

SERVICE MANUAL

SERVICE MANUAL SECTION

MULTI-LINK FRONT AIR SUSPENSION

Model: PROSTAR™

S03015

9/10/2007

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1. DESCRIPTION

The multi-link front air suspension is the ultimate in smooth, shock and vibration-free ride with a preset constant frame height.

The multi-link front air suspension adjusts to load changes automatically, providing a "low rate" suspension with a light or no load condition, and a "higher rate" suspension with heavier loads. The major components of the multi-link front air suspension system are as follows.

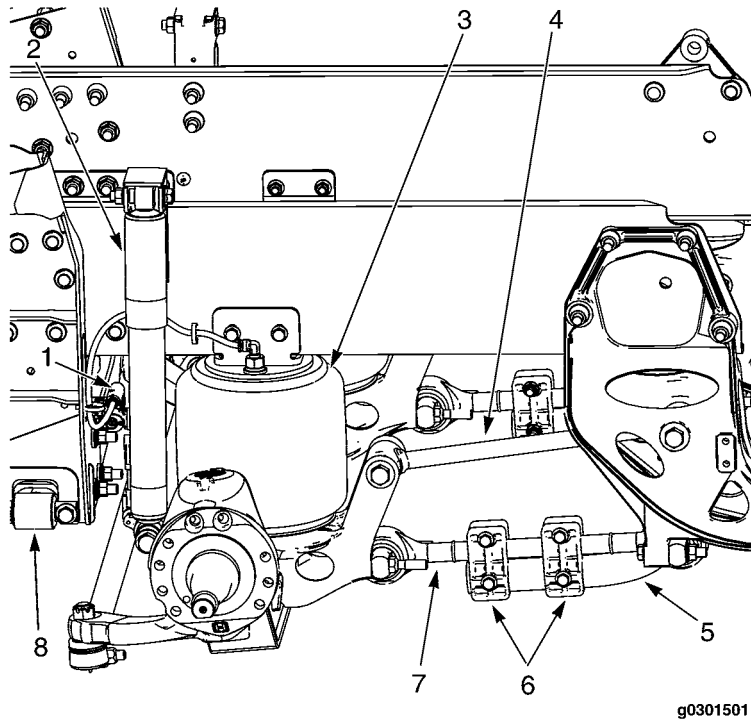
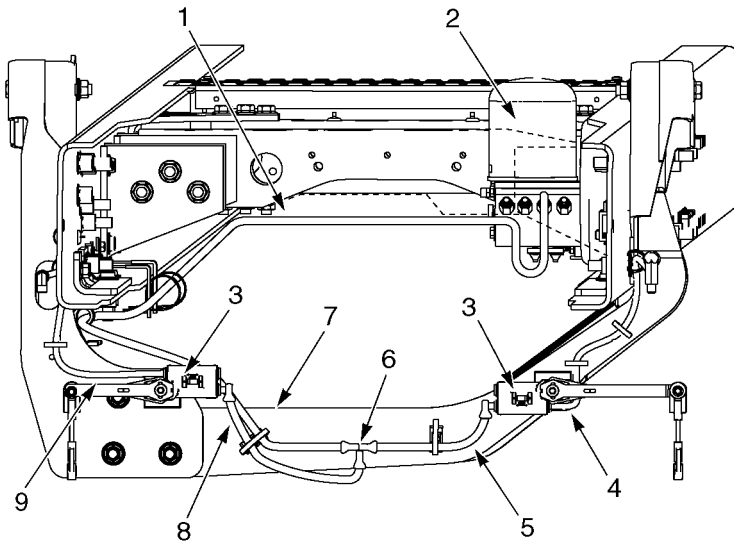


Figure 1 Multi-link Front Air Suspension System

1. HEIGHT CONTROL VALVE
2. SHOCK
3. AIR SPRING
4. TOP TORQUE ROD
5. SWAY BAR
6. SWAY BAR CLAMPS
7. BOTTOM TORQUE ROD
8. TRANSVERSE TORQUE ROD

1.1. AIR SYSTEM



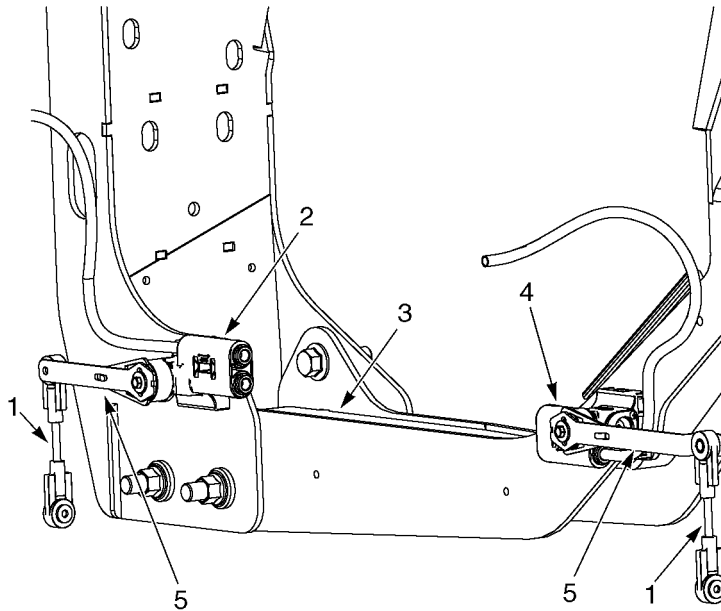
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Figure 2 Air System

1. MAIN SUPPLY AIR LINE
2. AIR DRYER
3. HEIGHT CONTROL VALVE
4. LEFT AIR SPRING SUPPLY AIR LINE
5. LEFT RIDE HEIGHT CONTROL VALVE SUPPLY AIR LINE
6. T-FITTING
7. TRANSVERSE CROSSMEMBER
8. RIGHT RIDE HEIGHT CONTROL VALVE SUPPLY AIR LINE
9. RIGHT AIR SPRING SUPPLY AIR LINE

The air is supplied to the dual height control valves from the air dryer. A T-fitting, mounted on the front side of the transverse crossmember, splits the air line into two air lines that direct the air to the supply port on each of the dual ride height control valves. Single air lines are connected to each front air spring to supply and exhaust air from the air springs.

1.2. HEIGHT CONTROL VALVES



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Figure 3 Height Control Valves

1. HEIGHT CONTROL ROD
2. RIGHT HEIGHT CONTROL VALVE
3. TRANSVERSE CROSSMEMBER
4. LEFT HEIGHT CONTROL VALVE
5. VALVE LEVER

The multi-link front air suspension is equipped with dual height control valves that, when properly adjusted, provide and maintain the correct ride height on each side of the vehicle.

The height control valves are mounted on the front of the transverse crossmember, one on each side. The height control valves have a valve lever connected to the axle assembly with a height control rod. This valve lever is sensitive to frame height and provides automatic filling or exhausting of the air springs to maintain the correct vehicle ride height.

IMPORTANT – Both height control valves are the same part that are mounted in opposite directions on the transverse crossmember. The difference in the two height control valves is the valve levers, and how the valve levers are mounted on the height control rods.

1.3. AIR SPRINGS

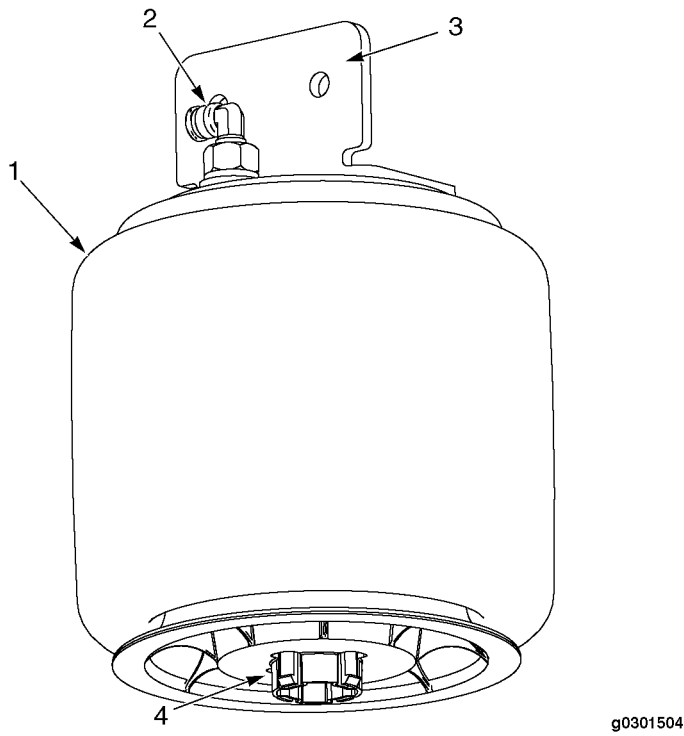


Figure 4 Air Spring

1. AIR SPRING
2. AIR SUPPLY FITTING
3. MOUNT BRACKET
4. SNAP-ON MOUNT

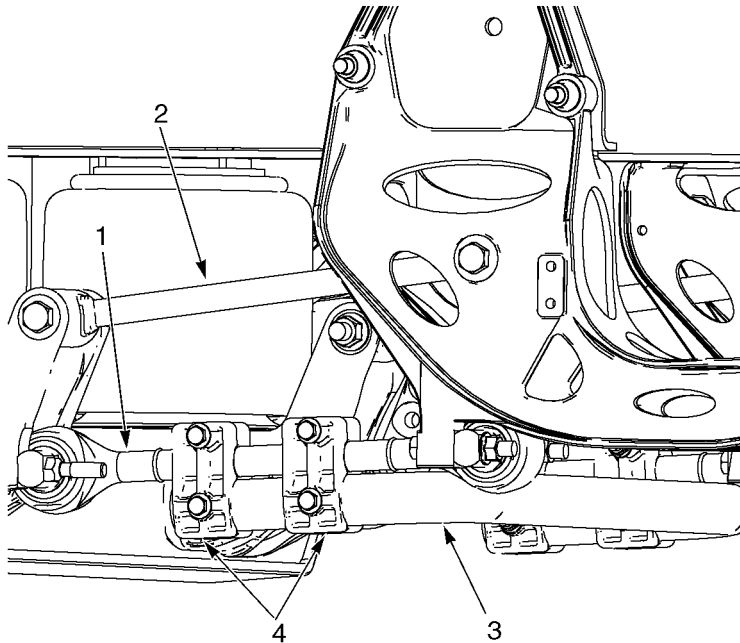
The air springs of the multi-link front air suspension take the place of steel springs, which means there is no inter-leaf friction to overcome; therefore, minimum road shock is transferred to the frame, cargo, and driver. The air springs are engineered to support the vertical load while providing a very low spring rate.

The quick “snap-on mount” and “push-to-connect” air supply fitting provide fast and easy removal and installation of the air springs.

1.4. SHOCK ABSORBERS

The multi-link front air suspension is equipped with one shock absorber on each side of the vehicle. Shock absorbers control vehicle body sway and also eliminate excessive tire wear. They improve the ride quality, and are especially effective when the vehicle is empty or only partly loaded.

1.5. TORQUE RODS AND SWAY BAR



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Figure 5 Torque Rods and Sway Bar

- 1. LOWER TORQUE ROD
- 2. UPPER TORQUE ROD
- 3. SWAY BAR
- 4. SWAY BAR CLAMPS

Dual torque rods are mounted between the front mega brackets and axle brackets on each side of the vehicle. The torque rods provide stability by minimizing axle movement caused by road bumps and the resulting load transfer during braking.

The sway bar mounts to the lower torsion bars with two sway bar clamps on each side. The sway bar helps reduce vehicle lean during cornering and stabilizes the chassis against sway.

1.6. TRANSVERSE TORQUE ROD AND CROSSMEMBER

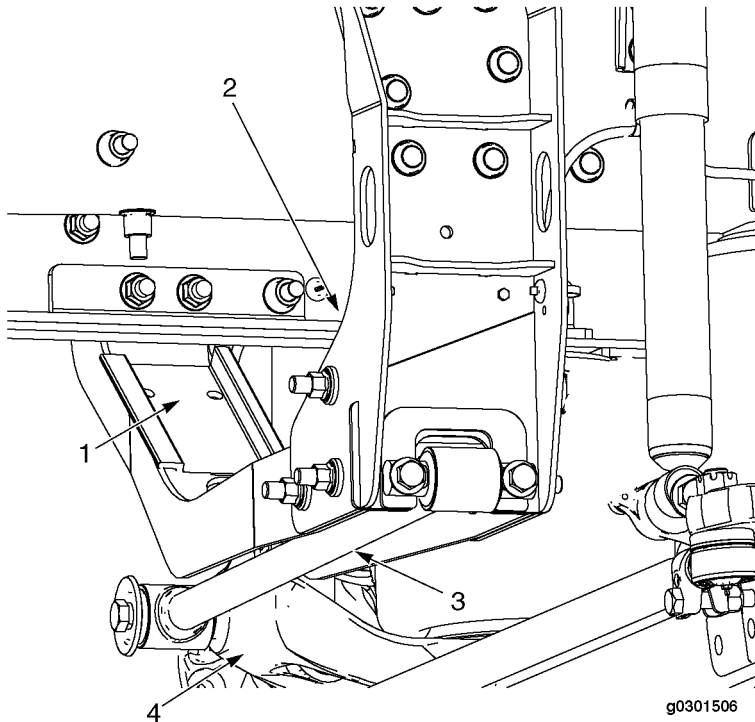


Figure 6 Transverse Torque Rod and Crossmember

1. STARTER SHIELD
2. TRANSVERSE CROSSMEMBER
3. TRANSVERSE TORQUE ROD
4. AXLE BRACKET

The transverse crossmember is used to mount the transverse torque rod behind the front axle. A plastic shield has been installed on the left side of the transverse crossmember to protect the starter and wiring.

The transverse torque rod is an integral component of the multi-link front air suspension that enhances handling during cornering and helps maintain lateral axle position.

2. REMOVE AND INSTALL PROCEDURES



WARNING – To prevent vehicle damage, personal injury, or possible death, park the vehicle on a flat, level surface. Make sure the engine ignition is in the off position and the transmission is in neutral or in the park position if the vehicle is equipped with an automatic transmission. Set the parking brake, chock the wheels, and disconnect the batteries at the negative terminal before doing any service procedures on the engine or vehicle.



WARNING – A jack must never be used alone to support a vehicle while under chassis service is being performed. The jack may lower and serious personal injury could result. Always support vehicle with floor stands.

CAUTION – Suspension fasteners are critical parts because they affect performance of vital parts and systems and their failure can result in major service expense. A new part with the same part number must be installed if installation becomes necessary. Do not use a replacement part of lesser quality or substitute design. Torque values must be used as specified during reassembly to make sure of correct retention of these parts.

IMPORTANT – Before performing any work on the multi-link front air suspension components, be sure to perform these basic procedures:

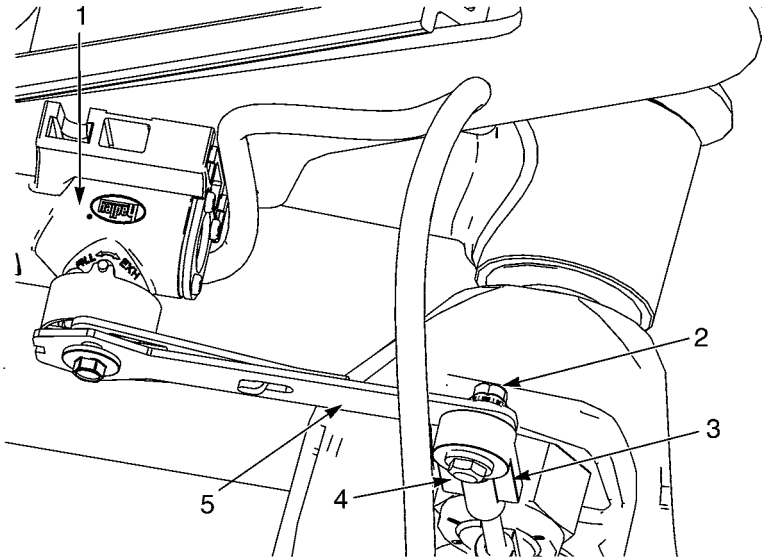
1. Park the chassis on a flat, level surface.
2. Place transmission in neutral (or park, if automatic transmission).
3. Set the parking brake.
4. Turn off ignition.
5. Install wheel chocks.
6. Disconnect the battery.

NOTE – Steering axle assembly service and maintenance instructions are covered by the Hendrickson STEERTEK service manual. Go to <http://www.hendrickson-intl.com> for this Service Manual.

2.1. HEIGHT CONTROL VALVES

NOTE – Both height control valves are removed in the same manner. Left side height control valve shown.

Height Control Valves – Removal

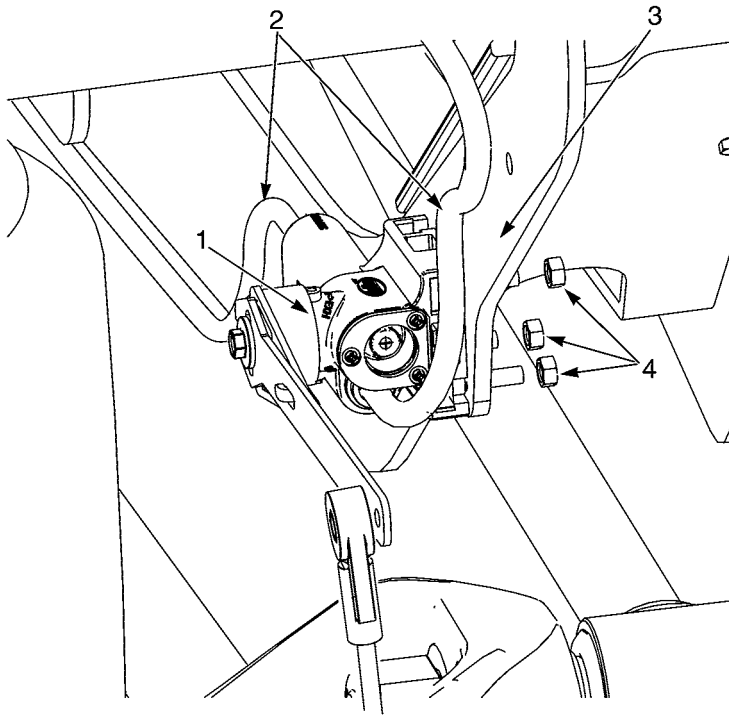


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Figure 7 Exhaust Air

1. HEIGHT CONTROL VALVE
2. NUT
3. HEIGHT CONTROL ROD
4. BOLT AND WASHER
5. VALVE LEVER

1. Drain air from vehicle reservoirs.
2. Remove bolt, washer, nut, and height control rod from the valve lever.
3. Rotate the valve lever on the height control valve to EXH (exhaust) position to drain air from system.



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Figure 8 Height Control Valve Mounting

1. HEIGHT CONTROL VALVE
2. AIR LINES
3. TRANSVERSE CROSSMEMBER
4. MOUNT NUTS

4. Disconnect two air lines from the height control valve.
5. Remove three mount nuts from the height control valve and the transverse crossmember.
6. Remove the height control valve.

Height Control Valves – Installation

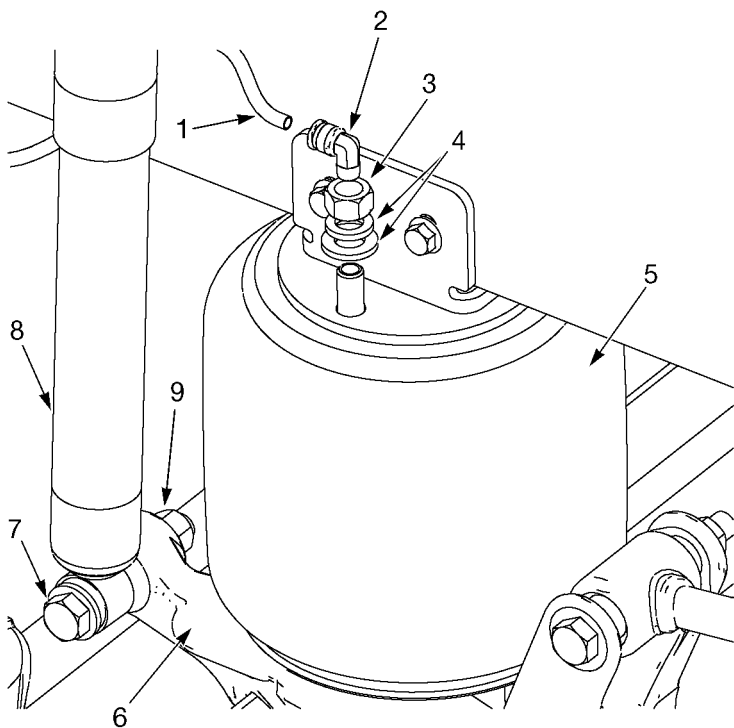
1. Align the height control valve on the transverse crossmember.
2. Install three nuts on the height control valve (Figure 8, Items 1 and 4). Torque nuts to 60 to 80 lbf-in (7 to 9 N•m).
3. Connect two air lines to the height control valve (Figure 8, Items 1 and 2).
4. Secure the height control rod to the valve lever with the bolt, washer, and nut (Figure 7). Torque bolt to 60 to 80 lbf-in (7 to 9 N•m).
5. Check ride height and adjust as needed (refer to CHECKING RIDE HEIGHT).

2.2. AIR SPRINGS

Air Springs – Removal

IMPORTANT – Even if the air spring has a leak and is deflated, the air must still be exhausted from the system.

1. Follow these steps to exhaust air from the vehicle and suspension system:
 - a. Drain air from vehicle reservoirs.
 - b. Remove bolt, washer, nut, and height control rod from the valve lever (Figure 7).
 - c. Rotate the valve lever on the height control valve to EXH (exhaust) position to drain air from system (Figure 7).



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Figure 9 Air Spring Mounting

1. AIR LINE
 2. AIR FITTING
 3. MOUNT NUT
 4. WASHERS
 5. AIR SPRING
 6. AXLE MOUNT BRACKET
 7. BOLT
 8. SHOCK ABSORBER
 9. MOUNT NUT
2. Remove bolt and nut from bottom of shock absorber and axle mount bracket.
 3. Remove air fitting from top of air spring.

4. Remove mount nut and two washers from air spring.



WARNING – A jack must never be used alone to support a vehicle while under chassis service is being performed. The jack may lower and serious personal injury could result. Always support vehicle with floor stands.

5. Raise the frame of the vehicle to remove load from the suspension and position frame stands to support the vehicle.

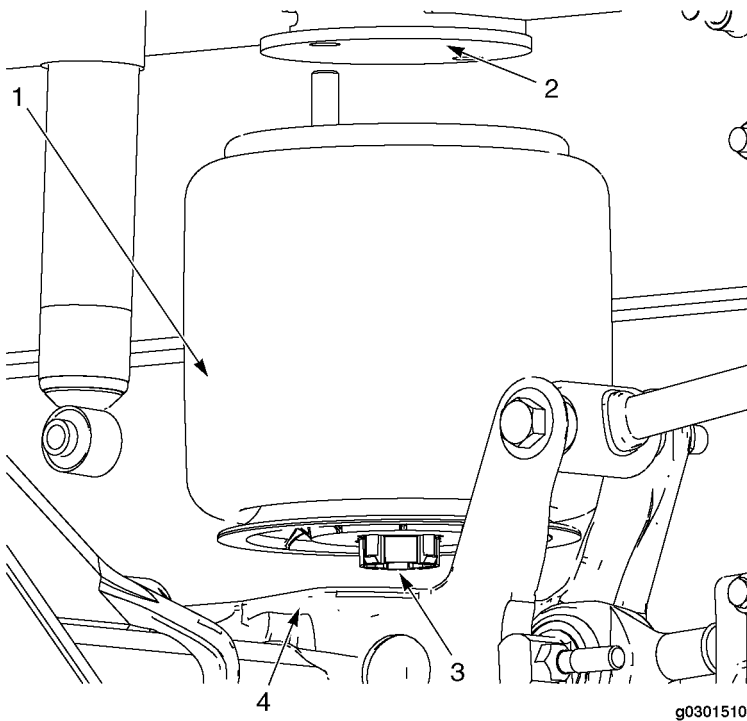
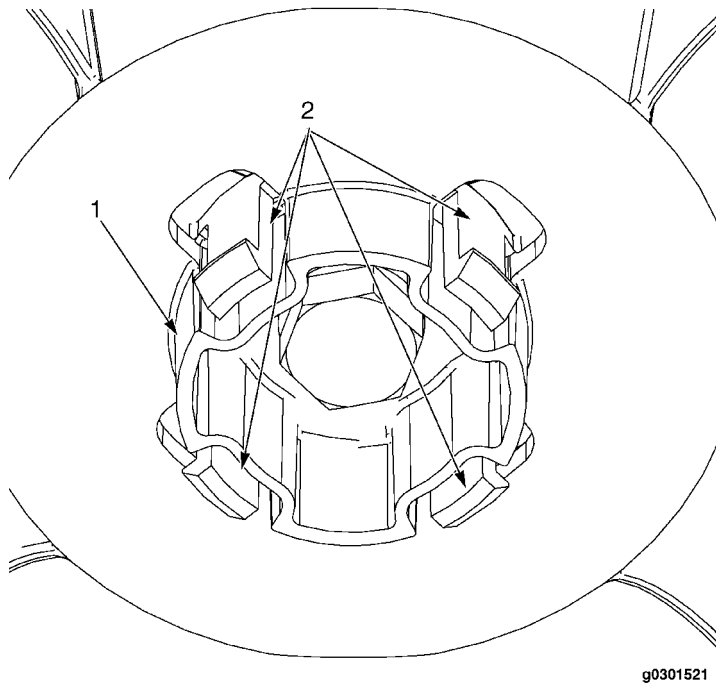


Figure 10 Snap-On Mount

1. AIR SPRING
2. TOP MOUNT BRACKET
3. SNAP-ON MOUNT
4. AXLE MOUNT BRACKET

6. Remove the air spring by placing a pry bar between the air spring and the axle mount bracket. Pry the air spring up to release the snap-on mount from the axle mount bracket. It may be necessary to pry on several sides of the air spring to free the snap-on mount.

Air Springs – Installation



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Figure 11 Air Spring Locking Clips

1. SNAP-ON MOUNT
2. LOCKING CLIPS

1. There are four locking clips on the bottom snap-on mount of the air spring. Two of these locking clips can be broken and the air spring will still be serviceable as the weight of the vehicle will maintain the air spring in the proper seat on the axle mount bracket.
2. Secure the air spring snap-on mount to the axle mount bracket making sure that the top of the air spring is properly aligned with the top mount bracket (Figure 10).
3. Lower the frame of the vehicle far enough to align the air spring on the top mount bracket (Figure 10, Items 1 and 2).
4. Install two washers and mount nut on the air spring (Figure 9, Items 3, 4, and 5). Torque mount nut to 45 to 55 lbf-lb (61 to 75 N•m).
5. Install air fitting on air spring and connect air line (Figure 9, Items 1, 2, and 5).

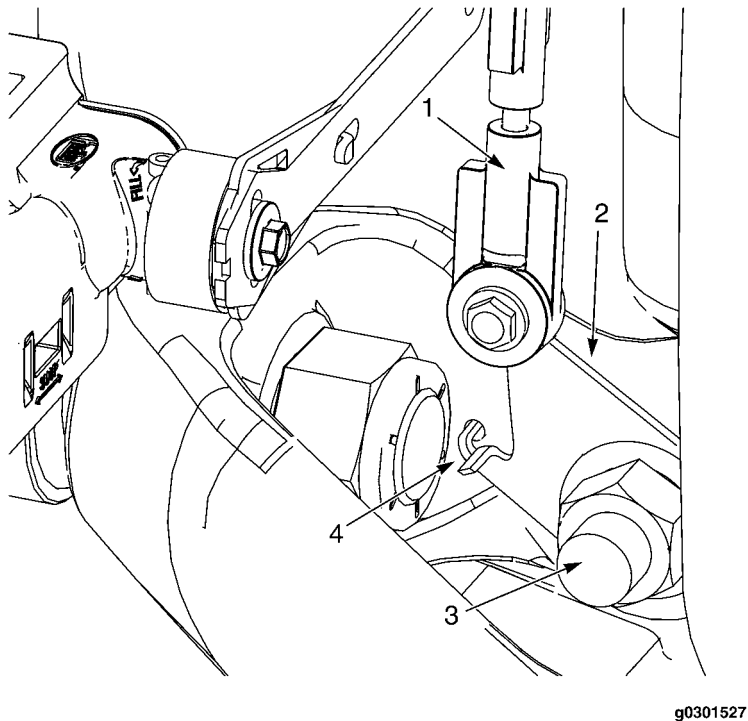


Figure 12

- 1. HEIGHT CONTROL ROD
- 2. SUPPORT BRACKET
- 3. BOTTOM MOUNT BOLT

NOTE – When installing the bottom mount bolt for the shock, be sure to attach the support bracket for the height control rod. A hole is provided in the axle casting for the support bracket tab to mount.

- 6. Position the shock absorber on the axle mount bracket and install the bolt and nut (Figure 9). Torque bolt to 250 to 300 lbf-ft (339 to 407 N•m).
- 7. Secure the height control rod to the valve lever with the bolt, washer, and nut (Figure 7). Torque bolt to 90 to 100 lbf-in (10 to 12 N•m).
- 8. Remove frame stands and jack from the vehicle.
- 9. Build system air pressure to governor cutout pressure and check for air leaks.
- 10. Check ride height and adjust as needed (refer to CHECKING RIDE HEIGHT).

2.3. SHOCK ABSORBER

Shock Absorber – Removal

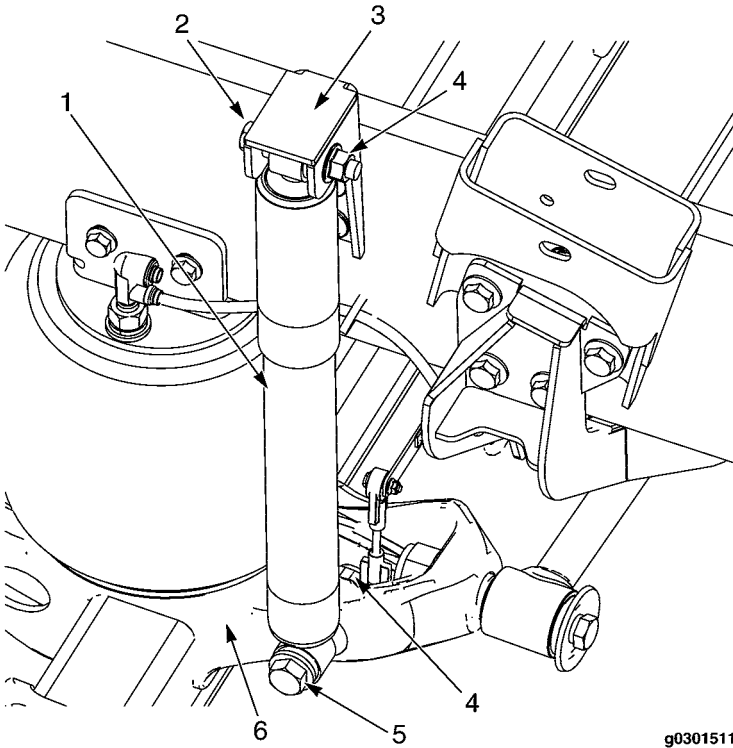


Figure 13 Shock Mounting

- 1. SHOCK ABSORBER
- 2. TOP MOUNT BOLT
- 3. FRAME MOUNT BRACKET
- 4. NUT
- 5. BOTTOM MOUNT BOLT
- 6. AXLE MOUNT BRACKET

1. Follow these steps to exhaust air from the vehicle and suspension system:
 - a. Drain air from vehicle reservoirs.
 - b. Remove bolt, washer, nut, and height control rod from the valve lever (Figure 7).
 - c. Rotate the valve lever on the height control valve to EXH (exhaust) position to drain air from system (Figure 7).
2. Remove the bottom mount bolt and nut from the shock absorber and axle mount bracket.
3. Remove the top mount bolt and nut from the shock absorber and frame mount bracket.
4. Remove the shock absorber.

Shock Absorber – Installation

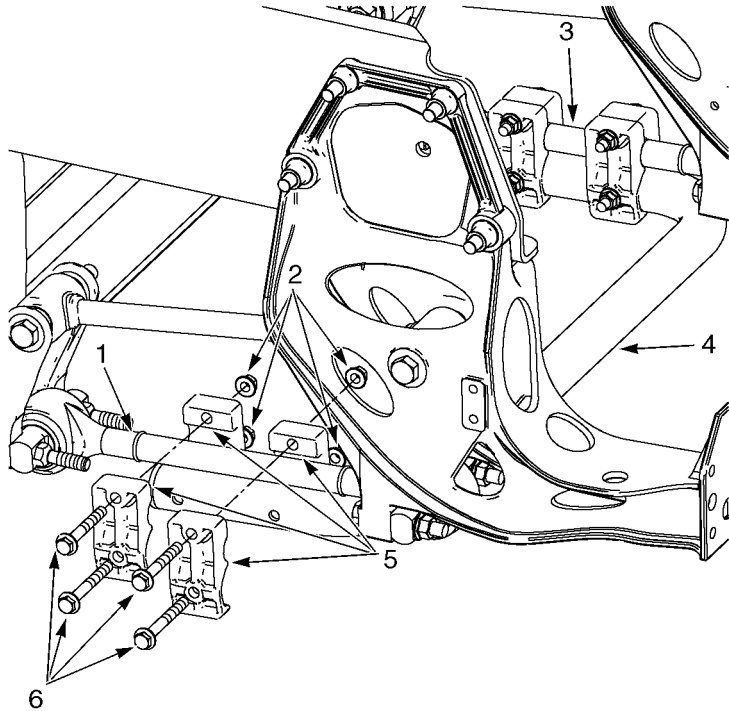
1. Position the shock absorber on the frame mount bracket and install the top mount bolt and nut (Figure 13). Do not tighten at this time.

NOTE – When installing the bottom mount bolt for the shock, be sure to attach the support bracket for the height control rod (Figure 12).

2. Position the shock absorber on the axle mount bracket and install the bottom mount bolt and nut (Figure 13). Torque bolt to 250 to 300 lbf-ft (339 to 407 N•m).
3. Torque the top mount bolt to 195 to 240 lbf-ft (265 to 325 N•m).

2.4. SWAY BAR

Sway Bar – Removal



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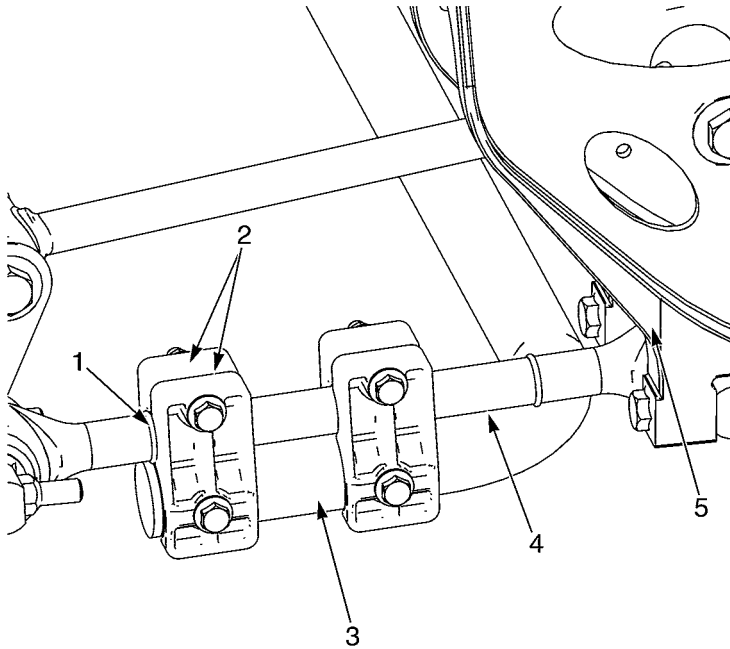
Figure 14 Sway Bar Mounting

1. LEFT LOWER TORQUE ROD
2. NUTS
3. RIGHT LOWER TORQUE ROD
4. SWAY BAR
5. SWAY BAR CLAMPS
6. BOLTS

NOTE – It is recommended the vehicle be unloaded prior to performing this procedure. Vehicle must be at approximate air spring height.

1. Remove four nuts, bolts, and sway bar clamps from the left lower torque rod and sway bar.
2. Remove four nuts, bolts, and sway bar clamps from the right lower torque rod and sway bar.
3. Remove the sway bar.

Sway Bar – Installation



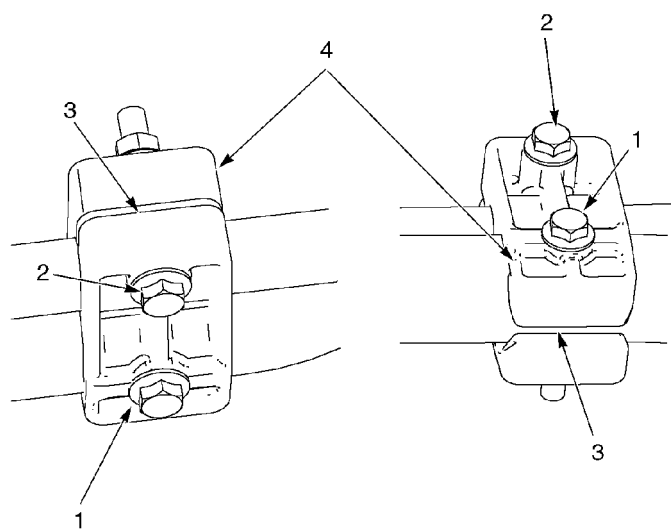
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Figure 15 Torque Rod Alignment Rib

1. REAR WELD BEAD
2. REAR SWAY BAR CLAMPS
3. SWAY BAR
4. LOWER TORQUE ROD
5. MEGA BRACKET

CAUTION – Failure to align the sway bar on the torque rod rear weld beads properly will allow the sway bar to contact the mega brackets.

1. With the aid of an assistant, align the sway bar on the lower torque rods.
2. Install two rear sway bar clamps, bolts, and nuts on the left lower torque rod and sway bar making sure to align the rear sway bar clamps on the rear weld bead. Do not tighten bolts at this time.
3. Install two rear sway bar clamps, bolts, and nuts on the right lower torque rod and sway bar making sure to align the rear sway bar clamps on the rear weld bead. Do not tighten bolts at this time.
4. Install two remaining sway bar clamps, bolts, and nuts on the left lower torque rod and sway bar (Figure 14). Do not tighten bolts at this time.
5. Install two remaining sway bar clamps, bolts, and nuts on the right lower torque rod and sway bar (Figure 14). Do not tighten bolts at this time.



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Figure 16 Sway Bar Clamps

1. BOTTOM BOLT
2. TOP BOLT
3. GAP BETWEEN SWAY BAR CLAMPS
4. SWAY BAR CLAMPS

NOTE – When properly installed, a gap will be present along both the bottom and top of each sway bar clamp.

6. Follow these steps to secure the sway bar clamps:
 - a. Install two sway bar clamps on each side of sway bar and install two bolts and nuts on each sway bar clamp.
 - b. Tighten all bolts, making sure that a gap is shown at top and bottom of each sway bar clamp.
 - c. Torque each sway bar clamp by first torquing the bottom bolt and then the top. Torque bolts to 80 to 100 lbf-ft (108 to 135 N•m).

2.5. TORQUE RODS

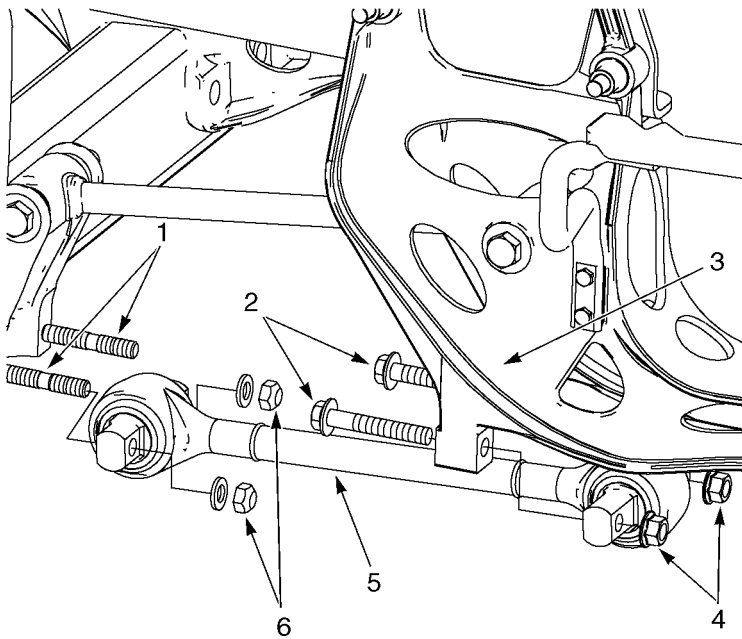
Lower Torque Rods – Removal

NOTE – The lower torque rods must be replaced one at a time. This will keep the axle from rotating out of position.

NOTE – It is recommended the vehicle be unloaded prior to performing this procedure. Vehicle must be at approximate air spring height.

NOTE – Place a reference mark on the torque rod, at the rear of the sway bar, to aid in alignment of the sway bar during installation procedures.

1. Remove four nuts, bolts, and sway bar clamps from the lower torque rod (Figure 14).



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Figure 17 Lower Torque Rod

1. AXLE MOUNT BRACKET STUDS
2. BOLTS
3. MEGA BRACKET
4. NUTS
5. LOWER TORQUE ROD
6. LOCKNUTS AND WASHERS

2. Remove two locknuts and washers from the lower torque rod and two axle mount bracket studs.
3. Remove two bolts and nuts from the mega bracket and lower torque rod.
4. To remove the lower torque rod, slide the lower torque rod off the two axle mount bracket studs.

Lower Torque Rods – Installation

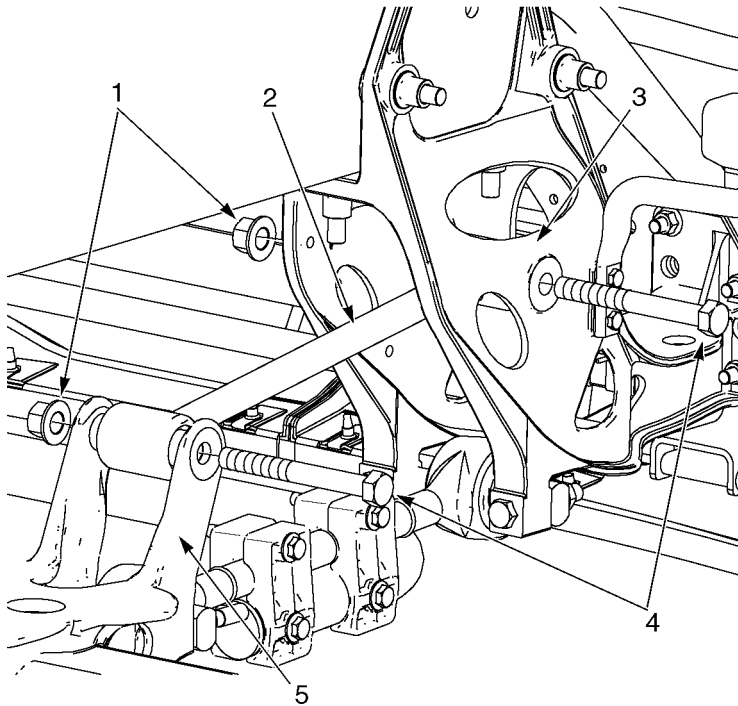
CAUTION – When tightening bolts on torque rod to specifications, the vehicle must be at proper ride height to avoid introducing unnecessary stress on the torque rod bushings.

1. Slide the lower torque rod onto the two axle mount bracket studs (Figure 17, Items 1 and 5).
2. Install two bolts and nuts on the mega bracket and lower torque rod (Figure 17). Torque bolts to 195 to 240 lbf-ft (265 to 325 N•m).
3. Secure the lower torque rod to the axle mount bracket studs with two washers and locknuts (Figure 17). Torque locknuts to 170 to 185 lbf-ft (230 to 251 N•m).
4. Secure the sway bar to the lower torque rod with two sway bar clamps, bolts and nuts (Figure 14). Do not tighten bolts at this time.

NOTE – When properly installed, a gap will be present along both the bottom and top of each sway bar clamp.

5. Follow these steps to secure the sway bar clamps (Figure 16):
 - a. Install two sway bar clamps on each side of sway bar and install two bolts and nuts on each sway bar clamp.
 - b. Tighten all bolts, making sure that a gap is shown at top and bottom of each sway bar clamp.
 - c. Torque each sway bar clamp by first torquing the bottom bolt and then the top. Torque bolts to 80 to 100 lbf-ft (108 to 135 N•m).
6. Check axle caster and adjust as needed (refer to FRONT AXLE CASTER).

Upper Torque Rods – Removal



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Figure 18 Upper Torque Rod

1. NUTS
2. UPPER TORQUE ROD
3. MEGA BRACKET
4. BOLTS
5. AXLE MOUNT BRACKET

NOTE – The upper torque rods must be replaced one at a time. This will keep the axle from rotating out of position.

NOTE – It is recommended the vehicle be unloaded prior to performing this procedure. Vehicle must be at approximate air spring height.

1. Remove bolt and nut from the mega bracket and upper torque rod.
2. Remove bolt and nut from the axle mount bracket and upper torque rod.
3. Remove the upper torque rod.

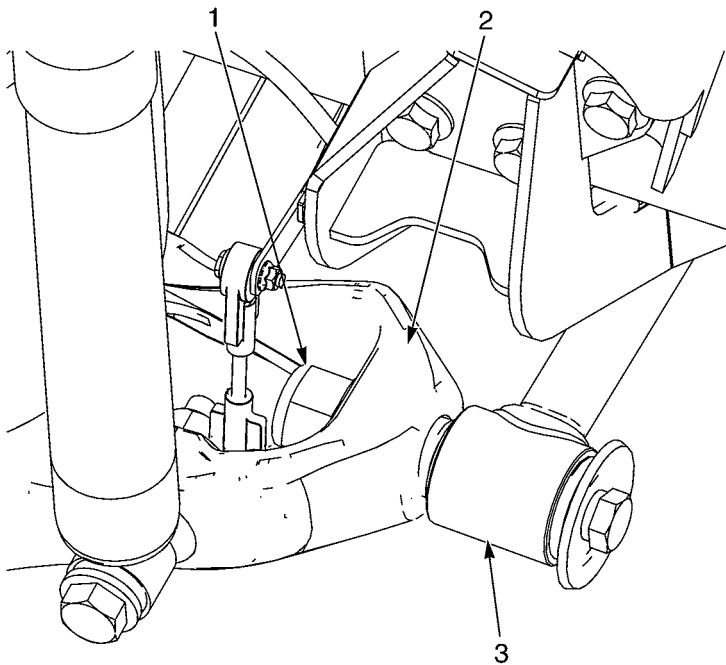
Upper Torque Rods – Installation

CAUTION – When tightening bolts on torque rod to specifications, the vehicle must be at proper ride height to avoid introducing unnecessary stress on the torque rod bushings.

1. Align the upper torque rod on the axle mount bracket and the mega bracket (Figure 18, Items 2, 3, and 5).
2. Install bolt and nut to secure the upper torque rod to the axle mount bracket (Figure 18). Torque bolt to 300 to 370 lbf-ft (407 to 502 N•m).
3. Install bolt and nut to secure the upper torque rod to the mega bracket (Figure 18). Torque bolt to 300 to 370 lbf-ft (407 to 502 N•m).
4. Check axle caster and adjust as needed (refer to FRONT AXLE CASTER).

2.6. TRANSVERSE TORQUE ROD

Transverse Torque Rod – Removal



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Figure 19 Axle Mount Bracket

1. LOCKNUT
2. AXLE MOUNT BRACKET
3. TRANSVERSE TORQUE ROD

NOTE – It is recommended the vehicle be unloaded prior to performing this procedure. Vehicle must be at approximate air spring height.

1. Remove the locknut from the axle mount bracket and transverse torque rod.
2. Disconnect the transverse torque rod from the axle mount bracket.

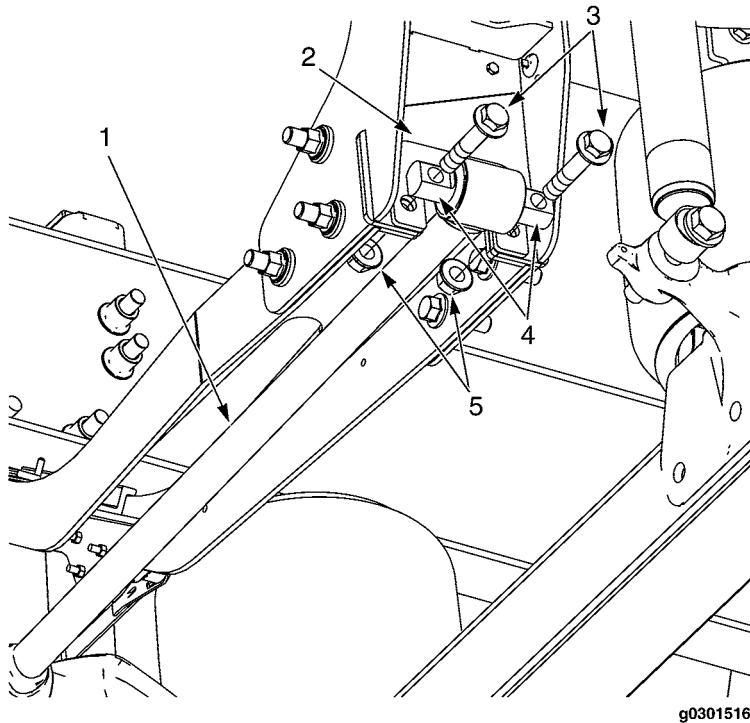


Figure 20 Transverse Torque Rod

1. TRANSVERSE TORQUE ROD
2. TRANSVERSE CROSSMEMBER
3. BOLTS
4. THROUGH ROD ENDS
5. NUTS

3. Remove two bolts and nuts from the transverse torque rod and transverse crossmember.
4. Remove the transverse torque rod from the transverse crossmember.

Transverse Torque Rod – Installation

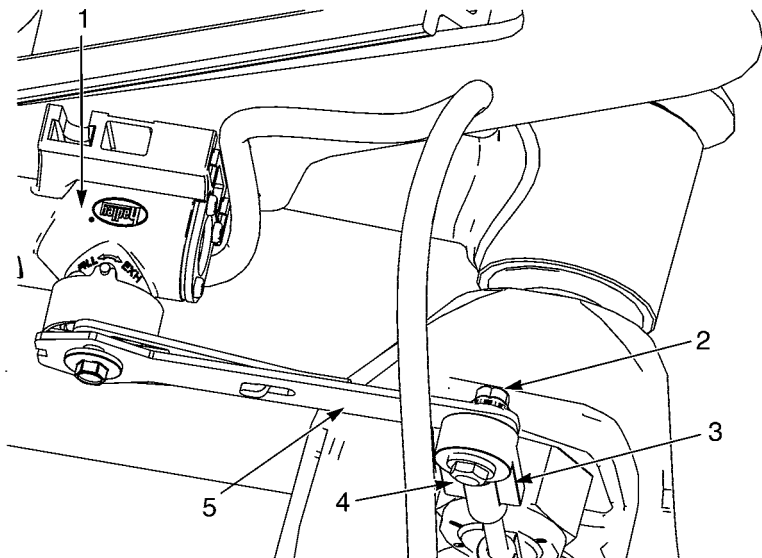
1. Align the transverse torque rod on the transverse crossmember.
2. Secure the transverse torque rod to the transverse crossmember with two bolts and nuts (Figure 120, Items 1, 3, and 5). Torque bolts to 195 to 240 lbf-ft (265 to 325 N•m).
3. Install the locknut on the axle mount bracket and transverse torque rod (Figure 19). Torque locknut to 225 lbf-ft (305 N•m). Tap the end of the transverse torque rod with a soft-faced mallet and re-torque locknut to 225 lbf-ft (305 N•m).

3. CHECKS AND ADJUSTMENTS

3.1. RIDE HEIGHT

Checking Ride Height

1. Park the vehicle unloaded on a level surface.
2. Chock wheels to prevent vehicle movement.
3. Release the parking brake.
4. Let the air pressure build to governor cut-out pressure, which should occur between 115 and 130 psi (793 and 896 kPa), and shut off the engine.



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Figure 21 Exhaust Air

1. HEIGHT CONTROL VALVE
2. NUT
3. HEIGHT CONTROL ROD
4. BOLT AND WASHER
5. VALVE LEVER

NOTE – The multi-link front air suspension is equipped with a ride height control valve on each side. Be sure to perform steps 5 through 8 on both sides of the multi-link front air suspension.

IMPORTANT – It is very important that the height control valve be cycled completely before and after any ride height adjustments. Cycling of the height control valve will help make the adjustment more accurate.

5. Remove bolt, washer, nut, and height control rod from the valve lever.

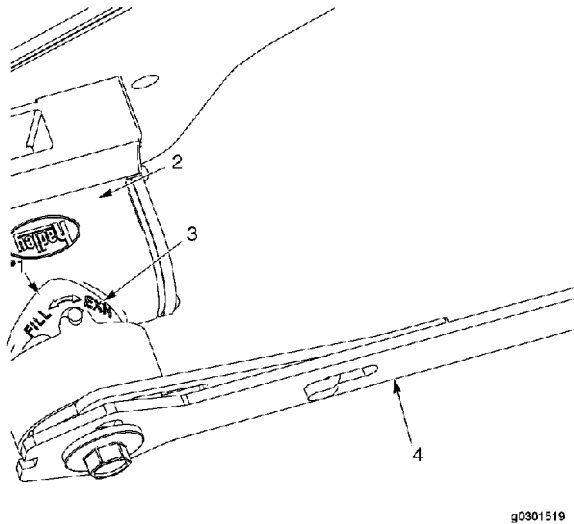


Figure 22 Dump Air

1. FILL POSITION
 2. HEIGHT CONTROL VALVE
 3. EXHAUST POSITION
 4. VALVE LEVER
6. Dump air from air spring by rotating the valve lever to the EXH (exhaust) position.
 7. Connect the height control rod to the valve lever with the bolt, washer, and nut. Torque bolt to 60 to 80 lbf-in (7 to 9 N•m). Allow the suspension to fill to ride height.

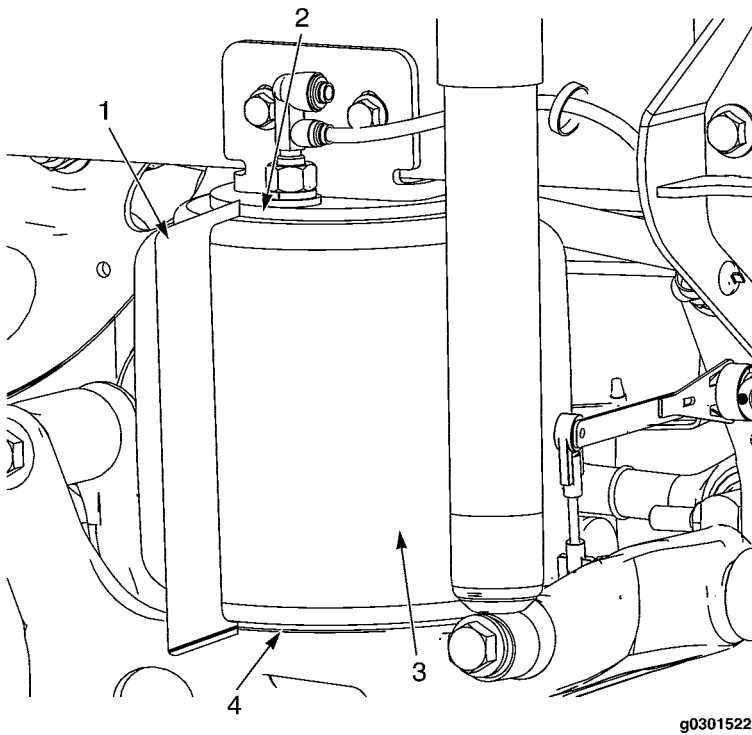
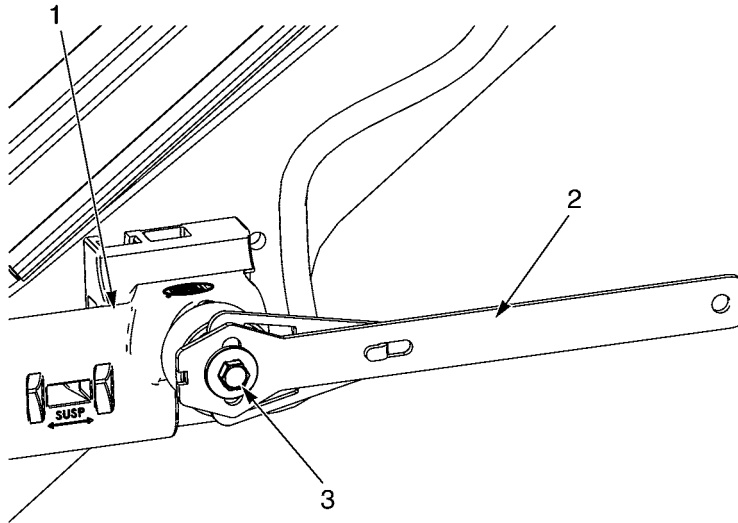


Figure 23 Ride Height Measurement

1. HEIGHT TOOL
 2. LEADING EDGE
 3. AIR SPRING
 4. LOWER FLANGE
8. Measure the ride height at the air spring. Special tool number **3822154C1** is recommended to measure the air spring ride height.
9. The measurement you obtain should fall within the **Target Air Spring Height** shown in the Ride Height Specifications table. If the measurement does not fall within the value shown on the table, the height control valve will need to be adjusted.

Ride Height Adjustment



g0301524

Figure 24 Ride Height Adjustment

1. HEIGHT CONTROL VALVE
2. VALVE LEVER
3. VALVE LEVER SCREW

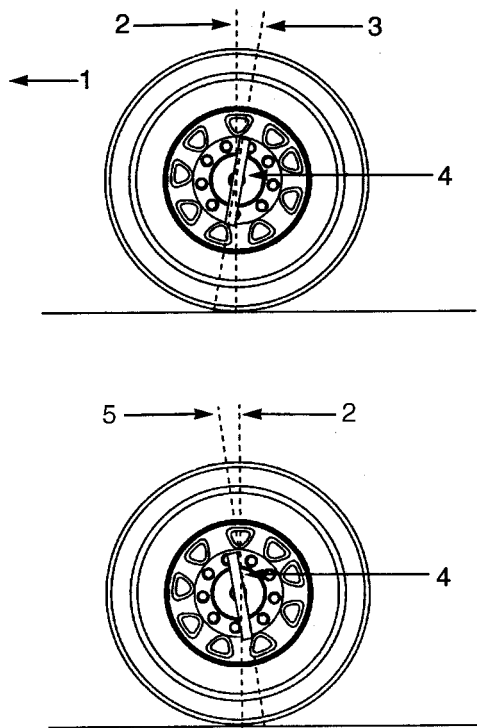
CAUTION – Do not loosen valve lever screw so far as to disengage the valve lever from the ride height valve.

IMPORTANT – It is very important that the height control valve be cycled completely before and after any ride height adjustments. Cycling of the height control valve will help make the adjustment more accurate.

NOTE – It is required that the system be brought to proper ride height by filling the system using the ride height control valve, not by exhausting the system to proper ride height.

1. Adjust the ride height by performing the following steps:
 1. Fill system to desired ride height.
 2. Loosen the valve lever screw.
 - a. Push or pull on the pivot point of the valve lever to adjust.
 - b. Adjustment is provided by the slot at the valve lever screw.
 3. Rotate the valve lever to fill with air until the correct ride height is attained. Only adjust to proper ride height by filling with air. If ride height is higher than correct ride height, exhaust enough air to lower ride height below proper ride height, and refill accordingly.
 4. Torque the valve lever screw to 50 to 55 lbf-in (6 N•m).
2. Check the ride height measurement by dropping the suspension and allowing the height control valve to air up to ride height.
3. Recheck the ride height adjustment.

3.2. FRONT AXLE CASTER



g0301520

Figure 25 Left Front Wheel Caster Angle

1. FRONT OF VEHICLE
2. VERTICAL (0°)
3. POSITIVE CASTER
4. KING PIN
5. NEGATIVE CASTER

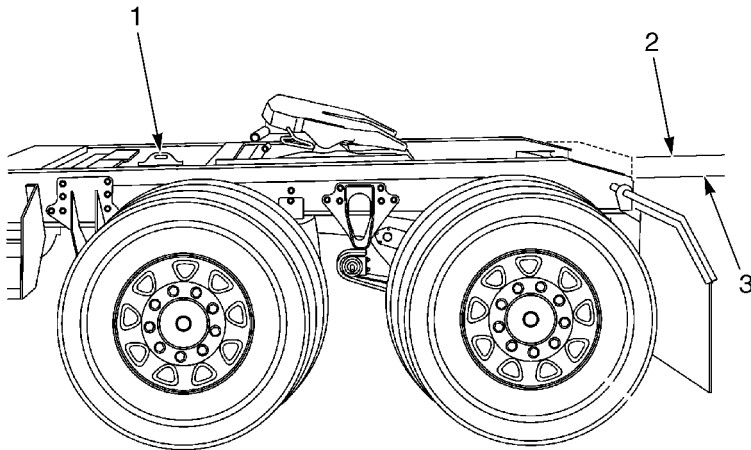
Caster is the amount in degrees the top of the kingpin is tilted toward the front or rear of the truck, as viewed from the side of the truck. The caster angle can range from a positive angle to a negative angle and this angle is measured in degrees.

- Positive caster is the tilting of the top of the king pin toward the rear of the truck.
- Negative, or sometimes called reverse caster, is the tilting of the top of the king pin toward the front of the truck.

Proper caster is important for directional stability and return-ability. Too much positive caster can cause shimmy, excessive steering effort, and is normally a vehicle performance and handling consideration. Uneven positive caster may create a steering pull toward the side with the lower caster. This attribute may be used to compensate for crowned roads. The correct amount of caster helps to keep the front wheels in the straight-ahead position. When in a turn, caster acts as a lever, assisting the driver to return the front wheels to the straight-ahead position.

Caster specifications are based on vehicle design load, which will usually result in a level frame. If the frame is not level when alignment checks are made, this must be considered in determining whether the caster setting is correct.

Rear Frame Angle



g0301525

Figure 26 Rear Frame Angle

1. BUBBLE PROTRACTOR
2. TYPICAL POSITIVE FRAME ANGLE
3. LEVEL FRAME

With the vehicle on a smooth, level surface, frame angle should be measured with a bubble protractor placed on the frame rail. The degree of tilt from the level frame position is the angle that must be used in determining a correct caster setting. Positive frame angle is defined as forward tilt (front end down) and negative angle as tilt to rear (front end height).

NOTE – The degree of tilt from the level frame position is the angle that must be used in determining a correct caster setting. Positive frame angle is defined as forward tilt (front end down) and negative angle as tilt to rear (front end up or high).

The measured frame angle should be added to, or subtracted from, as required, the specified level frame caster setting to obtain the caster that should actually be measured on the vehicle.

1. Positive frame angle should be subtracted from specified setting.
2. Negative frame angle should be added to specified setting.

As an example, if the specified caster setting is a positive 1° and it is found that the vehicle has a positive 1° frame angle, then the measured caster should be $0^{\circ} \pm \frac{1}{2}^{\circ}$. This would result in the desired $1^{\circ} \pm \frac{1}{2}^{\circ}$ caster angle when the chassis settled to level frame under load.

Checking Caster

IMPORTANT – Prior to checking caster, confirm that the vehicle is at its proper ride height on the rear suspension (if applicable). The rear ride height must be correct to achieve proper caster.

1. Park the vehicle unloaded on a level surface.
2. Chock wheels to prevent vehicle movement.
3. Check the rear frame angle.
4. Check front axle caster.

Decreasing Caster Adjustment

IMPORTANT – Keep in mind that if the caster is changed, the toe adjustment must be checked after completing the caster adjustment.

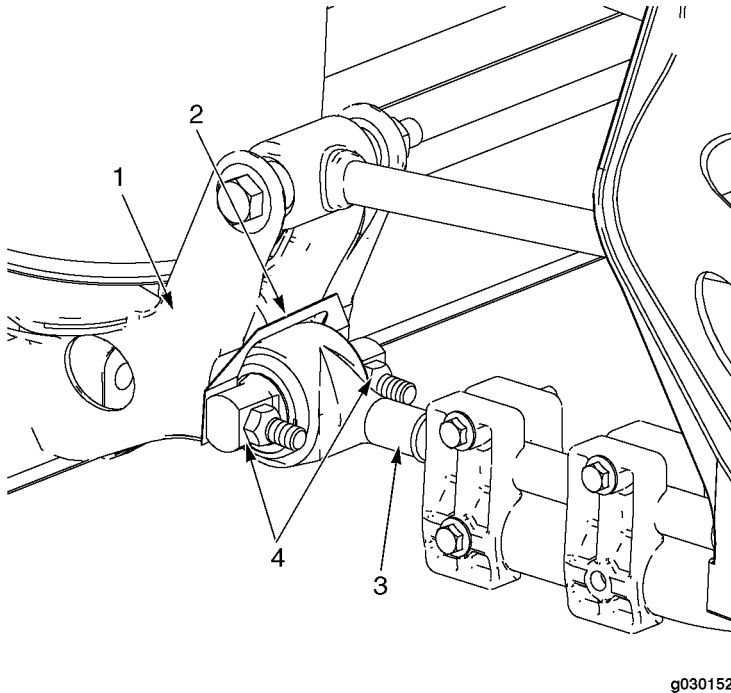


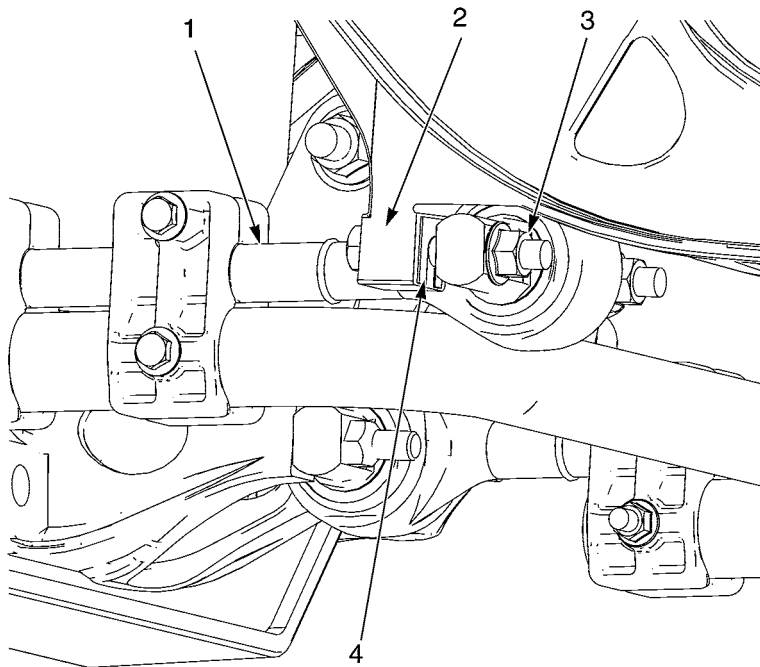
Figure 27 Decreasing Caster Shim

1. AXLE MOUNT BRACKET
2. CASTER SHIM
3. LOWER TORQUE ROD
4. NUTS

1. Jack up the front of the vehicle, at the frame, and support the vehicle.
2. Loosen but do not remove two locknuts from the lower torque rod and two axle mount bracket studs.
3. Using a pry bar, pry the lower torque rod forward and install the appropriate shim between the lower torque rod and the axle mount bracket.
4. Tighten the two locknuts on the lower torque rod and axle mount bracket. Torque locknuts to 170 to 185 lbf-ft (230 to 251 N•m).

Increasing Caster Adjustment

IMPORTANT – Keep in mind that if the caster is changed, the toe adjustment must be checked after completing the caster adjustment.



g0301526

Figure 28 Increasing Caster Shim

1. LOWER TORQUE ROD
2. MEGA BRACKET
3. MOUNT BOLT AND NUT
4. SHIM

1. Jack up the front of the vehicle, at the frame, and support the vehicle.
2. Loosen two bolts and nuts at the mega bracket and lower torque rod.
3. Using a pry bar, pry the lower torque rod forward and install the appropriate shim between the lower torque rod and the mega bracket on both bolts.
4. Tighten the two bolts and nuts on the lower torque rod and mega bracket. Torque nuts to 195 to 240 lbf-ft (265 to 325 N•m).

4. SPECIFICATIONS

4.1. RIDE HEIGHT DIMENSIONS

Table 1 Ride Height Specifications

Suspension Feature Code	Capacity	Target Air Spring Height — Inches
03AZD	12,000-lb	10 1/2 +/- 3/16

4.2. CASTER SPECIFICATIONS

Table 2 Caster Specifications

Caster Specification	
Left Side	Right Side
4½° to 6°	5° to 6½°
NOTE – Right side must be equal to or greater than the left-side, but not to exceed 1° greater.	

Table 3 Caster Shims

Decreasing Caster		Increasing Caster	
Part Number	Shim Size – in.	Part Number	Shim Size – in.
1516023C1	0.010	3821626C1	0.010
488917C1	0.030	3821627C1	0.030
488916C1	0.056	3821628C1	0.056
590752C1	0.119	3821629C1	0.119
NOTE – 0.030” shim is approximately equal to 0.5° caster change.			

TORQUE

Table 4 Torque Chart

Figure No. (Item No.)	Location	Lbf-ft/Lbf-in	N•m
Figure 8 (Item 4)	Height Control Valve Mount Nuts	60 to 80 lbf-in	7 to 9
Figure 7 (Item 4)	Height Control Rod Mount Bolt	60 to 80 lbf-in	7 to 9
Figure 9 (Item 3)	Air Spring Top Mount Nut	45 to 55 lbf-ft	61 to 75
Figure 13 (Item 2)	Shock Absorber Top Mount Bolt	195 to 240 lbf-ft	265 to 325
Figure 13 (Item 5)	Shock Absorber Bottom Mount Bolt	250 to 300 lbf-ft	339 to 407
Figure 16 (Items 1 and 2)	Sway Bar Clamp Mount Bolts	80 to 100 lbf-ft	108 to 135
Figure 17 (Item 6)	Lower Torque Rod Rear Locknuts	170 to 185 lbf-ft	230 to 251
Figure 17 (Item 2)	Lower Torque Rod Front Mount Bolts	195 to 240 lbf-ft	265 to 325
Figure 18 (Item 4)	Upper Torque Rod Mount Bolts	300 to 370 lbf-ft	407 to 502
Figure 19 (Item 1)	Transverse Torque Rod Left Side Mount Nut	225 lbf-ft	305
Figure 20 (Item 3)	Transverse Torque Rod Right Side Mount Bolts	195 to 240 lbf-ft	265 to 325
Figure 24 (Item 3)	Height Control Valve Lever Screw	50 to 55 lbf-in	6