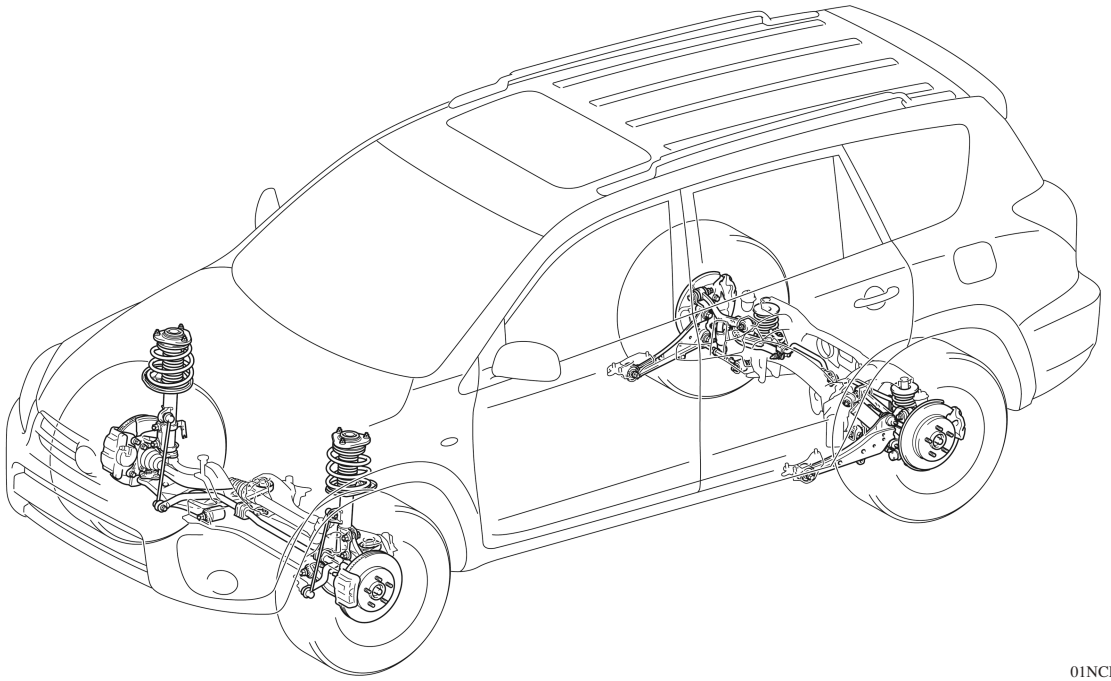
SUSPENSION AND AXLE

■ SUSPENSION

1. General

- For the front suspension, the MacPherson strut type suspension with L-shaped lower arms is used.
- For the rear suspension, the double-wishbone type suspension is used.



01NCH100Y

▶ Specification ◀

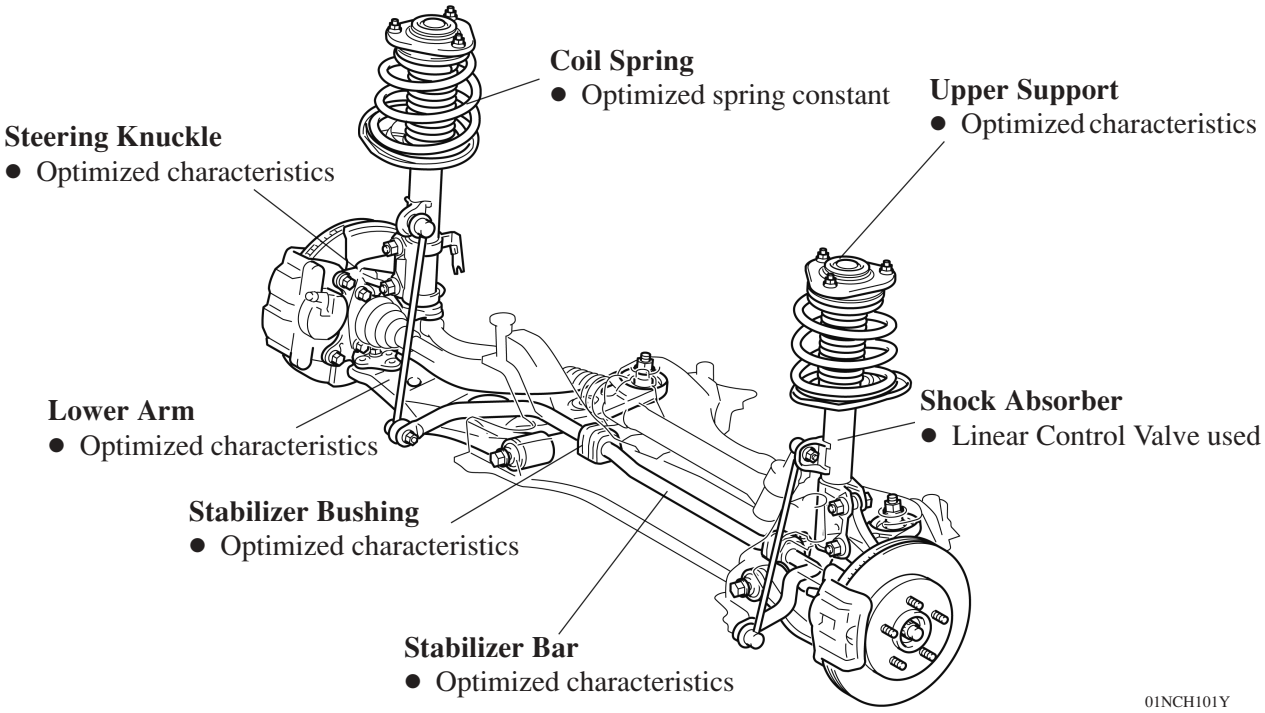
Destination			Europe		Australia	G.C.C. Genearl
Tire Size			215/70R16	225/65R17 235/55R18	225/65R17	225/65R17
Front Wheel Alignment	Type		MacPherson Strut	←	←	←
	Tread*	mm (in.)	1560 (61.42)	1560 (61.42)	1560 (61.42)	1560 (61.42)
	Caster*	degrees	5° 41’	5° 47’	5° 42’	5° 50’
	Camber*	degrees	–0° 08’	–0° 11’	–0° 07’	–0° 11’
	Toe-in*	mm (in.)	1 (0.039)	←	←	←
	King Pin Inclination*	degrees	11° 16’	11° 26’	11° 14’	11° 26’
Rear Wheel Alignment	Type		Double-wishbone	←	←	←
	Tread*	mm (in.)	1560 (61.42)	1560 (61.42)	1560 (61.42)	1560 (61.42)
	Camber*	degrees	–0° 58’	–1° 07’	–0° 52’	–1° 04’
	Toe-in*	mm (in.)	2.3 (0.09)	←	←	←

*: Unloaded Vehicle Condition

2. Front Suspension

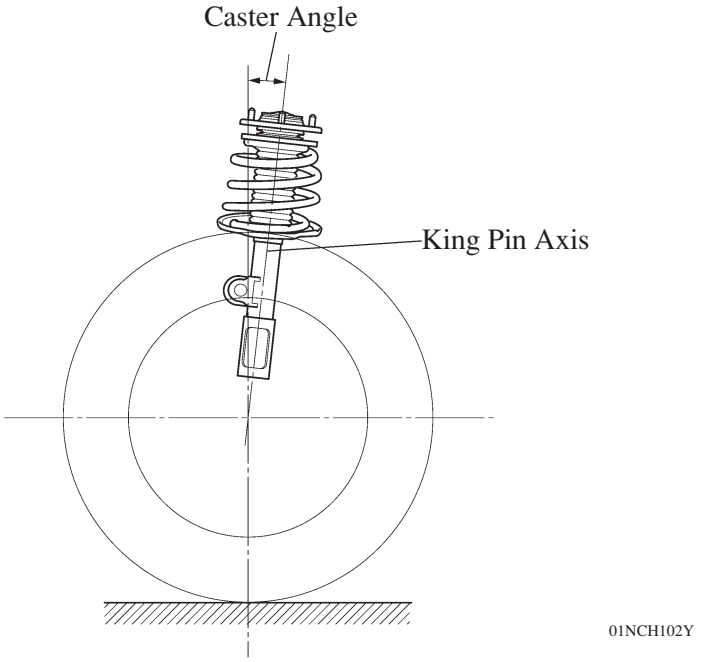
General

- The highly rigid and compact MacPherson strut with L-shaped lower arms is used.
- Excellent driving stability and ride comfort have been realized by enlarging the wheelbase and tread and optimizing the suspension geometry.
- Excellent vehicle stability has been ensured by optimizing the rolling rigidity.



Optimized Caster

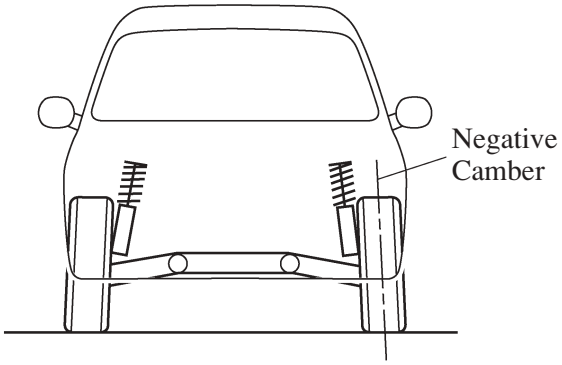
Optimum caster angle and trail value are featured to provide straight-line stability during low-speed to high-speed ranges and assists steering response during high speed.



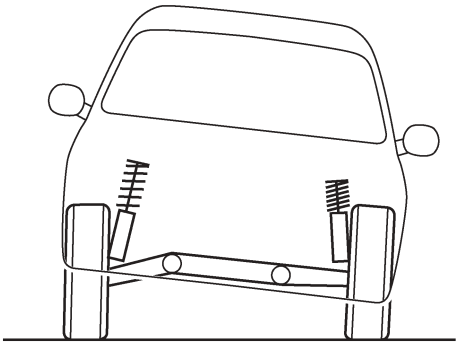
Optimized Camber

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 ◀



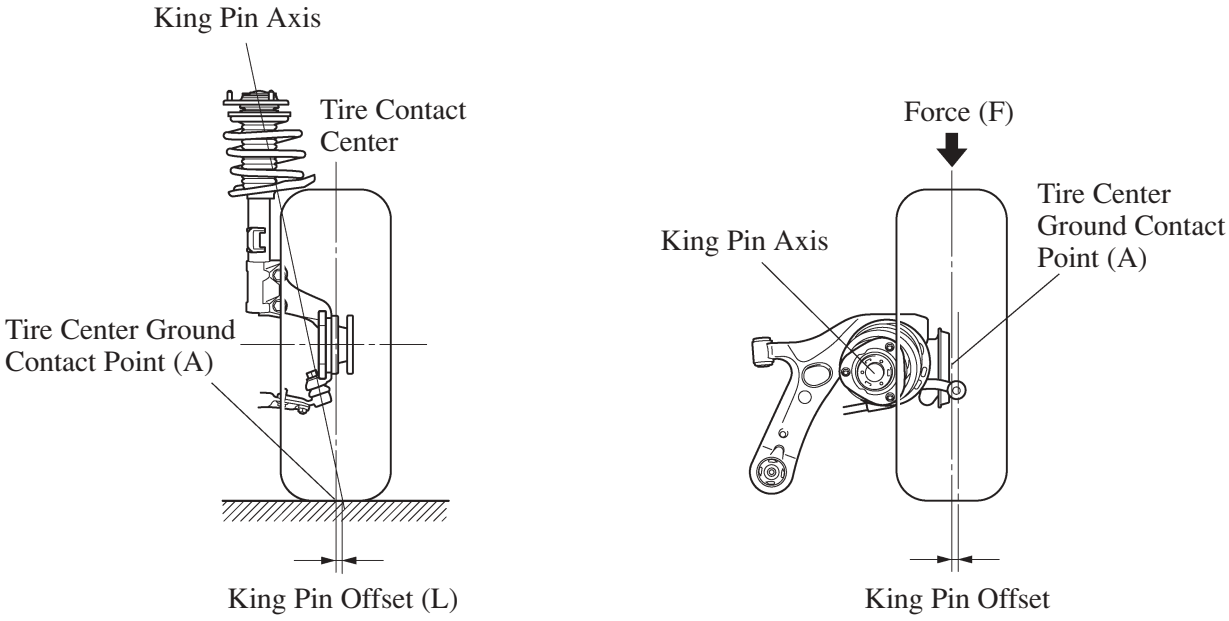
181CH23



181CH24

Optimized King Pin Offset

A small king pin offset is used and the moment which occurs around the king pin axis is made small in order to realize excellent vehicle stability when braking.
When force (F) is applied to the wheel during braking etc., (F) is applied at the tire center ground contact point (A) and the king pin offset radius (L). The power of (F) multiplied by (L) tries to turn the king pin axis. In this way, making the king pin offset smaller produces smaller moment of the king pin axis to provide excellent vehicle stability during braking.



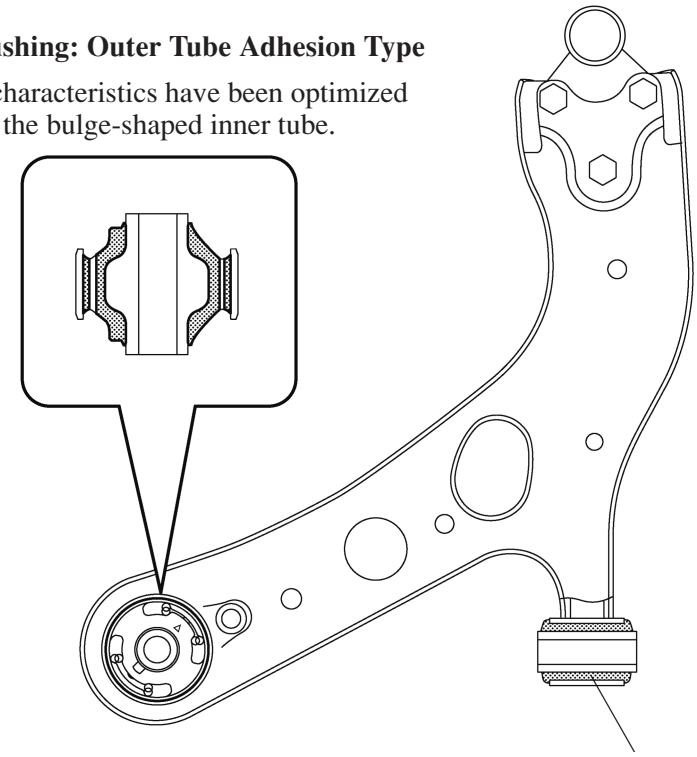
01NCH104Y

Lower Arm

- Closed cross section type lower arms that are lightweight and highly rigid are used.
- Along with the use of wider treads, the length of the lower arms has been extended.
- The installation point of the lower arm bushing and the bushing characteristics have been optimized to realize excellent ride comfort and steering characteristics.

No. 2 Bushing: Outer Tube Adhesion Type

Spring characteristics have been optimized through the bulge-shaped inner tube.



No. 1 Bushing: Without Outer Tube Type

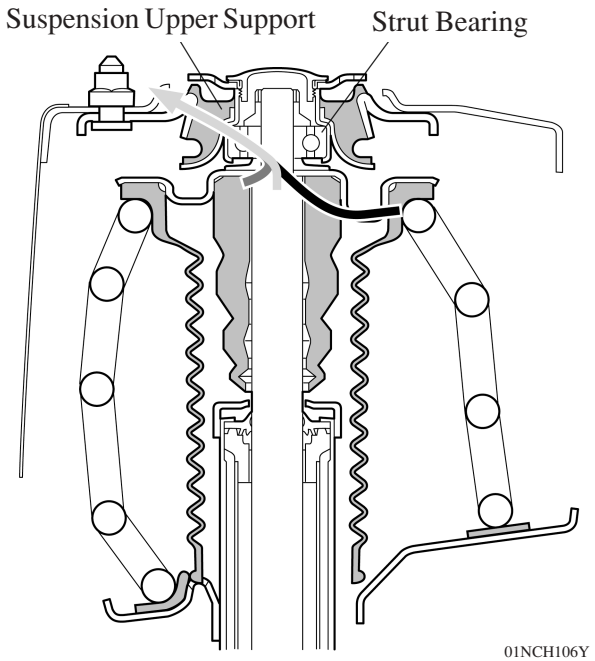
01NCH105Y

Suspension Upper Support

- Except on the models for Europe, an integrated input construction type suspension upper support is used, in which the pitch of the mounting bolts has been increased and the characteristics have been optimized.
- On the models for Europe, a separate input construction type suspension upper support is used. This construction transmits only the inputs from the shock absorber and the bound stopper via the suspension upper support to the body. Thus, it realizes superior quietness and ride comfort performance.

Integrated Input Construction Type:

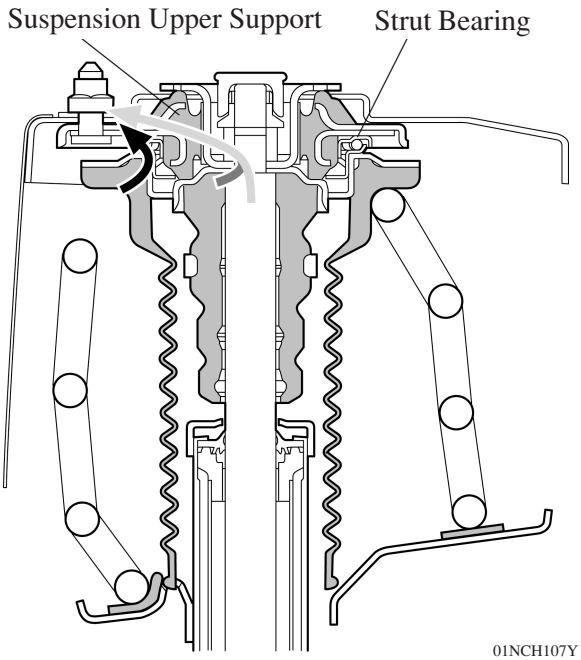
Transmits all the inputs (from the shock absorber, bound stopper, and coil spring) from the strut bearing via the suspension upper support to the body.



01NCH106Y

Separate Input Construction Type:

- Transmits the inputs from the shock absorber and bound stopper via the suspension upper support to the body.
- Transmits the input from the coil spring via the strut bearing to the body.



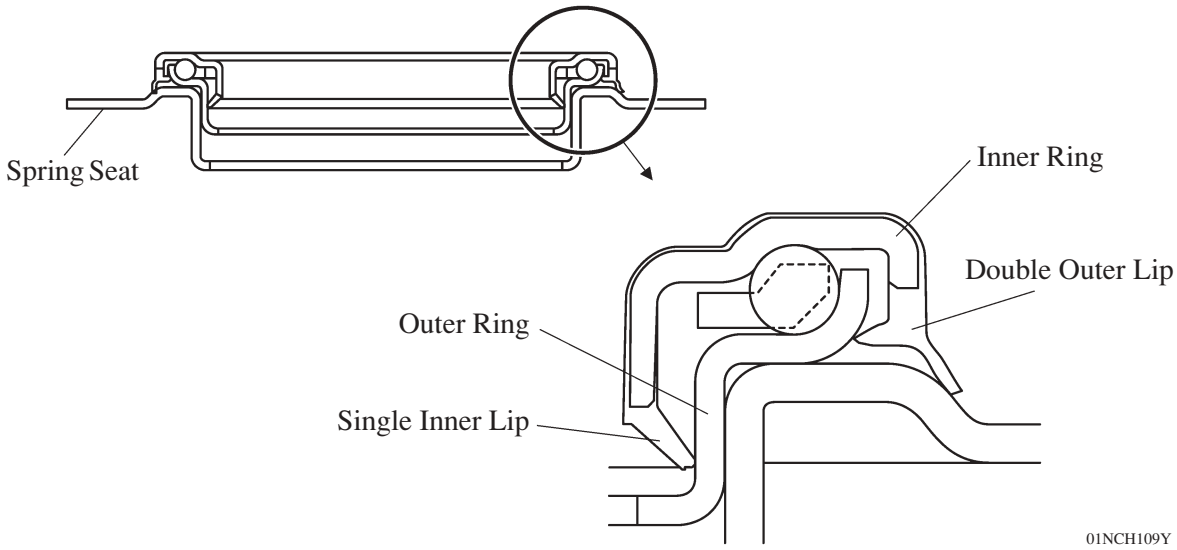
01NCH107Y



01NCH108Y

Strut Bearing (for Separate Input Construction Type Suspension Upper Support)

- A thrust type ball bearing is used in the strut bearing.
- It is an oil seal integrated type with a double outer lip and a single inner lip.
- The spring seat is an integrated type that is pressed-fit into the strut bearing.

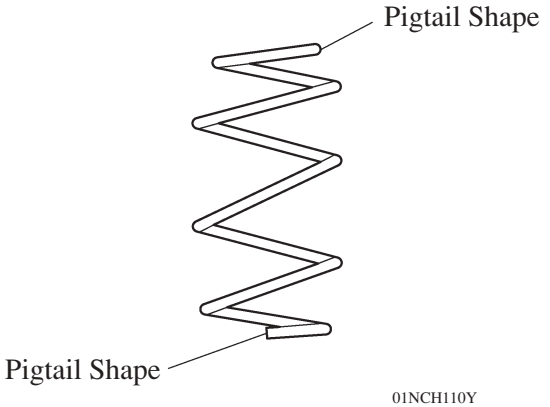


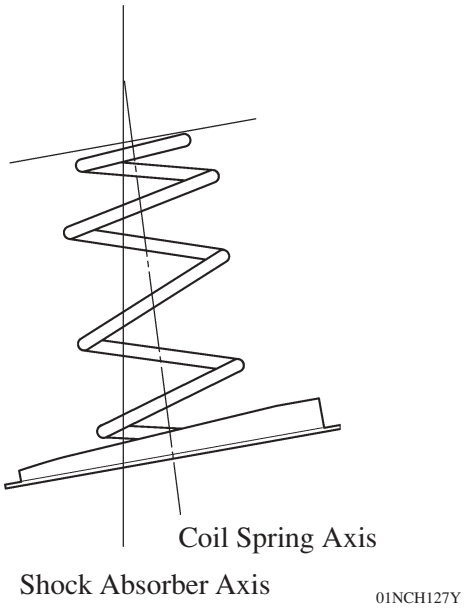
Service Tip

During the removal and installation of the strut bearing, the inner ring can be easily disengaged from the outer ring. Be careful not to disengage the rings. In case that the rings are disengaged, install a new strut bearing as it cannot be reused.
Be careful not to tilt the bearing when installing it with the suspension upper support.
For details on the diagnostic methods and diagnostic items, refer to the RAV4 Repair Manual. (Pub No. RM01N0E)

Coil Spring

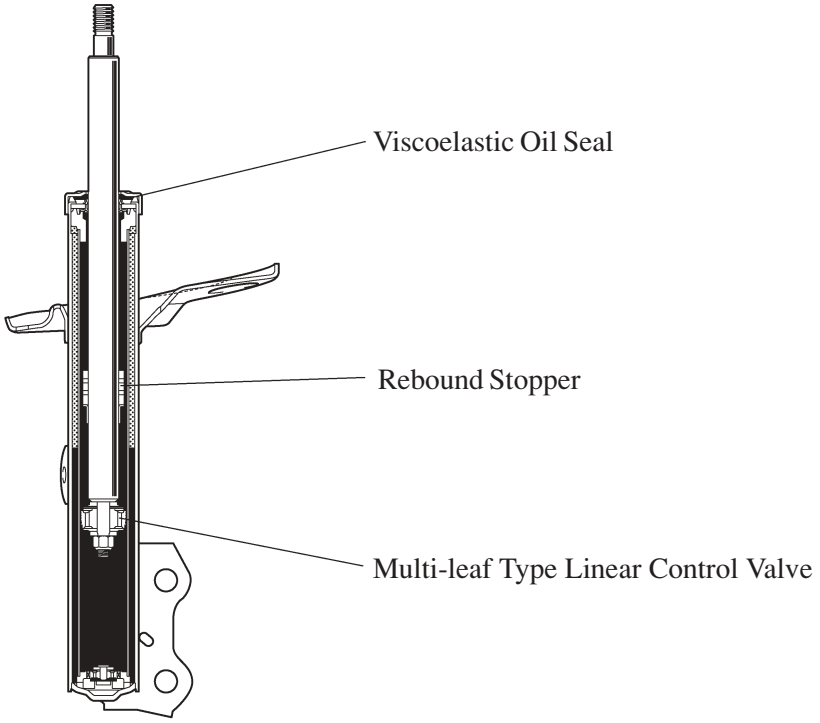
- Both ends of the coil spring are pigtail-shaped, and made compact and lightweight.
- The optimized shape of the spring and its installation position have reduced the lateral force that is applied to the shock absorber. Together with the smooth movement realized through reduced friction, excellent ride comfort and steering feel have been realized.





Shock Absorber

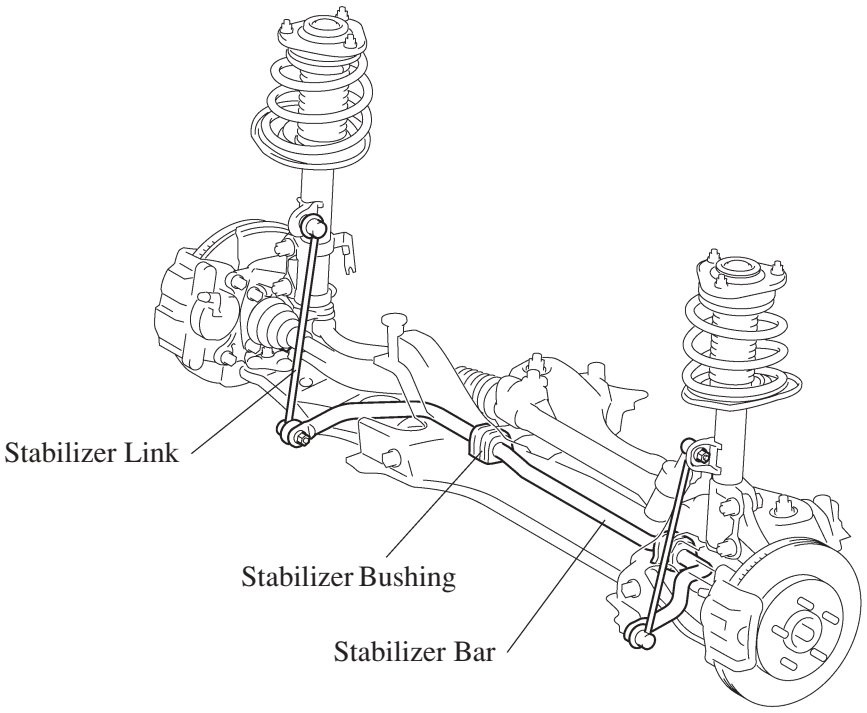
- The multi-leaf type linear control valve generates a smooth damping force characteristic to realize high-quality ride comfort.
- A viscoelastic oil seal is used and the hydraulic fluid has been optimized. These measures enable the shock absorber to generate damping force starting at an ultra-low speed range, and realize an excellent road holding feel and steering feel.
- The initial characteristic of the rebound stopper is set soft in order to ensure comfort when driving over a bump.



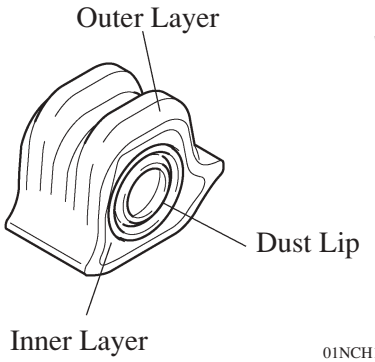
01NCH111Y

Stabilizer Bar

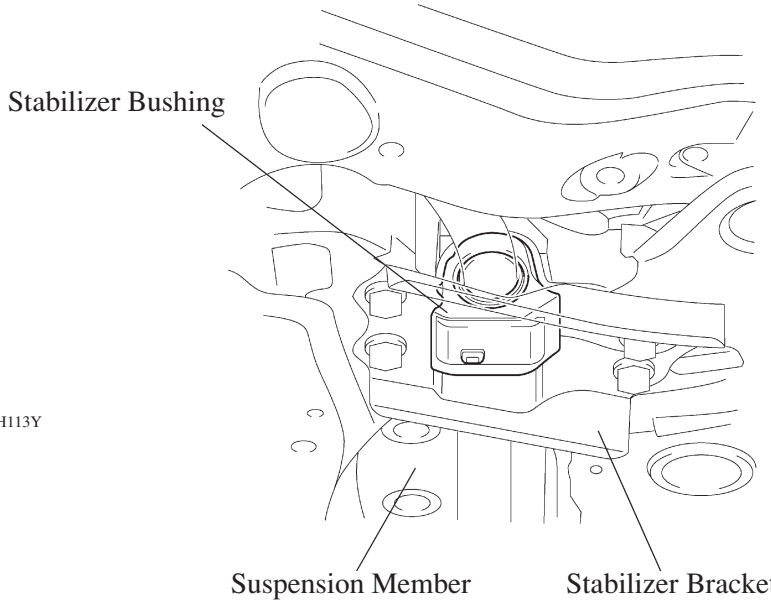
- The stabilizer bar is made of a hollow bar, reducing the weight. A ball joint is used between the stabilizer link and the stabilizer bar, and between the stabilizer link and the shock absorber. This helps reduce suspension friction and increase link rigidity. As a result, the ball joints perform effectively even for slight rolling and maintain stable roll feeling.
- The surface of the stabilizer bushing that is installed to the suspension member has a saddle shape. This construction, which is embedded into the cross section of the suspension member, ensures excellent support rigidity.
- The stabilizer bushing has a dual construction using the following materials: an outer layer made of highly rigid ordinary rubber, and an inner layer made of lowly rigid self-lubricating rubber. Thus, it realizes a high roll rigidity and ease of installation.
- The stabilizer bushing has been provided with a dust lip to prevent sand from entering.



01NCH112Y



01NCH113Y

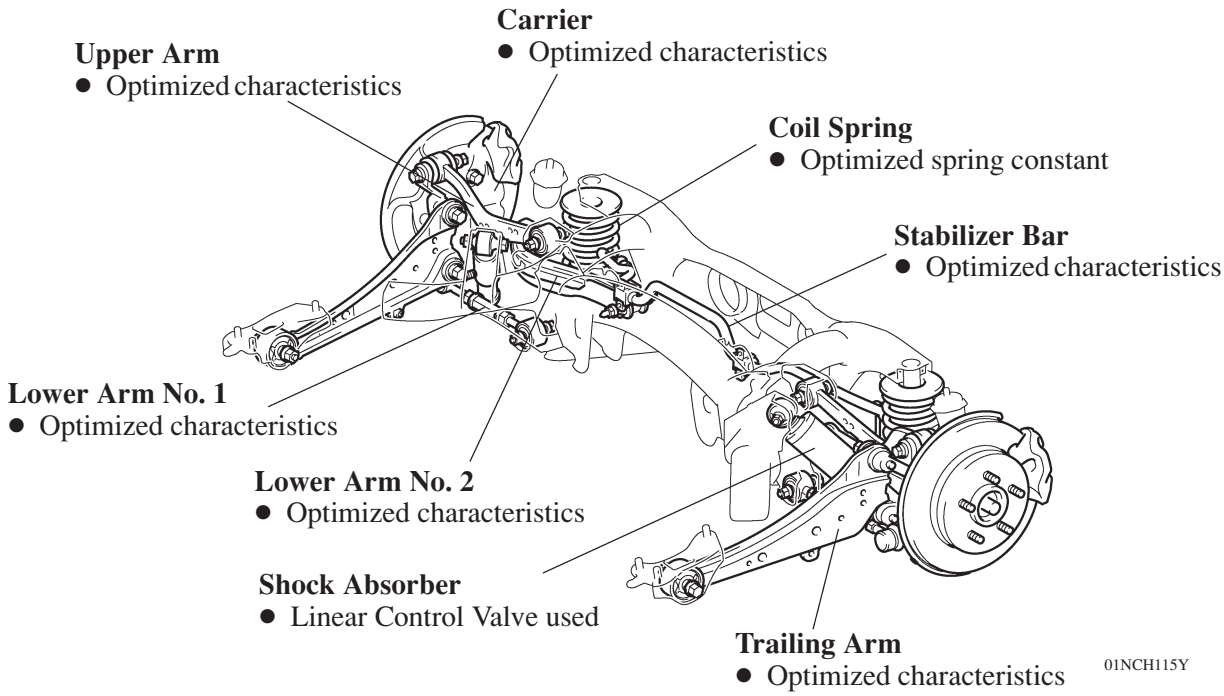


01NCH114Y

3. Rear Suspension

General

- A double-wishbone type suspension is used to realize excellent driving stability and ride comfort.
- The shock absorbers have been placed under the floor and the coil springs have been placed low to realize a more spacious cargo area and a lower floor.
- The parts have been made compact and lightweight to reduce unsprung weight and improve road holding.
- The suspension geometry has been optimized to realize excellent driving stability and ride comfort.
- The rolling rigidity has been optimized to realize excellent vehicle stability.



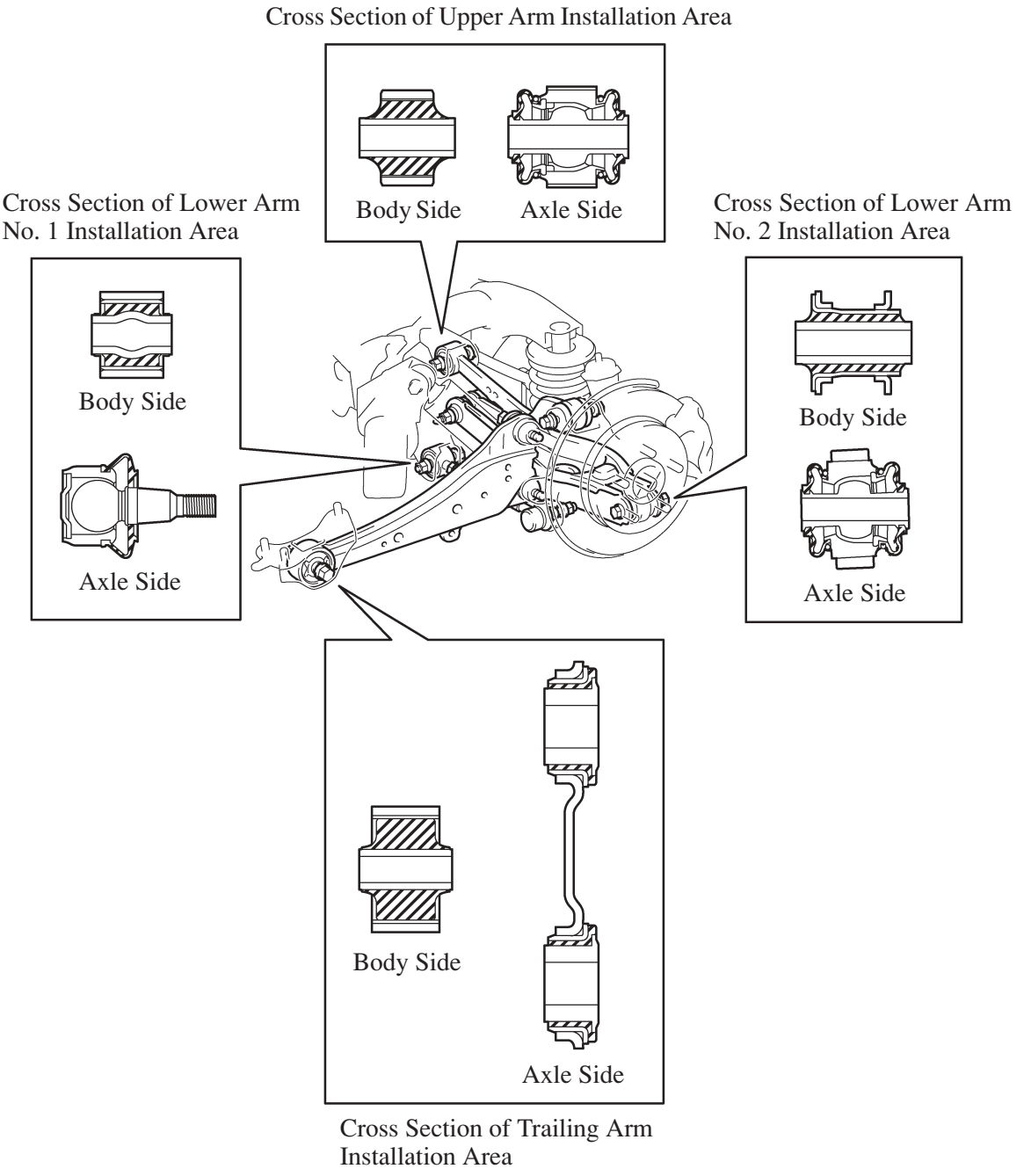
2WD Model

Optimized Camber

Both the initial camber and the camber change rate have been optimized to ensure excellent driving stability.

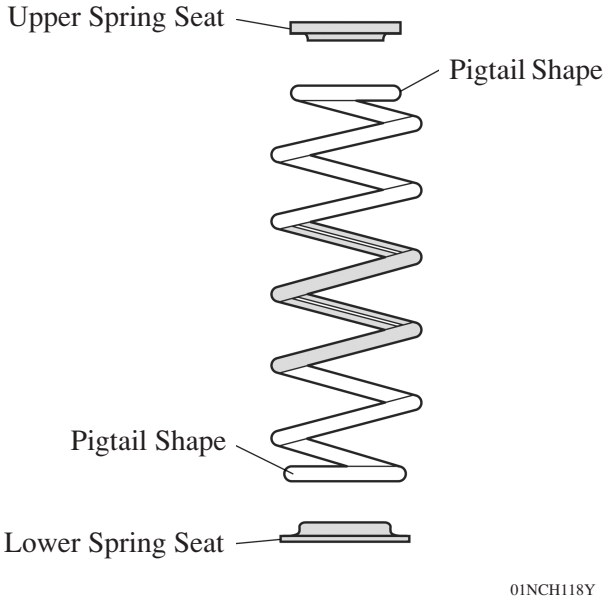
Trailing Arm, Upper Arm, and Lower Arm

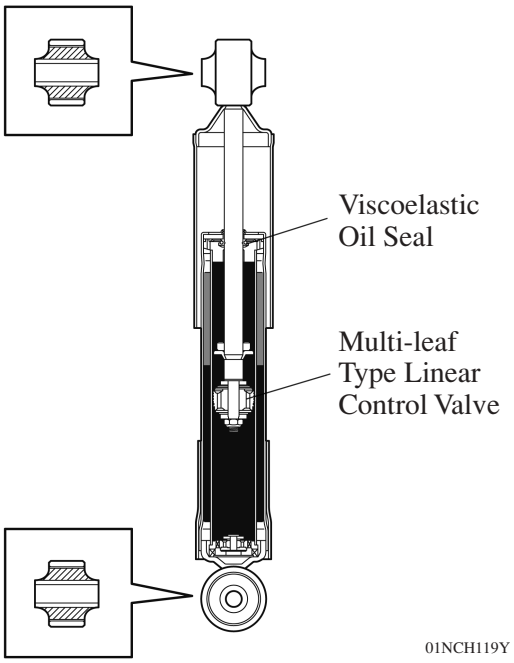
- The trailing arm, upper arm, and lower arm No. 2 are made of stamped high-strength sheet steel to realize a highly rigid and lightweight construction.
- The trailing arm uses a bushing with an outer tube in order to provide ample compliance to counter the longitudinal force, and realize excellent ride comfort.
- The upper arm, lower arm No. 1, and lower arm No. 2 use a bushing with an outer tube at their crossmember side, and a ball bushing at their axle side, to ensure a high level of support rigidity.



Coil Spring and Shock Absorber

- Both ends of the coil spring are pigtail-shaped, and made compact and lightweight.
- The shape of the upper spring seat has been optimized and a new lower spring seat is used to ensure a high level of vibration isolation performance.
- The multi-leaf type linear control valve generates a smooth damping force characteristic to realize high-quality ride comfort.
- A viscoelastic oil seal is used and the hydraulic fluid has been optimized. These measures enable the shock absorber to generate damping force starting at an ultra-low speed range, and realize an excellent road holding feel and steering feel.





Stabilizer Bar

- A highly rigid, solid type stabilizer bar is used.
- A ball joint is used between the stabilizer link and the stabilizer bar. This helps reduce suspension friction and increase link rigidity.
  As a result, the ball joints perform effectively even for slight rolling and maintain stable roll feeling.

