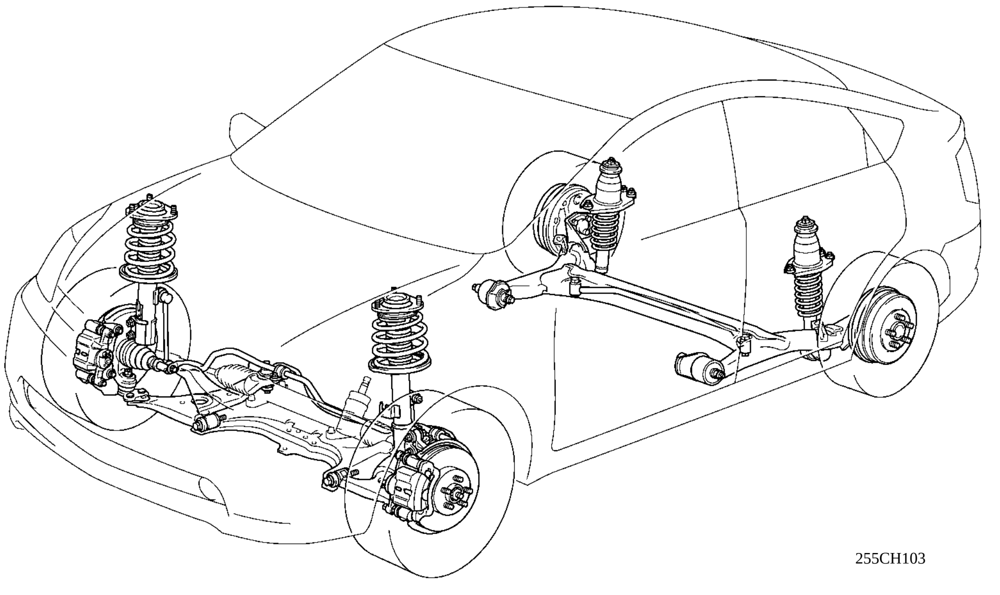
SUSPENSION AND AXLE

■SUSPENSION

1. General

- A MacPherson strut type independent suspension with L-shaped lower arms is used for the front.
- A torsion beam type suspension is used for the rear. In contrast to the toe-control link type used on the ’03 Prius, the rear suspension of the ’04 Prius has been changed to a toe-correction bushing type.



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▶ Specifications ◀

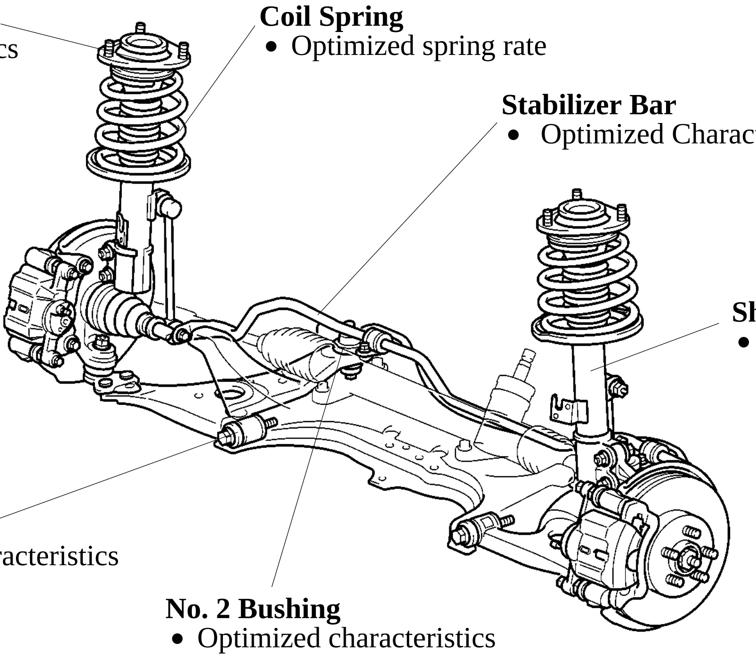
Model			’04 Prius	’03 Prius
Front Wheel Alignment	Type		MacPherson Strut	←
	Tread*	mm (in.)	1505 (59.3)	1480 (58.3)
	Caster*	degrees	3° 10’	1° 02’
	Camber*	degrees	– 0° 35’	– 1° 26’
	Toe-in*	mm (in.)	0 (0.00)	1 (0.04)
	King Pin Inclination*	degrees	12° 35’	9° 52’
Rear Wheel Alignment	Type		Torsion Beam	←
	Tread*	mm (in.)	1480 (58.3)	1478 (58.2)
	Camber*	degrees	– 1° 30’	←
	Toe-in*	mm (in.)	3 (0.12)	1 (0.04)

*: Unloaded Vehicle Condition

2. Front Suspension

General

Through the optimal allocation of components, the front suspension realizes excellent riding comfort and controllability.

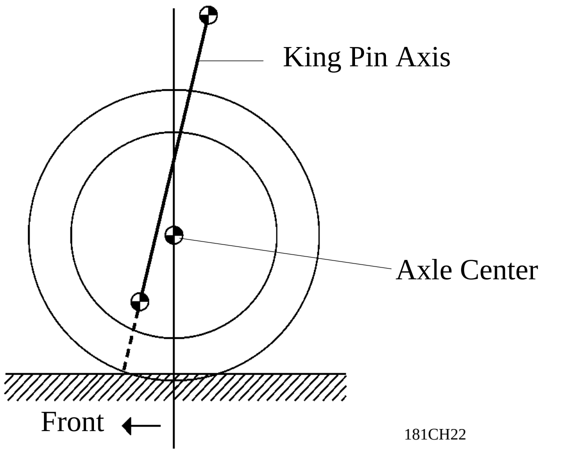


Service Tip

To adjust the camber of the front suspension, change the location of the bolts and nuts fastened onto the lower side of the shock absorber and front axle. For details, refer to the 2004 Prius Repair Manual (Pub. No. RM1075U).

Nachlauf Geometry

The front suspension adopts the nachlauf geometry in which the king pin axis is located ahead of the axle carrier. As a result, excellent straightline stability has been realized and the steering feeling has been improved.



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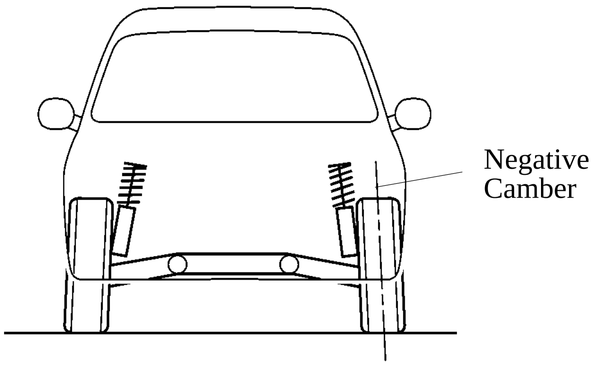
Negative Camber

The front suspension adopts negative camber to reduce the ground contact camber angle of the outer wheel at the time of turning (cornering), which is caused when the vehicle posture changes during cornering, thus realizing excellent cornering performance.

▶ During Cornering ◀



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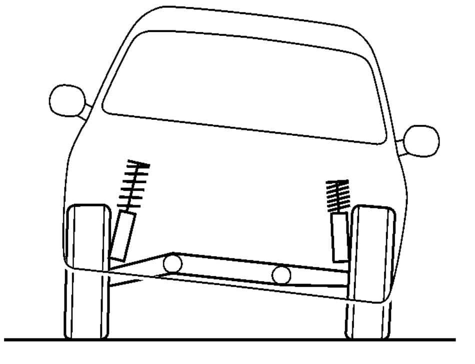

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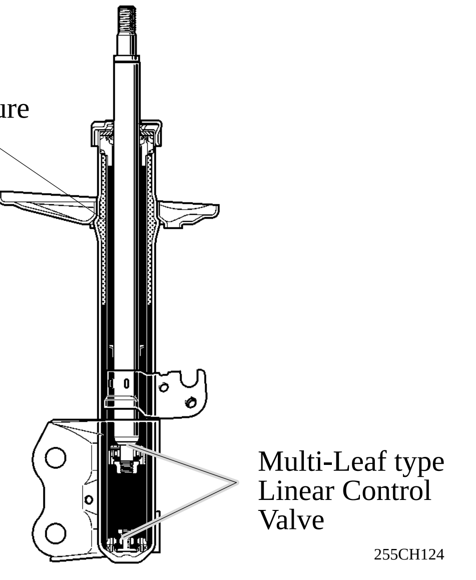
Shock Absorber

1) General

The shock absorber has adopted the two functions listed below to realize both driving stability and riding comfort.

- A low-pressure (N_2) gas sealed type construction has been adopted to suppress cavitation.
- A multi-leaf type linear control valve has been adopted to attain linear damping force characteristics.



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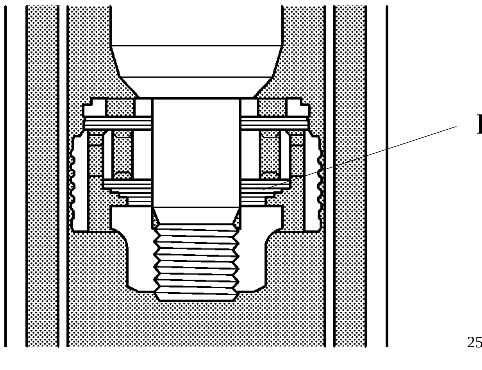
2) Construction of Multi-Leaf type Linear Control Valve

The multi-leaf type linear control valve has a structure of several layered leaf valves with different diameter. With the adoption of the multi-leaf type linear control valve, the changes in the damping force are made constant at low piston speeds, thus realizing the excellent riding comfort and controllability.



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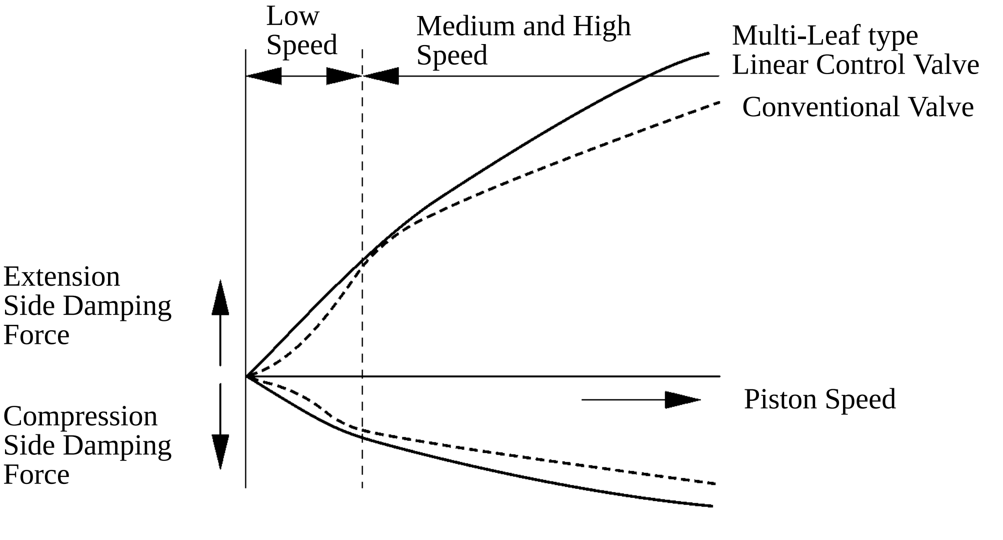

Damping Force Characteristics

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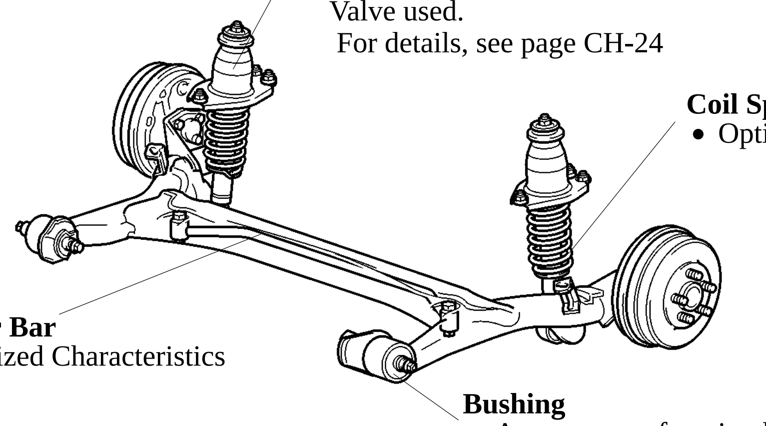
3. Rear Suspension

General

Through the optimal allocation of components, the rear suspension realizes excellent stability and controllability.



NOTICE

Be sure to use the jack-up points that are provided on the body when raising the vehicle on the jack. Never apply a jack under the axle beam, trailing arm, or the bushing of the rear suspension.

Toe and Camber Change

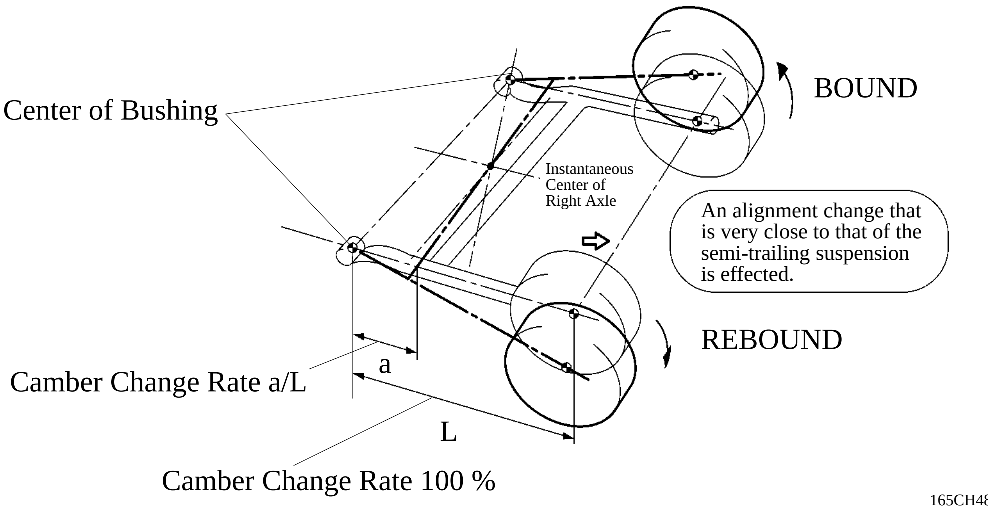
In a torsion-beam type suspension, the camber angle and the toe change differ between the bouncing case and the tramping case, offering both straight-line stability and excellent cornering stability.

1) Bouncing Case

Similar to the full-trailing arm type suspension, the axis that joins the center of the right and left trailing arm bushings is the center of the movement.

2) Tramping Case

During tramping case, or if a difference in suspension travel is created between the right and left wheels, the torsion beam twists with its shearing center as the center of its rotation.
Also, camber changes in relation to the suspension travel are determined by the ratio of the distance between the No.1 trailing arm bushing and the axle center and the shearing center (‘a’ in the Fig. Below) and distance between the No.1 trailing arm bushing and the axle beam (‘L’ in the Fig. Below).
Consequently, through the optimal allocation of the axle beam, the changes in the camber angle in relation to the suspension travel have been optimized, thus ensuring excellent cornering performance.



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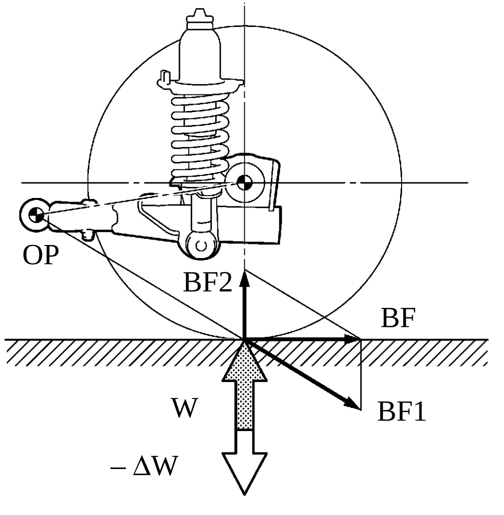
Anti-Lift Geometry

The lifting of the rear end of the vehicle during braking occurs due to the shifting of the center of gravity caused by inertia.
The intersecting point (OR) supports the braking force (BF) and generates a force (BF1) in the direction of the intersecting point and a component force (BF2) in the direction of the ground contact.
The BF1 force can change the height of the intersecting point OR. When OR is set high, it acts in the opposite direction (-W) of the load fluctuation (W), in order to restrain the lift.



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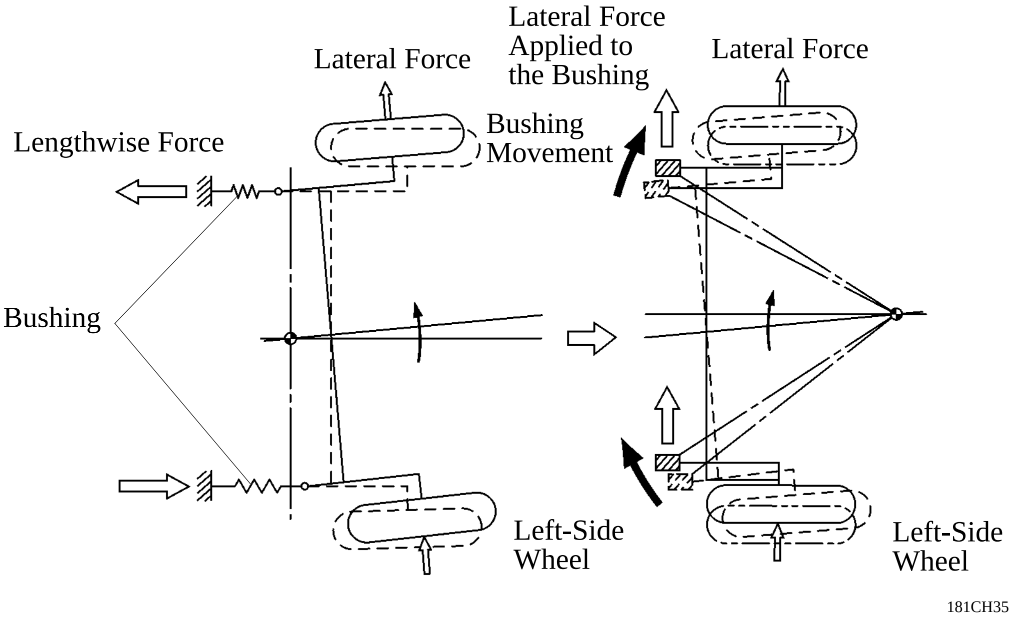
Toe-Correct Function

The longitudinal and lateral forces that are created in the vehicle during cornering causes the bushings in the trailing arms to deform.
On a right turn, the right trailing arm moves forward and the left trailing arms moves rearward, creating a tendency for the left wheel to toe out.
In this situation, the bushings that are installed in the trailing arms are designed to utilize the lateral force, which is applied to the bushings during cornering, to correct the left trailing arm towards the toe-in direction.
As a result, excellent stability and controllability are realized.



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