REMOVAL

1. Remove seat. See 2.40 SEAT.
2. See Figure 4-68. Remove two screws and washers (3) to detach ECM from bracket.
3. Unplug ECM connectors [10] and [11].

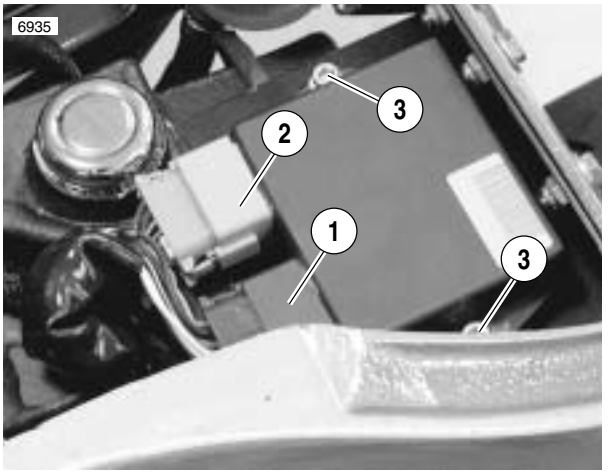
INSTALLATION

1. See Figure 4-68. Attach ECM connectors [10] and [11].
2. Align ECM with bracket mounting holes. Install using two screws and washers (3).
3. If installing a **new** ECM, calibrate throttle position sensor using SCANALYZER (Part No. HD-41325). See 4.36 THROTTLE POSITION SENSOR.

⚠WARNING

After installing seat, pull upward on front of seat to be sure it is locked in position. If seat is loose, it could shift during vehicle operation and startle the rider, causing loss of control which could result in death or serious injury.

4. Install seat. See 2.40 SEAT.



1. **ECM Connector [10] (Black)**
2. **ECM Connector [11] (Gray)**
3. **Screw and Washer (2)**

Figure 4-68. ECM

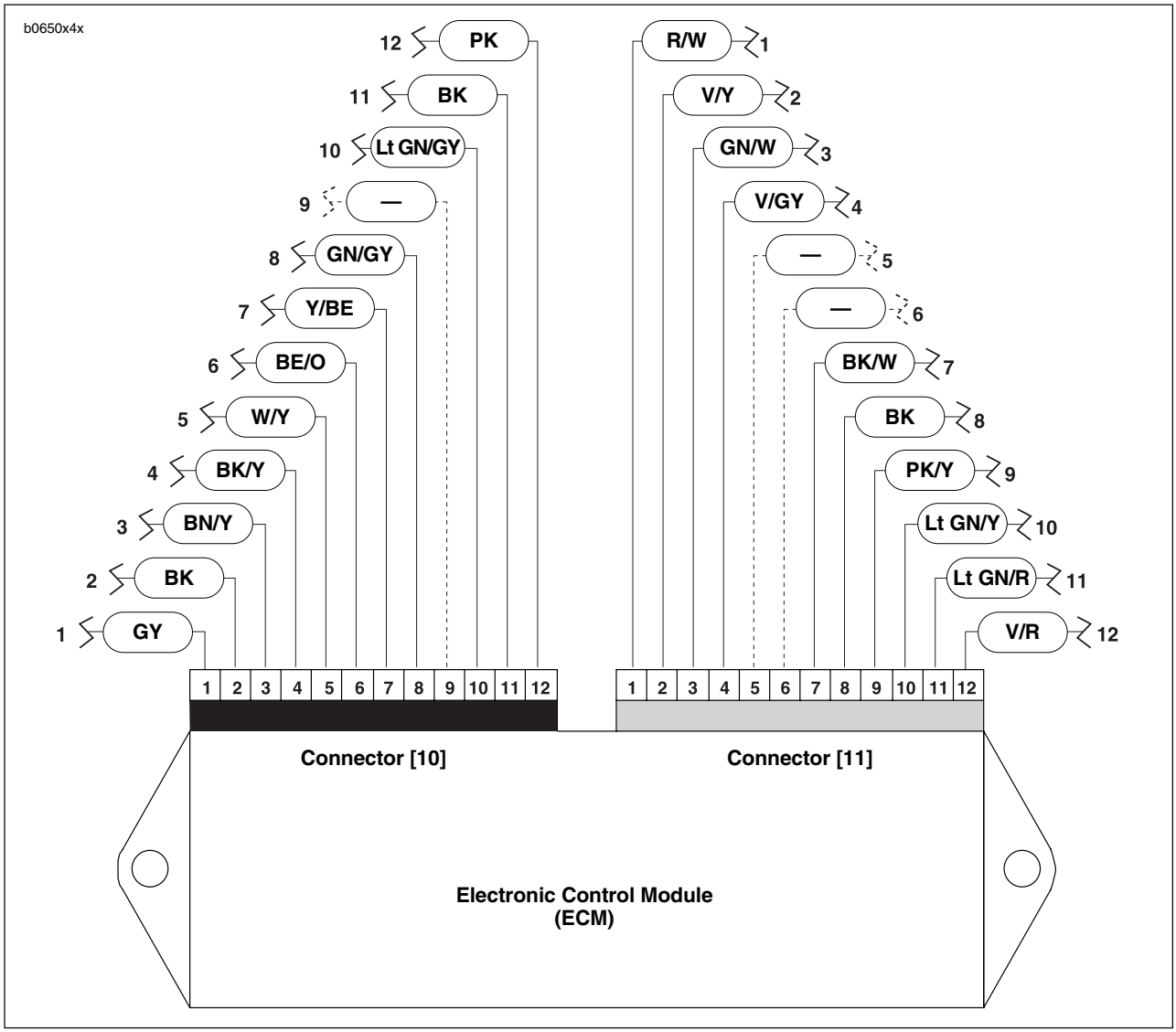


Figure 4-69. ECM Wiring

Table 4-27. Pin Table for ECM Connector [10] (Black)

PIN	FUNCTION
1	Switched ignition
2	System ground A (module)
3	Fuel pump output
4	Check engine lamp
5	Injector front output
6	Front coil primary
7	Rear coil primary
8	Injector rear output
9	No function
10	Bank angle sensor input
11	System ground B (coil)
12	Tachometer out

Table 4-28. Pin Table for ECM Connector [11] (Gray)

PIN	FUNCTION
1	5 volt sensor power
2	Throttle position sensor
3	Camshaft position sensor
4	Oxygen sensor
5	No function
6	No function
7	Sensor ground 1
8	Sensor ground 2
9	Engine temperature input
10	Intake air temperature input
11	Serial data receive
12	Serial data transmit

REMOVAL

⚠WARNING

To protect against accidental start-up of vehicle, disconnect the negative battery cable before proceeding. Inadequate safety precautions could result in death or serious injury.

⚠WARNING

Always disconnect the negative battery cable first. If the positive battery cable should contact ground with the negative cable installed, the resulting sparks may cause a battery explosion which could result in death or serious injury.

1. Disconnect **both** battery cables, negative cable first.
2. Remove sprocket cover. See 2.30 SPROCKET COVER.
3. Cut cable straps holding cam position sensor wiring at the following locations:
   - Starter
   - Edge of gearcase cover
   - Oil line
4. See Figure 4-70. Disconnect cam position sensor wiring at connector [14] located behind the starter motor.
5. Note position of each cam position sensor wiring terminal in plug end of connector.
6. See Figure 4-72. Remove connector terminal pins (16). See 7.25 DEUTSCH ELECTRICAL CONNECTORS.
7. Remove timer cover.
   a. Drill off heads of outer timer cover pop rivets (1) using a 3/8 in. (9.525 mm) drill bit.
   b. Tap remaining rivet shafts inboard through holes in timer cover (2) and inner cover (4).
   c. Remove timer cover. Remove inner cover screws (3) and inner cover (4).
   d. Carefully remove any remaining pieces of rivets from gearcase cover timer bore.
8. See Figure 4-71. To obtain approximate ignition timing during installation, scribe alignment marks (4) across cam position sensor (3) in two places.
9. See Figure 4-72. Remove timer plate studs. Carefully remove cam position sensor. Remove bolt (6) and trigger rotor (8).
10. Carefully remove camshaft oil seal (9) if damaged or if there is any evidence of oil leakage past the seal.

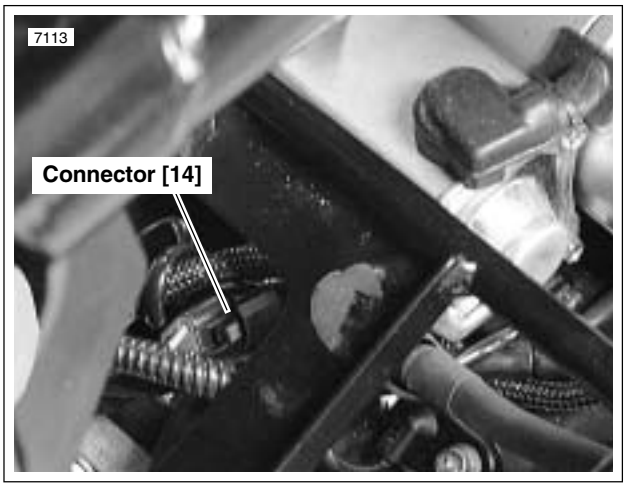
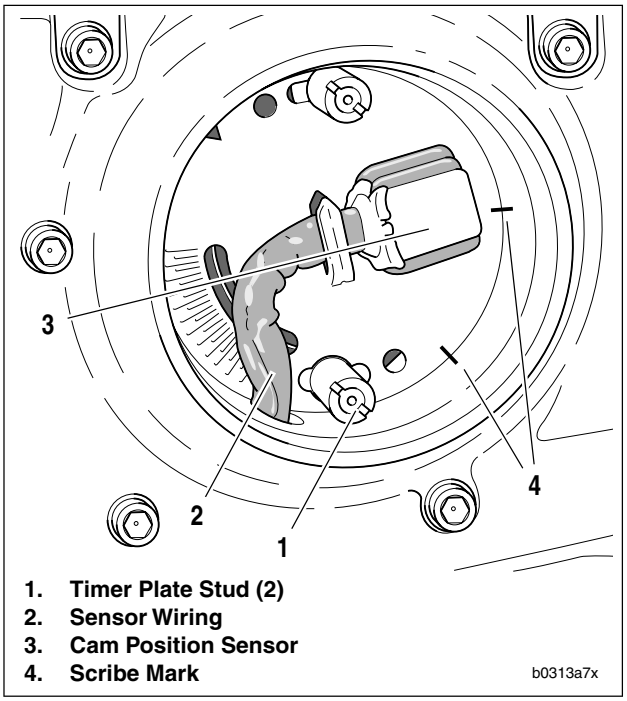


Figure 4-70. Cam Position Sensor Connector [14]



1. **Timer Plate Stud (2)**
2. **Sensor Wiring**
3. **Cam Position Sensor**
4. **Scribe Mark**

Figure 4-71. Marking Ignition Timing

1. Pop Rivet (2)
2. Timer Cover
3. Screw (2)
4. Inner Cover
5. Timer Plate Stud (2)
6. Bolt
7. Cam Position Sensor
8. Trigger Rotor
9. Seal
10. Gearcase Cover
11. Spark Plug (2)
12. Ignition Coil
13. Front Spark Plug Cable
14. Rear Spark Plug Cable
15. Cable Strap
16. Terminal Pin
17. Cam Position Sensor Connector [14]
18. Secondary Lock
19. Electronic Control Module (ECM)
20. Screw (2)

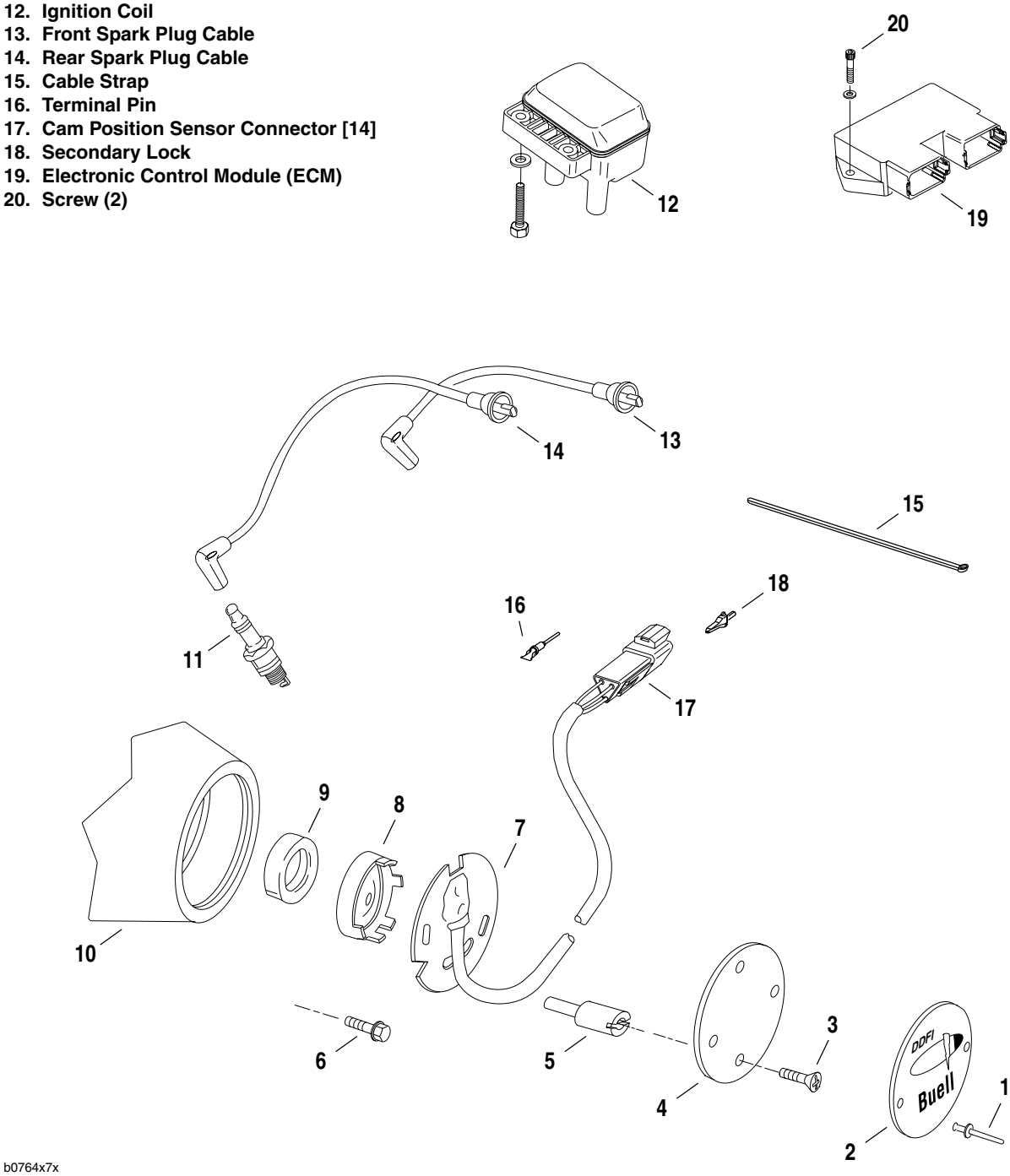


Figure 4-72. Ignition Components

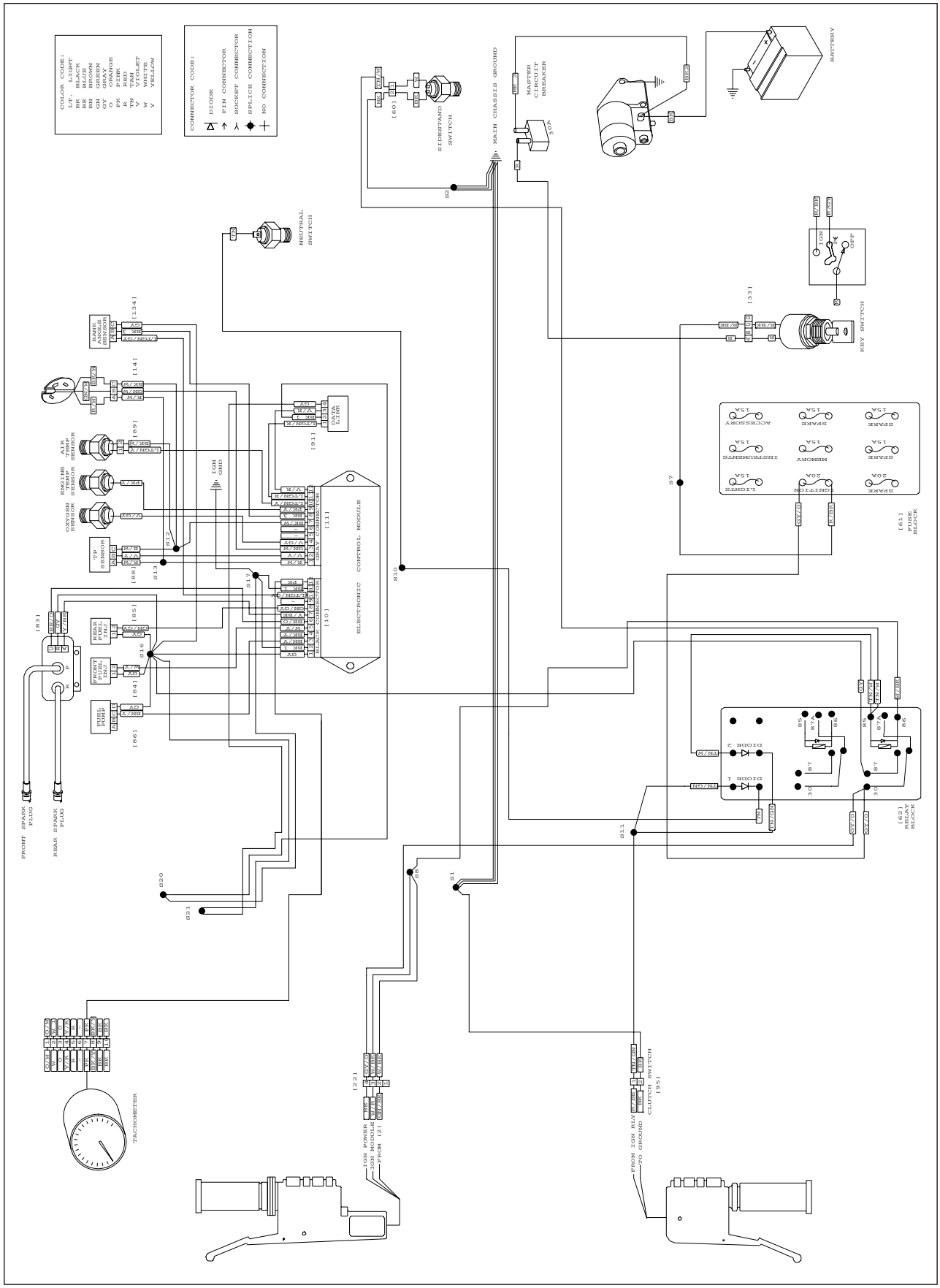


Figure 4-73. Ignition and Starting System Circuit

INSTALLATION

1. See Figure 4-72. With the lipped side facing inboard, install **new** camshaft oil seal (9) into gearcase cover (10), if removed. Press seal into position until flush with surface of timer bore.
2. Install trigger rotor (8).
   a. Apply LOCTITE THREADLOCKER 243 (blue) to threads of bolt (6).
   b. Position trigger rotor (8) onto end of camshaft aligning notch with camshaft slot.
   c. Install bolt to secure rotor. Tighten to 43-53 **in-lbs** (5-6 Nm).
3. Install cam position sensor (7) and timer plate studs (5). Rotate cam position sensor to its previously marked position to obtain approximate ignition timing.

CAUTION

See Figure 4-74. Route sensor wires about 1-1/2 in. (38 mm) forward of secondary drive belt and sprocket. If wires are routed too far to the rear of this position, they could contact the moving secondary drive belt and/or sprocket resulting in damage to sensor wiring.

4. Route sensor wiring leads.
   a. Downward through hole (7 o'clock position) in timer bore of gearcase cover.
   b. Upward through bottom opening between right crankcase half and rear of gearcase cover.
   c. Route wiring in front of tower shaft behind gearcase cover. Route wires upward to starter motor.
   d. Cable strap wiring.
5. See Figure 4-75. Install sensor wiring terminals into correct positions in plug end of connector [14]. R/W, GN/W and BK/W wires of plug end (from cam position sensor) must match same color wires in receptacle end of connector (from ignition module wiring harness). Install pin terminals. See 7.25 DEUTSCH ELECTRICAL CONNECTORS.
6. See Figure 4-72. Attach connector (17) [14].
7. Check ignition timing. See 1.21 IGNITION TIMING.
8. Tighten timer plate studs (5) to 15-30 **in-lbs** (2-3 Nm).
9. Install inner cover (4) using screws (3). Tighten to 12-20 **in-lbs** (1-2 Nm).

CAUTION

Use only H-D Part No. 8699 rivets to secure outer timing cover. These rivets are specially designed so that no rivet end falls off into the timing compartment. Use of regular rivets can damage ignition system components and may allow water to enter the timing compartment.

10. Secure timer cover (2) to inner cover using **new** rivets.

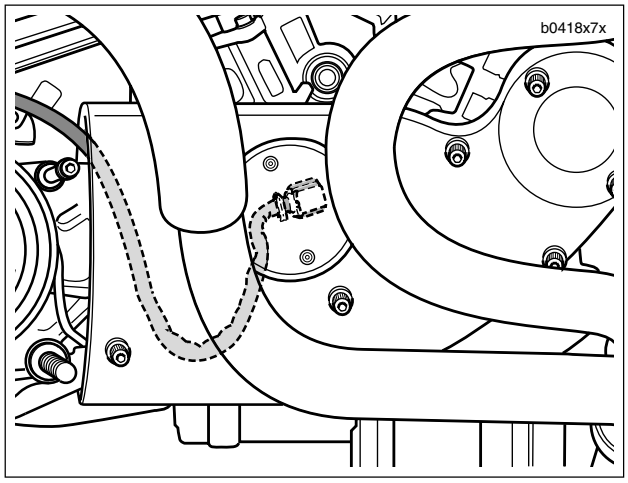


Figure 4-74. Routing Sensor Wires

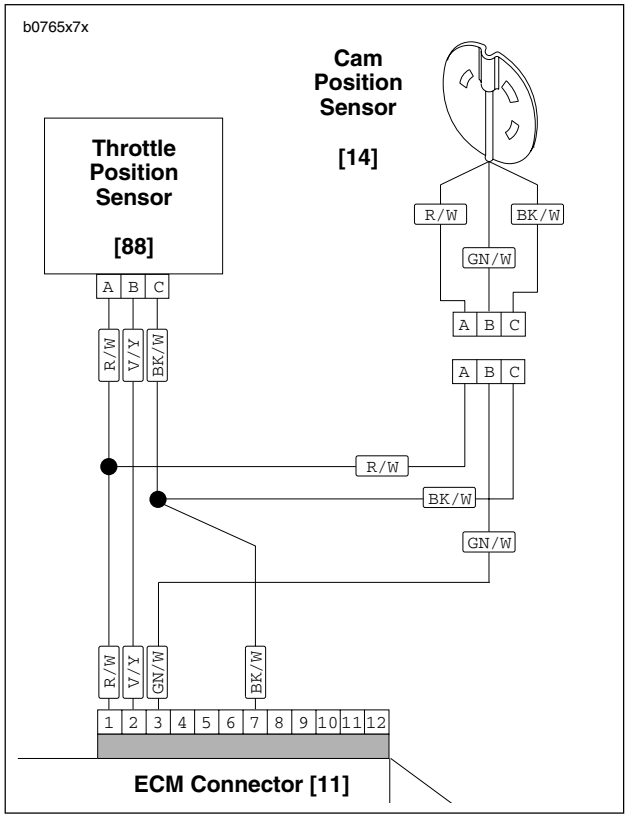


Figure 4-75. Connecting Sensor Wires

WARNING

Always connect the positive battery cable first. If the positive cable should contact ground with the negative cable installed, the resulting sparks may cause a battery explosion which could result in death or serious injury.

11. Install battery cables, positive cable first.

TROUBLESHOOTING

Follow the troubleshooting procedures listed under 4.9 INITIAL DIAGNOSTIC CHECK if the engine will not start, is difficult to start or runs roughly. Also check condition of spark plug cables. Insulation on cables may be cracked or damaged allowing high tension current to short to metal parts. This problem is most noticeable when cables are wet.

If poor starting/running condition persists, check resistance of ignition coil primary and secondary windings using an ohmmeter.

Ignition Coil Primary Circuit Test

1. Remove ignition coil. See 4.31 IGNITION COIL.
2. Set ohmmeter scale to RX1.
3. See Figure 4-76. Place multimeter wires on primary coil windings (1).
4. Check for primary coil winding resistance.
   a. Normal resistance range is 0.5-0.7 ohms.
   b. See TEST RESULTS if resistance is not within normal operating range.

Ignition Coil Secondary Circuit Test

1. Remove ignition coil. See 4.31 IGNITION COIL.
2. Set ohmmeter scale to RX1K.
3. See Figure 4-76. Place multimeter wires on secondary coil windings (2).
4. Check for secondary coil winding resistance.
   a. Normal resistance range is 5.5-7.5K ohms.
   b. See TEST RESULTS if resistance is not within normal operating range.

Test Results

1. A low resistance value indicates a short in the coil winding. Replace coil.
2. A high resistance value might indicate that there is some corrosion/oxidation of the coil terminals. Clean the terminals and repeat resistance test. If resistance is still high after cleaning terminals, replace coil.
3. An infinite ohms (∞ or no continuity) resistance value indicates an open circuit (a break in the coil winding). Replace coil.

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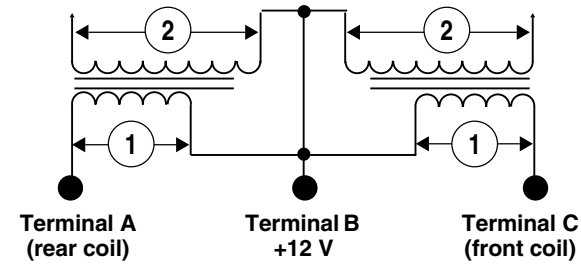

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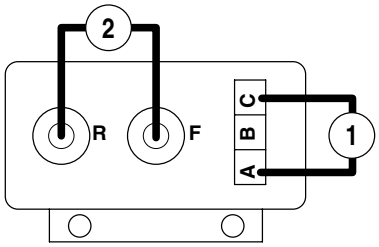


1. **Primary Resistance should be 0.5-0.7 ohms.**
2. **Secondary Resistance should be 5.5-7.5K ohms.**

Figure 4-76. Ignition Coil Testing

Ignition Coil Substitution

If a coil tester is not available, use the following test.

NOTE

Coil will function without being attached to frame.

1. Substitute a **new** ignition coil by attaching it to any convenient point near the old coil. Transfer terminal wires to **new** coil.
2. Attach **new** spark plug cables to coil and plugs.
3. Test system. If ignition trouble is eliminated by the temporary installation of a **new** coil, carefully inspect old coil and cables for damage. The insulation on the cables may be cracked or otherwise damaged allowing high tension current to short to metal parts. This is most noticeable in wet weather or after the motorcycle has been washed.

REMOVAL

⚠WARNING

To protect against accidental start-up of vehicle, disconnect the negative battery cable before proceeding. Inadequate safety precautions could result in death or serious injury.

⚠WARNING

Always disconnect the negative battery cable first. If the positive battery cable should contact ground with the negative cable installed, the resulting sparks may cause a battery explosion which could result in death or serious injury.

1. Disconnect **both** battery cables, negative cable first.
2. Remove left side scoop. See 2.36 AIR SCOOP.
3. See Figure 4-78. Disconnect the spark plug cables from the coil plug posts (1, 2).
4. Detach connector (7) [83].
5. Remove two screws and washers to drop coil from frame.

INSTALLATION

1. See Figure 4-77. Attach coil to frame with screws and washers. Tighten to 4-6 ft-lbs (5-8 Nm).
2. See Figure 4-78. Attach connector (7) [83].
3. Connect front spark plug cable to connector (2) and rear spark plug cable to connector (1).
4. Install left side scoop. See 2.36 AIR SCOOP.

⚠WARNING

Always connect positive battery cable first. If the positive cable should contact ground with the negative cable installed, the resulting sparks may cause a battery explosion which could result in death or serious injury.

5. Connect battery cables, positive cable first.

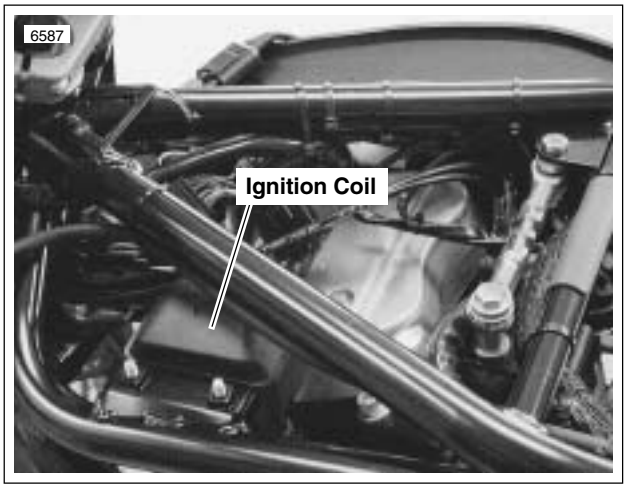
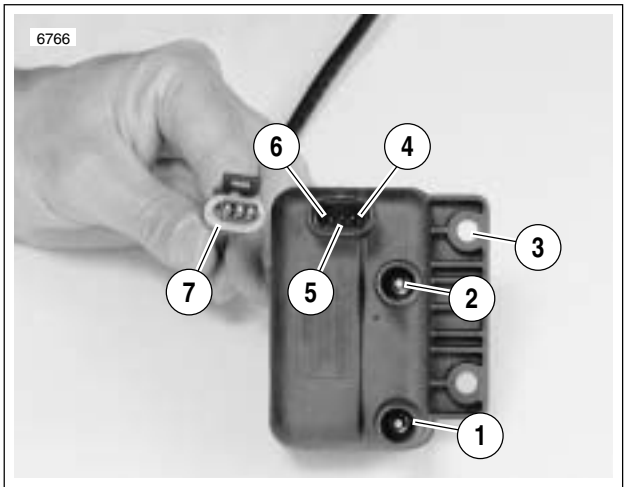


Figure 4-77. Ignition Coil Location



1. **Rear Cylinder Post**
2. **Front Cylinder Post**
3. **Screw and Washer Location**
4. **Coil Pin A (rear cylinder)**
5. **Coil Pin B (12 VDC)**
6. **Coil Pin C (front cylinder)**
7. **Coil Connector [83]**

Figure 4-78. Ignition Coil

GENERAL

The oxygen sensor (O2 Sensor), located in the header pipe, monitors oxygen gas content in the exhaust and converts it to a voltage reading. This voltage reading is used by the ECM to maintain the proper air/fuel ratio during closed loop operation.

REMOVAL

1. See Figure 4-79. Unplug 1-place connector [137] under battery tray.
2. Remove oxygen sensor from exhaust header using a 22 mm (or 7/8 in.) crow's foot or flare nut socket.

INSTALLATION

1. Apply LOCTITE ANTI-SEIZE LUBRICANT to threads of sensor. Make sure anti-seize is marked as safe for use with O2 sensors.
2. See Figure 4-79. Thread sensor into exhaust header. Tighten sensor to 42-45 ft-lbs (57-61 Nm).
3. Connect 1-place connector [137] to wiring harness.

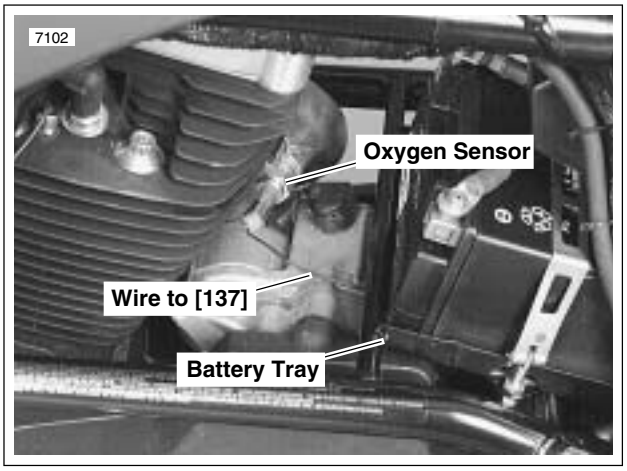


Figure 4-79. Installed Oxygen Sensor

ENGINE TEMPERATURE SENSOR 4.33

GENERAL

The Engine Temperature Sensor (ET Sensor), located in the rear cylinder head, monitors the engine temperature close to the combustion chamber. In addition to aiding the ECM in monitoring the operation of the engine, it is also used to warn the operator of potentially damaging temperatures by causing the CHECK ENGINE lamp to blink during operation.

REMOVAL

CAUTION

Do not pull on engine temperature sensor wiring. Excess strain to sensor wiring will cause sensor damage.

1. Remove fuel tank. See 4.37 FUEL TANK.
2. Unplug 1-place connector [90] above rear cylinder head.
3. See Figure 4-81. Remove rubber boot and sensor from rear cylinder head.

INSTALLATION

CAUTION

Do not pull on engine temperature sensor wiring. Excess strain to sensor wiring will cause sensor damage.

1. See Figure 4-81. Screw sensor into rear cylinder head with special ET sensor socket. Make sure wire is in cut-out portion (slot) of socket to prevent damage. Tighten ET sensor to 10-14 ft-lbs (14-19 Nm).
2. Install rubber boot to ET Sensor wire (push wire through hole in boot) with smaller OD side towards sensor.
3. Push rubber boot down sensor wire towards cylinder head until it seats in hole on top of ET sensor. NOTE: Orient the rubber boot so the flat on the boot is towards the left side of the motorcycle.
4. Route ET sensor wire lead through opening at rear of cylinder head, under rocker box and cover and connect ET sensor 1-place connector [90] to wiring harness.

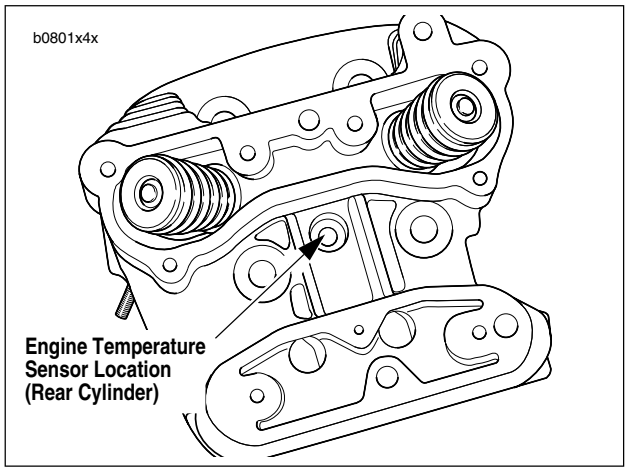


Figure 4-80. Engine Temperature Sensor Location

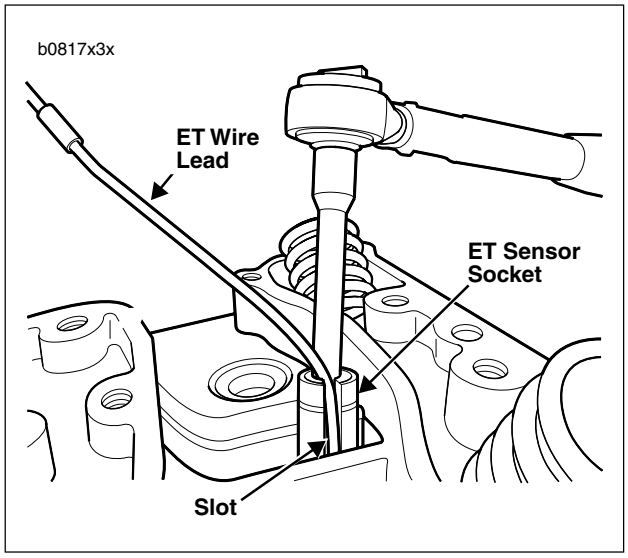


Figure 4-81. Engine Temperature Sensor Installation

BANK ANGLE SENSOR 4.34

GENERAL

The Bank Angle Sensor (BA Sensor), located below the tail section on the left side of the motorcycle, provides input to the ECM on whether or not the vehicle lean angle is greater than 55 degrees. If vehicle lean angle exceeds 55 degrees, the Bank Angle Sensor will shut off power to the ignition.

REMOVAL

1. See Figure 4-82. Locate bank angle sensor below left side of tail section. Unplug sensor connector [134].
2. Remove screw and washer to detach sensor from frame.

INSTALLATION

1. Position bank angle sensor on frame mounting tab. Make sure locating post on sensor engages hole in mounting tab.
2. Install bank angle sensor to mounting tab with screw and new locknut. Tighten screw to 25-27 **in-lbs** (2.8-3.1 Nm).
3. See Figure 4-82. Plug connector [134] into bank angle sensor.

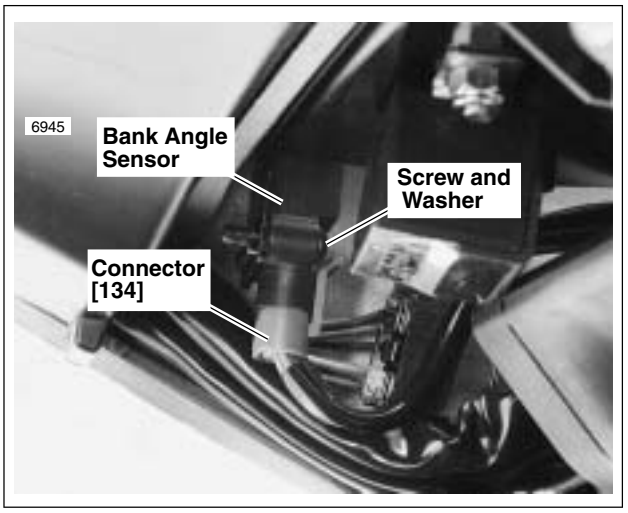


Figure 4-82. Bank Angle Sensor

INTAKE AIR TEMPERATURE SENSOR 4.35

GENERAL

The intake air temperature sensor (IAT Sensor), located on top of the snorkel under the air cleaner cover, measures the air temperature allowing the ECM to calculate the density of the air entering the manifold. The IAT is a thermistor type sensor.

REMOVAL

1. See Figure 4-108. Remove two screws (3) and washers (2) from front and one bolt (27) and washer (2) from back of air cleaner cover (1).
2. Remove air cleaner cover and air filter.
3. Disconnect connector [89] from intake air temperature sensor.
4. Remove IAT sensor from top of snorkel.

INSPECTION

Inspect sensor grommet for damage and replace as required.

INSTALLATION

1. Install IAT sensor and grommet into snorkel.
2. Connect IAT sensor connector [89] to sensor.
3. Place a small piece of double sided tape at the upper-center of the air filter foam gasket that fits against the backing plate.
4. Position air filter on air cleaner backing plate.
5. Install air cleaner cover.
   a. Position air cleaner cover over air cleaner backing plate, making sure that air filter is correctly positioned.
   b. Install long bolt and washer first.
   c. Align air cleaner cover and secure with two screws and washers. Tighten screws to 27-29 **in lbs** (3.1-3.3 Nm).

]

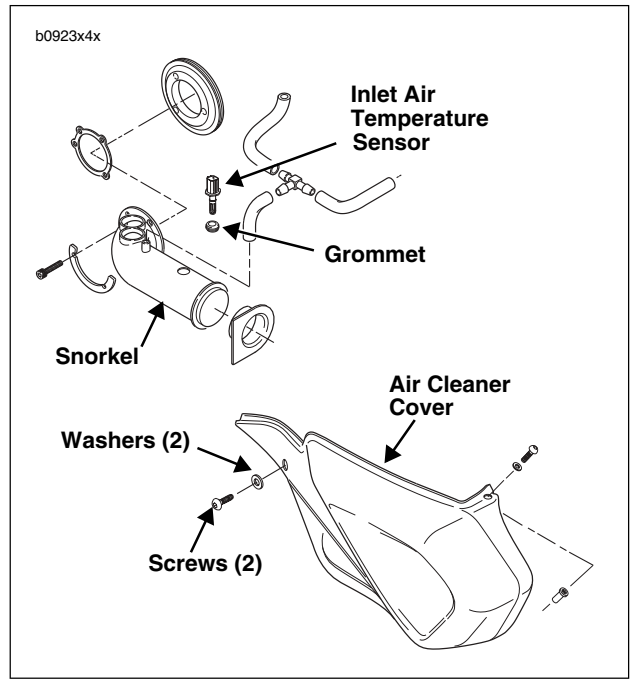


Figure 4-83. Intake Air Temperature Sensor

Figure 4-84. Intake Air Temperature Sensor Installed

THROTTLE POSITION SENSOR 4.36

REMOVAL

1. Remove air cleaner cover and backplate. See 4.42 AIR CLEANER
2. Remove front section of throttle body. Note that it is not necessary to detach manifold/injector portion from cylinder heads. See 4.41 THROTTLE BODY AND INTAKE MANIFOLD.
3. See Figure 4-85. Remove two screws and washers (2) (metric) to detach TP sensor.

INSTALLATION

1. See Figure 4-85. Attach TP sensor with two screws and washers (2) (metric).
2. Install throttle body manifold and throttle cables. See 4.41 THROTTLE BODY AND INTAKE MANIFOLD. Do not install air cleaner backplate at this time.
3. See Figure 4-86. Attach throttle position sensor connector [88]. Slots on female connector [88B] must fully engage tabs on male connector housing [88A].
4. Calibrate throttle position sensor using SCANALYZER (Part No. HD-41325).

CALIBRATION

1. Back out idle cable until screw no longer touches the throttle plate stop. Back out idle adjuster cable one to two additional turns.
2. Open and **snap shut** throttle control grip 3-5 times.
3. Install air cleaner backplate and cover. See 4.42 AIR CLEANER.
4. Attach Scanalyzer (Part No. HD-41325) to data link [91] with cable (Part No. HD-42921). See 4.5 SCANALYZER.
5. Turn the ignition/light key switch to IGNITION. Turn the handlebar mounted Engine Stop Switch to the RUN position (but do not start the engine).
6. Calibrate TP sensor using Scanalyzer (Part No. HD-41325).
   a. From Diagnostic Menu, press “7” to display Calibration Menu.
   b. Press “1” to activate TPS Zero Function.
   c. Press “Enter” to verify throttle plate is fully closed. Scanalyzer will then calibrate sensor.
7. Set idle speed.
   a. Press the mode key to return to Options Data Screen. Scroll to TP degrees. Turn idle adjuster cable clockwise until TP degree reading reaches 5.8.
   b. Start engine and bring the engine temperature to a minimum of 265° F (129.4° C).
   c. Set the warm idle speed at 1000-1100 rpm with the idle adjuster cable.

NOTE

Cold idle start quality is affected by the warm idle setting. The higher the RPM range that the warm idle is set to, the better the cold start idle quality will be. High RPM warm idle speed will also result in cleaner unassisted (not having to roll on the throttle) cold starts. Do not set the warm idle speed above 1100 RPM.

TP sensor voltage at hot idle will vary according to position of idle set screw.

8. Disconnect the Scanalyzer and turn the Ignition/Light Key Switch to OFF or LOCK. Turn the handlebar mounted Engine Stop Switch to the OFF position.
9. Disconnect Scanalyzer from motorcycle.

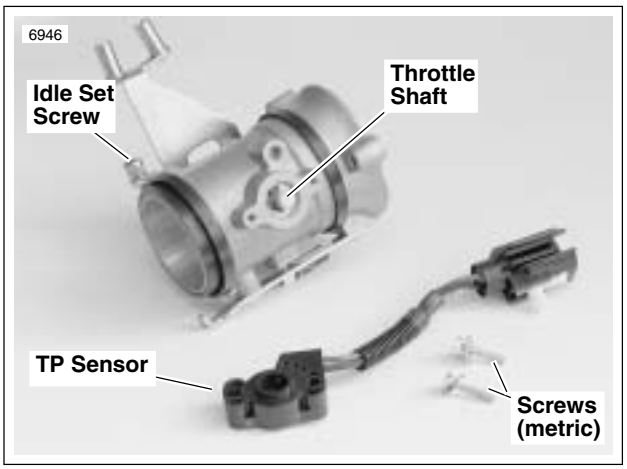


Figure 4-85. Throttle Position Sensor

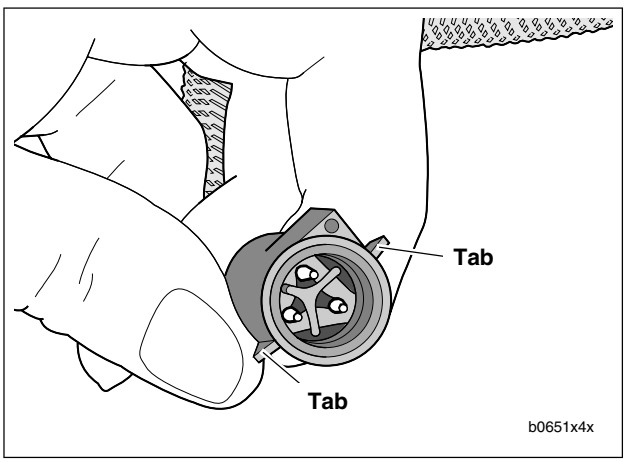


Figure 4-86. Tabs on TP Sensor Connector [88A]

REMOVAL

⚠WARNING

The gasoline in the fuel supply line downstream of the fuel pump is under high pressure (49 psi [338 kPa]). To avoid an uncontrolled discharge or spray of gasoline, always purge the system of high pressure gas before attaching fuel pressure gauge. Gasoline is extremely flammable and highly explosive. Inadequate safety precautions could result in death or serious injury.

1. Purge the fuel supply line of high pressure gasoline.
   a. See Figure 4-87. Disconnect the 4-place fuel pump connector [86]. Connector is on the left side, above the rear cylinder spark plug.
   b. With the motorcycle in neutral, start the engine and allow vehicle to run.
   c. When the engine stalls, press the starter button for 3 seconds to remove any remaining fuel from fuel line.
2. See Figure 4-88. Remove seat, fuel tank mount and fuel tank cover. See 2.40 SEAT.
3. Prop fuel tank against frame to gain access to fuel supply fitting. Wrap a shop towel around the fuel supply fitting.

⚠WARNING

A small amount of gasoline will drain from the fuel supply fitting and fuel line when removed. Thoroughly wipe up any spilt fuel immediately. Dispose of rags in a suitable manner. Gasoline is extremely flammable and highly explosive. Inadequate safety precautions could result in death or serious injury.

4. Remove fuel line from fuel supply fitting.
5. See Figure 4-89. Disconnect hose from vapor vent valve.
6. Remove fuel tank from frame.

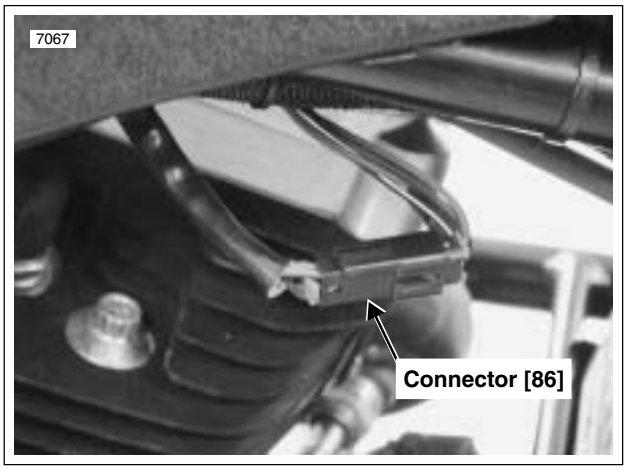


Figure 4-87. Fuel Pump Connector [86]

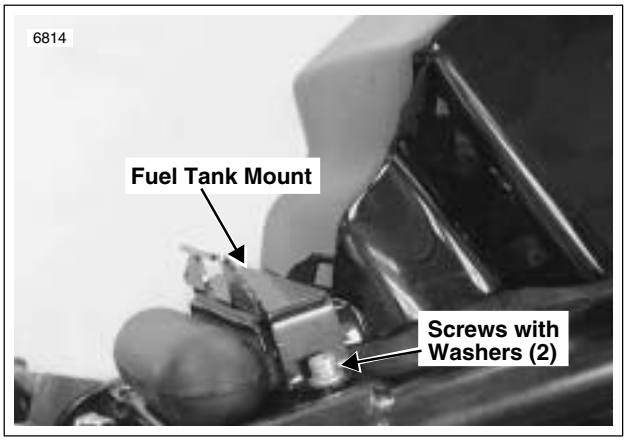


Figure 4-88. Fuel Tank Mount

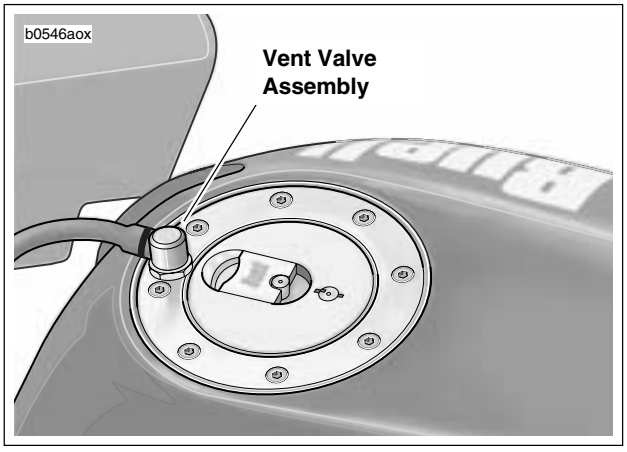


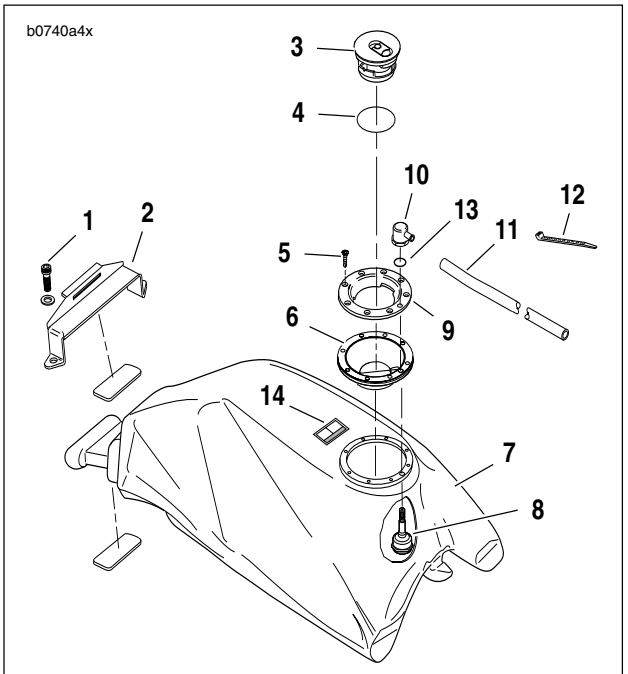
Figure 4-89. Vapor Vent Valve

DISASSEMBLY/ASSEMBLY

⚠WARNING

An open flame or spark may cause a fuel tank explosion if all traces of fuel are not purged from the tank. Use extreme caution when servicing fuel tanks. Gasoline is extremely flammable and highly explosive. Inadequate safety precautions could result in death or serious injury.

1. Drain fuel tank before disassembly.
   a. Using suitable external fuel pump, such as a Gas Caddy, pump fuel from tank and into suitable clean container.
   b. See instructions for external fuel pump for correct use.
2. See Figure 4-90. Remove fuel filler cap (3) with attached O-ring (4).
3. Remove screws (5) from fuel cap flange (9).
4. Remove fuel cap flange and fuel cap boot (6).
5. Detach vent valve fitting (10) and vent valve (8) from fuel cap flange.
6. For all fuel pump removal and repair instructions, see 4.40 FUEL PUMP.
7. Assemble in reverse order. Note that if fuel pump is removed, it must be reinstalled before fuel cap flange.
   a. Apply HYLOMAR to fuel cap boot, fuel cap flange and top of fuel tank.
   b. See Figure 4-91. Tighten screws to 16-18 **in-lbs** (1.8-2.0 Nm) in the order shown.
8. Install vent valve and fitting. See 4.38 FUEL TANK VENT VALVE.
9. Perform Fuel Tank Pressure Test.



1. **Screw (2)**
2. **Rear Tank Mount**
3. **Fuel Cap**
4. **O-Ring**
5. **Screw (8)**
6. **Fuel Cap Boot**
7. **Fuel Tank**
8. **Vent Valve**
9. **Fuel Cap Flange**
10. **Vent Valve Fitting**
11. **Vent Hose**
12. **Cable Strap**
13. **O-Ring**
14. **Decal**

Figure 4-90. Fuel Tank

CLEANING AND INSPECTION

⚠WARNING

An open flame or spark may cause a fuel tank explosion if all traces of fuel are not purged from the tank. Use extreme caution when servicing fuel tanks. Gasoline is extremely flammable and highly explosive. Inadequate safety precautions could result in death or serious injury.

Clean tank interior with commercial cleaning solvent or a soap and water solution.

1. Plug all tank openings except fuel cap hole.
2. Add cleaning agent. Replace fuel cap to seal tank.
3. Shake tank to agitate agent.
4. Thoroughly flush fuel tank after cleaning. Allow tank to air dry.
5. Carefully inspect fuel hose and vent hose for damage, wear or general deterioration. Replace as necessary.

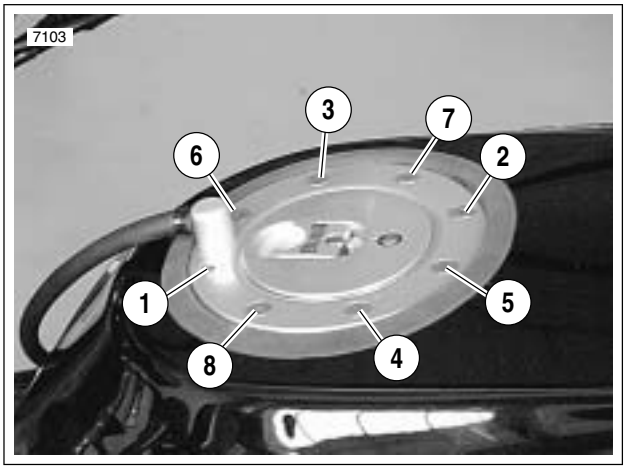


Figure 4-91. Tightening Sequence (Typical)

INSTALLATION

1. Place fuel tank on frame and install fuel tank cover and fuel tank mount. Tighten mount screws to 9-11 ft-lbs (12-15 Nm). See 2.35 FUEL TANK COVER.

CAUTION

Avoid pinching wiring harness and vent hose between fuel tank and frame during tank installation. Pinched hoses will negatively affect vehicle operation.

2. See Figure 4-90. Connect vent hose (11) to vent valve fitting (10). Clamp hose to fitting with a **new** cable strap (12).

⚠WARNING

Always make sure fuel hoses are seated against the component they connect to and that hose clamps are properly tightened and positioned on straight section of fitting and not on the fitting barb. Failure to comply may result in fuel leakage which could result in death or serious injury.

NOTE

The barb is the larger outside diameter portion (bump) on the fuel fitting.

3. Connect fuel hose to fuel outlet with a **new** clamp. Make sure to push fuel hose all the way on to fitting and position hose clamp on fitting side of barb.

4. Attach 4-place fuel pump connector [86].

⚠WARNING

After installing seat, pull upward on front of seat to be sure it is locked in position. If seat is loose, it could shift during vehicle operation and startle the rider, causing loss of control which could result in death or serious injury.

5. Install seat. See 2.40 SEAT.

NOTE

Use a good quality unleaded gasoline (91 pump octane or higher). Octane rating is usually found on the pump.

6. Fill fuel tank. Turn ignition key ON and listen for fuel pump activation.

7. Carefully inspect for leaks.

FUEL TANK PRESSURE TEST

The fuel tank is a sealed, pressure-tested assembly when it leaves the factory. If the fuel cap flange seal is broken the fuel tank must be pressure tested as listed below before installation.

1. With fuel filter removed, gas cap installed and fuel vent valve installed, spray soap and water solution around fuel cap flange and fuel vent valve fitting.
2. Connect air hose to fuel vent valve. Shake the tank several times to seat the ball in the vent valve.

NOTE

Fuel tank must be pressurized slowly or fuel vent will snap shut and tank will not be pressurized. Slowly remove the fuel cap when complete to verify that tank was pressurized during test.

3. *Slowly* pressurize fuel tank to 3.3-4.3 psi (22.8-29.7 kPa). Check for air bubbles around fuel cap and flange.
4. Spray soap and water solution around two fittings on bottom of fuel tank. Check for air bubbles around two fittings.
5. Remove fuel cap from tank to make sure tank was pressurized.
6. Clean soap and water solution from fuel tank.
7. If bubbles were seen around fuel cap or flange, rework gas cap or fuel tank and retest until no bubbles are present when fuel tank is pressurized. If bubbles were seen around fittings on bottom of fuel tank, tighten fittings to specification. Reinstall fuel pump with new seals if required. See 4.40 FUEL PUMP.

FUEL TANK VENT VALVE 4.38

GENERAL

The vent valve opens to allow gas vapor to escape the fuel tank and either vent to the atmosphere or to the charcoal canister on California Models (EVAP-equipped) and closes to prevent gasoline from leaking out of the fuel tank if the vehicle is tipped at an unusual angle.

REMOVAL

NOTE

The fuel tank must be drained to perform this service. The fuel tank does not need to be removed.

⚠WARNING

Always disconnect the negative battery cable when working on motorcycle to prevent accidental startup. If the positive cable should contact ground with the negative cable installed, the resulting sparks may cause a battery explosion, which could result in death or serious injury.

1. Disconnect negative battery cable.

⚠WARNING

An open flame or spark may cause a fuel tank explosion if all traces of fuel are not purged from the tank. Use extreme caution when servicing fuel tanks. Gasoline is extremely flammable and highly explosive. Inadequate safety precautions could result in death or serious injury.

2. Remove gas cap.
3. Relieve pressure from fuel system. Drain fuel tank.
   a. Using suitable external fuel pump, such as a Gas Caddy, pump fuel from tank and into suitable clean container.
   b. See instructions for external fuel pump for correct use.
4. See Figure 4-90. Cut cable tie holding vent hose to fitting and remove vent hose from fuel tank.
5. While holding vent valve with angled needle nose pliers, remove fitting from vent valve.
6. Pull the vent valve from the gasket and remove from fuel tank.

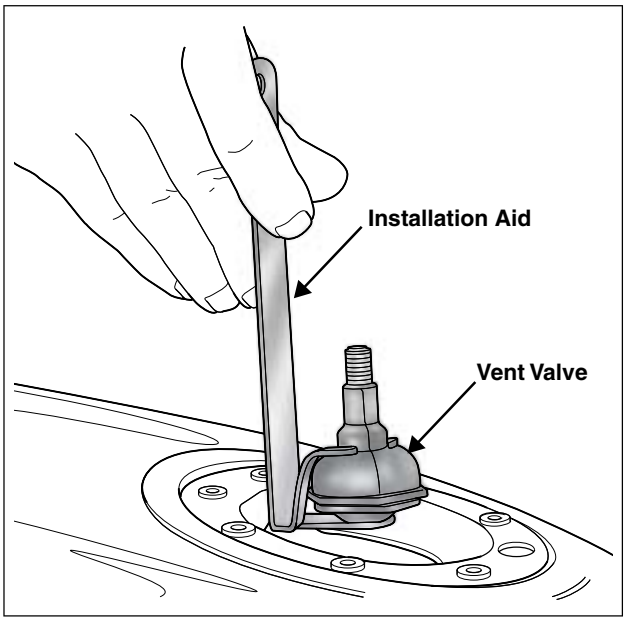


Figure 4-92. Installing Fuel Tank Vent

INSTALLATION

1. Wipe inside and outside vent valve mounting hole to make sure there is no gasoline or excess Hylomar sealant present.
2. See Figure 4-92. Using the fuel vent valve installation aid, lower the fuel tank vent valve into the fuel tank through the fuel filler neck.
3. Position the fuel tank vent valve so the threaded portion at the top protrudes from the fuel vent opening on the fuel cap flange. Verify hole on top of vent valve is not blocked by Hylomar sealant and that vent protrudes completely from hole.

NOTE

The fuel vent fitting is installed dry. Do NOT use teflon tape or loctite products when installing vent fitting.

4. See Figure 4-90. Install **new** O-ring in groove on bottom of **new** fitting.
5. While holding vent valve with fuel vent valve installation aid, install fitting and O-ring to threaded portion of vent valve. Do not tighten. Remove fuel vent valve installation aid.

NOTE:

It may take a few tries and slight rotation of the vent valve to get the alignment mentioned in Step 6.

6. See Figure 4-93. Align fitting so right front point of hex is oriented to 12:00 position when fitting is tightened finger tight. Make sure O-ring remains in groove of fitting while tightening.

CAUTION

Do not overtighten vent fitting or attempt to tighten with standard "click-type" torque wrench. Overtightening vent will cause it to snap off and fall into fuel tank, requiring fuel tank removal.

7. Using a dial-type torque wrench, tighten vent fitting to 40-60 **in-lbs**. (5-7 Nm) until top fitting nozzle points to 12:00 position.

NOTE:

If fitting nozzle does not point to 12:00 position when tightening within specified torque range, loosen fitting, rotate vent valve and try again. Repeat as required to get proper alignment of nozzle within specified torque range.

8. See Figure 4-90. Attach vent hose to nozzle on fitting with **new** cable tie.
9. Fill fuel tank with proper fuel (91 Octane) and install gas cap.
10. Connect negative battery cable. Tighten battery terminal hardware to 60-96 **in-lbs** (7-11 Nm).
11. Pressurize fuel system.
12. Check for leaks.

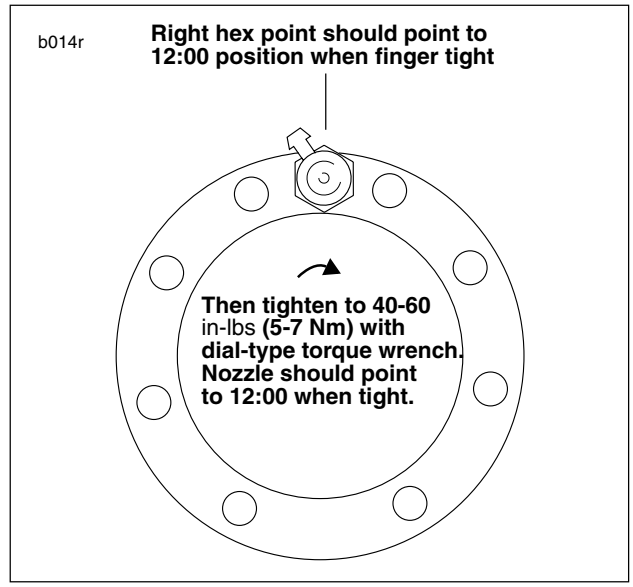


Figure 4-93. Fuel Tank Vent Alignment

INLINE FUEL FILTER 4.39

GENERAL

See Figure 4-94. There is a replaceable inline fuel filter between the fuel pump outlet at the fuel tank and the fuel rail assembly.

Replace the filter canister every 25,000 miles (40,000 km).

REMOVAL/INSTALLATION

⚠WARNING

The gasoline in the fuel supply line downstream of the fuel pump is under high pressure (49 psi [338 kPa]). To avoid an uncontrolled discharge or spray of gasoline, always purge the system of high pressure gas before removing fuel tank. Gasoline is extremely flammable and highly explosive. Inadequate safety precautions could result in death or serious injury.

1. Purge fuel line and remove fuel tank. See 4.37 FUEL TANK.
2. See Figure 4-94. Cut two cable ties that secure fuel filter to bracket.
3. Wrap a shop towel around the fuel filter.

⚠WARNING

A small amount of gasoline will drain from the fuel line when the filter is removed. Thoroughly wipe up any spilt fuel immediately. Dispose of rags in a suitable manner. Gasoline is extremely flammable and highly explosive. Inadequate safety precautions could result in death or serious injury.

4. See Figure 4-94. Remove hose clamps from both sides to detach filter.
5. Position **new** filter in bracket with arrow pointing in direction of fuel flow. Install two cable ties around filter and bracket. NOTE: If bracket was removed for any reason, tighten bolt to 30-33 ft-lbs (41-45 Nm).

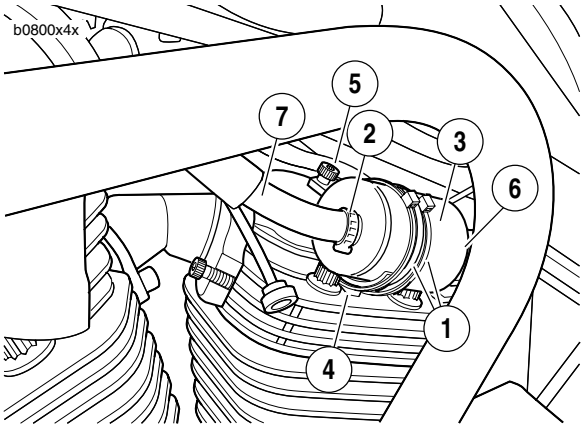
⚠WARNING

Always make sure fuel hoses are seated against the component they connect to and that hose clamps are properly tightened and positioned on straight section of fitting and not on the fitting barb. Failure to comply may result in fuel leakage which could result in death or serious injury.

NOTE

The barb is the larger outside diameter portion (bump) on the fuel fitting.

6. Install **new** filter with two **new** hose clamps. Arrow on filter must be pointing in direction of fuel flow. Make sure to push fuel hoses all the way on to fittings and position hose clamp on fitting side of barb.
7. Install fuel tank. See 4.37 FUEL TANK.
8. Pressurize fuel system and check for leaks.



1. **Cable Ties (2)**
2. **Hose Clamps (2)**
3. **Fuel Filter**
4. **Bracket**
5. **Bolt**
6. **From Fuel Tank**
7. **To Fuel Rail Assembly**

Figure 4-94. Inline Fuel Filter

REMOVAL

⚠WARNING

The gasoline in the fuel supply line downstream of the fuel pump is under high pressure (49 psi [338 kPa]). To avoid an uncontrolled discharge or spray of gasoline, always purge the system of high pressure gas before removing fuel tank. Gasoline is extremely flammable and highly explosive. Inadequate safety precautions could result in death or serious injury.

1. Purge fuel line and remove fuel tank. See 4.37 FUEL TANK.

⚠WARNING

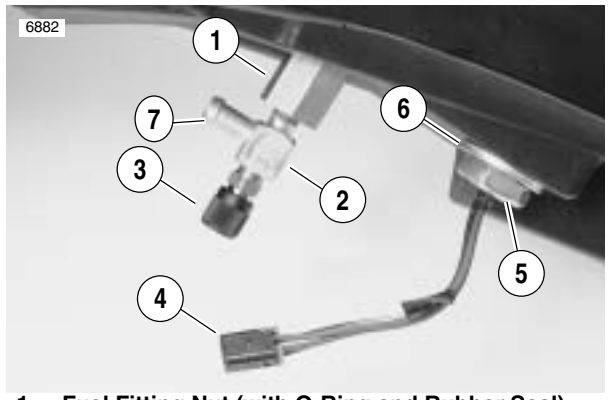
An open flame or spark may cause a fuel tank explosion if all traces of fuel are not purged from the tank. Use extreme caution when servicing fuel tanks. Gasoline is extremely flammable and highly explosive. Inadequate safety precautions could result in death or serious injury.

2. Drain fuel from tank.
   a. Using suitable external fuel pump, such as a Gas Caddy, pump fuel from tank and into suitable clean container.
   b. See instructions for external fuel pump for correct use.
3. Remove fuel filler cap flange assembly. See 4.37 FUEL TANK.
4. See Figure 4-95. Remove fuel fitting nut (1).
5. Remove electrical fitting nut (5), washer, sealing washer and rubber seal (6).
6. Push electrical and fuel fitting studs back into tank.
7. Reach inside fuel filler cap hole and remove pump assembly.

REPAIR

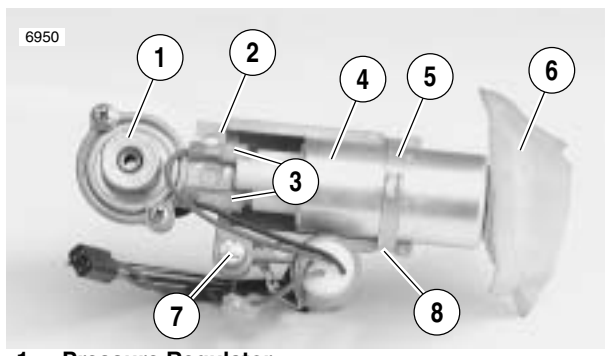
Fuel Pump Replacement

1. Remove fuel pump assembly from tank.
2. See Figure 4-96. Remove retaining clamp (5) from pump body (4) using a pair of cutters.
3. Pull pump outlet fitting from pump holder housing (2). Detach electrical wires (3) and discard old pump.
4. Place **new** rubber sleeve on **new** pump's outlet fitting.
5. Attach both electrical connectors (3) to **new** pump. Note that connectors are two different sizes.
6. Press pump fitting outlet into pump holder housing (2).
7. Place a **new** retaining clamp (5) over pump body. Position clamp inside groove (8) on pump holder housing.



1. **Fuel Fitting Nut (with O-Ring and Rubber Seal)**
2. **Fuel Outlet with attached Schraeder Valve**
3. **Protective Cap**
4. **Fuel Pump Connector [86]**
5. **Electrical Fitting Nut**
6. **Electrical Fitting Washer, Sealing Washer, and Rubber Seal**
7. **Barb (on Fitting)**

Figure 4-95. Fuel Pump Within Tank



1. **Pressure Regulator**
2. **Pump Holder Housing**
3. **Pump Wiring (2 connectors, 2 sizes)**
4. **Pump Body**
5. **Retaining Clamp**
6. **Filter**
7. **Low Fuel Level Sensor**
8. **Groove**

Figure 4-96. Fuel Pump Assembly

Table 4-29. Fuel Pump Specifications

SPECIFICATION	DATA
Pressure Setting	49 PSI
Operating Voltage	14 volts
Fuel Delivery	70 LPH @ 49 PSI
Current Draw	3 amps

8. Tighten clamp around pump.
9. Press **new** filter (6) onto pump being careful not to damage the pump assembly.
10. Install pump assembly inside fuel tank.

Fuel Pressure Regulator Replacement

1. Remove fuel pump assembly from tank.
2. See Figure 4-97. Remove two screws and washers holding fuel pressure regulator in place. Detach regulator from pump housing.
3. Remove and discard O-rings from pump holder housing.
4. Install **new** O-rings in pump holder housing. Press **new** regulator into place.
5. Install screws and washers. Tighten screws to 15-20 **in-lbs** (1.7-2.3 Nm).
6. Install pump assembly inside fuel tank.

Low Fuel Level Sensor Replacement

1. Remove fuel pump assembly from tank.
2. See Figure 4-98. Pull apart the wire connect.
3. Remove screw holding low fuel level sensor in place. Remove sensor from housing.
4. Install **new** sensor. Secure ground wire terminal under screw. Tighten screw to 16-20 **in-lbs** (1.8-2.3 Nm).
5. Attach wire connect.
6. Install pump assembly inside fuel tank.

INSTALLATION

1. See Figure 4-99. Check rubber seals on electrical and fuel outlet studs that go through tank.
2. Pump may be placed inside fuel tank by hand. Bending a 90 degree twist in the pump wiring will simplify locating the fuel and electrical outlet holes. However, if problems occur during installation:
   a. Obtain a stiff piece of wire approximately 24 in. (61 cm) long.
   b. Attach pump electrical connector to wire.
   c. Feed wire into tank through fuel filler cap hole and out through electrical fitting hole (smaller hole) in bottom of tank. Gently pull on wire to seat pump.
3. Install pump assembly inside tank through fuel filler cap hole. Position pump assembly with filter facing motorcycle license plate. When properly aligned, press both studs through the holes in the bottom of tank.
4. Install **new** O-ring on brass adaptor nut (for fuel stud).
5. Install rubber seal, sealing washer and washer on electrical outlet stud.

⚠WARNING

Do NOT overtighten fuel fitting nuts. Overtightening fasteners may result in excessive compression of rubber sealing washers and fuel leakage which could result in death or serious injury.

6. Apply two drops of LOCTITE THREADLOCKER 243 (blue) to middle threads of the fuel and electrical outlet studs. Use care to avoid getting threadlocker on the fuel tank. Install nuts on studs.
7. Using a crowsfoot attachment installed at a 90˚ angle to body of torque wrench, torque both nuts to 68-75 **in-lbs** (8-9 Nm).
8. Install fuel filler cap flange assembly. See 4.37 FUEL TANK.
9. Install fuel tank. See 4.37 FUEL TANK.

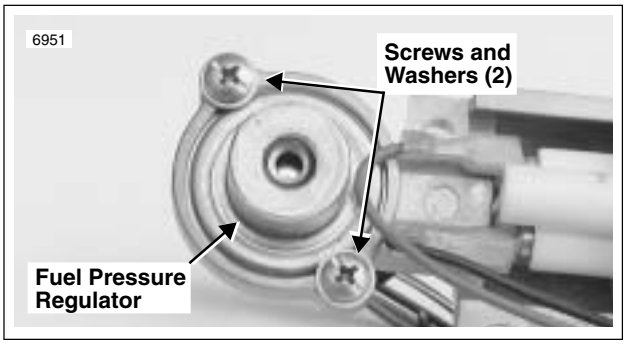


Figure 4-97. Fuel Pressure Regulator

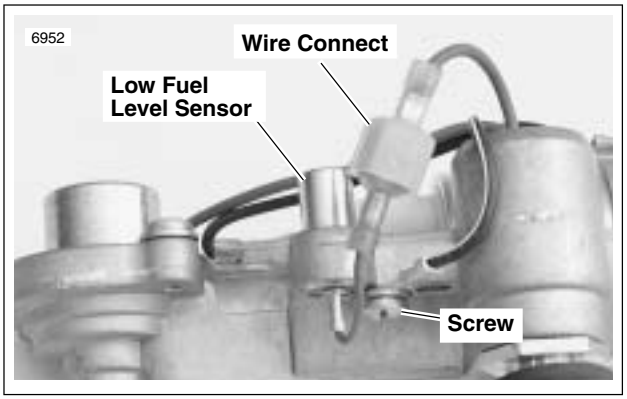


Figure 4-98. Low Fuel Level Sensor

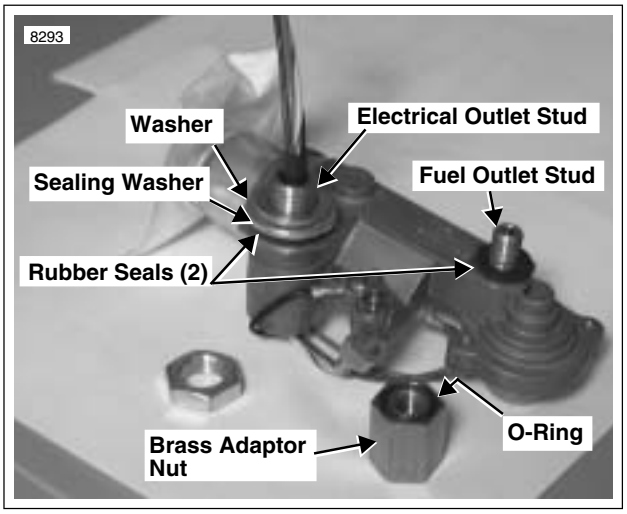


Figure 4-99. Rubber Seals and Washers

THROTTLE BODY AND INTAKE MANIFOLD 4.41

GENERAL

See Figure 4-100. The throttle body and intake manifold consist of the following components:

- Fuel injectors (front and rear).
- Fuel supply fitting.
- Idle speed adjustment screw.
- Cable bracket.
- Throttle position sensor.
- Throttle lever.

REMOVAL

⚠WARNING

The gasoline in the fuel supply line downstream of the fuel pump is under high pressure (49 psi [338 kPa]). To avoid an uncontrolled discharge or spray of gasoline, always purge the system of high pressure gas before removing fuel tank. Gasoline is extremely flammable and highly explosive. Inadequate safety precautions could result in death or serious injury.

1. Purge fuel line and remove fuel tank. See 4.37 FUEL TANK.
2. Remove air cleaner cover and backplate. See 4.42 AIR CLEANER.
3. See Figure 4-100. On California models, pull EVAP hose from fitting (3).

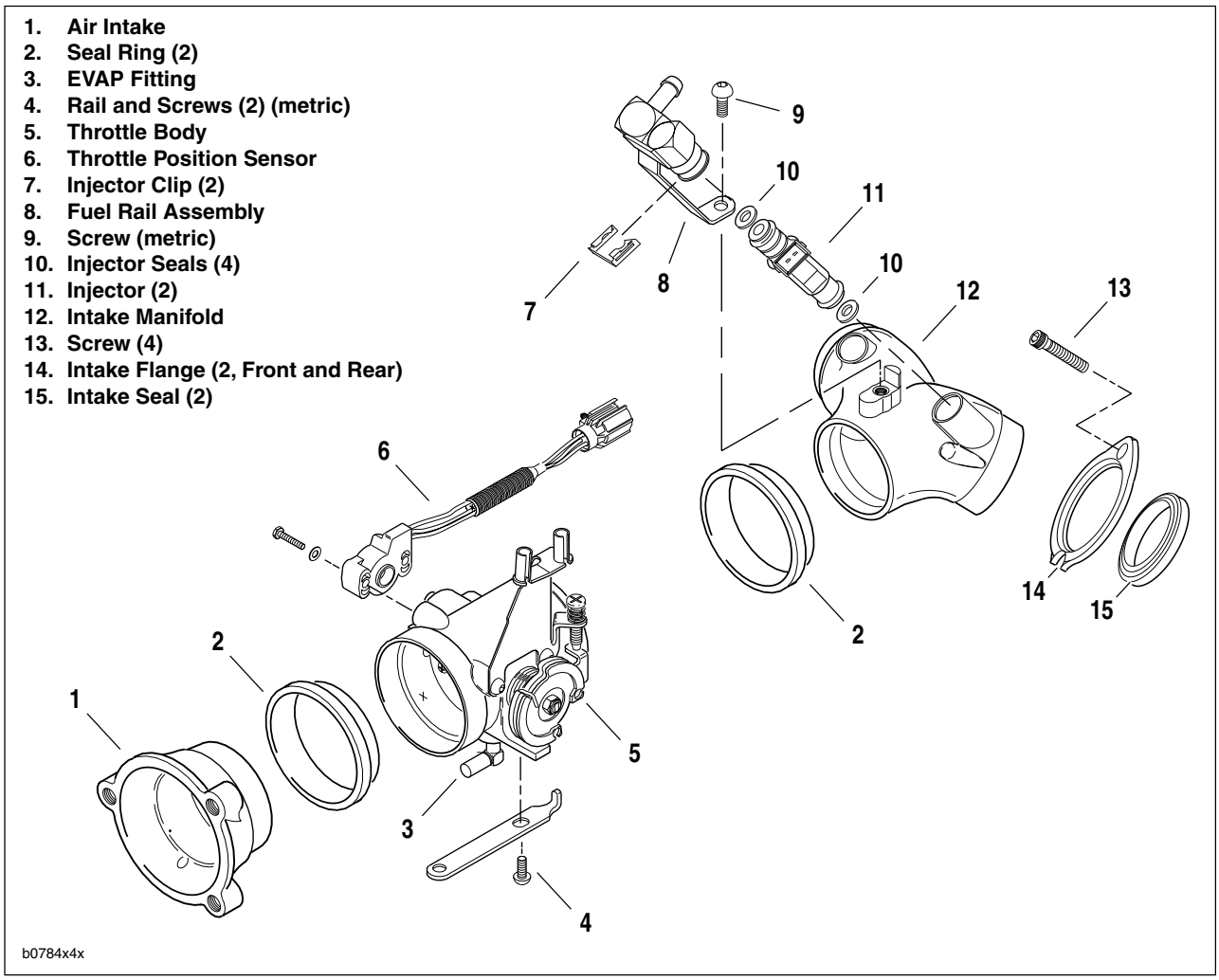


Figure 4-100. Throttle Body and Intake Manifold

4. Label and detach throttle cables.
   a. Remove screw and throttle cable brackets from throttle cables.
   b. See Figure 4-101. Increase throttle cable freeplay. Through the slots (1, 2) in the side of the bracket (3), remove both throttle cables.
   c. Using needle nose pliers, pull the cable barrels from attachment points (4, 5).
5. Detach wiring.
   a. Disconnect throttle position sensor by lifting both tabs on the connector while rocking the connection and pulling apart.
   b. If removing throttle body and intake manifold as an assembly, disconnect fuel injectors. Depress wire form on connector and use a rocking motion to detach electrical connectors from injectors.
6. If only removing throttle body, remove two screws (6) (metric). Detach hook on rail from tab on intake manifold (7) and slide throttle body out.
7. See Figure 4-100. Remove assembly from motorcycle.
   a. On primary cover side, loosen but do not remove the two front and rear intake flange screws (13). For best results use a 1/4 inch ball Allen bit with an end driver at least 4 inches long.
   b. On gearcase cover side, remove both intake flange screws from cylinder heads.
   c. Slide the throttle body and manifold assembly out from the right side of the bike frame.
8. Remove intake flanges (14) from manifold. Remove and discard seals (15).

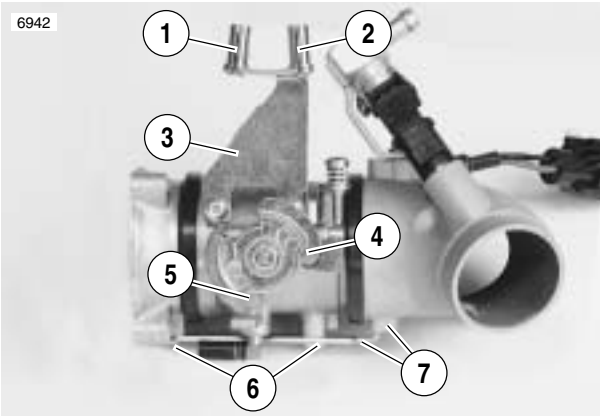
REPAIR

Throttle Position Sensor

See 4.36 THROTTLE POSITION SENSOR for removal, installation and calibration procedures.

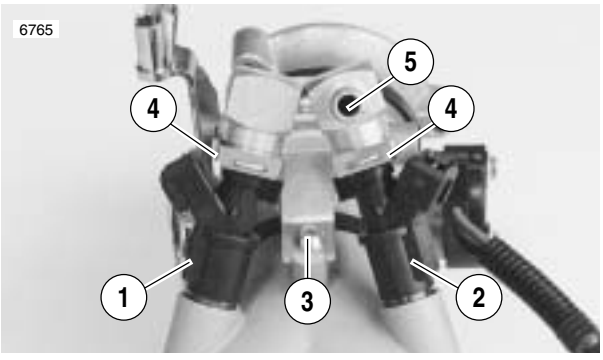
Fuel Injectors - Removal

1. Remove throttle body and intake manifold. See 4.41 THROTTLE BODY AND INTAKE MANIFOLD.
2. See Figure 4-102. Separate fuel rail assembly (3) from throttle body manifold.
   a. Remove both injector clips (4).
   b. Remove screw (3) (metric) that holds the fuel rail to the manifold.
   c. Separate fuel rail from injectors (1, 2) by gently rocking the fuel rail and pulling it away from the injectors.



1. **Throttle Control Cable Slot**
2. **Idle Control Cable Slot**
3. **Bracket**
4. **Idle Control Cable Attachment**
5. **Throttle Control Cable Attachment**
6. **Screws (2) (metric)**
7. **Hook and Tab**

Figure 4-101. Throttle Cable Bracket (Typical)



1. **Front Fuel Injector**
2. **Rear Fuel Injector**
3. **Fuel Rail Assembly and Screw (metric)**
4. **Clip (2)**
5. **Fuel Inlet**

Figure 4-102. Fuel Injectors

3. Remove fuel injectors (1, 2) from manifold by gently rocking and pulling it away from the manifold.

⚠WARNING

Do not use any injector that has damaged or deformed O-rings. Damaged O-rings may leak gasoline. Gasoline is extremely flammable and highly explosive. Use of damaged O-rings could result in death or serious injury.

4. Inspect all injector O-rings for cuts, tears or general deterioration. Replace O-rings if they have been damaged or have taken a definite set.

Fuel Injectors - Installation

1. Apply a thin coat of clean engine oil to top and bottom injector O-rings.
2. See Figure 4-103. Install fuel injectors.
   a. Place an O-ring on each side of injector.
   b. Install both injectors (4) into throttle body manifold.
   c. Press the fuel rail (1) onto the top of the injectors.
   d. Secure the fuel rail to the manifold with screw (metric). Tighten securely.
3. Snap the injector clips (2) over the flange on the fuel rail outlet and into the top grove in the injector.
4. Install throttle body manifold. See 4.41 THROTTLE BODY AND INTAKE MANIFOLD.

Fuel Injectors - Testing

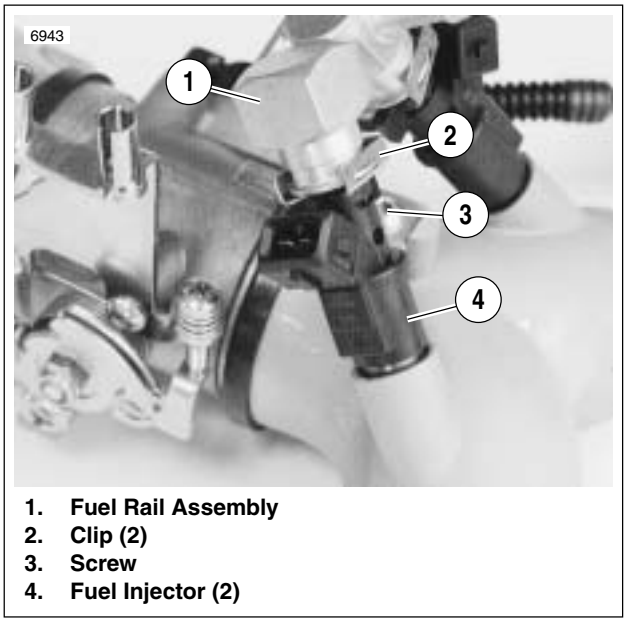
1. Remove air cleaner cover.
2. Conduct test.
   a. With throttle held wide open, turn key ON for two seconds.
   b. Turn key OFF for two seconds.
   c. Repeat Steps A and B five consecutive times. Replace fuel injectors if there is any evidence of raw fuel in throttle bottle manifold.
3. Install air cleaner cover.

INSTALLATION

NOTE

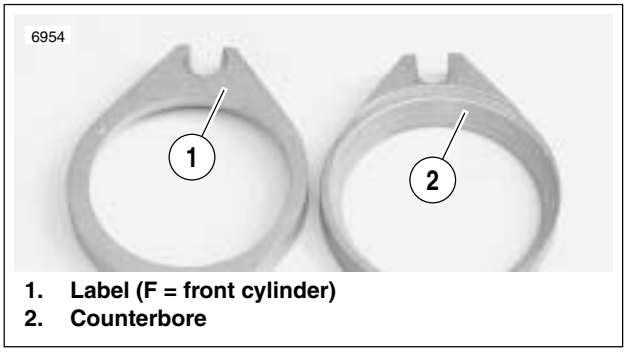
If only installing throttle body, begin installation with Step 3.

1. See Figure 4-104. Install front and rear intake flanges onto manifold with the counterbore facing out. Each intake flange is labeled and the pieces are not interchangeable.
2. Place a **new** seal in each intake flange with the beveled side against the counterbore.
3. See Figure 4-105. Attach both throttle cables. Add freeplay to cables if necessary.
   a. With the throttle body close to the right side of the bike but not fully installed, place idle control cable end (1) into hole on guide (2). Wrap the cable into the channel.
   b. Place the end of the cable housing into the bracket by sliding the cable through the slot (3). Adjust the cable so it will not dislodge from the bracket.
   c. Repeat procedure for the throttle control cable.
   d. Verify that the cables are seated in the channels on the guide. Check that the cable ends are positioned in the bosses on the cable bracket.
   e. Install screw and throttle cable brackets to throttle cables.
   f. Verify operation by turning throttle grip and observing the cable action and throttle valve movement.



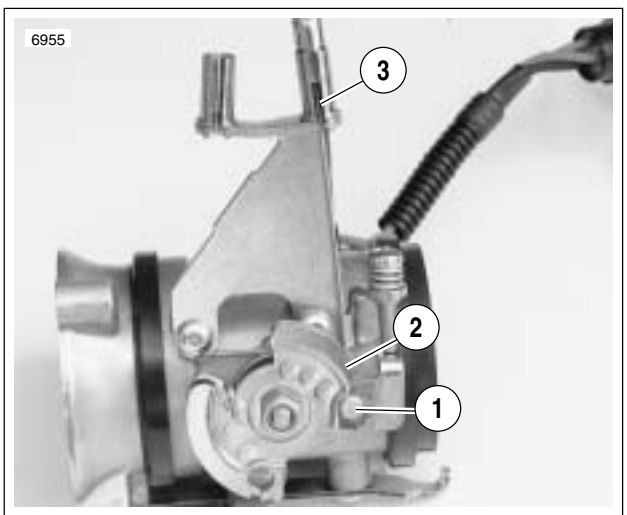
1. **Fuel Rail Assembly**
2. **Clip (2)**
3. **Screw**
4. **Fuel Injector (2)**

Figure 4-103. Installing Injectors



1. **Label (F = front cylinder)**
2. **Counterbore**

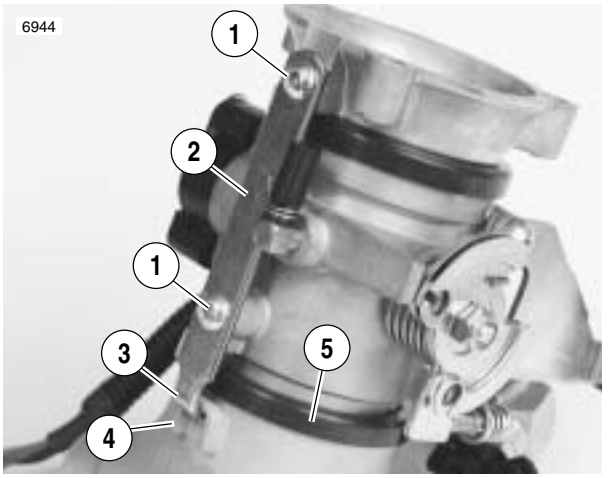
Figure 4-104. Intake Flanges



1. **Cable End**
2. **Guide**
3. **Slot**

Figure 4-105. Idle Control Cable Installation

4. Install the throttle body to the intake manifold. See the next step for entire assembly installation.
   a. See Figure 4-106. If front portion of throttle body was removed, lubricate surface of seal ring (5) that will contact manifold.
   b. Press throttle body into manifold.
   c. Place hook (3) on bottom rail (2) over tab (4) on manifold. Secure with two screws (1) (metric).
5. Install throttle body/intake manifold assembly.
   a. See Figure 4-107. Standing on the gearcase cover side of the vehicle, slide the assembly toward installed position. Manifold should slide over screws on primary cover side of engine.
   b. Align holes in intake flanges with those in cylinder heads and start screws. For best results, use a 1/4 inch Allen head with end driver 8 inches long.
   c. Make sure throttle body is centered between cylinders and tighten all intake flange screws to 6-10 ft-lbs (8-14 Nm).
6. Attach wiring.
   a. Injector cables are tagged F(ront) and R(ear) for ease of assembly. Push connector halves together until latches “click.” Grooves in female connector must align with the tabs in male housing.
   b. Connect throttle position sensor by pushing the connector halves together. Slots on female connector must fully engage tabs on male connector housing.
7. Connect EVAP hose to port at bottom of throttle body (California models only).
8. Install fuel tank. See 4.37 FUEL TANK.
9. Calibrate throttle position sensor if removed or replaced. See 4.36 THROTTLE POSITION SENSOR.
10. Install air cleaner backplate and cover. See 4.42 AIR CLEANER.
11. Check throttle cable adjustment.



1. **Screw (metric)**
2. **Rail**
3. **Hook**
4. **Tab**
5. **Seal Ring**

Figure 4-106. Front Portion of Throttle Body

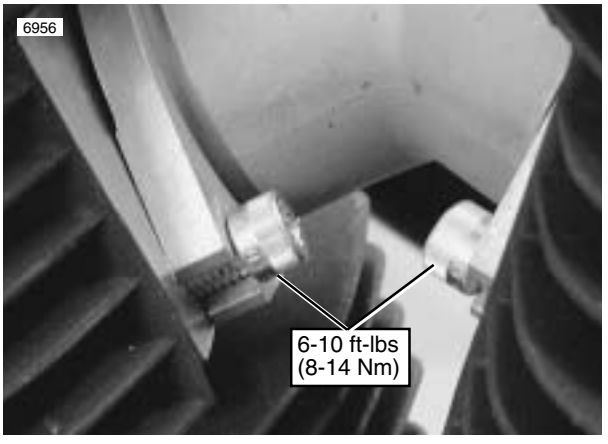


Figure 4-107. Intake Flange Screws, Primary Cover Side

REMOVAL

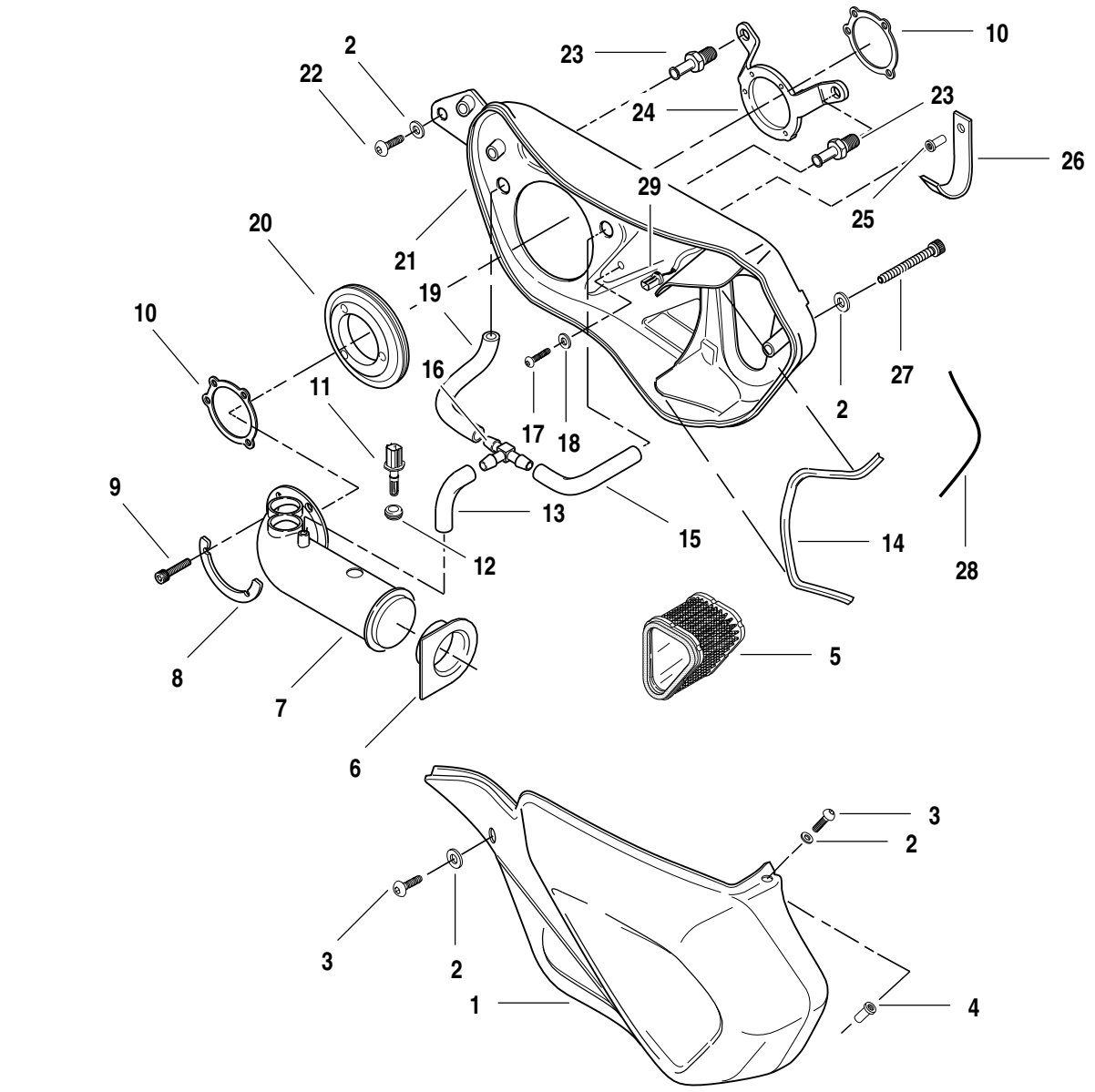
1. See Figure 4-108. Remove two screws (3) and washers (2) from front and one bolt (27) and washer (2) from back of air cleaner cover (1).
2. Remove air cleaner cover (1) and air filter (5).
3. Disconnect plug (29) from IAT (inlet air temperature) sensor (11).
4. Remove hose (13) from snorkel (7).
5. Remove three screws (9) from snorkel plate (8). Remove snorkel plate (8), snorkel (7) from support plate (24).
6. Remove three screws (17) and washers (18) and bolts (22) and washers (2) securing air cleaner backing plate (21) to wellnuts (25) in clamps (26).
7. Remove air cleaner backing plate (21).
   a. Disconnect breather hoses (15,19) from fittings (23).
   b. If necessary, pry grommet (20) from air cleaner backing plate.
8. Remove IAT sensor (11) from top of snorkel (7).
9. Remove breather bolts (23) from support plate (24) and remove support plate.

INSPECTION

1. See Figure 4-108. Inspect air cleaner. Check for dirt, torn filter material and general condition. Replace if necessary.
2. Inspect inside of backing plate and cover. Remove any dirt or debris.
3. Inspect condition of backing plate grommet (20), If torn or flattened, replace.
4. Inspect IAT sensor (11) and replace if faulty. Replace grommet (12) if necessary.

INSTALLATION

1. See Figure 4-108. Install **new** gasket (10) on back of support plate (24).
2. Apply HYLOMAR to threads of breather bolts. Install support plate (24) with breather bolts (23) to cylinder heads. Tighten breather bolts to 10-15 ft-lbs (14-20 Nm).
3. Install air cleaner backing plate (21).
   a. Insert intake air temperature sensor plug (29) through air cleaner backing plate (21) from back side of air cleaner backing plate.
   b. Position breather hoses (15, 19) on breather bolts (23).
4. Install, but do not tighten, three screws (17) and washers (18) to secure air cleaner backing plate (21) to wellnuts (25) in clamps (26). Tighten screws to 3-5 ft-lbs (4-7 Nm) after installing all three fasteners.
5. Install bolt (22) and washer (2) to secure backing plate to vehicle frame.
6. Install IAT sensor (11) and grommet (12) into snorkel (7).
7. If removed, position **new** gasket (10) in position on snorkel (7) flange.
8. Place snorkel (7) into position on backing plate (21) ensuring inlet end is in gasket (6) properly.
9. Apply LOCTITE THREADLOCKER 243 (blue) to threads of snorkel plate screws (9). Place snorkel plate (8) into position and secure with screws (9). Tighten screws to 6-8 ft-lbs (8-11 Nm).
10. Connect IAT sensor plug (29) to sensor (11).
11. Install hose (13) on snorkel (7).
12. Place a small piece of double sided tape at the upper-center of the air filter foam gasket that fits against the backing plate (21).
13. Position air filter (5) on air cleaner backing plate (21).
14. Install air cleaner cover (1).
    a. Position air cleaner cover (1) over air cleaner backing plate (21), making sure that air filter (5) is correctly positioned.
    b. Install long bolt (27) and washer (2) first.
    c. Align air cleaner cover (1) and secure with two screws (3) and washers (2). Torque screws to 27-29 **in lbs** (3.1-3.3 Nm).



1. Cover, Air Cleaner
2. Washer (3)
3. Screw (2)
4. Wellnut
5. Filter Element
6. Gasket, Snorkel
7. Snorkel, Internal
8. Snorkel Plate
9. Screw
10. Gasket (2)
11. IAT Sensor
12. IAT Grommet
13. Breather Hose, Snorkel
14. Gasket
15. Breather Hose
16. Breather Tee
17. Screw (3)
18. Washer (3)
19. Breather Hose
20. Grommet
21. Backing Plate
22. Bolt
23. Bolt, Breather (2)
24. Support Plate
25. Wellnut (3)
26. Clamp (3)
27. Screw
28. Gasket
29. IAT Connector [89] and Wiring

Figure 4-108. Air Cleaner

GENERAL

Buell motorcycles sold in the state of California are equipped with an evaporative (EVAP) emissions control system. The EVAP system prevents fuel hydrocarbon vapors from escaping into the atmosphere and is designed to meet the California Air Resource Board (CARB) regulations in effect at the time of manufacture.

The EVAP functions in the following manner:

- See Figure 4-109. Hydrocarbon vapors in the fuel tank are directed through the vent valve and stored in the carbon canister. If the vehicle is tipped at an abnormal angle, the vent valve closes to prevent liquid gasoline from leaking out of the fuel tank through the fuel tank vent hose.
- See Figure 4-110. When the engine is running, manifold venturi negative pressure (vacuum) slowly draws off the hydrocarbon vapors from the carbon canister through the canister vent hose. These vapors pass through the throttle body manifold and are burned as part of normal combustion in the engine. The large diameter canister-to-air cleaner backplate hose (canister fresh air inlet hose) supplies the canister with fresh air from the air cleaner.

TROUBLESHOOTING

⚠WARNING

Verify that the evaporative emissions system hoses do not contact hot exhaust or engine parts. The hoses contain flammable vapors that can be ignited if damaged, which could result in death or serious injury.

The system has been designed to operate with a minimum of maintenance. Check that all hoses are properly routed and connected and are not pinched or kinked. Periodically check all mounting hardware for tightness.

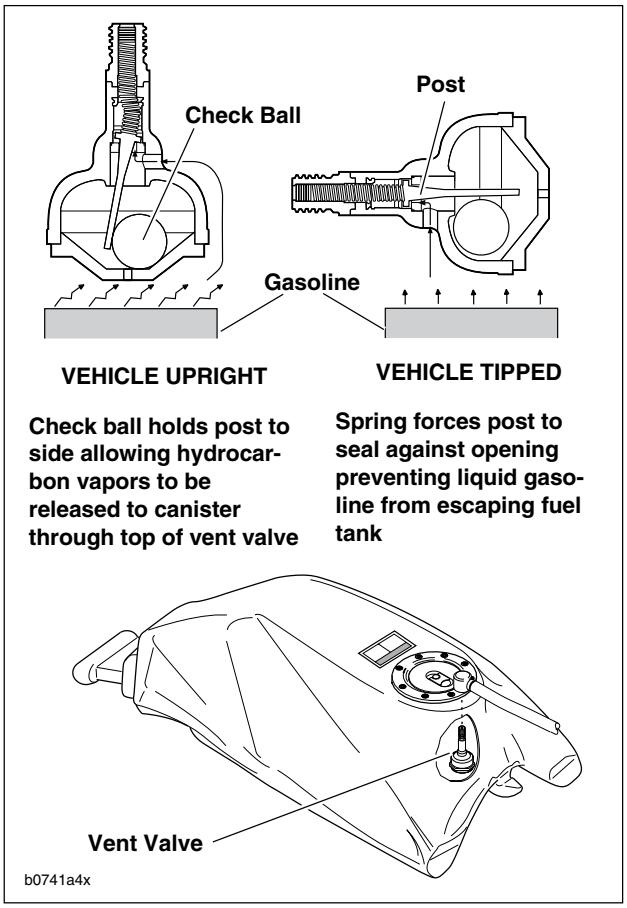


Figure 4-109. Vent Valve Operation

Figure 4-110. Carbon Canister Installation (Typical).

REMOVAL

Vent Valve

1. Remove vent valve. See 4.38 FUEL TANK VENT VALVE
2. See Figure 4-110. If necessary, label fuel tank vent hose (1) at canister fitting and remove.

Canister

1. See Figure 4-110. The canister assembly mounts on a frame tube along the left side of the motorcycle.
2. Label and disconnect the three hoses connected to the canister.
3. See Figure 4-112. Depress both locking tabs (3) on the canister mounting bracket (4). Slide canister towards the front wheel until it disengages from the mounting bracket and remove.
4. Remove screws, washers and locknuts (6) to detach mounting plate (2) from clamps (1).
5. Remove countersunk screws and locknuts (5) to separate bracket (4) from mounting plate (2).

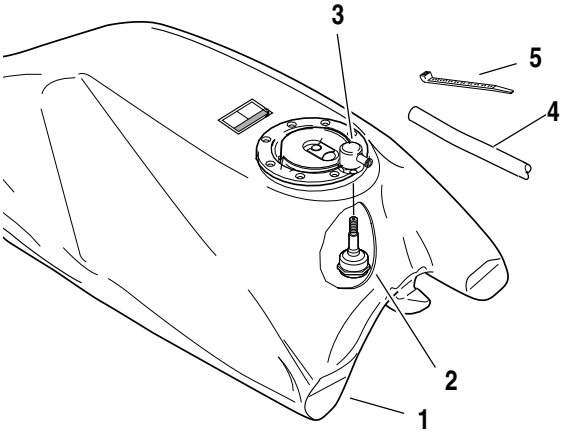
INSTALLATION

Vent Valve

⚠WARNING

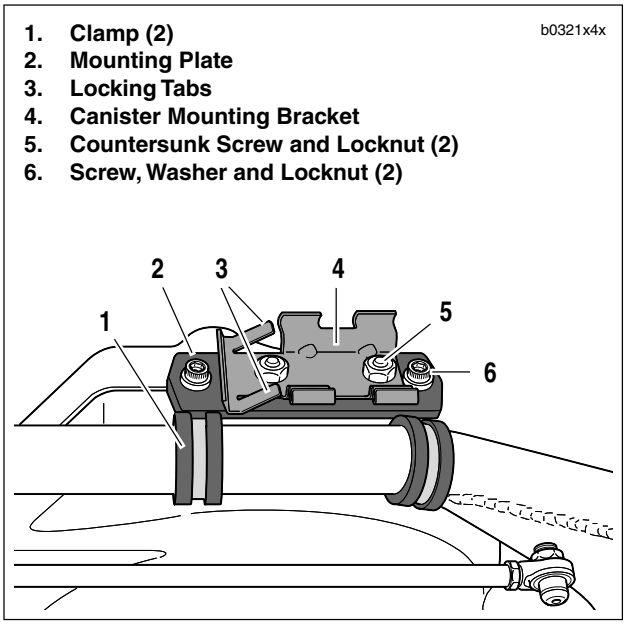
Verify that the fuel tank vent hose does not contact hot exhaust or engine parts. The hose contains flammable vapors that can be ignited if damaged, which could result in death or serious injury.

1. Install vent valve. See 4.38 FUEL TANK VENT VALVE.
2. See Figure 4-110. Attach fuel tank vent hose (1) to canister if disconnected.



1. **Fuel Tank**
2. **Vent Valve**
3. **Vent Valve Fitting**
4. **Fuel Tank Vent Hose**
5. **Cable Strap**

Figure 4-111. Vent Valve



1. **Clamp (2)**
2. **Mounting Plate**
3. **Locking Tabs**
4. **Canister Mounting Bracket**
5. **Countersunk Screw and Locknut (2)**
6. **Screw, Washer and Locknut (2)**

Figure 4-112. Carbon Canister Mounting

Canister

1. See Figure 4-112. Install canister mounting bracket (4) on mounting plate (2) with countersunk screws and locknuts (5).
2. Install mounting plate assembly on frame by attaching mounting clamps (1) using screws, washers and locknuts (6). Tighten to 6-8 ft-lbs (8-11 Nm).
3. Depress locking tabs (3) and slide canister into locked position on canister mounting bracket (4). Locking tabs (3) must engage canister; bend tabs outward somewhat if canister is not held securely.

⚠WARNING

Always make sure fuel hoses are seated against the component they connect to and that hose clamps are properly tightened and positioned on straight section of fitting and not on the fitting barb. Failure to comply may result in fuel leakage which could result in death or serious injury.

NOTE

The barb is the larger outside diameter portion (bump) on the fuel fitting.

4. See Figure 4-110. Connect all three hoses to the canister. Make sure to push fuel tank vent hose all the way on to carbon canister fitting and position hose clamp on fitting side of barb.
5. Measure distance to closest point of rear cylinder head. If clearance is not at least 0.5 in. (12.7 mm), move canister bracket clamps.

HOSE ROUTING

Intake Manifold

See Figure 4-113. Route the evaporative emissions control hose at the intake manifold. To gain access to the hose, remove the fuel tank and/or air cleaner and backplate assembly if necessary.

Canister Hose Routings

1. See Figure 4-110. Connect one end of the canister fresh air inlet hose (3) to the carbon canister.

⚠WARNING

Always make sure fuel hoses are seated against the component they connect to and that hose clamps are properly tightened and positioned on straight section of fitting and not on the fitting barb. Failure to comply may result in fuel leakage which could result in death or serious injury.

NOTE

The barb is the larger outside diameter portion (bump) on the fuel fitting.

2. Connect fuel tank vent hose (1) and canister vent hose (2) to the carbon canister. Canister vent hose attaches to the top fitting. Make sure to push fuel tank vent hose all the way on to carbon canister fitting and position hose clamp on fitting side of barb.

Figure 4-113. Emissions Hose Attachment

3. Route both hoses (1, 2) towards fresh air inlet hose (3) at rear of canister.
4. Cable strap the three hoses together where the hose connector attaches the two pieces of fresh air inlet hose (3).
5. Route the smaller hoses forward along the top left frame tube. The canister vent hose (2) and fuel tank hose (1) run together until the canister vent hose (2) turns between the cylinders.

⚠WARNING

Always make sure fuel hoses are seated against the component they connect to and that hose clamps are properly tightened and positioned on straight section of fitting and not on the fitting barb. Failure to comply may result in fuel leakage which could result in death or serious injury.

NOTE

The barb is the larger outside diameter portion (bump) on the fuel fitting.

6. See Figure 4-113. Connect the canister vent hose to elbow fitting. Make sure to push hose all the way on to elbow and position hose clamp on fitting side of barb.
7. See Figure 4-111. Connect the fuel tank vent hose (4) to vent valve fitting (3) using a **new** cable strap (5).
8. Route fresh air inlet hose upward and forward along the top left frame tube. Continue running hose to air cleaner backplate fitting. Secure hose to frame using **new** cable straps.

NOTES