

DESCRIPTION

Vehicle wheel alignment is the positioning of all interrelated front and rear suspension angles. These angles affect the handling and steering of the vehicle when it is in motion. Proper wheel alignment is essential for efficient steering, good directional stability, and proper tire wear.

The method of checking a vehicle's front and rear wheel alignment varies depending on the manufacturer and type of equipment used. The manufacturer's instructions should always be followed to ensure accuracy of the alignment, except when Chrysler Corporation's wheel alignment specifications differ.

On this vehicle, the suspension angles that can be adjusted are as follows:

Front

- | Camber (with cradle shift or service adjustment bolt package)
- | Caster (limited adjustment with cradle shift)
- | Toe

Rear

- | Toe

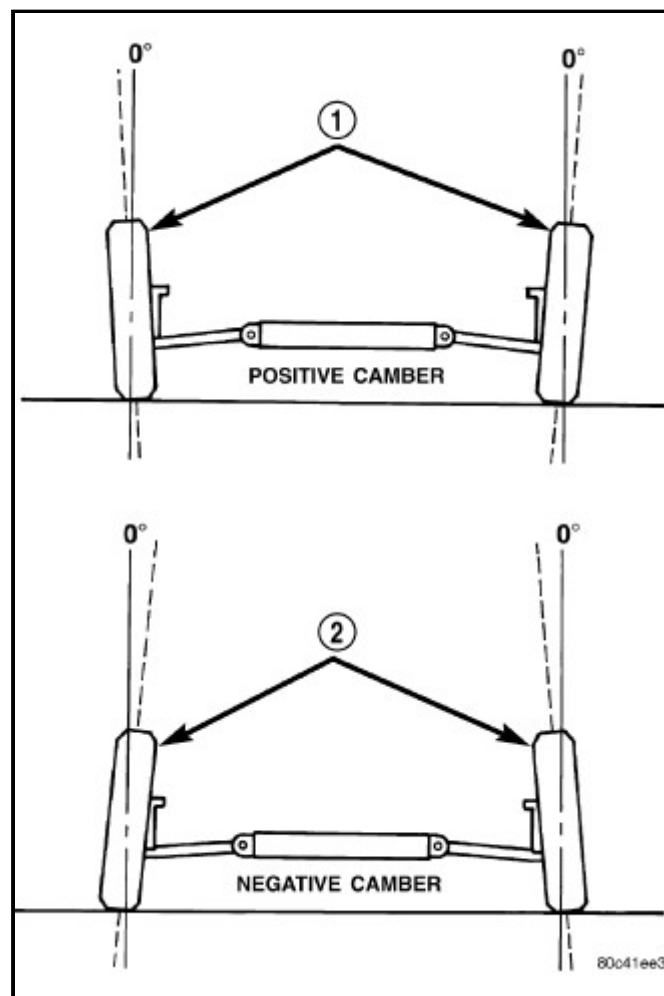
Check the wheel alignment and make all wheel alignment adjustments with the vehicle standing at its proper curb height specification. Curb height is the normal riding height of the vehicle. It is measured from a certain point on the vehicle to the ground or a designated area while the vehicle is sitting on a flat, level surface. Refer to Curb Height Measurement in this section for additional information.

Typical wheel alignment angles and measurements are described in the following paragraphs.

CAMBER

Camber is the inward or outward tilt of the top of the tire and wheel assembly. Inward tilt (2) is known as negative camber. Outward tilt (1) is known as positive camber. Camber is measured in degrees of angle relative to a true vertical line. Camber is a tire wearing angle.

- | Excessive negative camber will cause tread wear at the inside of the tire.
- | Excessive positive camber will cause tread wear on the outside of the tire.



CROSS CAMBER

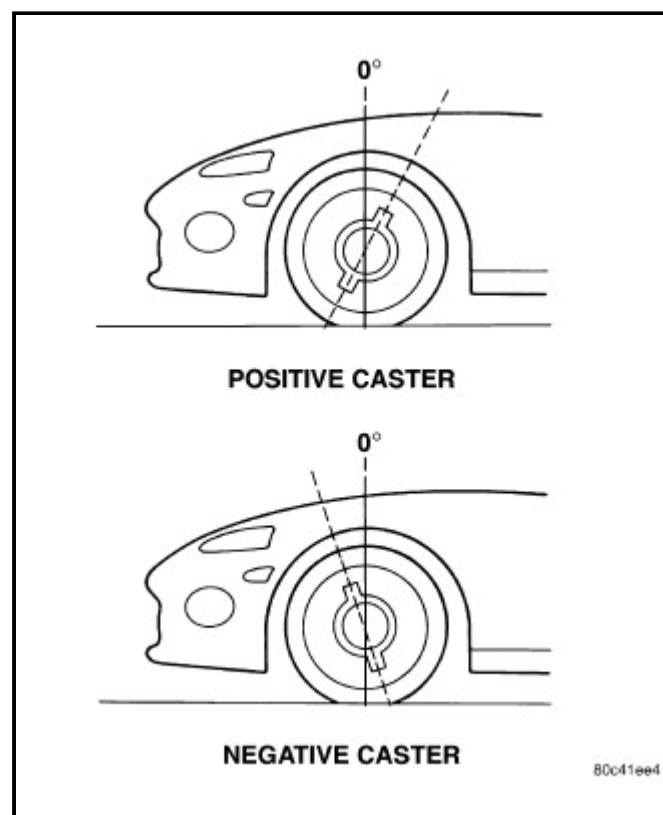
Cross camber is the difference between left and right camber. To achieve the cross camber reading, subtract the right side camber reading from the left. For example, if the left camber is -0.7° and the right camber is -0.5° , the cross camber would be -0.2° ($-0.7 - (-0.5) = -0.7 + 0.5 = -0.2$).

CASTER

Caster is the forward or rearward tilt of the steering knuckle in reference to the position of the upper and lower ball joints. Caster is measured in degrees of angle relative to a true vertical center line. This line is viewed from the side of the tire and wheel assembly.

- ┆ Forward tilt (upper ball joint ahead of lower) results in a negative caster angle.
- ┆ Rearward tilt (upper ball joint trailing lower) results in a positive caster angle.

Although caster does not affect tire wear, a caster imbalance between the two front wheels may cause the vehicle to lead to the side with the least positive caster.



CROSS CASTER

Cross caster is the difference between left and right caster. To achieve the cross caster reading, subtract the right side caster reading from the left. For example, if the left caster is 2.5° and the right caster is 2.7° , the cross caster would be -0.2° ($2.5 - 2.7 = -0.2$).

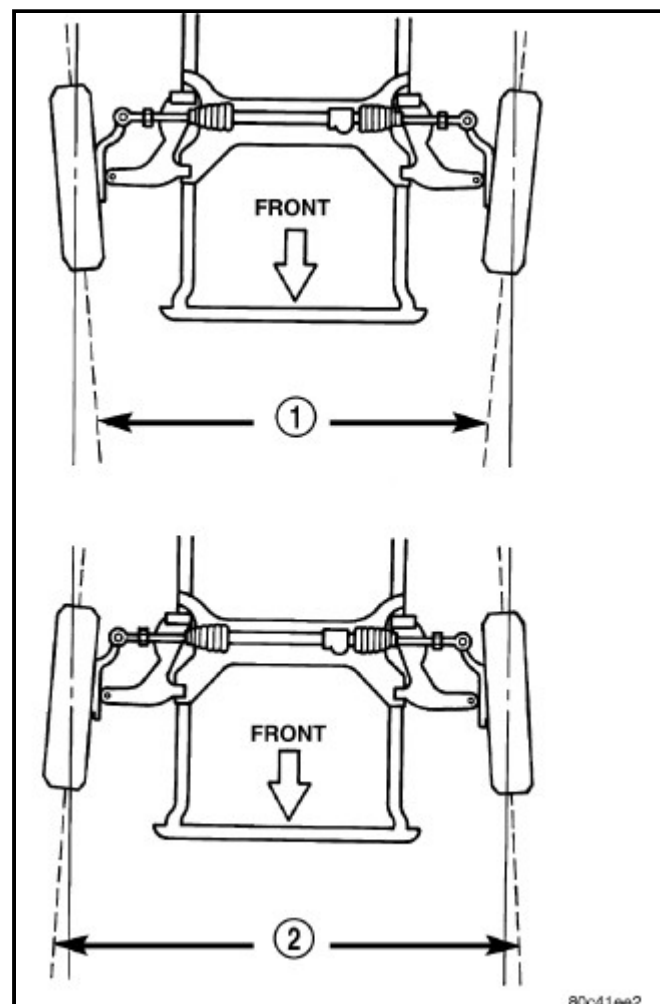
TOE

Toe is the inward or outward angle of the wheels as viewed from above the vehicle.

- ┆ Toe-in (1) is produced when the front edges of the wheels on the same axle are closer together than the rear edges.
- ┆ Toe-out (2) is produced when the front edges of the wheels on the same axle are farther apart than the rear edges.

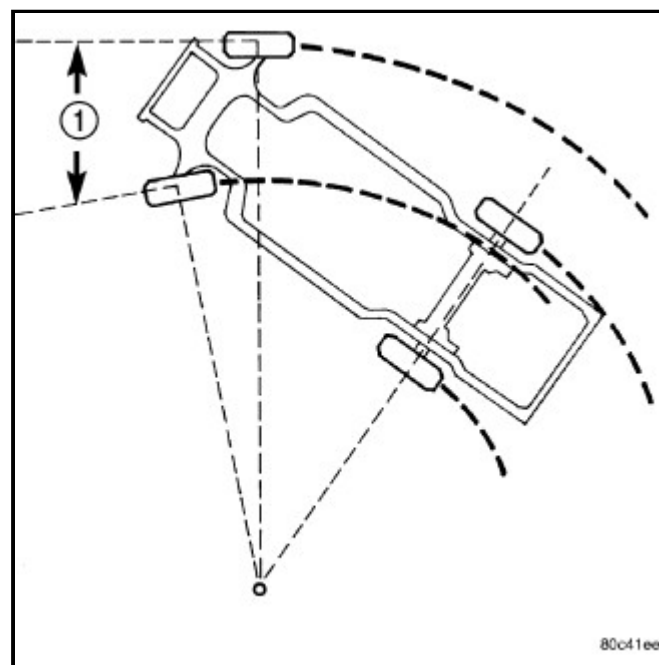
Toe-in and toe-out can occur at the front wheels and the rear wheels.

Toe is measured in degrees or inches. The measurement identifies the amount that the front of the wheels point inward (toe-in) or outward (toe-out). Toe is measured at the spindle height. Zero toe means the front and rear edges of the wheels on the same axle are equal distant.



TOE-OUT ON TURNS

Toe-out on turns (1), sometimes referred to as Ackerman Steering, is the relative positioning of the front wheels while steering through a turn. This compensates for each front wheel's turning radius. As the vehicle encounters a turn, the outboard wheel must travel in a larger radius circle than the inboard wheel. The steering system is designed to make each wheel follow its particular radius circle. To accomplish this, the front wheels must progressively toe outward as the steering is turned from center. This eliminates tire scrubbing and undue tire wear when steering a vehicle through a turn.



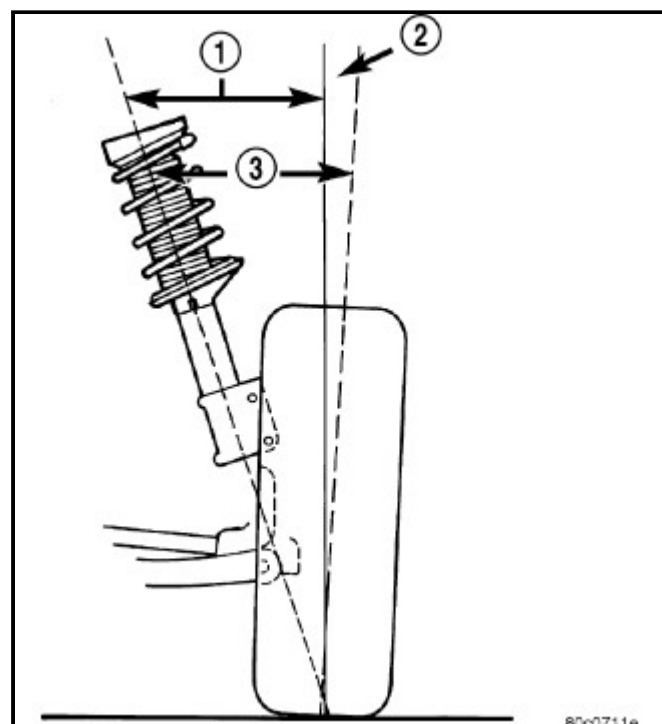
DYNAMIC TOE PATTERN

Dynamic toe pattern is the inward and outward toe movement of the front and rear tires through the suspension's jounce and rebound travel. As the vehicle's suspension moves up and down, the toe pattern varies. Toe pattern is critical in controlling the directional stability of the vehicle while in motion. Front and rear dynamic toe pattern is preset by the factory at the time the vehicle is assembled.

It is not necessary to check or adjust front or rear dynamic toe pattern when doing a normal wheel alignment. The only time dynamic toe pattern needs to be checked or adjusted is if the frame of the vehicle has been damaged.

STEERING AXIS INCLINATION (S.A.I.)

Steering axis inclination (1) is the angle between a true vertical line starting at the center of the tire at the road contact point and a line drawn through the center of the upper ball joint (or strut) and the lower ball joint. S.A.I. is built into the vehicle and is not an adjustable angle. If S.A.I. is not within specifications, a bent or damaged suspension component may be the cause.



INCLUDED ANGLE (I.A.)

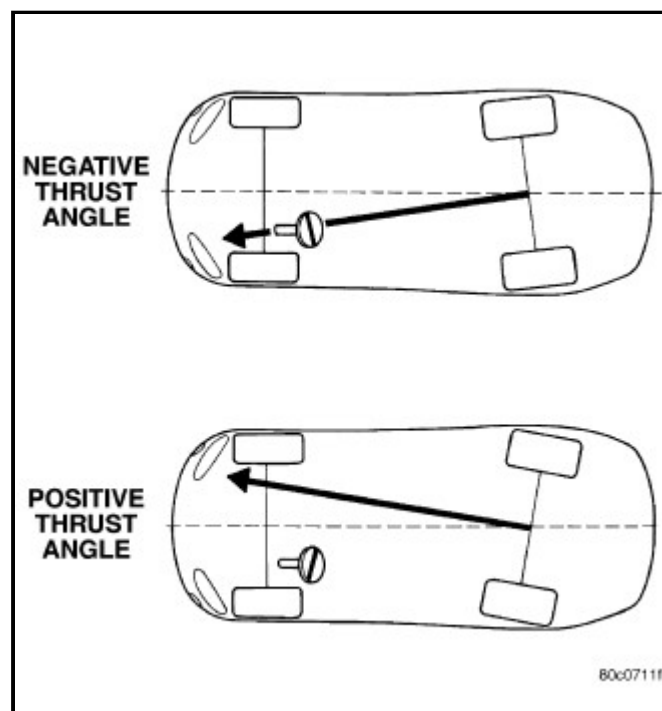
Included angle (3) is the sum of the S.A.I. angle (1) plus or minus the camber angle (2), depending on whether or not the wheel has positive or negative camber. If camber is positive, add the camber angle to the S.A.I. angle. If camber is negative, subtract the camber angle from the S.A.I. angle. Included angle is not adjustable, but can be used to diagnose a frame misalignment or bent suspension component (spindle, strut).

THRUST ANGLE

Thrust angle is the averaged direction the rear wheels are pointing in relation to the vehicle's center line. The presence of negative or positive thrust angle causes the rear tires to track improperly to the left or right of the front tires (dog tracking).

- ┆ Negative thrust angle means the rear tires are tracking to the left of the front tires.
- ┆ Positive thrust angle means the rear tires are tracking to the right of the front tires.

Improper tracking can cause undue tire wear, a lead or pull and a crooked steering wheel. Excessive thrust angle can usually be corrected by adjusting the rear wheel toe so that each wheel has one-half of the total toe measurement.



CURB HEIGHT MEASUREMENT

The wheel alignment is to be checked and all alignment adjustments made with the vehicle at its required curb height specification.

Vehicle height is to be checked with the vehicle on a flat, level surface, preferably a vehicle alignment rack. The tires are to be inflated to the recommended pressure. All tires are to be the same size as standard equipment. **Vehicle height is checked with the fuel tank full of fuel, and no passenger or luggage compartment load.**

Vehicle height is not adjustable. If the measurement is not within specifications, inspect the vehicle for bent or weak suspension components. Compare the parts tag on the suspect coil spring(s) to the parts book and the vehicle sales code, checking for a match. Once removed from the vehicle, compare the coil spring height to a correct new or known good coil spring. The heights should vary if the suspect spring is weak.

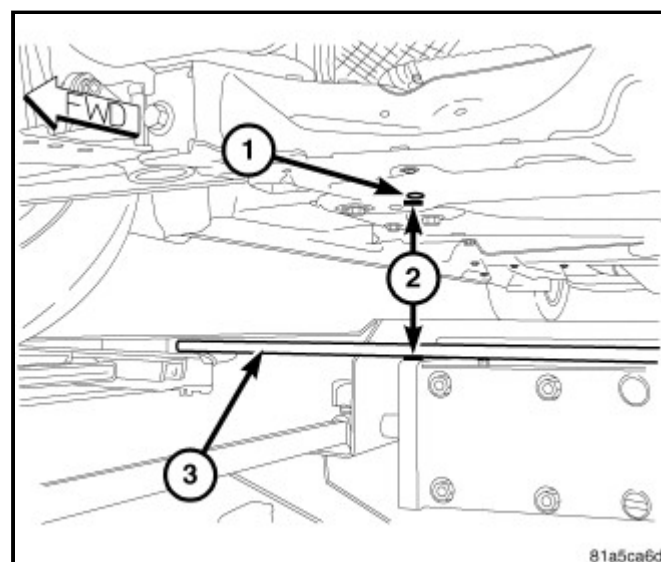
NOTE: Prior to reading the curb height measurement, the front and rear of the vehicle must be jounced to settle the suspension. Induce jounce by pushing down on the center of the bumper (fascia), using care not to damage the vehicle, moving the vehicle up and down, gradually increasing the suspension travel with each stroke. Release the bumper at the bottom of each stroke, repeating this action several times. Perform this to both front and rear suspensions an equal amount of times.

Measure curb height as follows:

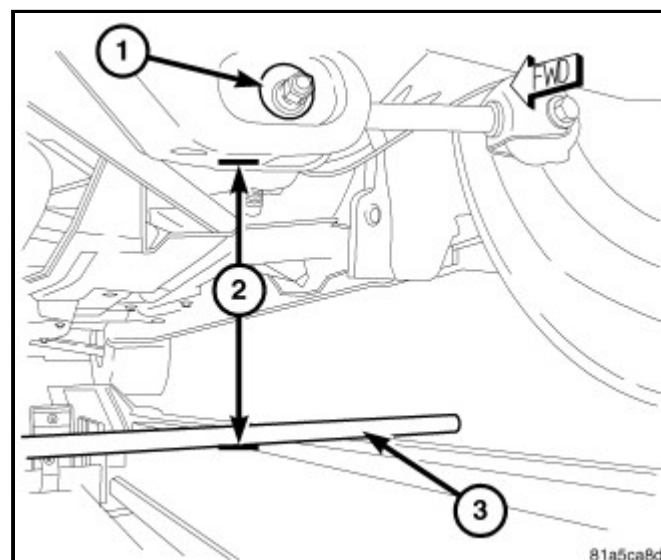
1. Jounce the vehicle. Refer to above note.

NOTE: On some vehicles it may be necessary to remove an engine belly pan in order to gain access to the lower control arm pivot bolt.

2. Front – On each side of the vehicle, measure the distance (2) from the flat surface behind the PLP hole (1) to the floor or alignment rack/lift runway surface. It may be necessary to measure to the bottom of a straight edge (3), placed from lift runway to runway, to get an accurate measurement.



3. Rear – On each side of the vehicle, measure the distance (2) from the flat surface below the rear toe adjustment cam bolt (1) to the floor or alignment rack/lift runway surface. It may be necessary to measure to the bottom of a straight edge (3), placed from lift runway to runway, to get an accurate measurement.



4. Compare the measurements to specifications listed in the following CURB HEIGHT SPECIFICATIONS chart. Maximum left-to-right differential is not to exceed 12.5 mm (0.5 in.).
5. If curb height is found to be out of specification and there is no sign of excessive body damage, curb height can be

changed by replacing the applicable spring with a spring offering a different check load. ([Refer to 02 - Front Suspension/Front/STRUT, Suspension - Removal](#))

CURB HEIGHT SPECIFICATIONS

WHEEL SIZE	FRONT	REAR
16 INCH	201 mm \pm 12 mm 7.91 in. \pm 0.47 in.	232 mm \pm 12 mm 9.13 in. \pm 0.47 in.
17 INCH	200 mm \pm 12 mm 7.87 in. \pm 0.47 in.	230 mm \pm 12 mm 9.06 in. \pm 0.47 in.
19 INCH	205 mm \pm 12 mm 8.07 in. \pm 0.47 in.	235 mm \pm 12 mm 9.25 in. \pm 0.47 in.

CURB HEIGHT SPECIFICATIONS - EXPORT

WHEEL SIZE	FRONT	REAR
16 INCH	184 mm \pm 12 mm 7.25 in. \pm 0.47 in.	216 mm \pm 12 mm 8.50 in. \pm 0.47 in.
17 INCH	198 mm \pm 12 mm 7.80 in. \pm 0.47 in.	228 mm \pm 12 mm 8.98 in. \pm 0.47 in.
19 INCH	203 mm \pm 12 mm 8.00 in. \pm 0.47 in.	233 mm \pm 12 mm 9.17 in. \pm 0.47 in.

WHEEL ALIGNMENT

PRE-WHEEL ALIGNMENT INSPECTION

Before any attempt is made to change or correct the wheel alignment, the following inspection and necessary corrections must be made to the vehicle to ensure proper alignment.

1. Verify the fuel tank is full of fuel. If the fuel tank is not full, the reduction in weight will affect the curb height of the vehicle and the alignment specifications.
2. The passenger and luggage compartments of the vehicle should be free of any load that is not factory equipment.
3. Check the tires on the vehicle. The tires are to be inflated to the recommended air pressure. All tires must be the same size and in good condition with approximately the same tread wear.
4. Check the front tire and wheel assemblies for excessive radial runout.
5. Inspect all suspension component fasteners for looseness and proper torque.
6. Inspect the lower front ball joints and all steering linkage for looseness and any sign of wear or damage.
7. Inspect the rubber bushings on all the suspension components for signs of wear or deterioration. If any bushings show signs of wear or deterioration, they should be replaced prior to aligning the vehicle.
8. Check vehicle curb height to verify it is within specifications. ([Refer to 02 - Front Suspension/Wheel Alignment - Standard Procedure](#))

WHEEL ALIGNMENT SETUP

1. Position the vehicle on an alignment rack.
2. Install all required alignment equipment on the vehicle, per the alignment equipment manufacturer's instructions. On this vehicle, a four-wheel alignment is recommended.

NOTE: Prior to reading the vehicle's alignment readouts, the front and rear of vehicle should be jounced. Induce jounce (rear first, then front) by grasping the center of the bumper and jouncing each end of vehicle an equal number of times. The bumper should always be released when vehicle is at the bottom of the jounce cycle.

3. Read the vehicle's current front and rear alignment settings. Compare the vehicle's current alignment settings to the vehicle specifications for camber, caster and toe-in. ([Refer to 02 - Front Suspension/Wheel Alignment - Specifications](#))

REAR CAMBER

Rear camber settings on this vehicle are determined at the time the vehicle is designed, by the location of the vehicle's suspension components. This is referred to as Net Build. The result is no required adjustment of camber after the vehicle is built or when servicing the suspension components. Thus, when performing a wheel alignment, rear camber is not considered an adjustable angle.

CAUTION: Do not attempt to adjust the vehicle's wheel alignment by heating or bending any of the suspension components.

FRONT CAMBER AND CASTER

Front camber and caster settings on this vehicle are determined at the time the vehicle is designed, by the location of the vehicle's suspension components. This is referred to as Net Build. The result is no required adjustment of camber and caster after the vehicle is built or when servicing the suspension components. Thus, when performing a wheel alignment, caster and camber are not normally considered adjustable angles but some adjustment can be made. Camber and caster should be checked to ensure they meet vehicle specifications. ([Refer to 02 - Front Suspension/Wheel Alignment - Specifications](#))

If individual front camber or caster is found not to meet alignment specifications, each can be adjusted by shifting the front crossmember or by using an available service adjustment bolt package. If an adjustment bolt package installation is necessary, inspect the suspension components for any signs of damage or bending first.

CAUTION: Do not attempt to adjust the vehicle's wheel alignment by heating or bending any of the suspension components.

ADJUSTMENT BY SHIFTING CROSSMEMBER

CAUTION: Always use care when shifting crossmember to avoid damaging other components on the vehicle.

1. Loosen the four bolts fastening the front crossmember to the frame just enough to allow movement of the crossmember. ([Refer to 13 - Frame and Bumpers/Frame/CROSSMEMBER - Removal](#))
2. Loosen the bolts fastening the fore/aft crossmember to the frame just enough to allow movement of the crossmember. ([Refer to 13 - Frame and Bumpers/Frame/CROSSMEMBER - Removal](#))

CAUTION: When shifting the front crossmember, keep in mind that the front and rear engine mounts are attached to the front crossmember and fore/aft crossmember and should be inspected following the crossmember shift to make sure they are properly aligned.

3. Shift front crossmember as necessary (See following tables) to bring camber or caster into specifications. When shifting crossmember, use care not to move other angles (camber or caster) that are within specifications, out of specifications.

FRONT CAMBER ADJUSTMENT BY SHIFTING CROSSMEMBER*	
Left Camber Below Specification	Move crossmember to the right
Left Camber Above Specification	Move crossmember to the left
Right Camber Below Specification	Move crossmember to the left
Right Camber Above Specification	Move crossmember to the right
Cross Camber Below Specification	Move crossmember to the right
Cross Camber Above Specification	Move crossmember to the left
* For every move to adjust one side of the vehicle, a countermove on the opposite side will occur.	

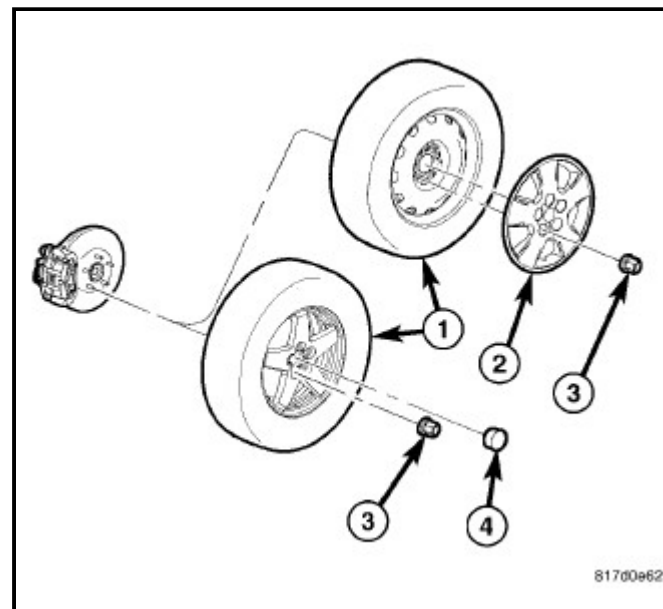
FRONT CASTER ADJUSTMENT BY SHIFTING CROSSMEMBER	
Left Caster Below Specification	Move left side of crossmember forward
Left Caster Above Specification	Move left side of crossmember rearward
Right Caster Below Specification	Move right side of crossmember forward
Right Caster Above Specification	Move right side of crossmember rearward
Cross Caster Below Specification	Move left side of crossmember forward and right side rearward
Cross Caster Above Specification	Move left side of crossmember rearward and right side forward

4. Tighten all previously loosened fasteners (bolts) securing the crossmember to the vehicle to specifications. ([Refer to 13 - Frame and Bumpers/Frame/CROSSMEMBER - Installation](#))
5. Jounce the rear, then front of the vehicle an equal amount of times.
6. Measure camber and caster. If camber and caster are within specifications, proceed to TOE. If camber cannot be brought into specifications, perform the CAMBER ADJUSTMENT BOLT PACKAGE INSTALLATION below.

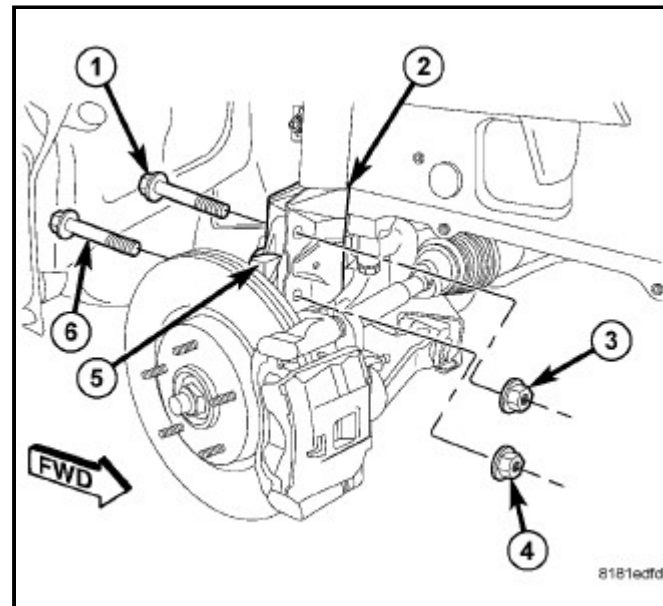
CAMBER ADJUSTMENT BOLT PACKAGE INSTALLATION

1. Raise the vehicle until its tires are not supporting the weight of the vehicle. ([Refer to 04 - Vehicle Quick Reference/Hoisting - Standard Procedure](#))
2. Remove the wheel mounting nuts (3), then the front tire and wheel assembly (1).

CAUTION: The strut clevis-to-knuckle attaching bolt shanks are serrated and must not be turned during removal. Remove the nuts while holding the bolts stationary, then tap the bolts out using a punch.

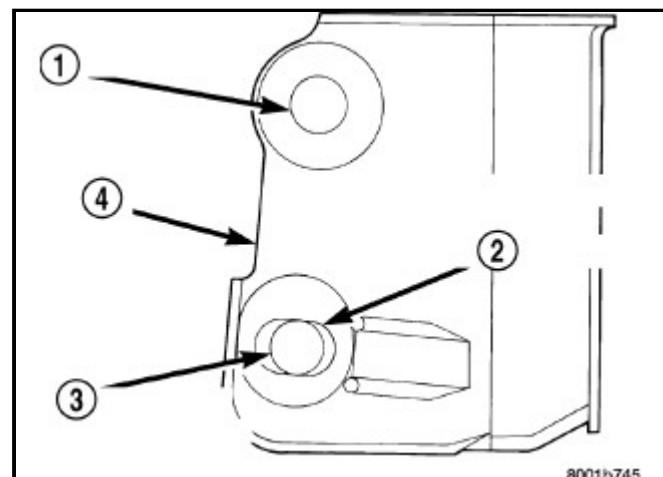


3. Remove the original nuts (3, 4) and upper (1) and lower (6) bolts attaching the strut clevis bracket (2) to the knuckle (5).
4. Separate the knuckle (5) from the strut clevis bracket (2) and position knuckle so it is out of the way of the strut. Use care not to overextend the brake flex hose or axle half shaft.



CAUTION: When slotting the bottom mounting hole (3) on the strut clevis bracket (4), do not enlarge the hole beyond the indentations (2) on the sides of the strut clevis bracket.

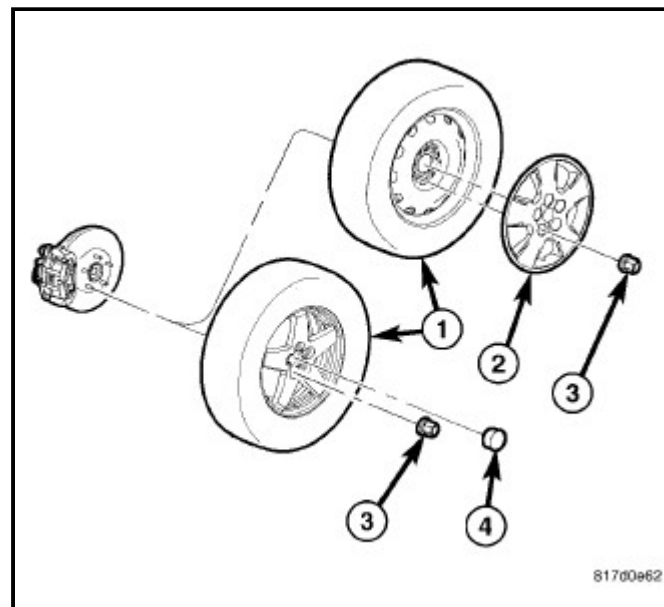
5. Using an appropriate grinder and grinding wheel, slot the bottom hole (3) in both sides of the strut clevis bracket (4).



CAUTION: After slotting the strut clevis bracket hole, do not install the original attaching bolts. Only the service package bolts and dog bone washers must be used to attach the knuckle to the strut once the mounting hole is slotted.

6. Position the strut clevis bracket in line with the upper end of the knuckle, aligning the mounting holes. Install the two service package bolts. **Be sure to place the bolt with the eccentric cam in the bottom (slotted) hole on strut clevis bracket.**
7. Install the dog bone washers provided in the service package and nuts on the replacement bolts. Tighten each nut just enough to hold the knuckle in position while adjusting camber, but still allows the knuckle to move in the clevis bracket.

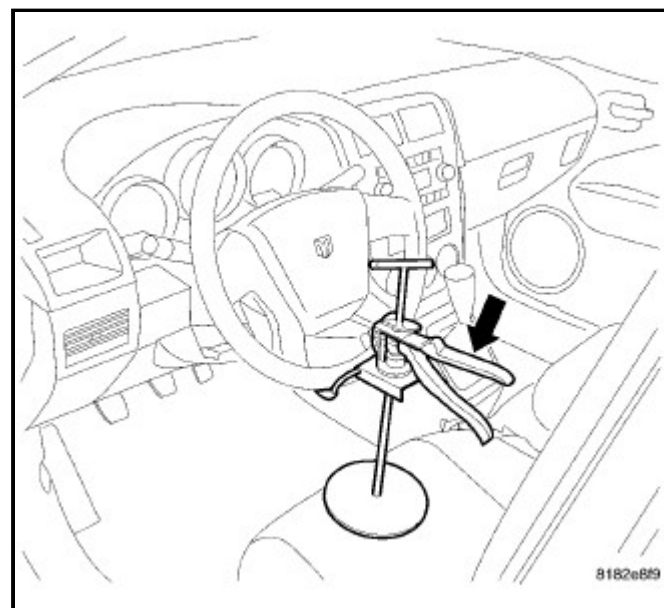
8. Install the tire and wheel assembly (1) ([Refer to 22 - Tires and Wheels - Installation](#)). Install and tighten the wheel mounting nuts (3) to 135 N·m (100 ft. lbs.).



9. Perform the above procedure to opposite side strut as required.
10. Lower the vehicle and jounce the front and rear of the vehicle.
11. Adjust the front camber to the preferred setting using the cam bolt in the lower mounting hole. Once camber is set to specifications, tighten the upper and lower strut service package bolt nuts to 140 N·m (103 ft. lbs.). Again jounce the front and rear of the vehicle, then verify the camber settings.
12. Once camber is within specifications, adjust toe to meet the preferred specification setting. Refer to FRONT TOE within this wheel alignment service procedure.

TOE

1. Center the steering wheel and lock it in place using a steering wheel clamp.



NOTE: When setting toe, make sure to set rear toe to the preferred specifications before setting front toe to the preferred specifications

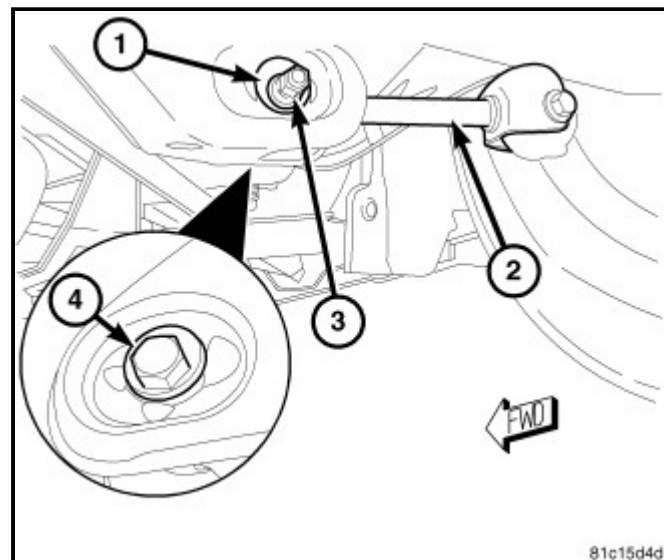
REAR TOE

NOTE: Perform the following at each rear wheel as necessary.

1. While holding the cam bolt head (4) stationary, loosen the toe link mounting cam bolt nut (3).
2. Rotate the cam bolt head (4) left or right until the rear wheel toe

for that rear wheel is set to the preferred specification. ([Refer to 02 - Front Suspension/Wheel Alignment - Specifications](#))

3. While holding the cam bolt head (4) stationary, tighten the toe link mounting cam bolt nut (3) to 35 N·m (26 ft. lbs.).

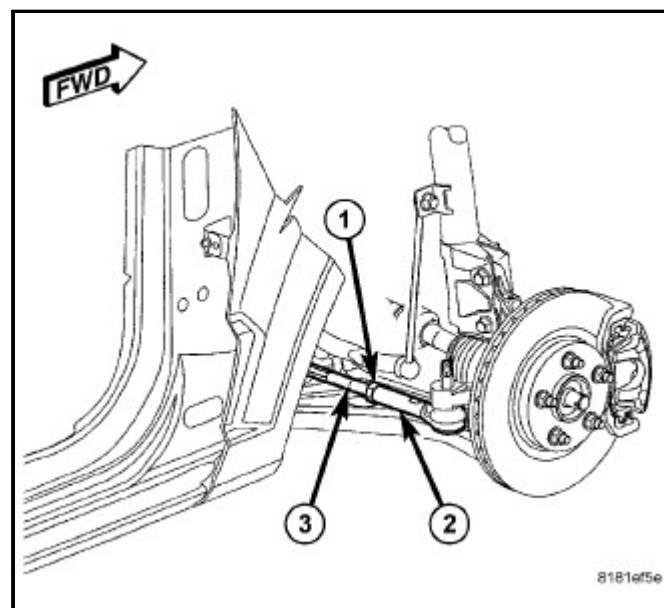


FRONT TOE

NOTE: Perform the following at each front wheel as necessary.

CAUTION: Do not twist the inner tie rod-to-steering gear boot (bellows) while turning the inner tie rod during front toe adjustment. It may be necessary to remove the clamp where the boot meets the inner tie rod.

1. Loosen the tie rod adjusting jam nut (1). Grasp the inner tie rod (3) and rotate it one way or the other until the front wheel toe is set to the preferred specification. ([Refer to 02 - Front Suspension/Wheel Alignment - Specifications](#))
2. Tighten the tie rod adjusting jam nut to of 75 N·m (55 ft. lbs.).
3. Make sure the inner tie rod-to-steering gear boot is not twisted. If removed, reinstall the clamp where the boot meets the inner tie rod.



2. Remove the steering wheel clamp.
3. Remove the alignment equipment.
4. Road test the vehicle to verify the steering wheel is straight and the vehicle does not pull or wander.

WHEEL ALIGNMENT

NOTE: All specifications are given in degrees.

NOTE: All wheel alignments are to be set with the vehicle at curb height. ([Refer to 02 - Front Suspension/Wheel Alignment - Standard Procedure](#))

NOTE: Curb (ride) height specifications can be found in the Curb Height Measurement procedure. ([Refer to 02 - Front Suspension/Wheel Alignment - Standard Procedure](#))

ALL EXCEPT EXPORT

FRONT WHEEL ALIGNMENT	PREFERRED SETTING	ACCEPTABLE RANGE
CAMBER	-0.10°	-0.65° to +0.45°
Cross Camber (Maximum Side-To-Side Difference)	0.00°	-0.80° to +0.80°
CASTER	+3.00°	+2.00° to +4.00°
Cross Caster (Maximum Side-To-Side Difference)	0.00°	-0.50° to +0.50°
TOE - INDIVIDUAL	+0.05°	-0.05° to +0.15°
TOE - TOTAL *	+0.10°	-0.25° to +0.45°
REAR WHEEL ALIGNMENT	PREFERRED SETTING	ACCEPTABLE RANGE
CAMBER	-0.60°	-1.25° to +0.05°
Cross Camber (Maximum Side-To-Side Difference)	0.00°	-0.80° to +0.80°
TOE - INDIVIDUAL	0.00°	-0.15° to +0.15°
TOE - TOTAL *	0.00°	-0.30° to +0.30°
THRUST ANGLE	0.00°	-0.13° to +0.13°
Notes: * TOTAL TOE is the sum of both the left and right wheel toe settings. TOTAL TOE must be equally split between each wheel on the same axle to ensure the steering wheel is centered after setting toe. Positive toe (+) is toe-in and negative toe (-) is Toe-out.		

EXPORT

FRONT WHEEL ALIGNMENT	PREFERRED SETTING	ACCEPTABLE RANGE
CAMBER	-0.13°	-0.68° to +0.42°
Cross Camber (Maximum Side-To-Side Difference)	0.00°	-0.80° to +0.80°
CASTER	+3.00°	+2.00° to +4.00°
Cross Caster (Maximum Side-To-Side Difference)	0.00°	-0.50° to +0.50°
TOE - INDIVIDUAL	+0.05°	-0.05° to +0.15°

TOE - TOTAL*	+0.10°	-0.25° to +0.45°
REAR WHEEL ALIGNMENT	PREFERRED SETTING	ACCEPTABLE RANGE
CAMBER	-0.40°	-1.05° to +0.25°
Cross Camber (Maximum Side-To-Side Difference)	0.00°	-0.80° to +0.80°
TOE - INDIVIDUAL	0.00°	-0.15° to +0.15°
TOE - TOTAL*	0.00°	-0.30° to +0.30°
THRUST ANGLE	0.00°	-0.13° to +0.13°
<p>Notes:</p> <p>* TOTAL TOE is the sum of both the left and right wheel toe settings. TOTAL TOE must be equally split between each wheel on the same axle to ensure the steering wheel is centered after setting toe.</p> <p>Positive toe (+) is toe-in and negative toe (-) is Toe-out.</p>		