

SECTION 10-01A Fuel Tank, Filters, Tubes and Electric Fuel Pump, Gasoline Engines

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VEHICLE APPLICATION

F-150, F-250, F-350, F-Super Duty and Bronco with Gasoline Engines

DESCRIPTION AND OPERATION

Fuel Injected Engines

WARNING: TANK-TO-INJECTOR FUEL INJECTION SUPPLY MANIFOLD REMAIN UNDER HIGH PRESSURE AFTER THE SYSTEM IS SHUT OFF. DEPRESSURIZE THE FUEL INJECTION SUPPLY MANIFOLD AT THE SCHRADER VALVE LOCATED ON THE ENGINE FUEL INJECTION SUPPLY MANIFOLD RAIL BEFORE DISCONNECTING ANY FUEL TUBE. DISCONNECTING FUEL TUBES WITHOUT DEPRESSURIZING THE SYSTEM AS DESCRIBED IN THIS SECTION CAN RESULT IN INJURY FROM FUEL BEING SPRAYED UNDER PRESSURE. ALSO, FUEL SPRAYED UNDER PRESSURE IS AN OBVIOUS FIRE HAZARD.

F-Series and Bronco vehicles are equipped with multipoint fuel injection (MFI) engines (6007). Separate electronically controlled fuel injectors (9F593) are mounted in the intake manifold (9424) on the runner for each cylinder.

Each fuel injector is mounted so that it sprays fuel into the cylinder head intake port of its cylinder. The fuel injectors are supplied fuel under high pressure through an engine-mounted fuel injection supply manifold (9F792) which also has a fuel pressure regulator (9C968). The fuel pressure regulator controls the pressure of fuel going into the fuel injectors and returns excess fuel to the fuel tanks (9002).

For a description of the operation of the fuel injectors and fuel injection supply manifold, refer to Section 03-04A for 4.9L, Section 03-04B for 5.0L and 5.8L, or Section 03-04C for 7.5L.

On all vehicles, a fuel pump (9350) located in a fuel delivery module (FDM) in the fuel tank supplies fuel under high pressure to the fuel injection supply manifold.

All vehicles have an in-line fuel filter (9155) mounted on the frame rail under the vehicle.

DESCRIPTION AND OPERATION (Continued)**Fuel Tank and Fuel Tank Filler Pipe**

All vehicles are equipped with a restricted opening on the fuel tank filler pipes (9034) that allows only a non-leaded fuel nozzle to be inserted.

The fuel tank filler pipe openings for the fuel tanks (9002) on trucks with multiport fuel injection (MFI) engines (6007) have been made smaller to prevent accidental filling with other than unleaded fuel. Gasoline pumps in the United States and Canada dispensing unleaded fuel are equipped with nozzles to accommodate the smaller filler opening on the fuel tank filler pipe.

The restrictor in the fuel tank filler pipe consists of a narrow opening in the fuel tank filler pipe covered by a spring steel trap door. The smaller non-leaded fuel nozzle will fit through the narrow opening and push the trap door aside, allowing normal filling. Leaded fuel nozzles will not fit through the narrow opening. The trap door being closed causes a fuel backup and automatic nozzle shutoff.

The restricted fuel tank filler pipe is manufactured as an assembly, and must be serviced by removal and replacement with a new part. Fuel tank filler pipes are not to be modified in any way.

The fill limiting system is designed to permit an approximate 10-12 percent tank volume air space when the fuel tank is filled to capacity. This air space provides for thermal expansion of fuel as well as being an aid to the in-tank vapor vent system.

Expansion of fuel due to temperature increases or overfilling ("topping off") causes fuel overflow at the fuel tank filler cap (9030) when the vehicle is standing or the fuel tank filler cap is removed. To minimize this condition, it is recommended that the amount of fuel put in the fuel tank when filling be limited to the automatic pump shutoff. If vehicle has two fuel tanks, use fuel from both fuel tanks after fill-up to reduce fuel levels.

Fuel Tank Filler Cap

Refer to Section 03-13.

Fuel Filter, In-Line

The in-line fuel filter (9155) provides filtration to protect the small metering orifices of the fuel injector nozzles. The fuel filter assembly is located on the left frame rail.

NOTE: The fuel filter should be changed at 24,000 km (15,000 miles) or 15-month intervals, and each time a fuel tank sending unit and pump is replaced. When the fuel filter needs to be replaced, proceed to Fuel Filter, In-Line in the Removal and Installation portion of this section.

If the fuel sending unit and pump is replaced, or the fuel system is contaminated with particles, the fuel filter should be replaced. If contamination of fuel is suspected, refill fuel tank (9002) with clean fuel, not fuel from fuel tanks.

Fuel Filter, In-Tank

An in-tank fuel filter is located on the inlet of the venturi pump. The inlet of the venturi pump has a nylon filter on it to prevent dirt and other particulate matter from entering the system. Water in the fuel tank can pass through the filter without restriction.

Fuel Filter, Fuel Injector Screen

An injector filter is located at the top of each injector and is not serviceable. If injector screen becomes clogged, replace the complete injector assembly. Refer to Section 03-04A, Section 03-04B and Section 03-04C for fuel injector information.

Fuel Tubes

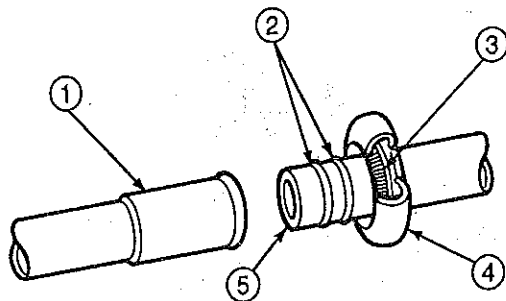
Fuel tubes on all Bronco and F-Series vehicles are steel and Teflon® with braided covering, and use one of two types of quick-connect couplings. Some tubes on vehicles are part of an organizer assembly.

The two types of quick-connect couplings are called push-connect fittings and metal spring lock connectors.

DESCRIPTION AND OPERATION (Continued)

Spring Lock Coupling

Spring lock fittings have a bead formed in one tube which is retained by a garter spring inside a cage on the other tube. Sealing is by O-rings on the cage side. These couplings are connected by pushing the two sides together until the garter spring clicks. They are disconnected by the use of special tools. Connecting and disconnecting instructions are in Removal and Installation, Spring Lock Coupling in this section. This type of connector is used for fuel tube-to-engine fuel manifold connections and sometimes for fuel filter connections.



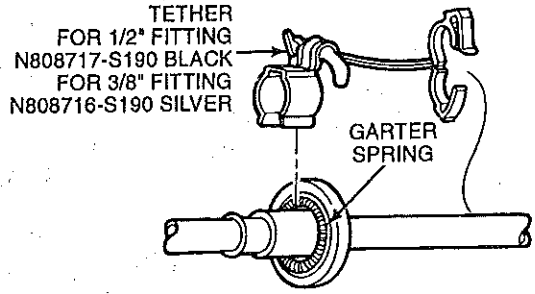
SPRING LOCK COUPLING DISCONNECTED
A16216-B

Item	Part Number	Description
1	—	Female Fitting (Part of 9J338)
2	—	O-Rings (Part of 19D690)
3	—	Garter Spring (Part of 9J338)
4	—	Cage (Part of 9J338)

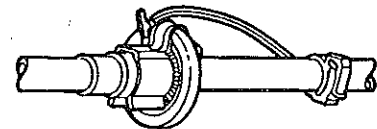
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Item	Part Number	Description
5	—	Male Fittings (Part of 9J338)

A tether is used for additional protection on spring lock connectors. It must be unclipped before disconnecting.



REMOVED



INSTALLED

A16217-B

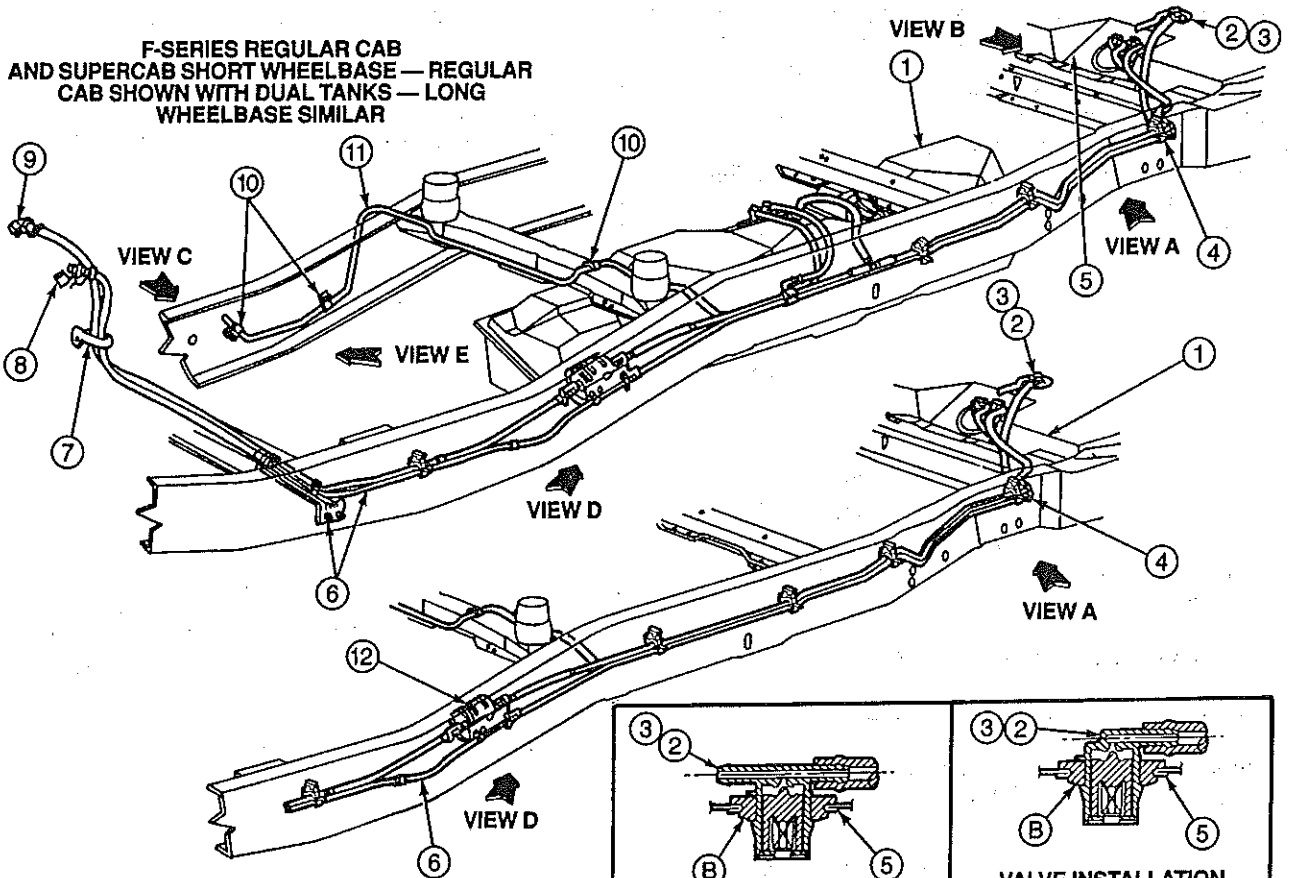
Push-Connect Fitting

Push-connect fittings consist of a tube (with a formed bead), a body, O-rings, retainer and safety retaining clip (redundant). The fittings are disconnected and connected by use of special tools. Instructions are in Push Connect Fittings, Steel in the Removal and Installation portion of this section.

DESCRIPTION AND OPERATION (Continued)

Fuel Tubes, F-150, F-250, F-350, Regular Cab and SuperCab and F-Super Duty Chassis Cab with Dual and Aft-of-Axle Tanks

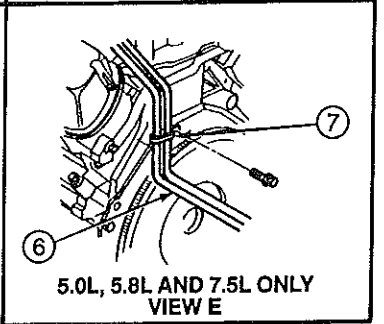
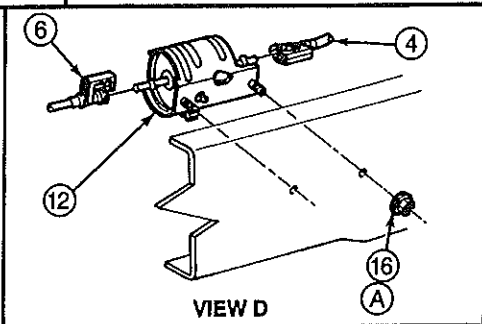
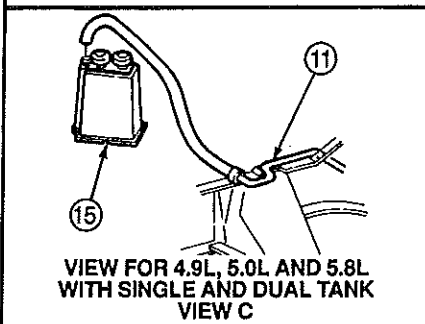
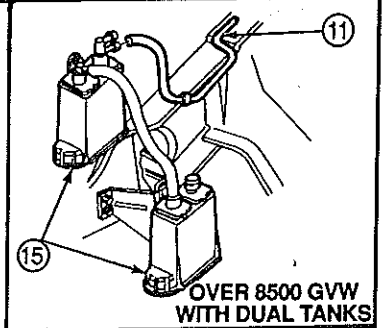
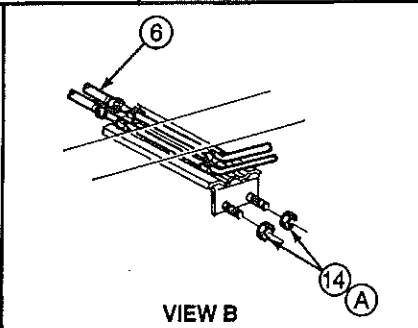
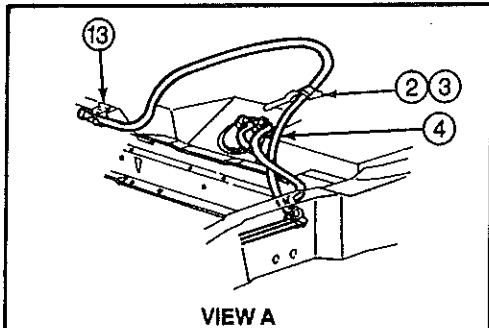
F-SERIES REGULAR CAB AND SUPERCAB SHORT WHEELBASE — REGULAR CAB SHOWN WITH DUAL TANKS — LONG WHEELBASE SIMILAR



F-SERIES REGULAR CAB SHORT WHEELBASE WITH AFT-OF-AXLE TANK SHOWN — LONG WHEELBASE SIMILAR

VALVE INSTALLATION FOR 5.8L AND 7.5L MFI ENGINES SECTION F

VALVE INSTALLATION CHASSIS CAB AFT AXLE TANK WITH 4.9L OR 5.0L ENGINES SECTION F



V7497-C

DESCRIPTION AND OPERATION (Continued)

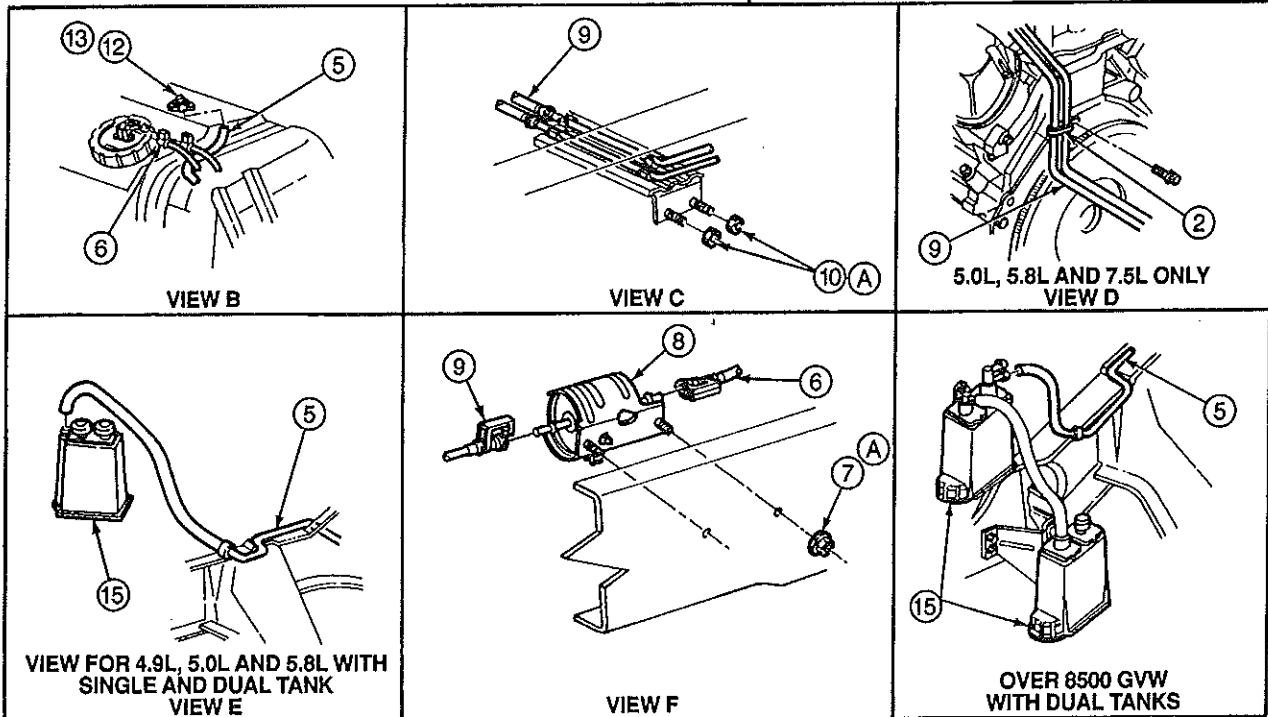
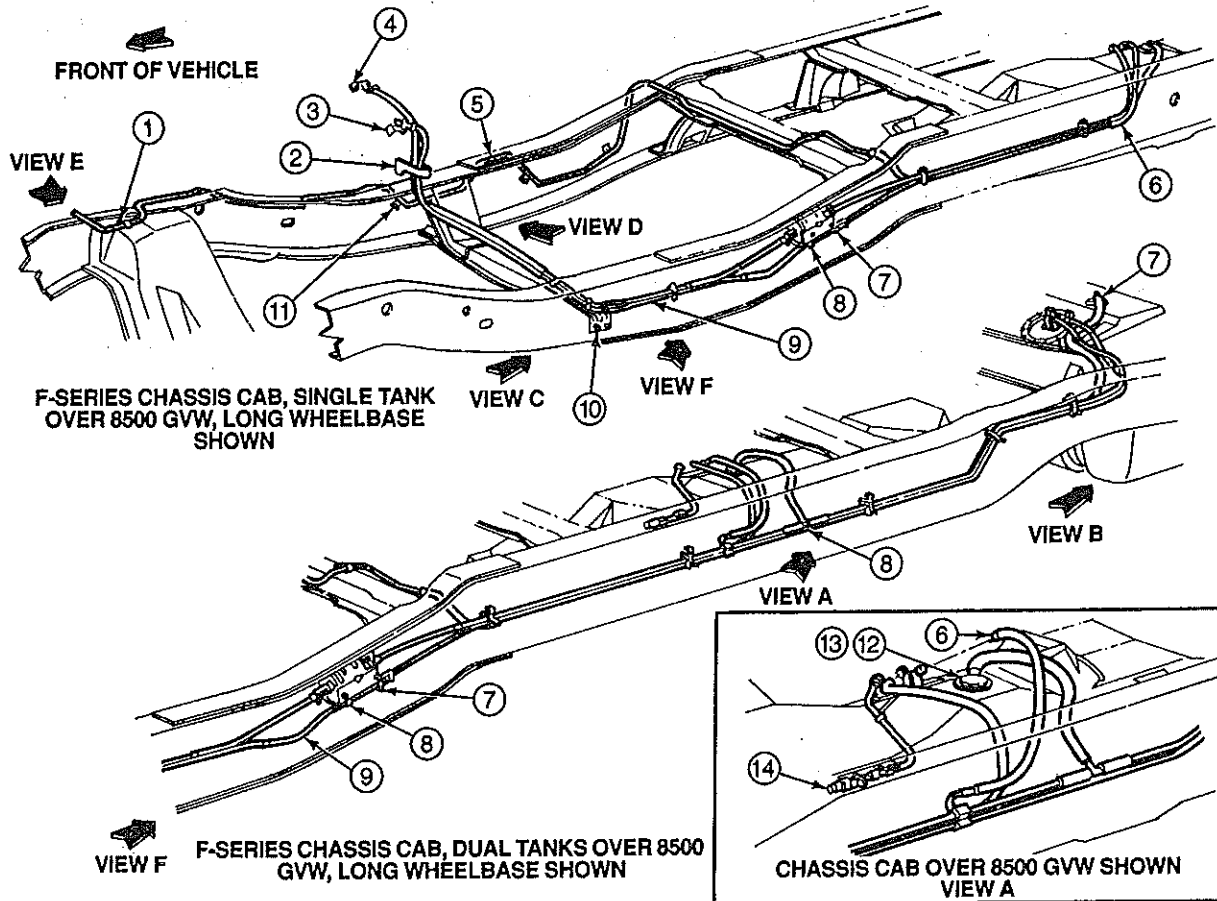
Item	Part Number	Description
1	9002	Fuel Tank
2	9C987	Evaporative Valve Assembly — 4.9L and 5.0L Engines
3	9B227	Evaporative Hose and Valve Assembly — 5.8L and 7.6L Engines
4	9S278	Rear Fuel Tube Assembly
5	9104	Fuel Tank, Aft-of-Axle
6	9J338	Front Fuel Tube Assembly
7	9D319	Fuel Tube Support Bracket
8	N8087 16-S 190	Fuel Tube Supply Connector
9	N8087 17-S 190	Fuel Tube Return Connector

(Continued)

Item	Part Number	Description
10	9F274	Fuel Tube Clip Assembly
11	9C016	Vapor Return Tube and Hose Assembly
12	9A335	Fuel Filter Bracket Assembly
13	370443-S32	Clip
14	N620480-S2	Nut
15	9D653	Fuel Vapor Canister
16	N620480-S2	Nut
A	—	Tighten to 8-10 N·m (71-89 Lb·In)
B	—	Valve Must Be Installed As Shown

DESCRIPTION AND OPERATION (Continued)

Fuel Tubes, F-350 and F-Super Duty Chassis Cab with Single and Dual Tanks



V8235-E

DESCRIPTION AND OPERATION (Continued)

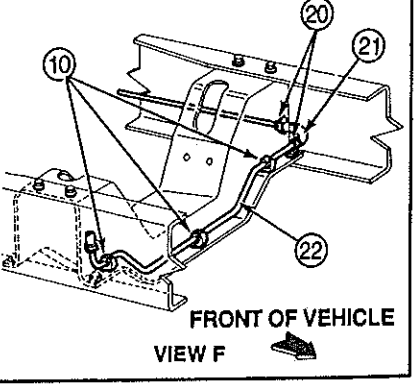
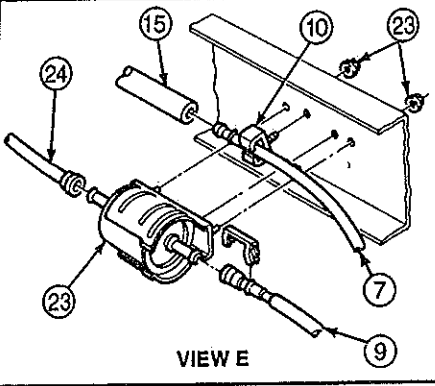
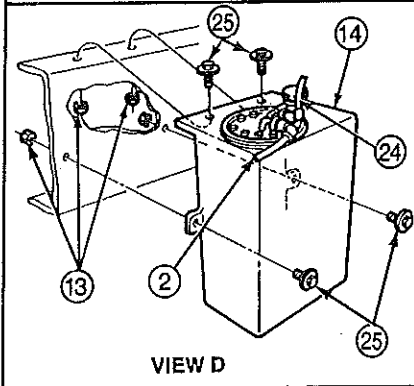
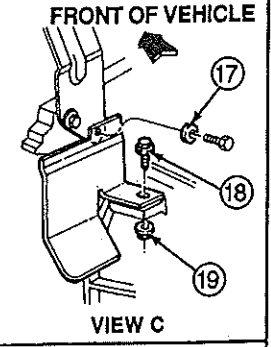
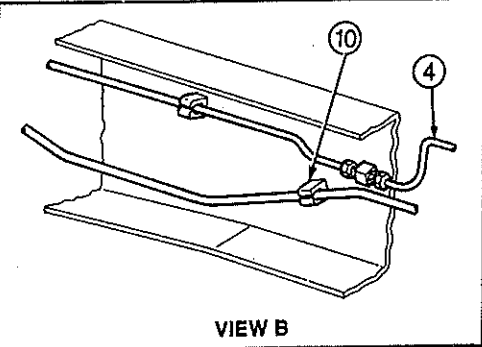
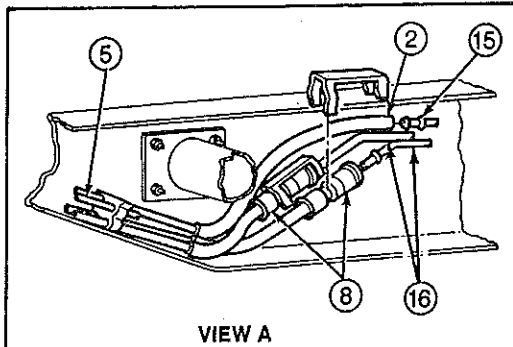
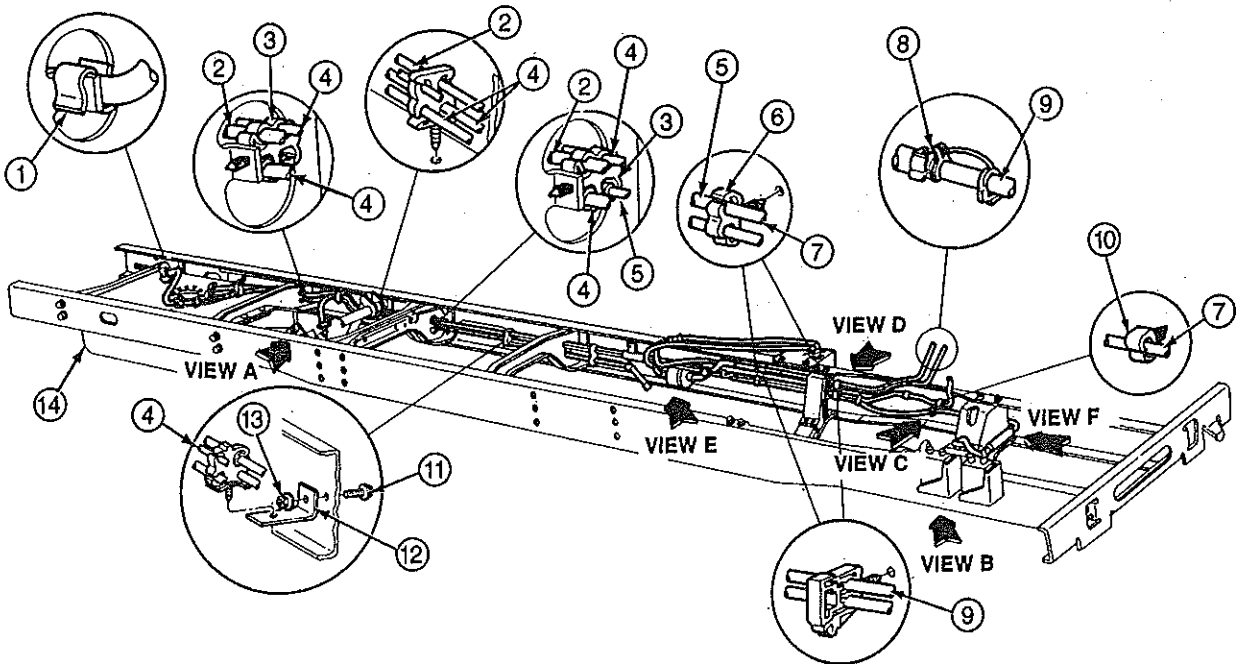
Item	Part Number	Description
1	9F274	Fuel Tube Clip Assembly
2	9D319	Fuel Tube Support Bracket
3	N8087 16-S 190	Fuel Tube Return Connector
4	N8087 17-S 190	Fuel Tube Supply Connector
5	9C016	Vapor Return Tube and Hose Assembly
6	9S278	Rear Fuel Tube Assembly
7	N620480-S2	Nut
8	9A335	Fuel Filter Bracket
9	9J338	Front Fuel Tube Assembly

(Continued)

Item	Part Number	Description
10	N620480-S2	Nut
11	370443-S32	Clip
12	9C987	Evaporation Valve Assembly — 4.9L and 5.0L Engines
13	9B227	Evaporation Hose and Valve Assembly — 5.8L and 7.5L Engines
14	9S303	Fuel Tank Auxiliary Drain Tube Assembly
15	9D653	Fuel Vapor Canister
A	—	Tighten to 8-10 N·m (71-89 Lb-in)

DESCRIPTION AND OPERATION (Continued)

Fuel Tubes, F-Super Duty Motorhome Chassis



V6297-F

Item	Part Number	Description
1	370443-S32	Open Push-On Clip
2	9G291	Rear Fuel Vapor Return Tube
3	9A317	Fuel Tube Clip

(Continued)

Item	Part Number	Description
4	9J337	Rear Fuel Supply and Return Tube
5	2269	Brake Tube

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DESCRIPTION AND OPERATION (Continued)

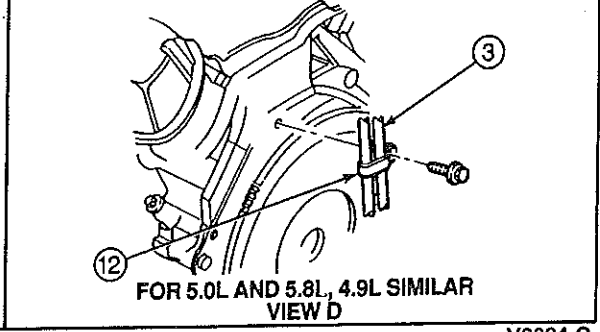
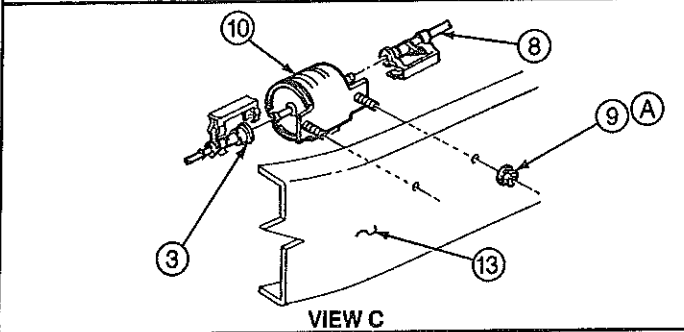
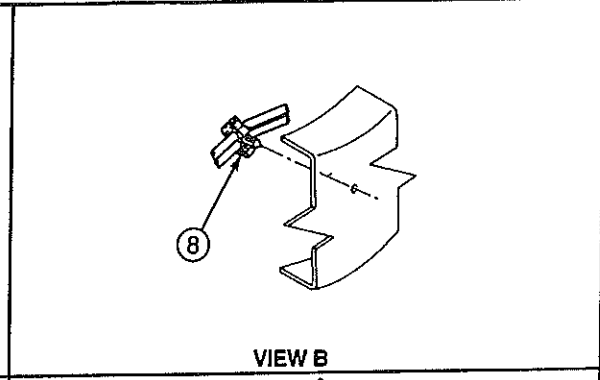
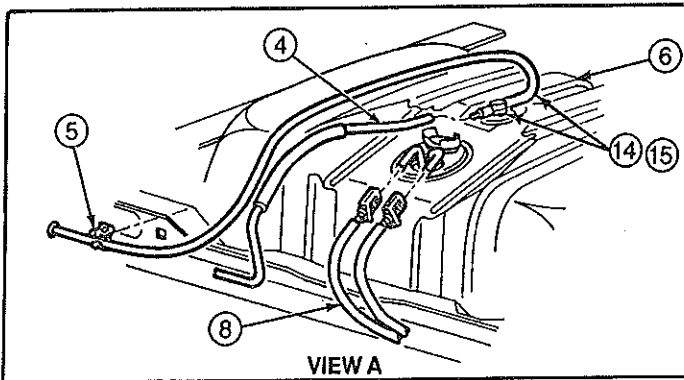
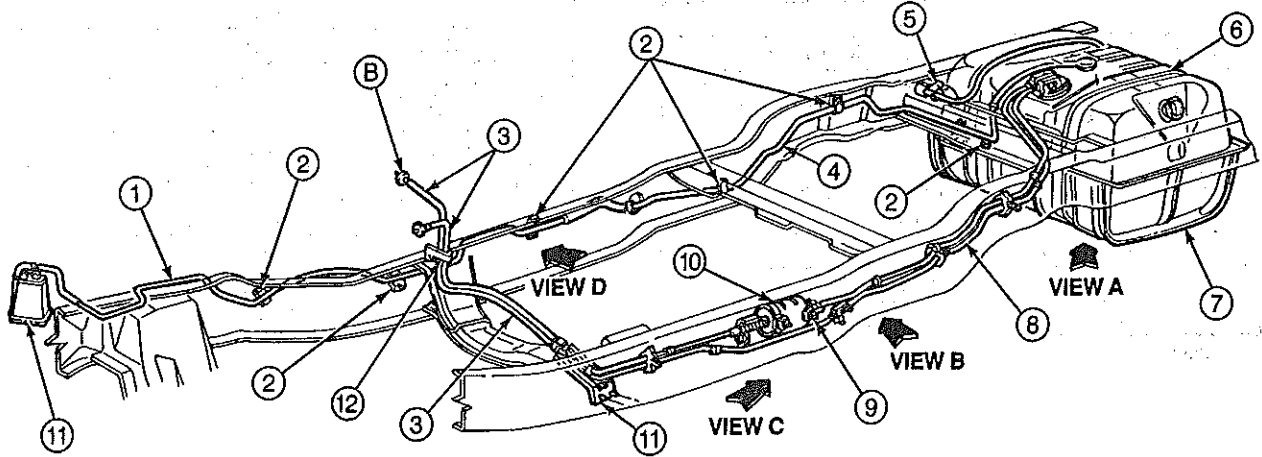
Item	Part Number	Description
6	N802769-S	Clip, Double
7	9291	Fuel Tube
8	N808716-S190	Retainer with Tether
9	9J338	Fuel Rail Tube
10	N802768-S	Clip, Single
11	N605895-S2	Bolt
12	9K337	Fuel Tube Clip Support Bracket
13	N620480-S2	Nut
14	9002	Fuel Tank
15	9B033	Fuel Vapor Tube

(Continued)

Item	Part Number	Description
16	9H334	Dual Fuel Supply and Return Tube
17	44878	Washer
18	9B076	Fuel Vapor Separator Seal
19	N620482-S2	Nut
20	383521-S	Clamp
21	381114	Hose, 3/8-Inch
22	9H336	Front Fuel Tube and Hose
23	9A335	Fuel Filter Bracket
24	9B273	Fuel Filter to Fuel Pump Tube
25	N606678	Bolt

DESCRIPTION AND OPERATION (Continued)

Fuel Tubes, Bronco (Includes Fuel Vapor Lines)



V8684-C

Item	Part Number	Description
1	9C016	Fuel Tank Vapor Tube and Hose Assembly
2	9F274	Clip
3	9J338	Fuel Supply and Return Tube Assembly
4	9C015	Fuel Tank Vapor Tube and Hose Assembly
5	370443-S32	Clip
6	9002	Fuel Tank
7	9053	Fuel Tank Support

Item	Part Number	Description
8	9S278	Rear Tube Assembly
9	N620480-S2	Nut
10	9A335	Fuel Filter Bracket
11	9D653	Fuel Vapor Canister
12	9D319	Front Support Bracket
13	5005	Frame
14	9C987	Fuel Vapor Return Hose and Valve Assembly — 4.9L and 5.0L Engines

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DESCRIPTION AND OPERATION (Continued)

Item	Part Number	Description
15	9B227	Fuel Vapor Return Hose and Valve Assembly — 5.8L Engine

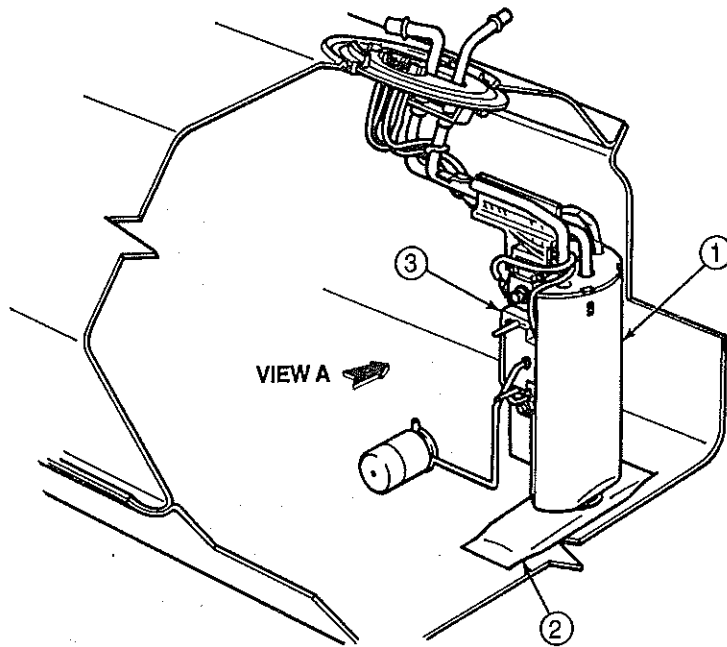
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Item	Part Number	Description
A	—	Tighten to 11-15 N-m (8-11 Lb-Ft)
B	—	To Engine

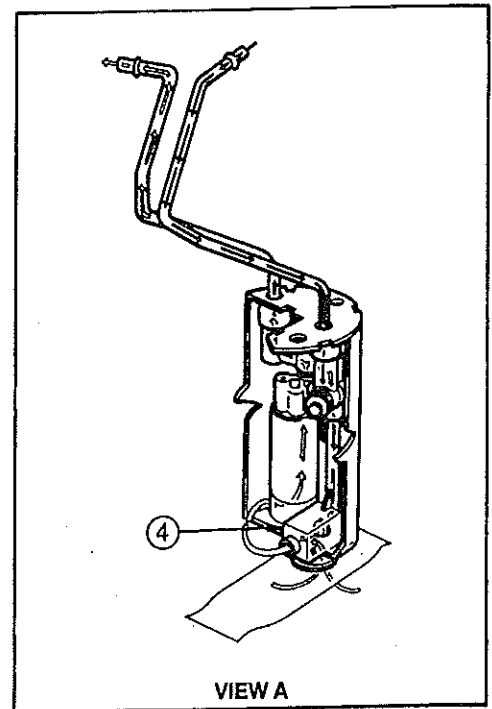
Fuel Pump

The electric fuel delivery system used on the 4.9L, 5.0L, 5.8L and 7.5L multipoint fuel injection (MFI) engines (6007) consists of a fuel delivery module (FDM) and sending unit. The fuel delivery module includes a high-pressure fuel pump (9350), venturi jet pump, supply check valve, and a shuttle selector valve located internally to a reservoir mounted from the fuel tank sender flange.

Fuel Pump Assembly



**HIGH PRESSURE PUMP/RESERVOIR/
SHUTTLE VALVE/SENDER ASSEMBLY**



V7911-D

Item	Part Number	Description
1	—	Fuel Delivery Module (Part of 9H307)
2	—	In-Tank Venturi Filter (Part of 9H307)

(Continued)

Item	Part Number	Description
3	9A299	Resistor Assembly (Part of 9H307)
4	—	High-Pressure Pump (Part of 9H307)

The following provides a brief description and function of each of the fuel delivery module internal components.

The high-pressure fuel pump is located inside the module.

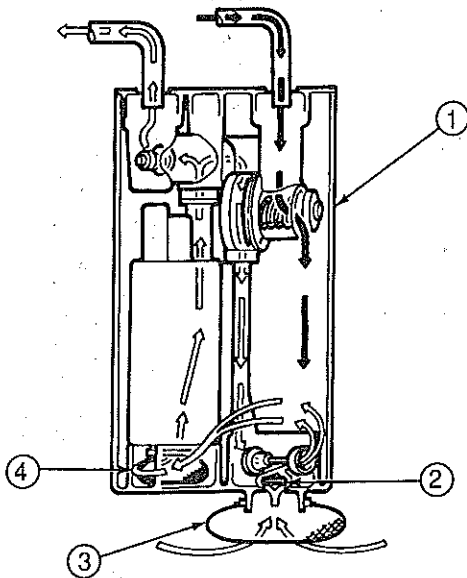
DESCRIPTION AND OPERATION (Continued)

The shuttle selector valve opens the return tube to the tank and the return flow is directed to the appropriate tank on vehicles equipped with dual tanks.

The supply check valve, which is normally closed, opens when the outlet pressure from the energized pump exceeds the opposing check valve spring force. When the fuel pump is de-energized (i.e., engine is shut off), the supply check valve closes to maintain pump prime and fuel supply tube pressure.

A portion of the high-pressure flow from the fuel pump is diverted to operate the venturi jet pump. The venturi-type fuel pump draws fuel from the fuel tank (9002) into the fuel delivery module reservoir to augment the engine return flow. This process ensures an adequate fuel supply to the fuel pump during extreme vehicle maneuvers and steep vehicle altitudes with low-tank fill levels.

The inlet of the venturi pump has a nylon filter on it to prevent dirt and other particulate matter from entering the system. Water in the fuel tank can pass through the filter without restriction.



FDM COMPONENTS AND FLOW PATH

V7913-D

Item	Part Number	Description
1	—	Fuel Delivery Module (Part of 9H307)
2	—	Supply Check Valve (Part of 9H307)
3	—	Venturi Filter Screen (Part of 9H307)

(Continued)

Item	Part Number	Description
4	—	Pump Filter Screen (Part of 9H307)

The in-tank mounted fuel delivery module containing the fuel pump is capable of supplying 105 liters (27.7 gallons) of fuel per hour at a working pressure of 270.0 kPa (39 psi) for the 5.0L, 5.8L and 7.5L MFI engines. The fuel delivery module can supply 90 liters (23.7 gallons) per hour at 380 kPa (55 psi) for the 4.9L SFI engine. The fuel pump has an internal pressure relief valve to provide over-pressure protection in the event the fuel flow becomes restricted. Over-pressure is restricted to 850 kPa (123 psi) and reduced fuel flow will result. The system pressure is controlled by a fuel pressure regulator (9C968) on the engine.

Fuel Pressure Regulator

Refer to Section 03-04A, Section 03-04B or Section 03-04C.

Fuel Gauge

Refer to Section 13-01 in the Body, Chassis Manual.

Fuel Tank Sending Unit

When the Ignition switch (11572) is turned to the ON position, the Electronic Engine Control (EEC) power relay is energized and provides power to both the fuel pump relay and a timing device in the powertrain control module (PCM)(12A650). Fuel pump power is provided through the contacts of the fuel pump relay and the inertia fuel shutoff switch. If the ignition switch is not turned to the START position within approximately one second, the timing device in the powertrain control module will open the ground circuit (No. 97 T/LG) to the fuel pump relay. Opening the ground circuit de-energizes the fuel pump relay (opening its contacts), which de-energizes the fuel pumps. This circuitry pressurizes the fuel system.

When the Ignition switch is turned to the START position, the powertrain control module energizes the fuel pump relay to provide fuel while cranking.

After the engine (6007) starts, the ignition switch is returned to the RUN position, the power to the fuel tank sending unit and pump is supplied through the fuel pump relay. The powertrain control module senses speed and shuts off the fuel pump by opening the ground circuit (No. 97 T/LG) to the fuel pump relay if the engine stops or engine speed drops below 120 rpm.

DESCRIPTION AND OPERATION (Continued)**Inertia Fuel Shutoff (IFS) Switch**

WARNING: IF YOU SEE OR SMELL GASOLINE AT ANY TIME OTHER THAN DURING FUELING, DO NOT RESET THE INERTIA FUEL SHUTOFF SWITCH.

CAUTION: Do not reset the inertia fuel shutoff switch until the complete fuel system has been inspected for leaks.

In the event of a collision, the electrical contacts in the inertia fuel shutoff switch open and the fuel pump (9350) automatically shuts off. The fuel pump will shut off even if the engine (6007) does not stop running. The engine, however, will stop a few seconds after the fuel pump stops. It is not possible to restart the engine until the inertia fuel shutoff switch is manually reset.

To reset the inertia fuel shutoff switch, depress the button on top of the inertia fuel shutoff switch.

Switch Location

The inertia fuel shutoff switch is on the right cowl panel just forward of the door below the instrument panel.

DIAGNOSIS AND TESTING**Fuel Tank, Filters, Tubes and Electric Fuel Pump**

Refer to the Powertrain Control/Emissions Diagnosis Manual.¹

REMOVAL AND INSTALLATION**Fuel Draining**

Use appropriate adapter to connect Rotunda Fuel Storage Tanker 164-R3201 or equivalent suction pump, to the fuel hose (at the fuel pump to fuel tube connection) and drain the fuel tank (9002).

Fuel Filling

The fuel tank filler pipe (9034) openings for the fuel tanks (9002) on trucks with multipoint fuel injection (MFI) engines (6007) have been made smaller to prevent accidental filling with other than unleaded fuel. Gasoline pumps in the United States and Canada dispensing unleaded fuel are equipped with nozzles to accommodate the smaller filler opening on the filler neck.

Expansion of fuel due to temperature increases, or overfilling ("topping off") causes fuel overflow at the fuel tank filler cap (9030) when the vehicle is standing or the fuel tank filler cap is removed. To minimize this condition, it is recommended that the amount of fuel put in the fuel tank when filling be limited to the automatic pump shutoff. If vehicle has two fuel tanks, use fuel from both fuel tanks after fill-up to reduce fuel levels.

Fuel Tank, Steel Midship, F-150, F-250, F-350 and F-Super Duty

NOTE: As there are different midship fuel tanks (9002) which are removed and installed essentially the same way, follow steps and refer to appropriate illustration for details.

Removal

- NOTE:** When the battery (10655) is disconnected and reconnected, some abnormal drive symptoms may occur while the powertrain control module (PCM)(12A650) relearns its adaptive strategy. The vehicle may need to be driven 16 km (10 miles) or more to relearn the strategy.
Disconnect battery ground cable (14301).
- Using Rotunda Fuel Storage Tanker 164-R3201 or equivalent, drain fuel tank. Drain both fuel tanks on dual-tank vehicles.
- Raise vehicle on hoist.
- If equipped with skid plate, remove fasteners and remove skid plate assembly.
- Loosen clamps and disconnect fuel tank filler pipe (9034) and vent hose at fuel tank.
- Position suitable jack under fuel tank.
- Remove nuts and bolts and lower fuel tank support straps (9092). If necessary, turn fuel tank support strap approximately 30 degrees and remove.
- Lower fuel tank enough to gain access to fuel connections.
- Disconnect electrical connector from fuel tank sending unit and pump.
- Disconnect fuel vapor hose(s) from port valve(s). If equipped, remove vent hose from clip on frame (5005).
- Disconnect fuel supply and return tubes according to Push-Connect Fittings, Steel in the Removal and Installation portion of this section.
- Remove fuel tank from vehicle.

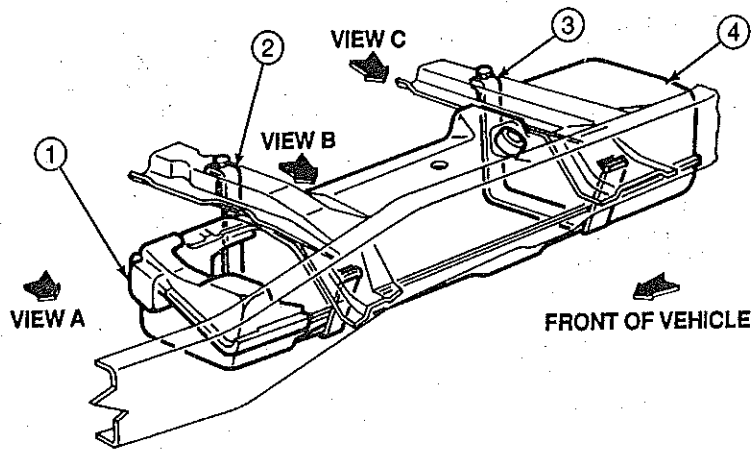
Installation

- Follow removal procedures in reverse order.
- Tighten fasteners to specifications.

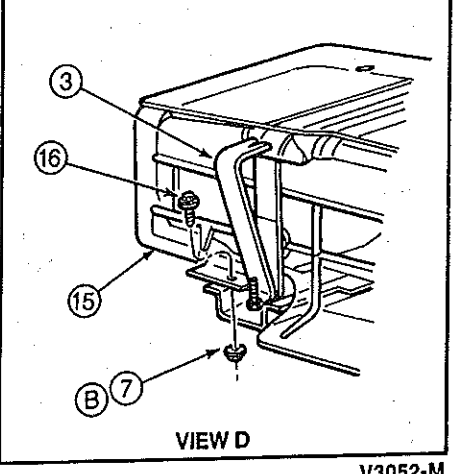
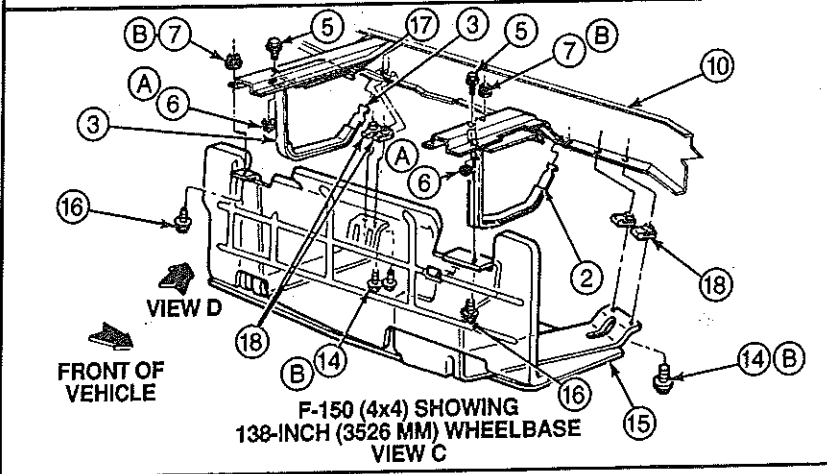
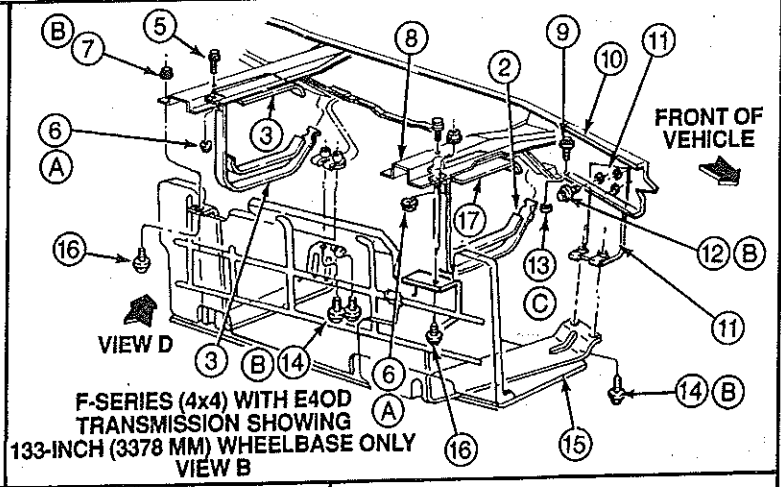
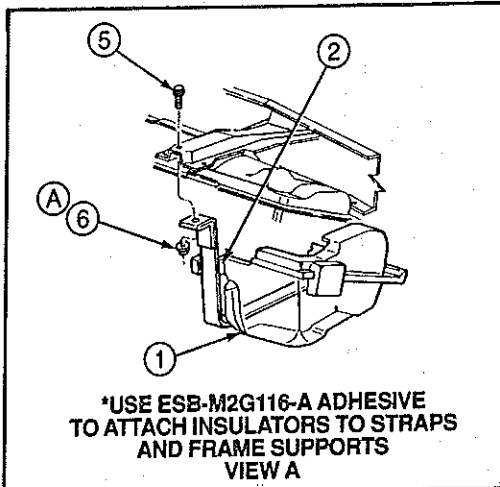
¹ Can be purchased as a separate item.

REMOVAL AND INSTALLATION (Continued)

Midship Fuel Tank Installation, F-150, F-250, F-350 and F-Super Duty Chassis Cab, 116- and 138-Inch Wheelbase



MAIN VIEW



V3052-M

Item	Part Number	Description
1	9K014	Shield Assembly
2	9092	Fuel Tank Support Straps, Front

(Continued)

Item	Part Number	Description
3	9057	Fuel Tank Support Strap, Rear
4	9002	Fuel Tank
5	N802253-S2	Bolt

(Continued)

REMOVAL AND INSTALLATION (Continued)

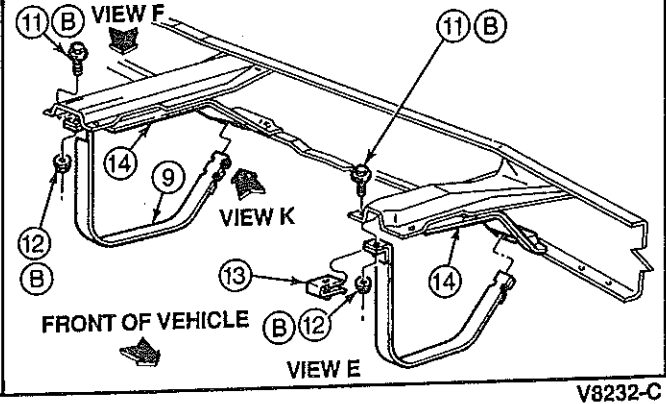
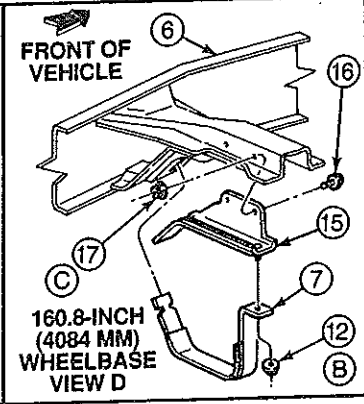
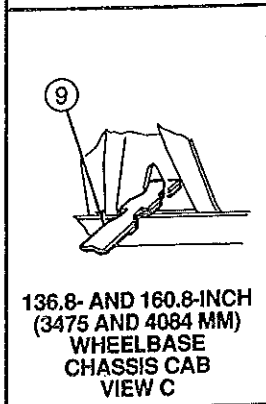
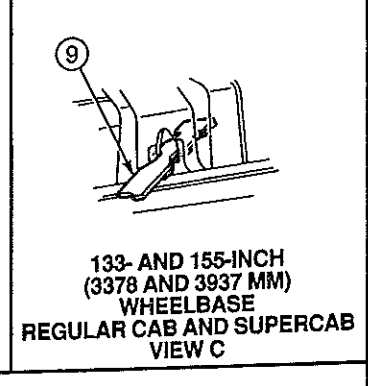
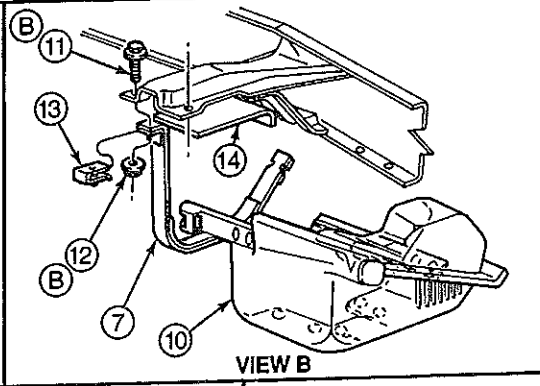
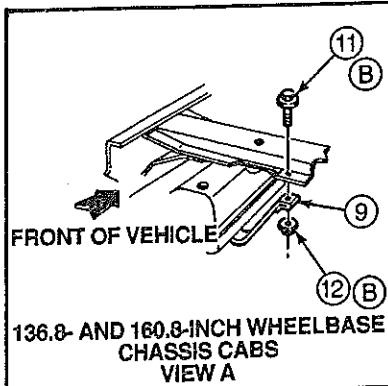
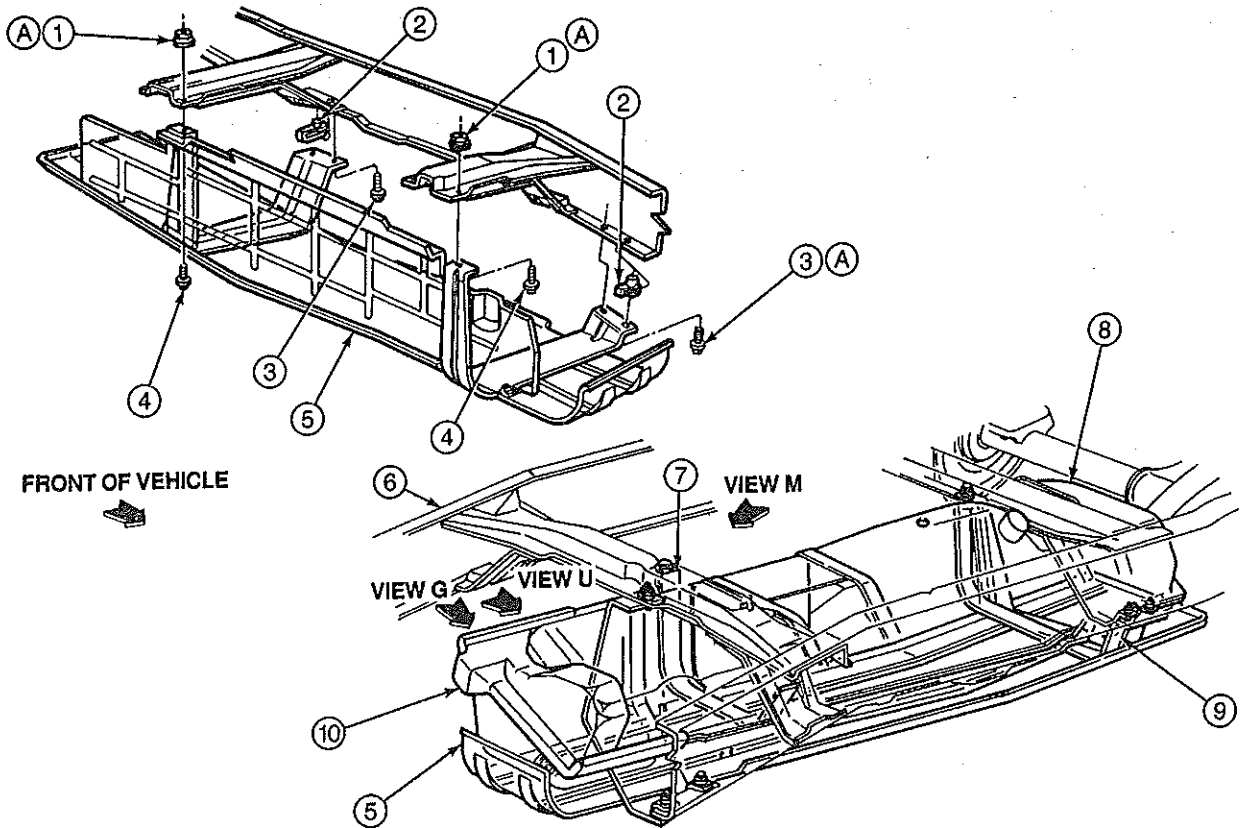
Item	Part Number	Description
6	N620481-S	Nut
7	N620481-S2	Nut
8	9061	Crossmember
9	N605919-S2	Bolt
10	5005	Frame
11	9C038	Bracket
12	N605906-S2	Bolt
13	N620482-S56	Nut
14	N605906-S2	Bolt

(Continued)

Item	Part Number	Description
15	9A147	Skid Plate Heat Shield
16	N605906-S20	Bolt
17	9240	Insulator, Upper
18	N804340-S2	U-Nut
A	—	Tighten to 30-40 N·m (22-30 Lb·Ft)
B	—	Tighten to 16-24 N·m (12-17 Lb·Ft)
C	—	Tighten to 34-46 N·m (25-34 Lb·Ft)

REMOVAL AND INSTALLATION (Continued)

Midship Fuel Tank Installation, F-150, F-250, F-350 and F-Super Duty Chassis Cab



V8232-C

REMOVAL AND INSTALLATION (Continued)

Item	Part Number	Description
1	N620481-S2	Nut
2	N804340-S2	U-Nut
3	N605906-S2	Bolt
4	N605906-S2	Bolt
5	9A148	Skid Plate
6	5005	Frame
7	9092	Fuel Tank Support Strap, Front
8	9002	Fuel Tank
9	9092	Fuel Tank Support Strap, Rear
10	9K014	Shield

(Continued)

Item	Part Number	Description
11	N802253-S2	Bolt
12	N620482-S2	Nut
13	N801107-S100	U-Nut
14	9240	Insulator, Upper
15	9065	Bracket
16	N605906-S2	Bolt
17	N620481-S2	Nut
A	—	Tighten to 16-24 N·m (12-17 Lb·Ft)
B	—	Tighten to 30-40 N·m (22-30 Lb·Ft)
C	—	Tighten to 22-28 N·m (17-21 Lb·Ft)

Fuel Tank, Aft-of-Axle, F-150, F-250, F-350 and F-Super Duty**Removal**

CAUTION: Care must be taken when installing the fuel tank (9002) to make sure the fuel tubes do not become kinked.

1. Raise the rear of the vehicle.
2. NOTE: When the battery (10655) is disconnected and reconnected, some abnormal drive symptoms may occur while the powertrain control module (PCM)(12A650) relearns its adaptive strategy. The vehicle may need to be driven 16 km (10 miles) or more to relearn the strategy.

To avoid electrical sparking at the fuel tank, disconnect battery ground cable (14301). Then disconnect the connector from fuel tank sending unit and pump near the fuel tank.

3. Using Rotunda Fuel Storage Tanker 164-R3201 or equivalent, drain fuel tank. Drain both fuel tanks on dual tank vehicles.
4. Disconnect the fuel tube push-connect fittings at the fuel tank sending unit and pump, according to instructions in Push-Connect Fittings, Steel in the Removal and Installation portion of this section.
5. Loosen the clamp on the fuel tank filler pipe (9034). Disconnect the fuel tank filler pipe by pulling along the rubber inner tube from the filler neck.
6. If removing the metal-type fuel tank, support the fuel tank and remove the bolts attaching the fuel tank support strap (9092) to the frame (5005). Carefully lower the fuel tank and disconnect the vent tube(s) from the vapor emission control valve in the top of the fuel tank. Finish removing the fuel tank filler pipe and fuel tank filler pipe vent hose if not possible in Step 5. Remove the fuel tank from under the vehicle.

7. If removing the plastic-type fuel tank, support the fuel tank and remove the bolts attaching the combination skid plate and tank support to the frame. Carefully lower the fuel tank and disconnect the vent tube(s) from the vapor emission control valve in the top of the fuel tank. Complete removing the fuel tank filler pipe if not possible in Step 5. Remove the skid plate and fuel tank from under the vehicle. Disassemble the skid plate from the tank.

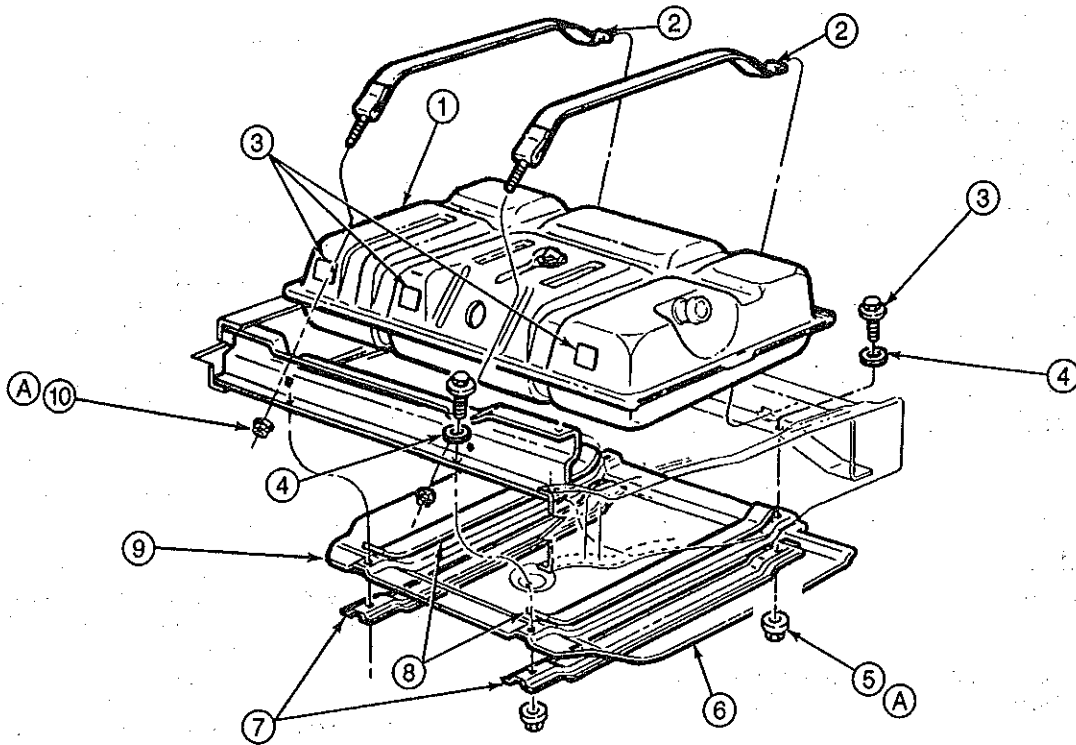
Installation

1. Follow removal procedures in reverse order.
2. **CAUTION:** The frame crossmember in front of the tank is narrower at the center to provide clearance for the fuel tubes. Be sure the tubes cross this portion of the crossmember on reinstallation to prevent damage to the tubes and restriction of fuel flow.

Grasp the three hoses about 300mm (12 inches) forward of the crossmember. Hold the hoses taut while installing the fuel tank. This will prevent the fuel tubes from becoming kinked, which will cause restricted fuel flow.
3. Use a thread adhesive (such as Loctite® or equivalent) on metal fuel tank attaching nuts and bolts. Tighten all fasteners to specifications.

REMOVAL AND INSTALLATION (Continued)

Steel Aft-of-Axle Tank Installation, F-150, F-250, F-350, 116-, 113-, 138- and 115-Inch Wheelbase



V3201-M

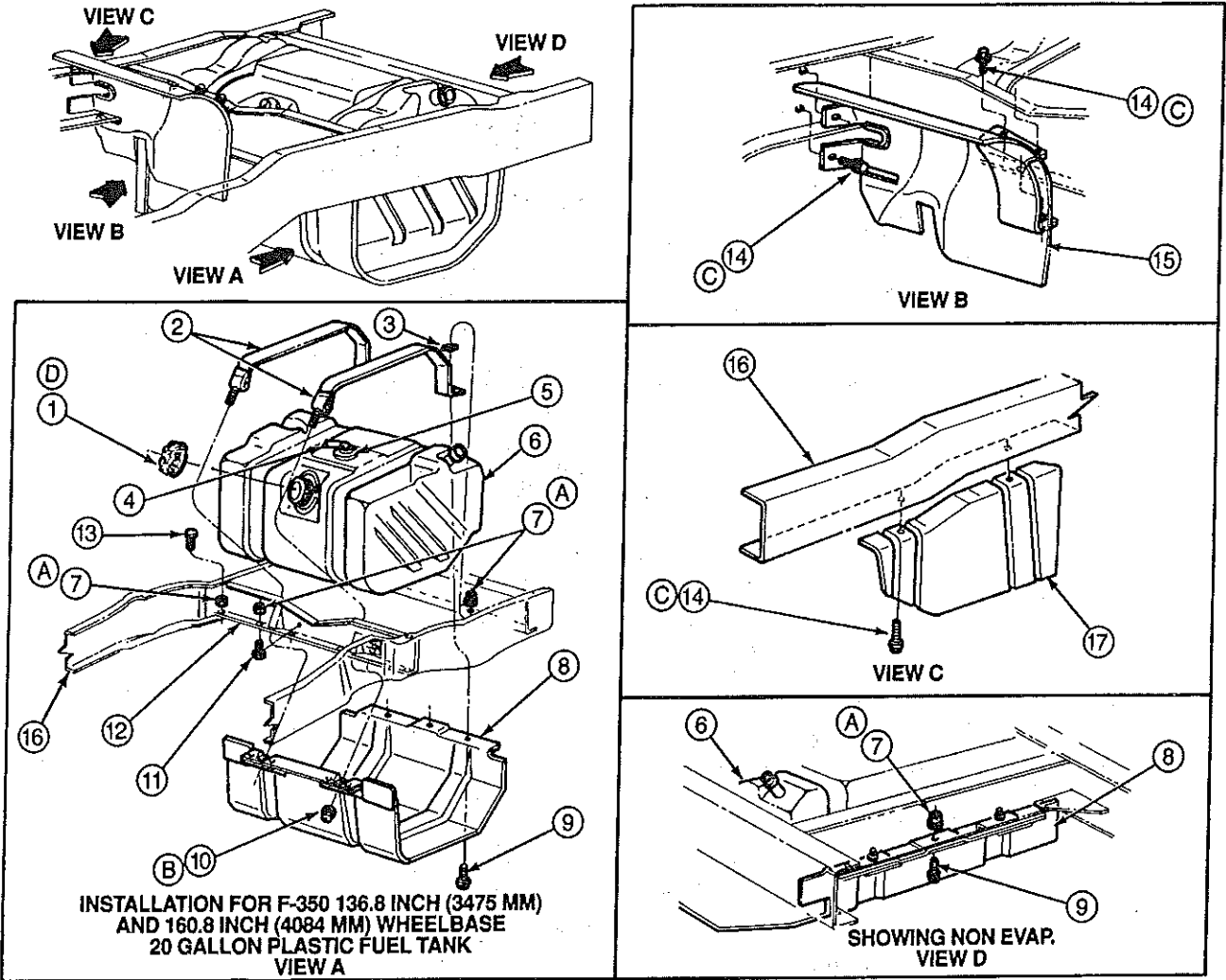
Item	Part Number	Description
1	9002	Fuel Tank
2	9092	Fuel Tank Support Strap
3	N801380-S100	Bolt
4	382873-S2	Washer
5	N620482-S2	Nut
6	9C045	Stone Shield (LH)

Item	Part Number	Description
7	9053	Fuel Tank Support
8	9240	Insulator
9	9K015	Stone Shield (RH)
10	34976-S362	Nut
A	—	Tighten to 34-46 N·m (25-34 Lb·Ft)

(Continued)

REMOVAL AND INSTALLATION (Continued)

Plastic Aft-of-Axle Tank Installation, F-350, 136.8- and 160.8-Inch Wheelbase



V3057-Q

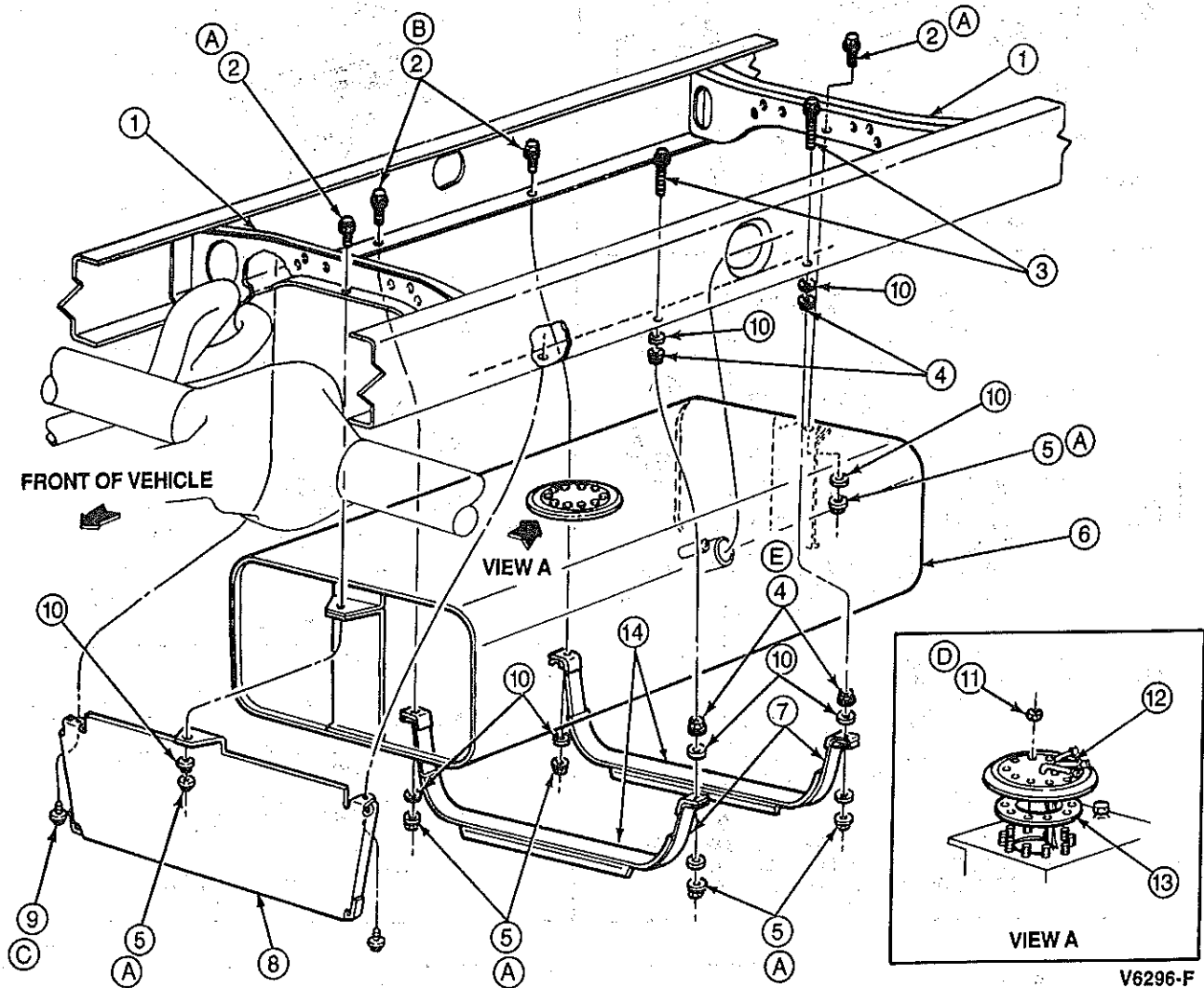
Item	Part Number	Description
1	9C385	Fuel Pump Locking Retainer Ring
2	9092	Fuel Tank Support Strap
3	W623484-S2	Spring Washer
4	9B227	Hose and Valve Assembly
5	9B076	Seal
6	9002	Fuel Tank
7	N620482	Nut, M10-1.5
8	9A148	Skid Plate
9	N605920-S2	Bolt, M10-1.5
10	379930-S2	Nut
11	56741	Bolt, M10-1.5
12	5037	Crossmember

Item	Part Number	Description
13	N605801-S2	Bolt
14	40949-S2	Screw
15	9A032	Shield
16	5005	Frame
17	9B100	Shield
A	—	Tighten to 34-46 N·m (25-34 Lb·Ft)
B	—	Tighten to Expose Thread Length 16-18mm (0.63-0.70 Inch)
C	—	Tighten to 10-14 N·m (8-10 Lb·Ft)
D	—	Tighten to 53-72 N·m (39-53 Lb·Ft)

(Continued)

REMOVAL AND INSTALLATION (Continued)

Fuel Tank, Aft-Of-Axle, F-Super Duty Motorhome Chassis
Aft-of-Axle 75-Gallon Tank



V6296-F

Item	Part Number	Description
1	5C054	Crossmember
2	N802114-S2	Bolt
3	N800898-S2	Bolt
4	N808660-S100	Nut
5	N804446-S160	Nut
6	9002	Fuel Tank
7	9092	Fuel Tank Support Straps
8	9B007	Fuel Tank Shield (RH Exhaust Only)
9	W611636-S2	Screw
10	N801616-S	Washer
11	N805320-S36	Nut

Item	Part Number	Description
12	9H307	Fuel Tank Sending Unit and Pump
13	9276	Fuel Level Sensor Gasket
14	9240	Fuel Tank Insulator
A	—	Tighten to 60-96 N·m (44-70 Lb·Ft)
B	—	Tighten to 60-90 N·m (44-67 Lb·Ft)
C	—	Tighten to 20-30 N·m (15-22 Lb·Ft)
D	—	Tighten to 7.5-9.5 N·m (67-84 Lb·In)
E	—	Allow 6mm (0.23 Inch) Gap

(Continued)

REMOVAL AND INSTALLATION (Continued)**Fuel Tank, Aft-of-Axle, Bronco****Removal**

1. NOTE: When the battery (10655) is disconnected and reconnected, some abnormal drive symptoms may occur while the powertrain control module (PCM)(12A650) relearns its adaptive strategy. The vehicle may need to be driven 16 km (10 miles) or more to relearn the strategy.

To avoid electrical sparking at the fuel tank (9002), disconnect battery ground cable (14301).

2. Using Rotunda Fuel Storage Tanker 164-R3201 or equivalent, drain fuel tank.
3. Raise the rear of the vehicle.
4. Loosen the clamp on the fuel filler pipe hose at the fuel tank filler pipe (9034) and disconnect the hose from the fuel tank filler pipe by pulling along the internal fuel tube from the tank filler neck.
5. Disconnect fuel tank sending unit and pump connector.
6. Disconnect fuel tube push-connect fittings and fuel vapor tubes as outlined in Push-Connect Fittings, Steel in the Removal and Installation portion of this section.

7. Support the fuel tank and remove the fuel tank support bracket bolts or skid plate bolts. Remove the fuel tank support (9053) or skid plate attaching nut at each tank mounting fuel tank support strap (9092). Lower the fuel tank supports, and lower the fuel tank enough to gain access to the fuel tank vent hose.
8. Remove the fuel tank from under the vehicle.

Installation

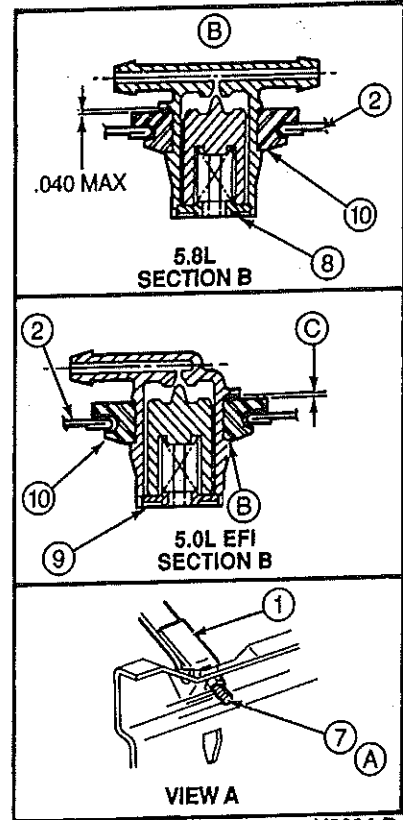
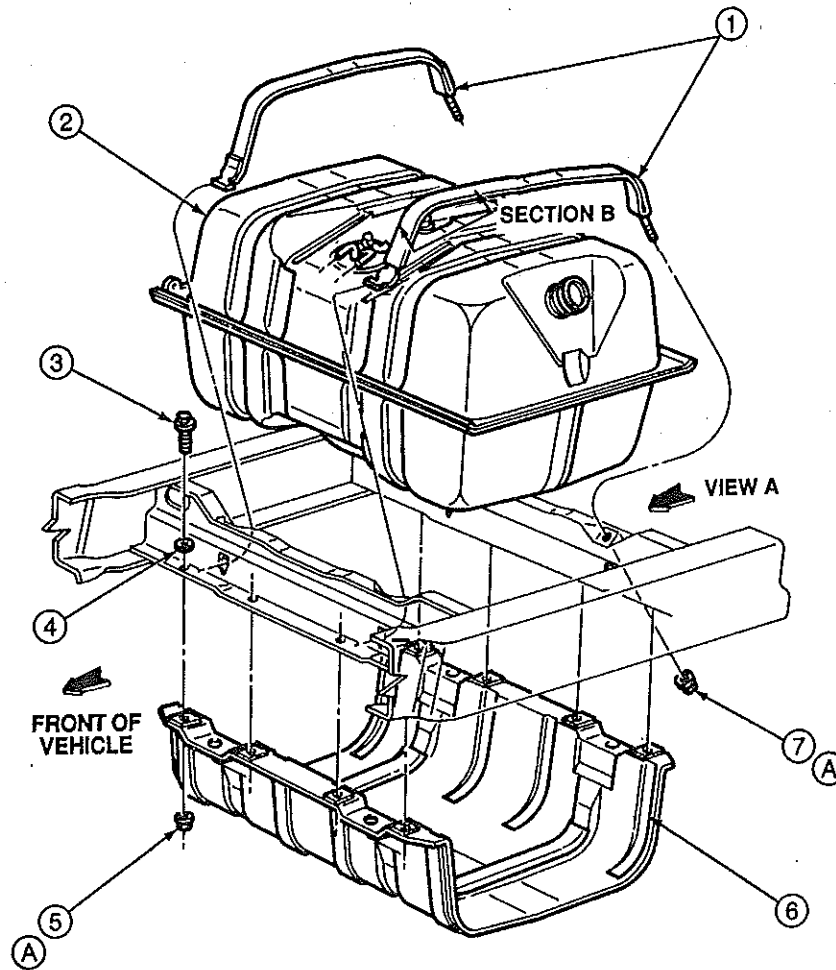
1. Follow removal procedures in reverse order.
2. Tighten all fasteners to specifications.

Fuel Tank Support Straps

Refer to Removal and Installation, Fuel Tank (select appropriate configuration and tank location), in this section.

REMOVAL AND INSTALLATION (Continued)

Aft-of-Axle Fuel Tank Installation, Bronco (4x4)



V8234-D

Item	Part Number	Description
1	9092	Fuel Tank Support Strap
2	9002	Fuel Tank
3	N801380-S100	Bolt
4	382873-S2	Washer
5	N620482-S2	Nut
6	9053	Fuel Tank Support
7	34976-S36	Nut
8	9B227	Hose and Valve Assembly, Fuel Vapor Return — 5.8L Engine

Item	Part Number	Description
9	9C987	Hose and Valve Assembly, Fuel Vapor Return — 5.0L Engine
10	9B076	Seal, Separator Fuel Vapor
A	—	Tighten to 34-46 N·m (25-34 Lb·Ft)
B	—	Valve Must Be Installed As Shown and Fully Seated
C	—	1.0mm (.040 Inch) Maximum

(Continued)

Fuel Tank Filler Pipe, F-150, F-250, F-350, Bronco Cutaway and Commercial Chassis

Procedures are the same for the aft-of-axle and midship fuel filler pipe.

REMOVAL AND INSTALLATION (Continued)

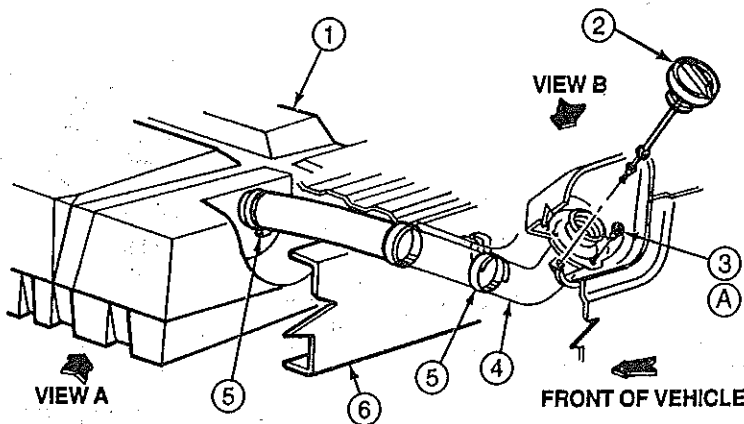
Removal

1. Drain fuel to a level (approximately 3/4 full) below the fuel tank filler pipe connection by using the fuel hose at the fuel pump-to-fuel tube connection.
2. Detach fuel tank filler pipe (9034) from support bracket and disconnect fuel tank filler pipe and vent hoses.
3. Loosen clamp attaching fuel tank filler pipe and disconnect hose from the fuel tank filler pipe, pulling the internal fuel tube from tank filler neck.
4. Remove the three retainer screws that attach the fuel tank filler pipe flange to the fuel filler housing.
5. Remove fuel tank filler pipe from vehicle.
6. Remove hose and clamps. Replace all damaged or worn parts.

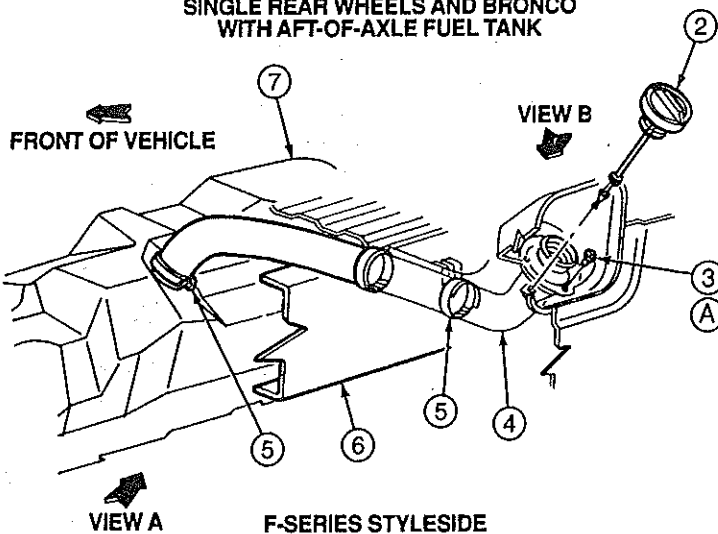
Installation

1. Position fuel tank filler pipe in vehicle, being careful to position neck on vehicles with internal vent tube.
2. Position fuel filler vent hoses on fuel tank filler pipe of vehicles with external vent hose.
3. Position clamps on fuel tank filler pipe and vent hoses.
4. Secure fuel tank filler pipe to mounting brackets. Tighten screws to 2-3 N·m (15-25 lb-in).
5. Adjust hose to obtain snug fuel tank filler pipe installation. Tighten hose clamps to 3-4 N·m (25-35 lb-in). Make certain clamps are forward of flange on fuel tank filler pipe to ensure a leakproof connection.
6. Fill fuel tank (9002) with fuel. Install fuel tank filler cap (9030), check for leaks.

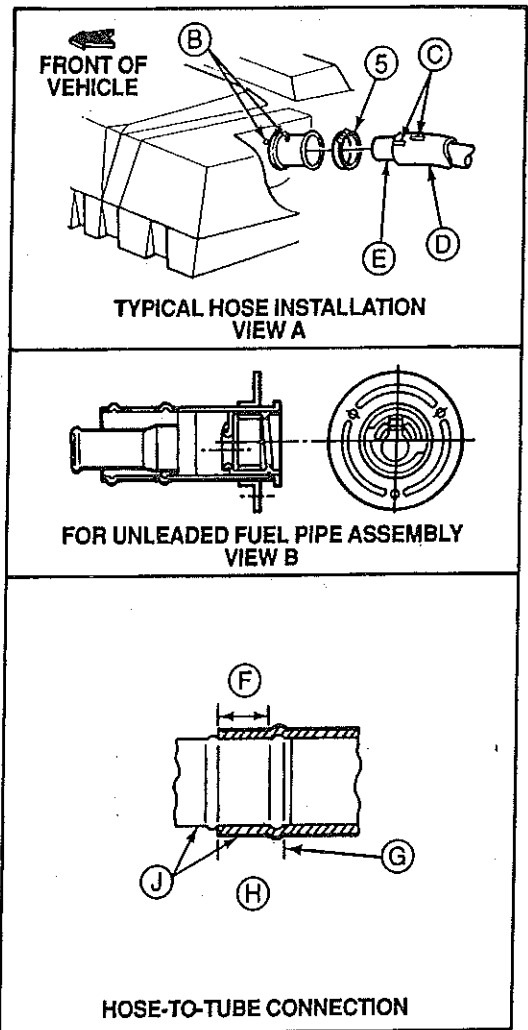
Fuel Filler System Installation, Single Rear Wheel Styleside, F-150, F-250, F-350 and Bronco



F-SERIES STYLESIDE WITH SINGLE REAR WHEELS AND BRONCO WITH AFT-OF-AXLE FUEL TANK



F-SERIES STYLESIDE WITH SINGLE REAR WHEELS WITH MIDSHIP FUEL TANK



V5586-E

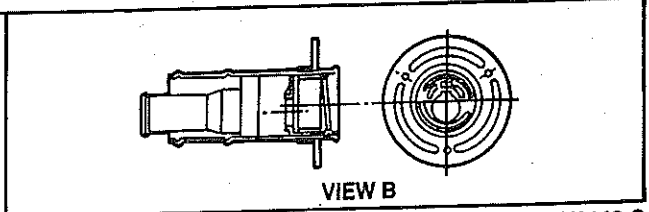
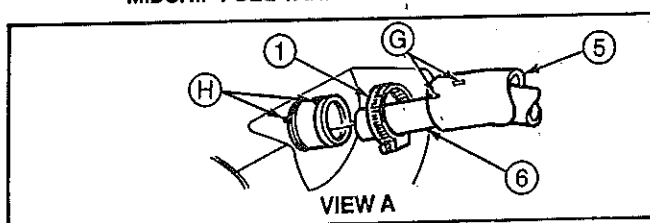
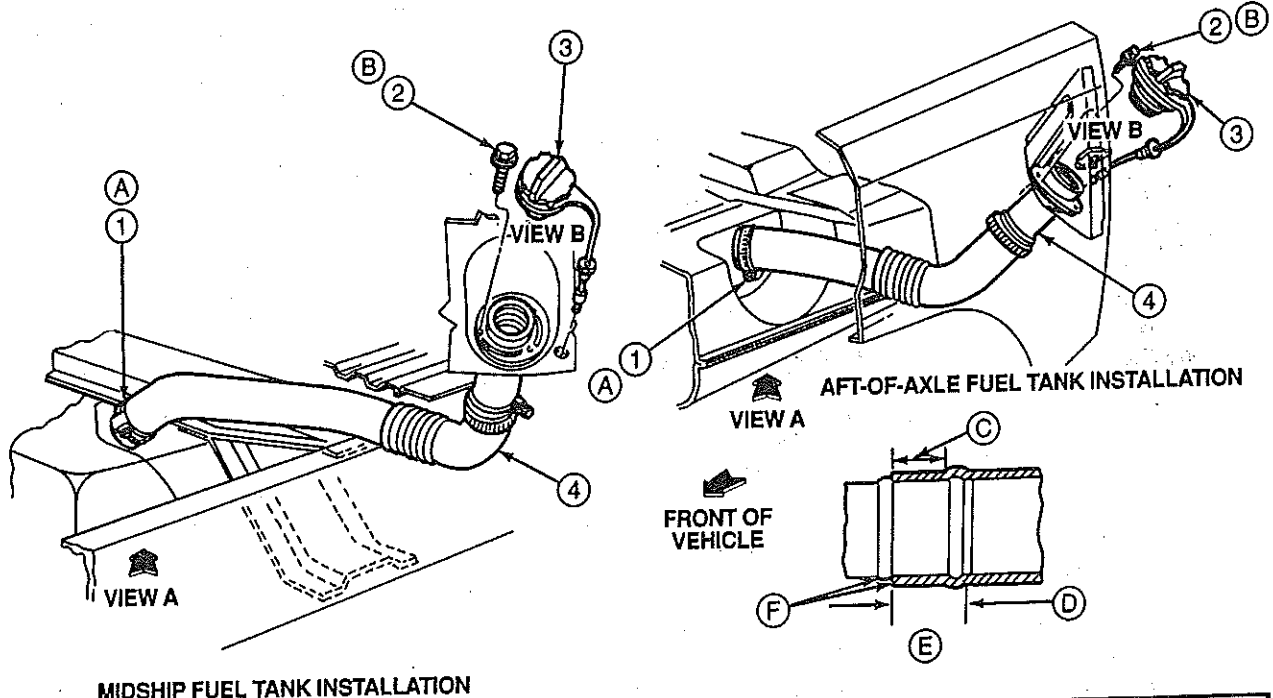
REMOVAL AND INSTALLATION (Continued)

Item	Part Number	Description
1	9002	Fuel Tank, Aft-of-Axle
2	9030	Fuel Tank Filler Cap
3	N802826-S55M	Screw
4	9034	Fuel Tank Filler Pipe
5	383526-S	Clamp
6	5005	Frame
7	9002	Fuel Tank, Midship
A	—	Tighten to 3-4 N·m (25-35 Lb-In)
B	—	Install Hose with Stripes in Line with Two Dimples on Fuel Tank

(Continued)

Item	Part Number	Description
C	—	Paint Stripes
D	—	Outer Hose
E	—	Inner Hose
F	—	Install Clamp in This Area (Beyond First Bead and Before Hose End).
G	—	For Pipes Without Secondary Bead
H	—	23.0mm (0.905 Inch) Engagement
J	—	Install Hose Within 1.5mm (0.059 Inch) of Secondary Positioning Bead Where Applicable

Fuel Filler System Installation, Single Rear Wheel Fleaside, F-150



V9146-C

Item	Part Number	Description
1	383526-S	Clamp
2	N802826-S55M	Screw

(Continued)

Item	Part Number	Description
3	9030	Fuel Tank Filler Cap
4	9034	Fuel Tank Filler Pipe

(Continued)

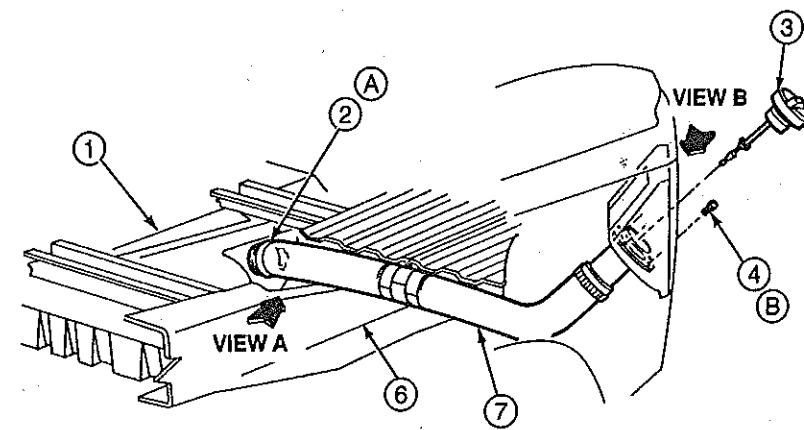
REMOVAL AND INSTALLATION (Continued)

Item	Part Number	Description
5	—	Fill Hose (Part of 9034)
6	—	Inner Hose (Part of 9034)
A	—	Tighten to 3-4 N·m (25-35 Lb·In)
B	—	Tighten to 3-4 N·m (25-35 Lb·In)
C	—	Install Clamp in This Area (Beyond First Bead and Before Hose End)
D	—	For Pipes Without Secondary Bead

(Continued)

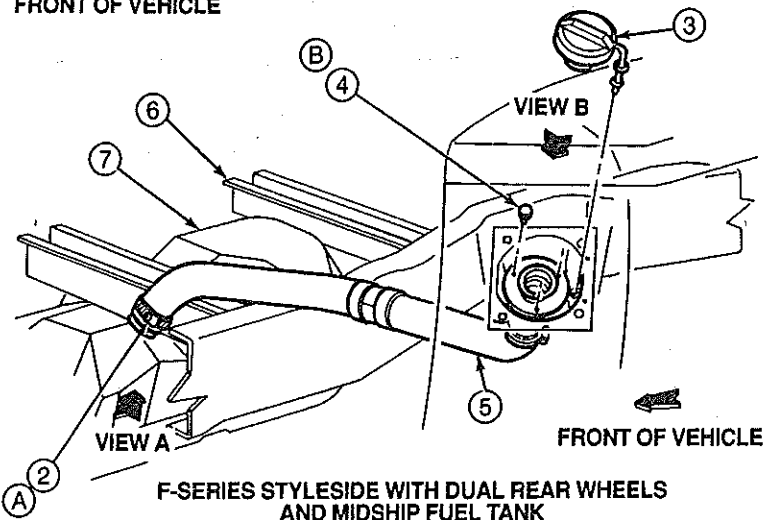
Item	Part Number	Description
E	—	23.0mm (0.905 Inch) Engagement Hose to Tube Connection
F	—	Install Hose Within 1.5mm (0.059 Inch) of Secondary Positioning Bead Where Applicable
G	—	Paint Stripes
H	—	Install Hose with Stripes in Tube with Two Dimples on Fuel Tank

Fuel Filler System Installation, Dual Rear Wheel Flareside, F-150, F-250, F-350 and F-Super Duty

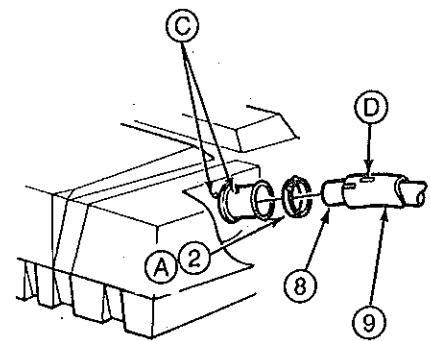


F-SERIES STYLESIDE WITH DUAL REAR WHEELS AND AFT-OF-AXLE FUEL TANK

FRONT OF VEHICLE

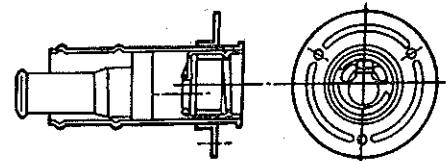


F-SERIES STYLESIDE WITH DUAL REAR WHEELS AND MIDSHIP FUEL TANK



FRONT OF VEHICLE

TYPICAL HOSE INSTALLATION SHOWN VIEW A



FOR UNLEADED FUEL PIPE ASSEMBLY VIEW B

V5587-E

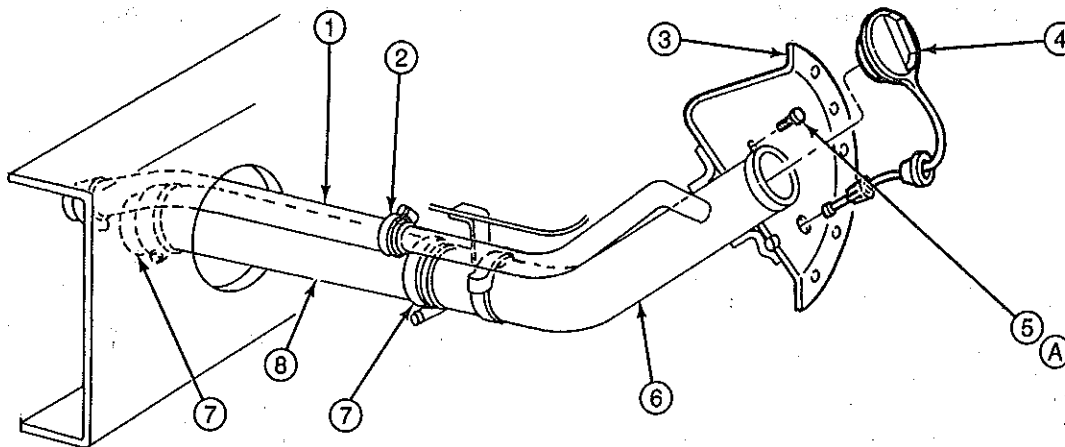
REMOVAL AND INSTALLATION (Continued)

Item	Part Number	Description
1	9002	Fuel Tank, Aft-of-Axle
2	383526-S	Clamp
3	9030	Fuel Tank Filler Cap
4	N802826-S60	Screw
5	9034	Fuel Tank Filler Pipe
6	5005	Frame
7	9002	Fuel Tank, Midship
8	—	Inner Hose (Part of 9034)

Item	Part Number	Description
9	—	Fill Hose (Part of 9034)
A	—	Tighten to 3-4 N·m (25-35 Lb·In)
B	—	Tighten to 3-4 N·m (25-35 Lb·In)
C	—	Install Hose with Stripes in Line with Two Dimples on Fuel Tank
D	—	Paint Stripes

(Continued)

Fuel Filler System, Aft-of-Axle, F-Super Duty Commercial and Motorhome Chassis



V8726-C

Item	Part Number	Description
1	9170	Fuel Tank Vent Tube Hose
2	383522-S	Clamp
3	9B213	Fuel Tank Filler Pipe Support
4	9030	Fuel Tank Filler Cap
5	N802826-S55M	Screw

Item	Part Number	Description
6	9034	Fuel Tank Filler Pipe
7	383526-S	Clamp
8	9047	Fuel Tank Filler Hose
A	—	Tighten to 17-28 N·m (13-21 Lb·Ft)

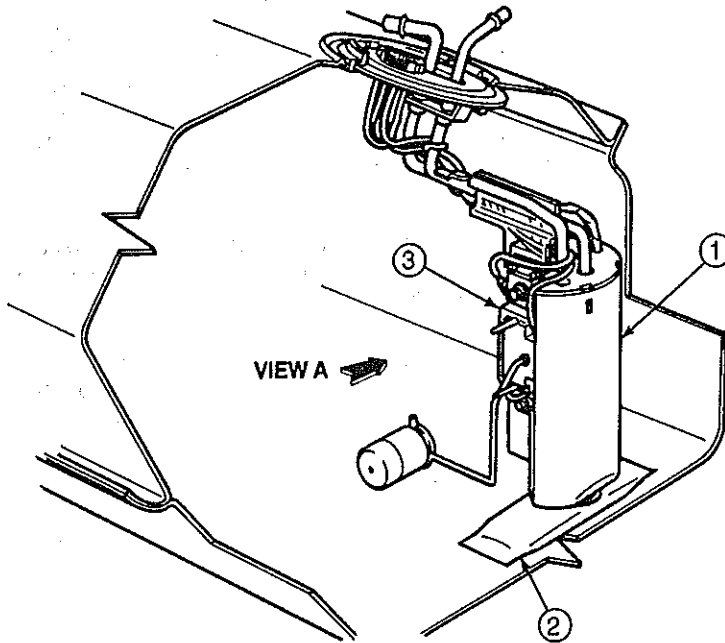
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Fuel Filter, In-Tank

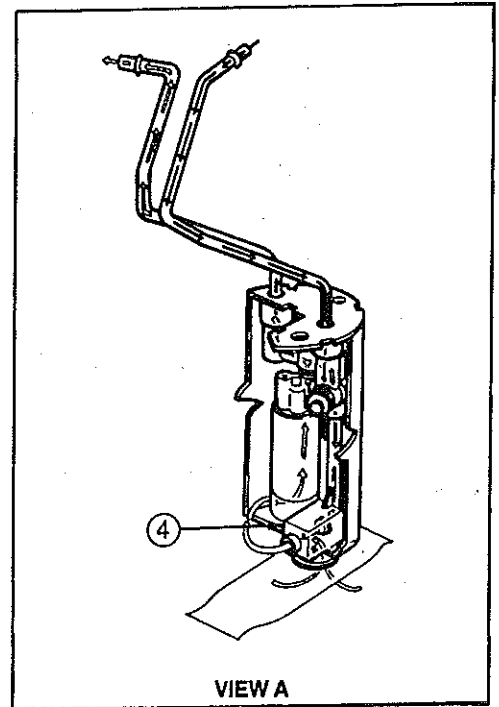
The inlet of the venturi pump (part of the fuel delivery module) has a nylon filter on it to prevent dirt and other particulate matter from entering the system. Water in the fuel tank (9002) can pass through the filter without restriction. This filter is not serviced as a separate component.

REMOVAL AND INSTALLATION (Continued)

Fuel Pump Assembly



HIGH PRESSURE PUMP/RESERVOIR/
SHUTTLE VALVE/SENDER ASSEMBLY



VIEW A

V7911-D

Item	Part Number	Description
1	—	Fuel Delivery Module (Part of 9H307)
2	—	In-Tank Venturi Filter (Part of 9H307)

(Continued)

Item	Part Number	Description
3	9A299	Resistor Assembly (Part of 9H307)
4	—	High-Pressure Pump (Part of 9H307)

Fuel Filter, In-Line

CAUTION: If the fuel filter (9155) is being serviced with the rear of the vehicle higher than the front, or if the fuel tank (9002) is pressurized, fuel leakage or siphoning from the tank fuel tubes could occur. To prevent this condition, maintain the vehicle front end at or above the level of the rear of vehicle. Also, relieve fuel tank pressure by loosening the fuel fill fuel tank filler cap (9030). Fuel tank filler cap should be retightened after pressure is relieved. Depressurize the fuel tube system at the Schrader valve on the engine fuel injection supply manifold (9F792). If vehicle is warm, change the fuel filter before the pressure rebuilds.

Removal

1. Shut engine (6007) off. Depressurize fuel system. Refer to Fuel System Pressure Relief in the Service Procedures portion of this section.

2. NOTE: When the battery (10655) is disconnected and reconnected, some abnormal drive symptoms may occur while the powertrain control module (PCM)(12A650) relearns its adaptive strategy. The vehicle may need to be driven 16 km (10 miles) or more to relearn the strategy.

Disconnect battery ground cable (14301).

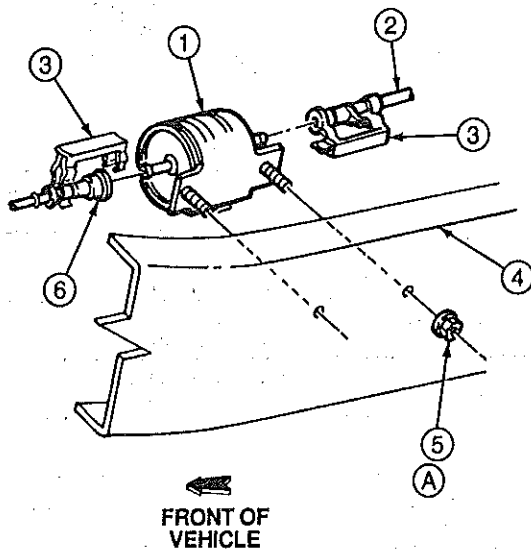
3. Raise vehicle on hoist. Refer to Section 00-02 in the Body, Chassis Manual.
4. Remove filter-to-fuel tube retainer clips.
5. Remove push-connect fittings at both ends of the fuel filter as described in Push-Connect Fittings, Steel in the Removal and Installation portion of this section.
6. Remove two nuts from filter studs and remove fuel filter bracket (9A335).

REMOVAL AND INSTALLATION (Continued)

Installation

1. NOTE: Note that the direction of the flow arrow points to the tab of the fuel filter bracket against which the fuel filter rests.
Install fuel filter assembly and two nuts. Tighten nuts to 8-10 N·m (71-89 lb-in).
2. Install push-connect fittings onto fuel filter ends as described in Push-Connect Fittings, Steel in the Removal and Installation portion of this section.
3. Snap on filter-to-fuel tube retainer clips. Long legs of clips go onto fuel tubes.
4. Lower vehicle and connect battery ground cable.
5. Turn ignition switch (11572) from OFF to RUN position several times without starting engine. Check for fuel leaks.

In-Line Fuel Filter Installation, F-Series and Bronco MFI Engines



V8537-D

Item	Part Number	Description
1	9A335	Fuel Filter Bracket
2	9S278	Rear Fuel Tube Assembly
3	9J278	Fuel Tube Retainer
4	5005	Frame
5	N620480-S2	Nut
6	9J338	Front Fuel Tube Assembly
A	—	Tighten to 8-10 N·m (71-89 Lb-in)

Fuel Tank Sending Unit and Pump, F-150, F-250, F-350, Bronco, and F-Super Duty

CAUTION: Fuel supply tubes remain pressurized for long periods of time after the engine (6007) is shut down. This pressure must be relieved before the fuel system is serviced. Refer to Fuel System Pressure Relief described in the Removal and Installation portion of this section.

Removal

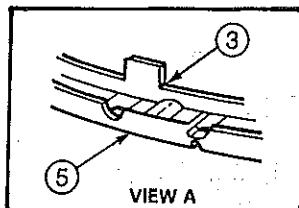
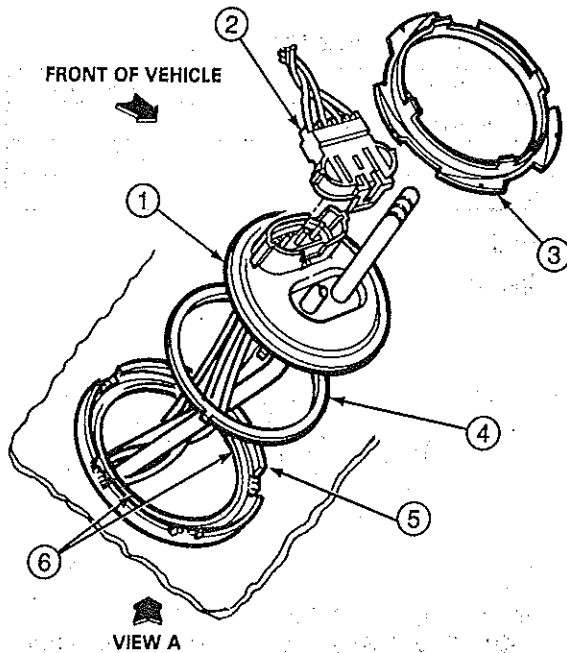
1. Remove the fuel tank (9002) as described in Fuel Tank (select appropriate configuration and tank location) in the Removal and Installation portion of this section.
2. Position fuel tank on a work bench and remove any dirt that has accumulated around the fuel tank sending unit and pump so that it will not enter the fuel tank.
3. Turn the fuel pump locking retainer ring (9C385) counterclockwise with Fuel Tank Sender Wrench D84P-9275-A or equivalent and remove fuel pump locking retainer ring.
4. Remove the fuel tank sending unit and pump from the fuel tank.
5. Remove seal gasket and discard.

Installation

1. Clean the fuel pump mounting flange and the fuel tank mounting surface and groove in the fuel pump mounting gasket (9417).
2. Put a light coating of Premium Long-Life Grease XG-1-C or -K or equivalent meeting Ford specification ESA-M1C75-B on a new fuel pump mounting gasket to hold it in place during assembly. Install it in the fuel ring groove.
3. Install fuel tank sending unit and pump carefully to make sure that the fuel filter (9155) is not damaged. Be sure that the tabs of the fuel tank sending unit and pump are positioned into slots of the fuel tank. Make sure ring remains in place.
4. Hold the fuel tank sending unit and pump and fuel pump mounting gasket in place; install and rotate the fuel pump locking retainer ring clockwise until the stop is against the retainer ring tab.
5. Install fuel tank as described in Fuel Tank (select appropriate configuration and tank location) in the Removal and Installation portion of this section.

REMOVAL AND INSTALLATION (Continued)

Fuel Tank Sending Unit and Pump, F-150, F-250, F-350 and Bronco

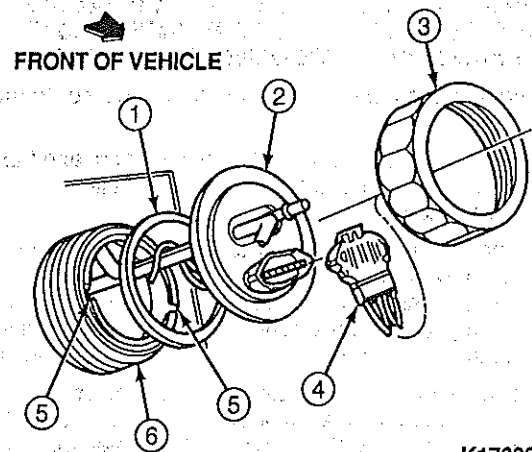


V4838-F

Item	Part Number	Description
1	9350	Fuel Pump
2	14405 or 14406	Wiring Assembly
3	9C385	Fuel Pump Locking Retainer Ring (Using D84P-9275-A or Equivalent, Turn Until Tabs Are Positioned Between Detent and Stop on Tank)
4	9417	Fuel Pump Mounting Gasket
5	9002	Fuel Tank
6	---	Locking Slots (Part of 9002) (Make Sure FDM Tabs Are Seated in Slot)

Fuel Tank Sending Unit and Pump, Units with Plastic Locking Ring, F-350 Chassis Cab

The fuel pump removal and installation procedure for units equipped with plastic fuel tank sending unit locking retainer rings is the same for units equipped with metal fuel tank sending unit locking retainer rings. The fuel tank sending unit locking retainer ring on these units can be removed with a band-type oil filter wrench or equivalent by turning counterclockwise. When installing the fuel tank sending unit locking retainer ring, tighten ring to 54-75 N·m (40-55 lb-ft).



K17093-B

Item	Part Number	Description
1	9417	Fuel Pump Mounting Gasket
2	9H307	Fuel Tank Sending Unit and Pump
3	9A307	Fuel Tank Sending Unit Locking Retainer Ring
4	14405 or 14406	Wiring Assembly
5	---	Locating Tabs (Part of 9H307 or 9275 Fuel Pump and Sending Unit)
6	9002	Fuel Tank

Fuel Vapor Valve

The evaporative emission valve (9B593) is centrally located on the upper surface of the fuel tank (9002) and is installed using a rubber gasket seal.

REMOVAL AND INSTALLATION (Continued)

Fuel and Vapor Return Tubes

Removal

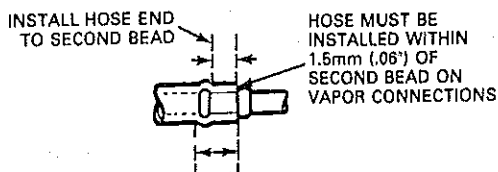
WARNING: MOST CONNECTIONS IN THE EVAPORATIVE EMISSION SYSTEM ARE VERY SECURE. A STRONG PULLING AND SIMULTANEOUS TWISTING ACTION IS REQUIRED TO DISCONNECT. WHEN DISCONNECTION OCCURS, BOTH HANDS COULD SHARPLY AND UNCONTROLLABLY MOVE IN THE DIRECTION OF EACH HAND'S PULLING. BE CAREFUL THAT NO SHARP OR POSSIBLY DAMAGING OBJECTS ARE IN LINE WITH THE DIRECTION OF PULL TO PREVENT PHYSICAL INJURY AND/OR DAMAGE TO THE OBJECTS THAT WILL BE IMPACTED BY THE HANDS WHEN DISCONNECTION OCCURS.

To disconnect a tube from any component, refer to the following:

1. Securely grip component with one hand, and tube with the other hand as close as possible to connection.
2. Sharply twist tube along its axis to "break" the temporary bond between tube and component. (No adhesive is used to make tube connections during vehicle assembly, but natural aging of the connections causes a temporary bond to exist.)
3. It is important to "break free" the tube at its connection point as indicated in Step 2. If the joint is stubborn and the above method does not work, grip the tube with a pair of pliers directly over the joint and twist again.
4. Once the tube/component joint has been broken, disconnect by securely gripping the component with one hand and hose with the other. Twist tube and at the same time pull apart.

Installation

1. To reconnect a tube to a component, wet the tube with water and push onto component.
2. Vapor tubes should be assembled with the minimum engagement shown in the following illustration.



V2351-D

Push-Connect Fittings, Steel

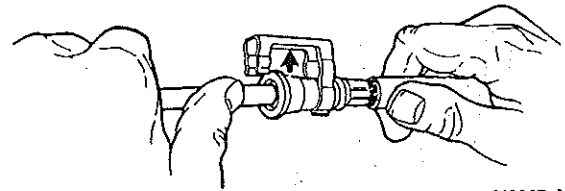
CAUTION: Discharge fuel system before disconnecting coupling.

SPECIAL SERVICE TOOL(S) REQUIRED

Description	Tool Number
Fuel Line Disconnect Tool Kit	T90T-9550-S
5/16-Inch	T90T-9550-B
3/8-Inch	T90T-9550-C

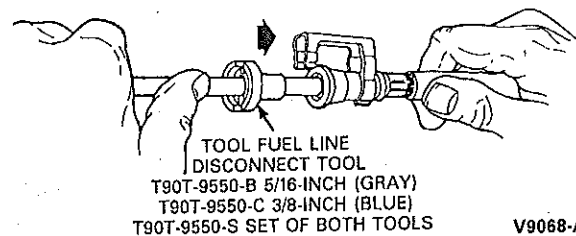
Removal

1. Open safety clip.



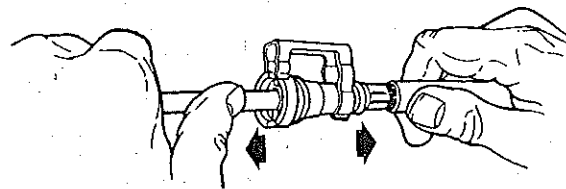
V9067-A

2. Fit Tool T90T-9550-B (5/16-inch) or T90T-9550-C (3/8-inch) to coupling so that tool can enter female fitting.



V9068-A

3. Push the tool into female fitting to release the retaining fingers from the formed male tube end.
4. Pull male and female fittings apart.



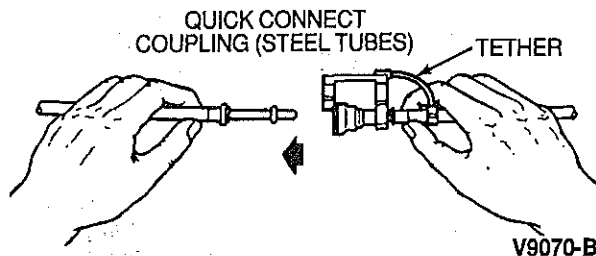
V9069-A

5. Remove the tool from the disconnected fitting.
6. Inspect the fitting for any internal parts that may have been damaged. Fuel tube should be replaced if internal parts are damaged.

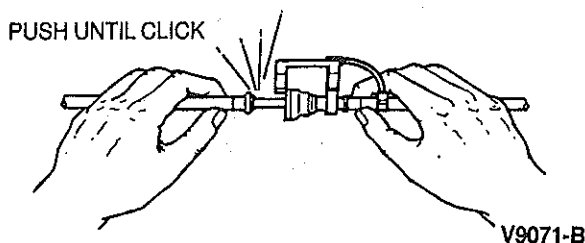
REMOVAL AND INSTALLATION (Continued)

Installation

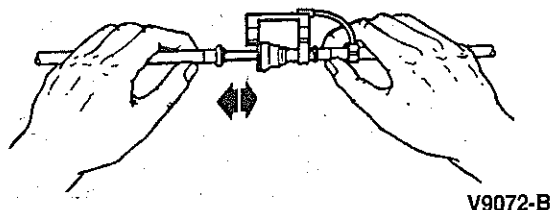
1. Align the fitting and tube axially.



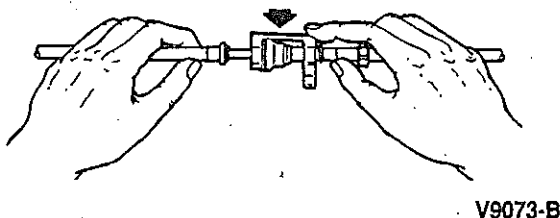
2. Push the tube into the fitting. When properly engaged, a definite "click" will be heard.



3. Pull on the fitting to make sure it is fully engaged.



4. Lock assembly with safety clip.



Spring Lock Coupling

SPECIAL SERVICE TOOL(S) REQUIRED

Description	Tool Number
Spring Lock Coupling Disconnect Tool (5/8-Inch)	T83P-19623-C

The spring lock coupling tool will not always fit over the shielded tube. To accommodate the shielding, the hole in the tubing end of the tool must be enlarged. To do this, clamp the tool closed and drill out the existing hole with 5/8-inch bit. Be careful to drill only the tubing hole and not the working end of the hole.

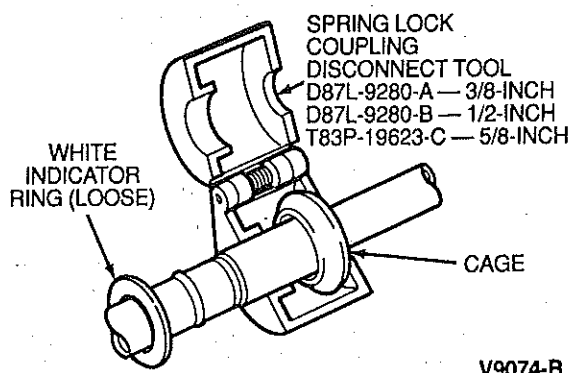
Removal

CAUTION: Discharge fuel system before disconnecting coupling.

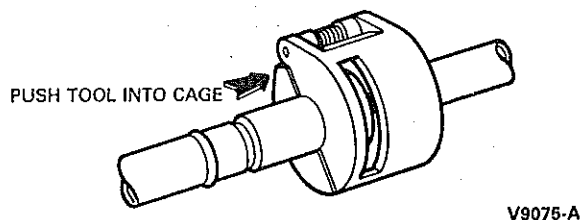
NOTE: Metal safety clips are used on metal tubes with metal spring lock connectors. Both types are illustrated.

NOTE: Before disconnecting, locate white indicator ring which may have slipped down length of fuel tube.

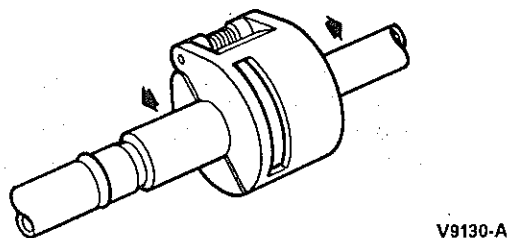
1. Fit Spring Lock Coupling Disconnect Tool T83P-19623-C to coupling so that tool can enter cage to release the garter spring.



2. Push the tool into the cage opening to release the female fitting from the garter spring.

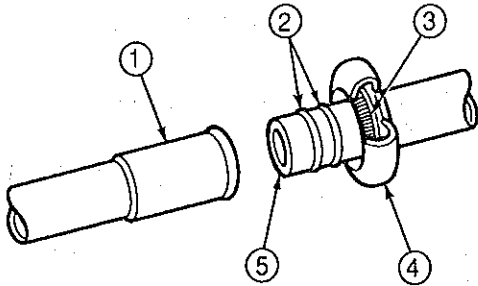


3. Pull the coupling male and female fittings apart.



REMOVAL AND INSTALLATION (Continued)

- Remove the tool from the disconnected spring lock coupling.



V9131-B

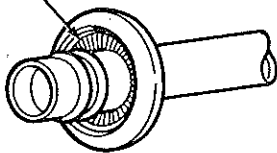
Item	Part Number	Description
1	—	Female Fitting (Part of 9J337)
2	—	O-Rings (Part of 19D690)
3	—	Garter Spring (Part of 9J337)
4	—	Cage (Part of 9J337)
5	—	Male Fittings (Part of 9J337)

Installation

- Check for missing or damaged garter spring. If spring is damaged or missing remove damaged spring with small hooked wire and install a new spring.

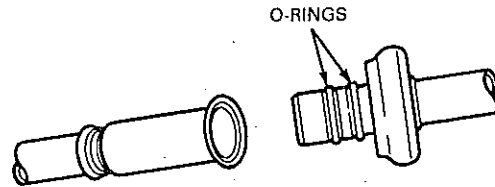
REPLACEMENT GARTER SPRINGS
 3/8 INCH — E1ZZ-19E576-A
 1/2 INCH — E1ZZ-19E576-B
 ALSO AVAILABLE IN
 E35Y-19D690-A KIT

GARTER SPRING



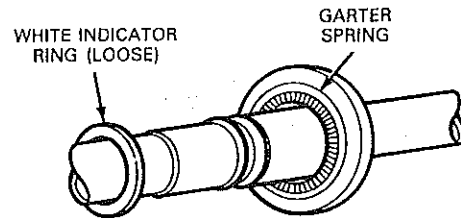
V9132-A

- Clean fittings and install new O-rings. Use only specified O-rings supplied in E9UZ-9B307-A kit. Lubricate with clean oil. Insert white indicator ring into cage on male fitting. Assemble fitting together by pushing with a slight twisting motion.



V9133-A

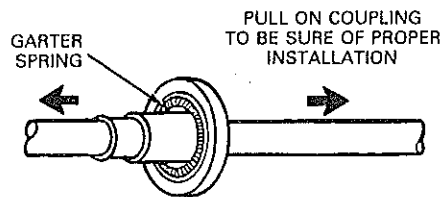
- White indicator ring will pop free of cage on male fitting when fully joined. This indicates that garter spring inside cage of male fitting is properly seated over lip of female connector.



V9134-A

Fuel Tube Retainer

- Visually check to be sure garter spring is over flared end of female fitting.
- Pull on connector opposite to the direction of installation to verify that the connector is locked in place. If connector is not locked in place, refer to Spring Lock Coupling procedure in the Removal and Installation portion of this section.

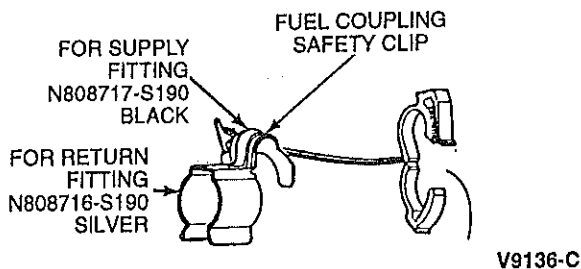
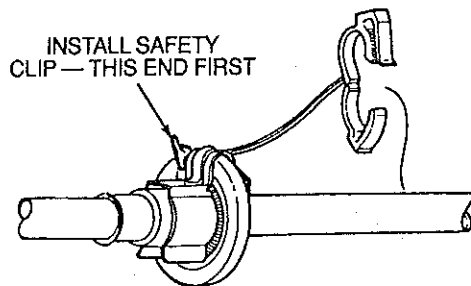


SPRING LOCK COUPLING — FOR FUEL LINE TO ENGINE FUEL RAIL CONNECTIONS

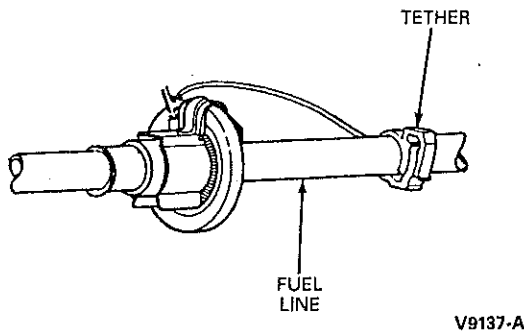
V9135-A

REMOVAL AND INSTALLATION (Continued)

3. Install large end of clip to garter spring side of fuel tube making sure that clip is properly positioned. The black 12.7mm (1/2-inch) clip fits the fuel supply tube. The silver 9.5mm (3/8-inch) clip fits fuel return tube. Refer to the following illustration.



4. Attach the tether to the fuel tube and snap shut.

**Fuel Pressure Regulator**

Refer to Sections 03-04A, Section 03-04B or Section 03-04C in this manual.

CLEANING AND INSPECTION

Fuel Tanks

CAUTION: Leaks or damage to the polyethylene fuel tanks (9002) are not repairable. This applies to certain F-Series vehicles with a plastic fuel tank including all polyethylene portions of the fuel tank body and fittings. Fuel tank replacement is the only acceptable service. There are no reliable repair products that meet the same standards as a new fuel tank. Methods which appear to work may not function for the long term or after being subjected to normal use or abuse.

Fuel tanks may be steam-cleaned and/or serviced using standard procedures. After steaming, allow time to thoroughly air dry. The evaporative emission valve (9B593) and fuel tank sending unit and pump should be removed prior to steaming.

SERVICE PROCEDURES

Fuel System Pressure Relief

- CAUTION:** Fuel supply tubes on 4.9L, 5.0L, 5.8L and 7.5L engines (6007) will remain pressurized for some period of time after the engine is shut off. This pressure must be relieved before servicing the fuel system.

Before opening the fuel system on vehicles, relieve fuel pressure as follows:

Locate and disconnect the electrical connection to either the fuel pump relay, the inertia fuel shutoff switch or the in-line high fuel pump (9350).

- Crank engine for approximately ten seconds. Engine may start and run for a short time. If so, crank engine an additional five seconds after engine stalls.
- Connect the electrical connector that was disconnected in Step 1.
- NOTE:** When the battery (10655) has been disconnected and reconnected, some abnormal drive symptoms may occur while the powertrain control module (PCM)(12A650) relearns its adaptive strategy. The vehicle may need to be driven 16 km (10 miles) or more to relearn the strategy.

Disconnect battery ground cable (14301).

Fuel System — Pressurized**Fuel Tubes, Steel**

Front fuel tubes are made of stainless steel tubes and flexible Teflon® tubing with a fiberglass braid cover.

Rear fuel tubes are made of stainless steel tubes and flexible Teflon® tubing with a stainless steel braid cover. If any portion of the tube becomes damaged, it must be replaced.

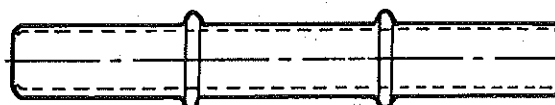
SERVICE PROCEDURES (Continued)

- | | |
|--|--|
| <p>1. Relieve fuel system pressure as described in Fuel System Pressure Relief in the Service Procedures portion of this section. Read cautionary note prior to relieving pressurized fuel system.</p> | <p>2. Remove tubes as described in Removal and Installation, Fuel and Vapor Returns Tubes in this section.</p> |
|--|--|

Push-Connect Tube Ends, Steel

1. Using a tube cutter, remove the damaged push-connect tube end at a convenient distance from the end. Allow for adequate room to tighten the union with a wrench.
2. Choose a proper replacement push-connect tube end.
3. If required, form the new tube end to the same shape as the damaged tube end which was removed.
4. Select the proper size union and attach the new steel tube end to the original tube.
5. Clean off the steel tube end and replace the push-connect fitting onto the tube. (A new retainer clip is recommended.)
6. Check that the underbody clips are properly securing the fuel tubes.

7. Start engine and check for leaks.



STEEL TUBE ENDS



V9200-A

SPECIFICATIONS

Fuel System Specifications

FUEL TANK SENDING UNIT SPECIFICATIONS

Engine Condition	4.9L	5.0L	5.8L	7.5L
Engine Running	28-45 psi 193-310 kPa	28-45 psi 193-310 kPa	28-45 psi 193-310 kPa	28-45 psi 193-310 kPa
Key ON Engine OFF	50-60 psi 345-415 kPa	35-45 psi 210-310 kPa	35-45 psi 210-310 kPa	35-45 psi 240-310 kPa

STANDARD AND AUXILIARY FUEL TANKS — CAPACITY IN LITERS (GALLONS)

Model		Body Style	Location	Fuel Evap.	Advertised Tank Cap. Refill Liters (Gal.)
Series	W.B. mm (In.)				
Bronco (4 x 4)	2660 (104.7)	All	Aft/Axle ^a	X	121 (32)
F-150 (4 x 2)	2967 (116.8)	Reg. Cab	Midship ^b Aft/Axle	X X	62 (16.3) 69 (18.2)
F-150 (4 x 2)	3378 (133.0)	Reg. Cab	Midship ^b Aft/Axle	X X	72 (19) 69 (18.2)
F-150 (4 x 4)	2967 (116.8)	Reg. Cab	Midship ^{ca} Aft/Axle ^c	X X	N/A 69 (18.2)
F-150 (4 x 4)	3378 (133.0)	Reg. Cab	Midship ^{bc} Aft/Axle ^c	X X	72 (19) 69 (18.2)
F-150 (4 x 2)	3526 (138.8)	Super Cab	Midship ^d Aft/Axle	X X	64 (16.5) 69 (18.2)
F-150 (4 x 2)	3937 (155.0)	Super Cab	Midship Aft/Axle ^d	X X	72 (19) 69 (18.2)

(Continued)

SPECIFICATIONS (Continued)

STANDARD AND AUXILIARY FUEL TANKS — CAPACITY IN LITERS (GALLONS) (Cont'd)

Model		Body Style	Location	Fuel Evap.	Advertised Tank Cap. Refill Liters (Gal.)
Series	W.B. mm (In.)				
F-150 (4 x 4)	3937 (155.0)	Super Cab	Midship ^c Aft/Axle ^{cd}	X X	72 (19) 69 (18.2)
F-250 (4 x 2)	3378 (133.0)	Reg. Cab	Midship Aft/Axle ^d	X X	72 (19) 69 (18.2)
F-250 (4 x 2)	3937 (155.0) 4278 (168.0)	Super Cab	Midship Aft/Axle ^d	X X	72 (19) 69 (18.2)
F-250 (4 x 4)	3378 (133.0)	Reg. Cab/W/E4OD	Midship ^e Midship ^d Aft/Axle ^{cd}	X X X	72 (19) 62 (16.5) 69 (18.2)
F-250 (4 x 4)	3937 (155.0)	Super Cab	Midship ^e Aft/Axle ^{cd}	X X	72 (19) 69 (18.2)
F-350 (4 x 2) and (4 x 4)	3378 (133.0)	Chassis Cab W/E4OD Chassis Cab	Midship Midship ^e Aft/Axle ^{bd}	X X X	69 (18.2) 62 (16.5) 72 (19)
F-350 (4 x 2) and (4 x 4)	3475 (136.8)	Chassis Cab	Midship Aft/Axle ^{ef}	X X	72 (19) 72 (19)
F-350 (4 x 2) and (4 x 4)	4084 (160.8)	Chassis Cab	Midship Aft/Axle ^{ef}	X X	72 (19) 72 (19)
F-350 (4 x 2) and (4 x 4)	3937 (155.0)	Super Cab	Midship Aft/Axle ^b	X X	72 (19) 69 (15.2)
F-Super Duty	3475 (136.8)	Chassis Cab	Midship Aft/Axle ^b	X X	72 (19) 72 (19)
F-Super Duty	4085 (160.8)	Chassis Cab	Aft/Axle ^b Midship	X X	72 (19) 72 (19)
F-Super Duty Motorhome Chassis	4521 (178)	Commercial Chassis	Aft/Axle ^e	X	284 (75)
F-Super Duty Motorhome Chassis	5283 (208)	Commercial Chassis	Aft/Axle ^e	X	284 (75)
F-Super Duty Motorhome Chassis	4826 (190) 5791 (228)	Commercial Chassis Commercial Chassis	Aft/Axle ^e Aft/Axle ^e	X X	284 (75) 284 (75)

a 15 liters (4 gal.) throwaway standard on commercial cutaway, and commercial chassis.

b Steel auxiliary tank.

c Optional skid plate available w/4 x 4 models.

d Standard dual tanks.

e Standard skid plate on 4 x 4 models.

f Plastic auxiliary tank.

NOTE: All F-Series aft-of-axle fuel tanks are standard. Midship (3378mm [133-inch] and 2967mm [116.8-inch] wheelbase only) is optional.

TORQUE SPECIFICATIONS

Description	N-m	Lb-Ft	Lb-In
Front Fuel Tube Bracket Nuts, F-Series and Bronco	11-15	8-11	—
Filter Bracket Nuts, F-Series and Bronco	8-10	—	71-89
Filter Bracket Nuts, F-Super Duty Motorhome Chassis	9-13	—	80-115
Front and Rear Strap Nuts, F-Series Midship Fuel Tank	30-40	22-30	—

(Continued)

TORQUE SPECIFICATIONS (Cont'd)

Description	N-m	Lb-Ft	Lb-In
Skid Plate/Heat Shield Nuts and Bolts, F-Series Midship Fuel Tank	16-24	12-17	—
Heat Shield Bracket, F-Series Midship Fuel Tank	16-24	12-17	—
Crossmember Nuts, F-Series Midship Fuel Tank	34-46	25-34	—
Bracket/Crossmember, Bolts F-Series Midship Fuel Tank	22-28	17-21	—

(Continued)

SPECIFICATIONS (Continued)

TORQUE SPECIFICATIONS (Cont'd)			
Description	N-m	Lb-Ft	Lb-In
Support Assembly Nuts, F-Series and Bronco Aft-of-Axle Fuel Tank	34-46	25-34	—
Shield/Frame Bolts F-Series Aft-of-Axle Fuel Tank	10-14	8-10	—
Heat Shield Bolt, F-Series Super Duty Motorhome, Aft-of-Axle Fuel Tank	20-30	15-22	—
Locking Ring, Plastic Fuel Tank Fuel Delivery Module (FDM Pump)	53-72	39-53	—
Fuel Tank Sending Unit and Pump Nut	7.5-9.5	—	67-84
Organizer Assembly	8-10	—	71-89
Fuel Filter to Frame	8-10	—	71-89
Fuel Tank Filler Pipe Mounting Bracket Screws	2-3	—	15-25
Upper Fuel Tank Mounting Strap Bolts	60-95	44-70	—
Fuel Tank Mounting Strap Bolts	60-90	44-67	—
Fuel Tank Heat Shield Nuts	16-24	12-17	—
Fuel Tank Filler Pipe Hose Clamps	3-4	—	25-35
Upper Fuel Tank Filler Pipe Support Screws	17-28	13-21	—
Fuel Tank Sending Unit Locking Retainer Ring, F-350 Chassis Cab	54-75	40-55	—

SPECIAL SERVICE TOOLS/EQUIPMENT

SPECIAL SERVICE TOOLS REQUIRED	
Tool Number/Description	Illustration
T83P-19623-C Spring Lock Coupling Disconnect Tool (5/8-Inch)	T83P-19623-C
T90T-9550-S Fuel Line Disconnect Tool Kit (5/16-Inch)	T90T-9550-S
SPECIAL SERVICE TOOLS DESIRED	
Tool Number	Description
D84P-9275-A	Fuel Tank Sender Wrench
D87L-9280-A	Spring Lock Coupling Tool (3/8-Inch)
D87L-9280-B	Spring Lock Coupling Tool (1/2-Inch)
ROTUNDA EQUIPMENT	
Model	Description
134-R0080	Plastic Fuel Line Connector Tool
164-R3201	Fuel Storage Tanker