

Page Description

For an example of a 122SD and Coronado 132 Maintenance Manual page, see Fig. 1.

A
B
C

Driveline
41

41-01 Driveline Inspection

**WARNING**

Self-locking bearing-cup or bearing-strap capscrews must not be reused; replace the capscrews with new ones. Also, do not undertighten or overtighten any bearing-cup or bearing-strap capscrews. A loose or broken fastener at any point in the driveline weakens the driveline connection, which could cause serious vehicle damage, or could result in a driveshaft separating from the vehicle, possibly causing loss of vehicle control that could result in serious personal injury or death.

1. Park the vehicle on a flat, level surface, apply the parking brakes, and chock the tires.

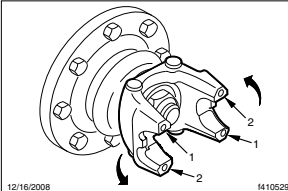
2. Check the torque of the bearing-cup or bearing-strap capscrews; see Table 1 for installed torque values.

Remove and discard any loose capscrews. Do not reuse any loosened self-locking capscrews; they are designed for one-time installation only. Replace all loosened and removed capscrews with new ones. Tighten the new capscrews as specified in Table 1.

*For half-round yokes with bearing straps, tighten the bearing-strap capscrews following the tightening sequence shown in Fig. 1, in increments of 20 lbf-ft (25 N-m) to the torque specifications listed in Table 1.*

Bearing Cap or Bearing Strap Capscrew Torque Specifications	
U-Joint Type	Torque: lbf-ft (N-m)
Half-Round Yokes with Bearing Straps and 3/8-inch Capscrews (see Fig. 2, Ref. 8)	45-60 (60-80)
Half-Round Yokes with Bearing Straps and 1/2-inch Capscrews (Fig. 2, Ref. 8)	130-135 (175-185)
Full-Round Yokes with Bearing Cups (Fig. 3)	43 (58)
RPL Series U-Joints with Bearing Cups (Fig. 4)	125 (169)

Table 1, Bearing Cap or Bearing Strap Capscrew Torque Specifications



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Tighten the capscrews in a counterclockwise sequence, starting with either number 1 position.

Fig. 1, Tightening Sequence, Half-Round Yoke Bearing Strap Capscrews

3. Check the driveline yokes for cracks, and check end-yokes for looseness; see Fig. 2.

Replace cracked yokes.

If any end-yoke can be moved in or out on its shaft, or can be rocked on its shaft, disconnect the driveshaft and U-joint from the yoke, then check the drive component's shaft seal for leakage or other visible damage that may have been caused by the loose yoke. Replace the seal if needed, then tighten the yoke nut. Refer to Section 41.00, Specifications 400 of the 122SD and Coronado Workshop Manual for torque specifications. If the yoke is still loose after tightening the yoke nut, replace the end-yoke and yoke nut.

Replace the prevailing torque locknut (end-yoke nut) if it was removed for yoke replacement, seal replacement, or any other reason.

4. Check U-joint assemblies for wear by moving the driveshaft up and down, and from side to side. If any movement of the U-joint cross in the bearings can be felt or seen, replace the U-joint assembly.

5. Check if the midship bearing and mounting are loose or have deteriorated, by attempting to move the driveshaft up and down, and from side to side. If the bearing is loose on its shaft, or rattles, replace it. If the bearing mount is loose on the frame, tighten the mounting fasteners to the proper torque value. See Section 41.00.

D
E
F

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A. Maintenance Operation Number consists of the Group Number followed by the Sequence Number  
 B. Group Title  
 C. Group Number  
 D. Vehicle Names  
 E. Release Date  
 F. Group Number/Page Number

Fig. 1, Example of a 122SD and Coronado 132 Maintenance Manual Page

## Vehicle Maintenance Schedule Tables: 00–02

Maintenance for Service Schedules III and IV				
Maint. No.	Maintenance Interval	Service Date	Service Schedules III and IV	
			Miles	km
1	IM and M1		25,000	40 000
2	M1		50,000	80 000
3	M1		75,000	121 000
4	M1 and M2		100,000	161 000
5	M1		125,000	201 000
6	M1		150,000	241 000
7	M1		175,000	281 000
8	M1 and M2		200,000	322 000
9	M1		225,000	362 000
10	M1		250,000	402 000
11	M1		275,000	443 000
12	M1, M2, and M3		300,000	483 000
13	M1		325,000	523 000
14	M1		350,000	563 000
15	M1		375,000	604 000
16	M1 and M2		400,000	644 000
17	M1		425,000	684 000
18	M1		450,000	724 000
19	M1		475,000	764 000
20	M1 and M2		500,000	805 000
21	M1		525,000	845 000
22	M1		550,000	885 000
23	M1		575,000	925 000
24	M1, M2, and M3		600,000	966 000
25	M1		625,000	1 005 800
26	M1		650,000	1 046 000
27	M1		675,000	1 086 000
28	M1 and M2		700,000	1 127 000
29	M1		725,000	1 167 000
30	M1		750,000	1 207 000
31	M1		775,000	1 248 000
32	M1 and M2		800,000	1 287 000
33	M1		825,000	1 328 000
34	M1		850,000	1 368 000
35	M1		875,000	1 408 000

## Noise Emission Control Maintenance

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### Federal Law, Part 205: Transportation Equipment Noise Emission Controls

Part 205, Transportation Equipment Noise Emission Controls, requires the vehicle manufacturer to furnish, with each new vehicle, such written instructions for the proper maintenance, use, and repair of the vehicle by the ultimate purchaser to provide reasonable assurance of the elimination or minimization of noise-emission-control degradation throughout the life of the vehicle. In compliance with the law, the noise emission controls maintenance information in each applicable group of this manual, in conjunction with the vehicle workshop manual, provides these instructions to owners.

### Recommendations for Replacement Parts

Replacement parts used for maintenance or repair of noise emission controls should be genuine Freightliner parts. If other than genuine Freightliner parts are used for replacement or repair of components affecting noise emission control, the owner should be sure that such parts are warranted by their manufacturer to be equivalent to genuine Freightliner parts in performance and durability.

### Freightliner Noise Emission Controls Warranty

Refer to the vehicle owner's warranty information book for warranty information concerning noise emission controls.

### Tampering with Noise Controls is Prohibited

Federal law prohibits the following acts or the causing thereof:

1. The removal or rendering inoperative by any person (other than for purposes of maintenance, repair, or replacement) of any device or element of design incorporated into any new vehicle for

the purpose of noise control, prior to its sale or delivery to the ultimate purchaser, or while it is in use.

2. The use of the vehicle after such device or element of design has been removed or rendered inoperative by any person.

Among those acts presumed to constitute tampering are the acts listed below:

- A. Removal of engine noise-deadening panels.
- B. Removal of cab-tunnel or hood noise-deadening panels.
- C. Removal of, or rendering inoperative, the engine speed governor so as to allow engine speed to exceed manufacturer's specifications.
- D. Removal of, or rendering inoperative, the fan clutch, including bypassing the control on any thermostatic fan drive to cause it to operate continuously.
- E. Removal of the fan shroud.
- F. Removal of, or rendering inoperative, exhaust components, including exhaust pipe clamping.
- G. Removal of air intake components.

## Maintenance Instructions

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Scheduled intervals are in the maintenance tables in this group. A "Verification of Inspections Log (Groups 01, 20, and 49)" follows, and should be filled in each time noise emission controls on the vehicle are maintained or repaired.

## 09-01 Air Cleaner Inspection

Restriction of air flow through the air cleaner element is measured at the tap in the air cleaner outlet. Check the restriction indicator at the air cleaner or in the cab if the vehicle is equipped with a dash-mounted restriction gauge.

Vehicles may be equipped with either a manual-reset restriction indicator with graduations (Fig. 1), or a go/no-go restriction indicator without graduations (Fig. 2).

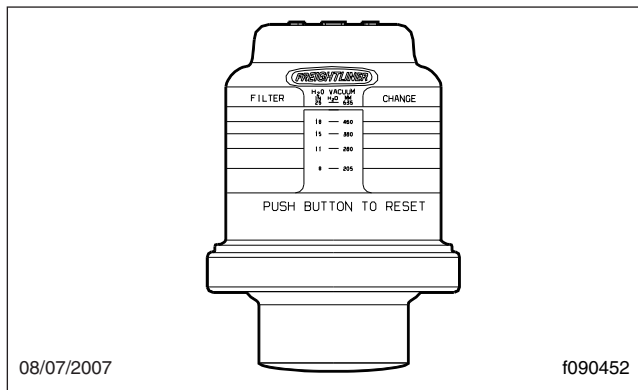


Fig. 1, Manual-Reset Air Restriction Indicator, Graduated

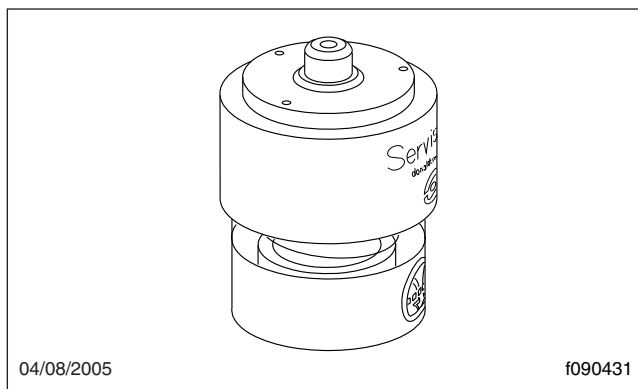


Fig. 2, Manual-Reset Air Restriction Indicator, Go/No-Go

1. Inspect the air restriction indicator to see if air restriction equals or exceeds the maximum allowable restriction. For instructions, see **Group 09** of the *122SD and Coronado Workshop Manual*.

2. Inspect the air cleaner housing for cracks, leaks, or any other damage. If the air cleaner housing or element is damaged, replace it.
3. Check the inserts at all four assembly fastener locations (see Fig. 3). Each insert should protrude from the housing as shown in Fig. 4.

If the head/flange of any of the threaded inserts is flush with or countersunk into the housing, replace the air cleaner assembly. See **Section 09.01** of the *122SD and Coronado Workshop Manual* for replacement instructions.

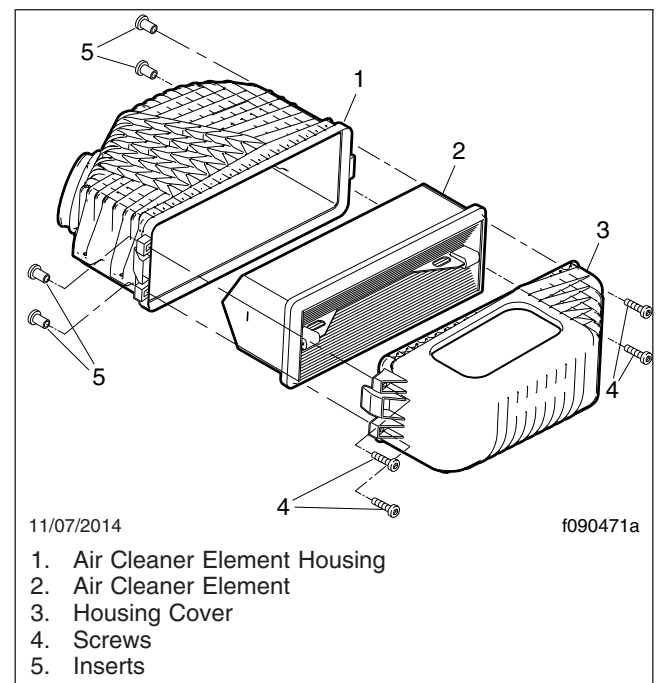


Fig. 3, Air Cleaner Assembly

### NOTICE

**Do not use aftermarket air cleaner elements. Aftermarket air cleaner elements may not seal the housing correctly, which can lead to engine damage and potentially the loss of warranty. When replacing an air cleaner element, use only the part listed in PartsPro for the serial number of the vehicle.**

4. If necessary, replace the air cleaner element. For air cleaner element replacement instructions, see **Group 09** of the *122SD and Coronado Workshop Manual*.

## 20–00 Safety Precautions

Safety Precautions in this section apply to all procedures within this group.

### **! DANGER**

When working on the vehicle, shut down the engine, set the parking brake, and chock the tires. Before working under the vehicle, always place jack stands under the frame rails to ensure the vehicle can not drop. Failure to follow these steps could result in serious personal injury or death.

## 20–01 Pressure Relief Cap Check

### **! WARNING**

Do not remove or loosen the surge tank cap until the engine and cooling system have completely cooled. Use extreme care when removing the cap. A sudden release of pressure from removing the cap prior to the system cooling can result in a surge of scalding coolant that could cause serious personal injury.

1. Remove the fill cap first, to relieve the cooling system pressure, then remove the SAE cap; see Fig. 1.
2. Using a radiator-cap tester, check the pressure cap to see if it maintains pressure to within 10% of the pressure rating marked on the cap. If it does not, replace the cap. Make sure that the replacement radiator cap is correctly rated for the cooling system of the vehicle.
3. There is a second valve in the radiator cap that opens under vacuum. This prevents the collapse of hoses and other parts that are not internally supported when the system cools. Inspect the vacuum-relief valve to be sure it is not stuck.
4. Make sure that the cap seals properly on the coolant filler neck seat, and that the radiator cap gasket is not damaged. On vehicles with screw-on caps with O-rings, make sure that the O-ring is not cracked or deteriorated. Replace the cap if the gasket shows deterioration or damage.

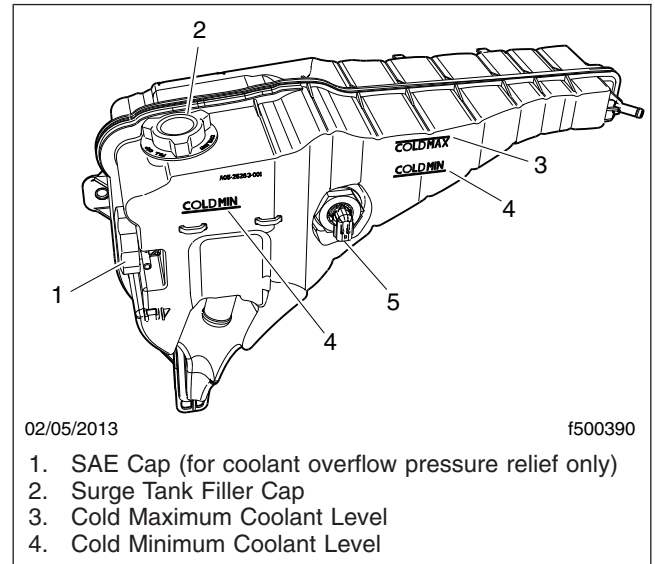


Fig. 1, Surge Tank

## 20–02 Radiator Pressure-Flushing and Coolant Change

NOTE: For additional instructions on cleaning and flushing the engine cooling system, see the applicable engine manufacturer's maintenance and operation manual.

1. Apply the vehicle parking brakes, then chock the tires. Tilt the hood.
2. Place a suitable container under the elbow of the radiator outlet pipe and the radiator. The container should hold at least 60 quarts (57 liters) of fluid.

### **! WARNING**

Do not remove or loosen the surge tank cap until the engine and cooling system have completely cooled. Use extreme care when removing the cap. A sudden release of pressure from removing the cap prior to the system cooling can result in a surge of scalding coolant that could cause serious personal injury.

3. Remove the surge tank cap.
4. Remove the drain plug at the radiator end tank; see Fig. 2. Allow the coolant to drain.

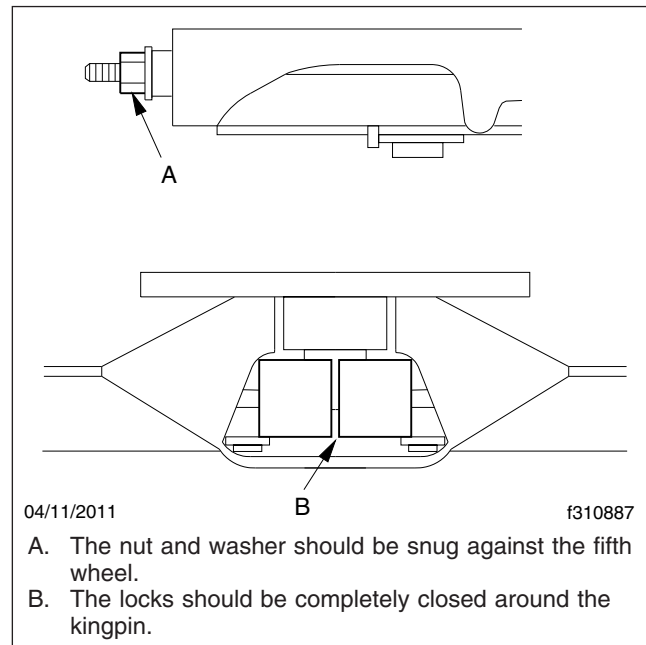
6. Check all cotter pins for cracking or damage. Replace any cotter pin that shows any signs of damage.
7. Check all mounting bolts for signs of fatigue, and tighten them to the proper torque. For torque specifications, see **Group 00** of the vehicle Workshop Manual. Inspect all angles, plates, and brackets for cracks or other damage.
8. Replace cracked, worn, or damaged parts with new parts. Replace all loose mounting bolts with 5/8–11 SAE grade 8 bolts, grade C locknuts, and hardened washers. *Do not* re-use bolts, nuts, and washers on fifth wheel mountings.
9. After inspecting the fifth wheel, lubricate all moving parts with a chassis or multipurpose grease. See **MOP 31–02** for lubrication instructions.

## Holland FW35

1. Disconnect the tractor from the trailer. For instructions, see the vehicle Driver's/Operator's Manual.
2. Thoroughly steam clean all fifth wheel components before inspection.
3. Check for cracks in the fifth wheel assembly, mounting brackets, and mounting parts.
4. Check the fastener torques on the fifth wheel assembly and fifth wheel mounting. Tighten bolts and nuts as needed. Replace missing or damaged bolts.
5. Inspect the fifth wheel for bent, worn, damaged, and missing parts; replace them as needed with genuine Holland parts.
6. Using a Holland Kingpin Lock Tester (Holland tool number TF-TLN-5001, available through the PDCs as HLD TFTLN5001), check the operation of the locking mechanism by opening and closing the locks. See **Fig. 3**.
7. After inspecting the fifth wheel, lubricate all moving parts with a chassis or multipurpose grease. See **MOP 31–02** in this manual for lubrication instructions.

## Fontaine

1. Disconnect the tractor from the trailer. For instructions, see the vehicle Driver's/Operator's Manual.



**Fig. 3, Holland Fifth Wheel Properly Closed**

2. Thoroughly steam clean the fifth wheel.
3. Check for cracks in the fifth wheel assembly, mounting brackets, and mounting parts.
4. Ensure that both bracket pins are in place and secured by retainer pins and cotter pins. See **Fig. 4**.
5. For fifth wheels equipped with bracket liners, rock the fifth wheel. If it does not rock freely, remove the top plate and inspect the bracket liners. Replace liners that are broken or less than 0.125 inch (3 mm) thick at the top of the liners. For the liner replacement procedure, see the Fontaine website, [www.fifthwheel.com](http://www.fifthwheel.com).
6. Check the jaw and stationary jaw for mushrooming, and check that the serrations at the jaw and wedge are in good condition.
7. Test the secondary safety lock latch for ease of operation.
8. Check for loose nuts or bolts on the fifth wheel and the mounting. Set a torque wrench to the maximum torque value for the bolt being checked, and confirm that the torque is to specification. Do not loosen the bolt to check the torque. For torque specifications, see **Group 00** of the vehicle Workshop Manual.

### 32-00 Safety Precautions

Safety Precautions in this section apply to all procedures within this group.



When working on the vehicle, shut down the engine, set the parking brake, and chock the tires. Before working under the vehicle, always place jack stands under the frame rails to ensure the vehicle can not drop. Failure to follow these steps could result in serious personal injury or death.

### 32-01 Suspension Inspection

#### Front Suspension Check



Do not replace individual leaves of a damaged leaf spring assembly; replace the complete spring assembly. Visible damage (cracks or breaks) to one leaf causes hidden damage to other leaves. Replacement of only the visibly damaged part(s) is no assurance that the spring is safe. On front spring assemblies, if cracks or breaks exist in the two top leaves, a loss of vehicle control could occur. Failure to replace a damaged spring assembly could cause an accident resulting in property damage, serious personal injury, or death.

Inspect the front spring assemblies for cracked, broken, or abnormally bent leaves. If any of these conditions exist, replace the spring assembly. See **Group 32** of the *122SD and Coronado Workshop Manual* for instructions.

#### Composite Springs

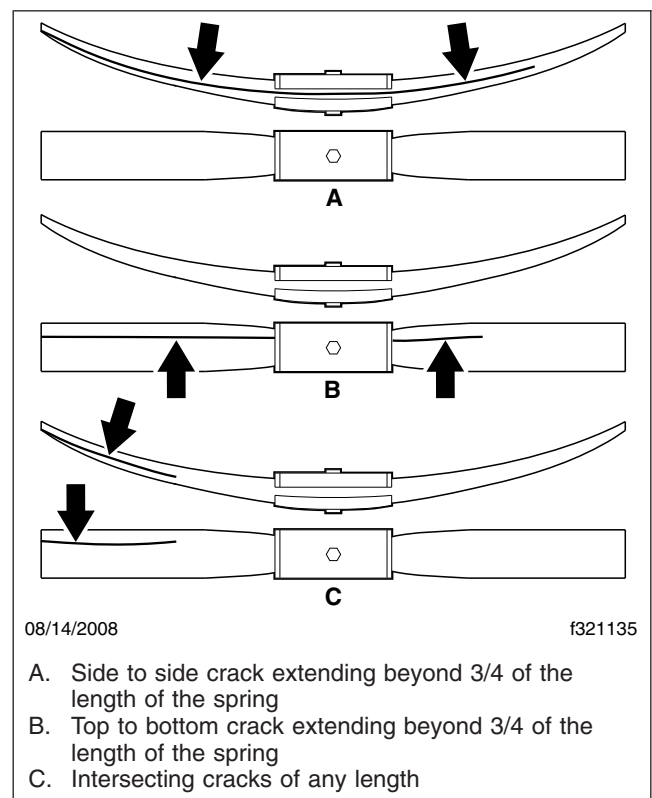
The Commercial Vehicle Safety Alliance (CVSA) defines a crack that causes out-of-service conditions for composite spring assemblies, as a separation in any axis, which passes completely through the composite spring material.

For additional information on composite spring assemblies, refer to the CVSA, *Out of Service (OOS) Criteria*.

Inspect the Liteflex spring for cracks that result in an out-of-service condition as follows (see **Fig. 1**):

- a side to side crack extending beyond 3/4 of the length of the spring;
- a top to bottom crack extending beyond 3/4 of the length of the spring;
- intersecting cracks of any length.

The Liteflex composite spring should also be removed from service if splintering has occurred to the point where noticeable vehicle ride height loss has occurred.



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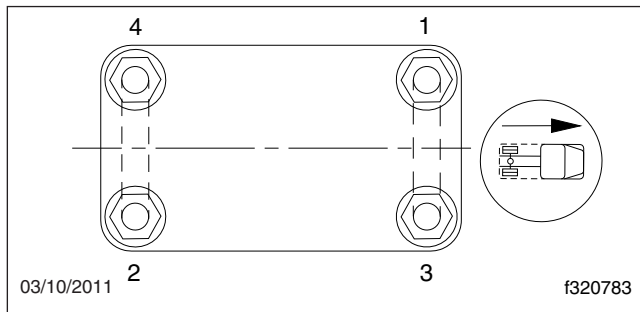
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- A. Side to side crack extending beyond 3/4 of the length of the spring
- B. Top to bottom crack extending beyond 3/4 of the length of the spring
- C. Intersecting cracks of any length

**Fig. 1, Out-of-Service Conditions, Composite Spring**

#### Shock Absorber Check, Front and Rear Suspensions

Make sure the shock absorber brackets are tight, and the shock absorber is not striking or rubbing the frame or some other part of the chassis. Striking or rubbing the frame is characterized by chafe marks on the shock absorber body and the frame rail. See **Fig. 2**. Check the rubber mounting bushings for cracks, cuts, swelling, and dry rot. Also, check the bushings for missing pieces. Replace the bushings as needed.



**Fig. 10, Tightening Pattern for U-Bolt High Nuts**



- Remove the axle carrier fill plug. Then remove the drain plug from the bottom of the housing. Completely drain the lubricant while the unit is warm, to allow the lubricant to drain faster.

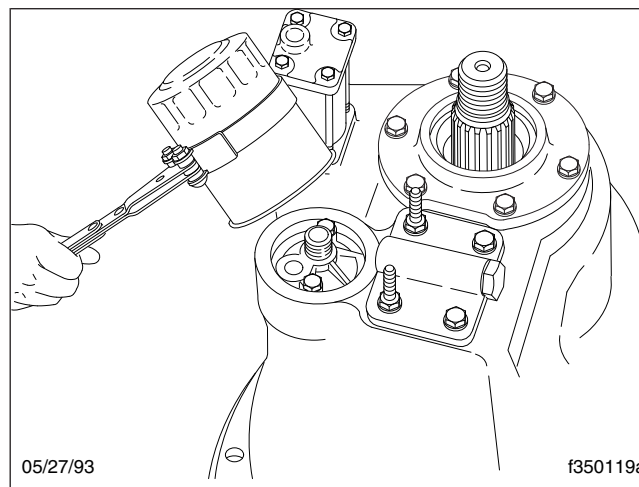
On tandem-drive axles, it is also necessary to remove the plug at the bottom of the interaxle differential housing to drain that lubricant.

- If equipped with an oil pump, remove the axle oil filter. Use a suitable filter strap wrench; see [Fig. 3](#). Discard the old filter.

**NOTE:** There may be about one pint (0.5 L) of lubricant remaining in the filter. Be careful not to spill it when removing the filter.

- Using the recommended drive axle lubricant, coat the face of the gasket on the new oil filter, if one was removed. Install the filter over the adapter, and tighten the filter one full turn after the gasket contacts the base; do not overtighten. See [Table 3](#) for recommended lubricants.

- Clean the fill and drain plugs as follows. Change them if necessary.



**Fig. 3, Meritor Axle Oil Filter Removal**

Meritor Drive Axle Recommended Lubricant			
Recommended Lubricant Type	Ambient Temperature	Lubricant SAE Viscosity Grade	Meritor Specification
Synthetic Gear Oil	-40°F (-40°C) and Up*	75W-90	0-76-N
	-40°F (-40°C) and Up*	75W-140	0-76-M

\* There is no upper limit on these outside temperatures, but axle sump temperature must never exceed 250°F (121°C).

**Table 3, Meritor Drive Axle Recommended Lubricant**

- For magnetic plugs, use a piece of key stock or any other convenient steel slug to short the two magnetic poles and divert the magnetic field.
- Check the drain plug for metal particles every 100,000 miles (160 000 km). Clean away the collected material deposited on each pole. Magnets will rapidly lose their effectiveness as collected material bridges the gap between the two poles.
- Each time the oil is changed, replace any magnetic drain plug that does not meet the minimum pickup capacity.

**NOTE:** Meritor recommends plugs with elements having a minimum pickup capacity of 1.5 pounds (0.7 kg) of low-carbon steel.

- After cleaning, install the drain plug(s) and tighten to 35 lbf-ft (47 N·m).

- Fill the axle with recommended lubricant as follows. See [Table 4](#) for drive axle lubricant capacities.

**NOTE:** Some Meritor axles have a small tapped and plugged hole near and below the housing lubricant fill hole. This smaller hole is for a lubricant temperature indicator only, and should not be used as a fill or level hole.

- With the vehicle on a level surface, fill the axle through the oil fill hole. Allow a few minutes for the oil to flow into the axle. Lubricant should be level with the bottom of the oil fill hole. To check fluid level, see [Fig. 2](#).
- Install and tighten the fill plug 35 lbf-ft (47 N·m).

## Two-Speed Axles With Shift Unit

### Dana Spicer and Meritor

IMPORTANT: Also do the appropriate procedure under the heading "All Axle Models."

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#### NOTICE

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**Failure to keep lubricant at the specified level could cause damage to the axle shift unit.**

1. Clean the shift unit oil fill plug, and the area surrounding the plug. See **Fig. 6**. Turn the fill plug counterclockwise to remove it.
2. Insert a finger or pipe cleaner into the fill plug hole and check the fluid level. The lubricant should be level with the bottom of the fill hole. If low, add the recommended lubricant.

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#### NOTICE

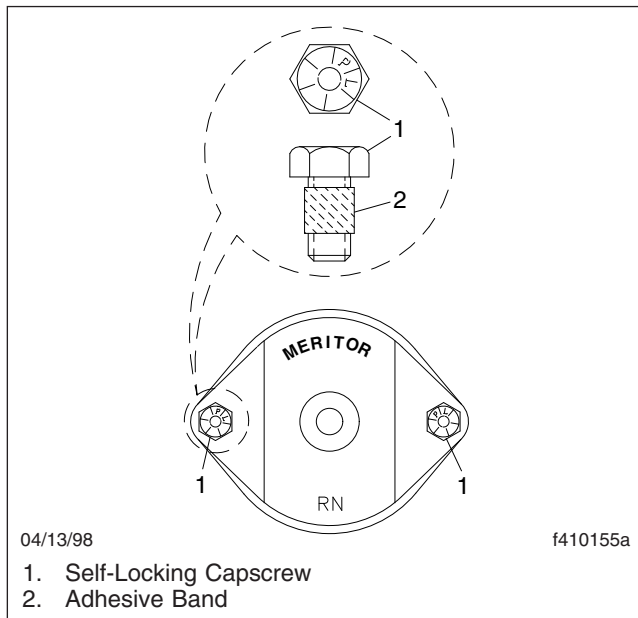
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**Before adding additional lubricant, make sure of the type currently in the shift unit. To prevent component damage, do not mix engine oil with automatic transmission fluid.**

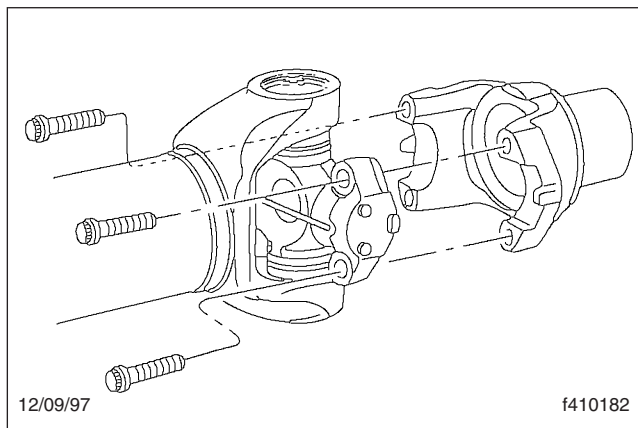
IMPORTANT: When the ambient temperature is above 0°F (-18°C), use SAE 10 heavy-duty engine oil, API service classification SD (sulfated ash content must not exceed 1.85%). When the ambient temperature is below 0°F (-18°C), use one part kerosene to three parts SAE 10 heavy-duty engine oil, API service classification SD (sulfated ash content must not exceed 1.85%). This cold-weather mixture can be safely used up to 32°F (0°C).

Commercially available automatic transmission fluid may be used in place of SAE 10 engine oil. Automatic transmission fluid can be used for all temperatures; do not mix it with kerosene.

3. Coat the threads of the fill plug with a small amount of Loctite® 242, or equivalent sealant. Install the fill plug finger-tight in the rear axle shift unit housing. Using a wrench, tighten it an additional 1-1/2 turns.

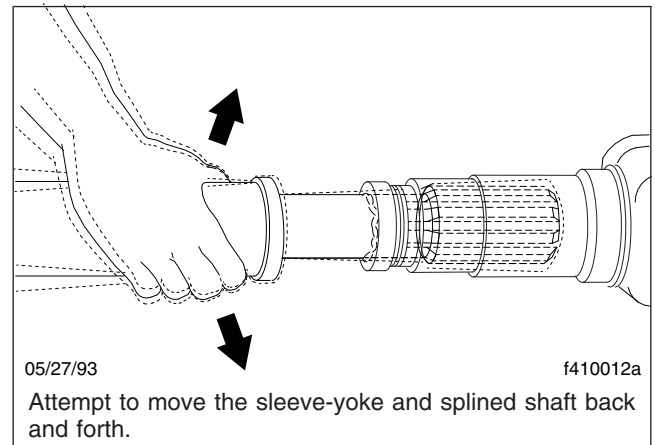


**Fig. 3, Meritor U-Joint Fasteners for Full-Round Yokes**



**Fig. 4, Meritor RPL Series U-Joint**

6. Check slip joints for spline wear by moving the sleeve-yoke and splined shaft back and forth; see **Fig. 5**. If the slip joint can be twisted in a clockwise, or counterclockwise movement greater than 0.007 inch (0.18 mm), replace both the sleeve-yoke and the splined shaft.
7. Examine the driveshaft tubes for dents, bends, twists, or other damage. If any tube appears to be damaged, refer to **Section 41.00** of the *122SD and Coronado Workshop Manual* for repair and replacement instructions.



**Fig. 5, Slip Joint Spline Wear Checking**

8. Examine the driveshaft for evidence of missing balance weights, and for build-up of foreign material. Remove any foreign material. If there is any evidence that balance weights are missing, remove the driveshaft and have it balanced.
9. For driveshafts with slip joints, check to be sure the yoke plug is not loose or missing; see **Fig. 6**, Ref. 2. Repair or replace the yoke plug as needed. If the yoke plug is missing, the splined shaft may be hitting the plug and knocking it out; contact your Regional Service Office for assistance in determining the correct driveshaft length.

## 41-02 Driveline Lubrication

### Universal Joint Lubrication

**NOTE:** Vehicles equipped with Meritor RPL Series drivelines do not require periodic lubrication.

1. Park the vehicle on a level surface, apply the parking brakes, and chock the tires.
2. Wipe all old grease and dirt from each U-joint grease fitting. See **Fig. 6**.
3. Use a hand-type grease gun, or a high-pressure gun with a low-pressure adapter, to lubricate U-joints. If a low-pressure adapter is not used, U-joints may not receive enough grease.

Using lithium 12-Hydroxy stearate grease (NLGI Grade 2, with EP additives), lubricate until *new* grease can be seen at *all four* U-joint seals. Fresh grease must be seen escaping from *all*

8. Install the reservoir on the cover and tighten the capscrews.
9. Fill the reservoir with 40 ounces (1183 mL) of methyl alcohol, then install the filler cap.

## 42–05 Brake Inspection

### Parking Brake Operational Check

**IMPORTANT:** This procedure should be performed prior to lubrication of the brake components.

#### CAUTION

**Perform the following check in a clear safe area. If the parking brakes fail to hold the vehicle, personal injury or property damage may result.**

1. With the engine running, and air pressure at cut-out pressure, set the parking brake.
2. Put the vehicle in the lowest gear and gently attempt to move it forward. The vehicle should not move. If the vehicle moves, the parking brakes are not operating correctly and must be repaired before the vehicle is returned to service. See **Group 42** of the vehicle Workshop Manual for repair procedures.

### Brake Component Inspection

1. Park the vehicle on a level surface, set the parking brake, and chock the tires. Once the tires are chocked, release the parking brake.

#### WARNING

**Manually adjusting an automatic slack adjuster to bring the pushrod stroke within legal limits is likely masking a mechanical problem. Adjustment is not repairing. Before adjusting an automatic slack adjuster, troubleshoot the foundation brake system and inspect it for worn or damaged components. Improperly maintaining the vehicle braking system may lead to brake failure, resulting in property damage, personal injury, or death.**

2. With the engine off, and 100 psi (689 kPa) of air tank pressure, have an assistant apply and hold an 80 to 90 psi (550 to 620 kPa) brake application.

3. Check to see if the colored over-stroke band on each brake chamber pushrod is exposed.

If a band shows, the stroke is too long. Check the foundation brake components for wear or damage, and repair as needed. See **Group 42** of the vehicle Workshop Manual for inspection and repair procedures.

4. Measure the applied chamber stroke.

See **Table 1** for the proper stroke for the type of chamber being used. If the stroke is too short, the brakes may drag or will not fully apply. Check for improper operation or adjustment of the automatic slack adjuster. See **Group 42** of the vehicle Workshop Manual.

<b>Actuator Stroke–Standard Stroke</b>	
<b>Brake Actuator Size</b>	<b>Recommended Maximum Operating Stroke (Inches)</b>
30	2
24	1-3/4
20	1-3/4
16	1-3/4
12	1-3/8

**Table 2, Actuator Stroke–Standard Stroke**

<b>Actuator Stroke–Long Stroke</b>	
<b>Brake Actuator Size</b>	<b>Recommended Maximum Operating Stroke (Inches)</b>
30 Long Stroke	2-1/2
24 Long	2
24 Long Stroke	2-1/2
20 Long	2
16 Long	2

**Table 3, Actuator Stroke–Long Stroke**

## 47–00 Safety Precautions

Safety Precautions in this section apply to all procedures within this group.

### DANGER

When working on the vehicle, shut down the engine, set the parking brake, and chock the tires. Before working under the vehicle, always place jack stands under the frame rails to ensure the vehicle can not drop. Failure to follow these steps could result in serious personal injury or death.

## 47–01 Fuel Filter Replacement

For engine-mounted fuel filter replacement, refer to the engine manufacturer's service manual for removal and installation procedures.

## 47–02 Fuel/Water Separator Element Checking and Replacement

### Alliance/Racor

The only maintenance necessary on an Alliance or Racor fuel/water separator is to replace the filter element.

### WARNING

Fluid circulated through the fuel/water separator to heat the fuel may be diesel fuel returned from the engine, or engine coolant. Drain the fuel/water separator only when the engine and fluids have cooled. Draining it when the engine is hot could cause severe personal injury due to scalding.

If returning fuel is released into the atmosphere, its vapors can ignite in the presence of any ignition source. Do not expose the fuel to, or work with the fuel system near, open flame or intense heat. To do so could cause fire, possibly resulting in serious personal injury or property damage.

1. Drain off some fuel by loosening the vent plug and opening the drain valve.

2. Disconnect the water sensor and heater connections if equipped.
3. Remove the element and bowl together, by turning counterclockwise.
4. Remove the bowl from the element and clean the O-ring land.
5. Apply a coating of clean fuel or motor oil to the new O-ring and element seal.
6. Spin the bowl onto the new element, then spin them both onto the filter head, snugly, by hand only.

**IMPORTANT:** Do not use tools to tighten the bowl and element.

7. Connect the water sensor and heater connectors if equipped.
8. If equipped with a primer pump, prime the fuel/water separator as follows.
  - 8.1 Loosen the vent plug. Then operate the primer pump until the fuel purges at the vent plug. See [Fig. 1](#).
  - 8.2 Close the vent plug.
9. Start the engine and check for fuel leaks.
10. Shut down the engine and correct any fuel leaks.

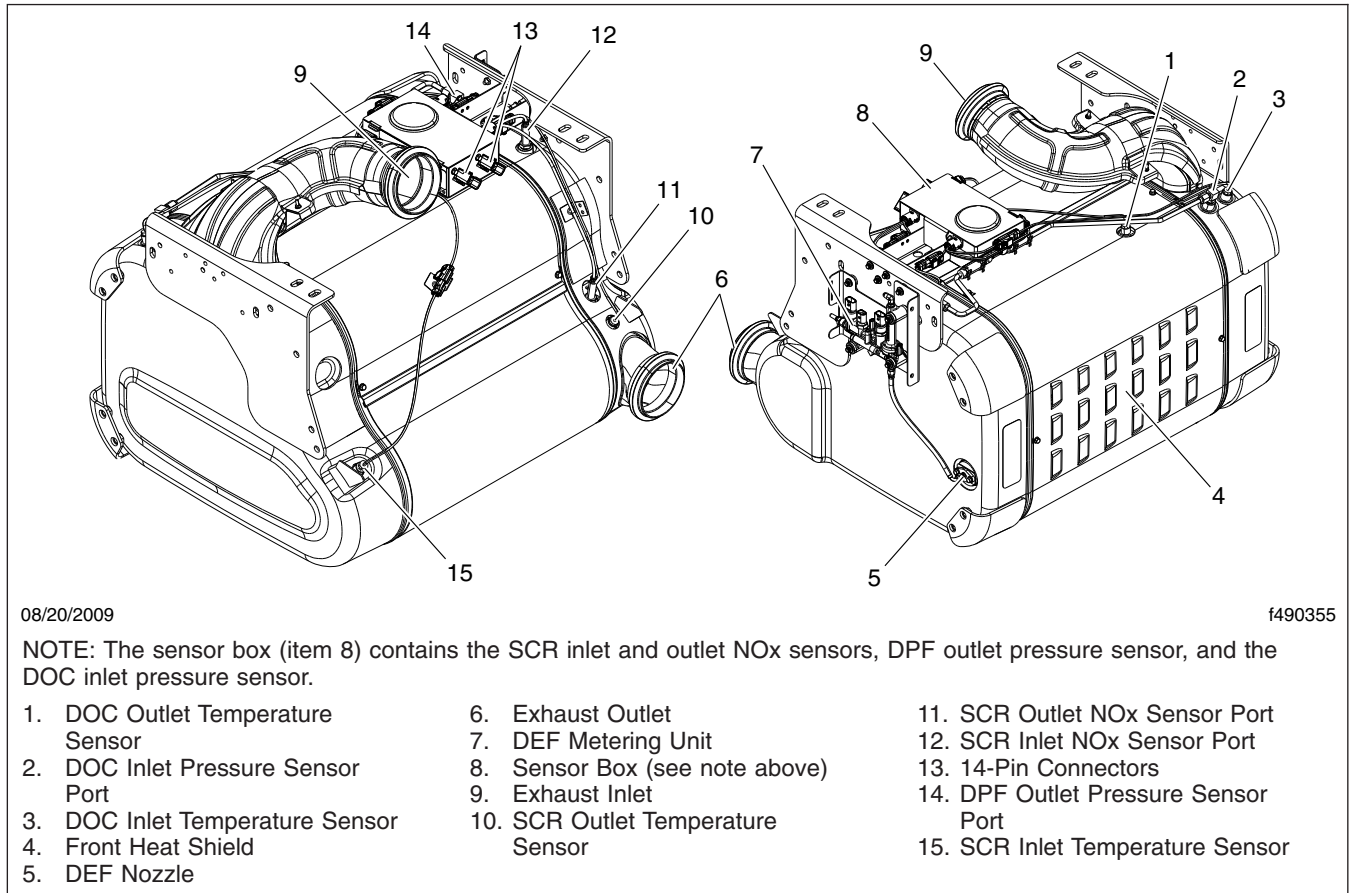
## Davco Fuel Pro® 382 and 482

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The filter element should be changed only when the fuel level has reached the top of the filter element. There is no significant restriction to fuel flow until the element is completely clogged.



**Fig. 1, One-Box ATS Sensor Locations (EPA10)**

mm) deep could cause internal damage to the DPF, causing it to malfunction.

- 8. Check for heat discoloration on the surface of the ATD. Heat discoloration may indicate internal damage; especially around the DPF.
- 9. Check any wires, lines, or hoses within 4 inches (10 cm) of the exhaust system for heat damage. Repair or reroute as needed.