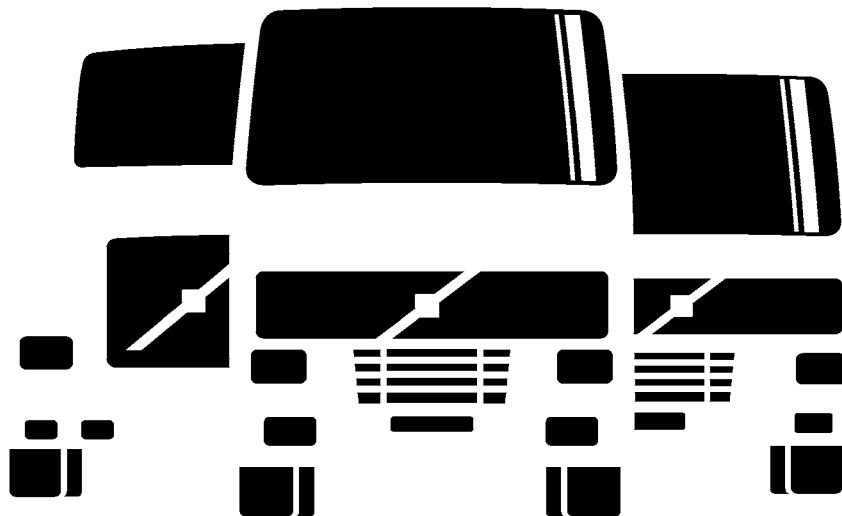


Service Manual Trucks

Group **818–500**

Cab Suspension

VN, VHD



Foreword

The descriptions and service procedures contained in this manual are based on designs and methods studies carried out up to October 2000.

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-TSP145512

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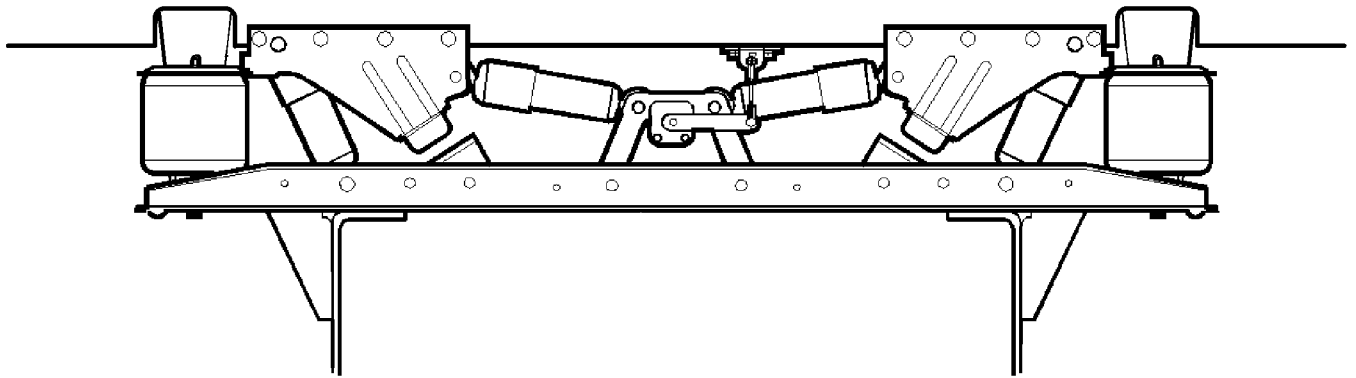
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Feedback

Operation Numbers

General

Cab Suspension



W8002861

General

Introduction

This service information contains component descriptions, operation, troubleshooting procedures and service procedures necessary for servicing the VOLVO VN/VHD cab suspensions.

Cab Suspension

The VOLVO VN/VHD cab suspension isolates the cab from chassis shock and vibration. This isolation gives the driver a superior ride by dampening the lateral and vertical cab movement as well as the torsional vibration. The improved ride and dampening also adds to safety by improving truck handling.

Cab suspension refers to the components that are used to mount the cab to the chassis. There are two versions of cab suspension available: the air ride suspension system and the coil spring suspension system.

Both use the same front cab mounting bracket for mounting the cab to the chassis.

The air ride suspension uses air springs that adjust automatically and maintain a preset level position.

The coil spring suspension system, as its name implies, uses coil springs to absorb vertical movement transferred from the chassis to the cab.

The front cab mounts are also a part of the cab suspension. Front cab mount information includes procedures for replacing and adjusting them.

Cab Alignment

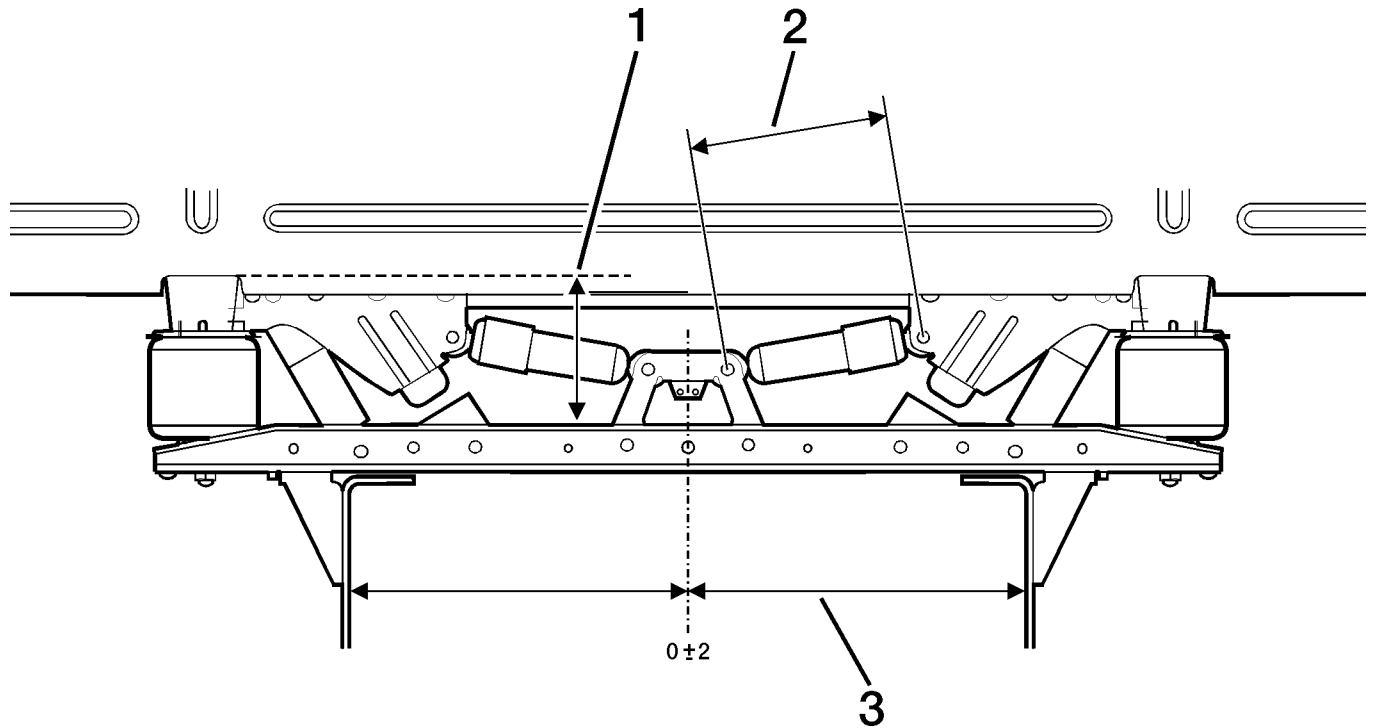
For the VN and VHD (with air spring suspension), lateral shock absorbers take the place of the panhard rod that is found on the VHD coil spring suspensions. These lateral shock absorbers allow the rear of the cab to "float" on the air springs and shock absorbers. Because of this, the centerline of the cab has the freedom to "drift" from the center of the chassis approximately 20 mm (0.80 in.) to either side.

Normal operation of the truck should cause the cab to recenter itself. However, the shocks or air springs do not have enough stiffness to return the cab to the center once the truck is stopped. In this case, the cab will look off-center. Examples of this include: stopping the truck after making a hard turn, stopping on an uneven surface, or braking suddenly. Therefore, it is important to perform the "Cab Alignment, Checking" page 42 to determine if there is a problem with the centering of the cab. If a problem exists, perform "Cab Alignment, Adjustment" page 43 to center the cab.

Specifications

Cab Suspension

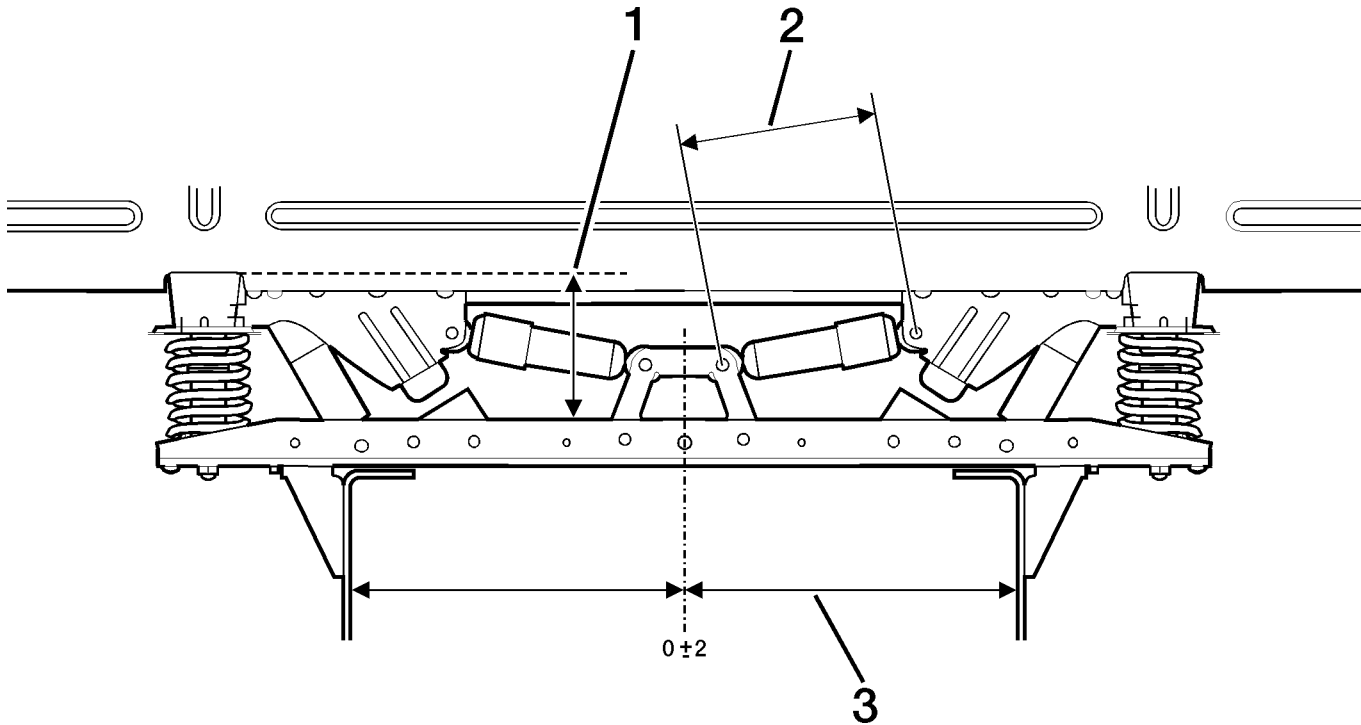
Air Ride Cab Suspension



- 1 Rear cab height measurement should be **188 ± 4 mm (7.4 ± 0.16 in.)**. This measurement must be taken from the top edge of the cab-suspension crossmember to the bottom of the cab floor.
- 2 Lateral shock lengths should be **245 ± 3 mm (9.65 ± 0.12 in.)** in the installed position. This measurement is taken from centerline to centerline of the shock mounting bolts.
- 3 The measurement from the centerline of the cab suspension crossmember to each frame rail should not be offset right or left more than **2 mm (0.08 in.)**.

W8002187

Coil Spring Cab Suspension System

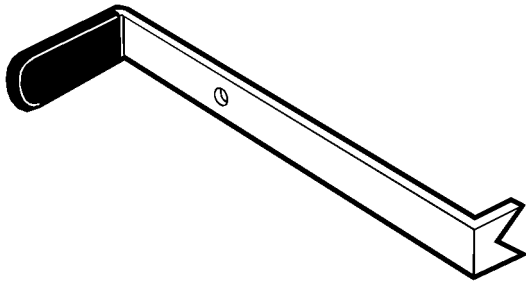


- 1 **VN/VHD:** Rear cab height measurement must be taken from the top edge of the cab-suspension crossmember to the bottom of the cab floor. This measurement depends on exterior options:
- | | |
|--------------------------|---|
| 188 mm (7.41 in.) | Without roof deflector |
| 192 mm (7.56 in.) | With roof deflector installed |
| 194 mm (7.64 in.) | With roof deflector specified but not installed |
- 2 **VN:** Lateral shock lengths should be **245 ± 6 mm (9.65 ± 0.25 in.)** in the installed position. This measurement is taken from centerline to centerline of the shock mounting bolts.
- 3 **VN:** The measurement from the centerline of the cab suspension crossmember to each frame rail should be not offset right or left more than **2 mm (0.08 in.)**.

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Tools

Special Tools

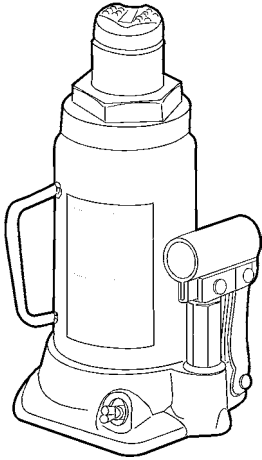


W0001198

Kent-Moore
J-42189

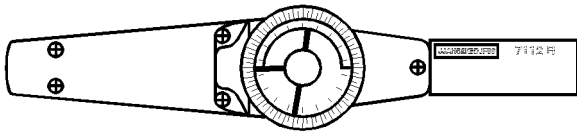
Brake tubing release tool

Special Equipment

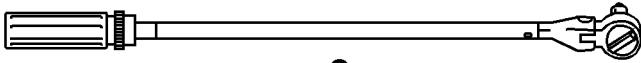


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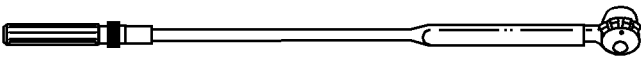
Bottle jack



1



2



3

W8000858

- 1 Torque wrench
0 to 17 Nm (0 to 150 in-lb)
- 2 Torque wrench
41 to 340 Nm (30 to 250 ft-lb)
- 3 Torque wrench
272 to 816 Nm (200 to 600 ft-lb)

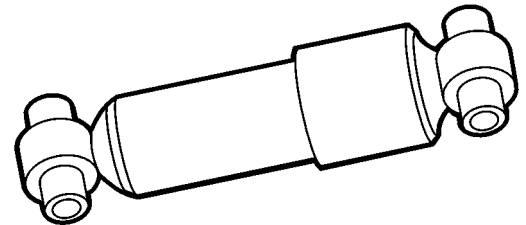
Design and Function

Cab Suspension

Component Descriptions

Vertical Shock Absorber

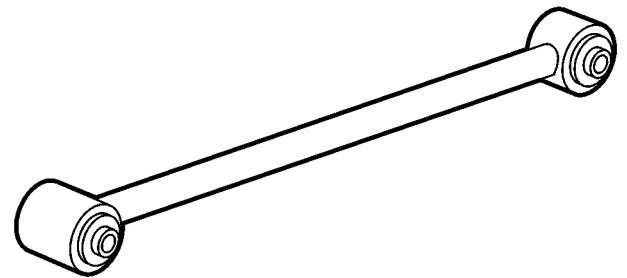
The vertical shock absorbers are located at the rear of the cab and are bolted to the bottom of the cab and to the cab suspension crossmember. Their function is to dampen the up and down motion of the rear of the cab.



W8002862

Panhard Rod

The cab suspension panhard rod is only used on VHD and VNM-L1 trucks with the coil spring cab suspension system. The panhard rod is mounted between the cab suspension crossmember by a bracket and the bottom of the cab. The panhard rod is provided to take up any side to side movement.



W8002845

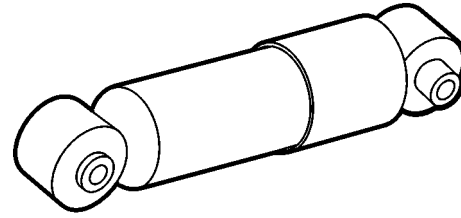
Lateral Shock Absorber

The lateral shock absorbers are located at the rear of the cab. They are bolted to the bottom of the cab and to a bracket that is bolted to the center of the cab suspension crossmember. Vibrations from wheel imbalances are reduced, and the transmission of driveline vibration is reduced, by the use of the lateral shock absorbers.

The lateral shock absorbers center the rear of the cab between the frame rails. These shock absorbers take the place of the panhard rod and introduce a major innovation in lateral cab movement dampening.

The lateral shock absorbers are spring loaded in the extended position. They are designed and mounted to oppose each other. This opposition between these two shock absorbers keeps the cab centered between the frame rails.

If one of the lateral shock absorbers is damaged, it will cause the rear of the cab to be off center. Refer to "Troubleshooting" page 19, to determine if this is the cause. Lateral shock absorbers should always be replaced as a pair.



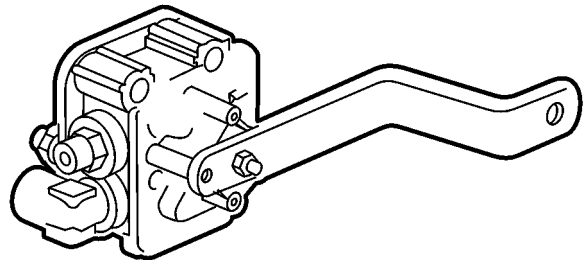
W8002863

Leveling Valve

The cab suspension leveling valve is only used on trucks with the air ride cab suspension system. It controls the amount of air that is released to the cab suspension air springs.

The leveling valve is bolted to a bracket that is bolted to the center of the cab suspension crossmember and is connected to the bottom of the cab by an adjustable control rod. Adjusting the length of the control rod adjusts the rear cab height. Correct rear cab height should be maintained at all times to ensure good ride and to prevent damage to the cab bumpers and other cab suspension components.

Refer to the Specifications section (see "Specifications" page 5) to find the correct rear cab height and to the Service Procedures section (see "Service Procedures" page 21) for the proper adjustment procedure.



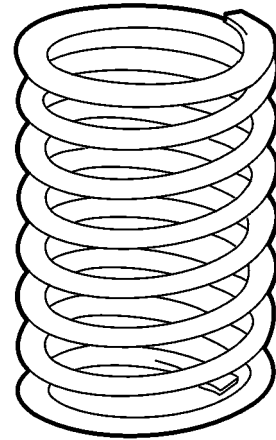
W8002864

Coil Spring

Trucks not equipped with the cab air ride system are equipped with the coil spring suspension system.

The coil spring system has an internal bumper and bumper stop that is located inside the coil springs.

The rear cab height for the coil spring system is the same as the rear cab height for the air ride system. When a cab fairing is installed on the cab roof it will be necessary to add a shim between the coil springs and the top spring plates. These shims can be ordered through the VOLVO parts system (Part number 8075535). Refer to the Specifications section (see "Specifications" page 5) for the correct rear cab height with the cab roof fairing.

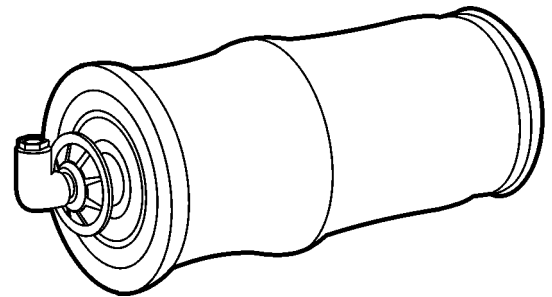


W8002865

Air Spring

The air springs are inflatable rubber bags that are used in the air ride system. They are attached to the vehicle air system and are filled with air to level the cab. The leveling valve controls the amount of air that is allowed into or exhausted from the air springs.

Located on each side of the cab at the rear, the air springs screw into the bottom of the cab. There is also a spring plate that is mounted between the cab and the top of the air spring. The bottom of the air spring is attached to the cab suspension crossmember by a stud and retainer clip.

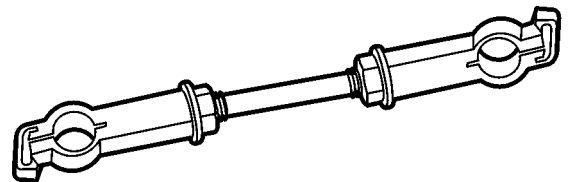


W8002866

Control Rod

The control rod is the linkage between the leveling valve and the bottom of the cab. The control rod is anchored to the bottom of the cab and is attached to the control lever on the leveling valve.

It is attached to the anchor point on the bottom of the cab and to the leveling valve by a ball and socket. The socket that is on the control rod itself has a catch that must be unlatched before the socket is installed or removed from the ball. Specific instructions on removing and installing the control rod are included in the Service Procedures section (see "Service Procedures" page 21).



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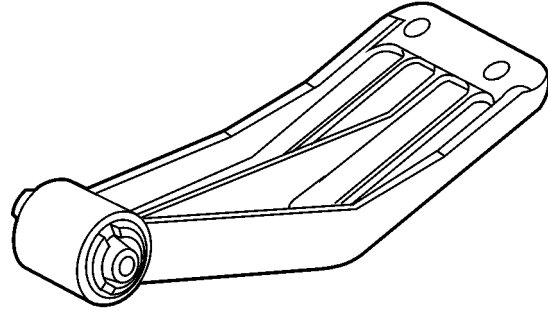
Front Cab Mount

The cab is supported at the front by the front cab mounts. The front cab mounts are heavy duty castings that are bolted to the outside of the frame rails just behind the front wheels.

The cab is bolted to the top of the front cab mounts through rubber bushings that are pressed into the front cab mounts. The front cab mount is designed so the rubber bushings are mounted longitudinally which allows the flexibility that is required at the rear of the cab.

Both types of cab suspension, the air ride and the coil spring type, use the same front cab mounts. However, the VHD and VNM uses spacers between the front cab mounts and the frame rails.

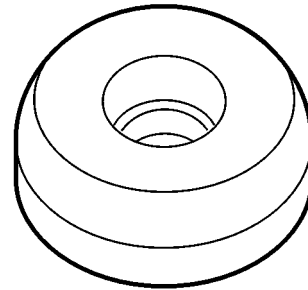
Front cab mounts are not serviceable. In the event the rubber bushings or the castings become worn or damaged the front cab mounts must be replaced as an assembly (see "Cab Mounting Bracket, Replacement" page 39) .



W8002868

Cab Bumper

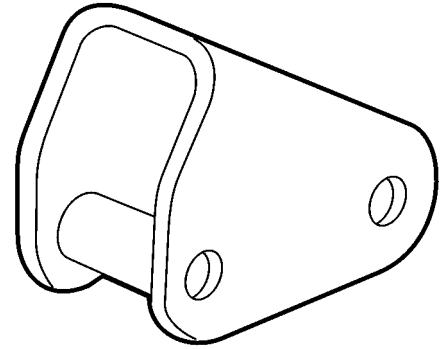
The cab bumper is located at the rear of the cab and is used both with the air ride cab suspension and the VN coil spring suspension. It keeps the cab shock absorbers from bottoming out and damaging the shock absorber piston and piston rod.



W8002869

Cab Bumper Stop

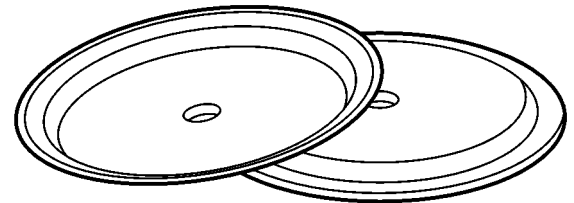
The cab bumper stop is located directly below and in line with the cab bumper at the rear of the cab. It is, as its name implies, the stop that the cab bumper contacts.



W8002870

Spring Plates

The spring plates are used with the air spring and the coil spring suspension systems. These plates are slightly concave to contain the end of the springs.



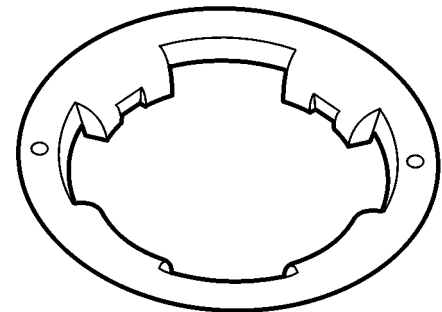
W8002871

Coil Spring Shim

The coil spring shim is used with the coil spring suspension system only. It is used to shim the coil springs only when the cab is equipped or is going to be equipped with a roof fairing.

The coil spring shim is 6 mm thick and is installed between the top of the coil spring and the bottom of the spring plate.

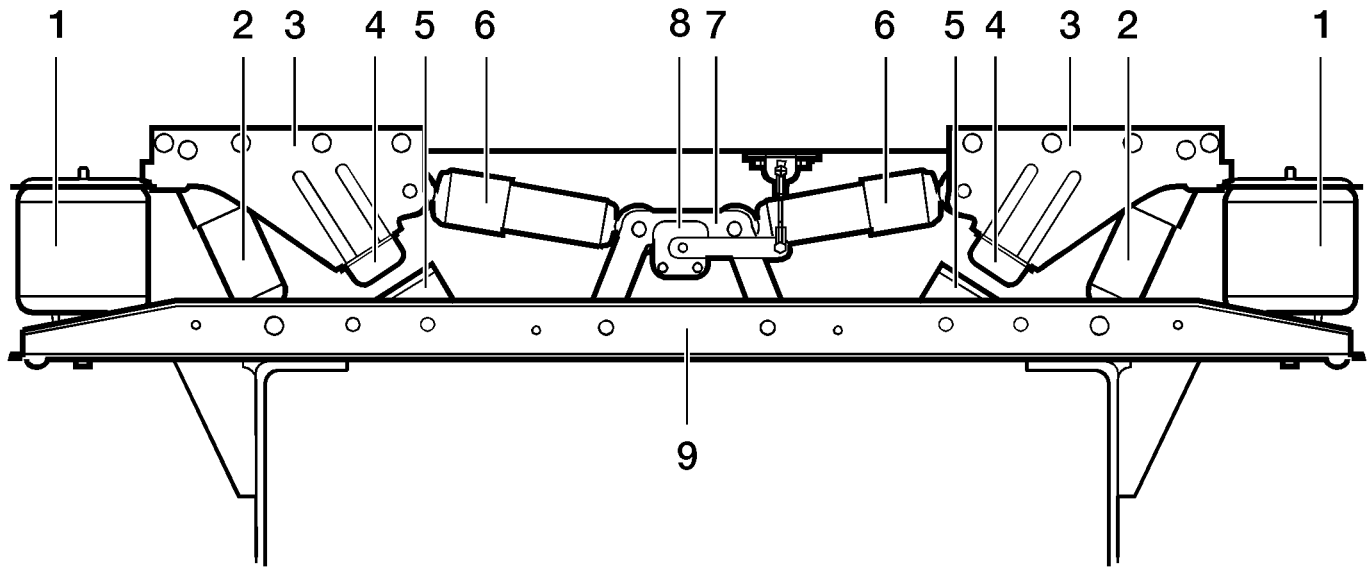
It is available through the VOLVO parts system and can be ordered by part number 8075535.



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Function

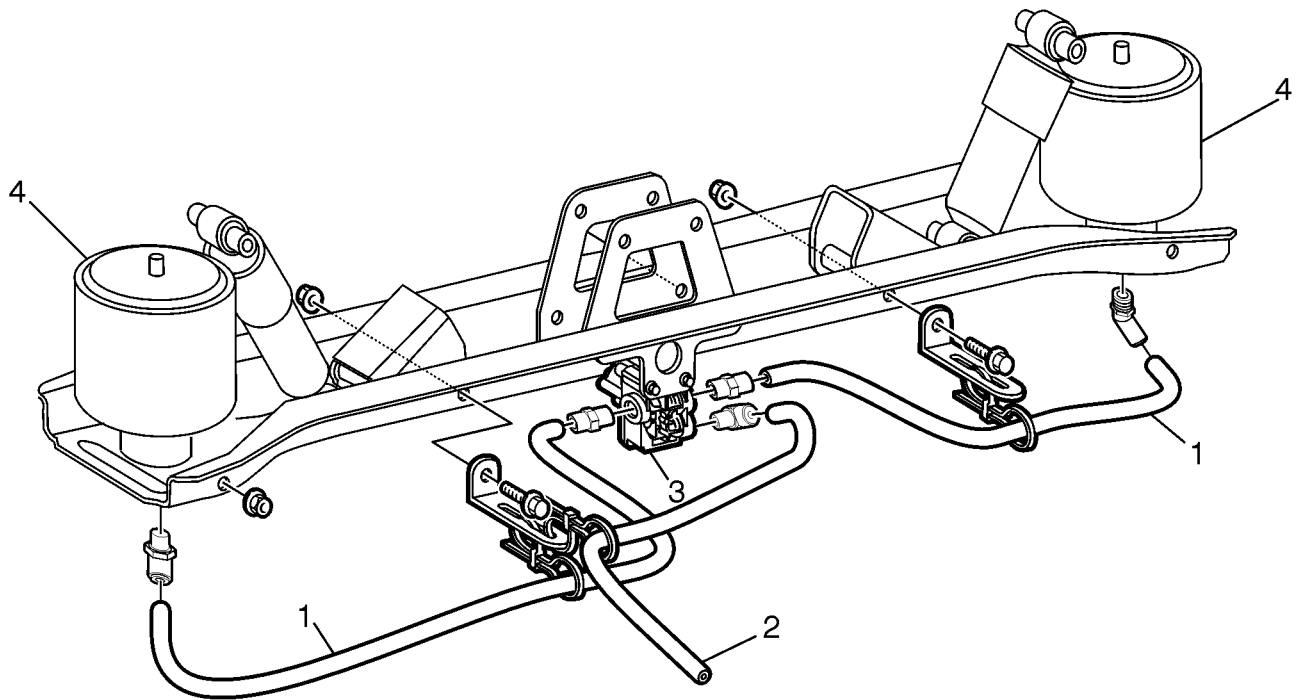
Air Ride Suspension



W8000860

Cab suspension — air ride

- | | | | |
|---|-------------------------|---|--------------------------------|
| 1 | Air spring | 6 | Lateral shock absorber |
| 2 | Vertical shock absorber | 7 | Lateral shock absorber bracket |
| 3 | Truck cab | 8 | Cab leveling valve |
| 4 | Cab bumper | 9 | Cab suspension crossmember |
| 5 | Cab bumper stop | | |

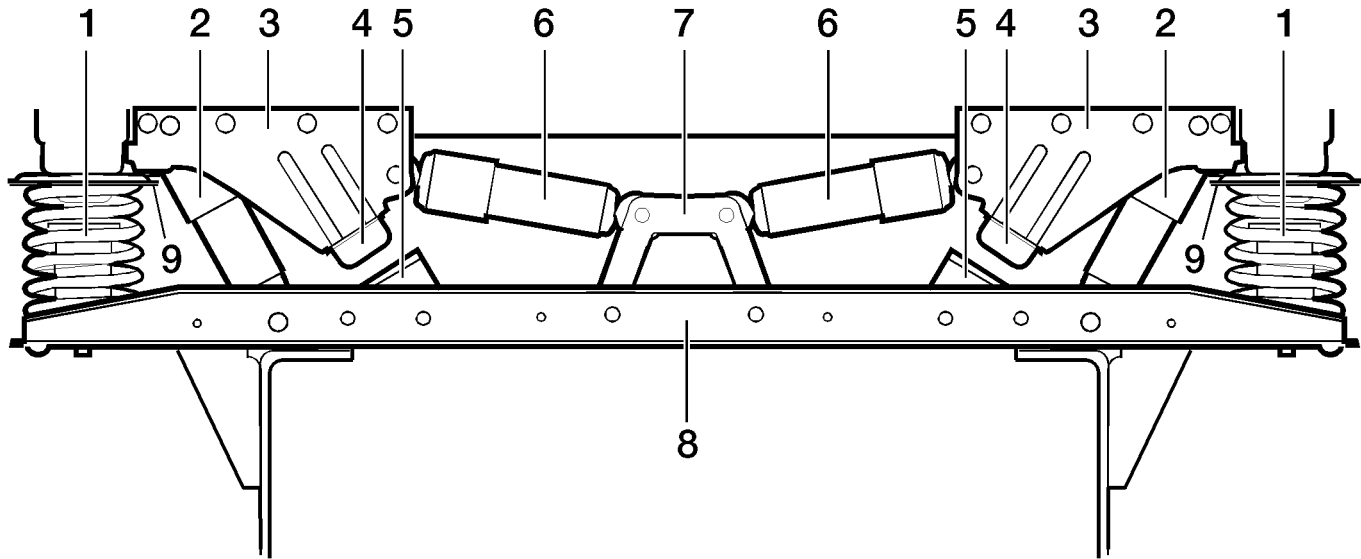


W8002874

Air ride suspension — air system

- | | | | |
|---|--------------------|---|--------------------|
| 1 | Air delivery lines | 3 | Cab leveling valve |
| 2 | Air supply line | 4 | Air spring |

Coil Spring Suspension w/ Lateral Shock Absorbers

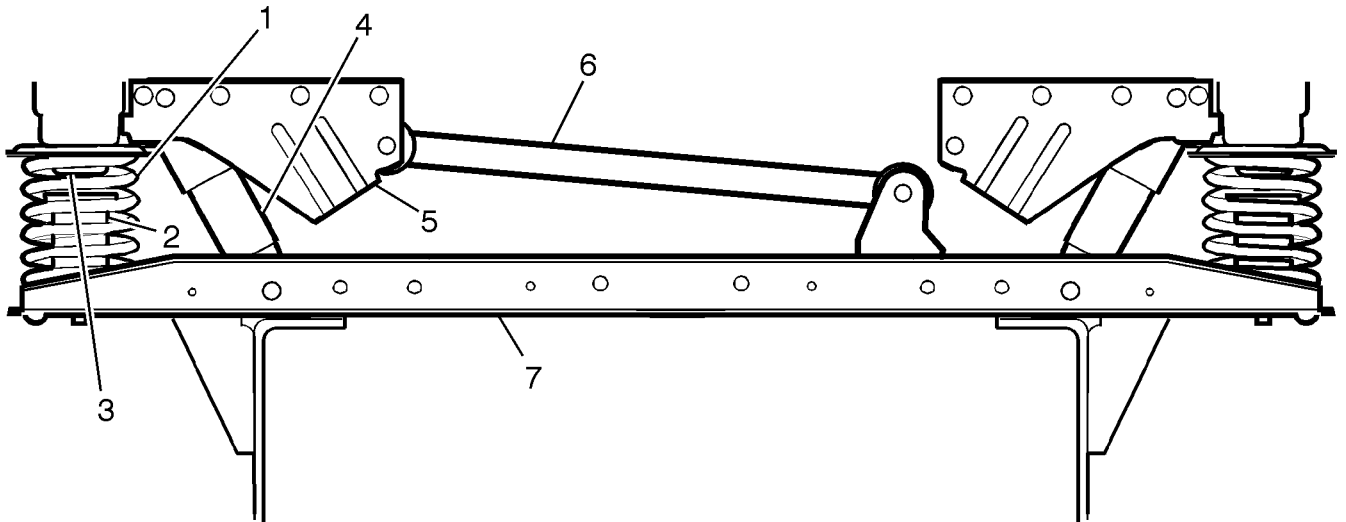


W8000859

Cab suspension — Coil spring

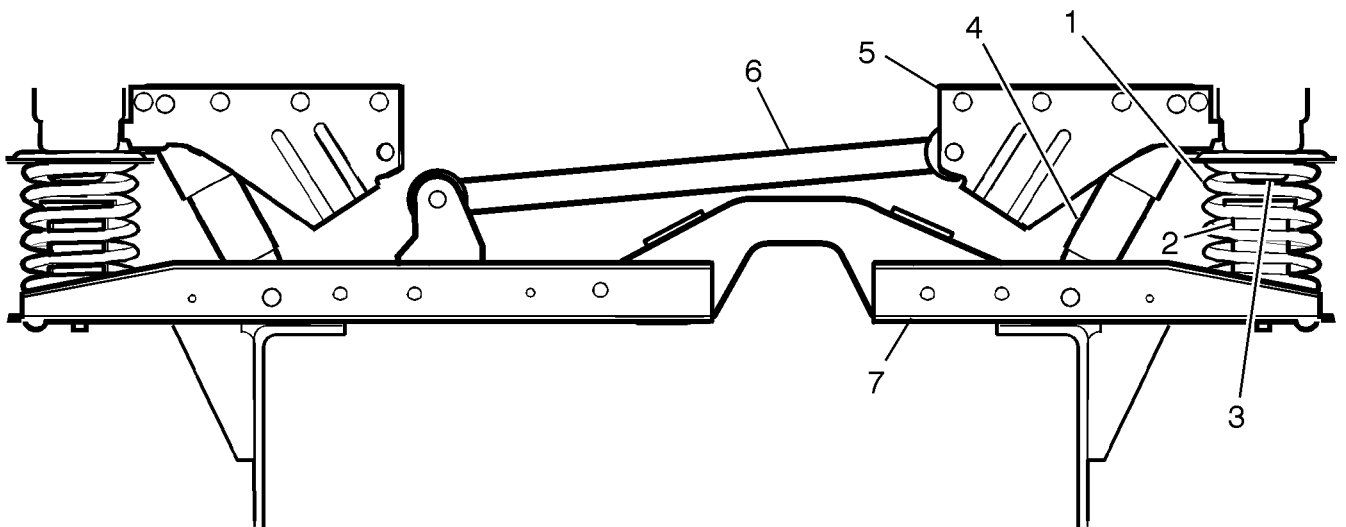
- | | | | |
|---|-------------------------|---|--------------------------------|
| 1 | Coil spring | 6 | Lateral shock absorber |
| 2 | Vertical shock absorber | 7 | Lateral shock absorber bracket |
| 3 | Truck cab | 8 | Cab suspension crossmember |
| 4 | Cab bumper | 9 | Spring plate |
| 5 | Cab bumper stop | | |

Coil Spring Suspension w/ Panhard Rod



Cab suspension — Coil spring

W8002846

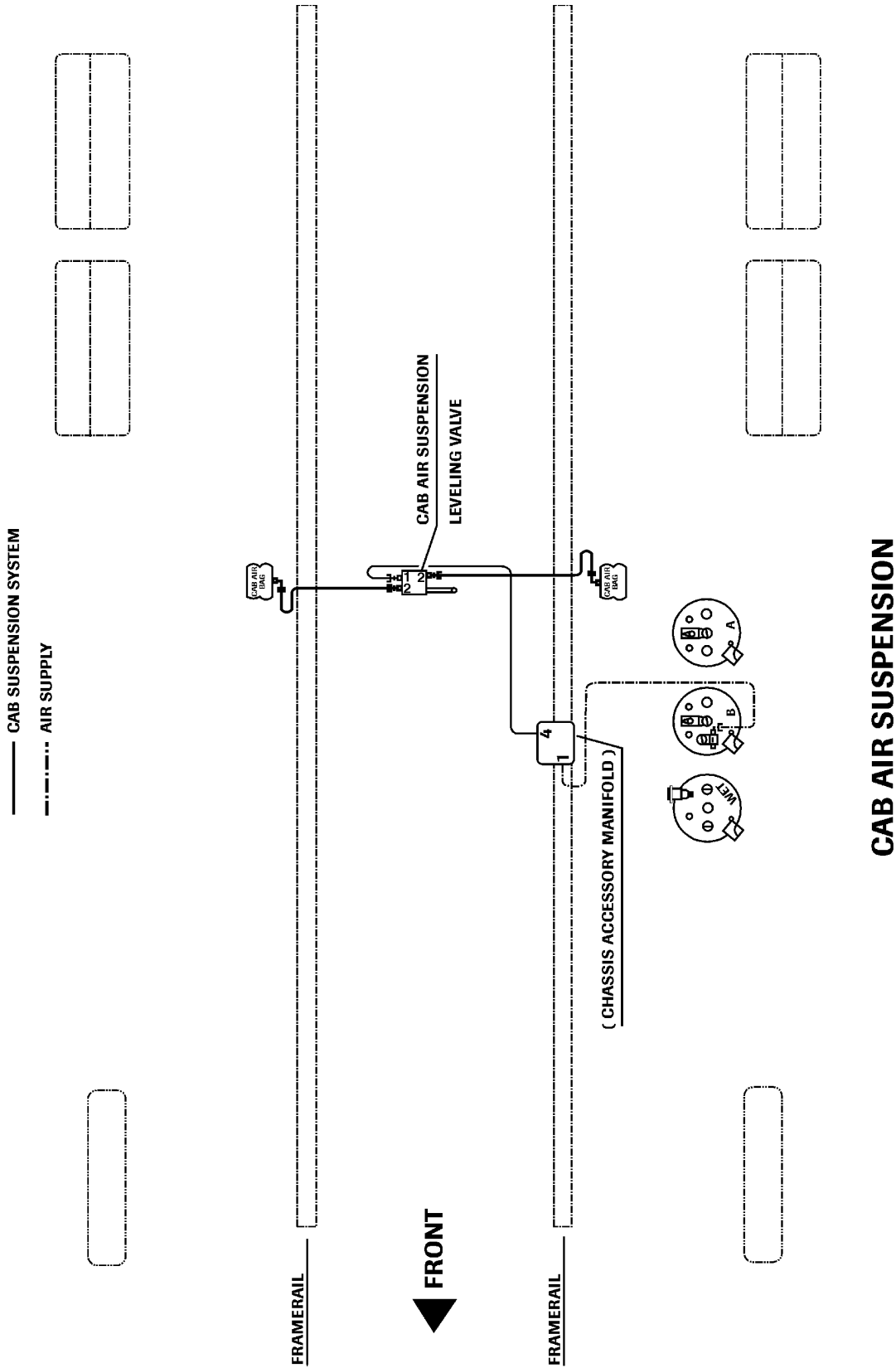


Cab suspension — Coil spring (Repto)

W8002877

- | | | | |
|---|-------------------------|---|----------------------------|
| 1 | Coil spring | 5 | Truck cab |
| 2 | Coil spring bumper stop | 6 | Panhard rod |
| 3 | Coil spring bumper | 7 | Cab suspension crossmember |
| 4 | Vertical shock absorber | | |

Cab Air Suspension



W8002873

Troubleshooting

Cab Suspension Troubleshooting

| Symptom | Cause | Correction |
|--|---|---|
| Rear of cab is not centered on chassis | Spring in lateral shock absorber is damaged. | Refer to "Cab Alignment, Checking" page 42 and "Cab Alignment, Adjustment" page 43, for the test procedure. Replace both lateral shock absorbers. |
| | Front cab mounts are damaged or not aligned properly. | Refer to "Cab Alignment, Checking" page 42 and "Cab Alignment, Adjustment" page 43, to properly align front cab mounts. |
| Cab ride is rough or bouncy | Rear cab height is not within specifications. | Adjust rear cab height. Refer to "Rear Cab Height, Adjustment" page 28. |
| | Leveling valve control rod is broken. | Replace leveling valve control rod. Refer to "Control Rod, Replacement" page 36. |
| | Air system pressure is below 551 kPa (80 psi). | Repair air system leak. |
| | No air pressure is going to cab leveling valve. | Repair leaking or pinched air supply line. |
| | No air pressure is coming from cab leveling valve. | Replace leveling valve. Refer to "Cab Leveling Valve, Replacement" page 26. |
| | Shock absorbers leaking, broken or worn out. | Replace damaged shock absorber(s). Refer to "Cab Suspension Shock Absorber, Replacement" page 41. |
| | Cab suspension mounting bolts are broken or loose. | Replace broken bolts. Torque all bolts to proper torque. Refer to torque values in Specifications section, see "Specifications" page 5. |
| | Cab suspension crossmember is broken or cracked. | Replace cab suspension crossmember. Refer to "Cab Suspension Crossmember, Replacement" page 29, "Cab Suspension Crossmember, Replacement" page 32 or "Cab Suspension Crossmember, Replacement" page 34. |
| Front cab mounting bracket is broken or bushing is worn out. | Replace front cab mounting bracket. Refer to "Cab Mounting Bracket, Replacement" page 39. | |

| Symptom | Cause | Correction |
|-------------------------------|---|---|
| Cab is low on one side | No air pressure is coming from the leveling valve. | Replace leveling valve. Refer to "Cab Leveling Valve, Replacement" page 26. |
| | No air pressure is going to the air spring from the leveling valve. | Repair leaking or pinched air line. |
| | Air spring or coil spring is broken. | Replace air spring or coil spring. Refer to "Air Spring, Replacement" page 21 or "Coil Spring, Replacement" page 23. |
| | Cab suspension mounting bolts are broken or loose. | Replace broken bolts. Torque all bolts to proper torque. Refer to torque values in the Specifications section, see "Specifications" page 5. |
| | Cab suspension crossmember is broken or cracked. | Replace cab suspension crossmember. Refer to "Cab Suspension Crossmember, Replacement" page 29, "Cab Suspension Crossmember, Replacement" page 32 or "Cab Suspension Crossmember, Replacement" page 34. |
| | Front cab mounting bracket is broken. | Replace front cab mounting bracket. Refer to "Cab Mounting Bracket, Replacement" page 39. |
| Air is leaking | Air spring is leaking. | Replace air spring. Refer to "Air Spring, Replacement" page 21. |
| | Cab leveling valve is leaking. | Replace cab leveling valve. Refer to "Cab Leveling Valve, Replacement" page 26. |
| | Air line is leaking. | Repair leaking air line. |

Service Procedures

8181-03-02-01 Air Spring, Replacement

DANGER

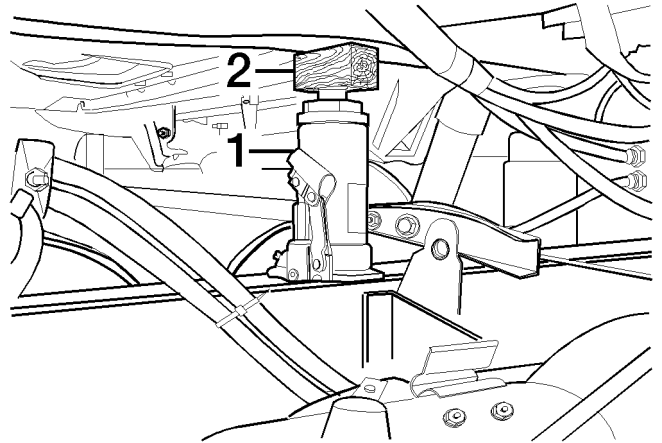
Before working on a vehicle, set the parking brakes, place the transmission in neutral, and block the wheels. Failure to do so can result in unexpected vehicle movement and can cause serious personal injury or death.

WARNING

Before beginning any service work on any part of the air system, be certain that the air pressure has been released. Failure to do so may cause a component to violently separate, which can result in serious personal injury.

Removal

1



W8000857

- 1 Bottle jack
- 2 Wood block

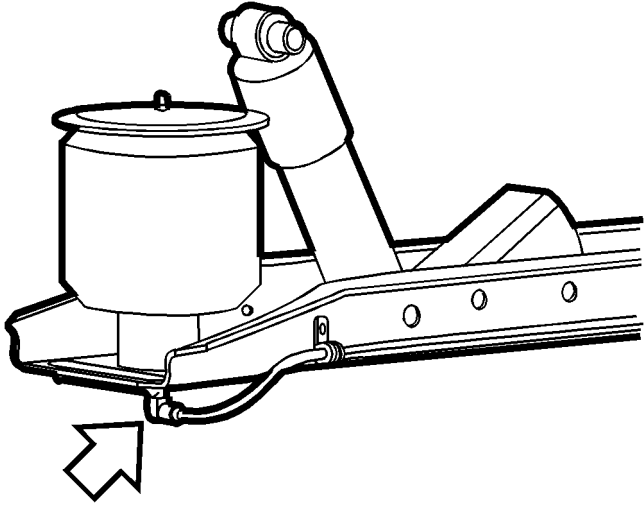
CAUTION

Do not raise the rear of the cab any more than absolutely necessary (max. 300 mm (12 in.)). Raising the rear of the cab too far could damage the front cab mounting brackets.

Tilt the hood forward and then use a bottle jack to raise the rear of the cab. Support the rear of the cab with wooden blocks.

- 2 Completely drain the air from the air system.

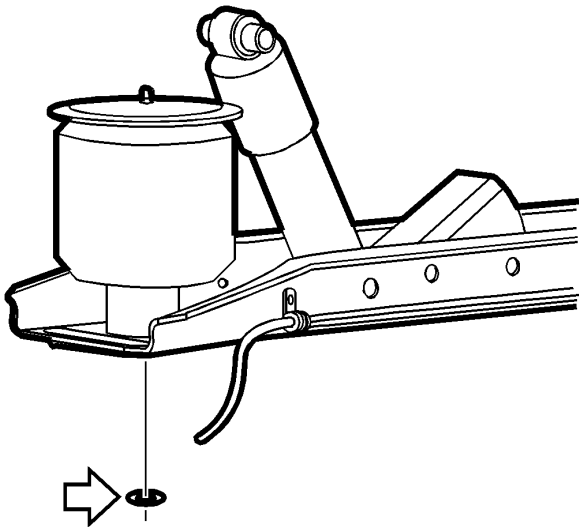
3



W8000842

Remove the air line and fitting from the bottom of the air spring.

4



W8000872

Remove the retaining clip from the bottom stud of the air spring.

5

Remove the air spring by unscrewing it from the bottom of the cab.

Installation

1

Be sure to install the spring plate on top of the new air spring, then screw the new air spring into the bottom of the cab.

2

Place the bottom stud through the cab suspension crossmember, then install a **new** retaining clip over the stud.

3

Apply pipe sealer to the fitting and install the air fitting in the bottom of the air spring.

4

Install the air line, start the truck and allow the air system to refill.

5

Remove the bottle jack and the cab supports.

6

Check for air leaks.

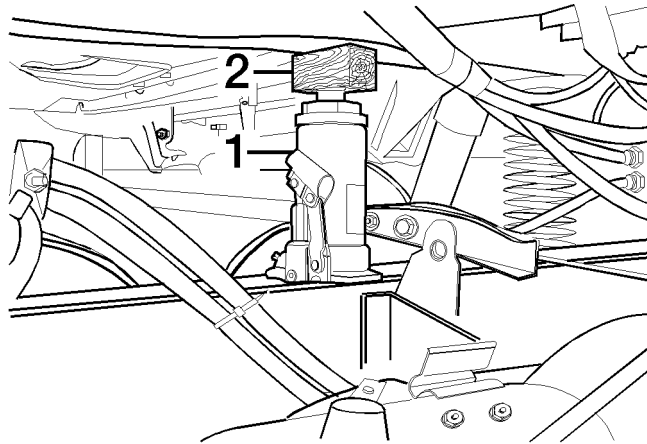
8181-03-02-02 Coil Spring, Replacement

⚠ 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.

Removal

1



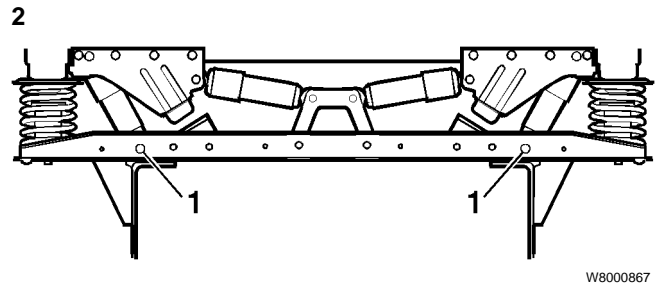
1 Bottle jack
2 Wood block

W8000870

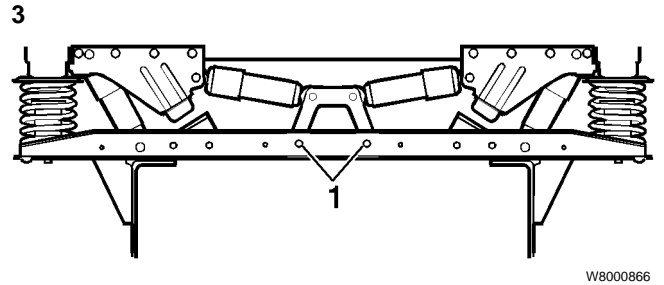
⚠ CAUTION

Do not raise the rear of the cab any more than absolutely necessary (max. 300 mm (12 in.)). Raising the rear of the cab too far could damage the front cab mounting brackets.

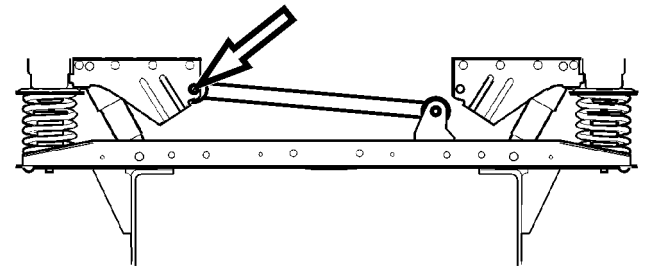
Tilt the hood forward and then use a bottle jack to raise the rear of the cab. Support the rear of the cab with wooden blocks.



Remove the lower vertical shock absorber bolts (1).



Lateral shock absorber bracket bolts.



Panhard rod.

Vehicles w/ lateral shock absorbers:
Remove the bolts from the bracket for the lateral shock absorbers (1).
Vehicles w/ panhard rod:
Disconnect the panhard rod from the cab.

4

CAUTION

It may be necessary to raise the rear of the cab further to remove the coil spring from under the cab. Do not raise the rear of the cab any more than absolutely necessary (max. 300 mm (12 in.)). Raising the rear of the cab too far could damage the front cab mounting brackets.

Remove the nut from the bottom of the coil spring bumper stop and slide the coil spring and coil spring bumper stop out from under the cab.

Installation

1

Install the new coil spring and the coil spring bumper stop. Torque the coil spring bumper stop nut to 140 ± 25 Nm (103 ± 18 ft-lb).

2

Lower the cab. **Vehicles w/ lateral shock absorbers:** Align the bracket for the lateral shock absorbers. Install the bolts and torque them to 85 ± 15 Nm (63 ± 11 ft-lb). **Vehicles w/ panhard rod:** Install the panhard rod to the cab. Torque to 140 ± 25 Nm (103 ± 18 ft-lb).

Note: Use new mounting nuts. Mounting nuts for the panhard rod should only be tightened and loosened once.

3

Reinstall the lower vertical shock absorber bolts and torque the bolts to 140 ± 25 Nm (103 ± 18 ft-lb).

Note: Use new mounting nuts. Mounting nuts for the shock absorbers should only be tightened and loosened once.

4

Remove the bottle jack and the cab supports.

5

Check the rear cab height.

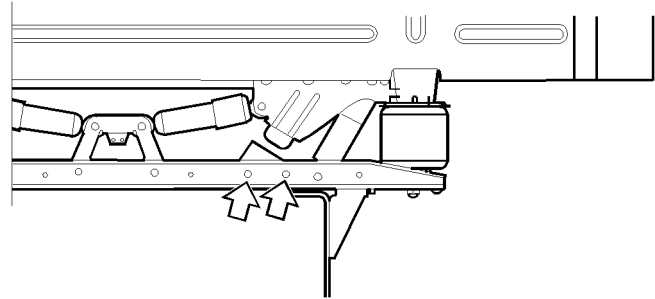
8181-03-02-03 Cab Bumper, Replacement

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.

Removal

1



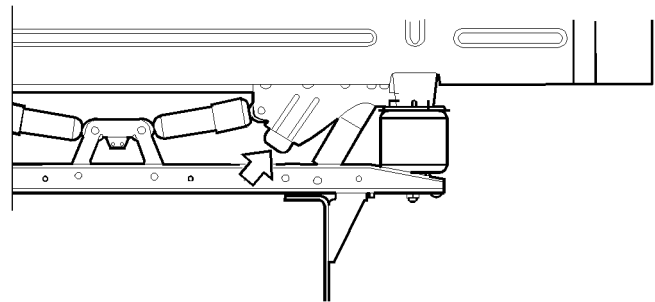
W8000851

Remove the two bolts attaching the cab bumper stop to the cab suspension crossmember.

2

Remove the cab bumper stop from the cab suspension crossmember.

3



W8000875

Remove the allen head bolt and remove the cab bumper.

Installation

- 1
Install the new cab bumper. Torque the allen head bolt to 48 ± 8 Nm (36 ± 6 ft-lb).
 48 ± 8 Nm (36 ± 6 ft-lb).
- 2
Install the cab bumper stop into the cab suspension crossmember, align the bolt holes and install the two bolts and nuts. Torque the bolts to 100 ± 15 Nm (72 ± 11 ft-lb).
 100 ± 15 Nm (72 ± 11 ft-lb)

8181-03-02-04

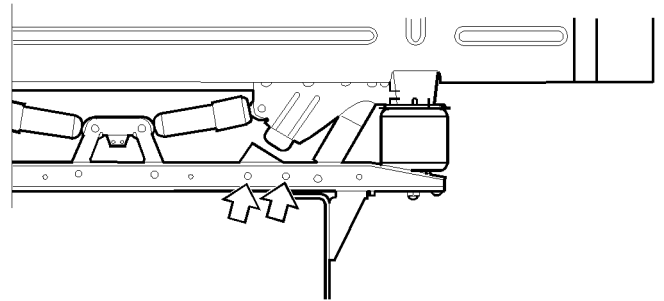
Cab Bumper Stop, Replacement



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.

Removal

1



W8000845

Remove the two bolts attaching the cab bumper stop to the cab suspension crossmember.

2

Remove the cab bumper stop from the cab suspension crossmember.

Installation

- 1
Install the cab bumper stop into the cab suspension crossmember, align the bolt holes and install the two bolts and nuts. Torque the bolts to 100 ± 15 Nm (72 ± 11 ft-lb).
 100 ± 15 Nm (72 ± 11 ft-lb).

8181-03-02-05 Cab Leveling Valve, Replacement

DANGER

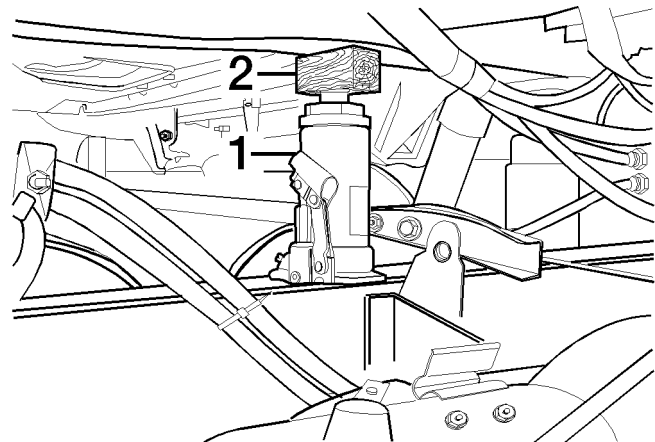
Before working on a vehicle, set the parking brakes, place the transmission in neutral, and block the wheels. Failure to do so can result in unexpected vehicle movement and can cause serious personal injury or death.

WARNING

Before beginning any service work on any part of the air system, be certain that the air pressure has been released. Failure to do so may cause a component to violently separate, which can result in serious personal injury.

Removal

1



W8000857

- 1 Bottle jack
- 2 Wood block

CAUTION

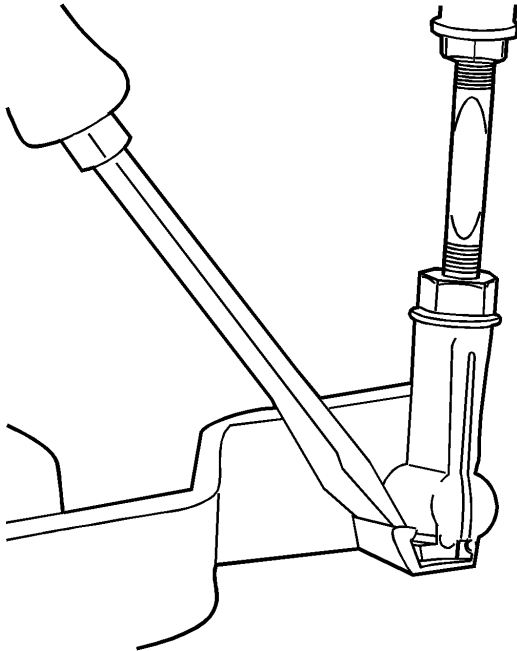
Do not raise the rear of the cab any more than absolutely necessary (max. 300 mm (12 in.)). Raising the rear of the cab too far could damage the front cab mounting brackets.

Tilt the hood forward and then use a bottle jack to raise the rear of the cab. Support the rear of the cab with wooden blocks.

2
Completely drain the air from the air system.

3
Remove the air lines from the leveling valve.

4



W8000856

Using a small flat blade screwdriver, unlatch the catch on the control rod socket and pry the control rod socket off the ball on the leveling valve.

5

Remove the attaching bolts from the leveling valve and remove the leveling valve.

6

Remove the air fittings from the leveling valve.

Installation

1

Apply pipe sealer to the fittings and install the air fittings in the new leveling valve.

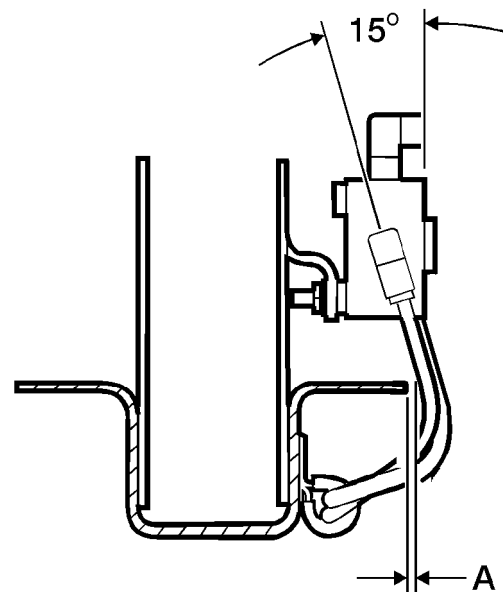
2

Install the leveling valve and torque the nuts to 10 ± 1 Nm (89 ± 9 in-lb).

3

Install the control rod onto the leveling valve and lock the catch back in place.

4



W8002875

Install the air lines, start the vehicle and let the air pressure build up. Check for air leaks.

Note: Check to be sure there is at least 5 mm (3/16 in.) spacing between the air tubing and the crossmember. Use tie straps as necessary and strap the air lines together to keep the air tubing away from the crossmember.

5

Remove the bottle jack and the cab supports.

6

Check the rear cab height. If the rear cab height needs adjusting refer to the Rear Cab Height Adjustment procedure.

8181-05-02-05 Rear Cab Height, Adjustment

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.

1

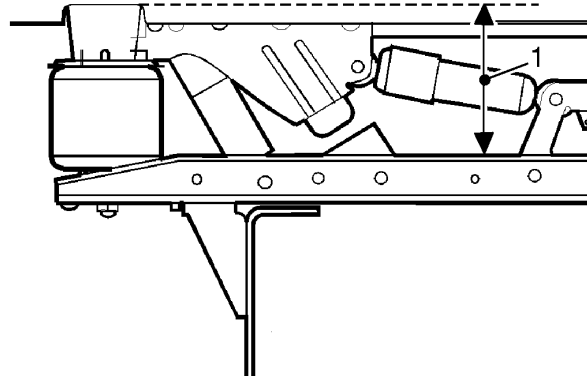
DANGER

When lowering the cab, be certain to keep hands and arms clear of the area under the cab. Failure to do so could lead to personal injury or death.

Before measuring the rear cab height for this procedure the air must be exhausted from the air springs. This can be done by disconnecting the control rod from the leveling valve and then manually operating the leveling valve to release the air from the air springs. After the air is released from the air springs, reconnect the control rod to the leveling valve and allow the air springs to inflate. Once the air springs have inflated completely, then proceed to the next step.

Note: Be sure the truck air system is at full capacity before checking or adjusting the rear cab height.

2



W8002876

The rear cab height is measured as shown in the graphic (1). This measurement should be 188 ± 4 mm (7.4 \pm 0.16 in.).

3

If the rear cab height needs adjusting, loosen the lock nuts on the control rod at the cab leveling valve. Adjust the control rod until the proper height is attained.

4

Tighten the lock nuts and recheck the cab height.

8181-03-02-06 Cab Suspension Crossmember, Replacement

DANGER

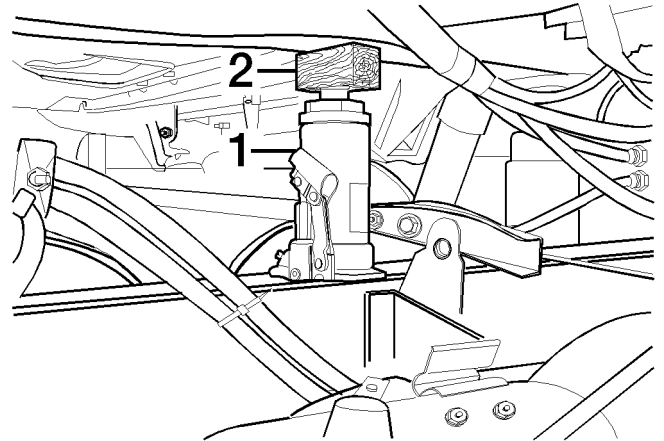
Before working on a vehicle, set the parking brakes, place the transmission in neutral, and block the wheels. Failure to do so can result in unexpected vehicle movement and can cause serious personal injury or death.

WARNING

Before beginning any service work on any part of the air system, be certain that the air pressure has been released. Failure to do so may cause a component to violently separate, which can result in serious personal injury.

Air Ride Removal

1



W8000857

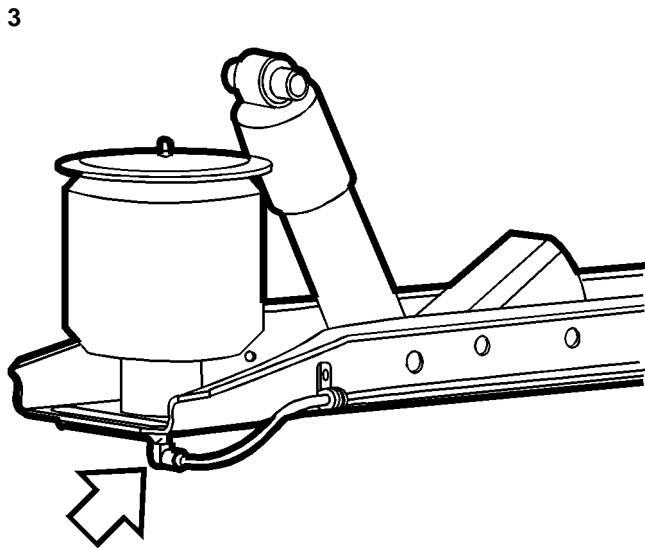
- 1 Bottle jack
- 2 Wood block

CAUTION

Do not raise the rear of the cab any more than absolutely necessary (max. 300 mm (12 in.)). Raising the rear of the cab too far could damage the front cab mounting brackets.

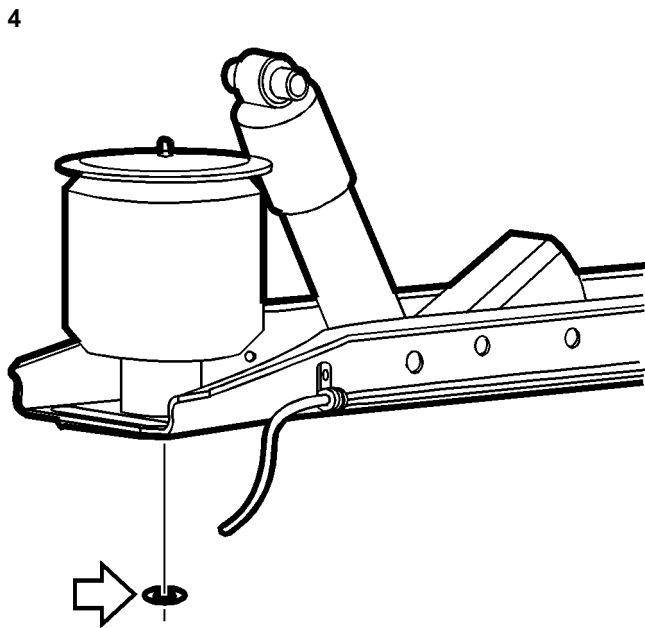
Tilt the hood forward and then use a bottle jack to raise the rear of the cab. Support the rear of the cab with wooden blocks.

2
Completely drain the air from the air system.



Remove the air lines and fittings from the bottom of the air springs.

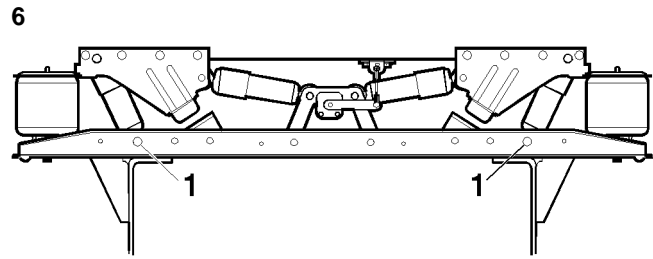
W8000842



Remove the retaining clips from the bottom stud of the air springs.

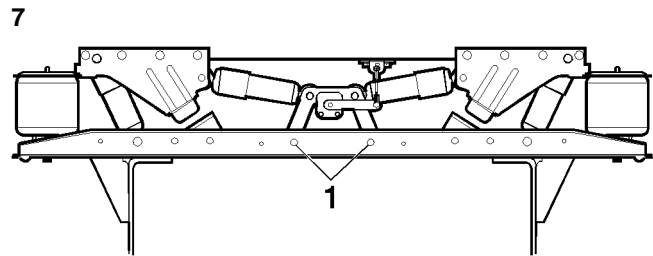
W8000872

5
Remove the air springs by unscrewing them from the bottom of the cab.



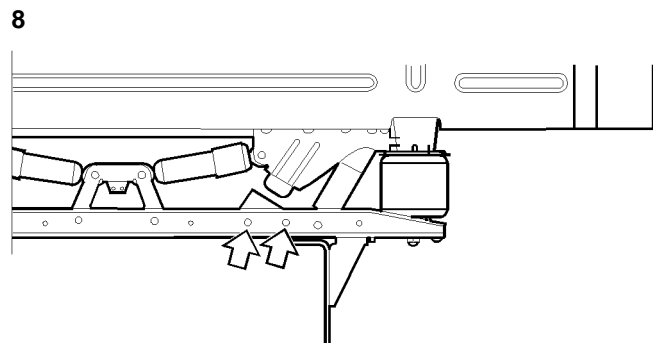
W8000864

Remove the lower vertical shock absorber bolts (1).



W8000865

Remove the bolts from the lower bracket for the lateral shock absorbers (1).



W8000851

Remove the bolts for the bumper stops and then remove the bumper stops.

9
Unbolt the clamps that attach the air lines to the cab suspension cross-member.

10

**CAUTION**

It may be necessary to raise the cab a little more to get the crossmember out from under the cab. Do not raise the rear of the cab any more than absolutely necessary (max. 300 mm (12 in.)). Raising the rear of the cab too far could damage the front cab mounting brackets.

Remove the bolts for the cab suspension crossmember and remove the cab suspension crossmember from under the cab.

Installation

1

Install the new cab suspension crossmember and bolts. Torque the bolts to 140 ± 25 Nm (104 ± 18 ft-lb).

Note: The new crossmember must be centered to within ± 2 mm (0.078 in.) between the chassis rails.

2

Clamp the air lines back to the new cab suspension crossmember.

3

Reinstall the bumper stops. Torque the bolts to 100 ± 15 Nm (72 ± 11 ft-lb).

4

Lower the cab and align the lateral shock absorber bracket. Install the bolts and torque them to 85 ± 15 Nm (63 ± 11 ft-lb).

5

Align the vertical shock absorbers. Install the bolts and torque them to 140 ± 25 Nm (103 ± 18 ft-lb).

Note: Use new mounting nuts. Mounting nuts for the shock absorbers should only be tightened and loosened once.

6

Be sure the plate is on top of the air springs and screw the air springs back into the bottom of the cab.

7

Place the bottom studs through the cab suspension crossmember, then install the **new** retaining clips over the studs.

8

Apply pipe sealer to the fittings and install the air fittings in the bottom of the air springs.

9

Reinstall the air lines.

10

Start the truck and let the air system build up maximum air pressure. Remove the bottle jack and the cab supports.

11

Check for air leaks, check the rear cab height and check the rear cab alignment, see "Cab Alignment, Checking" page 42.

If the rear cab height needs adjusting refer to "Rear Cab Height, Adjustment" page 28.

If the rear of the cab is not centered properly refer to "Cab Alignment, Adjustment" page 43.

8181-03-02-06 Cab Suspension Crossmember, Replacement

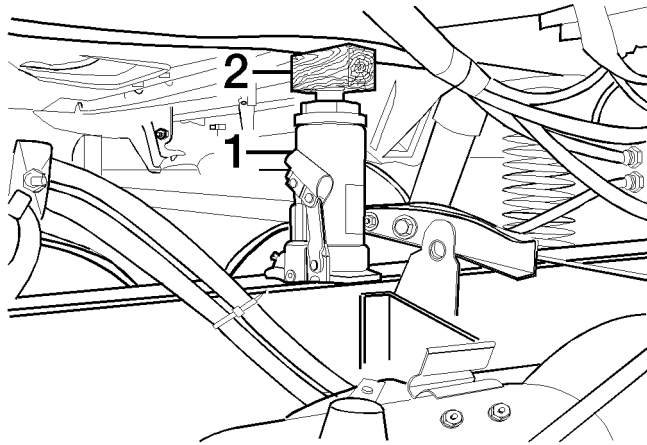


Before working on a vehicle, set the parking brakes, place the transmission in neutral, and block the wheels. Failure to do so can result in unexpected vehicle movement and can cause serious personal injury or death.

Coil Spring w/ Lateral Shock Absorbers

Removal

1



W8000870

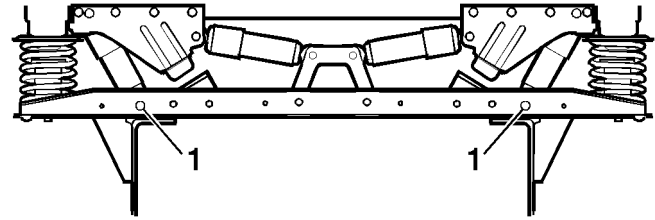
- 1 Bottle jack
- 2 Wood block



Do not raise the rear of the cab any more than absolutely necessary (max. 300 mm (12 in.)). Raising the rear of the cab too far could damage the front cab mounting brackets.

Tilt the hood forward and then use a bottle jack to raise the rear of the cab. Support the rear of the cab with wooden blocks.

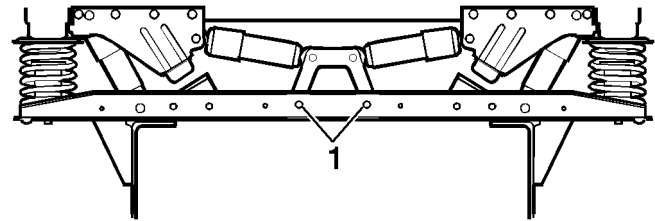
2



W8000867

Remove the lower vertical shock absorber bolts (1).

3



W8000866

Remove the bolts from the lower bracket for the lateral shock absorbers (1).

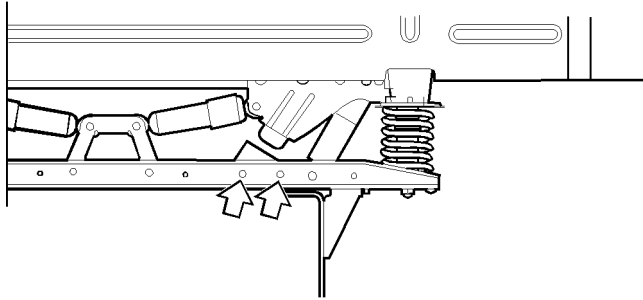
4



It may be necessary to raise the rear of the cab a little more to get the coil springs out from under the cab. Do not raise the rear of the cab any more than absolutely necessary (max. 300 mm (12 in.)). Raising the rear of the cab too far could damage the front cab mounting brackets.

Remove the nuts from the bottom of the coil spring bumper stop and slide the coil springs out.

5



W8000869

Remove the bolts for the bumper stops and then remove the bumper stops.

6

CAUTION

It may be necessary to raise the cab slightly to get the crossmember out from under the cab. Do not raise the rear of the cab any more than absolutely necessary (max. 300 mm (12 in.)). Raising the rear of the cab too far could damage the front cab mounting brackets.

Remove the bolts for the cab suspension crossmember and remove the cab suspension crossmember from under the cab.

Installation

1

Install the new cab suspension crossmember and bolts. Torque the bolts to 140 ± 25 Nm (103 ± 18 ft-lb).

2

Reinstall the bumper stops. Torque the bolts to 100 ± 15 Nm (72 ± 11 ft-lb).

3

Reinstall the coil springs and the coil spring bumper stops. Torque the coil spring bumper stop nuts to 140 ± 25 Nm (103 ± 18 ft-lb).

4

Lower the cab and align the bracket for the lateral shock absorbers. Install the bolts and torque them to 85 ± 15 Nm (63 ± 11 ft-lb).

5

Align the vertical shock absorbers. Install the bolts and torque them to 140 ± 25 Nm (103 ± 18 ft-lb).

Note: Use new mounting nuts. Mounting nuts for the shock absorbers should only be tightened and loosened once.

6

Remove the bottle jack and the cab supports.

7

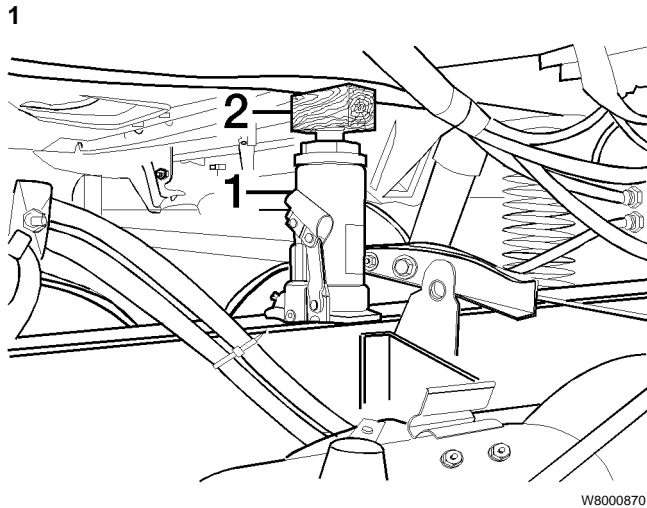
Check the rear cab height and rear cab alignment, see "Cab Alignment, Checking" page 42 and "Cab Alignment, Adjustment" page 43.

8181-03-02-06 Cab Suspension Crossmember, Replacement



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.

Coil Spring w/ Panhard Rod Removal



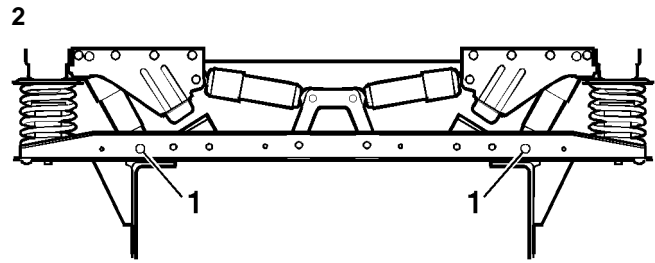
- 1 Bottle jack
- 2 Wood block

W8000870



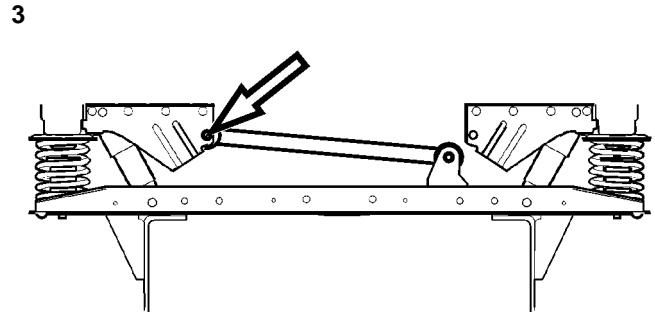
Do not raise the rear of the cab any more than absolutely necessary (max. 300 mm (12 in.)). Raising the rear of the cab too far could damage the front cab mounting brackets.

Tilt the hood forward and then use a bottle jack to raise the rear of the cab. Support the rear of the cab with wooden blocks.



W8000867

Remove the lower vertical shock absorber bolts (1).



W8002847

Disconnect the panhard rod from the cab.

4 Remove the 2 crossmember mounting studs on the left side and then on the right side.

5



It may be necessary to raise the rear of the cab a little more to get the coil springs out from under the cab. Do not raise the rear of the cab any more than absolutely necessary (max. 300 mm (12 in.)). Raising the rear of the cab too far could damage the front cab mounting brackets.

Remove the nuts from the bottom of the coil spring bumper stop and slide the coil springs out. Remove the support bumper stop.

6

**CAUTION**

It may be necessary to raise the cab slightly to get the crossmember out from under the cab. Do not raise the rear of the cab any more than absolutely necessary (max. 300 mm (12 in.)). Raising the rear of the cab too far could damage the front cab mounting brackets.

Remove the cab suspension crossmember from under the cab.

Installation

1

Install the new cab suspension crossmember and bolts. Torque the 4 bolts to 140 ± 25 Nm (103 ± 18 ft-lb).

2

Reinstall the coil springs and the coil spring bumper stops. Torque to 140 ± 25 Nm (103 ± 18 ft-lb).

3

Lower the cab.

4

Install the panhard rod to the cab. Torque to 140 ± 25 Nm (103 ± 18 ft-lb).

Note: Use new mounting nuts. Mounting nuts for the panhard rod should only be tightened and loosened once.

5

Align the vertical shock absorbers. Install the bolts and torque them to 140 ± 25 Nm (103 ± 18 ft-lb).

Note: Use new mounting nuts. Mounting nuts for the shock absorbers should only be tightened and loosened once.

6

Remove the bottle jack and the cab supports.

7

Check the rear cab height and rear cab alignment. Refer to "Rear Cab Height, Adjustment" page 28, "Cab Alignment, Checking" page 42 and "Cab Alignment, Adjustment" page 43.

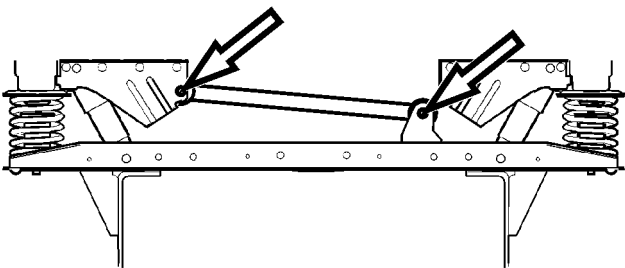
8181-03-02-27 Panhard Rod, Replacement



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.

Removal

1



W8002848

Loosen the bolts on both ends of the rod. Remove the panhard rod.

Installation

1

Install the panhard rod into position, tighten the bolts. Torque to 140 ± 25 Nm (103 ± 18 ft-lb).

140 ± 25 Nm
(103 ± 18 ft-lb)

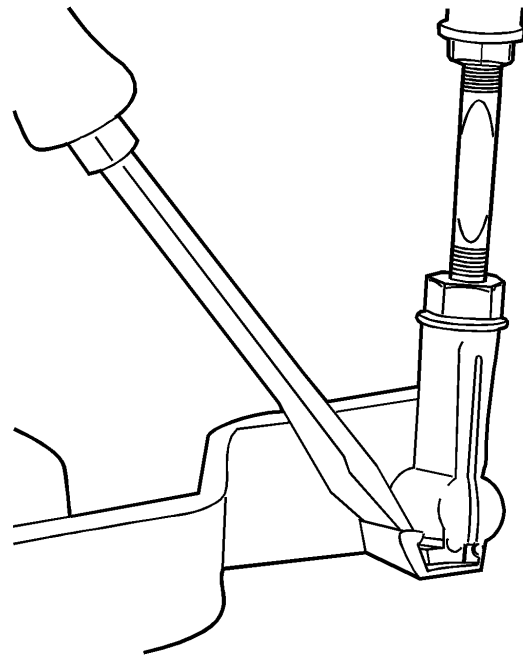
8181-03-02-08 Control Rod, Replacement



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.

Removal

1



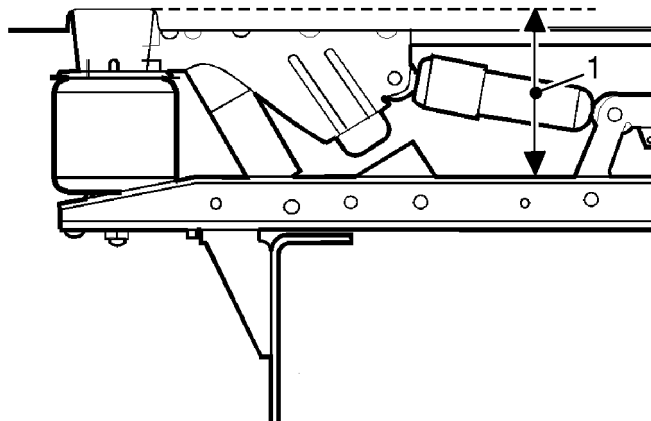
W8000856

Using a small flat blade screwdriver, unlatch the catch on the control rod sockets and pry the control rod socket off the ball on the leveling valve and off the ball on the anchor end.

Installation

1
Check to be sure the catch on the new control rod is unlatched. Push the new control rod sockets on the ball at each end. Lock the catch on the sockets.

2



W8002876

DANGER

When lowering the cab, be certain to keep hands and arms clear of the area under the cab. Failure to do so could lead to personal injury or death.

Check the rear cab height adjustment. Rear cab height (1) should be 188 ± 4 mm (7.4 ± 0.16 in.). Refer to "Rear Cab Height, Adjustment" page 28.

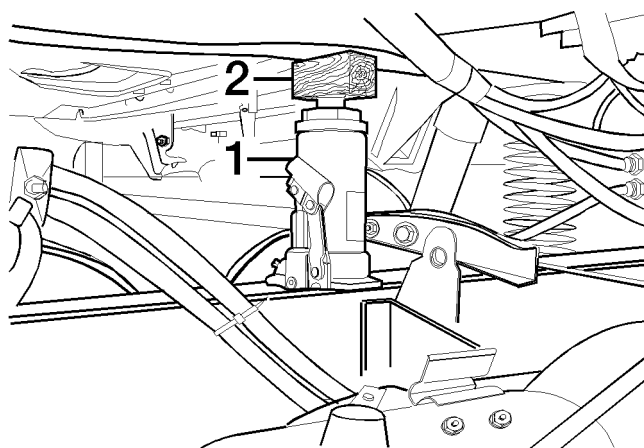
8181-03-02-09 Coil Spring Bumper, Replacement

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.

Removal

1



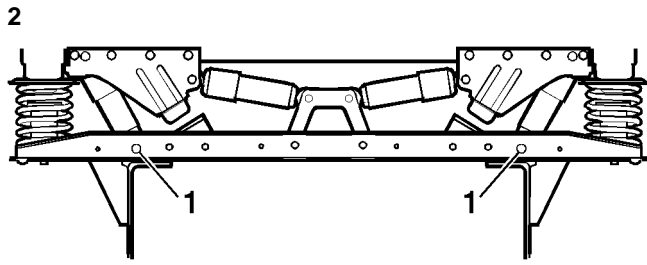
W8000870

- 1 Bottle jack
- 2 Wood block

CAUTION

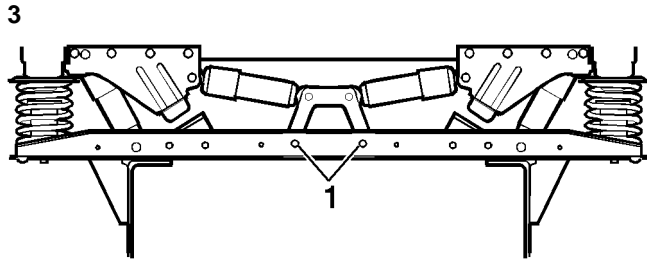
Do not raise the rear of the cab any more than absolutely necessary (max. 300 mm (12 in.)). Raising the rear of the cab too far could damage the front cab mounting brackets.

Tilt the hood forward and then use a bottle jack to raise the rear of the cab. Support the rear of the cab with wooden blocks.



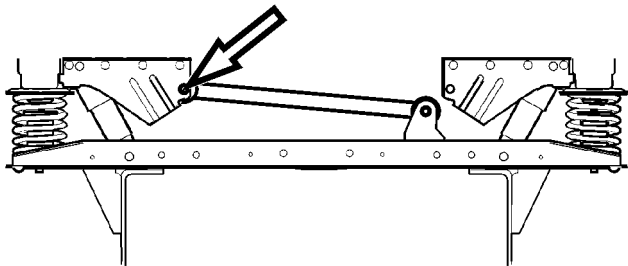
W8000867

Remove the lower vertical shock absorber bolts (1).



W8000866

Lateral shock absorber bracket bolts.



W8002847

Panhard rod.

Vehicles w/ lateral shock absorbers:

Remove the bolts from the bracket for the lateral shock absorbers (1).

Vehicles w/ panhard rod:

Disconnect the panhard rod from the cab.

4



It may be necessary to raise the rear of the cab further to get the coil springs out from under the cab. Do not raise the rear of the cab any more than absolutely necessary (max. 300 mm (12 in.)). Raising the rear of the cab too far could damage the front cab mounting brackets.

Remove the nut from the bottom of the coil spring bumper stop and slide the coil spring and coil spring bumper stop out from under the cab.

5

Remove the coil spring bumper from the bottom of the cab.

Installation

1

Install the new coil spring bumper and spring plate to the bottom of the cab. Torque the allen head bolt to 48 ± 8 Nm (35 ± 6 ft-lb).

2

Reinstall the coil spring and the coil spring bumper stop. Torque the coil spring bumper stop nut to 140 ± 25 Nm (103 ± 18 ft-lb).

3

Lower the cab. **Vehicles w/ lateral shock absorbers:** Align the bracket for the lateral shock absorbers. Install the bolts and torque them to 85 ± 15 Nm (63 ± 11 ft-lb).

Vehicles w/ panhard rod:

Install the panhard rod to the cab. Torque to 140 ± 25 Nm (103 ± 18 ft-lb).

Note: Use new mounting nuts. Mounting nuts for the panhard rod should only be tightened and loosened once.

4

Reinstall the lower outside shock absorbers and torque the bolts to 140 ± 25 Nm (103 ± 18 ft-lb).

140 ± 25 Nm
(103 ± 18 ft-lb)

Note: Use new mounting nuts. Mounting nuts for the shock absorbers should only be tightened and loosened once.

5

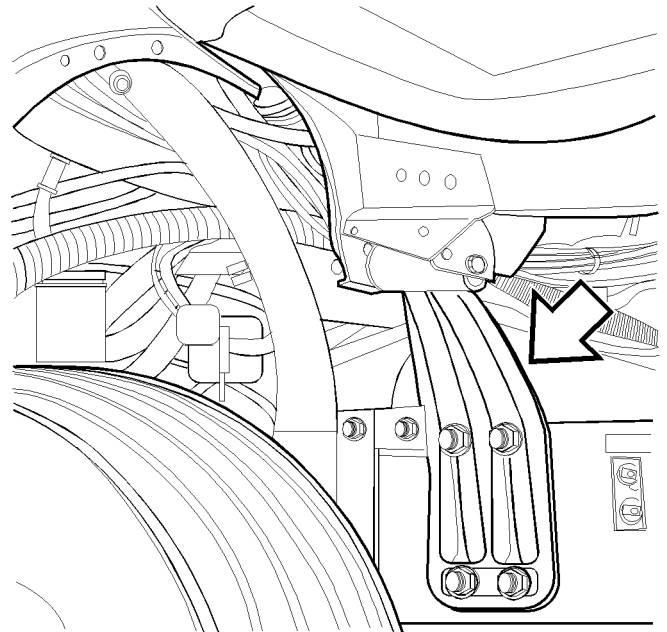
Remove the bottle jack and the cab supports.

6

Check the rear cab height. Refer to "Rear Cab Height, Adjustment" page 28.

8181-03-02-10**Cab Mounting Bracket, Replacement**

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.

Removal**1**

W8000849

Tilt the hood forward and remove the splash shield on the side of the cab where the mounting bracket is to be replaced.

2

Use a jack to lift the front of the cab. Lift the front of the cab slightly and support it.

3

Remove the bolts and remove the front cab mounting bracket.

Installation

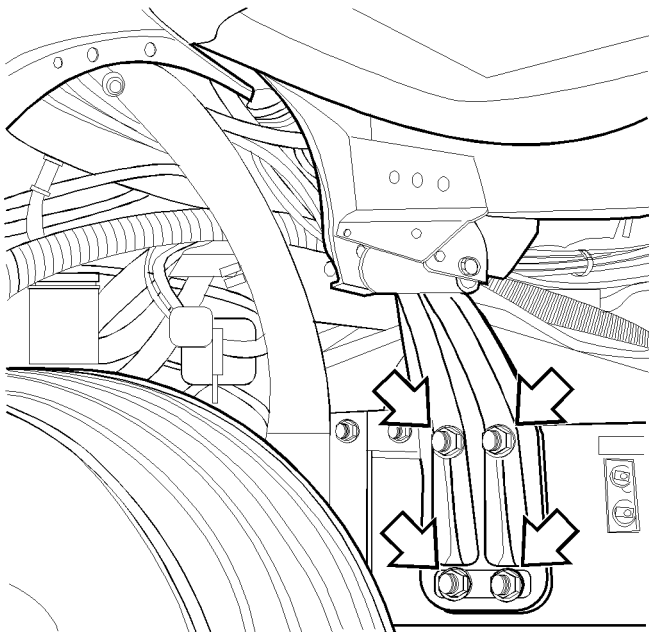
1
Install the new front cab mounting bracket to the chassis. Do **not** tighten the chassis bolts at this time.

Note: In order for the cab to be properly aligned, the cab to front cab mounting bracket bolt must be installed and torqued to the proper specification **before** tightening and torquing the front cab mounting bracket to chassis bolts.

2
Lower the cab and install the bolt that holds the cab to the front cab mounting bracket. Tighten the bolt and torque to 235 ± 20 Nm (174 ± 15 ft-lb).

Note: Use new mounting nuts. The mounting nuts should only be tightened and loosened once.

3



Tighten the front cab mounting bracket to chassis bolts. Torque the bolts to 540 ± 90 Nm (400 ± 67 ft-lb).

4
Lower the cab. Remove the jack and cab support.

5
Check the rear of the cab to be sure it is centered properly and square on the chassis.

6
Reinstall the splash shield.

8181-03-02-11 Cab Suspension Shock Absorber, Replacement

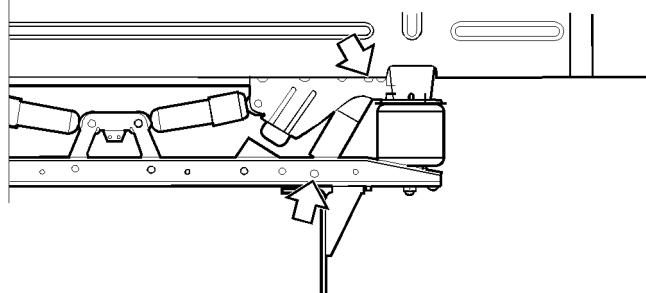


Before working on a vehicle, set the parking brakes, place the transmission in neutral, and block the wheels. Failure to do so can result in unexpected vehicle movement and can cause serious personal injury or death.

Note: This procedure may be used for the vertical or lateral shock absorbers on trucks with air ride cab suspension or coil spring cab suspension.

Removal

1



Remove the upper and lower shock absorber bolts.

2

Pry the shock absorber out.

Note: It may be necessary to loosen the bumper stop bolts or remove the leveling valve to remove the shock absorbers.

W8000844

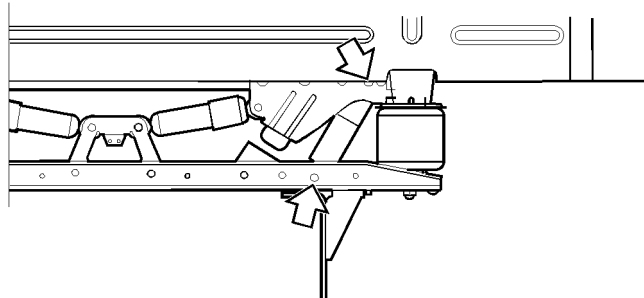
Installation

1

Install the new shock absorber into the cab suspension crossmember.

Note: The lateral shock absorbers must be installed with the label on the side of the shock absorber facing down.

2



Install the bolts and torque to 140 ± 25 Nm (103 ± 18 ft-lb).

W8000844
 140 ± 25 Nm
(103 ± 18 ft-lb)

Note: Use new mounting nuts. Mounting nuts for the shock absorbers should only be tightened and loosened once.

Note: Tighten the bumper stop bolts or reinstall the leveling valve if one of these steps was taken during removal. Check the torque values for the correct torque for these bolts.

8181-06-03-01 Cab Alignment, Checking



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.

The following guidelines must be followed before taking cab alignment measurements.

- 1 Rear cab height and crossmember lateral position **must** be established before taking cab center measurements.
- 2 Ensure measurements are taken on an empty vehicle, with no one on the truck and no extra items that were not factory installed.
- 3 The vehicle should be driven to a level surface without severe turning of the wheels. A severe turn of the wheels while driving may cause the cab to appear out of alignment. Park the vehicle on a level surface with the wheels straight ahead.

Rear Cab Height *Air Ride Suspension*

Cabs with air suspension have a leveling valve which automatically adjusts the rear cab height to an optimal level when weight is added or removed from the cab. For ride quality, leveling valves have a "dead band" which allows the cab height to vary within a certain range without activating the valve.

The truck air system must have a minimum of 90 psi (260 kPa) when measurements are taken. The rear cab height at the center of the cab should measure 188 ± 4 mm (7.41 ± 0.16 in.) from the top edge of the cab-suspension crossmember to the bottom of the cab floor. See "Air Ride Cab Suspension" page 5.

If the measurement is out of specification, the control rod on the cab leveling valve can be adjusted, see "Rear Cab Height, Adjustment" page 28.

Rear Cab Height *Coil Spring Suspension*

Cab coil spring suspension systems do not have an automatic leveling system. Therefore, the rear cab height measurement depends on the weight of the cab. When a roof fairing is specified with coil spring suspension, a shim is added to the springs to compensate for the extra weight of the fairing.

See "Coil Spring Cab Suspension System" page 6 for rear cab height measurement specifications.

Cab Suspension Crossmember

Measure from the centerline of the cab suspension crossmember to each frame rail. The maximum allowable offset to the right or left is 2 mm (0.08 in.).

See "Air Ride Cab Suspension" page 5 or "Coil Spring Cab Suspension System" page 6 for correct specifications.

Cab Center Measurement

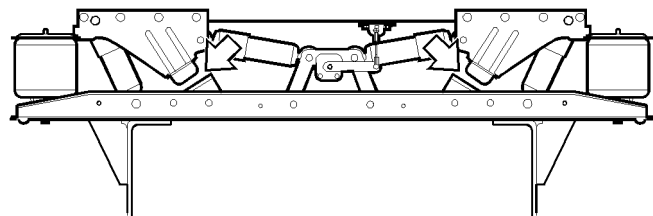
Measure the length of the lateral shock absorbers from bolt hole center to center. See "Air Ride Cab Suspension" page 5 or "Coil Spring Cab Suspension System" page 6. This measurement should be 245 ± 3 mm (9.65 ± 0.12 in.). If both lateral shock absorbers are within this specification, the cab is aligned properly.

If one or both lateral shock absorbers is not within this specification, proceed as follows:

Coil Spring Suspension

If one or both lateral shock absorbers are not within this specification, proceed to "Cab Alignment, Adjustment" page 43.

Air Ride Suspension



W8000862

- 1 Lubricate the bottom of the cab bumpers and the top of the bumper stops with a liquid gel soap.

Note: Do not use grease or other petroleum-based lubricants.

2

! DANGER

Stay clear when suspension air is released. Chassis may drop quickly and can cause serious injury or death to anyone under the vehicle.

! DANGER

When lowering the cab, be certain to keep hands and arms clear of the area under the cab. Failure to do so could lead to personal injury or death.

! WARNING

Before beginning any service work on any part of the air system, be certain that the air pressure has been released. Failure to do so may cause a component to violently separate, which can result in serious personal injury.

Drain the truck air system. Be sure that the air springs are fully deflated and the cab is resting evenly (side to side) on the bump-stops. It may be necessary to shake the cab side to side to help center the cab on the bump-stops.

3

Start the engine and build the truck air system to a minimum pressure of 90 psi (260 kPa). The air springs should re-inflate until the proper cab height is achieved.

4

Measure the length of the lateral shock absorbers from bolt hole center to center. This measurement should be 245 ± 3 mm (9.65 ± 0.12 in.). See "Air Ride Cab Suspension" page 5. If both lateral shock absorbers are within this specification, the cab is aligned properly. If one or both lateral shock absorbers are not within this specification, proceed to "Cab Alignment, Adjustment" page 43.

245 ± 3 mm
(9.65 ± 0.12 in.)

5

Wash off the soap applied in step 1.

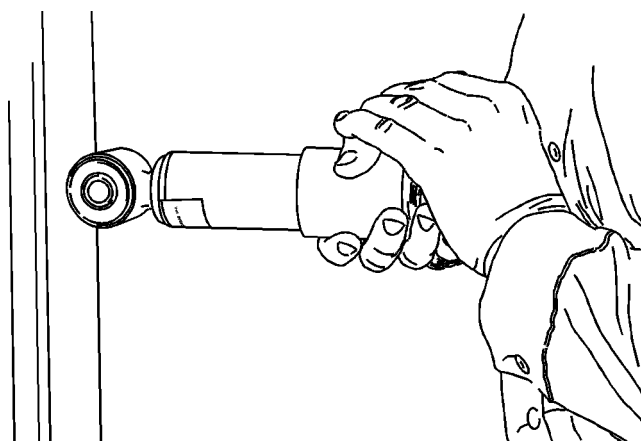
8181-05-02-01 Cab Alignment, Adjustment

! 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.

Note: For VHD equipped with coil spring suspension continue to step 12.

1



W8002186

Remove and test both lateral shock absorbers. To test each lateral shock absorber, hold the shock horizontally *with the label down*. Place one end of the shock absorber against a fixed object. Holding the other end, completely compress the shock absorber, then release it. The lateral shock should compress and extend smoothly.

Note: Compressing the shock will require approximately 50 N (11 lbf) of force at full extension, to approximately 430 N (97 lbf) at full compression.

2

After releasing, the shock should re-extend immediately to its full length. Measure the extended length of the lateral shock from bolt hole center to center. This measurement should be 261 ± 3 mm ($10.28 \pm .12$ in.).

261 ± 3 mm
($10.28 \pm .12$ in.)

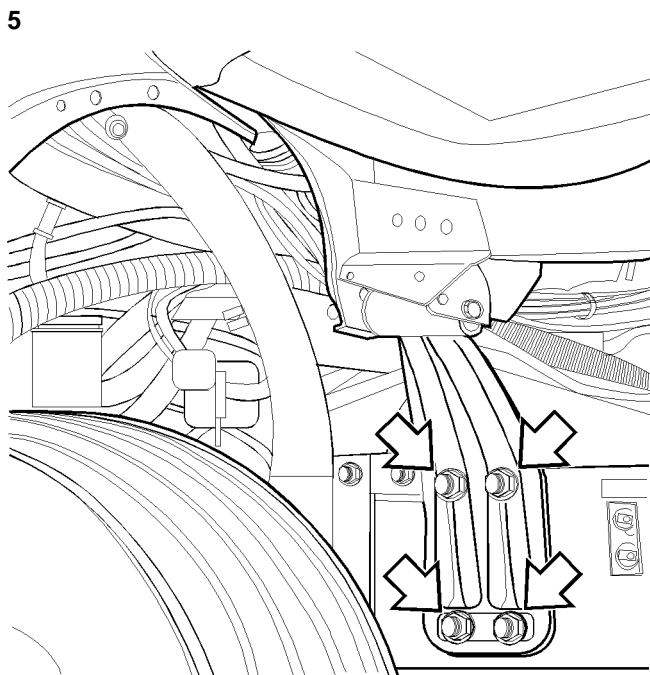
3
If one or both lateral shocks does not pass these tests, replace **both** lateral shocks.

4
Reinstall the lateral shock absorbers. The mounting bolt torque is 140 ± 25 Nm (103 ± 18 ft-lb).

Note: Use new mounting nuts. Mounting nuts for the shock absorbers should only be tightened and loosened once.

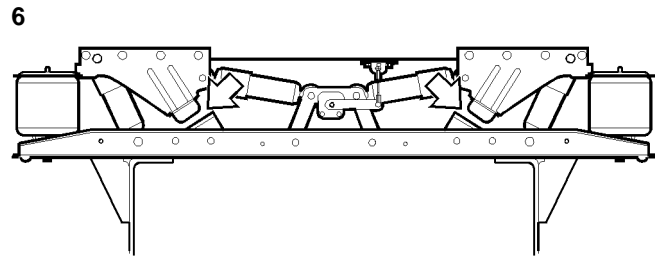
Note: If equipped with coil spring suspension, continue to step **12**.

Air Ride Suspension



Loosen the bolts that hold the front cab mounting brackets to the frame rails on both sides.

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W8000862

Lubricate the bottom of the cab bumpers and the top of the bumper stops with a liquid gel soap.

Note: Do not use grease or other petroleum-based lubricants.

7

! DANGER

Stay clear when suspension air is released. The vehicle chassis may drop quickly and can cause serious injury or death to anyone under the vehicle.

! WARNING

Before beginning any service work on any part of the air system, be certain that the air pressure has been released. Failure to do so may cause a component to violently separate, which can result in serious personal injury.

Drain the truck air system. Be sure that the air springs are fully deflated and the cab is resting evenly (side to side) on the bump-stops. It may be necessary to shake the cab side to side to help center the cab on the bump-stops.

8
Tighten the front cab mounting bracket bolts to 540 ± 90 Nm (400 ± 67 ft-lb).

Note: Mounting bolts for the front cab brackets should only be loosened and tightened once. Always use new bolts.

9

Start the engine and build the truck air system to a minimum pressure of 90 psi (260 kPa). The air springs should re-inflate until the proper cab height is achieved.

10

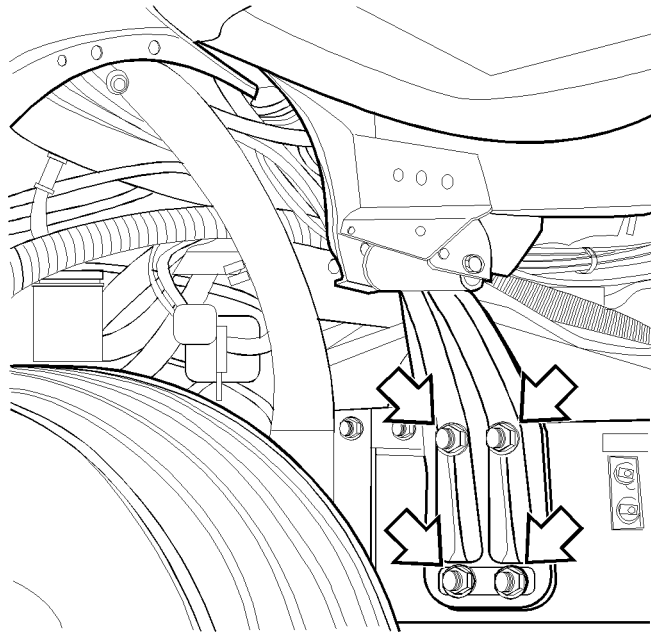
Measure the length of the lateral shock absorbers from bolt hole center to center. This measurement should be 245 ± 3 mm (9.65 ± 0.12 in.). See "Air Ride Cab Suspension" page 5.

245 ± 3 mm
(9.65 ± 0.12 in.)

11

Wash off the soap applied in step 6.

Coil Spring Suspension

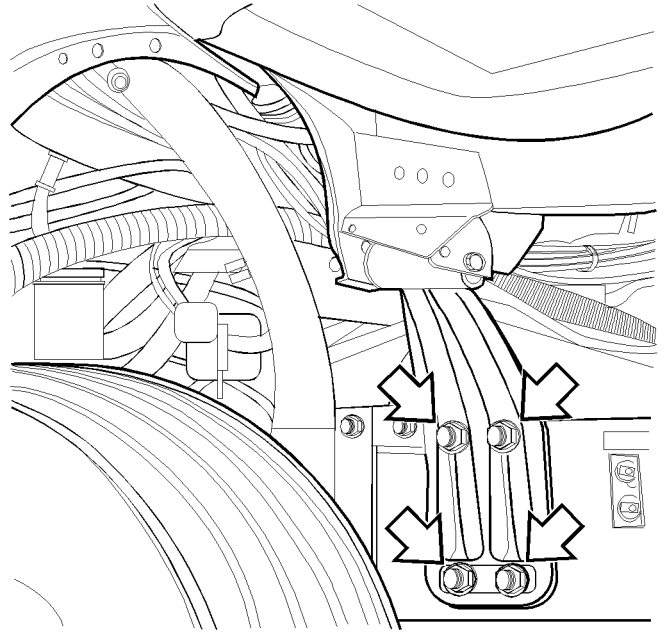
12

W8000863

Loosen the bolts that hold the front cab mounting brackets to the frame rails on both sides.

13

Manually center the cab between the frame rails.

14

W8000863

Tighten the front cab mounting bracket bolts to 540 ± 90 Nm (400 ± 67 ft-lb).

Note: Mounting bolts for the front cab brackets should only be loosened and tightened once. Always use new bolts.

15

Measure the length of the lateral shock absorbers from bolt hole center to center. This measurement should be 245 ± 3 mm (9.65 ± 0.12 in.). See "Coil Spring Cab Suspension System" page 6.

Operation Numbers

| | | |
|---------------|--|------------|
| 8181-03-02-01 | Air Spring, Replacement | 21 |
| 8181-03-02-02 | Coil Spring, Replacement | 23 |
| 8181-03-02-03 | Cab Bumper, Replacement | 24 |
| 8181-03-02-04 | Cab Bumper Stop, Replacement | 25 |
| 8181-03-02-05 | Cab Leveling Valve, Replacement | 26 |
| 8181-03-02-06 | Cab Suspension Crossmember, Replacement | 29, 32, 34 |
| 8181-03-02-08 | Control Rod, Replacement | 36 |
| 8181-03-02-09 | Coil Spring Bumper, Replacement | 37 |
| 8181-03-02-10 | Cab Mounting Bracket, Replacement | 39 |
| 8181-03-02-11 | Cab Suspension Shock Absorber, Replacement | 41 |
| 8181-03-02-27 | Panhard Rod, Replacement | 36 |
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| 8181-05-02-05 | Rear Cab Height, Adjustment | 28 |
| 8181-06-03-01 | Cab Alignment, Checking | 42 |

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