

N - REMOVE/INSTALL/OVERHAUL

1994 Toyota Celica

1994 ENGINE PERFORMANCE
Toyota Removal, Overhaul & Installation
Celica

INTRODUCTION

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.

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. If vehicle is equipped with air bag(s), after disconnecting negative battery cable, wait a minimum of 2 minutes before working on vehicle.

COMPUTERIZED ENGINE CONTROLS

ENGINE CONTROL MODULE (ECM)

ECM LOCATION TABLE

Model	Location
Celica	Below Passenger's Side Of Dash, Underneath Carpet

ENGINE SENSORS

NOTE: For locations of engine sensors not covered in this article, see appropriate E - THEORY/OPERATION article.

KNOCK SENSOR LOCATIONS TABLE (1)

Model	Location
Celica	Side Of Cylinder Block, Near Alternator

(1) - Knock sensor monitors ignition knock conditions and delivers an input signal to KNK or KNK1 and KNK2 terminals of Engine Control Module (ECM). The ECM uses input signal to determine ignition timing (spark advance) and control fuel injection system.

KNOCK SENSORS

Removal & Installation

Disconnect negative battery cable. On Supra, remove starter motor. On all models, disconnect knock sensor connector. Using Knock Sensor Socket (SST 09816-30010), remove knock sensor. Using ohmmeter, ensure there is no continuity between terminal and ground. If there is continuity, replace knock sensor. To install, reverse removal procedure. Tighten knock sensor to 33 ft. lbs. (44 N.m).

IGNITION SYSTEM

DISTRIBUTOR

NOTE: For timing specifications and procedures, see information in D - ADJUSTMENTS article.

Removal (1.8L)

Disconnect negative battery cable. Disconnect Integrated Ignition Assembly (IIA) distributor connectors. Disconnect high tension wire clamp from engine hanger. Disconnect spark plug wires from spark plugs. Remove 2 bolts, and pull out distributor. Remove "O" ring from distributor housing.

Overhaul (1.8L)

1) Remove 3 bolts and distributor cap. Remove rotor, dust cover and gasket. Remove 2 nuts, and disconnect 4 wires from ignition coil terminals. Remove 4 screws and ignition coil. Remove 3 screws, and disconnect 3 wires from ignitor terminals.

2) Remove 2 screws and ignitor. Disconnect 2 connectors from cord clamp. Remove screw and cord clamp. Remove distributor wire from distributor housing. Remove screw and condenser.

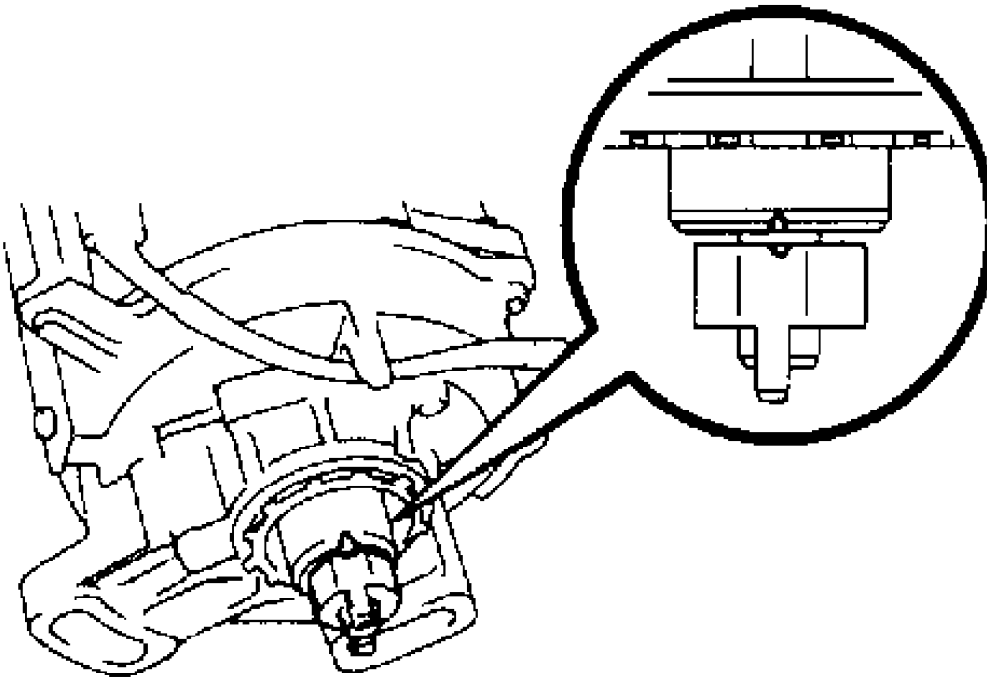


Fig. 1: Aligning Distributor Cut-Out Marks (Similar)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

Installation (1.8L)

1) Coat NEW "O" ring with oil and install onto distributor housing. Remove right engine undercover and verify cylinder No. 1 is

at TDC by viewing camshaft slot. Slot should be vertical with timing marks at TDC.

2) Align cut-out portion of coupling with groove of housing. See Fig. 1. Insert distributor, aligning center of flange with bolt hole on cylinder head. Lightly tighten 2 bolts. Connect spark plug wire to cap in proper order. Connect distributor electrical connector. Connect negative battery cable. Set ignition timing. Tighten distributor hold-down bolt/nut(s). See TORQUE SPECIFICATIONS TABLE at the end of this article.

Removal (Celica 2.2L 5S-FE)

1) Disconnect negative battery cable. Remove air cleaner cover. Disconnect Intake Air Temperature (IAT) sensor connector. Remove wire from air cleaner hose. Disconnect accelerator cable from clamp. Disconnect cruise control actuator cable from clamps. Remove air hose for idle-up from air cleaner hose.

2) Disconnect 4 clamps and air cleaner cover from air cleaner case. Loosen hose clamp, and disconnect air cleaner hose from throttle body. Remove air cleaner cover and air cleaner hose assembly. Disconnect distributor connector.

3) Disconnect spark plug wires from clamp on cylinder head cover and rubber boot. Remove bolt, and pull out distributor. Remove "O" ring from distributor housing and discard.

Overhaul

1) On California models, remove 2 bolts, distributor cap and washer. Remove 2 screws and rotor.

2) On Federal models, remove 3 bolts and distributor cap. Remove rotor and ignition coil dust cover. Remove dust cover gasket. Remove 2 nuts, and disconnect 3 wires from ignition coil terminals.

3) On Federal models, also remove distributor wire from distributor housing. Remove 4 screws and ignition coil. Remove screw and condenser.

Installation

1) Coat NEW "O" ring with oil and install onto distributor housing. Remove right engine undercover and verify cylinder No. 1 is at TDC by viewing camshaft slot. Slot should be vertical with timing marks at TDC.

2) Align cut-out portion of coupling with housing groove. See Fig. 1. Insert distributor, aligning center of flange with bolt hole on cylinder head. Lightly tighten bolt. Connect spark plug wire to cap in proper order. Connect distributor electrical connector. Connect negative battery cable. Set ignition timing. Tighten distributor hold-down bolt/nut(s). See TORQUE SPECIFICATIONS TABLE at the end of this article.

CAMSHAFT POSITION SENSOR

Inspection

Before removing camshaft position sensor from vehicle, disconnect camshaft position sensor connector. Using an ohmmeter, measure resistance between terminals. Cold, resistance should be 835-1400 ohms. Hot, resistance should be 1060-1645 ohms. If resistance is not as specified, replace camshaft position sensor.

FUEL SYSTEM

FUEL SYSTEM PRESSURE RELEASE

WARNING: High fuel pressure may be present in fuel lines and component parts. Before opening system for testing purposes or

component replacement, relieve fuel pressure. DO NOT allow fuel to flow onto engine or electrical parts. Whenever possible, release fuel pressure at fuel filter fitting.

Disconnect negative battery cable. If possible, position container under fuel fitting to be loosened. To prevent fuel spraying, use a rag to cover fuel fitting to be loosened. Slowly loosen fitting, allowing pressurized fuel to spill into container or spray into rag(s). After fuel system pressure is released, disconnect fitting and plug all openings.

CHECKING FOR FUEL LEAKS

NOTE: After replacing fuel system components or performing fuel system maintenance, verify there are no fuel leaks.

Using Diagnosis Check Wire (SST09843-18020), connect Data Link Connector 1 (DLC1) terminals +B and FP. Turn ignition on, with engine off. When fuel return hose is pinched (DO NOT bend hose, as it may cause cracking), fuel pressure within high pressure line will rise to approximately 57 psi (4 kg/cm²). Pinch fuel return hose and verify there are no fuel system leaks. When inspection is completed, turn ignition off and remove diagnosis check wire from DLC1.

FUEL PUMP

Removal & Installation

1) Disconnect negative battery cable. Remove gas cap from filler tube to relieve fuel tank pressure. Remove rear seat cushion. Remove fuel pump hole cover. Disconnect fuel pump and fuel sender electrical connector. Release fuel pressure at filter. See FUEL SYSTEM PRESSURE RELEASE.

2) Disconnect fuel outlet line and fuel return line from fuel pump bracket assembly. Remove bolts securing fuel pump and bracket assembly to fuel tank. Remove fuel pump and bracket assembly from tank.

3) Remove nuts and washers retaining fuel sending unit wires. Disconnect wires. Remove screws retaining sending unit, and separate sending unit from fuel pump and bracket assembly.

4) Pull lower end of fuel pump (with filter) from bracket. Remove 2 nuts securing fuel pump wires to fuel pump. Disconnect wires. Disconnect fuel hose from fuel pump. Remove fuel pump.

5) To install, reverse removal procedure. Use NEW retaining clip to install filter. Use NEW gasket between fuel pump bracket and tank. Tighten fuel pump bracket-to-tank nuts to 31 INCH lbs. (3.5 N.m). Tighten fuel pump outlet line to 22 ft. lbs. (30 N.m). Check for fuel leakage. See CHECKING FOR FUEL LEAKS.

FUEL INJECTORS & FUEL RAILS

NOTE: Install NEW grommets and "O" rings when replacing fuel injectors or reinstalling old injectors. Verify injectors rotate smoothly in injector ports and in fuel rail. If injectors do not rotate smoothly, check "O" rings for proper installation.

Removal (2.2L)

1) Disconnect negative battery cable. Release fuel pressure at fuel filter. See FUEL SYSTEM PRESSURE RELEASE. Drain engine coolant. Disconnect throttle cable(s) from throttle body. Remove air temperature sensor connector and cruise control cable clamp from air cleaner housing. On California models only, disconnect air hose for idle-up from air cleaner hose.

2) On all models, loosen duct hose clamp from throttle body. Remove air cleaner cap, resonator and duct hose as an assembly. Disconnect Throttle Position Sensor (TPS) connector and Idle Air Control (IAC) valve connector from throttle body. Mark positions of all vacuum hoses connected to throttle body for reassembly purposes, and remove vacuum hoses from throttle body.

3) Remove 4 throttle body mounting bolts. Remove coolant hoses from throttle body, and remove throttle body. Remove power steering vacuum hoses from tubing lines near intake manifold. Mark positions, and remove 2 vacuum hoses from EVAP-Thermal Vacuum Valve (TVV) near distributor. Remove EGR temperature sensor harness connector (if equipped).

4) Mark positions, and remove 2 vacuum hoses from EGR VSV near bottom of intake manifold. Remove vacuum hose from canister. Remove vacuum hose tubing retaining clamp near bottom of intake manifold. Disconnect EGR pipe fittings. Remove EGR valve, EGR vacuum modulator and related vacuum hoses.

5) Remove vacuum hoses from intake manifold to brake booster, vacuum sensor, and A/C magnet switch VSV connector. Remove engine ground wire from intake manifold. Disconnect knock sensor and EGR VSV harness connectors. Remove engine harness clamps from brackets on intake manifold. Remove 2 intake manifold support braces. Remove intake manifold.

6) Disconnect fuel injector harness connectors. Disconnect fuel return hose from fuel return pipe. Remove fuel inlet hose by removing pressure pulsation damper and washer gaskets.

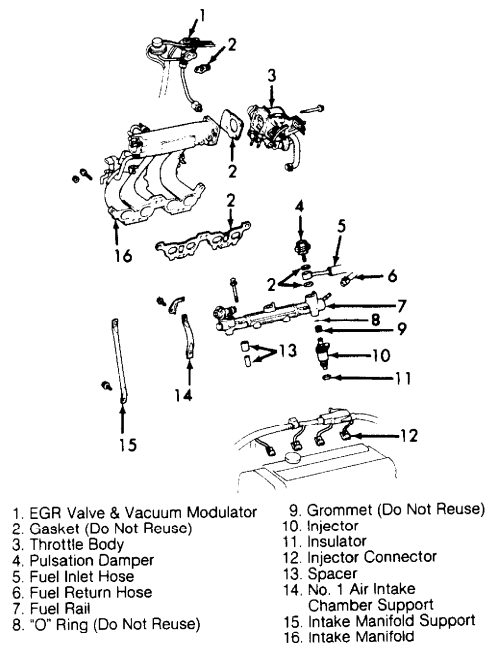
7) Remove 2 fuel rail mounting bolts. Gently twist each injector to ease removal. Remove fuel rail with 4 injectors attached, using care not to drop injectors from rail. Replace injector if dropped. Remove 4 injector insulators and 2 rail spacers from intake manifold. Remove fuel injectors from fuel rail by gently pulling. Remove pressure regulator from fuel rail. See Fig. 2.

Installation (2.2L)

1) Install NEW grommets and "O" rings onto injectors. Apply light coat of gasoline to "O" rings, and install injectors to fuel rail. See Figs. 2 and 3. Install 4 NEW injector insulators and 2 rail spacers in position on cylinder head.

2) Place injectors with attached fuel rail into injector ports on cylinder head. Verify injectors rotate smoothly. If injectors do not rotate smoothly, check "O" rings for binding and for proper installation. Replace "O" ring(s) as required. Verify injector electrical connectors are positioned upward and on cam cover side of fuel rail.

3) Install fuel rail bolts. Install fuel inlet pipe and pulsation damper. To complete installation, reverse removal procedure. Tighten all nuts and bolts to specification. See TORQUE SPECIFICATIONS TABLE at the end of this article. Fill engine with coolant. Engine coolant capacity is 6.7 qts. (6.3L). Check for fuel leakage. See CHECKING FOR FUEL LEAKS.



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 Fig. 2: Locating Fuel Injection Components
 Courtesy of Toyota Motor Sales, U.S.A.

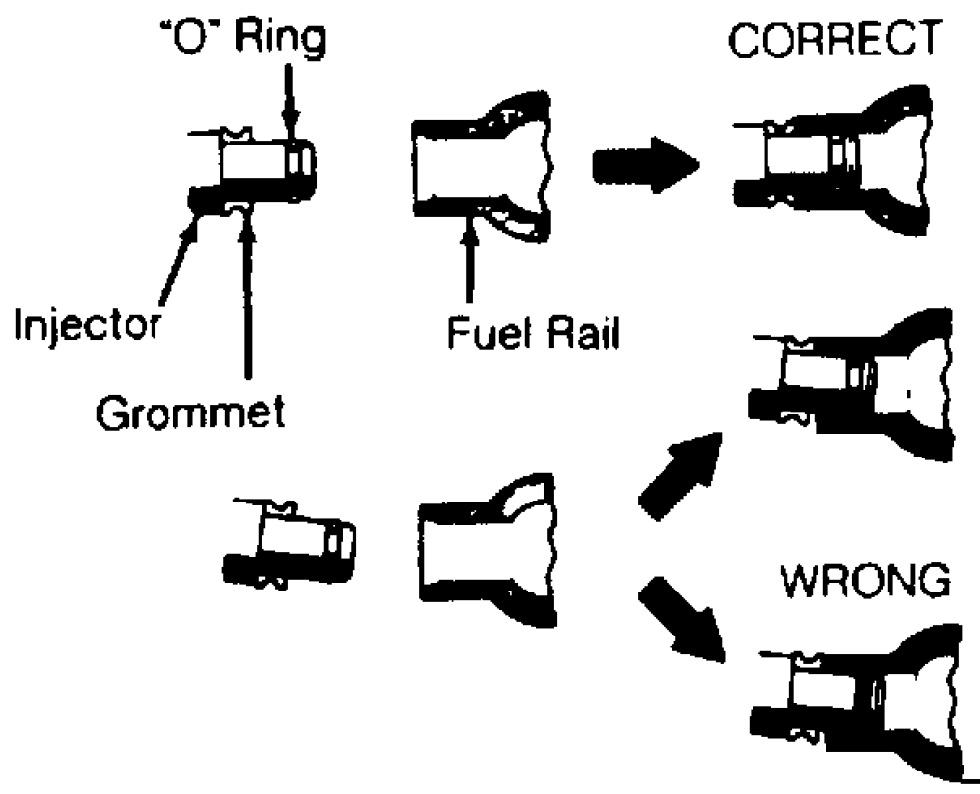


Fig. 3: Proper Injector Installation Into Fuel Rail (Typical)
 Courtesy of Toyota Motor Sales, U.S.A., Inc.

Removal (1.8L)
 1) Disconnect negative battery cable. Disconnect Intake Air

Temperature (IAT) sensor connector, air cleaner cap and hoses. Release fuel pressure. See FUEL SYSTEM PRESSURE RELEASE. Disconnect accelerator cable(s) from throttle linkage, and remove cable bracket.

2) Disconnect EGR and EVAP vacuum hoses. Disconnect throttle position sensor and Idle Air Control (IAC) valve connectors. Remove throttle body from air intake chamber. On California models, disconnect EGR hose, EGR vacuum hose, air pipe and fuel inlet hose. Remove EGR vacuum modulator, EGR valve and EGR pipe. On all models, remove engine hanger and air intake chamber support. Disconnect fuel pressure regulator vacuum hose. Disconnect PCV hose from PCV valve and air intake chamber cover. Remove air intake chamber cover gasket.

3) Remove fuel rail inlet pipe union bolt, and disconnect fuel inlet pipe. Remove 2 fuel rail mounting bolts, and remove fuel rail with injectors attached. DO NOT drop injectors from fuel rail.

4) Remove fuel rail mounting spacers and injector insulators from intake manifold. Pull injectors from fuel rail. Remove "O" rings and grommets from injectors. See Fig. 4.

Installation (1.8L)

1) Install NEW grommets and "O" rings onto injector ends to be inserted into fuel rail. Apply a thin coat of gasoline to "O" rings, and install injectors into fuel rail. Install NEW injector insulators and NEW fuel rail mounting spacers to intake manifold.

2) Install fuel rail, with attached injectors, into intake manifold. Verify injectors rotate smoothly. If injectors do not rotate smoothly, check "O" rings for proper installation. Replace as required.

3) Position injector connectors upward on cam shaft cover side of fuel rail. Install fuel rail mounting bolts and tighten to specification. Connect fuel inlet pipe and return hose to rail. Install fuel pressure regulator. Tighten bolts to specification. See TORQUE SPECIFICATIONS TABLE at the end of this article. After installation is complete, check for fuel leaks. See CHECKING FOR FUEL LEAKS.

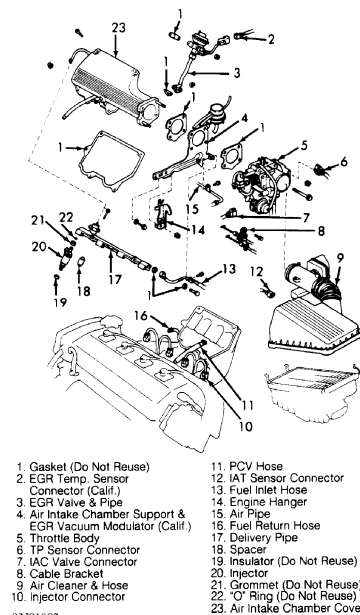


Fig. 4: Locating Fuel Components (1.8L)
Courtesy of Toyota Motor Sales, U.S.A.

OXYGEN (O2) & SUB-OXYGEN SENSORS

NOTE: To ease removal of O2 sensor and/or its mounting bolts from exhaust pipe/manifold, it may be necessary to apply penetrating oil to threads. Also run engine a few minutes to heat exhaust system to about 120°F (48°C).

Removal

1) Turn engine off. Disconnect O2 sensor electrical connector. Remove 2 mounting bolts/nuts, and remove O2 sensor from manifold/pipe. Some O2 and sub-oxygen sensors screw into exhaust manifold or header pipe in front of converter.

2) When removing an O2 sensor that will be reused, protect its permanent pigtail from damage by using proper socket wrench (if required). After removal, verify sensor tip is free of contaminants. Replace sensor as required. DO NOT use cleaning solvents on sensor tip.

Installation

Before installing O2 sensor, apply anti-seize compound or silicone to O2 sensor threads or to mounting bolt threads. Screw O2 sensor into exhaust, or install gasket and O2 sensor using mounting bolts.

FUEL PRESSURE REGULATORS

NOTE: If component removal and installation is primarily an unbolt and bolt-on procedure, only a torque specification may be furnished. See TORQUE SPECIFICATIONS TABLE at the end of this article.

Removal & Installation (2.2L)

1) Disconnect negative battery cable. It is not necessary to remove intake manifold to remove pressure regulator from fuel rail. Disconnect vacuum hose from pressure regulator. Remove A/C idle-up valve (if equipped). Release fuel pressure at fuel filter. See FUEL SYSTEM PRESSURE RELEASE.

2) Position cloth under pressure regulator fuel return pipe fitting. On 5S-FE, remove fuel return hose union bolt and 2 washer gaskets. On all models, remove 2 mounting bolts, and remove pressure regulator from fuel rail.

3) To install pressure regulator, apply light coat of gasoline to NEW "O" ring and install onto pressure regulator. Carefully insert pressure regulator into fuel rail, and verify pressure regulator and "O" ring are properly seated to rail. Install mounting bolts and tighten to 48 INCH lbs. (5.4 N.m).

4) Install fuel return hose and union bolt with 2 NEW washer gaskets. Tighten union bolt to 14 ft. lbs. (19 N.m). On all models, connect vacuum hose. Connect negative battery cable. Check for fuel leakage. See CHECKING FOR FUEL LEAKS.

Removal & Installation (1.8L)

1) Disconnect negative battery cable. It is not necessary to remove intake manifold to remove pressure regulator from fuel rail. Disconnect vacuum hose from pressure regulator. Release fuel pressure at fuel filter. See FUEL SYSTEM PRESSURE RELEASE.

2) Position cloth under pressure regulator fuel return pipe fitting. Release hose clamp and remove fuel return hose. Remove 2 mounting bolts, and remove pressure regulator from fuel rail.

3) To install pressure regulator, apply light coat of gasoline to NEW "O" ring and install onto pressure regulator. Turn pressure regulator left and right and carefully insert into fuel rail. Verify pressure regulator and "O" ring are properly seated to rail. Install mounting bolts and tighten to 82 INCH lbs. (9.3 N.m). Install fuel return hose and tighten hose clamp. Connect vacuum hose. Check

for fuel leakage. See CHECKING FOR FUEL LEAKS.

THROTTLE BODY

Removal & Installation (1.8L)

1) Disconnect negative battery cable. Drain engine coolant. Remove air cleaner hose. Disconnect accelerator cable from throttle body linkage. Remove cable bracket from throttle body.

2) Unplug throttle position sensor connector. Disconnect PCV hose and 2 coolant by-pass hoses. Label and disconnect emission control vacuum hoses from throttle body. Remove 2 bolts and 2 nuts retaining throttle body and remove throttle body.

3) To install, reverse removal procedure. Tighten all nuts and bolts to specification. See TORQUE SPECIFICATIONS TABLE at the end of this article. Check for fuel leakage. See CHECKING FOR FUEL LEAKS.

Removal & Installation (2.2L)

1) Disconnect negative battery cable. Drain engine coolant. Disconnect throttle cable (A/T) and accelerator cable from throttle body linkage.

2) Disconnect air intake temperature sensor connector and cruise control cable from air cleaner. Loosen air cleaner hose clamp at throttle body. Remove air cleaner cap, resonator and air cleaner hose as one assembly.

3) Disconnect TPS connector. Disconnect ISC valve connectors. Disconnect PCV valve hose from throttle body. Label and disconnect emission control vacuum hoses from throttle body.

4) Remove throttle body mounting bolts. Remove air hose and 2 coolant by-pass hoses from throttle body. Remove throttle body. Note position of throttle body gasket for reassembly reference.

5) To install, reverse removal procedure. Tighten all nuts and bolts to specification. See TORQUE SPECIFICATIONS TABLE at the end of this article. Throttle body bolts are of different lengths. Install 2 shorter bolts in top holes of throttle body. Check for fuel leakage. See CHECKING FOR FUEL LEAKS.

TORQUE SPECIFICATIONS

CAM POSITION SENSOR & DISTRIBUTOR TORQUE SPECIFICATIONS TABLE

Application	Ft. Lbs. (N.m)
Distributor Hold-Down Bolt	
1.8L 7A-FE	15 (20)
2.2L 5S-FE	14 (19)

FUEL INJECTION TORQUE SPECIFICATIONS TABLE (1.8L)

Application	Ft. Lbs. (N.m)
Fuel Pressure Regulator Fuel Pipe Bolt	14 (19)
Fuel Pump Outlet Pipe Union Bolt	22 (30)
Fuel Rail Inlet Pipe Union Bolt	22 (30)
Fuel Rail-To-Cylinder Head Bolt	11 (15)
Throttle Body-To-Intake Manifold Bolt	16 (22)

INCH Lbs. (N.m)

Fuel Pressure Regulator-To-Fuel Rail	82 (9.3)
Fuel Pump Housing Bracket-To-Tank Nuts	26 (2.9)

FUEL INJECTION TORQUE SPECIFICATIONS TABLE (2.2L)

Application	Ft. Lbs. (N.m)
Air Intake Chamber	
Cylinder Head Mounting Bolts	14 (19)
Support Bracket Bolts	
12-mm Bolts	16 (22)
14-mm Bolts	31 (42)
EGR Valve Pipe Union Nut	43 (59)
Fuel Pressure Regulator Fuel Pipe Union Bolt	14 (19)
Fuel Pump Outlet Pipe Union Bolt	22 (30)
Fuel Rail Inlet Pipe Pulsation Damper	25 (34)
Throttle Body-To-Intake Manifold	14 (19)
	INCH Lbs. (N.m)
EGR Valve Mounting Nut	115 (13)
Fuel Pressure Regulator-To-Fuel Rail	48 (5.4)
Fuel Pump Housing Bracket-To-Tank Nuts	26 (2.9)
Fuel Rail-To-Cylinder Head Bolts	115 (13)

FUEL PUMP TORQUE SPECIFICATIONS TABLE

Application	INCH Lbs. (N.m)
Fuel Pump Bracket Retaining Screws	
2.2L	26 (2.9)
1.8L	30 (3.4)

THROTTLE BODY TORQUE SPECIFICATIONS TABLE

Application	Ft. Lbs. (N.m)
1.8L 4A-FE	16 (22)
2.2L 5S-FE	14 (19)