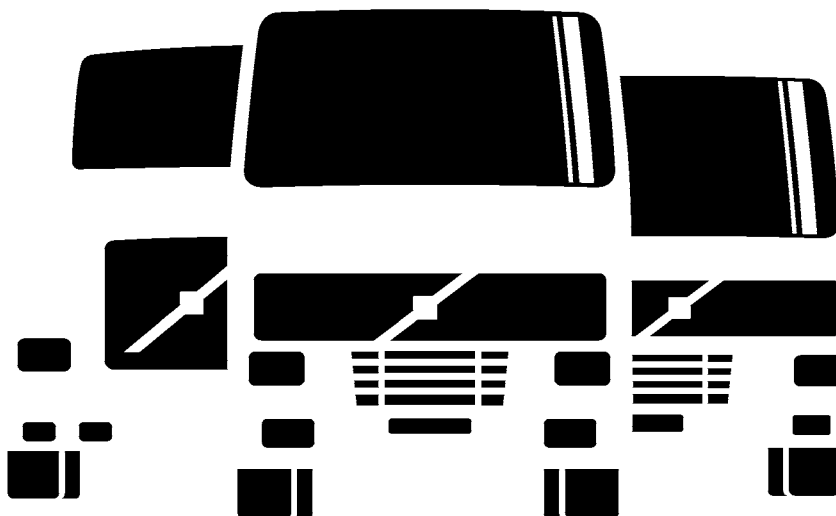


# Service Manual Trucks

Group **171–500**

Pre-Delivery Inspection

VN, VHD



# Foreword

The descriptions and service procedures contained in this manual are based on designs and methods studies carried out up to April 2001.

The products are under continuous development. Vehicles and components produced after the above date may therefore have different specifications and repair methods. When this is believed to have a significant bearing on this manual, supplementary service bulletins will be issued to cover the changes.

The new edition of this manual will update the changes.

In service procedures where the title incorporates an operation number, this is a reference to an S.R.T. (Standard Repair Time).

Service procedures which do not include an operation number in the title are for general information and no reference is made to an S.R.T.

The following levels of observations, cautions and warnings are used in this Service Documentation:

**Note:** Indicates a procedure, practice, or condition that must be followed in order to have the vehicle or component function in the manner intended.

**Caution:** Indicates an unsafe practice where damage to the product could occur.

**Warning:** Indicates an unsafe practice where personal injury or severe damage to the product could occur.

**Danger:** Indicates an unsafe practice where serious personal injury or death could occur.

**Volvo Trucks North America, Inc.**  
Greensboro, NC USA

**Order number: PV776-TSP147914**

**Repl: This manual replaces Service Manual 171-500 "Pre-Delivery Inspection", publication no. PV776-TSP142924 and Supplement 171-500-01, "Axle Shaft Gaskets, Pre-Delivery," publication no. PV776-TSP144734, of 8/2000.**

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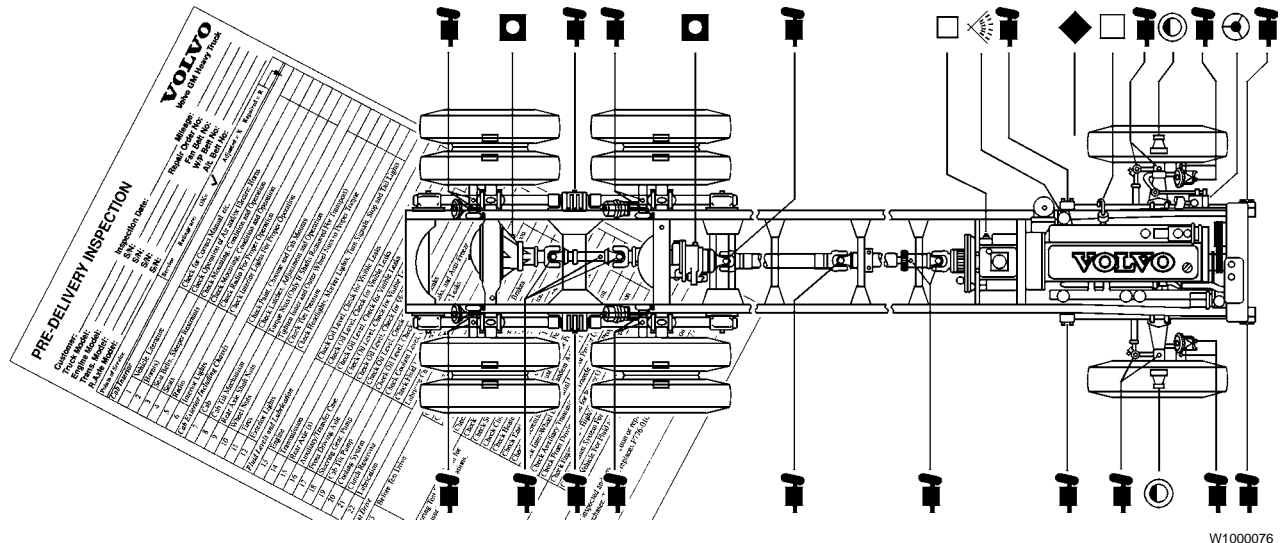
# Contents

<b>General</b> .....	3
Pre-Delivery Inspection .....	3
<b>Pre-Delivery Inspection</b> .....	5
1711-09-02-01 Pre-Delivery Inspection .....	5
Cab Interior .....	5
Cab Exterior Including the Chassis .....	8
Fluid Levels and Lubrication .....	12
Test Drive .....	19
Pre-Delivery Inspection Form .....	22
<b>Feedback</b>	



# General

## Pre-Delivery Inspection



W1000076

The Pre-Delivery Service Manual is written for the purpose of assuring the customer and Volvo Trucks North America, Inc. that the vehicle is checked and inspected before actual delivery to the customer.

This manual together with the Operator's Manual for the vehicle are a help to service personnel and should be used with the Pre-Delivery Inspection Sheet at the end of this information.

This is not a step-by-step procedures manual and, when necessary, other manuals will be noted when reference is needed. Where the phrase "Check for proper operation" is used, it is assumed that an experienced technician, with a working knowledge of the vehicle and its basic operation, is performing the check. Technicians not familiar with basic vehicle operation should receive adequate training to the point where an inspection of the vehicle can be carried out with an assurance that the judgement to pass an item as being in good condition is made with certainty.

When using the "Pre-Delivery Inspection Form" page 22, note on the back of the form under NOTES any defects found when doing the inspection.



# Pre-Delivery Inspection

1711-09-02-01

## Pre-Delivery Inspection

The "Pre-Delivery Inspection Form" page 22 should be used when doing the Pre-Delivery Inspection. Fill in the form and add a copy to the owner's package.

### Cab Interior



1

#### Vehicle Literature

Check the vinyl envelope that is provided with the vehicle to see that it contains the following information:

- Operator's Manual for Vehicle
- Operator's Manual, Maintenance and Engine
- Operator's Manual, Vendor Engines or Transmissions
- Dealer Directory
- Truck Warranty Certificate
- Product Report
- Publications Order Form
- Incomplete Vehicle Document
- Wheel Alignment Information
- Truck Order Bill Listing
- Weight Certificate
- Tire Warranty

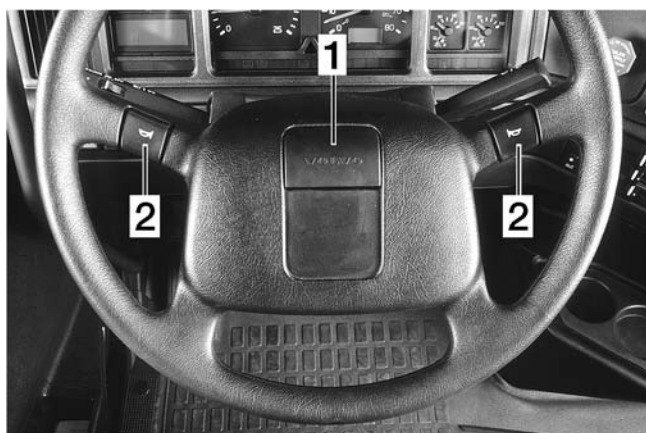
**Note:** Other literature may be provided depending on the configuration of the truck. Such literature includes, but is not limited to:

- Engine Brakes
- Radio, etc.



**DANGER**

Before working on a vehicle, set the parking brakes, place the transmission in neutral, and block the wheels. Failure to do so can result in unexpected vehicle movement and can cause serious personal injury or death.

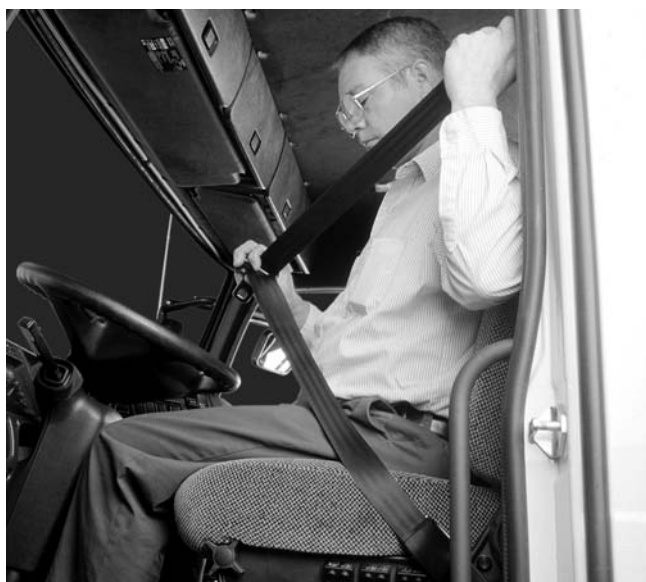


W8000947

**2** Horn(s)

Sound the air horn (1) and electric horn (2) to ensure proper operation.

Each horn should have a strong, clear tone.

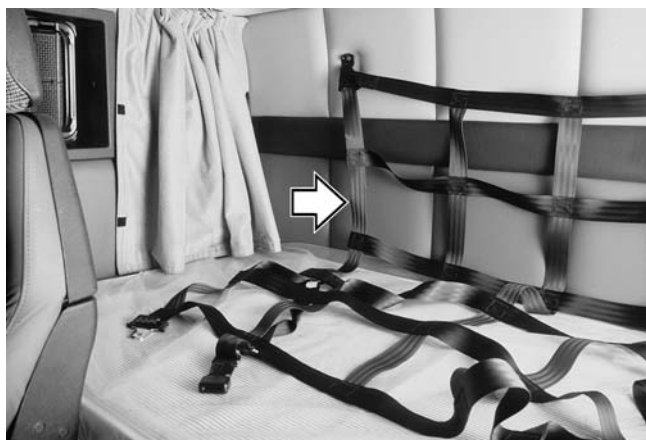


W8000893

**3** Safety Belts, Sleeper Restraints

Check the safety belts for function and condition. Operate the belt latch and verify that it locks and unlocks properly. Check belts for:

- Smooth rolling when rolling out and retracting.
- Check mounting bolt tightness and for any defects in hardware.



W8000895

If the vehicle is a sleeper model, verify that the restraint harness latches operate properly. Check condition of the webbing.





W8002768

## 4 Seats

Check both seats for proper function. Operate the switches to verify function.

If seat has the heater option, turn on the switch and feel for heat.

**Note:** The heater will only work at ambient temperatures under  $103 \pm 5^{\circ}\text{F}$  ( $40 \pm 3^{\circ}\text{C}$ ).



W3000756

## 5 Radio

Turn on the radio (if equipped) and verify that it operates without distortion or static noise.

Check all functions of:

- Radio
- Tape deck
- CD player

**Note:** Use the same cassette and/or CD recording every time to test the sound system.



W3000809

## 6 Interior Lights

Operate the switches of all interior lights to verify function and that the bulbs light up:

- Ceiling light
- Bunk lights
- Door lights
- Luggage compartment lights

**Note:** The overhead light is operated by the door switch in one position and will stay on in the other position.

## Cab Exterior Including the Chassis

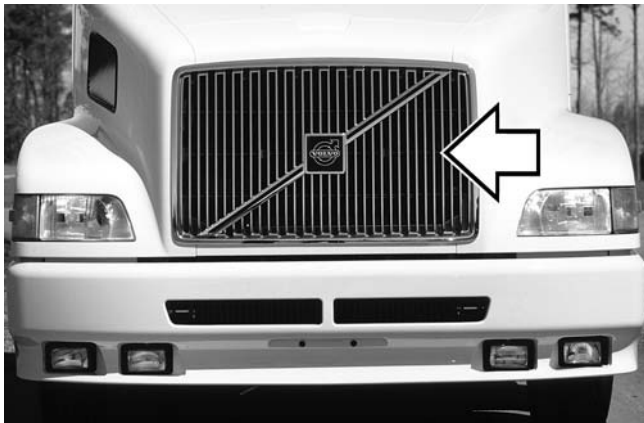


W1000061

**7****Cab****DANGER**

Before working on a vehicle, set the parking brakes, place the transmission in neutral, and block the wheels. Failure to do so can result in unexpected vehicle movement and can cause serious personal injury or death.

Check all paint on the cab, hood and chassis. Note any discrepancies.



W8001288

Check all chrome, for example grille, chrome accessories, etc., for damage or discoloration.



W8000855

Check cab mounting and suspension. Check the ride height for cab air suspension. For the proper operation for checking the cab suspension, refer to service information in group 81.

Measure from top of spring plates to top of cab suspension crossmember. Correct ride height is  $6.850 \pm 0.157$  in. ( $174 \pm 4$  mm).

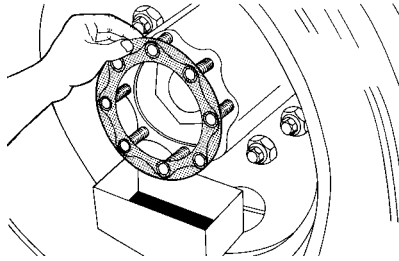


W8000897

**8****Hood Latch and Tilt**

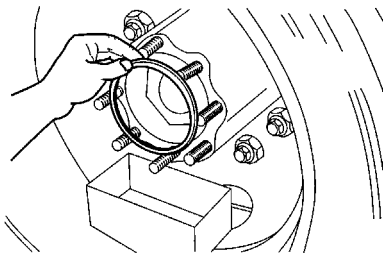
Check the hood latches for proper adjustment and operation.

Check operation of hood restraint cylinders. Inspect splash shields. Raise and lower the hood to ensure proper operation and make sure that the latches secure the hood when closed.



W7000046

Gasket for aluminum hubs



W4002087

O-ring for steel hubs

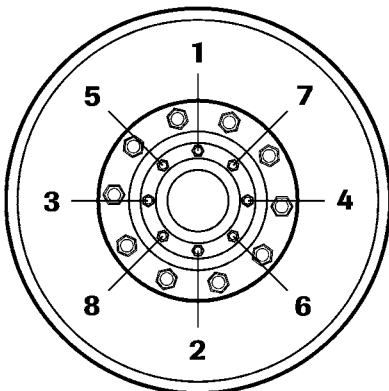
**9****Drive Axle Shaft Gaskets**

On vehicles where the axle shafts were removed for transportation, check for cracks or tears in the gaskets or O-rings. If any damage can be seen, replace gasket or O-ring. Remove transport cover. Install new gasket (for aluminum hub) or O-ring (for steel hub). Inspect gasket or O-ring surface on the axle shaft to make sure it is clean. Install axle shaft.

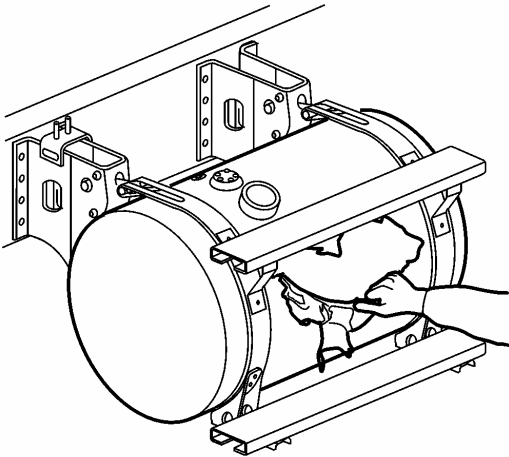
<i><b>Fastener</b></i>	<b>Torque Values, ft-lb (Nm)</b>
<b>Thread Size (in.)</b>	<b>Lock Nut</b>
0.75-16	275 ± 25 (372 ± 34)

**10****Drive Axle Shaft Nuts**

On vehicles where the axle shafts were removed for transportation, check-tighten the drive axle shaft nuts to the correct torque, as indicated.

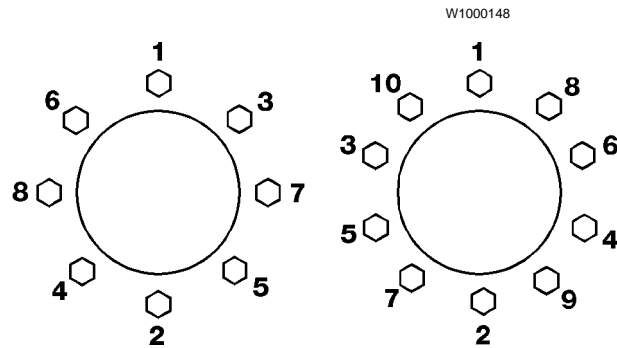


W4000895



## 11 Fuel Tanks

Remove protective coating on polished tanks if tank is exposed.



Wheel Nut Torque Tightening Sequence

## 12 Wheel Nuts

All disc wheels for the VN or VHD-series have fasteners that require a torque of 450 ft-lb (610 Nm). For dual wheels, the following procedure must be used:

- 1 Loosen outer nuts.
- 2 Tighten inner nuts to a torque of 450 ft-lb (610 Nm).
- 3 Tighten outer nuts to a torque of 450 ft-lb (610 Nm).

For spoke wheels, check the manufacturer specifications.



W7000437

## 13 Tires

Check the tires for proper inflation and leak-test the valve stems.

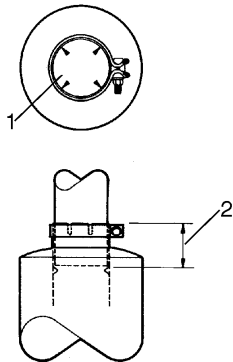


W3004392

## 14 Exterior Lights

Check headlights, marker lights, turn signals, stop, and tail lights for proper operation.

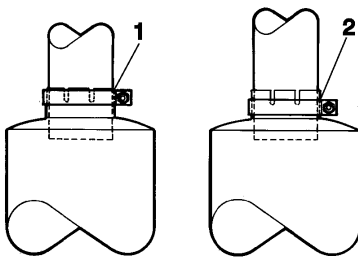
Check headlight aim.



W2003594

Inserting stack pipe to stops

- 1 Stops
- 2 3 1/2 in. (38.1 mm)



W2003595

Aligning clamp

- 1 Correct
- 2 Incorrect

## 15 Exhaust Clamp

If the exhaust stack has been removed during towing, the clamp must be retorqued after reinstallation of the stack pipe. Check to be sure the top edge of the clamp is flush with the top of the muffler. The clamp must cover the slots.

Finish tightening nut to a torque of 32-37 ft-lb (43.5-50 Nm).

## Fluid Levels and Lubrication

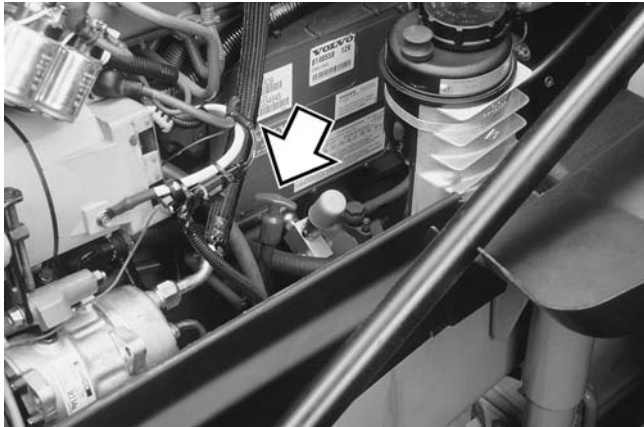
### DANGER

Before working on a vehicle, set the parking brakes, place the transmission in neutral, and block the wheels. Failure to do so can result in unexpected vehicle movement and can cause serious personal injury or death.

### WARNING

**HOT ENGINE!** Keep yourself and your test equipment clear of all moving parts or hot engine parts and/or fluids. A hot engine and/or fluids can cause burns or can permanently damage test equipment.

**Note:** Check fluid levels with the vehicle on level ground. If the fluid level is low, add as necessary. If oil has to be added, use only the same type of oil that is already in the component. Also check for any leaks and note on the back of the "Pre-Delivery Inspection Form" page 22.



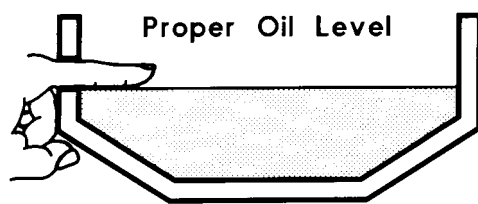
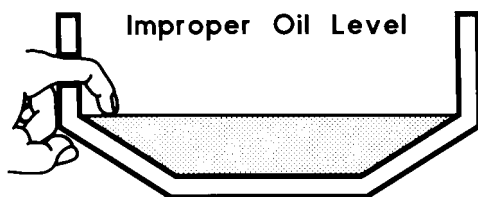
W2002047

## 16 Engine

### CAUTION

Do not mix synthetic oils with petroleum-based oils. Mixing synthetic oils with petroleum-based oils can cause component failure and/or component damage.

Check the engine oil level. The acceptable level is between the MIN and MAX marks on the dipstick. If the oil level is above the top mark, oil should be removed from the oil sump. Check for visible oil leaks.



W4000768

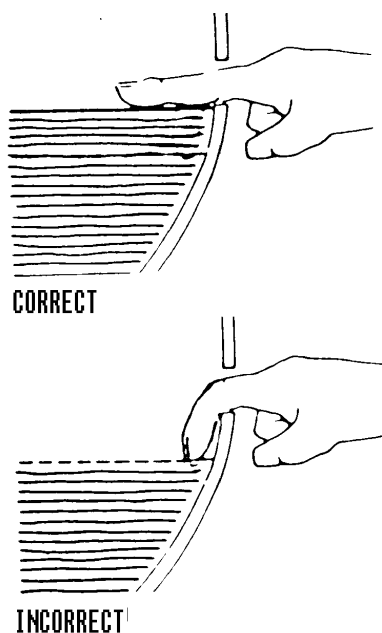
## 17 Transmission/Oil Cooler

### CAUTION

Do not mix synthetic oils with petroleum-based oils. Mixing synthetic oils with petroleum-based oils can cause component failure and/or component damage.

Check the oil level in the transmission by removing the fill/level plug in the side of the transmission housing or check with the dipstick. The oil should be level with the bottom of the fill/level plug hole or according to the marking on the dipstick. Check for visible oil leaks.

For Allison automatic transmission, refer to the Allison Operator's Manual for proper fluid level checking procedures.



W0000233

## 18 Rear Axle(s)

### ! CAUTION

Most rear differentials have a large screw and nut protruding from the housing. The screw and nut hold the thrust plate shoe against the ring gear and are not to be confused with the fill/level plug.

### ! CAUTION

Do not mix synthetic oils with petroleum-based oils. Mixing synthetic oils with petroleum-based oils can cause component failure and/or component damage.

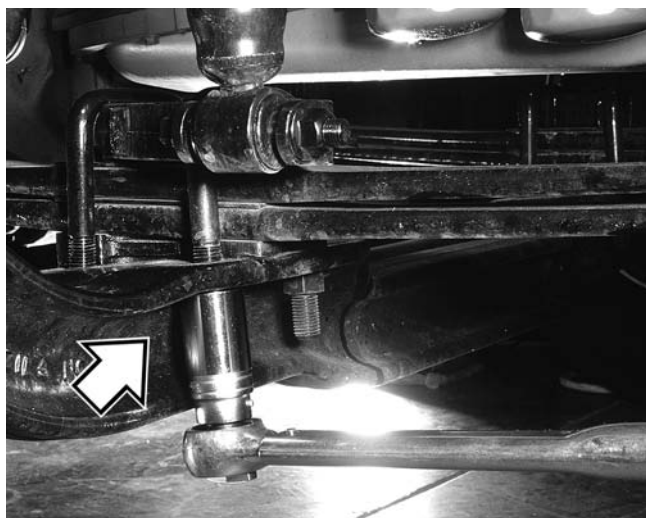
Check the oil in the differential by removing the fill/level plug in the housing. The oil should be level with the bottom of the fill/level plug hole. Check for visible oil leaks.

## 19 Auxiliary/Transfer Case

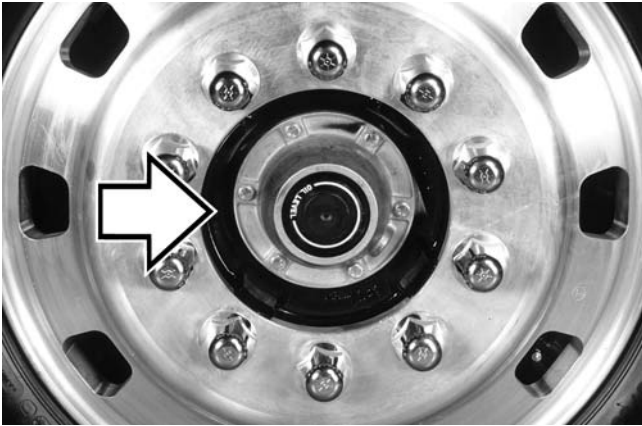
Not offered for the VN or VHD series.

## 20 Front Axle

Tighten the spring U-bolt nuts to a torque of 310 ft-lb (420 Nm).



W6000877



W7000438

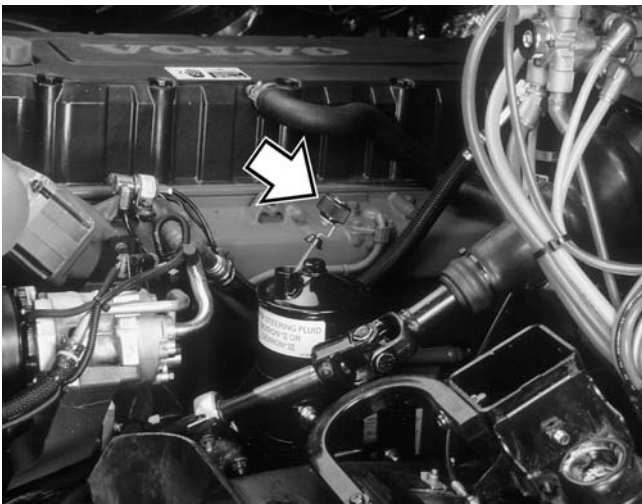
## 21 Front Axle Hubs



### CAUTION

Do not mix synthetic oils with petroleum-based oils. Mixing synthetic oils with petroleum-based oils can cause component failure and/or component damage.

For front axles equipped with oil lubricated wheel bearings, check the fluid level in front axle hubs. Check for visible leaks.



W6001428

## 22 Steering System



### CAUTION

Do not mix synthetic oils with petroleum-based oils. Mixing synthetic oils with petroleum-based oils can cause component failure and/or component damage.

Check the fluid level in the power steering reservoir with the engine off. The level should be at the full mark on the dipstick. Check for visible leaks.

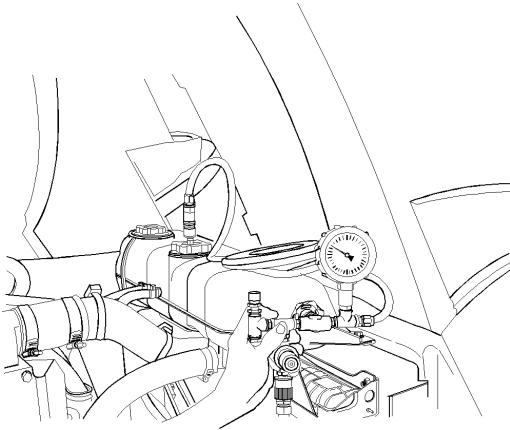
**Note:** Do not overfill the power steering reservoir or fill with the engine running. For proper fluid type, refer to decal affixed to the power steering reservoir.

On vehicles equipped with steering helper cylinder or gear on the right side of the frame, check the components for visible leaks.

## 23 Cab Tilt Pump

Not used for the VN or VHD-series.





W2001430

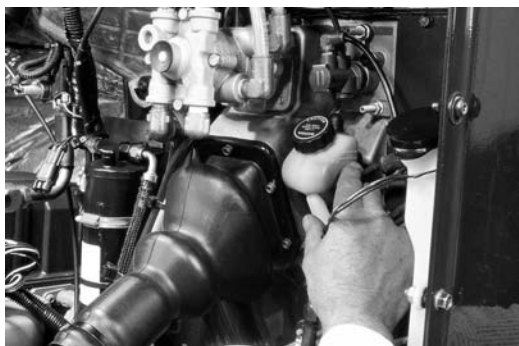
**24 Cooling System****! WARNING**

Do not remove the coolant fill cap (or cap on the expansion tank) until coolant temperature is less than 120°F (50°C). Otherwise, scalding steam or fluid may escape under pressure, which can cause serious injury.

**! WARNING**

Do not work near the fan with the engine running or the ignition in the ON position. The engine fan can engage at any time without warning. Anyone near the fan when it turns on could be seriously injured.

Check to see that the coolant/anti-freeze in the radiator is at the proper level. Pressure test the system and check for leaks. For information, refer to service information in group 26.



W4000749

**25** Clutch Reservoir**CAUTION**

Do not mix synthetic oils with petroleum-based oils. Mixing synthetic oils with petroleum-based oils can cause component failure and/or component damage.

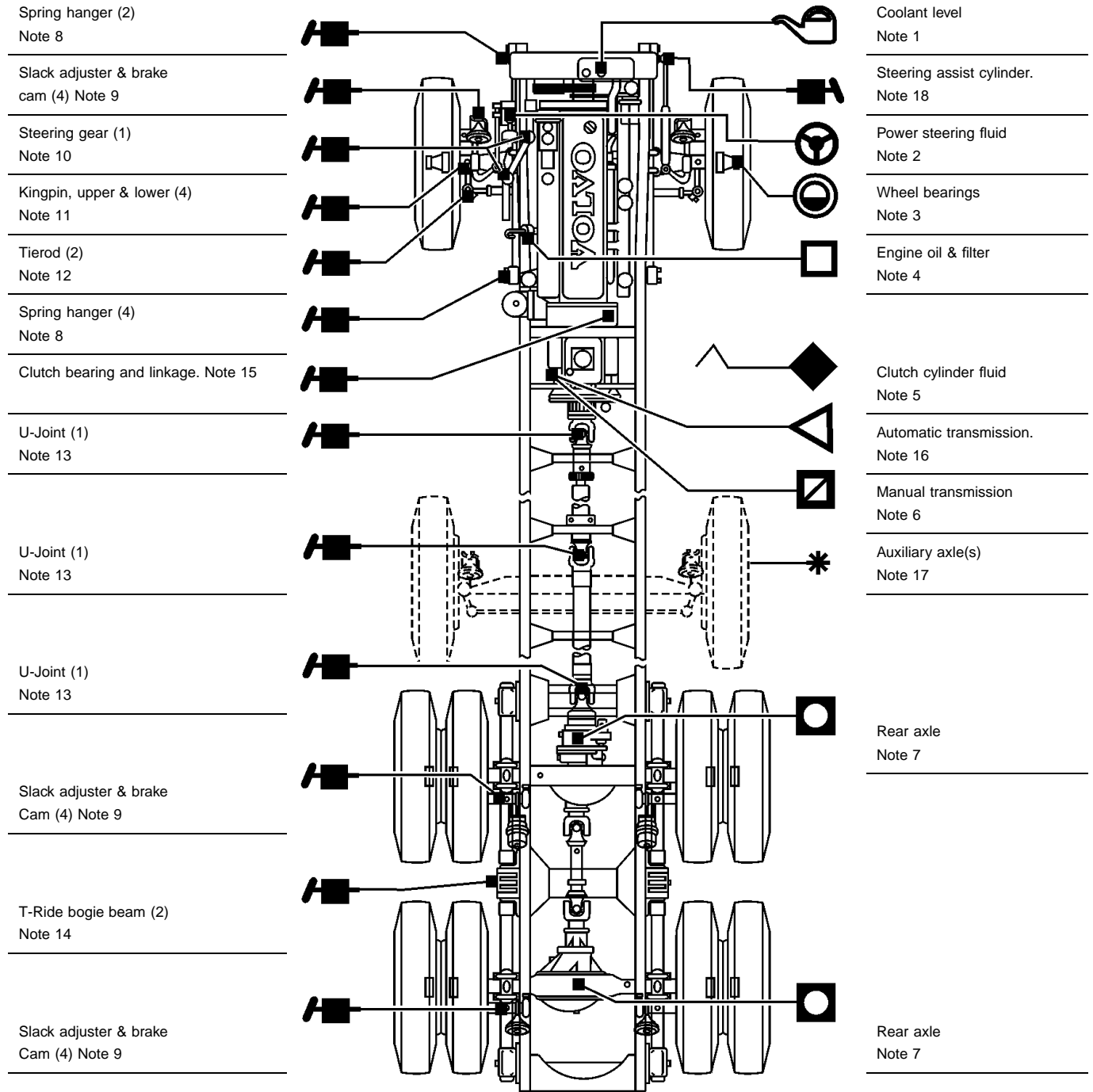
Check fluid level in the clutch fluid reservoir. Add if necessary.

**26** Lubrication

Grease all points as indicated in the "Lubrication Chart" page 17.

**Note:** When necessary, refer to the Preventive Maintenance Service Manual for more information and procedures.

## Lubrication Chart



There are notes for each type of lubrication on the next page. Read the notes before selecting a lubricant.

- Grease
- Hub Oil
- Engine Oil
- Hydraulic Oil
- Steering Fluid

- Coolant
- Aut. Transm. Fluid
- Man. Transm. Oil
- Rear Axle Oil
- Brake Fluid

## Lubrication Chart Notes



### CAUTION

Do not mix synthetic oils with petroleum-based oils. Mixing synthetic oils with petroleum-based oils can cause component failure and/or component damage.

- 1 Add if necessary. Only use pre-mixed clean water and antifreeze in a 50/50 mix. Add only the same type antifreeze, that is: extended life or standard.
- 2 Check the fluid in the reservoir with the dipstick. Add if necessary.
- 3 Change the oil (or grease) only in connection with work on the hub or if dirt is found in the lubrication.
- 4 Change the oil according to the schedule in TSI Service Bulletin 175-001.
- 5 Check that the fluid is at the correct level. If needed, add fluid.
- 6 Level should be to the bottom of the inspection hole. See TSI 175-001 for correct oil.
- 7 Check the oil level in the rear axles. The oil should be level with the inspection hole. Add if necessary. See TSI 175-001 for correct oil.
- 8 Use a lithium based grease with specification API NLGI No. 2. When lubricating the springs, lift the axle off of the floor, suspend the frame with axle stands and lower the axle. The spring bushings are now in the position where grease can be added to the contact surfaces.
- 9 Use a lithium based grease with specification API NLGI No. 2. Use liberally in the slack adjuster. Make sure the grease purges through the seal on the brake cam.  
  
**Note:** If the brake cam seal does not purge, make sure the inner seal does not purge into the brake drum and onto the brake linings.  
  
**Note:** Low maintenance brake options, such as Meritor LX500 brakes are frequently specified. If vehicle is so equipped, follow manufacturer's procedures, lubrication type, and service intervals carefully.

- 10 Use a lithium based grease with specification API NLGI No. 2. Only use a hand operated grease gun. The high pressure from an air operated grease gun will damage the seal.
- 11 Use a lithium based grease with specification API NLGI No. 2.  
  
**Note:** Always grease a Volvo front axle with the wheels on the ground.  
  
**Note:** To grease non-Volvo axles, they are typically greased with the wheels on the ground. Consult with the axle manufacturer for the latest recommendation.
- 12 Use a lithium based grease with specification API NLGI No. 2.  
  
**Note:** Volvo axles may use a greased-for-life tierod. No provisions for adding grease are available.
- 13 Use a lithium based grease with EP additives to specification API NLGI No. 2.  
  
**Note:** Make absolutely sure that grease purges out of all four seals of the U-joint.
- 14 Use a lithium based grease with EP additives to specification API NLGI No. 2. Make sure the grease purges out of both the outer and inner seals. If necessary, adjust the lubrication schedule to include greasing the bogie bearing as often as daily, in applications where the bogie runs in corrosive conditions or is submerged in water.
- 15 Use a lithium based grease with EP additives to specification API NLGI No. 2. Do not over-grease the throwout bearing as grease may get into the clutch.
- 16 See the manufacturer's operator's manual for intervals and quantity.
- 17 If equipped with auxiliary lift axles, grease and lubricate according to notes 3, 9, 11 and 12.
- 18 Use a lithium based grease with EP additives to specification API NLGI No. 2 to grease both ball joints.

## Test Drive

### 27 Before Test Drive

**Note:** Make sure to note any observations made before, during, and after the test drive on the "Pre-Delivery Inspection Form" page 22.

Before the test drive, check the following for proper operation (refer to the Operator's Manual):

- Dash controls, gauges and indicator lights
- Air pressure build up
- Holding ability of service and parking brakes
- Windshield wipers and washers

Start the engine and check for rapid build-up of air pressure. Depress the brakes and deplete air in the tanks to check air pressure recovery. The ability to disengage the parking brake should happen after 30 seconds of running at 1000 rpm from when air tanks were empty.

### 28 During Test Drive

During the test drive, check the following for proper performance and listen for any unusual noise or vibration:

Check engine controls and performance while moving through the gears. The accelerator should move smoothly and without any hesitation in engine response. The engine should accelerate smoothly and without hesitation, misses or surges.



W1000065



W1000064

Check the steering wheel and handling capabilities of the vehicle. The steering should operate precisely and without shimmies, tracking or vibrations. When operated at low speed and in close quarters doing full turns, the steering should operate without binding in any spot.



W4000724

Check the clutch for proper operation. The clutch should have smooth operation and engagement when shifting gears.

Check the transmission for ease of shifting and proper operation. The lever should move smoothly through the gear pattern. Listen for unusual noises during shifting.



W8000889

Check the heater and A/C for proper operation. Operate all controls and run the fan on all speeds.



W2001084

Check the service and parking brakes for proper operation.



**DANGER**

When operating a tractor bobtail without a trailer or on slippery roads, the engine brake switch must be in the "OFF" position. Failure to follow these instructions can result in loss of vehicle control and serious personal injury or death.

Check the engine retarder (exhaust brake) for proper operation.

Make sure the brake function disengages by:

- Depressing either the accelerator or clutch pedal.
- Engine speed falling below 1200 rpm (1200 r/min).
- Vehicle speed falling below 2 mph (3 km/h).
- Engaging PTO.



W3000810

Check the inter-axle differential lock for proper operation.

If equipped, check the inter-wheel differential lock for proper operation.

### Diagnostic Messages

W3000924

## 29 After Test Drive

Check the Graphic Display for any diagnostic messages.



W8000995

Check the exhaust system for leaks.

Check the vehicle for any fluid, oil, water or air leaks.

Check the A/C diagnostic module. If the green light is slowly blinking, the A/C unit is OK.

If the vehicle is equipped with a sleeper cab, check the function of the A/C and heater unit in the sleeper compartment.

## Pre-Delivery Inspection Form

Use the following Pre-Delivery Inspection form to check off the points as they are completed and to note test values.



# Pre-Delivery Inspection



**Customer** \_\_\_\_\_  
**Engine Model & S/N** \_\_\_\_\_  
**Transm. Model & S/N** \_\_\_\_\_  
**Rear Axle Model & S/N** \_\_\_\_\_

**Truck Model** \_\_\_\_\_  
**VIN** \_\_\_\_\_  
**Mileage** \_\_\_\_\_  
**Repair Order** \_\_\_\_\_  
**Date** \_\_\_\_\_

Points of Service		Indicate Service Rating ..... (OK = ✓, Adjusted = X, Repaired = R)
<i>Cab Interior</i>		
1	Vehicle Literature	Check for correct manuals.
2	Horn(s)	Check operation of electric and/or air horns.
3	Safety Belts, Sleeper Restraints	Check mounting, condition and operation.
4	Seats	Check mounting, condition and operation.
5	Radio	Check for proper operation.
6	Interior Lights	Check for proper operation.
<i>Cab Exterior, Including Chassis</i>		
7	Cab	Check mounting and condition.
8	Hood Latch and Tilt (VN/VHD)	Check latches, adjustment and operation.
9	Drive Axle Shaft Gaskets	Check for cracks or tears.
10	Drive Axle Shaft Nuts	Torque nuts (only if shafts were removed for transport).
11	Fuel Tanks	Remove protective coating on polished fuel tank if exposed.
12	Wheel Nuts	Tighten inner and outer wheel nuts to proper torque.
13	Tires	Check tire pressure.
14	Exterior Lights	Check headlights, marker lights, turn signals, stop and tail lights for proper operation.
15	Exhaust Clamp	Check for proper installation to specific torque.
<i>Fluid Levels and Lubrication</i>		
16	Engine	Check oil level. Check for visible leaks.
17	Transmission/Oil Cooler	Check oil level. Check for visible leaks.
18	Rear Axle(s)	Check oil level. Check for visible leaks.
19	Auxiliary/Transfer Case	Check oil level. Check for visible leaks.
20	Front Axle	Check for proper installation to specific torque.
21	Front Axle Hubs	Check oil level. Check for visible leaks.
22	Steering System	Check oil level. Check for visible leaks.
23	Cab Tilt Pump (WX/WXLL)	Check oil level. Check for visible leaks.
24	Cooling System	Check coolant level. Check for leaks. Freeze protection _____°F (_____°C).
25	Clutch Reservoir	Check fluid level. Check for visible leaks.
26	Lubrication	Lubricate chassis per the lube chart.

<i>Test Drive</i>			
27	Before Test Drive	Check controls, gauges and indicator lights on dash for proper function.	
		Check air pressure build-up.	
		Check holding ability of service and parking brakes.	
		Check windshield wipers and washers for proper operation.	
28	During Test Drive	Check engine for proper performance and operation.	
		Check steering wheel and handling capabilities.	
		Check clutch and transmission for proper performance and operation.	
		Check heater/air conditioner for proper operation.	
		Check service and parking brakes for proper operation.	
		Check engine retarder (exhaust brake) for proper operation.	
		Check inter-axle differential locks for proper operation.	
		Check inter-wheel differential locks for proper operation.	
29	After Test Drive	Check graphic display for any diagnostic messages.	
		Check exhaust system for leaks.	
		Check vehicle for other fluid and/or air leaks.	
		Check A/C diagnostic module.	
		Check function of A/C and heater unit in sleeper, if equipped.	

This vehicle has been properly inspected and any correction or repairs have been done. This vehicle is roadworthy and ready to be delivered to the purchaser. (This form replaces all previous forms: F7760-010, F7760-011, F7760-023, F7760-023A and FV7760-023.)

Dealer Signature \_\_\_\_\_ Date \_\_\_\_\_

Notes:

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# Feedback

**One of our objectives is that workshop personnel should have access to correct and appropriate service manuals where it concerns fault tracing, repairs and maintenance of Volvo trucks.**

**In order to maintain the high standards of our literature, your opinions and experience when using this manual would be greatly appreciated.**

**If you have any comments or suggestions, make a copy of this page, write down your comments and send them to us, either via telefax or mailing directly to the address listed below.**

**To**

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## Comments/proposals

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**Concerns Service Manual:** .....

# **VOLVO**

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