

Wheel Alignment

Specifications

Wheel Alignment Specifications

Application	Specification	
	Set	Check
Front Caster	4.5 to 5.5 degrees	4.0 to 6.0 degrees
Cross Caster (Front)	-0.7 to 0.7 degrees	-0.7 to 0.7 degrees
Front Camber	-0.1 to 0.9 degrees	-0.6 to 1.4 degrees
Cross Camber (Front)	-0.7 to 0.7 degrees	-0.7 to 0.7 degrees
Individual Toe (Front)	-0.1 to 0.1 degrees	-0.1 to 0.1 degrees
Total Toe (Front)	-0.2 to 0.2 degrees	-0.2 to 0.2 degrees
Steering Wheel Angle (Front)	-3.5 to 3.5 degrees	-3.5 to 3.5 degrees
Rear Camber	-0.6 to 0.6 degrees	-0.6 to 0.6 degrees
Cross Camber (Rear)	-0.6 to 0.6 degrees	-0.6 to 0.6 degrees
Total Toe (Rear)	-0.3 to 0.3 degrees	-0.3 to 0.3 degrees
Rear Thrust Angle	-0.15 to 0.15 degrees	-0.15 to 0.15 degrees

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Inner Tie Rod Nut	47 N·m	35 lb ft
Lower Control Arm Nut	100 N·m	47 lb ft

Diagnostic Information and Procedures

Preliminary Alignment Inspection

Steering and vibration concerns are not always the result of improper alignment. Tire lead is a condition caused by worn or improperly-manufactured tires. Tire lead is the vehicle deviation from a straight path on a level road without pressure on the steering wheel. In order to determine if the vehicle has a tire lead problem, refer to *Radial Tire Lead/Pull Correction* in Suspension General Diagnosis.

Before making any adjustment that will affect the tire and wheel alignment, verify correct alignment readings and alignment adjustments:

- Inspect all tires for proper inflation pressures. Also verify that all the tires have nearly even tread wear.
- Inspect the control arm ball studs. If the studs are loose, correct them before adjusting the tire and wheel alignment. Refer to *Ball Stud Check* in Front Suspension.
- Inspect the tie rod ends. If the ends are loose, correct them before adjusting the tire and wheel alignment. Refer to *Power Steering Gear Replacement (V6)* or *Power Steering Gear Replacement (V8)* in Power Steering.
- Check the tires and wheels for runout.

- Inspect the vehicle trim height. If the height is out of limits and a correction is to be made, make the correction before adjusting the alignment. Refer to *Trim Height Specifications* in General Diagnosis.
- Inspect the steering gear for looseness at the frame.
- Inspect the control arms for loose bushings.
- Inspect the stabilizer shaft for loose or missing parts.
- Inspect the shock absorber and the springs for improper operation.
- Inspect the suspension and the steering components for damage. Replace the parts as necessary.
- Inspect the vehicle for stability. The fuel tank should be full, or the vehicle should have compensating ballast.
- Jounce the vehicle lightly 3 times in the rear and 3 times in the front.

Give consideration to excess loads, such as tool boxes or sample cases, which are normally carried in the vehicle. These loads should remain in the vehicle during alignment adjustments.

Give consideration also to the condition of the equipment being used in order to adjust the alignment. Follow the equipment manufacturer's instructions. Regardless of the equipment used, the vehicle must be on a level surface, both front-to-rear and side-to-side.

Repair Instructions

Measuring Wheel Alignment

Satisfactory vehicle operation may occur over a wide range of alignment settings. If settings vary beyond the specifications, correct the alignment angles.

1. Measure the front alignment angles.
2. Install the alignment equipment according to the manufacturer's instructions.
3. Jounce the front and rear bumpers lightly three times in order to normalize the suspension prior to measuring the angles.
4. Measure the alignment angles and record the readings. If adjustments are required, make the adjustments in the following order:
 - 4.1. The camber
 - 4.2. The caster
 - 4.3. The toe

Front Caster and Camber Adjustment

Tools Required

J 38658 Caster/Camber Adjusting Tool

1. Before making any adjustments to the caster or camber, jounce the front bumper three times in order to allow the vehicle to return to the normal height.
2. Raise and suitably support the vehicle. Refer to *Lifting and Jacking the Vehicle* in General Information.
3. Loosen the lower control arm nuts.
4. Install the *J 38658* to the holes in the lower control arm (2) and front crossmember (1).
5. Adjust the camber by rotating the turnbuckle on *J 38658*.
 - Rotating the turnbuckle clockwise will increase the camber.
 - Rotating the turnbuckle counterclockwise will decrease the camber.
6. Install the *J 38658* to the holes in the lower control arm (1) and the front crossmember (2).
 - Rotating the turnbuckle clockwise will increase the caster.
 - Rotating the turnbuckle counterclockwise will decrease the caster.
7. Adjust caster by rotating the turnbuckle on the *J 38658*.
8. Remove the *J 38658* from the holes.

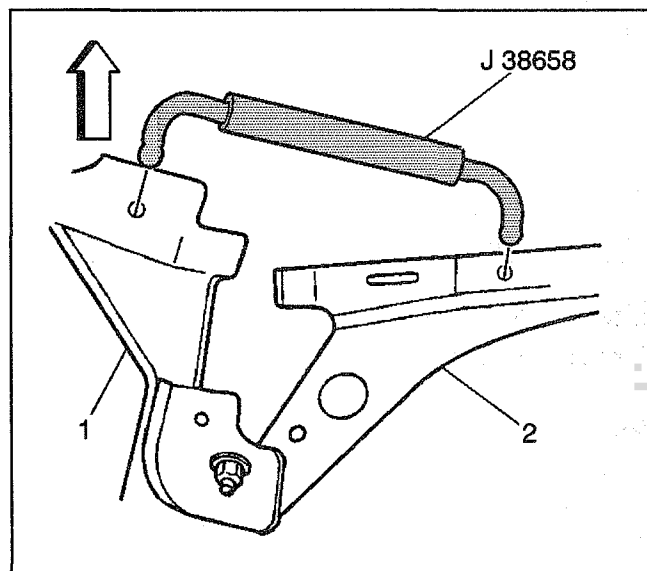
Notice: Refer to *Fastener Notice* in Cautions and Notices.

9. Tighten the lower control arm nuts.

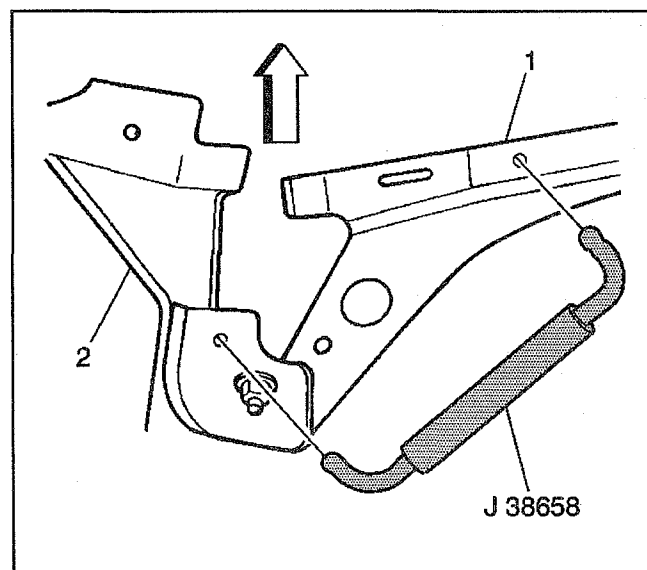
Tighten

Tighten the lower control arm nuts to 100 N·m (74 lb ft).

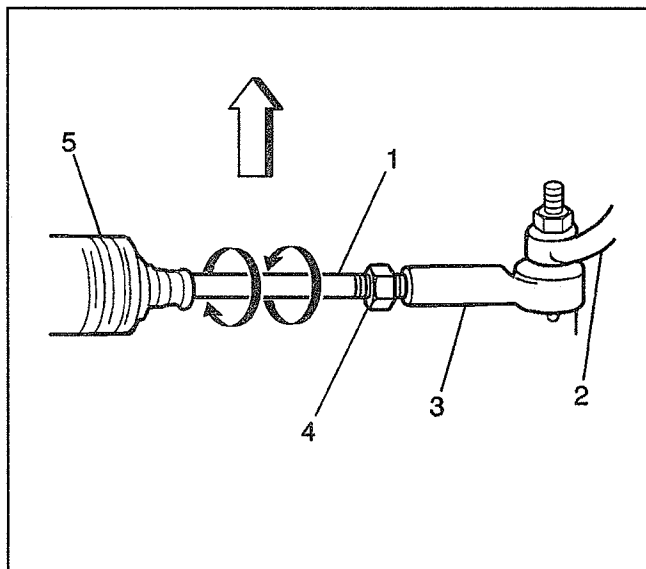
10. Lower the vehicle.



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Front Toe Adjustment

1. Set the steering wheel in a straight-ahead position within -3.5 to 3.5 degrees.
2. Make toe adjustments separately at each individual tire and wheel.
3. Loosen the inner tie rod nut (4).
4. Adjust the toe to specifications by turning the inner tie rod (3). Refer to *Wheel Alignment Specifications*.

Notice: Refer to *Fastener Notice* in Cautions and Notices.

5. Verify that the steering gear boot seal (5) is not twisted.

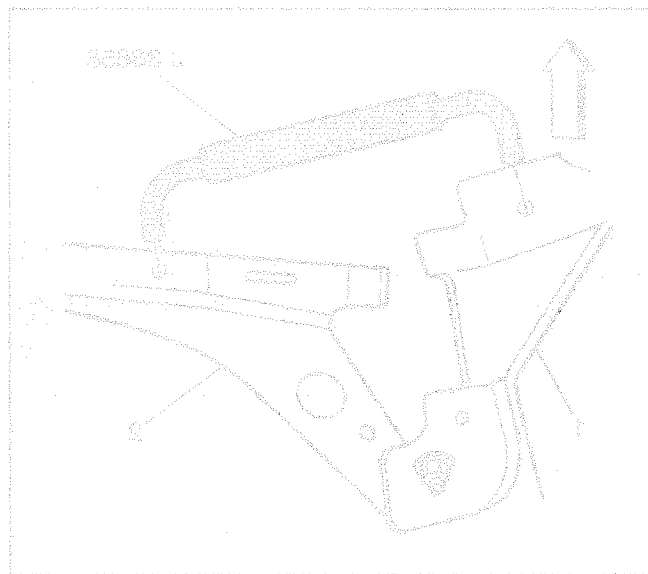
Tighten

Tighten the inner tie rod nut (4) to $47\text{ N}\cdot\text{m}$ ($35\text{ lb}\cdot\text{ft}$).

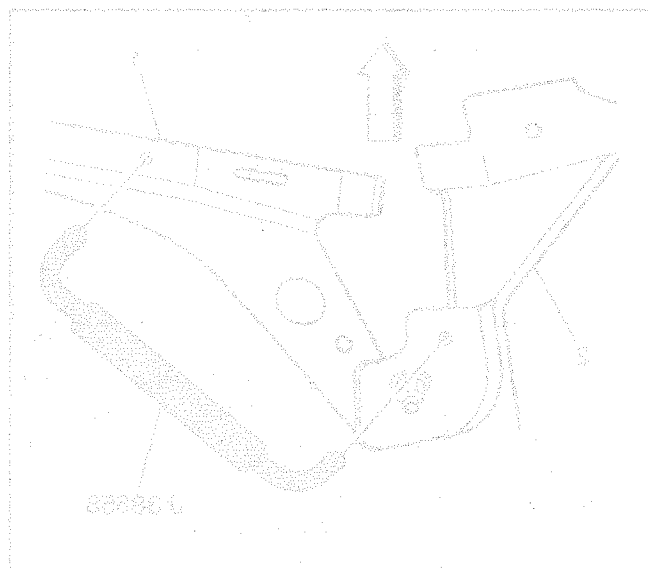
6. Check the toe alignment. Readjust the inner tie rod (3), if necessary. Refer to *Wheel Alignment Specifications*.

Rear Thrust Angle Adjustment

If the thrust angle is not within specifications, inspect the lower control arms for damage. If the control arms are not damaged, check the frame dimensions. Refer to *Dimensions - Frame* in *Frame and Underbody*.



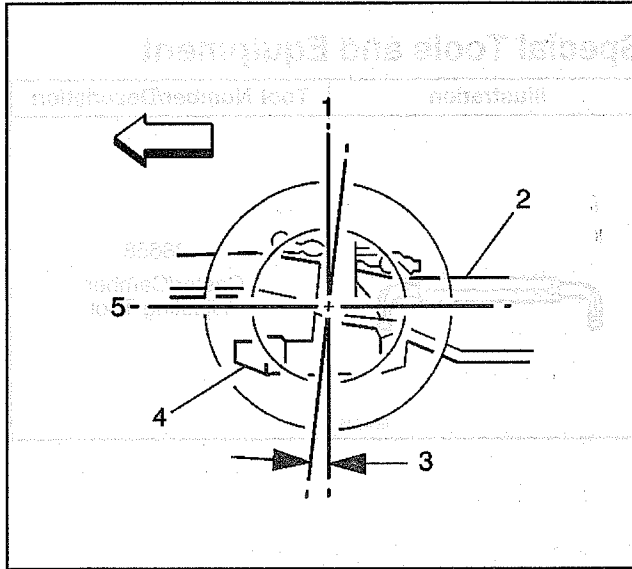
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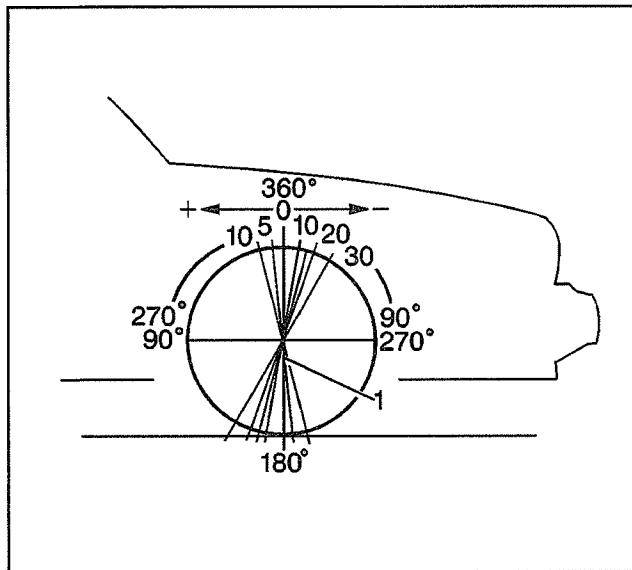
Description and Operation

Caster Description



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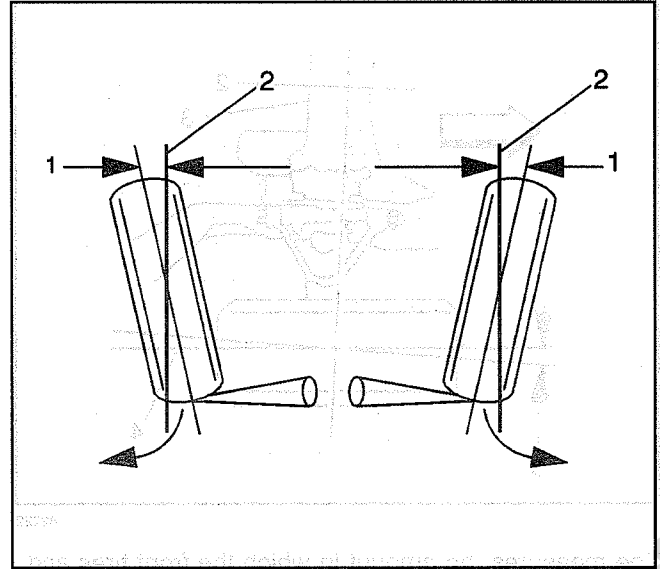
Caster is the tilting of the front steering axis (at the top) either forward or backward (3) from the vertical (1). A backward tilt is positive (+) and a forward tilt is negative (-). Caster influences the directional control of the steering but does not affect the tire wear. Caster is adjustable only at the front tires and wheels.



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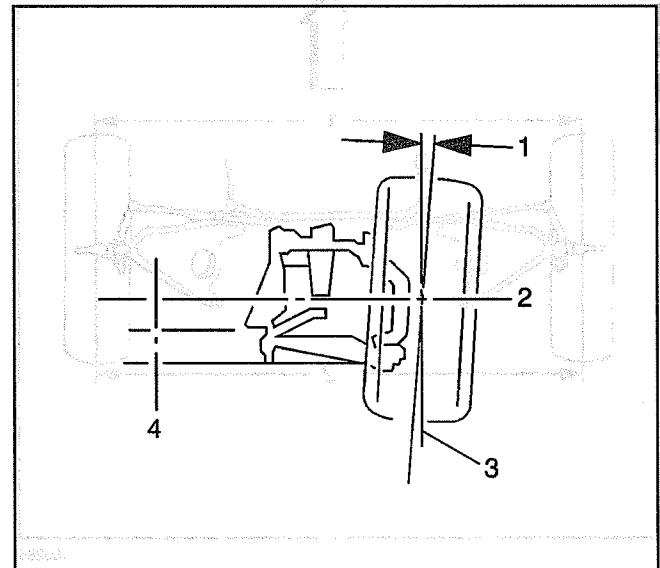
Caster is affected by the vehicle height. Therefore you must keep the body at the designated trim height. Vehicle overload or a weak sagging rear spring can affect the caster. When the rear of the vehicle is lower than the designated trim height, the front suspension moves to a more positive caster. If the rear of the vehicle is higher than the designated trim height, the front suspension moves to a less positive caster. For trim height information, refer to *Trim Height Specifications* in General Diagnosis.

Camber Description



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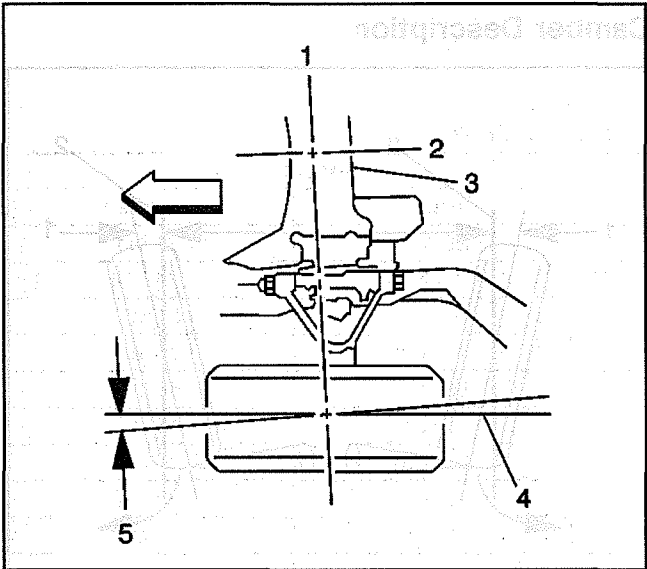
Camber is the tilting of the front tires and wheels (1) from the vertical (2) as viewed from the front of the vehicle. When the tires and wheels tilt outward (1) at the top, the camber is positive (+). When the tires and wheels tilt inward at the top, the camber is negative (-). The amount of the tilt is measured in degrees from the vertical and is called the camber angle. The camber setting influences directional control and tire wear.



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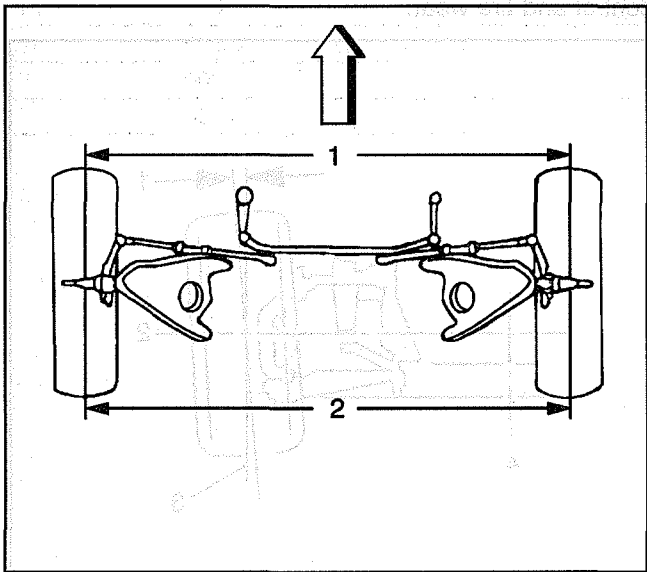
When set to a positive camber angle (1), the tires and the wheels will tend to roll in a path that is away from the true path of the vehicle. The effect of one tire and wheel tends to cancel the others. The suspension geometry and the camber setting keep the tire tread surface perpendicular (flat) on the road through the full range of suspension travel.

Toe Description



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Toe measures the amount in which the front tires and wheels are turned in or out (5) from a straight-ahead position (4). When the tires and the wheels are turned in, toe is positive (+). When the tires and the wheels are turned out, toe is negative (-). The actual amount of toe is normally only a fraction of a degree. The purpose of toe is to ensure that the tires and the wheels roll parallel by compensating the slight tolerances that exist within the suspension components.



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You can also measure total toe, which is the relationship or difference between the front toe dimension (1) and the rear toe dimension (2). Total toe indicates the tire-to-tire relationship, but does not indicate the relationship of a tire to the vehicle centerline. Toe also serves to offset the small deflections of the tire and the wheel support system which occur when the vehicle is rolling forward.

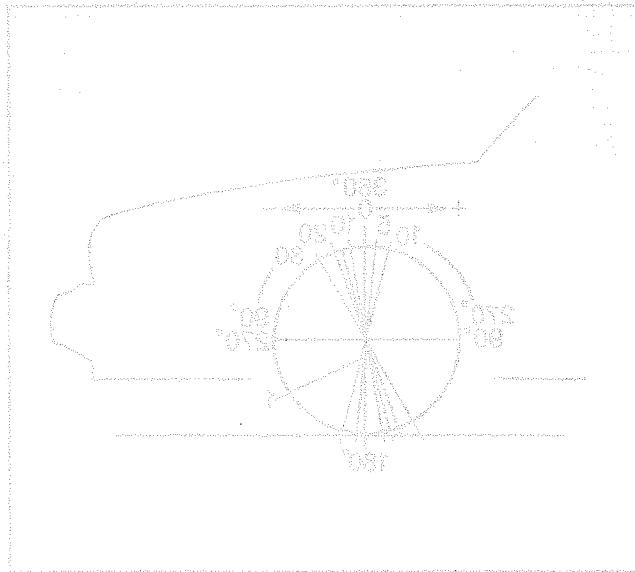
In other words, even when the tires and wheels are set to toe in slightly when the vehicle is standing still, the tires tend to roll parallel on the road when the vehicle is moving. Toe affects tire wear.

Special Tools and Equipment

Illustration	Tool Number/Description
	J-38658 Caster/Camber Adjusting Tool

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Caster is the tilting of the front steering axle (at the top) either forward or backward (3) from the vertical (1). A backward tilt is positive (+) and a forward tilt is negative (-). Caster influences the directional control of the steering but does not affect the tire wear. Caster is adjustable only at the front tires and wheels.



Caster is affected by the vehicle height. Therefore you must keep the body at the designed rim height. Vehicle overloaded or a weak sagging rear spring can affect the caster. When the rear of the vehicle is lower than the designated rim height, the front suspension moves to a more positive caster. If the rear of the vehicle is higher than the designated rim height, the front suspension moves to a less positive caster. For trim height information, refer to Trim Height Specifications in General Diagnosis.