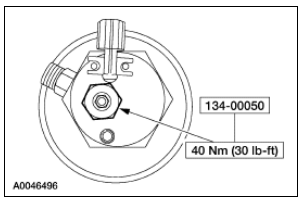
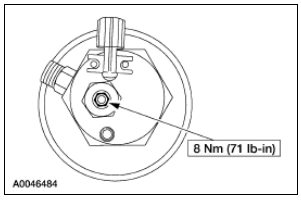
Install the override tool into the fuel tank solenoid valve of the tank to be vented.



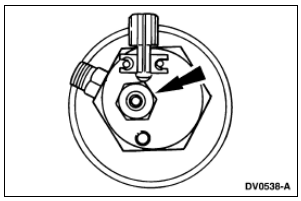
12. Slowly turn in the override tool jackscrew until fuel flows. Observe the gauge pressure of the Fuel Filler Neck Venting Kit. The pressure reading should be at tank pressure.



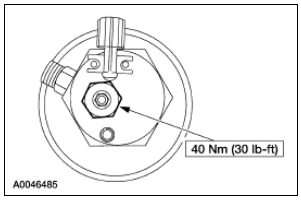
13. Slowly open the bleed valve on the venting kit and allow the contents of the fuel tank to vent to the atmosphere. Venting can take in excess of one hour.

14. Vent the fuel tank until the fuel flow stops.

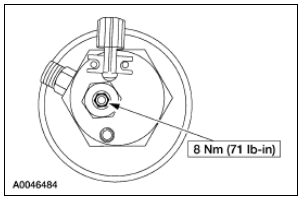
15. Remove the override tool from the fuel tank solenoid valve.



16. Install the fuel tank solenoid manual lockdown valve.

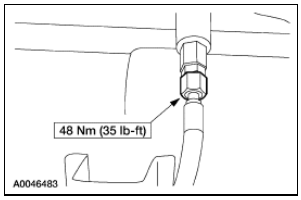


17. Turn in the manual lockdown valve jackscrew on the fuel tank solenoid valve.



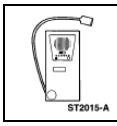
18. Repeat the procedure until all affected tanks are vented.

19. Install the fuel fill line onto the fuel fill valve.


48 Nm (35 lb-ft)
A0046483

Fuel System Leak Test

Special Tool(s)

 ST2015-A	Combustible Gas Detector 134-00049 or equivalent

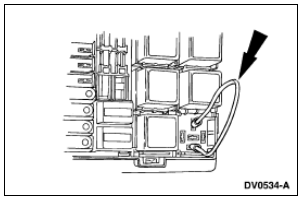
Fuel Injection Supply Manifold and Fuel Injectors

1. **NOTE:** After the vehicle has soaked for several hours, a very slight natural gas smell may emanate from within the intake manifold and intake air system. This is normal, as the fuel injectors leak down from the fuel injection supply manifold to the intake manifold over several hours.

   Remove the fuel pump relay from the power distribution box.

2. Construct a jumper wire from 152 mm (6 inches) of 18 gauge wire and two spade terminal ends.

3. Jumper the fuel pump relay circuit from Socket 87 to Socket 30.


DV0534-A

4. Remove the jumper wire.

5. Install the fuel pump relay into the power distribution box.

6. Check the spring lock coupling and the fuel injection supply manifold to fuel injector connections for leaks, using the combustible gas detector.

7. If a leak is detected, verify the connection is engaged properly, then retest.

8. If the leak remains, repair as necessary and retest.

Fuel Tanks, Filter and Lines

1. **NOTE:** Verify system pressure is at least 10,343 kPa (1500 psi). If system pressure is below 10,343 kPa (1500 psi), refuel the vehicle.

   Check the fuel tank(s), coalescer/filter and fuel line connections for leaks, using the combustible gas detector.

2. If a leak is detected, verify that the fittings are tightened properly, then retest.

3. If the leak remains, inspect the O-ring seal, O-ring seal land and sealing surfaces for any damage, distortion or contamination.

4. Repair as necessary and retest.

Fuel Tank Inspection

1. **NOTE:** The following procedure is an in-vehicle, visual inspection for natural gas fuel cylinders. A 1-year/19,310-km (12,000-mile) (whichever occurs first) inspection interval is assumed.

   NOTE: The Compressed Natural Gas Pamphlet C6.2 can be obtained from the Compressed Gas Association, Inc., 1725 Jefferson Davis Highway, Arlington, VA 22202-4102.

   Raise and support the vehicle.

2. Examine the vehicle underbody and chassis in the general area near the fuel tank(s) for any indication of collision damage, malfunction, fire or excessive mud/dirt accumulation.

3. Examine the fuel tank stone/heat shield for any indication of collision damage, malfunction, fire or excessive mud/dirt accumulation.

4. Remove the fuel tank stone/heat shield.

5. Examine the fuel tank(s) and the stone/heat shield interior for any foreign objects (such as stones or gravel) or foreign materials (such as mud, salt, liquids or chemical residue).

6. Remove any foreign material, using only a clean, dry cloth. Remove all foreign objects. Do not use water or any cleaners.

7. Examine the fuel tank labels for the tank expiration date. Use a light and mirror to access labels hidden from normal view. If the expiration date has been exceeded, condemn the tank, using the procedure in Step 14.

8. Inspect the tank sidewall and dome ends, following the general guidelines set forth in the Compressed Gas Association Pamphlet C6.2. Inspect the tank(s) for the following:
   - abrasions
   - dents
   - cracking, blistering or peeling of clear coating
   - corrosion
   - cracks or gouges in the metal dome
   - cracks in the fiberglass overwrap
   - impact damage (crazing) in the fiberglass overwrap
   - cuts or gouges in the fiberglass overwrap
   - exposed fibers
   - delamination (separating) of the fiberglass overwrap
   - discoloration of the fiberglass overwrap
   - fire or heat damage, such as charring or discoloration

9. If any flaws are detected, measure the depth and length of the flaw in accordance with the Compressed Gas Association Pamphlet C6.2 guidelines. If any of the flaws cannot be completely measured in the vehicle, the tank must be removed from the vehicle for further inspection.

10. If the tanks have been or are suspected of having been exposed to a corrosive chemical spill, the tank must be removed from the vehicle for further inspection of the complete composite surface, including the area under the tank straps. If there is any indication of chemical attack, such as blistering, cracking

or delamination, the tanks must be condemned and replaced with new tanks. Tanks on the Natural Gas Econoline are of an NGV2-2 design and do not have to be hydrostatically tested during their 15-year service life.

11. The acceptance criteria for cuts and abrasions are different from those listed in Section 6.5.1 of the Compressed Gas Association Pamphlet C6.2. These tanks have extra epoxy resin and a clear coat to reduce the sensitivity to surface damage. The following are the composite wrap inspection criteria:
    - Level 1 Abrasions: These are defined as minor abrasions, such as scuffs less than 0.254 mm (0.010 inch) deep, and are acceptable without repair.
    - Level 2 Abrasions: These are defined as abrasions having some exposed fibers or flat spots with a depth between 0.254 mm (0.010 inch) and 0.762 mm (0.030 inch). Level 2 abrasions must be repaired before the tank is returned to service.
    - Level 1 Cuts: These are defined as cuts or scratches less than 0.254 mm (0.010 inch) deep and are acceptable without repair regardless of length, number or direction.
    - Level 2 Cuts: These cuts have a maximum depth up to 0.762 mm (0.030 inch) and a maximum length up to 203 mm (8 inches). Level 2 cuts must be repaired before the tank is returned to service.

12. Repair of the damage to composite wrap is as follows:
    - Level 2 cuts and abrasions are to be coated with epoxy resin. Mix and apply commercial room temperature cure, two-component epoxy resin according to the manufacturer's instructions. Frayed fibers must be cut away before application of the epoxy resin.
    - Tanks with damage exceeding Level 2 must be condemned in accordance with Step 14.
    - The criteria for other damage to the composite wrap are defined in the Compressed Gas Association Pamphlet C6.2.

13. The metal tank ends are protected with a multi-coat system using epoxy and polyurethane coatings. Chips in the coating must be evaluated and repaired. The metal tank end external inspection criteria are as follows:
    - Level 1 Chips: These are chips or abrasions which do not penetrate the black epoxy coating. The steel or gray primer has not been exposed. Level 1 chips require no repair.
    - Level 2 Chips: These are chips or abrasions which penetrate the black epoxy coating and must be repaired as follows to prevent corrosion:
        - ♦ Sand the damaged area to remove rust and rough up the surrounding coating.
        - ♦ Clean the damaged area with a commercial pre-paint cleaning solvent.
        - ♦ Apply a zinc-rich, cold galvanizing compound (Rust-Oleum ™ Zinc-Rich or equivalent commercial product).
    - Dents: Tanks with dents to the metal ends which exceed 1.524 mm (0.060 inch) in depth must be removed from service and condemned.
    - Gouges: Tanks with sharp gouges penetrating the coating and into the metal liner must be removed from service and condemned.

14. Condemned tanks, whether due to damage or expiration, shall be removed from the vehicle and destroyed as follows:
    1. Vent and remove the fuel tanks. Refer to Section 310-01B .
    2. Remove the fuel tank solenoid valve. Refer to Section 310-01B .
    3. Purge the fuel tank with compressed air for 30 seconds.
    4. Destroy the fuel tank by drilling a 12.7-mm (0.50-inch) diameter hole in the fuel tank sidewall.

15. Fuel Tank Straps: Examine the fuel tank straps for proper positioning of the rubber isolators. Replace the rubber isolators as necessary.

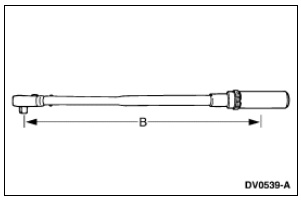
16. Inspection Record: Record the date, vehicle mileage and the results of the fuel tank inspection.

Torque Multiplication Conversion

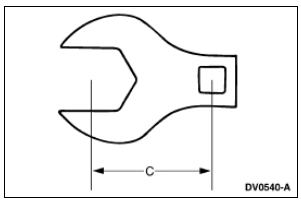
1. **NOTE:** When using a torque wrench adapter, the distance from the torque wrench drive to the adapter drive changes the actual torque value. Apply the following formula (A x B ÷ B - C = D) to obtain the correct torque value.

   Record the torque value to be obtained as A.

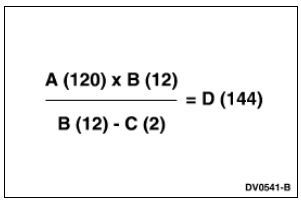
2. Measure the distance from the center of the torque wrench handgrip to the center of the torque wrench drive. Record this measurement as B.



3. Measure the distance from the center of the torque wrench adapter opening to the center of the torque wrench adapter drive. Record this measurement as C.



4. Example: multiply the torque value to be obtained A (120) by the length of the torque wrench B (12). Subtract the length of the torque wrench adapter C (2) from the length of the torque wrench B (12). Divide the product of A x B (1440) by the difference of B - C (10) to obtain the torque multiplication conversion D (144).



General Specifications

Item	Specification
Fuel Tank Capacity	
Midship Tank, Van/Wagon L (Gal)	132 (35)
Aft-of-Axle Tank, Cutaway/Commercial Chassis L (Gal)	140 (37)
Aft-of-Axle Tank, Cutaway/Commercial Chassis L (Gal)	208 (55)
Fuel Pressure Specifications	
Key On Engine Running kPa (psi)	193-310 (28-45)
Key On Engine Off kPa (psi)	240-310 (35-45)

Torque Specifications

Description	Nm	lb-ft	lb-in
Fuel Pump Mounting Bolts (Diesel)	8-10		71-88
Fuel Pump Mounting Screws (Gasoline)	8-10		71-88
Fuel Pump Mounting Nuts (Gasoline)	8-10		71-88
Fuel Tank Filler Pipe Bolts	2.1-2.9		19-25
Fuel Tank Support Strap Nuts (Aft-of-Axle)	77-103	56-75	
Inertia Fuel Shutoff Switch Bolts	1.6-2.2		14-19
Fuel Tank Support Strap Bolts (Aft-of-Axle)	87-119	64-88	
Fuel Tank Support Strap Nuts (Midship)	17-23	13-17	