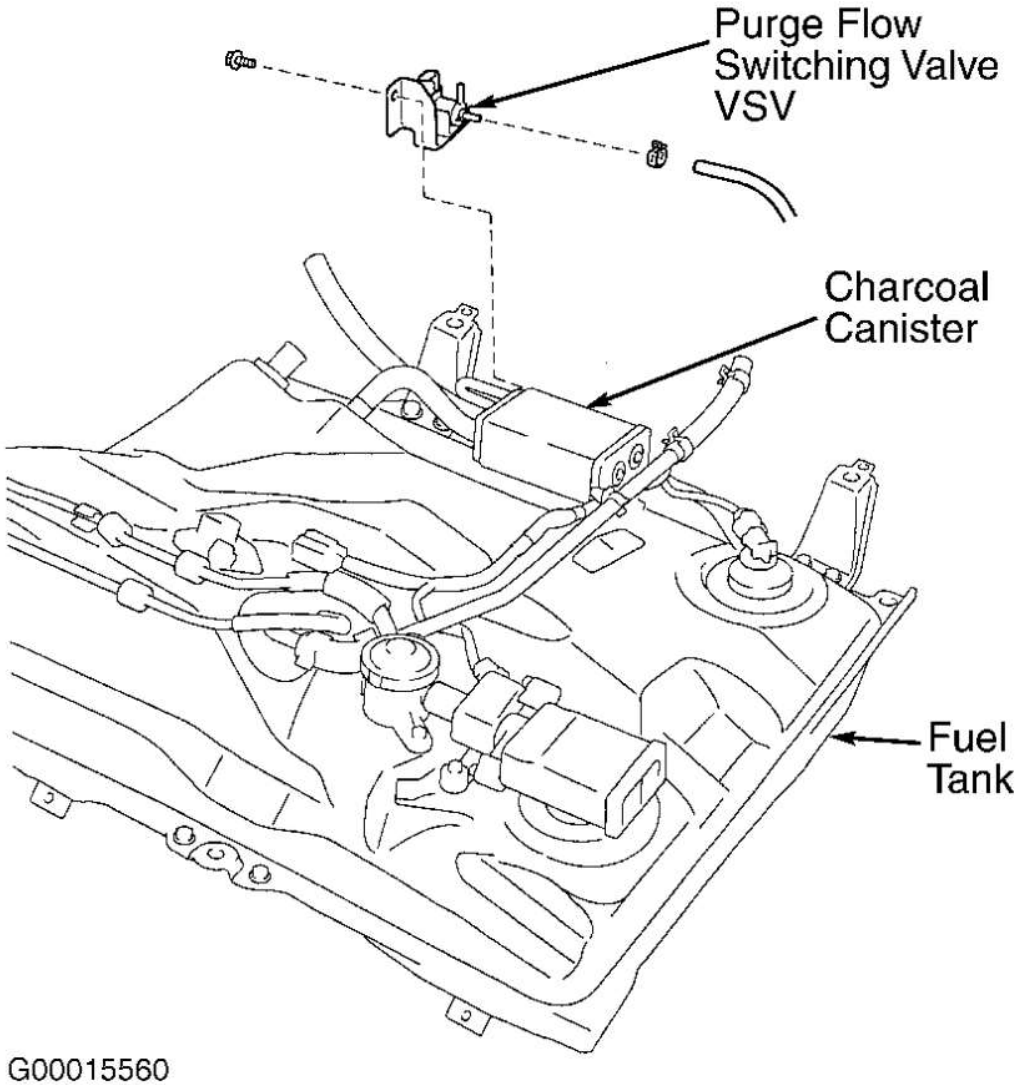


Fig. 106: Locating Purge Flow Switching Valve Vacuum Switching Valve (Prius)
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TRAP FILTER

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Removal & Installation (Prius)

WARNING: Read service precautions before proceeding with service procedure. See SERVICE PRECAUTIONS .

Trap filter is located on top of fuel tank. See **Fig. 104** . For servicing of trap filter, see **CANISTER CLOSED VALVE VACUUM SWITCHING VALVE** .

VAPOR PRESSURE SENSOR

Removal & Installation (Camry & Highlander)

Information is not available from manufacturer.

Removal & Installation (Camry Solara & Corolla)

Service information is not available from manufacturer. On Camry Solara, vapor pressure sensor is located on charcoal canister near fuel tank and contains Black 3-pin electrical connector with Blue/Red, Brown and Yellow wires. On Corolla, vapor pressure sensor is located on charcoal canister near fuel tank and contains Black 3-pin electrical connector with Brown, Blue and Yellow wires. For illustration of vapor pressure sensor location, see **EMISSION SYSTEMS & SUB-SYSTEMS** in SYSTEM & COMPONENT TESTING - 4-CYLINDER article.

Removal & Installation (Celica & ECHO)

Vapor pressure sensor is located on top of fuel pump. See **Fig. 54** and **Fig. 61** . Remove rear seat cushion and cover plate on floor panel for access to vapor pressure sensor. Disconnect electrical connector at vapor pressure sensor. Ensure area around vapor pressure sensor is clean. Remove retaining clip and vapor pressure sensor. To install reverse removal procedure.

Removal & Installation (MR2)

1. Vapor pressure sensor is located on top of fuel pump. See **Fig. 65** . Apply tape to end of screwdriver to prevent scratching interior components. Using screwdriver, remove door opening scuff plates, lower trim covers and quarter trim covers. See **Fig. 4** . Remove luggage compartment lids, luggage compartment boxes and cover plate on floor panel for access to vapor pressure sensor.
2. Remove bolts and fuel pump protector cover located on fuel tank, above fuel pump. Disconnect electrical connector at vapor pressure sensor. Ensure area around vapor pressure sensor is clean. Remove retaining clip located just below the vapor pressure sensor. Remove vapor pressure sensor. To install reverse removal procedure.

Removal (Prius)

WARNING: Read service precautions before proceeding with service procedure. See SERVICE PRECAUTIONS .

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1. Vapor pressure sensor is located at top corner of fuel tank. See **Fig. 107** . Manufacturer states fuel tank must be removed for access to vapor pressure sensor. Release fuel pressure. See **FUEL SYSTEM PRESSURE RELEASE** .
2. Remove rear seat cushion and cover plate on floor panel for access to fuel pump if not previously done. Disconnect electrical connector from top of fuel pump. This is electrical connector for fuel pump and fuel gauge sending unit. Electric fuel pump is located in the fuel tank.
3. Raise and support vehicle. Remove exhaust pipe assembly and tailpipe for access to fuel tank. Drain gasoline from fuel tank into approved container. Disconnect fuel filler tube and any remaining hoses for fuel tank removal. Support fuel tank with transmission jack. Remove fuel tank retaining bolts and fuel tank.
4. Disconnect electrical connector at vapor pressure sensor. Ensure area around vapor pressure sensor is clean. Remove retaining clip and vapor pressure sensor from mounting flange. Use care not to scratch vapor pressure sensor or vapor pressure sensor sealing surfaces. DO NOT use tools to remove vapor pressure sensor. Vapor pressure sensor should be removed from mounting flange by-hand.

Installation

1. If mounting flange was removed from fuel tank, using NEW seal packing, install mounting flange in fuel tank. Ensure vapor pressure sensor and vapor pressure sensor sealing surfaces are clean and no scratches exist. Install vapor pressure sensor. Ensure vapor pressure sensor is fully seated in mounting flange.
2. Install retaining clip. Ensure retaining clip is fully seated in rim of vapor pressure sensor. Check that vapor pressure sensor cannot be pulled from mounting flange. To install remaining components, reverse removal procedure using NEW gasket on exhaust pipe at exhaust manifold. Tighten fuel tank retaining bolts and exhaust pipe-to-exhaust manifold bolts to specification. See **TORQUE SPECIFICATIONS** . Operate fuel pump and check for fuel leaks. See **FUEL PUMP OPERATION** under FUEL SYSTEMS in BASIC DIAGNOSTIC PROCEDURES - 4-CYLINDER article.

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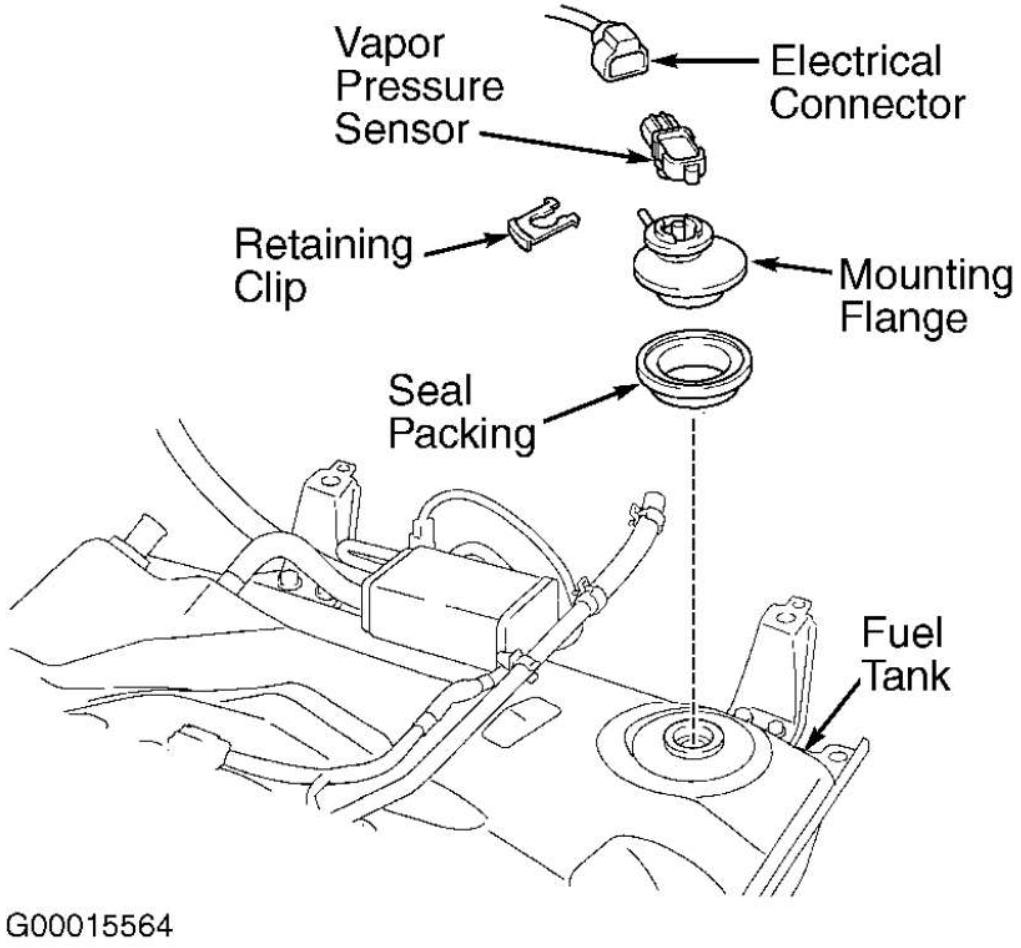


Fig. 107: Locating Vapor Pressure Sensor (Prius)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal & Installation (RAV4)

Vapor pressure sensor is located on top of fuel pump. See **Fig. 69** . Remove driver's side rear seat and cover plate on floor panel for access to vapor pressure sensor. Disconnect electrical connector at vapor pressure sensor. Ensure area around vapor pressure sensor is clean. Remove retaining clip and vapor pressure sensor. To install reverse removal procedure.

Removal & Installation (Tacoma)

Vapor pressure sensor is located on top of fuel pump. See **Fig. 73** . Servicing information is not available from manufacturer.

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VARIABLE VALVE LIFT SYSTEM

VARIABLE VALVE LIFT OIL CONTROL VALVE

NOTE: Variable Valve Lift (VVL) oil control valve may also be referred to as VVL Oil Control Valve (OCV) or camshaft timing oil control valve (VVL) and is used with VVL system. VVL system may also be referred to as Variable Valve Timing Lift Intelligent (VVTL-I or VVTL-i) system.

Removal & Installation (Celica 1.8L 2ZZ-GE)

1. Variable Valve Lift (VVL) oil control valve is located at intake manifold side of cylinder head, near flywheel end of engine. See **Fig. 110** . Remove No. 2 cylinder head cover located on top of engine, above ignition coils and valve cover, front fender apron seal and upper radiator support seal. See **Fig. 12** .
2. Disconnect electrical connector at VVL oil control valve. Remove retaining bolt and VVL oil control valve with "O" ring from housing on rear of cylinder head. To install, reverse removal procedure using NEW "O" ring. Tighten retaining bolt to specification. See **TORQUE SPECIFICATIONS** .

VARIABLE VALVE TIMING SYSTEM

VARIABLE VALVE TIMING CAMSHAFT TIMING OIL CONTROL VALVE

NOTE: Variable Valve Timing (VVT) camshaft timing oil control valve may also be referred to as oil control valve for VVT, VVT Oil Control Valve (OCV) or camshaft timing oil control valve VVT.

Removal & Installation (Camry, Camry Solara, Celica, Corolla, ECHO, Highlander, MR2, Prius & RAV4)

WARNING: On Prius, read service precautions before proceeding with service procedure. See SERVICE PRECAUTIONS .

1. Variable Valve Timing (VVT) camshaft timing oil control valve is located at intake manifold side of cylinder head, near timing chain end of engine. See **Fig. 108** -**Fig. 113** . Remove No. 2 cylinder head cover (if equipped) which is located on top of engine, above ignition coils and valve cover for access to VVT camshaft timing oil control valve.
2. On Celica, remove front fender apron seal, upper radiator support seal, generator and ventilation tube for access to VVT camshaft timing oil control valve. See **Fig. 12** . On ECHO, remove generator bracket for access to VVT camshaft timing oil control valve. On MR2, remove suspension upper brace. Suspension upper brace fits between strut towers and is bolted to top of each strut tower. On Prius, remove air cleaner assembly on top of engine for access to VVT camshaft timing oil control valve.
3. On all models, disconnect electrical connector at VVT camshaft timing oil control valve. Remove retaining bolt and VVT camshaft timing oil control valve with "O" ring from cylinder head. To install, reverse removal procedure using NEW "O" ring. Tighten retaining bolt to specification (if available). See **TORQUE SPECIFICATIONS** .

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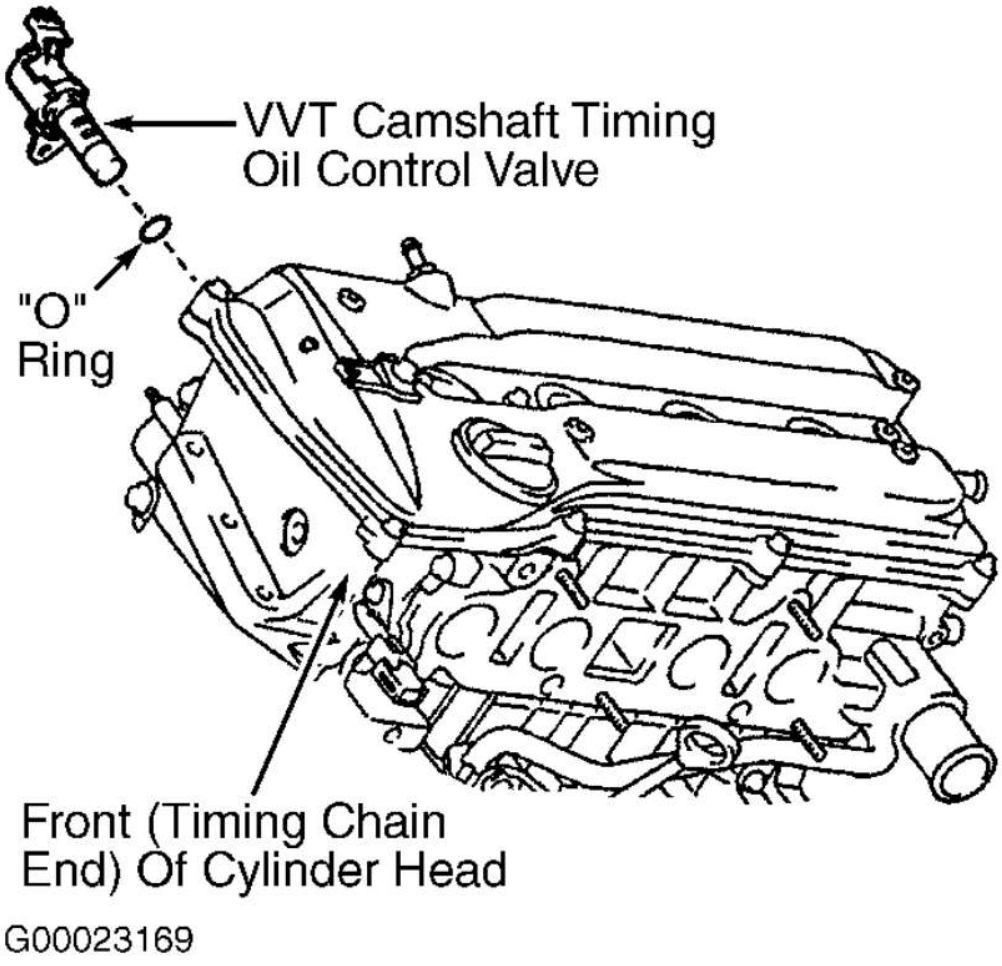


Fig. 108: Locating Typical Variable Valve Timing Camshaft Timing Oil Control Valve (Camry, Camry Solara, Highlander & RAV4)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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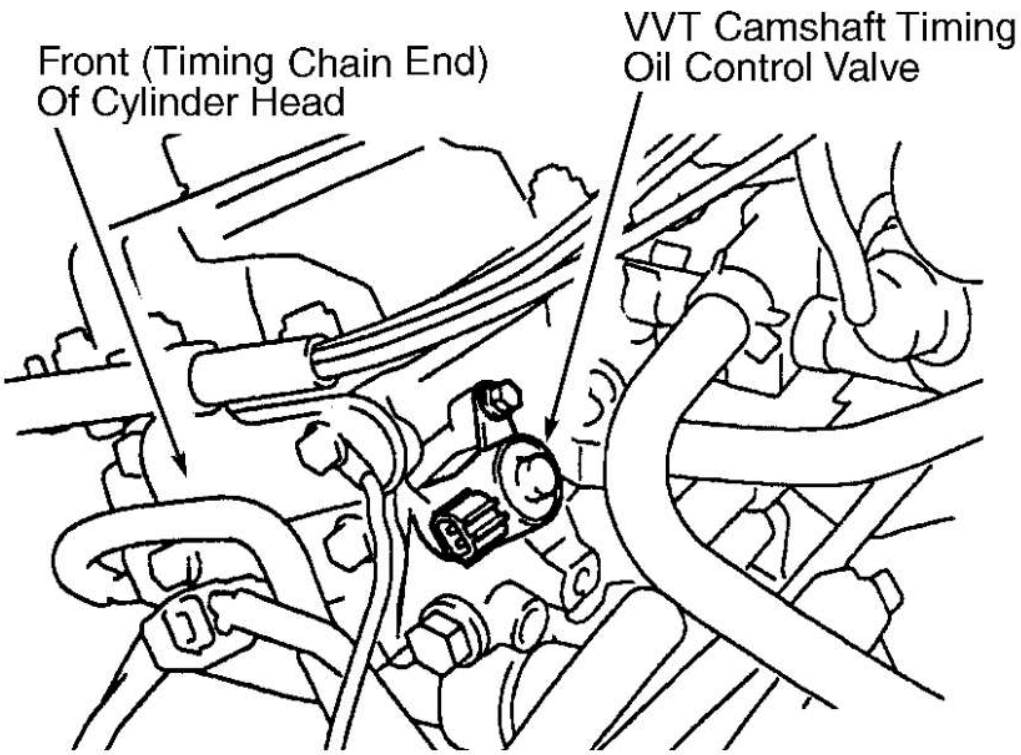


Fig. 109: Locating Variable Valve Timing Camshaft Timing Oil Control Valve (Celica 1.8L 1ZZ-FE)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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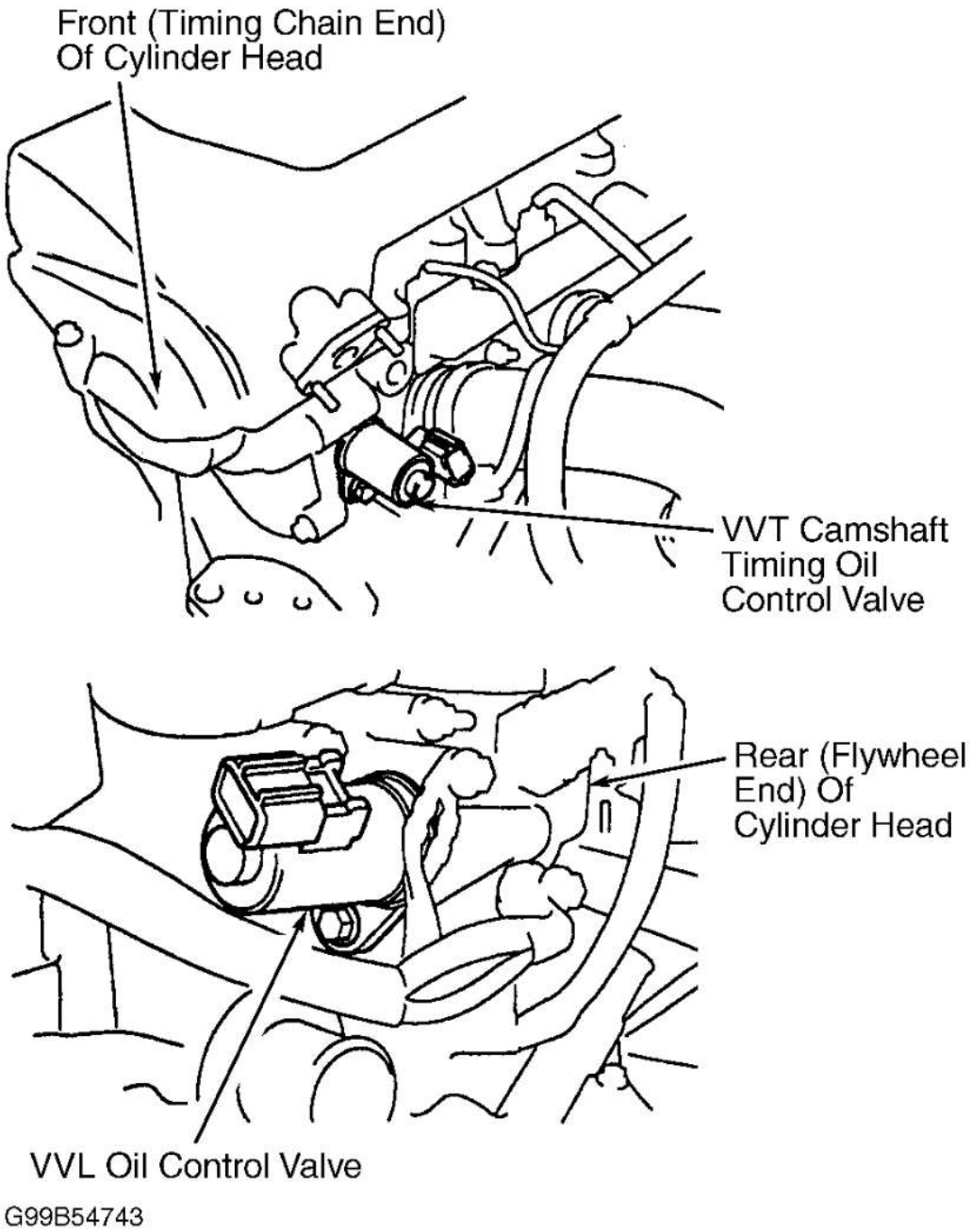


Fig. 110: Locating Variable Valve Lift Oil Control Valve & Variable Valve Timing Camshaft Timing Oil Control Valve (Celica 1.8L 2ZZ-GE)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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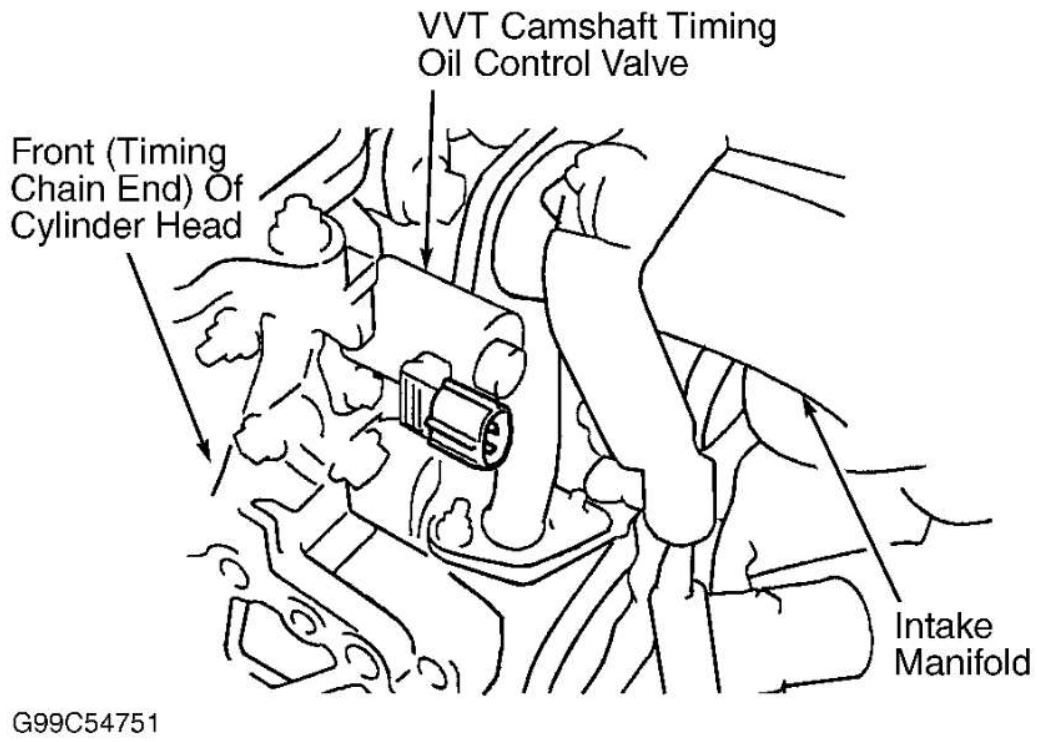


Fig. 111: Locating Variable Valve Timing Camshaft Timing Oil Control Valve (Corolla)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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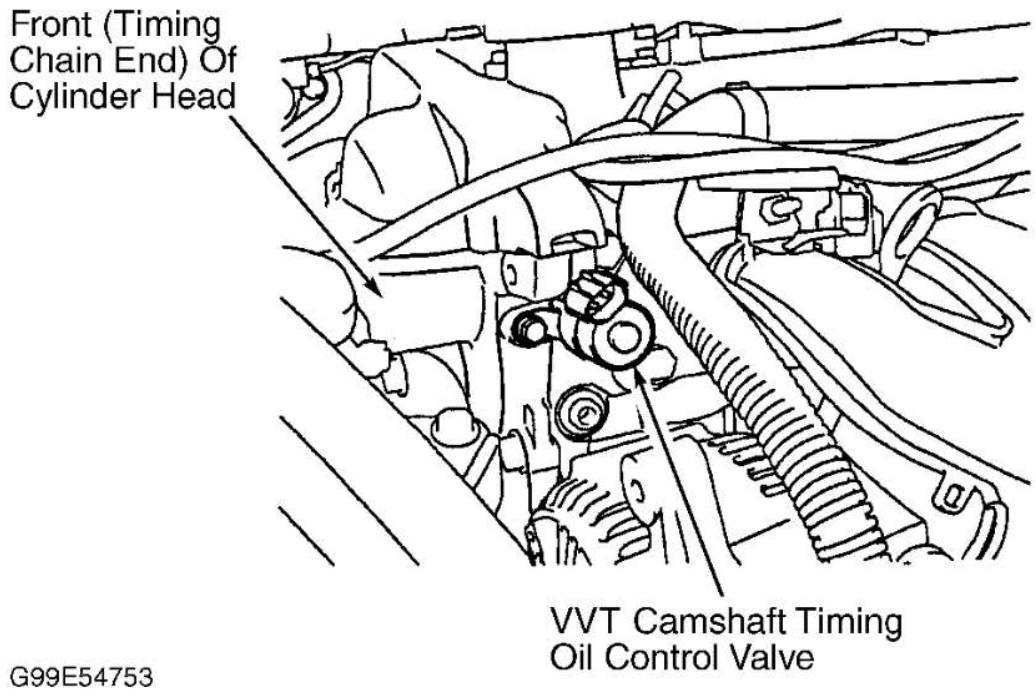


Fig. 112: Locating Variable Valve Timing Camshaft Timing Oil Control Valve (ECHO)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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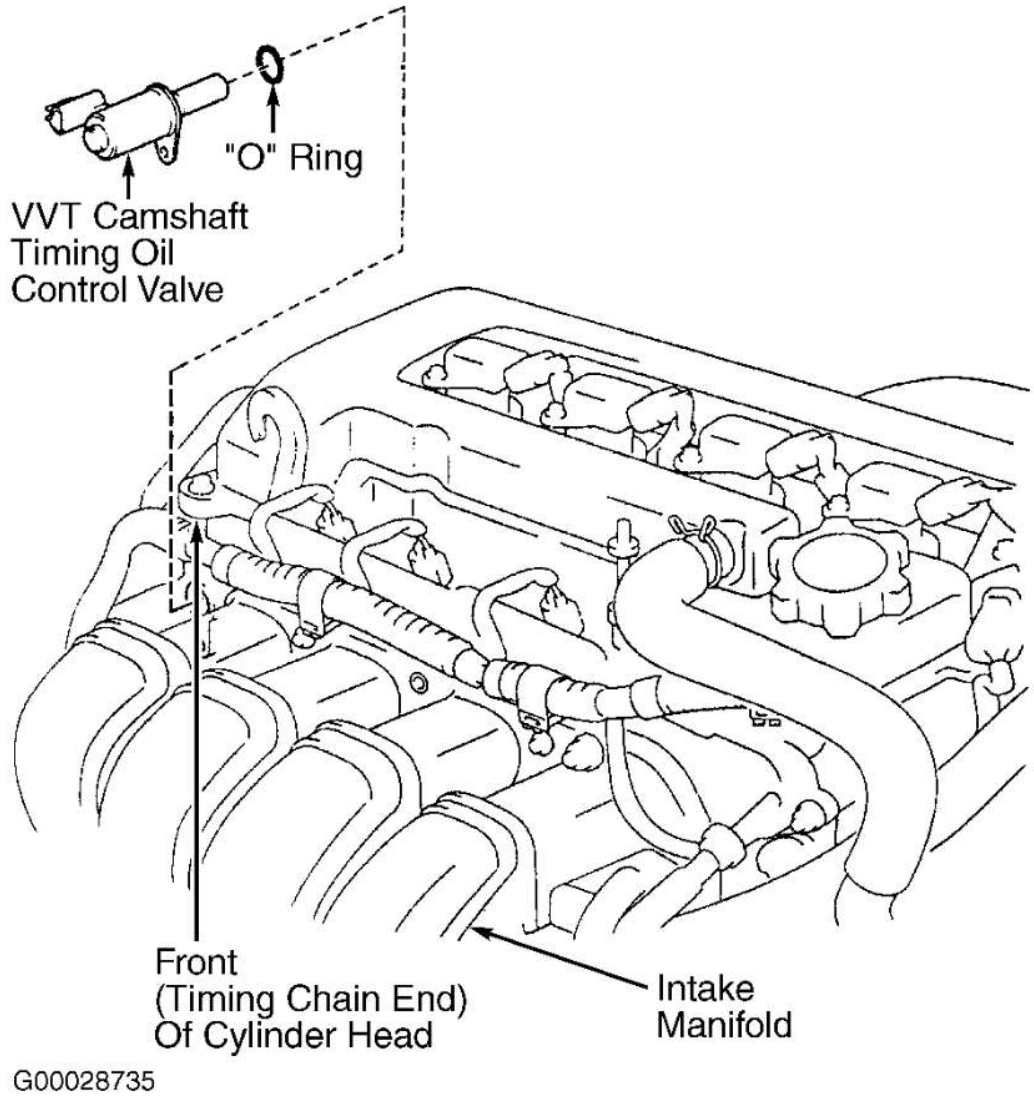


Fig. 113: Locating Typical Variable Valve Timing Camshaft Timing Oil Control Valve (MR2 & Prius)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

VARIABLE VALVE TIMING SENSOR

NOTE: **Variable Valve Timing (VVT) sensor may also be referred to as camshaft position sensor.**

Removal & Installation (Camry, Camry Solara, Celica, Corolla, ECHO, Highlander, MR2, Prius & RAV4)

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For VVT sensor servicing, see **CAMSHAFT POSITION SENSOR** under IGNITION SYSTEMS.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS (CAMRY)

Application	Ft. Lbs. (N.m)
A/F Sensor	(1)
ECT Sensor	15 (20)
Fuel Rail-To-Cylinder Head Bolt	15 (20)
Heated Oxygen Sensor	32 (43)
Intake Manifold Bolt/Nut	22 (30)
Knock Sensor	29 (39)
Power Steering Pressure Switch	15 (20)
Throttle Body Bolt	22 (30)
Vehicle Speed Sensor Retaining Bolt	(1)
	INCH Lbs. (N.m)
Camshaft Position Sensor Bolt	80 (9.0)
Control Lever Nut	112 (12.7)
Crankshaft Position Sensor Bolt	80 (9.0)
Fuel Pump Retaining Plate-To-Fuel Tank Bolt	31 (3.5)
Ignition Coil Bolt	80 (9.0)
PNP Switch Retaining Bolt	48 (5.4)
PNP Switch Retaining Nut	61 (6.9)
VVT Camshaft Timing Oil Control Valve Retaining Bolt	80 (9.0)
(1) Information is not available from manufacturer.	

TORQUE SPECIFICATIONS (CAMRY SOLARA)

Application	Ft. Lbs. (N.m)
A/F Sensor	32 (43)
ECT Sensor	15 (20)
Fuel Rail-To-Cylinder Head Bolt	15 (20)
Heated Oxygen Sensor	32 (43)
Intake Manifold Bolt/Nut	22 (30)
Knock Sensor	32 (43)
Power Steering Pressure Switch	15 (20)
Throttle Body Bolt	22 (30)
	INCH Lbs. (N.m)
Accelerator Pedal Bracket Retaining Bolt	80 (9.0)
Camshaft Position Sensor Bolt	80 (9.0)
Control Lever Nut	112 (12.7)

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Crankshaft Position Sensor Bolt	80 (9.0)
Fuel Pressure Regulator Retaining Screw	18 (2.0)
Fuel Pump Protector Cover Bolt	35 (4.0)
Fuel Pump Retaining Plate-To-Fuel Tank Bolt	35 (4.0)
Ignition Coil Bolt	80 (9.0)
PNP Switch Retaining Bolt	48 (5.4)
PNP Switch Retaining Nut	61 (6.9)
Round Fuel Filter Retaining Screw	18 (2.0)
Vehicle Speed Sensor Retaining Bolt	49 (5.5)
VVT Camshaft Timing Oil Control Valve Retaining Bolt	78 (8.8)

TORQUE SPECIFICATIONS (CELICA)

Application	**Ft. Lbs. (N.m)**
ECT Sensor	(1)
Fuel Rail-To-Cylinder Head Bolt	
1.8L 1ZZ-FE	14 (19)
1.8L 2ZZ-GE	21 (29)
Heated Oxygen Sensor	32 (43)
Intake Manifold Bolt/Nut	
1.8L 1ZZ-FE	14 (19)
1.8L 2ZZ-GE	(2)
Intake Manifold Support Bolt/Nut	
1.8L 2ZZ-GE	18 (24)
Knock Sensor	
1.8L 1ZZ-FE	29 (39)
Knock Sensor Retaining Nut	
1.8L 2ZZ-GE	15 (20)
Power Steering Pressure Switch	15 (20)
Throttle Body Bolt/Nut	
1.8L 1ZZ-FE	15 (20)
1.8L 2ZZ-GE	16 (22)
	INCH Lbs. (N.m)
Camshaft Position Sensor Bolt	78 (8.8)
Control Lever Nut	115 (13.0)
Crankshaft Position Sensor Bolt	78 (8.8)
Fuel Pipe Clamp-To-Cylinder Head Bolt	80 (9.0)
Fuel Pump Retaining Plate-To-Fuel Tank Bolt	35 (4.0)
Ignition Coil Bolt	80 (9.0)
PNP Switch Retaining Bolt	48 (5.4)
PNP Switch Retaining Nut	61 (6.9)

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Vehicle Speed Sensor Retaining Bolt	
A/T	49 (5.5)
M/T	97 (11.0)
VVL Oil Control Valve Retaining Bolt	
1.8L 2ZZ-GE	75 (8.5)
VVT Camshaft Timing Oil Control Valve Retaining Bolt	
1.8L 1ZZ-FE	66 (7.5)
1.8L 2ZZ-GE	75 (8.5)

(1) Information is not available from manufacturer.

(2) Tighten bolts/nuts "A" to 20 ft. lbs. (27 N.m) and bolt "B" to 34 ft. lbs. (46 N.m). See **Fig. 14** .

TORQUE SPECIFICATIONS (COROLLA)

Application	**Ft. Lbs. (N.m)**
ECT Sensor	(1)
Fuel Rail-To-Cylinder Head Bolt	14 (19)
Heated Oxygen Sensor-To-Exhaust Pipe Behind Catalytic Converter	32 (43)
Heated Oxygen Sensor-To-Exhaust Pipe Retaining Nut	32 (43)
Intake Manifold Bolt/Nut	14 (19)
Intake Manifold Support Bolt	14 (19)
Knock Sensor	29 (39)
Power Steering Pressure Switch	15 (20)
Throttle Body Bolt/Nut	15 (20)
Vehicle Speed Sensor Retaining Bolt	
A/T	12 (16)
M/T	(2)
	INCH Lbs. (N.m)
Camshaft Position Sensor Bolt	80 (9.0)
Control Lever Nut	106 (12.0)
Crankshaft Position Sensor Bolt	80 (9.0)
Fuel Pipe Clamp-To-Cylinder Head Bolt	80 (9.0)
Fuel Pump Retaining Plate-To-Fuel Tank Bolt	35 (4.0)
Ignition Coil Bolt	62 (7.0)
PNP Switch Retaining Bolt	48 (5.4)
PNP Switch Retaining Nut	61 (6.9)
VVT Camshaft Timing Oil Control Valve Retaining Bolt	(1)

(1) Information is not available from manufacturer.

(2) Tighten retaining bolt to 97 INCH lbs. (11.0 N.m).

TORQUE SPECIFICATIONS (ECHO)

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Application	Ft. Lbs. (N.m)
ECT Sensor	(1)
Fuel Rail-To-Cylinder Head Bolt	14 (19)
Heated Oxygen Sensor	32 (43)
Intake Manifold Bolt/Nut	22 (30)
Knock Sensor	29 (39)
Power Steering Pressure Sensor	15 (20)
Throttle Body Bolt/Nut	22 (30)
	INCH Lbs. (N.m)
Camshaft Position Sensor Bolt	71 (8.0)
Control Lever Nut	115 (13.0)
Crankshaft Position Sensor Bolt	66 (7.5)
Fuel Pipe Clamp-To-Cylinder Head Bolt	80 (9.0)
Fuel Pump Retaining Plate-To-Fuel Tank Bolt	35 (4.0)
Ignition Coil Bolt	80 (9.0)
PNP Switch Retaining Bolt	48 (5.4)
PNP Switch Retaining Nut	61 (6.9)
Valve Cover Bolt/Nut (2)	89 (10.1)
Vehicle Speed Sensor Retaining Bolt	
A/T	62 (7.0)
M/T	97 (11.0)
VVT Camshaft Timing Oil Control Valve Retaining Bolt	75 (8.5)

(1) Information is not available from manufacturer.

(2) Tighten to specification in sequence. See **Fig. 85** .

TORQUE SPECIFICATIONS (HIGHLANDER)

Application	Ft. Lbs. (N.m)
A/F Sensor	(1)
ECT Sensor	15 (20)
Fuel Rail-To-Cylinder Head Bolt	15 (20)
Heated Oxygen Sensor	(1)
Intake Manifold Bolt/Nut	22 (30)
Knock Sensor	29 (39)
Power Steering Pressure Switch	15 (20)
Throttle Body Bolt	22 (30)
	INCH Lbs. (N.m)
Camshaft Position Sensor Bolt	80 (9.0)
Control Lever Nut	112 (12.7)
Crankshaft Position Sensor Bolt	80 (9.0)

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Fuel Pump Retaining Plate-To-Fuel Tank Bolt	(1)
Ignition Coil Bolt	80 (9.0)
PNP Switch Retaining Bolt	48 (5.4)
PNP Switch Retaining Nut	61 (6.9)
VVT Camshaft Timing Oil Control Valve Retaining Bolt	80 (9.0)
(1) Information is not available from manufacturer.	

TORQUE SPECIFICATIONS (MR2)

Application	Ft. Lbs. (N.m)
A/C Compressor Bolt	18 (24)
ECT Sensor	15 (20)
Fuel Rail-To-Cylinder Head Bolt	14 (19)
Heated Oxygen Sensor	32 (43)
Intake Manifold Bolt/Nut	22 (30)
Knock Sensor	29 (39)
Suspension Upper Brace Bolt	54 (73)
Suspension Upper Brace Nut	59 (80)
Throttle Body Bolt/Nut	22 (30)
Throttle Body Support Bracket Bolt (1)	36 (49)
	INCH Lbs. (N.m)
Accelerator Pedal Position Sensor Bolt (1)	48 (5.4)
Camshaft Position Sensor Bolt	80 (9.0)
Crankshaft Position Sensor Bolt	80 (9.0)
Fuel Pump Protector Cover Bolt	30 (3.4)
Fuel Pump Retaining Plate-To-Fuel Tank Bolt	30 (3.4)
Ignition Coil Bolt	80 (9.0)
TP Sensor Retaining Screw (1)	18 (2.0)
VVT Camshaft Timing Oil Control Valve Retaining Bolt	80 (9.0)
(1) Applies only to models with sequential manual transaxle.	

TORQUE SPECIFICATIONS (PRIUS)

Application	Ft. Lbs. (N.m)
Accelerator Pedal Retaining Bolt	12 (16)
Exhaust Pipe-To-Exhaust Manifold Bolt	46 (62)
Fuel Rail-To-Cylinder Head Bolt	14 (19)
Fuel Tank Retaining Bolt	29 (39)
Heated Oxygen Sensor	32 (43)
Intake Manifold Bolt/Nut	15 (20)
Knock Sensor	32 (43)

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Throttle Body Bolt/Nut	15 (20)
	INCH Lbs. (N.m)
Crankshaft Position Sensor Bolt	66 (7.5)
Fuel Pipe Clamp-To-Cylinder Head Bolt	80 (9.0)
Ignition Coil Bolt	80 (9.0)
TP Sensor Retaining Screw	15 (1.7)
Valve Cover Bolt/Nut (1)	89 (10.1)
VVT Camshaft Timing Oil Control Valve Retaining Bolt	66 (7.5)
(1) Tighten to specification in sequence. See **Fig. 85** .	

TORQUE SPECIFICATIONS (RAV4)

Application	**Ft. Lbs. (N.m)**
A/F Sensor	32 (43)
ECT Sensor	15 (20)
Fuel Rail-To-Cylinder Head Bolt	15 (20)
Heated Oxygen Sensor	32 (43)
Intake Manifold Bolt/Nut	22 (30)
Knock Sensor	29 (39)
Power Steering Pressure Switch	15 (20)
Throttle Body Bolt	22 (30)
Vehicle Speed Sensor Retaining Bolt	
A/T	(1)
M/T	13 (18)
	INCH Lbs. (N.m)
Camshaft Position Sensor Bolt	80 (9.0)
Control Lever Nut	112 (12.7)
Crankshaft Position Sensor Bolt	80 (9.0)
Fuel Pump Retaining Plate-To-Fuel Tank Bolt	30 (3.4)
Ignition Coil Bolt	80 (9.0)
PNP Switch Retaining Bolt	48 (5.4)
PNP Switch Retaining Nut	61 (6.9)
VVT Camshaft Timing Oil Control Valve Retaining Bolt	80 (9.0)
(1) Tighten retaining bolt to 49 INCH lbs. (5.5 N.m).	

TORQUE SPECIFICATIONS (TACOMA)

Application	**Ft. Lbs. (N.m)**
A/F Sensor Retaining Nut	15 (20)
ECT Sensor	15 (20)
EGR Pipe Bolt/Nut	

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2.7L 3RZ-FE	14 (19)
EGR Valve Retaining Nut	
2.7L 3RZ-FE	14 (19)
Fuel Filter Mounting Bolt	15 (20)
Fuel Inlet Pipe-To-Fuel Rail Union Bolt	22 (30)
Fuel Rail-To-Cylinder Head Bolt	15 (20)
Generator Mounting Bracket-To-Timing Chain Cover Bolt	
Large Bolt	55 (75)
Small Bolt	13 (18)
Heated Oxygen Sensor-To-Exhaust Pipe Retaining Nut	15 (20)
Knock Sensor	33 (45)
Starter Bolt	29 (39)
Throttle Body Bolt/Nut	15 (20)
Transmission Oil Cooler Line Elbow	25 (34)
Transmission Oil Cooler Line Nut	25 (34)
Vehicle Speed Sensor Retaining Bolt	(1)
	INCH Lbs. (N.m)
Airflow Meter Retaining Nut	75 (8.5)
Camshaft Position Sensor Bolt	48 (5.4)
Crankshaft Position Sensor Bolt	75 (8.5)
Fuel Pressure Regulator Bolt	78 (8.8)
Fuel Pump Mounting Bracket-To-Fuel Tank Bolt	31 (3.5)
Ignition Coil Bolt	66 (7.5)
PNP Switch Retaining Bolt	
2.4L 2RZ-FE	48 (5.4)
2.7L 3RZ-FE	115 (13.0)
PNP Switch Retaining Nut	
2.4L 2RZ-FE	35 (4.0)
2.7L 3RZ-FE	61 (6.9)
(1) On A/T models, tighten retaining bolt to 12 ft. lbs. (16 N.m) on 2WD models or 102 INCH lbs. (11.5 N.m) on 4WD models. On M/T models, tighten retaining bolt to 115 INCH. lbs. (13.0 N.m) on 2WD models or 102 INCH lbs. (11.5 N.m) on 4WD models.	

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