

FUEL TRANSFER PUMP

DESCRIPTION

The fuel transfer pump (fuel lift pump) is attached to the rear of the fuel filter/water separator housing. The 12-volt electric pump is operated and controlled by the Engine Control Module (ECM).

OPERATION

The purpose of the fuel transfer pump is to supply (transfer) a low-pressure fuel source: **from** the fuel tank, **through** the fuel filter/water separator and **to** the fuel injection pump. Here, the low-pressure is raised to a high-pressure by the fuel injection pump for operation of the high-pressure fuel injectors. Check valves within the pump, control direction of fuel flow and prevent fuel bleed-back during engine shut down.

Maximum current flow to the pump is 5 amperes.

With the engine running, the pump has a 100 percent duty-cycle.

The transfer pump is self-priming: When the key is first turned on (without cranking engine), the pump will operate for approximately 2 seconds and then shut off. The pump will also operate for up to 25 seconds after the starter is engaged, and then disengaged and the engine is not running. The pump shuts off immediately if the key is on and the engine stops running.

The fuel volume of the transfer pump will always provide more fuel than the fuel injection pump requires. Excess fuel is returned from the injection pump through an overflow valve, and then back to the fuel tank.

REMOVAL

The fuel transfer pump (fuel lift pump) is attached to the rear of the fuel filter/water separator housing (Fig. 23).

(1) Drain fuel from fuel filter housing. Refer to Fuel Filter/Water Separator - Removal. See Draining.

(2) Disconnect electrical connector (Fig. 23) from fuel transfer pump.

(3) Disconnect fuel tank supply line from fuel transfer pump extension line. This is done at disconnection point at inside of left inner frame rail (Fig. 24). Refer to quick-connect fittings for procedures.

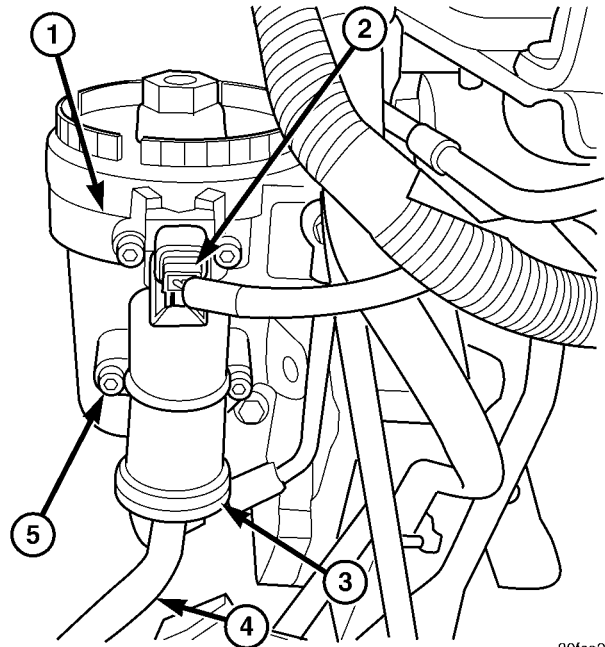
(4) Remove 4 pump mounting bolts (hex-allen), and remove pump from fuel filter housing.

(5) Confirm that transfer pump o-ring is also removed from fuel filter housing.

INSTALLATION

(1) Install a new o-ring to fuel transfer pump.

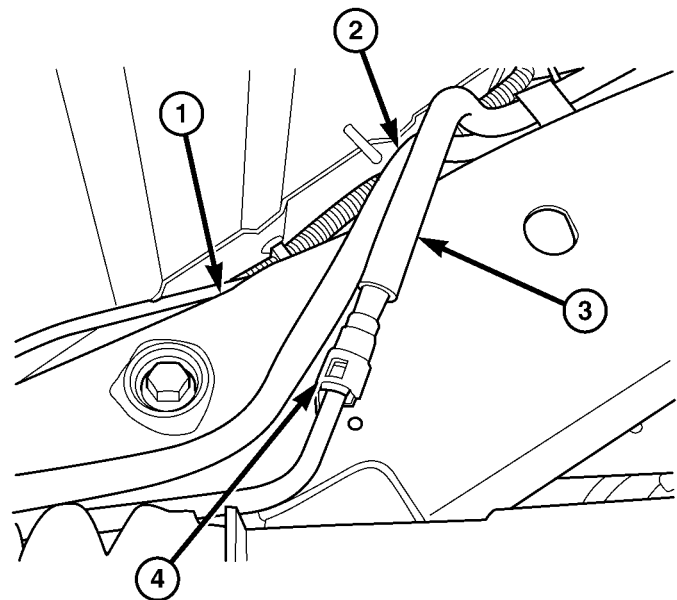
(2) Lubricate o-ring and OD of transfer pump inlet connector.



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Fig. 23 FUEL TRANSFER (LIFT) PUMP

- 1 - FILTER HOUSING
- 2 - ELEC. CONNECTOR
- 3 - FUEL TRANSFER (LIFT) PUMP
- 4 - FUEL LINE EXTENSION
- 5 - MOUNTING BOLTS (4)



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Fig. 24 TRANSFER PUMP FUEL LINE CONNECT

- 1 - LEFT INNER FRAME RAIL
- 2 - FUEL RETURN LINE
- 3 - FUEL SUPPLY LINE
- 4 - QUICK-CONNECT FITTING

FUEL TRANSFER PUMP (Continued)

(3) Position fuel transfer pump onto fuel filter housing. **Do not use mounting bolts to draw transfer pump to filter housing.**

(4) Be sure pump is positioned flat to fuel filter housing. Install mounting bolts and evenly tighten to 7 N-m (61 in. lbs.).

(5) Connect fuel line extension at fuel supply line.

(6) Connect electrical connector to pump.

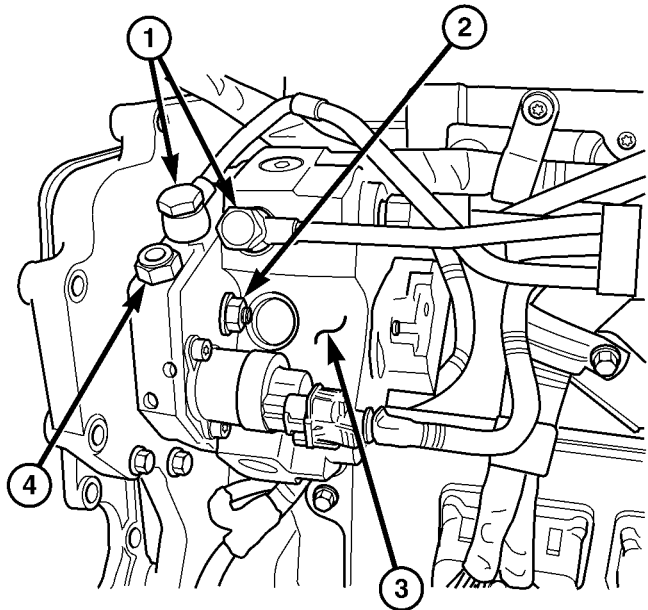
(7) **Prime System:** Cycle key to actuate transfer pump, or use DRB Scan Tool to actuate transfer pump. Check for leaks.

(8) Operate engine and check for fuel leaks.

CASCADE OVERFLOW VALVE

DESCRIPTION

The cascade overflow valve is located on the top/rear side of the fuel injection pump (Fig. 25).



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Fig. 25 OVERFLOW VALVE

- 1 - BANJO BOLTS
- 2 - PUMP MOUNTING NUTS (3)
- 3 - FUEL INJECTION PUMP
- 4 - CASCADE OVERFLOW VALVE

OPERATION

When the fuel control actuator (FCA) is opened, the maximum amount of fuel is being delivered to the fuel injection pump. The cascade valve regulates how much excess fuel is used for lubrication of the injection pump, and is also used to route excess fuel through the drain circuit and back into the fuel tank.

REMOVAL

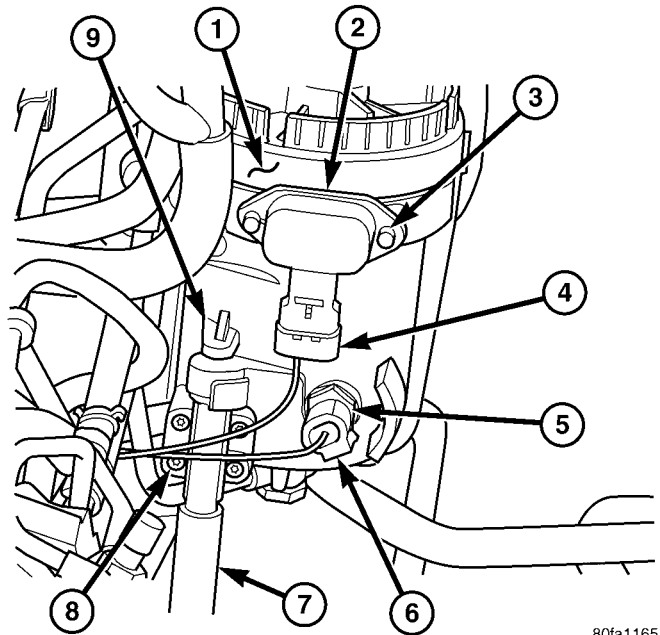
REMOVAL/INSTALLATION

The cascade overflow valve is not serviced separately.

WATER IN FUEL SENSOR

DESCRIPTION

The Water-In-Fuel (WIF) sensor is located on the side of the fuel filter/water separator canister (Fig. 26).



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Fig. 26 FILTER HOUSING

- 1 - FILTER HOUSING
- 2 - FUEL HEATER AND THERMOSTAT
- 3 - FUEL HEATER MOUNTING SCREWS
- 4 - FUEL HEATER ELEC. CONNECTOR
- 5 - WIF SENSOR
- 6 - WIF SENSOR ELEC. CONNECTOR
- 7 - DRAIN HOSE
- 8 - DRAIN VALVE MOUNTING SCREWS
- 9 - DRAIN VALVE

OPERATION

The sensor sends an input to the Engine Control Module (ECM) when it senses water in the fuel filter/water separator. As the water level in the filter/separator increases, the resistance across the WIF sensor decreases. This decrease in resistance is sent as a signal to the ECM and compared to a high water standard value. Once the value reaches 30 to 40 kilohms, the ECM will activate the water-in-fuel warning lamp through CCD bus circuits. This all takes place when the ignition key is initially put in the ON position. The ECM continues to monitor the input while the engine is running.

