

2009 ENGINE**Ignition Control - Service Information - Journey****DESCRIPTION****DESCRIPTION**

NOTE: All engines use a fixed ignition timing system. Basic ignition timing is not adjustable. All spark advance is determined by the Powertrain Control Module (PCM).

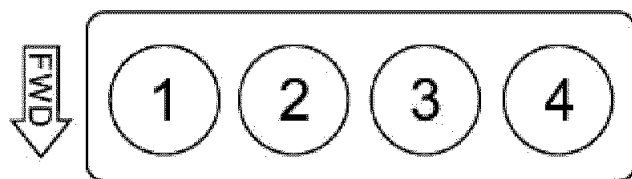
The ignition system used on these engines is referred to as coil on plug. The system's four main components are the coils, crankshaft position sensor, spark plugs, and camshaft position sensors. The coil on plug ignition system utilizes an ignition coil for every cylinder. The ignition coils are mounted directly over the each spark plug.

OPERATION**OPERATION**

The crankshaft position sensor and camshaft position sensor are hall effect devices. The camshaft position sensor and crankshaft position sensor generate square wave pulses that are inputs to the PCM. The PCM determines engine position from these sensors. The PCM calculates injector sequence and ignition timing from crankshaft AND camshaft position.

SPECIFICATIONS**FIRING ORDER**

2.4L



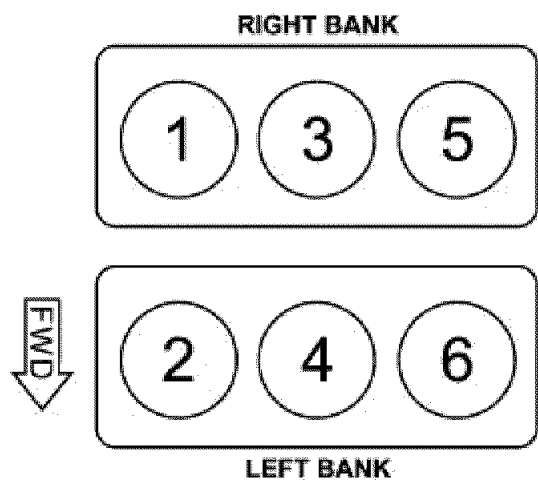
FIRING ORDER 1-3-4-2

B1d1aa54

Fig. 1: Identifying Firing Order 2.4L
Courtesy of CHRYSLER LLC

The firing order is 1-3-4-2.

2.7, 3.5L



FIRING ORDER 1-2-3-4-5-6

B1d1aa67

Fig. 2: Transverse 6 Cyl. Firing Order
Courtesy of CHRYSLER LLC

The firing order is 1-2-3-4-5-6.

IGNITION RESISTANCE

2009 Dodge Journey R/T

2009 ENGINE Ignition Control - Service Information - Journey

IGNITION COIL RESISTANCE**IGNITION COIL RESISTANCE**

MANUFACTURER	Engine	Primary Resistance at 21°C-27°C (70°F-80°F)	Secondary Resistance at 21°C-27°C (70°F-80°F)
Diamond Electric Mfg. Corporation	2.4L, 2.7L, 3.5L	0.495 to 0.605 ohms	5.13K to 6.27K ohms

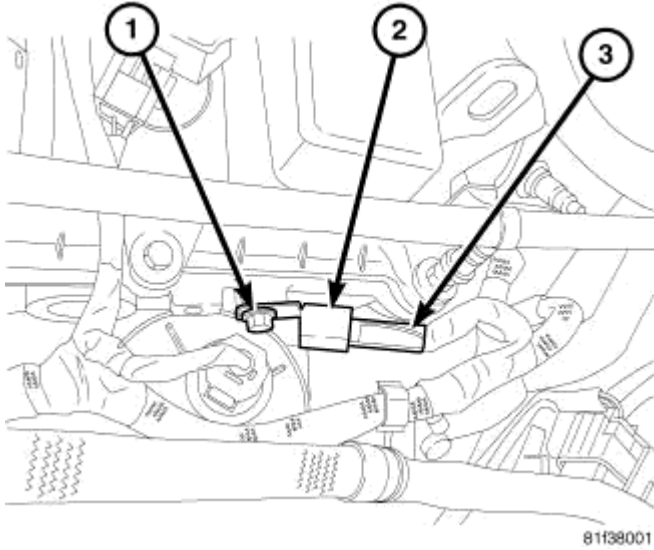
SPARK PLUG**SPARK PLUG**

Engine	Spark Plug	Electrode Gap	Thread Size
2.4L* (with PZEV)	ZFR5AP	0.8 mm (0.031 in.)	M14 X 1.25
2.4L (without PZEV)	ZFR5F-11	1.1 mm (0.043 in.)	M14 X 1.25
2.7L	TE10PMC5	1.27 mm (0.050 in.)	M14 X 1.25
3.5L	ZFR5LP-13G	1.27 mm (0.050 in.)	M14 X 1.25
*Partial Zero Emission Vehicle			

TORQUE**TORQUE SPECIFICATIONS**

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
2.4 Camshaft Sensor Screw	9	-	79.5
2.7, 3.5L Camshaft Sensor Screw	12	-	106
2.4L Ignition Coil Bolts	9	-	79.5
2.7L Ignition Coil Bolts	7.5	-	65
2.4L Spark Plugs	27	20	-
2.7L Spark Plugs	18	13	-
3.5L Spark Plugs	27	20	-
Knock Sensor 2.4, 2.7L	10	7	-
Knock Sensor 3.5L	20	15	-
Ignition Coil Capacitor Bolt 2.4, 2.7L	10	-	88.5
Ignition Coil Capacitor Bolt 3.5L	28	20.5	-
Transmission Mounting Bolt	61	45	-

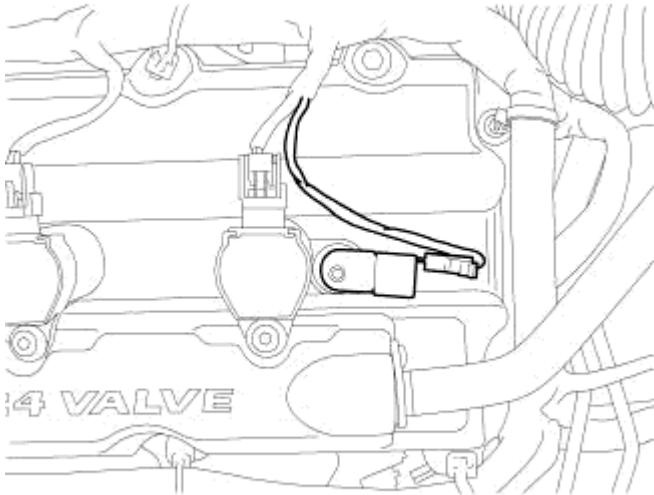
CAPACITOR, IGNITION

REMOVAL**2.4L****Fig. 3: Capacitor 2.4L****Courtesy of CHRYSLER LLC**

- | |
|---------------|
| 1 - Bolt |
| 2 - Capacitor |
| 3 - Connector |

1. Disconnect and isolate negative battery cable at battery.
2. Remove engine cover.
3. Remove electrical connector (3).
4. Remove mounting bolt (1) and ignition capacitor (2).

2.7L 1st



8192aa6e

Fig. 4: 1st Ignition Capacitor - 2.7L
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Disconnect the electrical connector.
3. Remove nut and capacitor.

2.7L 2nd

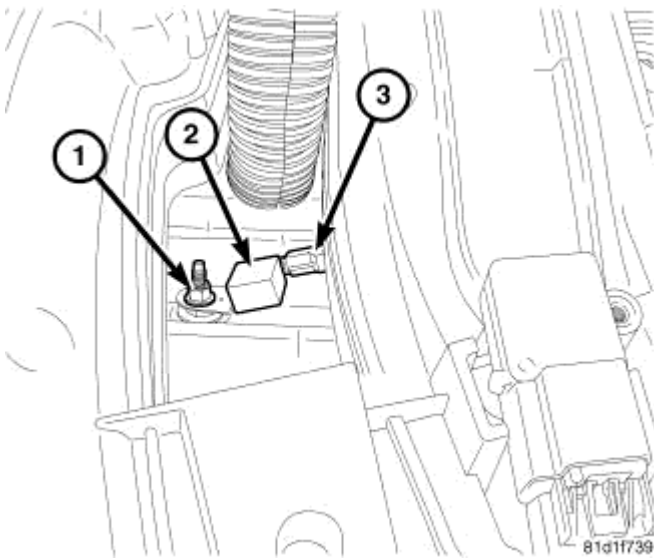


Fig. 5: 2nd Ignition Capacitor - 2.7L
Courtesy of CHRYSLER LLC

The ignition capacitor is located under the intake manifold on the drivers side of the engine.

1. Disconnect and isolate negative battery cable at battery.
2. Remove electrical connector (3).
3. Remove mounting bolt (1) and ignition capacitor (2).

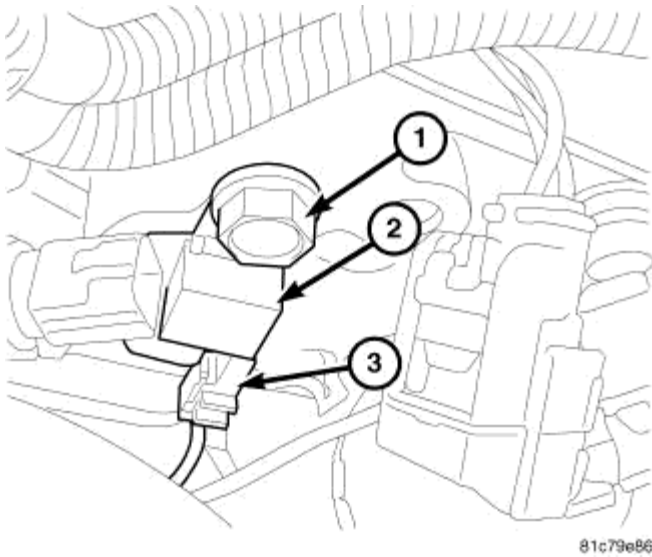
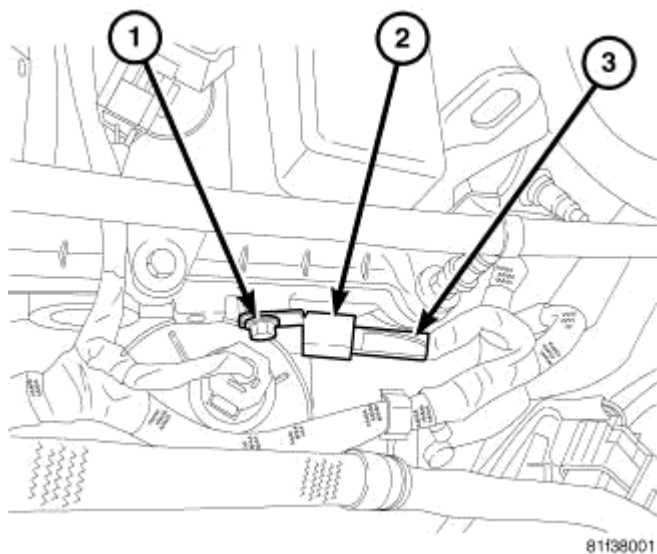
3.5L

Fig. 6: Ignition Capacitor - 3.5L
Courtesy of CHRYSLER LLC

The ignition capacitor is located on the drivers side of the engine.

1. Disconnect and isolate negative battery cable at battery.
2. Remove electrical connector (3).
3. Remove mounting bolt (1) and ignition capacitor (2).

INSTALLATION**2.4L**

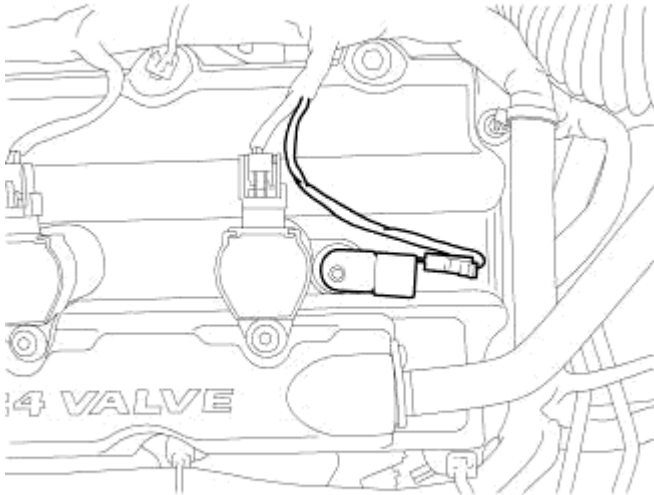
**Fig. 7: Capacitor 2.4L**

Courtesy of CHRYSLER LLC

- | |
|---------------|
| 1 - Bolt |
| 2 - Capacitor |
| 3 - Connector |

1. Install ignition coil capacitor (2) and bolt (1), tighten bolt to 10 N.m (88.5 ft. lbs.).
2. Connect electrical connector (3).
3. Install engine cover.
4. Connect negative battery cable, tighten nut to 5 N.m (45 in. lbs.).

2.7L 1st

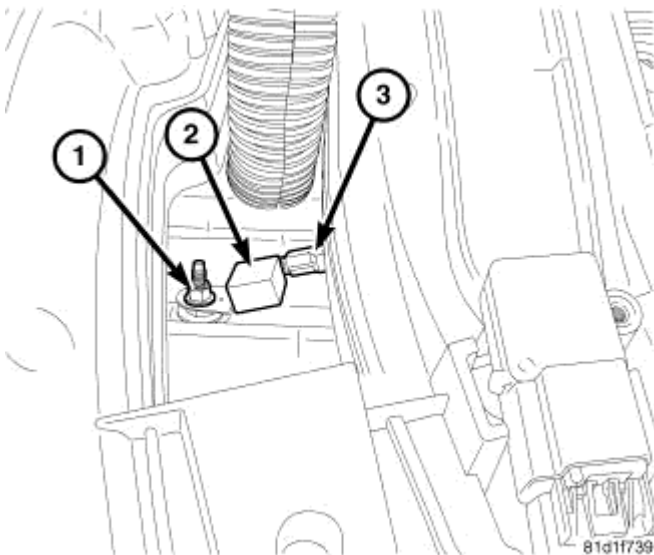


8192aa6e

Fig. 8: 1st Ignition Capacitor - 2.7L

Courtesy of CHRYSLER LLC

1. Install ignition coil capacitor and nut.
2. Tighten nut to 10 N.m (88.5 in. lbs.).
3. Attach electrical connector to capacitor.
4. Connect negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

2.7L 2nd

81d1f739

Fig. 9: 2nd Ignition Capacitor - 2.7L

Courtesy of CHRYSLER LLC

1. Install ignition coil capacitor (2) and bolt (1).
2. Tighten bolt to 28 N.m (20.5 ft. lbs.).
3. Connect electrical connector (3).
4. Connect negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

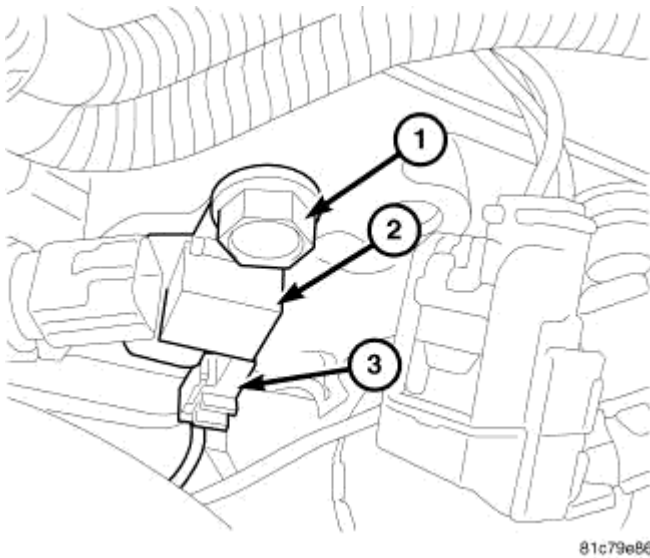
3.5L

Fig. 10: Ignition Capacitor - 3.5L
Courtesy of CHRYSLER LLC

1. Install ignition coil capacitor (2) and bolt (1).
2. Tighten bolt to 28 N.m (20.5 ft. lbs.).
3. Connect electrical connector (3).
4. Connect negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

COIL, IGNITION**REMOVAL****2.4L**

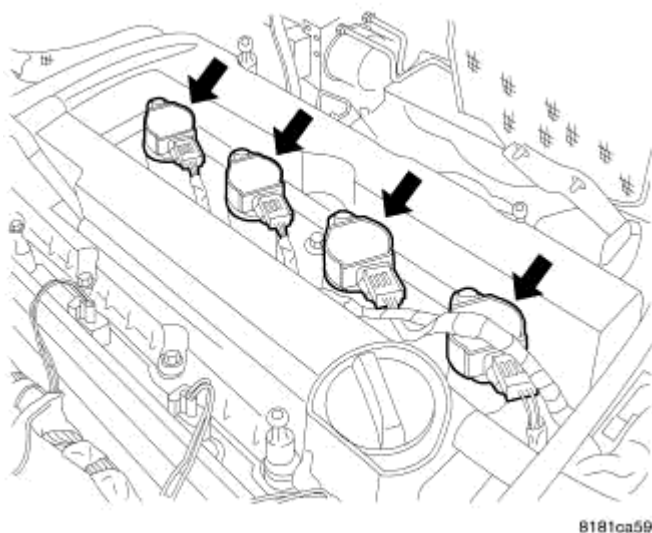


Fig. 11: Identifying Ignition Coil Electrical Connectors

Courtesy of CHRYSLER LLC

NOTE: Prior to removing coil, spray compressed air around coil top to make sure no dirt drops into the spark plug tube.

The electronic ignition coil attaches directly to the valve cover.

1. Disconnect and isolate the negative battery cable.
2. Remove engine cover.
3. Disconnect electrical connector from ignition coil.

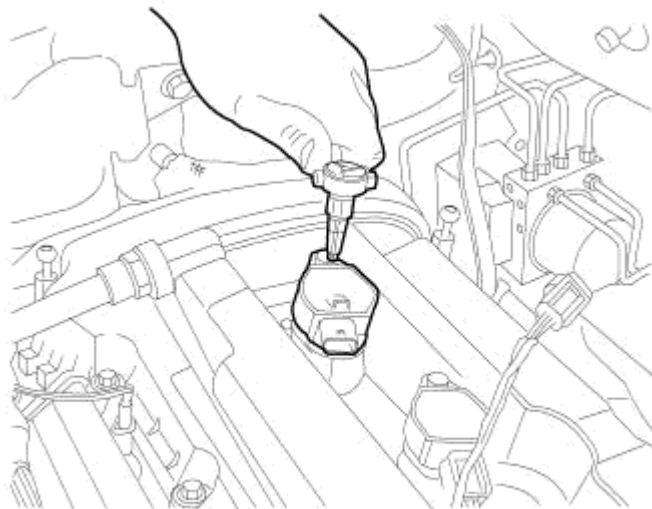


Fig. 12: Removing/Installing Ignition Coil Mounting Bolts

Courtesy of CHRYSLER LLC

4. Remove ignition coil mounting bolts.

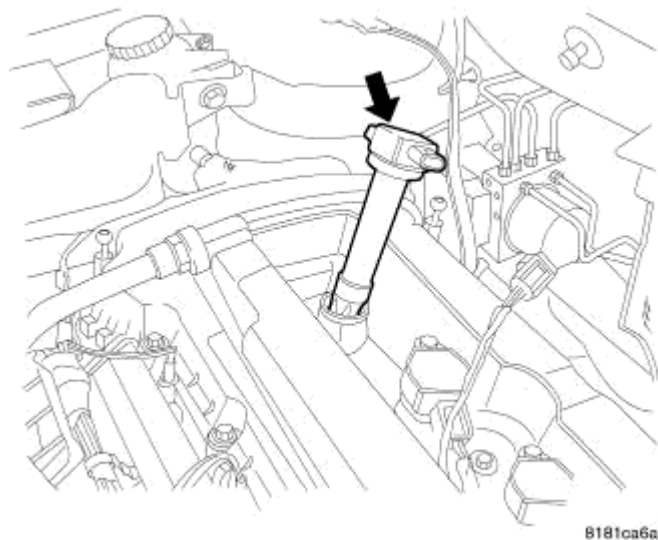


Fig. 13: Removing/Installing Ignition Coil
Courtesy of CHRYSLER LLC

5. Twist the ignition coil then pull straight up.

2.7L

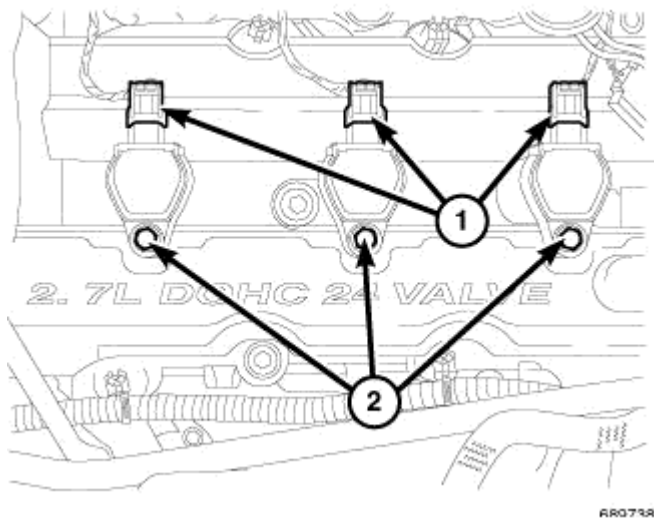


Fig. 14: Removing/Installing Electrical Connectors And Mounting Bolts At Ignition Coil
Courtesy of CHRYSLER LLC

NOTE: Always remove the ignition coil assembly by turning the assembly 1/2 turn and pulling up in a steady motion.

1. Disconnect the negative battery cable.
2. Remove the upper intake manifold. Refer to **Engine/Manifolds/MANIFOLD, Intake - Removal**.
3. Disconnect electrical connector (1) from ignition coil.
4. Remove mounting bolt (2) from ignition coil.

CAUTION: Prior to removing the ignition coils, spray compressed air around the coils and spark plugs. If dirt and debris enter the engine, this may cause internal engine damage.

5. Remove the ignition coils.

3.5L

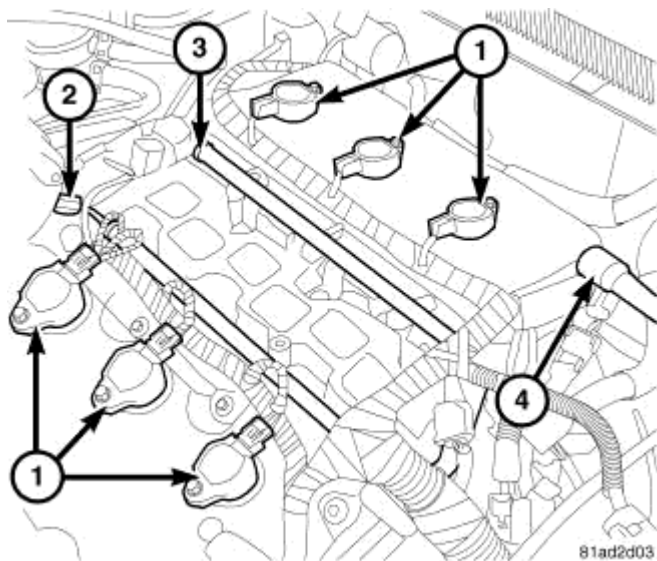


Fig. 15: Ignition Coils And Fuel Rail

Courtesy of CHRYSLER LLC

1. Remove engine cover.
2. Disconnect and isolate the negative battery cable.
3. Remove the upper intake manifold. Refer to **Engine/Manifolds/MANIFOLD, Intake - Removal**.

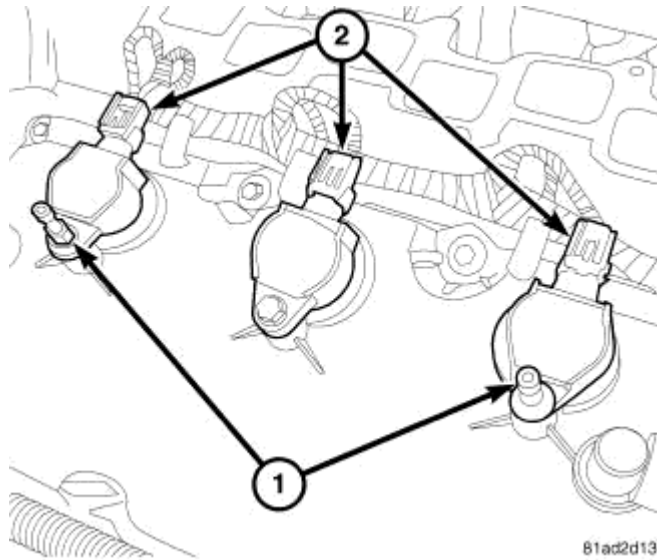


Fig. 16: Ignition Coils

Courtesy of CHRYSLER LLC

4. Unlock and disconnect electrical connector (2) from ignition coils.
5. Remove mounting bolts and engine cover studs (1).

CAUTION: Prior to removing the ignition coils, spray compressed air around the coils and spark plugs. If dirt and debris enter the engine, this may cause internal engine damage.

6. Twist, lift and remove ignition coil from engine.

INSTALLATION

2.4L

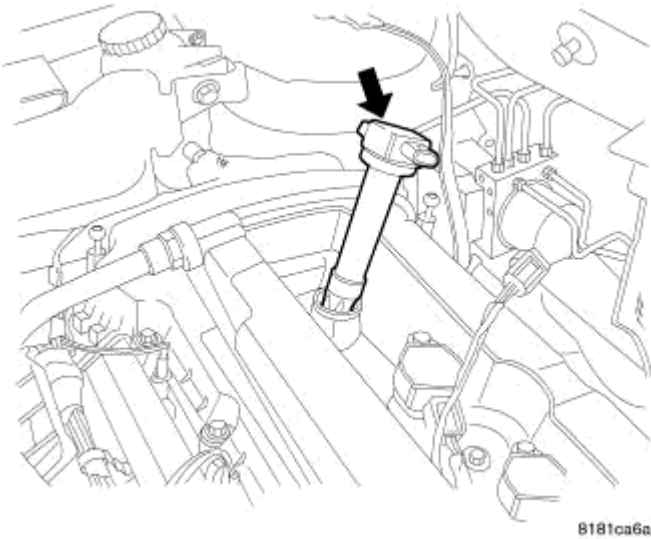


Fig. 17: Removing/Installing Ignition Coil
Courtesy of CHRYSLER LLC

1. Install ignition coil onto spark plug.

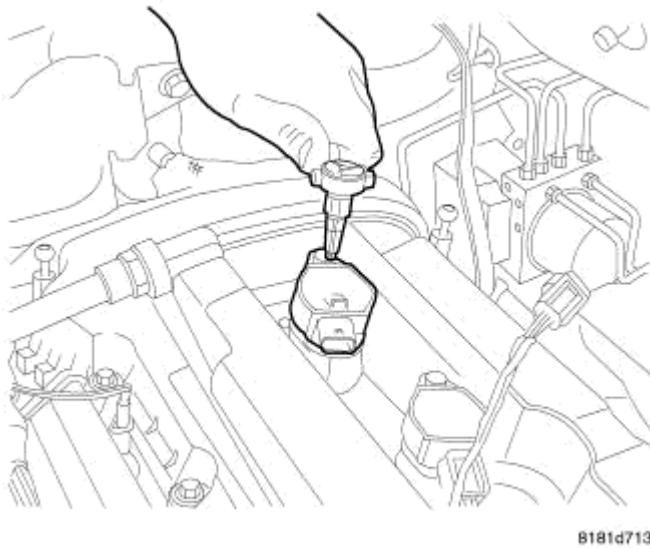


Fig. 18: Removing/Installing Ignition Coil Mounting Bolts
Courtesy of CHRYSLER LLC

2. Install ignition coil mounting bolt, tighten to 9 N.m (79.5 in. lbs.).
3. Connect ignition coil electrical connectors.
4. Connect negative battery cable, tighten nut to 5 N.m (45 in. lbs.).
5. Install engine cover.

2.7L

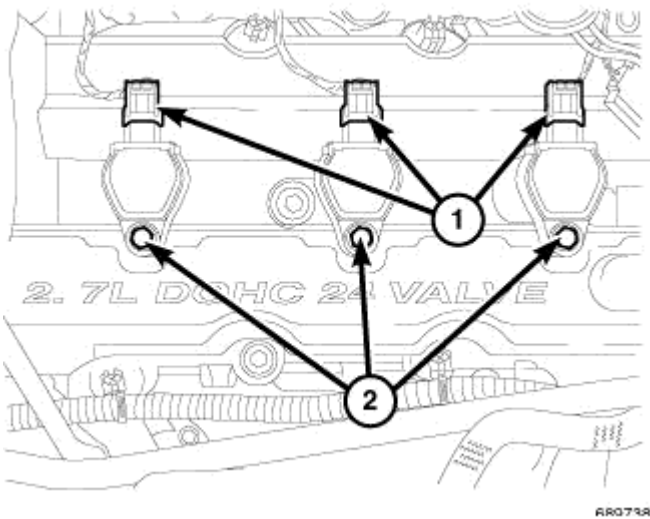


Fig. 19: Removing/Installing Electrical Connectors And Mounting Bolts At Ignition Coil
Courtesy of CHRYSLER LLC

1. Align ignition coil with top of spark plug.
2. Twist and push down ignition coil assembly onto spark plug and valve cover. Install mounting bolt (2) and tighten to 7.5 N.m (65 in. lbs.).
3. Connect electrical connector (1) to ignition coil.
4. Install upper intake manifold. Refer to **Engine/Manifolds/MANIFOLD, Intake - Installation** .
5. Connect negative battery cable.

3.5L

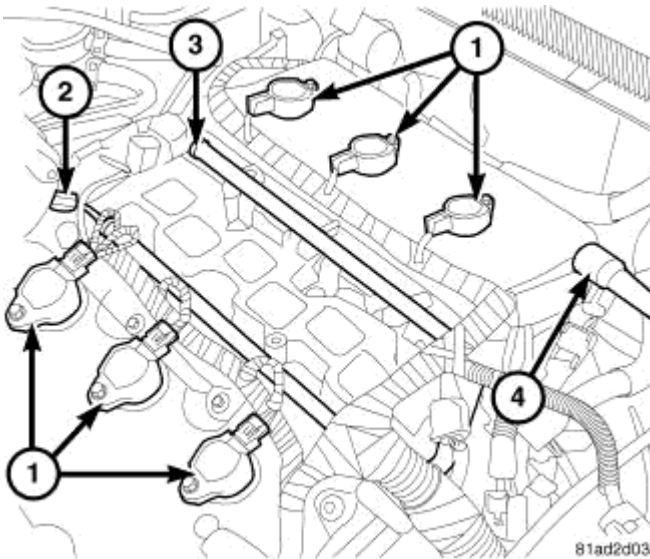


Fig. 20: Ignition Coils And Fuel Rail
Courtesy of CHRYSLER LLC

1. Install ignition coil (1).

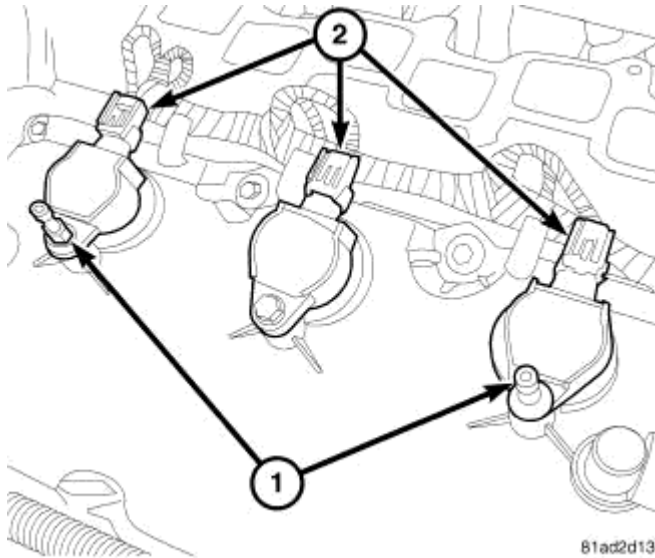


Fig. 21: Ignition Coils
Courtesy of CHRYSLER LLC

2. Install engine cover studs (1) in the two outside ignition coils on the front of the engine. Install bolts on the other ignition coils.
3. Tighten studs and bolts to 8 N.m (71 in. lbs.).

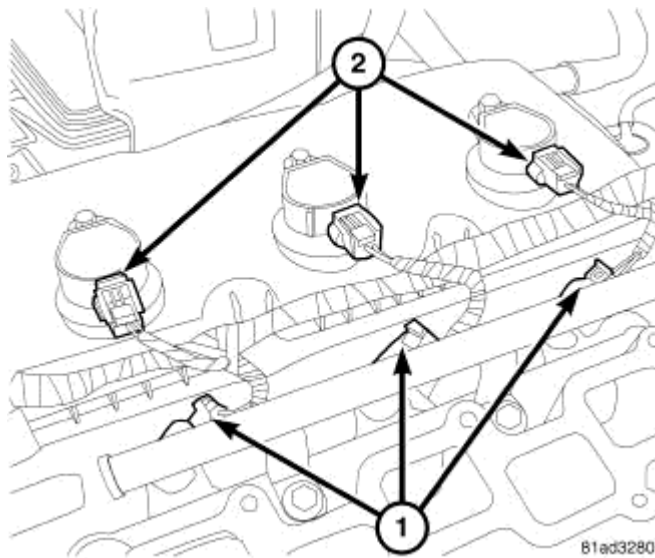


Fig. 22: Identifying Coil & Fuel Injector Connectors
Courtesy of CHRYSLER LLC

4. Connect electrical connector and lock (2).
5. Install intake manifold. Refer to **Engine/Manifolds/MANIFOLD, Intake - Installation**.
6. Connect negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

7. Install engine cover.

MODULE, GLOW PLUG

DESCRIPTION

DESCRIPTION

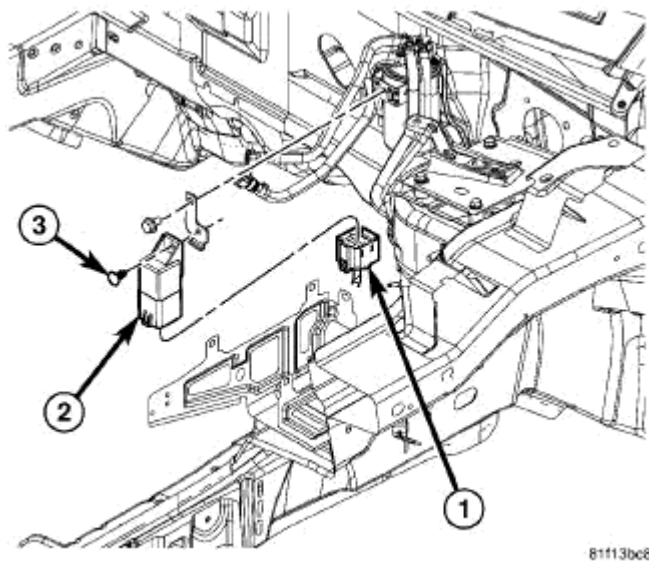


Fig. 23: Locating Diesel Glow Plug Control Module

Courtesy of CHRYSLER LLC

The glow plug control module is mounted to the fuel filter/water separator bracket, and is controlled by the engine control module.

OPERATION

OPERATION

When the ignition (key) switch is placed in the ON position, a signal is sent to the ECM relating current engine coolant temperature. This signal is sent from the engine coolant temperature sensor.

The glow plug control module receives information about the glow function from the engine control module. The start of glow plug operation, the period of glow plug operation, the actuation frequency and the pulse duty factor are therefore determined by the engine control module.

REMOVAL

REMOVAL

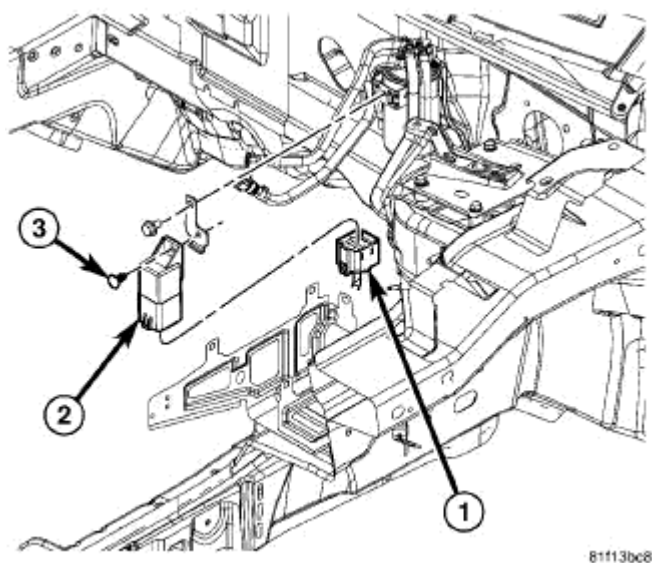


Fig. 24: Locating Diesel Glow Plug Control Module
Courtesy of CHRYSLER LLC

1. Disconnect the glow plug module harness connector (1)
2. Remove the fastener (3).
3. Remove the glow plug module (2).

INSTALLATION

INSTALLATION

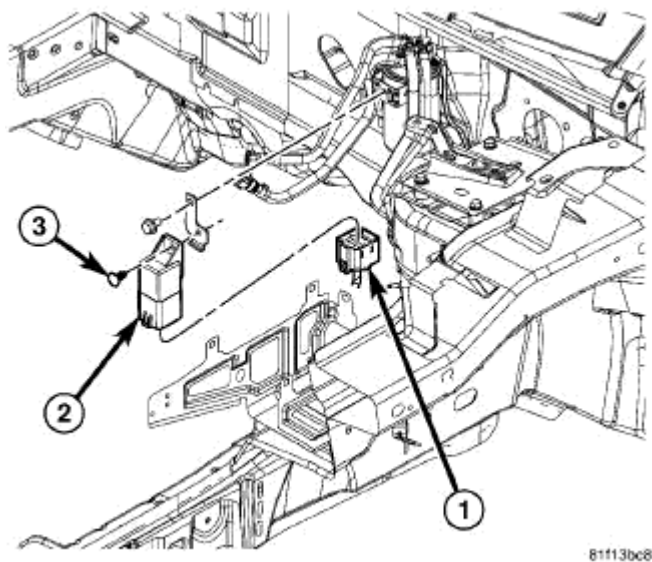


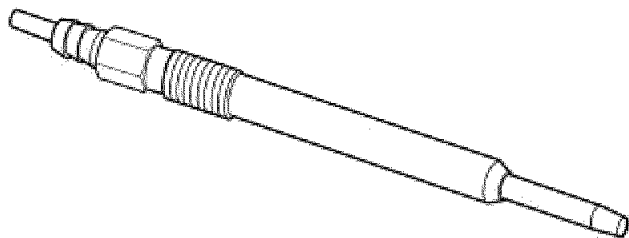
Fig. 25: Locating Diesel Glow Plug Control Module
Courtesy of CHRYSLER LLC

1. Install the glow plug module (2).
2. Install the fastener (3).
3. Reconnect the glow plug module harness connector (1)

PLUG, GLOW

DESCRIPTION

DESCRIPTION



80c46e18

Fig. 26: Glow Plug

Courtesy of CHRYSLER LLC

Glow plugs are used to help start a cold or cool engine. The glow plugs will heat up and glow to heat the combustion chamber of each cylinder. An individual glow plug is used for each cylinder. Each glow plug is threaded into the cylinder head below the cylinder head cover.

OPERATION

OPERATION

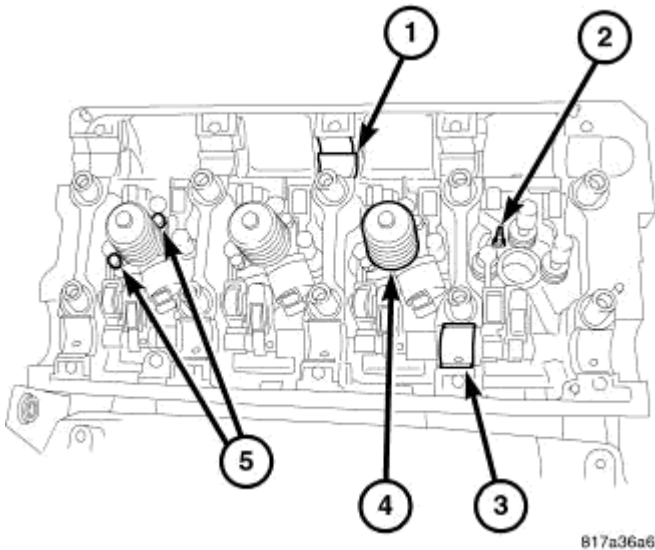
The glow plugs are used to preheat the combustion chambers in order to achieve the ignition temperature required for the fuel-air mixture.

The heating element is integrated in the glow rod. It consists of a heating winding and a control winding connected in series.

The glow plug system is a quick start type. This allows for immediate start in practically all weather conditions without long periods of preglowing. This works in conjunction with 6-hole injectors, which have a special "ignition" spray pattern. The glow plugs reach 1000° C (1832° F) in 2 seconds.

REMOVAL

REMOVAL

**Fig. 27: Glow Plugs**

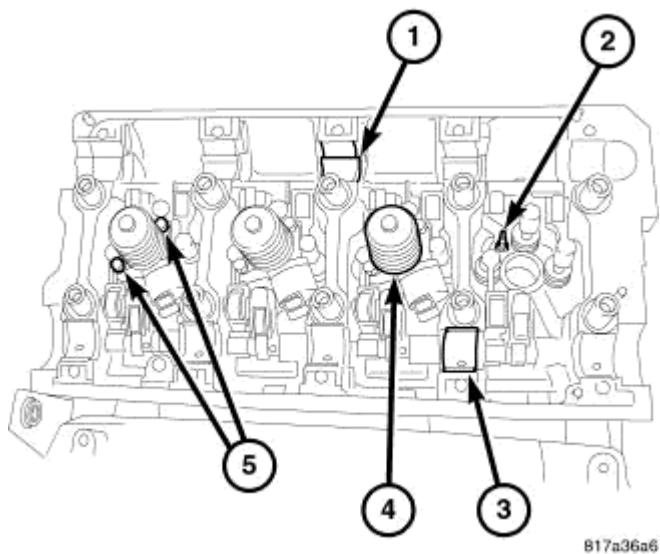
Courtesy of CHRYSLER LLC

NOTE: If replacing a one or more glow plugs that failed, check the glow plug relay control circuit (K202) for a short to voltage. Back probe circuit (K202) between the engine control module and the glow plug control module. Any reading higher than 9.8 volts with the key on would be considered a short to voltage.

1. Disconnect negative battery cable.
2. Remove engine cover. Refer to **Engine - Removal**.
3. Remove cylinder head cover. Refer to **Engine/Cylinder Head/COVER(S), Cylinder Head - Removal**.
4. Disconnect glow plug electrical connector.
5. Remove glow plugs (2) from cylinder head.

INSTALLATION

INSTALLATION

**Fig. 28: Glow Plugs**

Courtesy of CHRYSLER LLC

1. Clean glow plug bay and install glow plug.
2. Tighten glow plugs to 10 N.m (89 lbs. in.).
3. Connect glow plug electrical connector.
4. Install cylinder head cover. Refer to **Engine/Cylinder Head/COVER(S), Cylinder Head - Installation**).
5. Install engine cover. Refer to **Engine - Installation** .
6. Connect negative battery cable.

SENSOR, CAMSHAFT POSITION

OPERATION

CAMSHAFT AND CRANKSHAFT SIGNALS

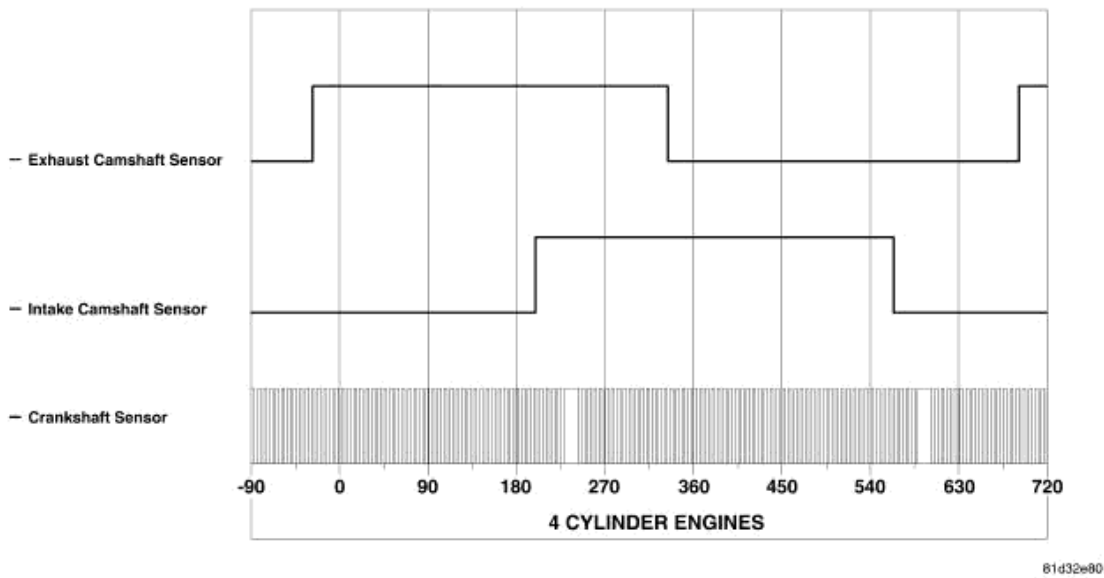


Fig. 29: 4 Cylinder Cam & Crank Signals
Courtesy of CHRYSLER LLC

NOTE: The graphic represents the relationship between camshaft and crankshaft sensors edges with camshafts in "lock pin" position (cam shafts are not "phasing"). This is normally seen during idle.

Depiction of good camshaft and crankshaft square wave signals for 4 cylinder engines.

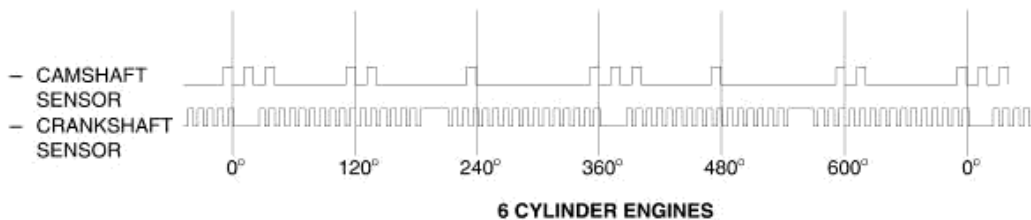


Fig. 30: 6 Cylinder Cam & Crank Signals
Courtesy of CHRYSLER LLC

Depiction of good camshaft and crankshaft square wave signals for 6 cylinder engines.

REMOVAL

2.4L FRONT

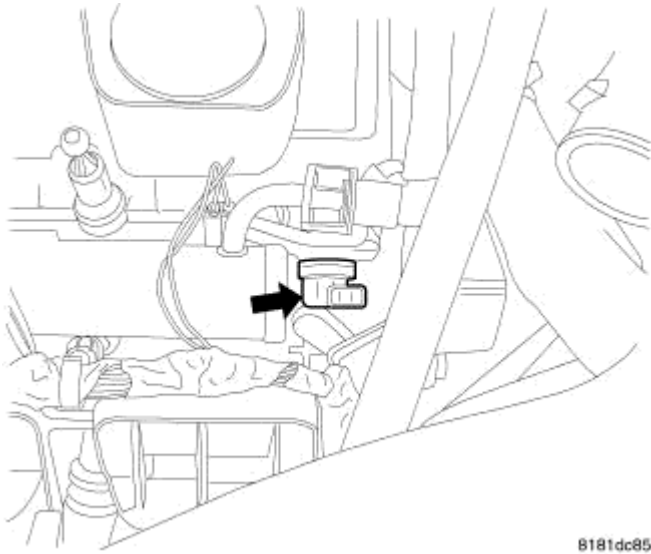


Fig. 31: Front Cam Sensor
Courtesy of CHRYSLER LLC

1. Disconnect and isolate negative battery cable.
2. Disconnect electrical connector from camshaft position sensor.
3. Remove camshaft position sensor mounting screw.

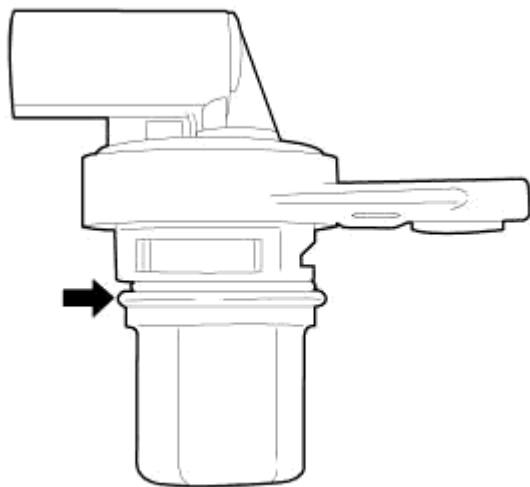


Fig. 32: Removing/Installing Camshaft Position Sensor
Courtesy of CHRYSLER LLC

4. Remove sensor.

2.4L REAR

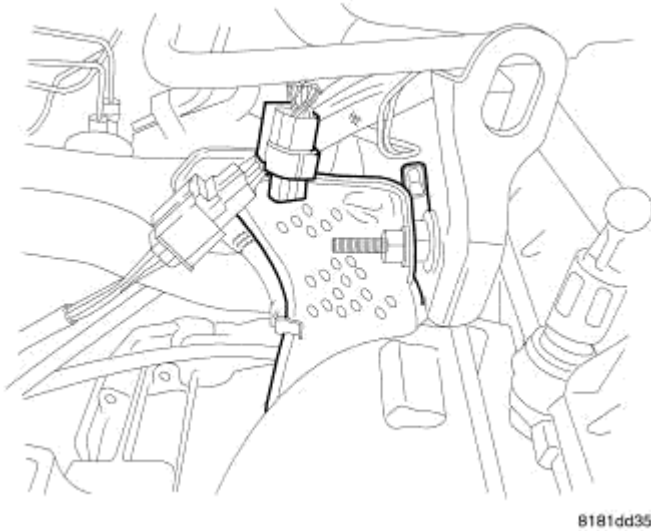


Fig. 33: Identifying Camshaft Position Sensor Heat Shield - Remove/Install
Courtesy of CHRYSLER LLC

1. Disconnect and isolate negative battery cable.
2. Disconnect electrical connector at sensor.
3. Remove nut retaining heat shield.

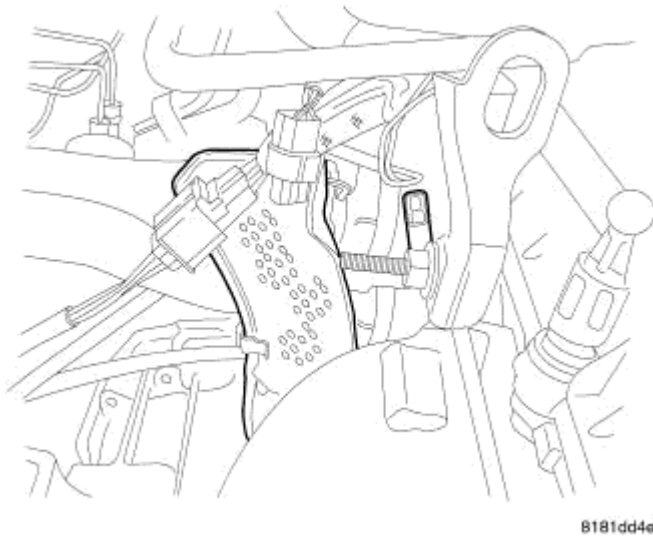
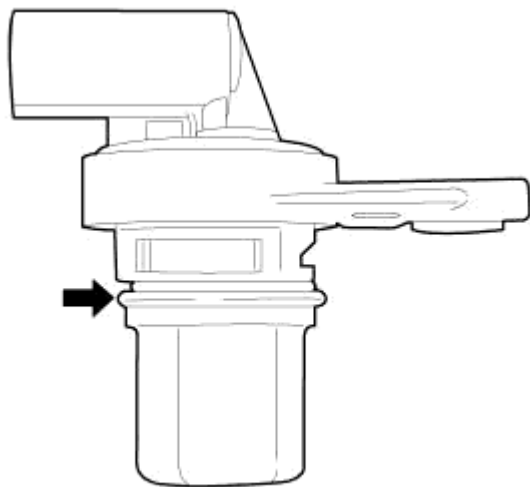


Fig. 34: Identifying Camshaft Position Sensor Heat Shield - Remove/Install
Courtesy of CHRYSLER LLC

4. Pull heat shield out to uncover sensor.

5. Remove mounting bolt.

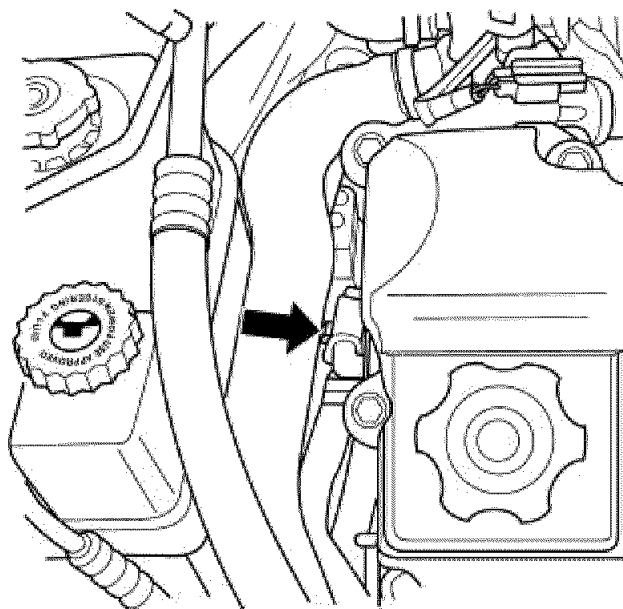


8181dc89

Fig. 35: Removing/Installing Camshaft Position Sensor
Courtesy of CHRYSLER LLC

6. Remove sensor.

2.7L



8096b870

Fig. 36: Cam Sensor Location 2.7L
Courtesy of CHRYSLER LLC

The camshaft position sensor is mounted in the front of the head.

1. Disconnect electrical connector from sensor.
2. Remove camshaft position sensor screw.
3. Without pulling on the connector, pull the sensor out of the chain case cover.

3.5L

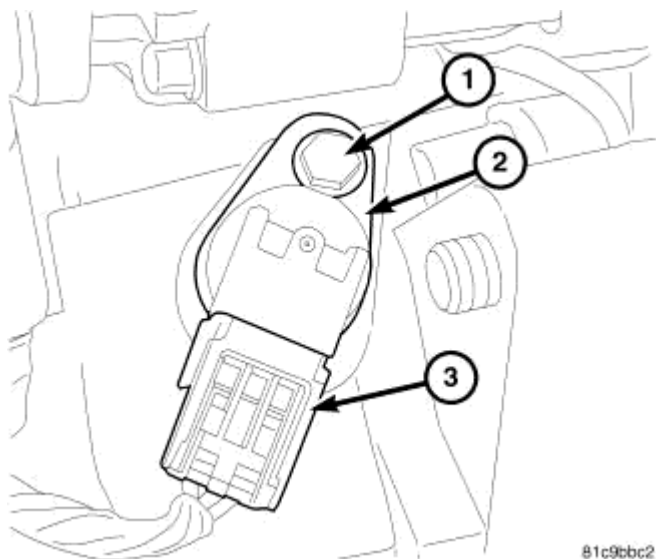
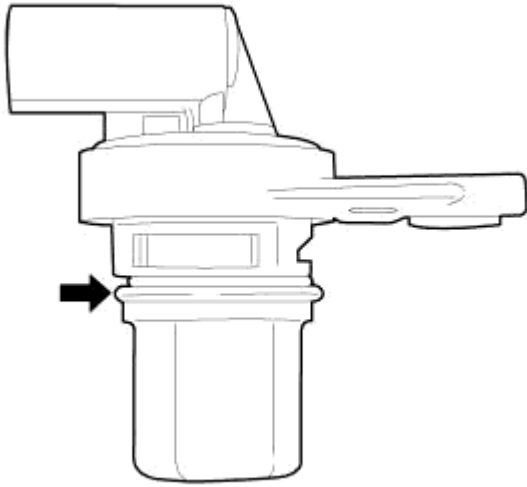


Fig. 37: 3.5L Camshaft Sensor
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable at battery.
2. Disconnect electrical connector (3) from camshaft position (CMP) sensor (2).
3. Remove bolt (1) and CMP sensor (2).

INSTALLATION

2.4L FRONT

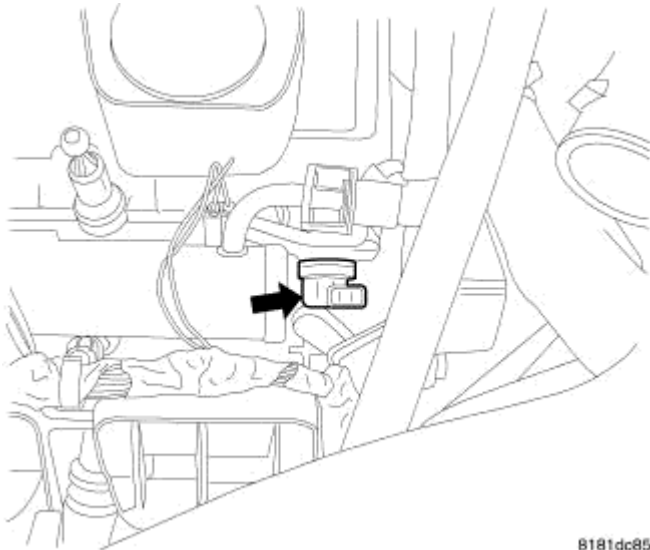


8181dc89

Fig. 38: Removing/Installing Camshaft Position Sensor
Courtesy of CHRYSLER LLC

CAUTION: Install camshaft position (CMP) sensor utilizing twisting motion. Make sure CMP sensor is fully seated. Do not drive CMP sensor into the bore with mounting screw. This may cause CMP sensor to be incorrectly seated causing a faulty signal or no signal at all.

1. Lubricate sensor O-ring.

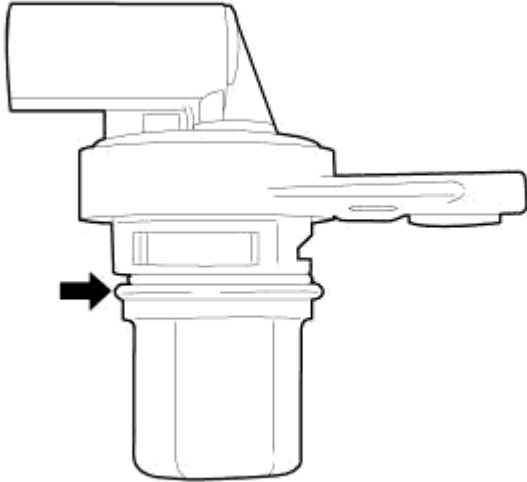


8181dc85

Fig. 39: Front Cam Sensor
Courtesy of CHRYSLER LLC

2. Install CMP sensor and mounting bolt, tighten to 9 N.m (79.5 in. lbs.).
3. Connect electrical connector to camshaft position sensor.

4. Connect negative battery cable, tighten nut to 5 N.m (45 in. lbs.).

2.4L REAR

8181dc89

Fig. 40: Removing/Installing Camshaft Position Sensor
Courtesy of CHRYSLER LLC

CAUTION: Install camshaft position (CMP) sensor utilizing twisting motion. Make sure CMP sensor is fully seated. Do not drive CMP sensor into the bore with mounting screw. This may cause CMP sensor to be incorrectly seated causing a faulty signal or no signal at all.

1. Lubricate sensor O-ring.
2. Install CMP sensor and mounting bolt, tighten to 9 N.m (79.5 in. lbs.).



8181dd4e

Fig. 41: Identifying Camshaft Position Sensor Heat Shield - Remove/Install
Courtesy of CHRYSLER LLC

3. Connect electrical connector to camshaft position sensor.
4. Install heat shield onto mounting stud.
5. Install heat shield retaining nut and tighten.

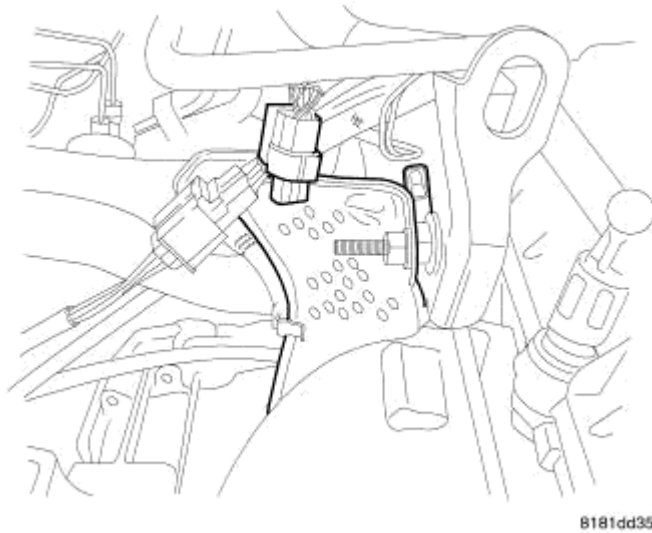


Fig. 42: Identifying Camshaft Position Sensor Heat Shield - Remove/Install
Courtesy of CHRYSLER LLC

6. Connect the electrical connector.
7. Connect negative battery cable, tighten nut to 5 N.m (45 in. lbs.).

2.7L

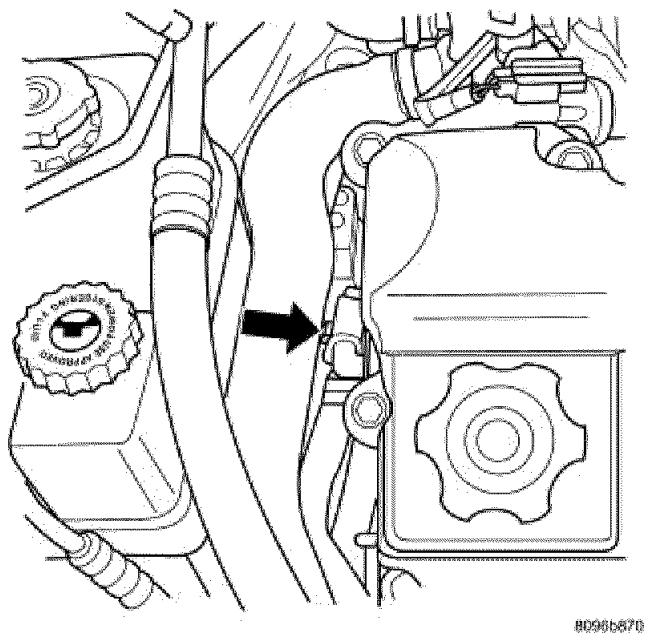


Fig. 43: Cam Sensor Location 2.7L

Courtesy of CHRYSLER LLC

CAUTION: Install camshaft position (CMP) sensor utilizing twisting motion. Make sure CMP sensor is fully seated. Do not drive CMP sensor into the bore with mounting screw. This may cause CMP sensor to be incorrectly seated causing a faulty signal or no signal at all.

NOTE: If reinstalling the sensor, check the sensor O-ring for damage and replace if necessary. Lubricate the O-ring with clean engine oil before installing the sensor.

1. Push the CMP sensor into the chain case cover with a twisting motion until fully seated.
2. While holding the sensor in this position, install and tighten the retaining bolt to 12 N.m (106 in. lbs.).
3. Connect and lock the electrical connector to the CMP sensor.
4. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

NOTE: The Cam/Crank Variation Relearn procedure must be performed anytime there has been a repair/replacement made to a powertrain system, for example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components. Refer to DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure

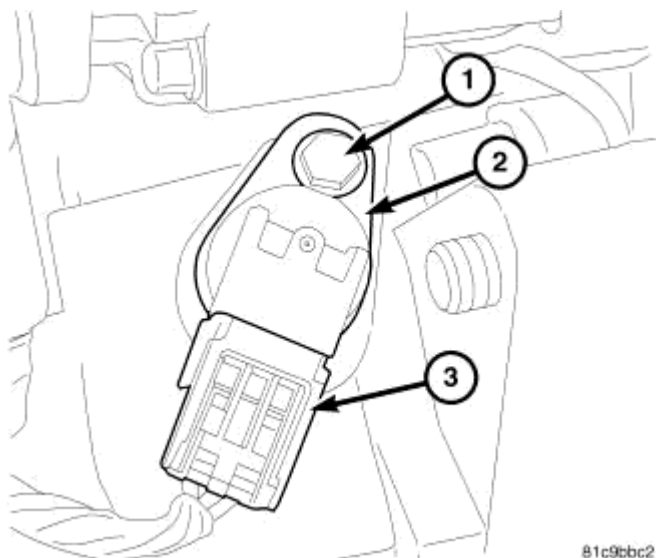


Fig. 44: 3.5L Camshaft Sensor
Courtesy of CHRYSLER LLC

CAUTION: Install camshaft position (CMP) sensor utilizing twisting motion. Make sure CMP sensor is fully seated. Do not drive CMP sensor into the bore with mounting screw. This may cause CMP sensor to be incorrectly seated causing a faulty signal or no signal at all.

NOTE: If reinstalling the sensor, check the sensor O-ring for damage and replace if necessary. Lubricate the O-ring with clean engine oil before installing the sensor.

1. Push the CMP sensor (2) into the timing belt cover with a twisting motion until fully seated.
2. While holding the sensor (2) in this position, install and tighten the retaining bolt (1) to 12 N.m (106 in. lbs.).
3. Connect and lock the electrical connector (3) to the CMP sensor (2).
4. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

NOTE: The Cam/Crank Variation Relearn procedure must be performed anytime there has been a repair/replacement made to a powertrain system, for example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components. Refer to DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure

SENSOR, KNOCK

REMOVAL

2.4L

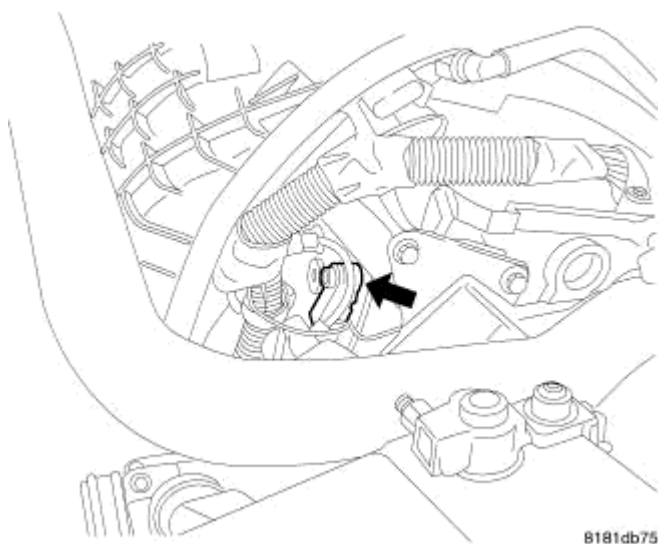


Fig. 45: Locating Knock Sensor
Courtesy of CHRYSLER LLC

The knock sensor bolts into the side of the cylinder block in front of the starter under the intake manifold.

1. Disconnect and isolate negative battery cable.

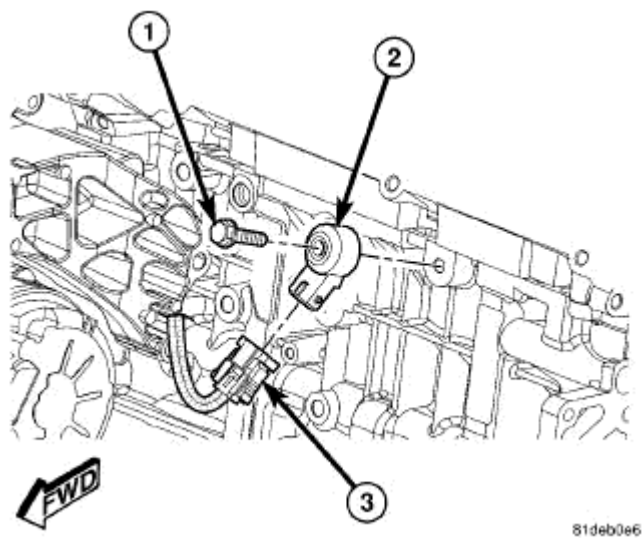
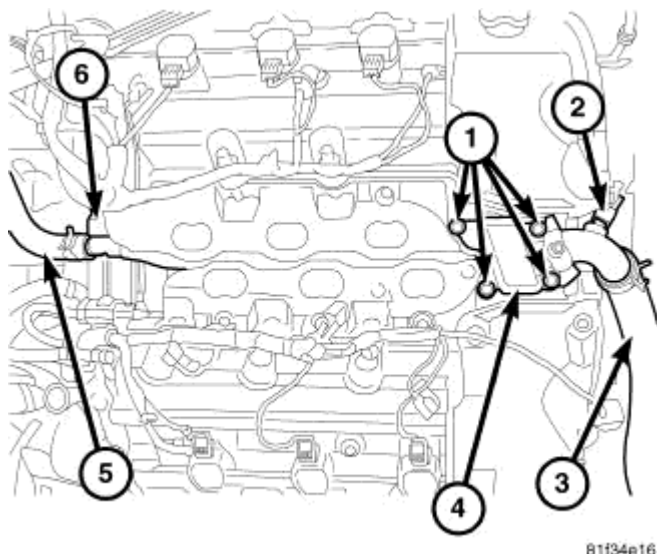


Fig. 46: 2.4L Knock Sensor
Courtesy of CHRYSLER LLC

2. Disconnect electrical connector (3) from knock sensor (2).
3. Remove bolt (1) and knock sensor (2) from engine block.

2.7L



81f34e16

Fig. 47: Water Housing Outlet Tube 2.7L

Courtesy of CHRYSLER LLC

1 - Bolts
2 - Coolant Temp Sensor Connector
3 - Radiator Upper Hose
4 - Water Housing Outlet Tube
5 - Heater Hose
6 - Retaining Clip

WARNING: Do not remove pressure cap with the system hot and under pressure because serious burns from coolant can occur.

1. Drain cooling system. Refer to **Cooling - Standard Procedure** .
2. Disconnect and isolate the negative battery cable.
3. Remove lower intake manifold. Refer to **Engine/Manifolds/MANIFOLD, Intake - Removal** .
4. Remove radiator upper hose (3) at water housing outlet tube (4).
5. Remove heater hose (5) from water housing outlet tube (4) at rear of engine.
6. Disconnect water housing outlet tube (4) from retaining clip (6) at rear of engine.
7. Disconnect electrical connector (2) from coolant temperature sensor.
8. Remove 4 bolts (1) attaching water housing outlet tube (4) to cylinder heads.

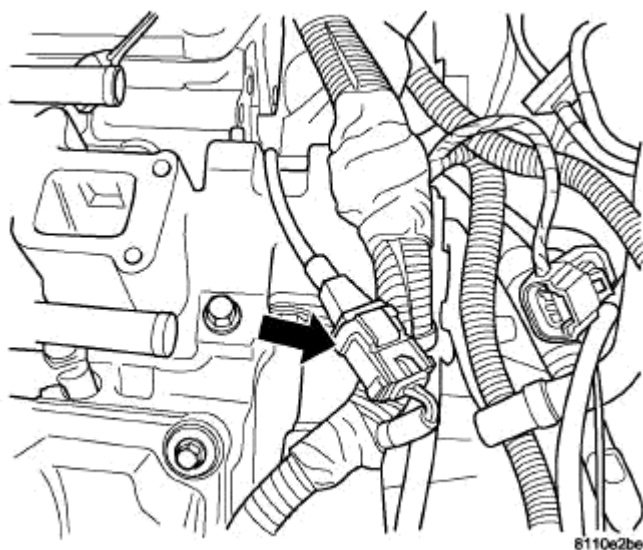


Fig. 48: Knock Sensor Connector
Courtesy of CHRYSLER LLC

9. Disconnect electrical connector from knock sensor.

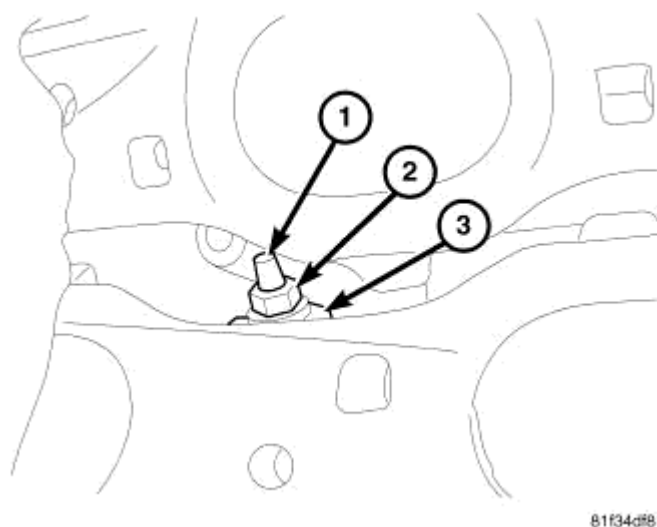


Fig. 49: Knock Sensor 2.7L
Courtesy of CHRYSLER LLC

1 - Stud
2 - Nut
3 - Knock Sensor

10. Reposition the water housing outlet tube and remove nut (2) from knock sensor mounting stud (1).
11. Remove knock sensor (3) from engine block.

3.5L

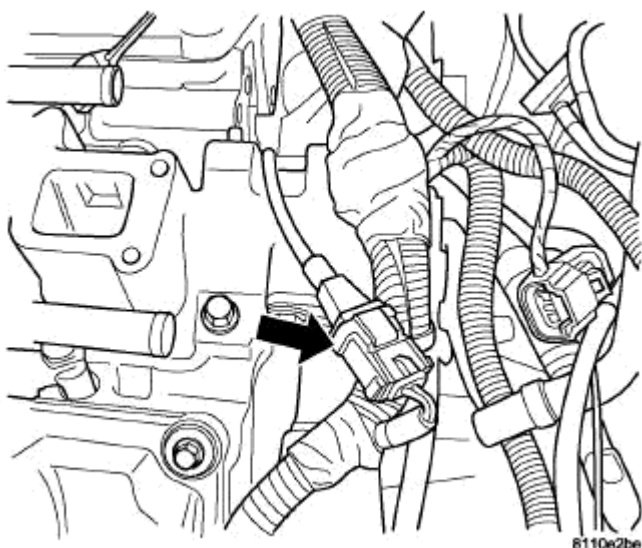


Fig. 50: Knock Sensor Connector
Courtesy of CHRYSLER LLC

1. Disconnect the negative battery cable.
2. Remove the upper intake manifold. Refer to **Engine/Manifolds/MANIFOLD, Intake - Removal** .
3. Disconnect the electrical connector.

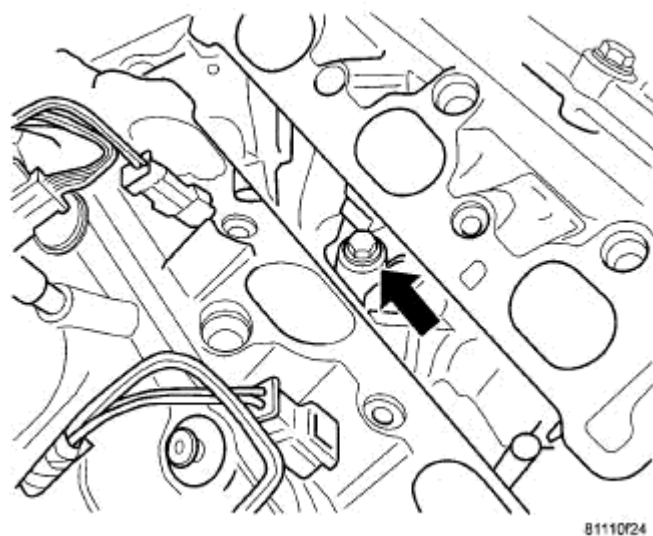


Fig. 51: Knock Sensor Location
Courtesy of CHRYSLER LLC

4. Remove the knock sensor .

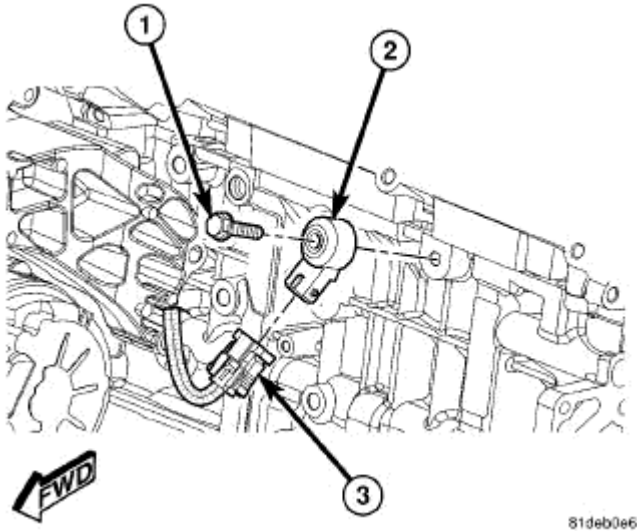
INSTALLATION**2.4L**

Fig. 52: 2.4L Knock Sensor
Courtesy of CHRYSLER LLC

CAUTION: Always torque knock sensors to the correct torque specification. Over or under tightening effects knock sensor performance. Ensure the electrical connector orientation is at the six O'clock position to the engine block.

1. Install knock sensor (2) and bolt (1) to engine block. Tighten bolt to 22 N.m (195 in. lbs.).
2. Connect electrical connector (3) to knock sensor (2).
3. Connect negative battery cable, tighten nut to 4.5 N.m (40 in. lbs.).

2.7L

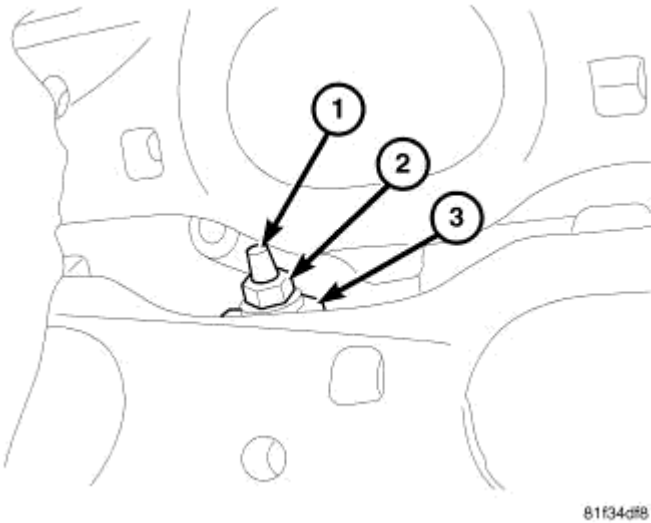


Fig. 53: Knock Sensor 2.7L
Courtesy of CHRYSLER LLC

- | |
|------------------|
| 1 - Stud |
| 2 - Nut |
| 3 - Knock Sensor |

CAUTION: Over or under tightening effects knock sensor performance resulting in possible improper spark control.

1. Install knock sensor (3) and nut (2) onto stud (1).

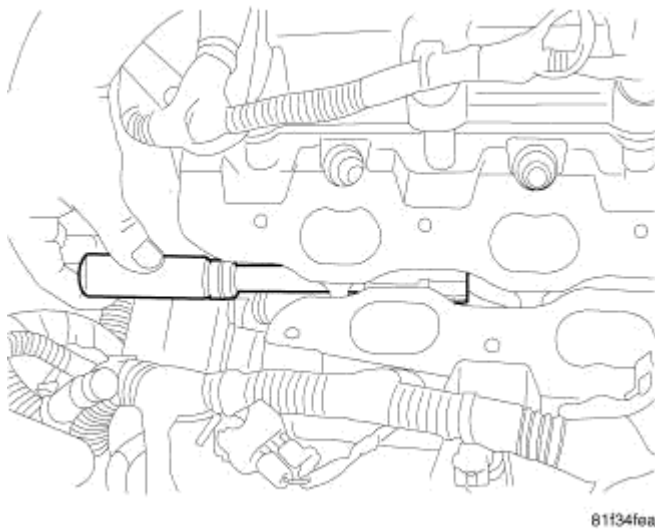


Fig. 54: Tighten Knock Sensor Nut
Courtesy of CHRYSLER LLC

2. Tighten knock sensor nut to 15 N.m (11 ft. lbs.).

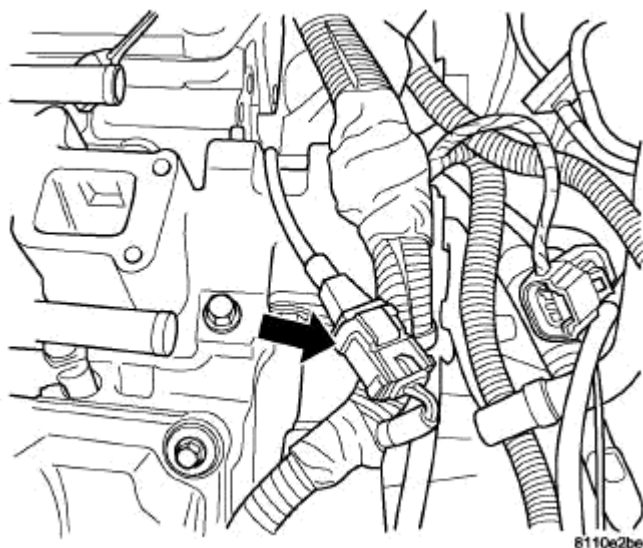


Fig. 55: Knock Sensor Connector
Courtesy of CHRYSLER LLC

3. Attach electrical connector to knock sensor.

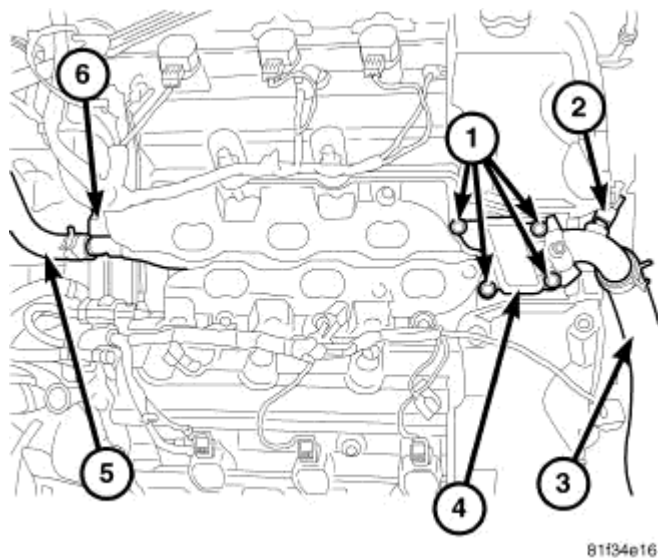


Fig. 56: Water Housing Outlet Tube 2.7L
Courtesy of CHRYSLER LLC

1 - Bolts
2 - Coolant Temp Sensor Connector
3 - Radiator Upper Hose

4 - Water Housing Outlet Tube

5 - Heater Hose

6 - Retaining Clip

4. Position the water housing outlet tube (4) to the cylinder heads and loosely install four bolts (1).
5. Attach water housing outlet tube (4) to the retaining clip (6) at rear of engine.
6. Tighten the four bolts (1) to 3 N.m (30 in. lbs.).
7. Connect electrical connector (2) to the coolant temperature sensor.
8. Install heater hose (5) to water housing outlet tube (4) at rear of engine.
9. Install radiator upper hose (3) to water housing outlet tube (4).
10. Install intake manifold. Refer to **Engine/Manifolds/MANIFOLD, Intake - Installation**.
11. Connect negative battery cable, tighten nut to 5 N.m (45 in. lbs.).
12. Fill cooling system. Refer to **Cooling - Standard Procedure**.
13. Operate engine until it reaches normal operating temperature. Check cooling system for correct fluid levels.

3.5L

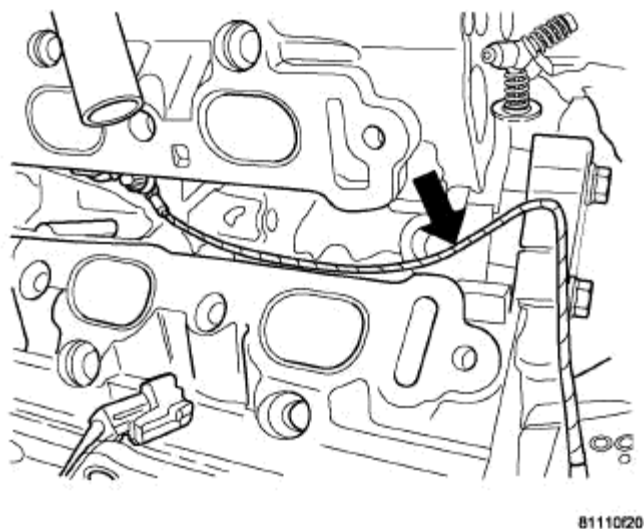


Fig. 57: Knock Sensor Wire Route
Courtesy of CHRYSLER LLC

CAUTION: Always use the specified torque when installing the knock sensor bolt. Over or under tightening the sensor mounting bolt will affect knock sensor performance, possibly causing improper spark control.

1. Install knock sensor. Tighten knock sensor to 20 N.m (15 ft. lbs.).
2. Route the knock sensor wire in the proper location.

3. Install upper intake manifold. Refer to **Engine/Manifolds/MANIFOLD, Intake - Installation** .

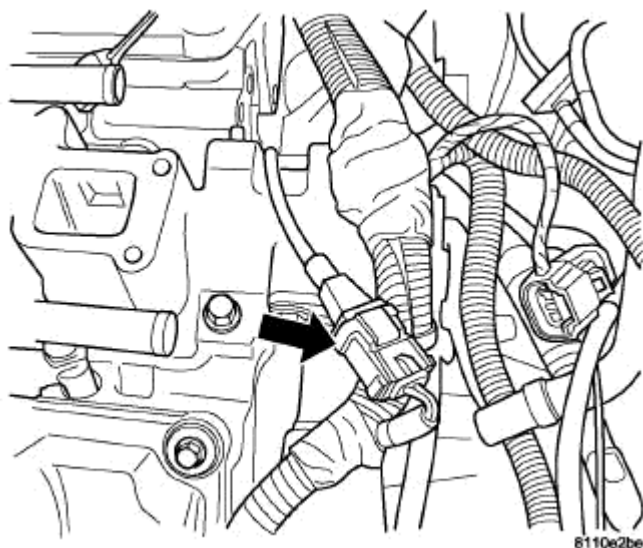


Fig. 58: Knock Sensor Connector
Courtesy of CHRYSLER LLC

4. Connect the electrical connector.
5. Connect the negative battery cable.

SPARK PLUG

REMOVAL

2.4L

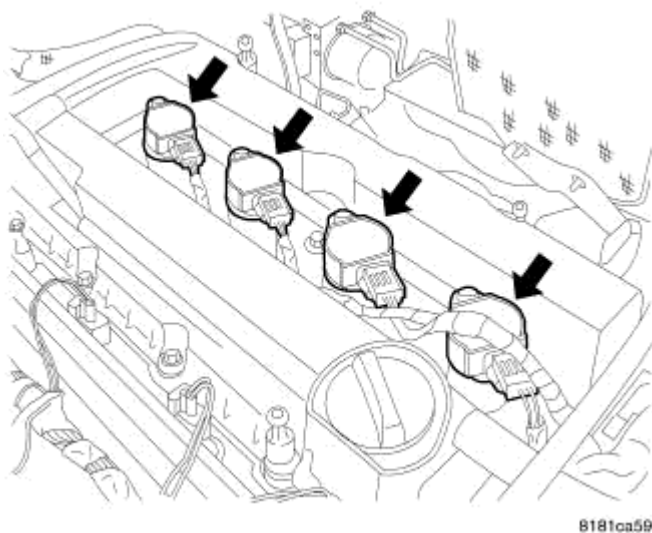
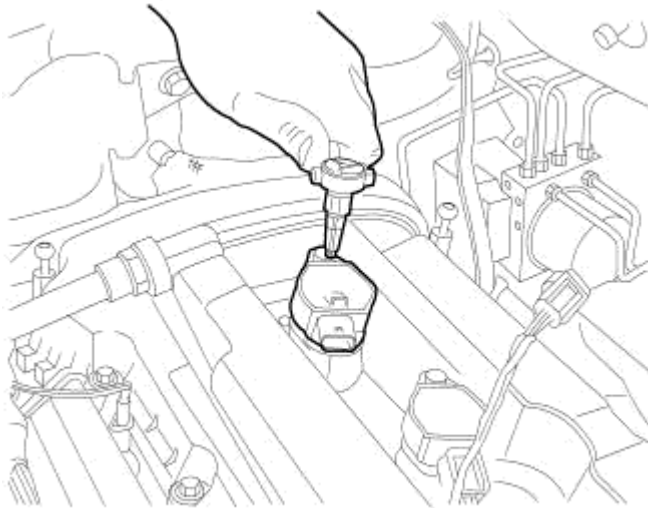


Fig. 59: Identifying Ignition Coil Electrical Connectors

Courtesy of CHRYSLER LLC

NOTE: Prior to removing coil, spray compressed air around coil top to make sure no dirt drops into the spark plug tube.

1. Disconnect and isolate the negative battery cable.
2. Remove engine cover.
3. Disconnect the electrical connectors from ignition coils.

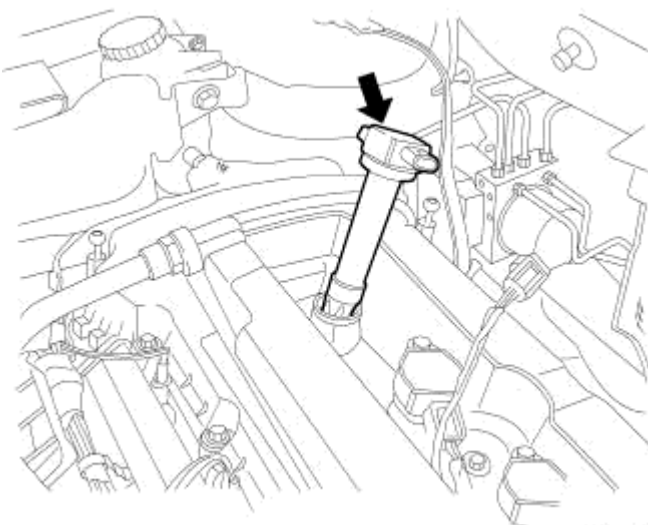


8181d713

Fig. 60: Removing/Installing Ignition Coil Mounting Bolts

Courtesy of CHRYSLER LLC

4. Remove the ignition coil mounting bolt.



8181ca6a

Fig. 61: Removing/Installing Ignition Coil
Courtesy of CHRYSLER LLC

5. Twist the ignition coil then pull straight up.

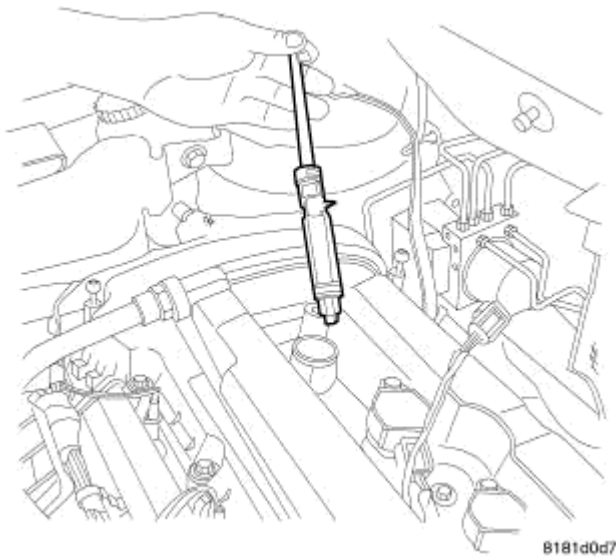


Fig. 62: Removing/Installing Spark Plug
Courtesy of CHRYSLER LLC

NOTE: Prior to loosening the spark plug, use compressed air to blow out any debris that might be in the spark plug tube.

6. Remove the spark plug using a quality socket with a rubber or foam insert.
7. Inspect the spark plug condition.

2.7L

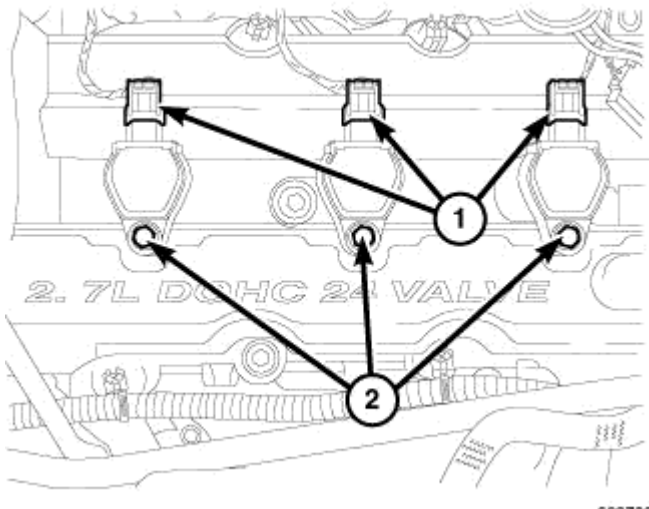


Fig. 63: Removing/Installing Electrical Connectors And Mounting Bolts At Ignition Coil
Courtesy of CHRYSLER LLC

NOTE: Always remove the ignition coil assembly by turning the assembly 1/2 turn and pulling straight back in a steady motion.

1. Disconnect the negative battery cable.
2. Remove the upper intake manifold. Refer to Engine/Manifolds/MANIFOLD, Intake - Removal.
3. Disconnect electrical connector (1) from ignition coil.
4. Remove mounting bolt (2) from ignition coil.

CAUTION: Prior to removing the ignition coils, spray compressed air around the coils and spark plugs. If dirt and debris enter the engine, this may cause internal engine damage.

5. Remove the ignition coils.
6. Remove the spark plugs.

3.5L

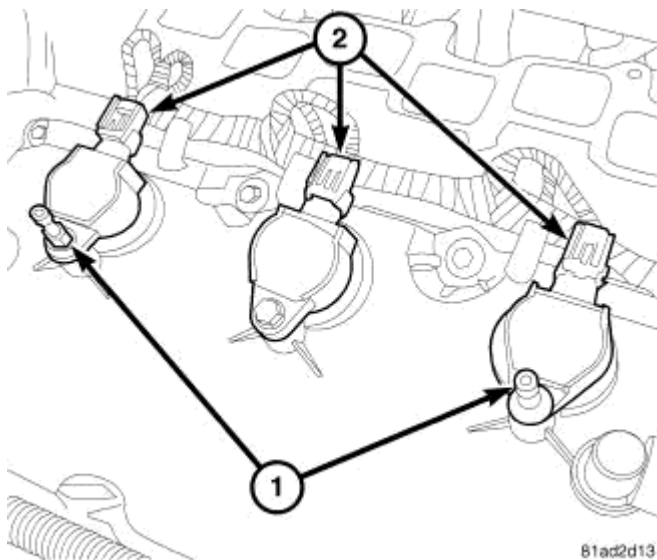


Fig. 64: Ignition Coils
Courtesy of CHRYSLER LLC

1. Remove engine cover.
2. Disconnect and isolate the negative battery cable.
3. Remove the intake manifold. Refer to Engine/Manifolds/MANIFOLD, Intake - Removal.
4. Unlock and disconnect electrical connector (2) from ignition coils.
5. Remove mounting bolts and engine cover studs (1).

6. Twist, lift and remove ignition coil from engine.

CAUTION: Prior to removing the spark plugs, use compressed air to remove any accumulated dirt and debris. If dirt and debris enter the engine, this may cause internal engine damage.

7. Remove spark plug using a quality socket with a rubber or foam insert.

INSTALLATION

2.4L

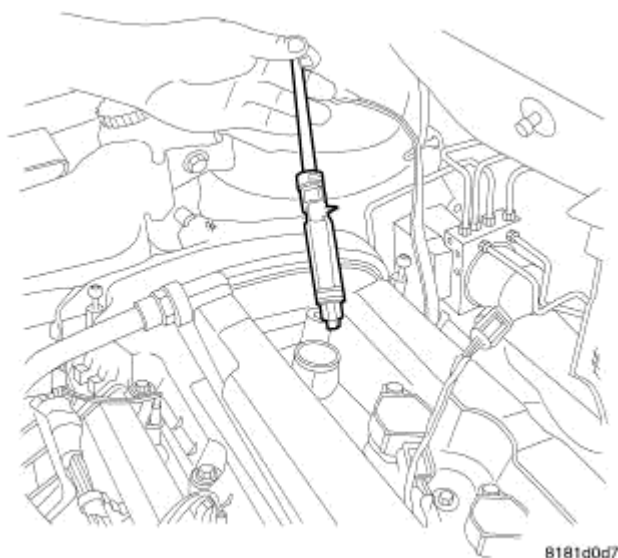


Fig. 65: Removing/Installing Spark Plug
Courtesy of CHRYSLER LLC

CAUTION: Handle the spark plugs with care. Do not drop or force the spark plugs into the wells, damage to the electrodes and/or porcelain body may occur. Always start each spark plug by hand in order to avoid cross-threading the spark plug in the cylinder head. Always tighten spark plugs to the specified torque. Too much or not enough torque will cause damage to the cylinder head and/or spark plug and may lead to poor engine performance.

1. Install each spark plug to the cylinder head. Tighten spark plugs to 27 N.m (20 ft. lbs.).

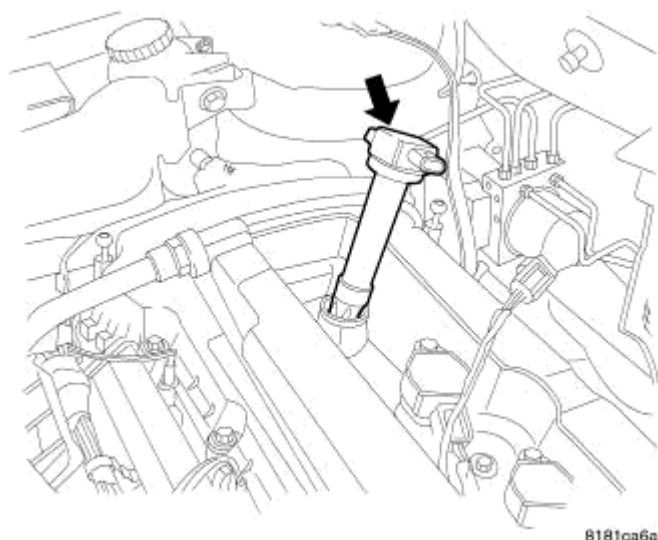


Fig. 66: Removing/Installing Ignition Coil
Courtesy of CHRYSLER LLC

2. Install ignition coil onto spark plug.

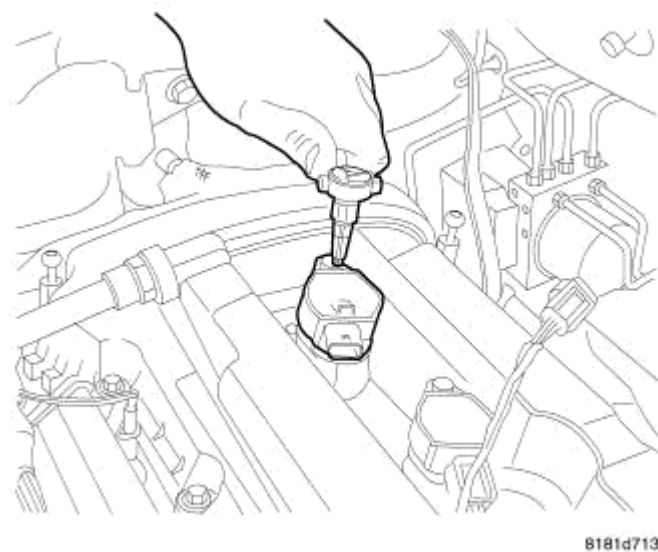


Fig. 67: Removing/Installing Ignition Coil Mounting Bolts
Courtesy of CHRYSLER LLC

3. Install ignition coil mounting bolt. Tighten to 9 N.m (79.5 in. lbs.).
4. Connect ignition coil electrical connectors.
5. Connect negative battery cable, tighten nut to 5 N.m (45 in. lbs.).
6. Install engine cover.

CAUTION: Handle the spark plugs with care. Do not drop or force the spark plugs into the wells, damage to the electrodes and/or porcelain body may occur. Always start each spark plug by hand in order to avoid cross-threading the spark plug in the cylinder head. Always tighten spark plugs to the specified torque. Too much or not enough torque will cause damage to the cylinder head and/or spark plug and may lead to poor engine performance.

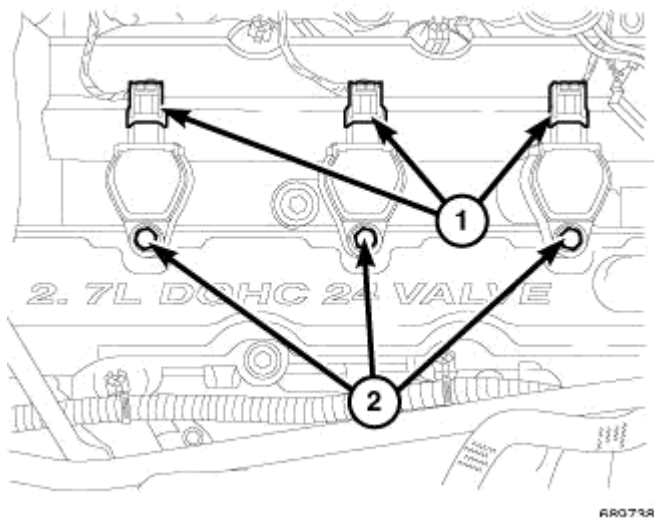


Fig. 68: Removing/Installing Electrical Connectors And Mounting Bolts At Ignition Coil
Courtesy of CHRYSLER LLC

1. Install each spark plug to the cylinder head. Tighten spark plugs to 17 N.m (13 ft. lbs.).
2. Align ignition coil with top of spark plug.
3. Twist and push down ignition coil assembly onto spark plug and valve cover. Install mounting bolt (2) and tighten to 7.5 N.m (65 in. lbs.).
4. Connect electrical connector (1) to ignition coil.
5. Install upper intake manifold. Refer to **Engine/Manifolds/MANIFOLD, Intake - Installation** .
6. Connect negative battery cable.

3.5L

CAUTION: Handle the spark plugs with care. Do not drop or force the spark plugs into the wells, damage to the electrodes and/or porcelain body may occur. Always start each spark plug by hand in order to avoid cross-threading the spark plug in the cylinder head. Always tighten spark plugs to the specified torque. Too much or not enough torque will cause damage to the cylinder head and/or spark plug and may lead to poor engine performance.

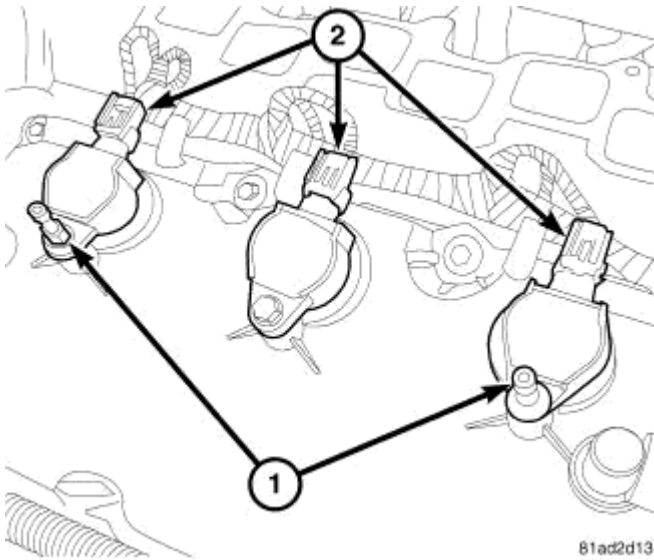


Fig. 69: Ignition Coils

Courtesy of CHRYSLER LLC

1. To avoid cross threading, start the spark plug into the cylinder head by hand.
2. Tighten spark plugs to 27 N.m (20 ft. lbs.).
3. Install ignition coil.
4. Install engine cover studs (1) in the two outside ignition coils on the front of the engine. Install bolts on the other ignition coils.
5. Tighten studs and bolts to 8 N.m (71 in. lbs.).

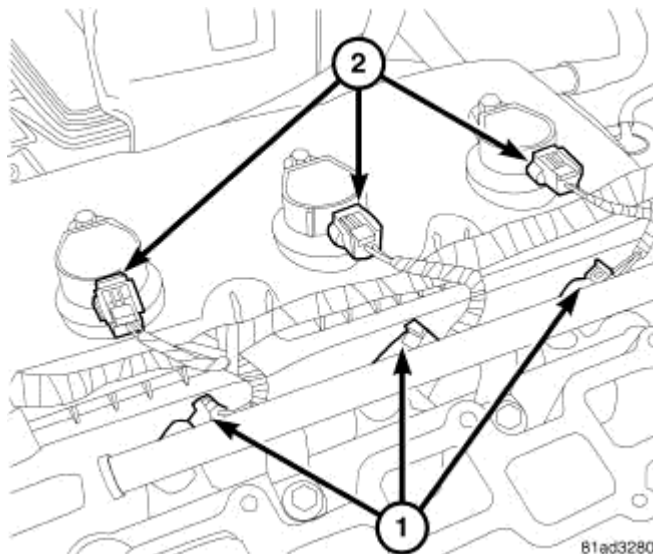


Fig. 70: Identifying Coil & Fuel Injector Connectors

Courtesy of CHRYSLER LLC

6. Connect electrical connector and lock (2).

7. Install intake manifold. Refer to **Engine/Manifolds/MANIFOLD, Intake - Installation** .
8. Reconnect the negative battery cable.
9. Install the engine cover.

SWITCH, IGNITION

DESCRIPTION

DESCRIPTION

This vehicle is equipped with a Wireless Ignition Node (WIN). The WIN, along with the FOB with Integrated Key (FOBIK) are the primary components of the keyless ignition system. The only visible component of the WIN is the ignition switch located on the face of the instrument panel just to the inboard side of the steering column. The remainder of the WIN including its mounting provisions and electrical connections are concealed within the instrument panel.

In addition to replacing a conventional keyed ignition switch, the WIN is an integrated electronic receiver that serves as the base station in the vehicle. It communicates with other electronic modules in the vehicle over the Controller Area Network (CAN) data bus.

The WIN interfaces with the Remote Keyless Entry (RKE) FOBIK and the Tire Pressure Monitor (TPM) sensors (if equipped) using Radio Frequency (RF) communication, with the Sentry Key Immobilizer System (SKIS) transponder within the FOBIK using Low Frequency (LF) RF communication.

The WIN cannot be adjusted or repaired, but is flash update capable. If ineffective or damaged the entire WIN must be replaced. Refer to **Electrical - Electronic Control Modules/Electronic Control Modules/RECEIVER, Wireless Ignition Node - Removal** .