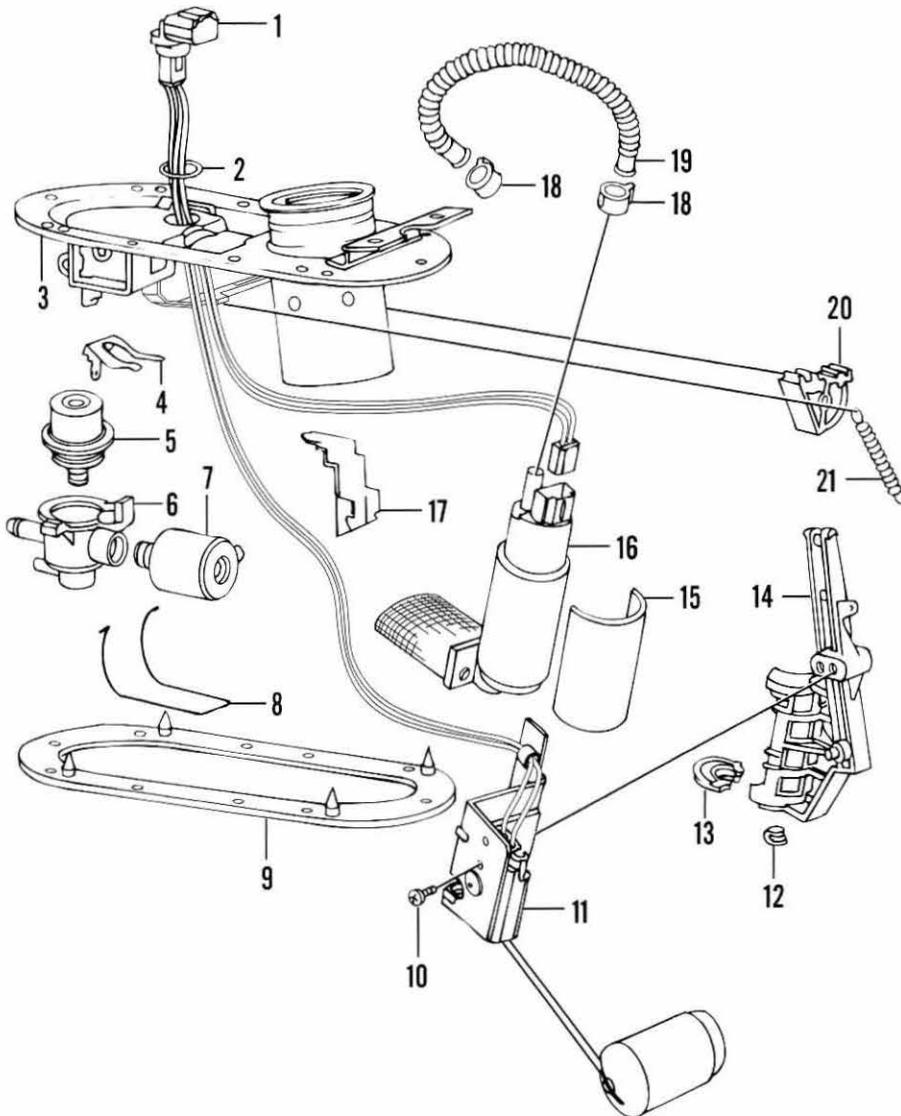


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### FUEL PUMP AND FILTER (FLHTCUI, FLHTCI, FLHTRI [2002])



- |                               |                               |
|-------------------------------|-------------------------------|
| 1. Three-way header assembly  | 12. Rubber spacer             |
| 2. O-ring                     | 13. Rubber cushion            |
| 3. Canopy                     | 14. Fuel pump housing         |
| 4. Clip connector             | 15. Rubber sleeve             |
| 5. Fuel pressure regulator    | 16. Fuel pump                 |
| 6. Pressure regulator housing | 17. Wire bail bracket         |
| 7. Fuel filter                | 18. 8 mm hose clamp           |
| 8. Wire bail                  | 19. Fuel pump-to-filter hose  |
| 9. Gasket                     | 20. Fuel pump housing end cap |
| 10. Screw                     | 21. Spring                    |
| 11. Fuel gauge sending unit   |                               |

7. Partially lift the canopy up away from the fuel tank.

**CAUTION**

*Do not cut the fuel supply hose while cutting the hose clamp in the following step.*

8. On the left side of the fuel tank, carefully cut the hose clamp securing the outlet hose to the fuel filter fitting.

9. Carefully pull the canopy assembly straight up and out of the fuel tank. Do not damage the fuel gauge sending unit float during removal.

10. Remove the canopy gasket.

11. Installation is the reverse of these removal steps while noting the following:

- a. Slip a *new* hose clamp onto the outlet hose prior to installing the assembly into the fuel tank.
- b. Install the outlet onto the fuel filter and crimp the hose clamp.
- c. Install a *new* canopy gasket.
- d. Tighten the T20 Torx bolts securely.
- e. To synchronize the ECM and the idle speed control actuator, turn the engine stop switch to the RUN position. Then turn the ignition key to the IGNITION position for five seconds and to the OFF position for 10 seconds. Repeat this step once.

**Fuel Filter Removal/Installation  
(2000-2001 Models)**

1. Remove the canopy assembly as previously described.

2. Use side cutting pliers to cut the hose clamp, and remove it and the hose from the fuel pump inlet port.

3A. On FLHTCUI, FLHTCI and FLTRI models, remove the retaining ring from the groove in the fuel filter outlet port. Pull the fuel filter outlet port from the housing and remove the fuel filter.

3B. On FLHRI and FLHRCI models, use a small screwdriver to gently pry the fuel filter from the slotted side of the canopy mounting bracket. Remove the fuel filter from the mounting bracket.

4. Discard the fuel filter.

5. Installation is the reverse of removal. Use *new* hose clamps.

**Fuel Filter Removal/Installation  
(2002 Models)**

1. Remove the canopy assembly as previously described.

2. Carefully pull the wire bail from the slots on the fuel filter canister bracket. Move the wire bail out of the way.

3. Pull the canister bracket forward and disengage the tab from the slot on the canopy weldment.

4. Carefully pull the fuel filter out of the pressure regulator housing.

5. Use side cutting pliers to cut the hose clamp and remove it from the fuel pump hose.

6. Disconnect the fuel filter from the fuel pump hose.

7. Discard the fuel pump.

8. Installation is the reverse of removal while noting the following:

- a. Use a *new* hose clamp.
- b. Use a *new* O-ring on the fuel filter.

**Fuel Pump Removal/Installation**

1. Remove the canopy assembly as described in this chapter.

2. Depress the latch and disconnect the electrical connector from the fuel pump.

3. Remove the T15 Torx screw and remove the fuel sending unit from the fuel pump bracket.

4. Use side cutting pliers to cut the hose clamp, and remove it and the hose from the fuel pump outlet port.

5. On FLHTCUI, FLHTCI and FLTRI models, remove the retaining ring from the groove in the fuel filter outlet port. Pull the fuel filter outlet port from the mounting bracket and remove the fuel filter.

6. Use a 1/8 in. punch to tap the roll pin from the spring stop and the canopy support rod.

7. Slide the fuel pump and bracket assembly, spring and spring stop from the canopy support rod.

8. Discard the fuel pump and bracket assembly.

**NOTE**

*The new fuel pump assembly consists of the fuel pump, mounting bracket, rubber spacer and the rubber cushion.*

9. Slide the *new* fuel pump assembly onto the canopy support rod. Before the rod enters the housing's

lower square hole, slide the spring and spring stop onto the end of the support rod.

10. Align the spring stop hole with the canopy support rod hole and install the roll pin. Carefully tap the roll pin into place until the end is flush with the spring stop.

11. On FLHTCUI, FLHTCI and FLTRI models, install the fuel filter outlet port through the hole in the mounting bracket and secure it with the retaining ring.

#### CAUTION

*Do not crimp the hose clamp too tight as it may crack the fuel pump plastic outlet port.*

12. Install a *new* hose clamp onto the fuel pump outlet hose. Install the hose onto the outlet port and carefully crimp the clamp.

13. Attach the fuel sending unit to the fuel pump bracket and tighten the T15 Torx screws securely.

14. Attach the electrical connector to the top of the fuel pump and push it on until it clicks into the locked position. Pull straight up on the connector to ensure it is locked in place.

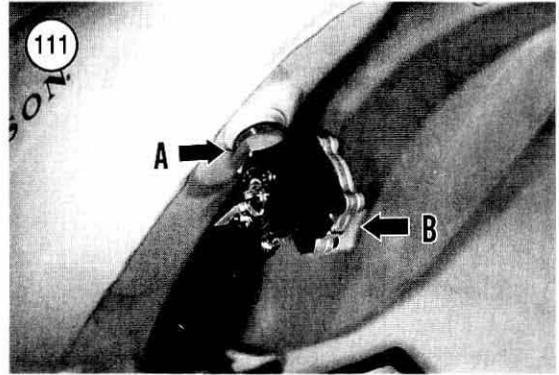
15. Install the canopy assembly as previously described.

### Fuel Pump Removal/Installation (2002 Models)

#### NOTE

*During the removal procedure, the fuel pump mounting bracket will be damaged and must be replaced along with the fuel pump. Make sure the fuel pump is defective prior to removing it from the bracket.*

1. Remove the canopy assembly as previously described.
2. Depress the external latch and disconnect the electrical connector from the fuel pump.
3. Use side cutting pliers to cut the hose clamp, and remove it from the fuel pump hose.
4. Remove the T15 Torx screw and remove the fuel level sending unit from the post on the fuel pump mounting bracket.
5. Disconnect the spring from the hook on the fuel pump mounting bracket.
6. Insert a flat screwdriver tip and crack the webbing at the top of the fuel pump mounting bracket



hinge. Remove the hinge from the mounting bracket.

7. Remove the fuel pump and bracket assembly.

8. Installation is the reverse of removal. Install a new fuel pump and fuel pump mounting bracket.

### FUEL SHUTOFF VALVE (CARBURETED MODELS)

A three-way vacuum-operated fuel shutoff valve is mounted to the left side of the fuel tank. A replaceable fuel filter is mounted to the top of the fuel shutoff valve.

To troubleshoot this valve, refer to *Vacuum Operated Fuel Shutoff Valve Testing* in Chapter Two.

#### Removal

#### WARNING

*Gasoline is very volatile and flammable. Work in a well-ventilated area away from any open flames, including pilot lights on household appliances. Do not allow anyone to smoke in the area and have a fire extinguisher rated for gasoline fires on hand.*

1. Disconnect the negative battery cable as described in Chapter Eight.
2. Turn the fuel shutoff valve to the OFF position.
3. Drain the fuel tank as described under *Fuel Tank Removal/Installation* in this chapter.

#### NOTE

*The fuel shutoff valve can be removed with the fuel tank in place. **Figure 111** is shown with the fuel tank removed to better illustrate the step.*

4. Loosen the fuel valve fitting (A, **Figure 111**) and remove the fuel shutoff valve (B) from the fuel tank. Drain residual gasoline still in the tank after the valve is removed.

### Cleaning and Inspection

1. Inspect the filter mounted on top of the fuel valve. Remove contamination from the filter. Replace the filter if it is damaged.
2. Install a *new* filter gasket before installing the filter onto the fuel valve.
3. Remove all sealant residue from the fuel tank and fuel valve threads.

### Installation

1. Install a *new* filter gasket onto the fuel shutoff valve, then install the filter.
2. Coat the fuel valve threads with Loctite Teflon pipe sealant.
3. Insert the fuel valve into the tank, then start the hex fitting onto the fuel tank threads two turns.
4. Hold the hex fitting and start the fuel valve into the fitting by turning it *counterclockwise* two turns.
5. Hold the fuel valve and tighten the hex fitting to the torque specification in **Table 2**.

#### WARNING

*If the hex fitting is turned more than two turns on the valve, it may bottom out on the valve and cause a fuel leak.*

6. Install the insulator tube over the fuel hose.
7. Reconnect the fuel hose to the fuel shutoff valve and secure it with a hose clamp.
8. Refill the fuel tank and check for leaks.

### FUEL TANK GAUGE (FLHR)

#### WARNING

*Gasoline is extremely flammable and explosive, perform this procedure away from all open flames, including appliance pilot lights, and sparks. Do not smoke or allow someone to smoke in the work area, as an explosion and fire may occur. Always work in a well-ventilated area. Wipe up any spills immediately.*

### Removal/Installation

1. Remove the fuel tank as described in this chapter.

#### NOTE

*The fuel gauge electrical wires are routed through a tube in the fuel tank and are secured with a clamp at the bottom of the fuel tank. Loosen the clamp and make sure there is enough slack in the wires to allow the gauge to be pulled up and out of the fuel tank.*

2. Pull straight up on the gauge and partially remove it from the tank.
3. Disconnect the electrical connector from the wires in the fuel tank. Do not disconnect the electrical wires from the fuel gauge.
4. Remove the fuel gauge and the gasket.
5. Remove the five screws securing the sending unit to the fuel tank.

#### CAUTION

*Do not bend the float arm during removal of the sending unit. If bent, the gauge will give inaccurate readings.*

6. Carefully withdraw the sending unit while moving it back and forth, and while lifting and turning it in either direction.
7. Remove the gasket from the fuel tank.
8. Install by reversing these removal steps while noting the following:
  - a. Install *new* gaskets between the fuel gauge and fuel tank.
  - b. Install the sending unit *carefully* to avoid damage to the float arm.
  - c. Tighten all screws securely.

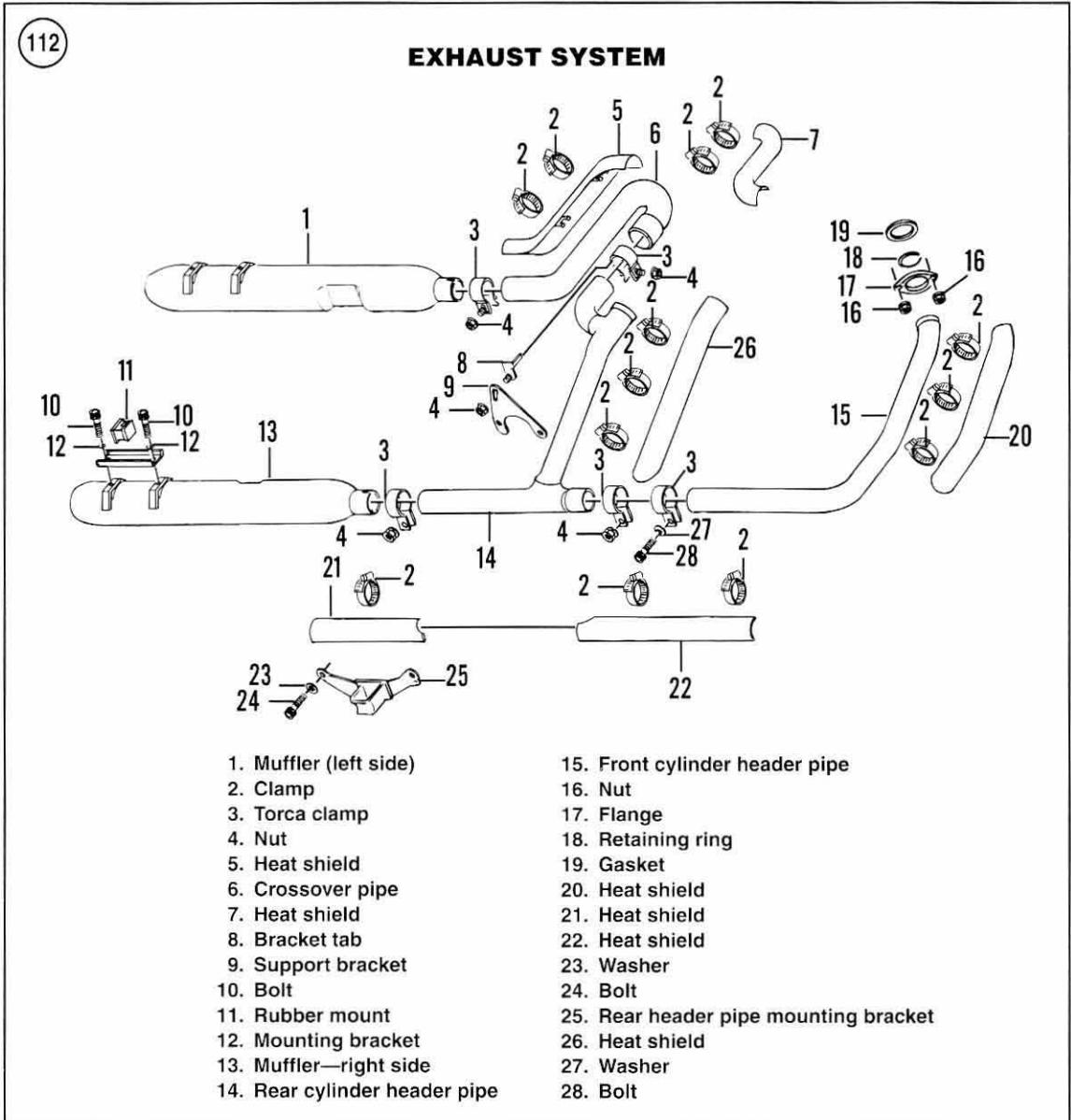
### EXHAUST SYSTEM

#### Removal

Refer to **Figure 112**.

#### NOTE

*If the system joints are corroded or rusty, spray all connections with WD-40, or an equivalent, and allow the penetrating oil to soak in sufficiently to free the rusted joints.*



1. Support the motorcycle on a work stand. See *Motorcycle Stands* in Chapter Nine.

2. Remove both saddlebags as described in Chapter Fourteen.

3. Remove the footboards as described in Chapter Fourteen.

4. Label the heat shields prior to removal for aid during installation. They look very similar but all have slight differences. Use the numbers assigned to these parts in **Figure 112**.

5. Loosen the clamps and remove the six heat shields.

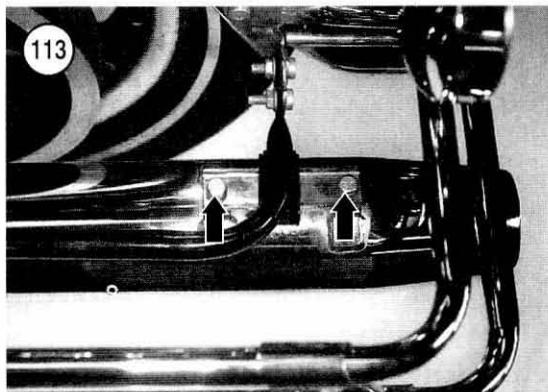
6. Wrap the left side muffer in a towel, then secure it to the saddlebag mounting bracket with a Bungee cord or rope.

7. At each cylinder head, loosen and remove the two flange nuts securing both the front and rear exhaust pipes to the cylinder heads.

8. Slide the exhaust flange and retaining ring off the cylinder head studs.

9. Loosen the Torca clamps in the following order:

- a. Front header pipe-to-rear header pipe.
- b. Rear header pipe-to-right side muffer.
- c. Rear header pipe-to-crossover pipe.



d. Crossover pipe-to-the left side muffler.

10. Remove the bolts and lockwashers securing the right side muffler to the saddlebag lower support rail.

11. Pull the muffler toward the rear and disconnect the right side muffler from the rear header pipe. Remove the muffler. Slightly rotate the muffler during removal.

12. Remove the nut securing the bracket tab to the support bracket.

13. Remove the rear header pipe from the front header pipe, the crossover pipe and the rear cylinder head port studs.

14. Remove the bracket tab from the slot in the Torca clamp.

15. Remove the bolt, washer and lockwasher from the transmission clamp on the front header pipe. Open the clamp and remove the front header pipe from the transmission bracket.

16. Remove the front header pipe from the front cylinder head port studs.

17. Remove the crossover pipe from the left side muffler.

18. Remove the bolts and lockwashers (**Figure 113**) securing the left side muffler to the saddlebag lower support rail.

19. Remove the Bungee cord or rope, and remove the left side muffler.

20. Remove the retaining ring, then remove the exhaust port gaskets.

21. Inspect the exhaust system as described in this chapter.

22. Store the exhaust system components in a safe place until they are reinstalled.

## Installation

### NOTE

*New Torca clamps must be installed to ensure correct sealing integrity. The new Torca clamps eliminate the need for graphite or silicone tape during installation of the mufflers.*

### NOTE

*To prevent exhaust leaks, do not tighten any of the mounting bolts and nuts or the Torca clamps until all exhaust components are in place.*

1. Scrape the exhaust port surfaces to remove all carbon residue. Then wipe the port with a rag.

2. Install a *new* exhaust port gasket into each exhaust port with the tapered side facing out. Install the retaining rings to secure the gaskets.

3. If the transmission clamp was removed, install it onto the transmission side cover.

4. Install the front header pipe onto the front cylinder head exhaust port. Install the flange nuts and tighten them finger-tight.

5. Install the front header pipe onto the transmission bracket clamp. Close the clamp and install the bolt, washer and lockwasher, then tighten the bolt finger-tight.

6. Install a *new* Torca clamp onto the end of the front header pipe.

7. Install the rear header pipe onto the rear cylinder head exhaust port. Install the flange nuts and tighten them finger-tight.

8. Move the Torca clamp into position where the front and rear header pipes join.

### NOTE

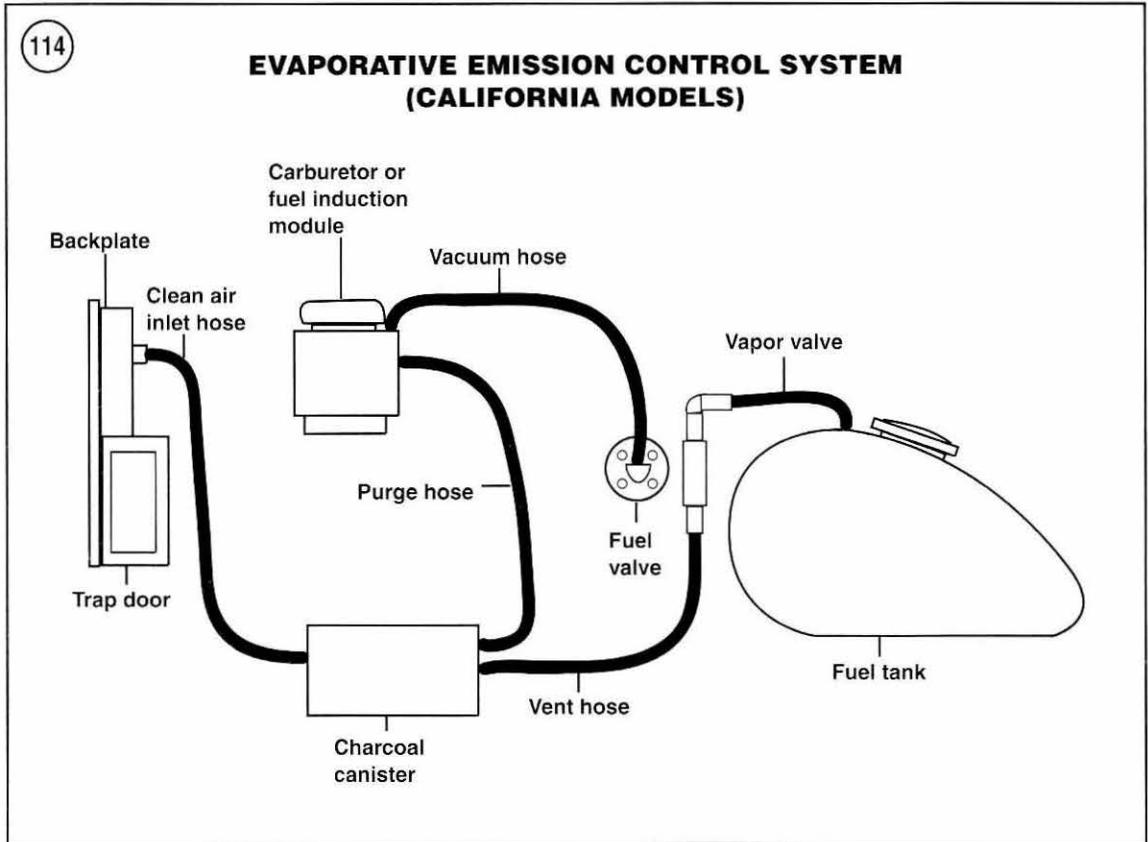
*The crossover pipe to the rear header pipe Torca clamp is unique since it has a slot for the support bracket tab.*

9. Install a *new* Torca clamp onto each free end of the rear header pipe.

10. Install the right side muffler onto the rear header pipe.

11. Install the bolts and lockwashers securing the right side muffler to the saddlebag lower support rail. Tighten the bolts finger-tight.

12. Move the Torca clamp into position where the muffler and rear header pipe join.



13. Fit the bracket tab into the slot of the Torca clamp, engaging the stud in the slot of the exhaust pipe bracket. Start the nut and tighten it finger-tight.

14. Install a *new* Torca clamp onto each free end of the crossover pipe.

15. Install the left side muffler onto the crossover pipe.

16. Secure the left side muffler to the saddlebag mounting bracket with a Bungee cord or rope.

17. Move the Torca clamp into position where the muffler and crossover pipe join.

18. Install the bolts and lockwashers securing the left side muffler to the saddlebag lower support rail. Tighten the bolts finger-tight.

19. Check the entire exhaust system to make sure none of the exhaust components are touching the frame. If necessary, make slight adjustments to avoid any contact that would transmit vibrations to the rider through the frame.

20. Check the exhaust assembly alignment, then tighten the mounting bolts and nuts as follows:

- Front cylinder head flange nuts. Tighten the upper nut to 9-18 in-lbs. (1-2 N•m), then

tighten the lower nut to 120 in-lbs. (14 N•m). Tighten the upper nut to 120 in-lbs. (14 N•m).

- Rear cylinder head flange nuts. Tighten the upper nut to 9-18 in-lbs. (1-2 N•m), then tighten the lower nut to 120 in-lbs. (14 N•m). Tighten the upper nut to 120 in-lbs. (14 N•m).

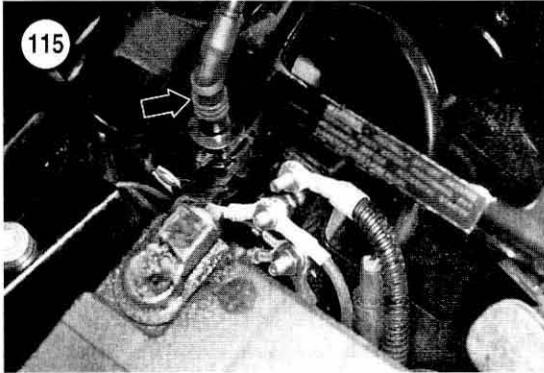
- Tighten the transmission clamp bolt securely.
- On each side, tighten the muffler-to-saddlebag mounting bracket bolts securely.

21. Tighten the Torca clamps to 45-60 ft. lbs. (61-81 N•m) in the following order:

- Crossover pipe-to-left muffler.
- Rear header pipe-to-right muffler.
- Front header pipe-to-rear header pipe.
- Rear header pipe-to-cross over pipe.

22. Tighten the exhaust support bracket nut securely.

23. Open the heat shield clamps completely. Position the clamp so the screw is on the outboard side in the most accessible position. Install the heat shields in the locations marked during removal. Tighten the clamps to 20-40 in-lbs. (2-5 N•m).



24. Check all heat shields to make sure none are touching the frame. If necessary, make slight adjustments to avoid any contact that would transmit vibrations to the rider through the frame.
25. Remove the Bungee cord or rope securing the left side muffler to the saddlebag lower support rail.
26. Start the engine and check for leaks.
27. Install the saddlebags as described in Chapter Fourteen.

### Inspection

1. Replace rusted or damaged exhaust system components.
2. Inspect all pipes for rust or corrosion.
3. Remove all rust from exhaust pipes and muffler mating surfaces.
4. The Torca clamps are not reusable.
5. Replace damaged exhaust pipe retaining rings.
6. Replace worn or damaged heat shield clamps as required.
7. Check the mounting bracket bolts and nuts for tightness.

### EVAPORATIVE EMISSION CONTROL SYSTEM (CALIFORNIA MODELS)

The evaporative emission control system prevents gasoline vapor from escaping into the atmosphere.

When the engine is not running, the system directs the fuel vapor from the fuel tank through the vapor valve and into the charcoal canister. Also, when the engine is not running, the gravity-operated trap door in the air filter backplate blocks the inlet port of the air filter. This prevents hydrocarbon vapors from the carburetor venturi, or fuel injection induction module, from escaping into the atmosphere.

When the engine is running, these vapors are drawn through a purge hose and into the carburetor, or fuel injection induction module, where they burn in the combustion chambers. The vapor valve also prevents gasoline vapor from escaping from the carbon canister if the motorcycle falls onto its side.

Also, when the engine is running, the engine vacuum pulls the air filter backplate trap door open, allowing air to enter.

### Inspection

Refer to **Figure 114** for component placement and hose routing. Before removing the hoses from any of the parts, mark the hose and fitting with a piece of masking tape to identify them.

1. Check all emission control lines and hoses to make sure they are correctly routed and connected.

#### WARNING

*Make sure the fuel tank vapor hoses are routed so they cannot contact hot engine or exhaust components. These hoses contain flammable vapor. If a hose melts from contact with a hot part, leaking vapor may ignite, causing severe motorcycle damage and rider injury.*

2. Make sure there are no kinks in the lines or hoses. Also inspect the hoses and lines routed near engine hot spots for excessive wear or burning.
3. Check the physical condition of all lines and hoses in the system. Check for cuts, tears or loose connections. These lines and hoses are subjected to various temperatures and operating conditions, and eventually become brittle and crack. Replace damaged lines and hoses.
4. Check all components in the emission control system for damage, such as broken fittings.

### Vapor Valve Replacement

The vapor valve (**Figure 115**) is connected to the vent hose between the fuel tank and carbon canister.

1. Remove the seat as described in Chapter Fourteen.
2. Label the hoses at the vapor valve, then disconnect them.
3. Note that one end of the vapor valve is longer than the other end. The longer end must face up to-