

FRONT SUSPENSION

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FRONT SUSPENSION

Minor Maintenance

Front Wheel Alignment

The tie rods, part of the steering rack assembly, are adjustable for length to permit the setting toe-in and wheel lock angles.

Don't attempt to carry out alignment checks without first making a preliminary check of the serviceability of the front end components.

Front Wheel Alignment Check

Equipment Installation

Install the wheel alignment equipment on the vehicle and follow the installation, inspection and operating instructions provided by the equipment manufacturer.

Equipment used for front wheel alignment inspection must be accurate. Controlled body height spacers are used when checking camber and caster. The spacers should be omitted when checking toe-in and wheel lock angles. Vehicles with rear IRS must have the rear IRS aligned before aligning the front suspension.

Caster

Check the caster angle at each front wheel.

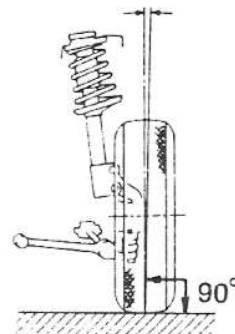
Caster is the forward or rearward tilt of the top of the wheel spindle. If the spindle tilts to the rear, caster is positive. If the spindle tilts to the front, caster is negative. The correct angle, or tilt, is specified at the end of the chapter. The maximum difference between both front wheel caster angles should not exceed 1 degree.

When carrying out the check of caster angle, it is possible that the strut bushes may not always be under equal compression and therefore, will tend to bias the strut rod

in a forward or rearward position, thus affecting the steering caster angle.

Therefore it is important whenever the steering caster angle is checked, that the car is bounced up and down to ensure the strut rubbers are not holding the vehicle at an angle before taking gauge readings.

Camber Angle



Positive direction

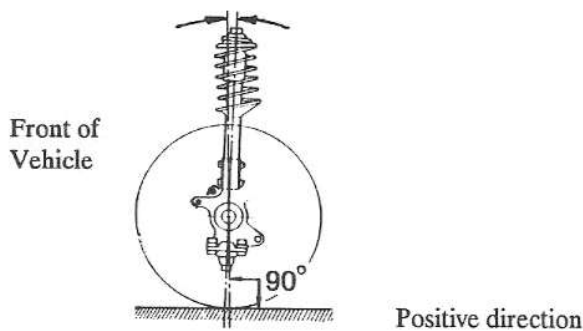
Camber Angle View from Front

Camber

Check the camber angle at each front wheel.

Camber is the amount the front wheels are tilted inboard or outboard at the top. If a wheel tilts outward, camber is negative. The correct camber angle, or outward (positive) tilt, is specified at the end of the chapter. The maximum difference between both front wheel camber angles should not exceed 3/4 degrees.

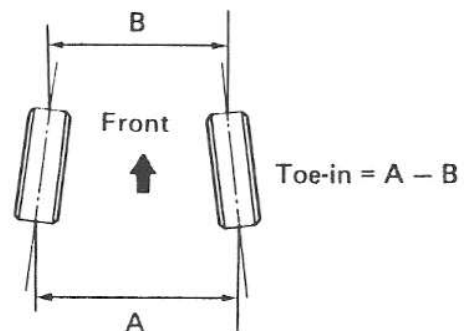
Side view of front wheel



Positive direction

Caster Angle Side View

Top view of front wheels



Toe-in = A - B

Toe-In

Toe-in is the inward point of both front wheels at the front.

The checking and optimum resetting toe-in specifications are specified at the end of the chapter.

Check the toe-in with the steering wheel in the straight ahead position.

WHEEL ALIGNMENT**Caster Adjustment**

To adjust caster angle one spacer washer on one tension rod, the one with the highest reading.

Caster at kerb weight 5deg.0min +/- 30min

Camber Adjustment

Adjust.

1. The vehicle needs to be lifted and supported so that the front wheels are well clear of floor. Remove front wheels.

2. Loosen the two bolts from the lower section of the suspension strut to the front hub and knuckle.

3. Adjust the camber adjusting bolt to obtain the correct camber adjustment.

Clockwise / In: Reduces the negative camber.

Anti-clockwise / Out: Reduces the positive camber.

Camber:

Standard Suspension-minus- 0deg12min +/- 0 deg 12min

FE2 Suspension-minus- 0deg48min +/- 0 deg 12min

V5W Suspension-minus- 0deg0min +/- 0 deg 12min

Utility Suspension-minus- 0deg0min +/- 0 deg 12min

4. Tighten the two bolts from the lower section of the suspension strut to the front hub and knuckle. Tighten to specification.

Strut To Front Hub/Knuckle Bolt Torque:

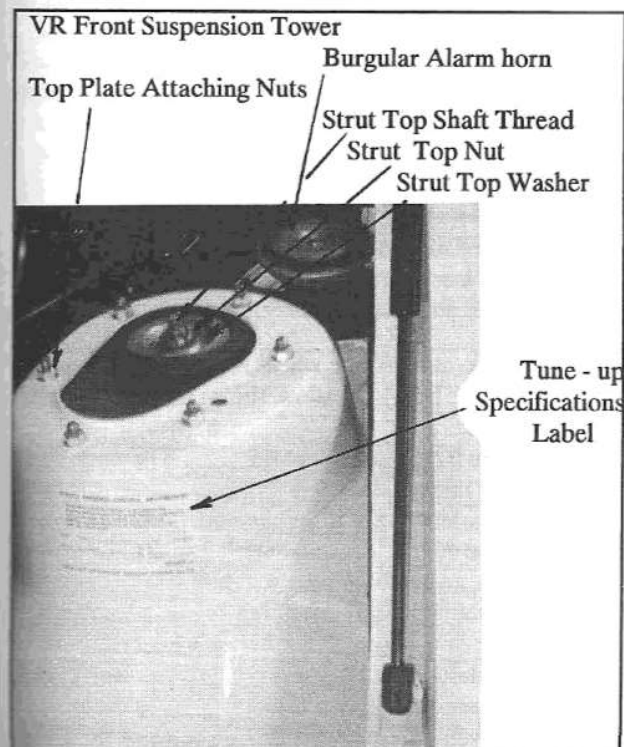
Step One: 85Nm

Step Two: 170Nm

Step Three: Plus 30°-45° Turn

5. Fit wheels and tighten to specification.

Road Wheels Nuts specified torque: 100-125Nm

**Toe-In & Steering Wheel Adjustments**

Check the steering wheel position when the front wheels are in the straight ahead position. If the steering wheel is not in its correct position, it can be corrected while toe-in is being adjusted.

1. Clean and lubricate the exposed threads on the tie-rods. Loosen the clip on the outer ends of the rack bellows and ensure that the bellows are free on the tie-rods.

2. Hold the tie-rod and loosen the lock nut on each rod.

*** Both rods have right hand threads.**

3. Adjust toe-in. If the steering wheel is in the correct position, lengthen or shorten both rods equally to obtain correct toe-in. If the steering wheel is not in its correct position, make the necessary rod adjustments to obtain the correct toe-in and steering wheel spoke alignment.

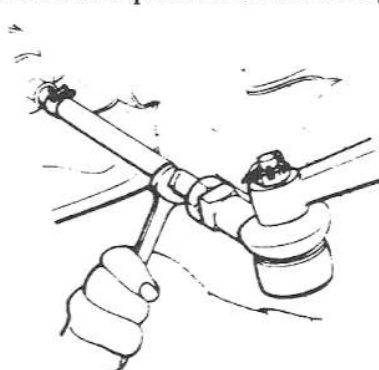
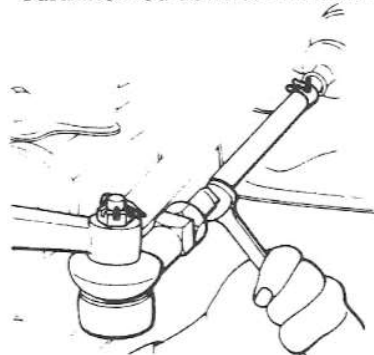
4. When the toe-in and steering wheel spoke alignment are both correct tighten the lock nut on each rod.

*** A maximum of 20mm of thread may be exposed on either rod after the lock nuts have been tightened.**

Toe-in Adjustment**FRONT OF VEHICLE**

Turn Tie Rod down to Increase Rod Length

Turn Tie Rod Up to Increase Rod Length



Tie Rod Ball Joint

Lock Nut

Rack & Pinion Rubber Dust Boot

Lock nut

Tie Rod Ball Joint

5. Position each tie-rod end ball joint at the centre of its articulation and tighten the clips on the rack bellows.

Toe-in (Deg total) 0deg. 20min +/- 0 deg. 5min

Toe-in (mm total) 2.0mm +/- 1.0mm

Front Wheel Lock Angle

When the inside wheel is turned 20 degrees, the turning angle of the outside wheel should be approximately 18.5°.

If the turning angles are incorrect or uneven when compared. First check the toe-in. If this is correct, examine the tie rods which should be approximately the same length. If they are appreciably different (i.e. 3.0mm) the turning angles will be adversely affected. It should be noted that minor differences in tie rod lengths are acceptable and, in fact, sometimes necessary to compensate for production tolerances in the build up of the suspension and steering assembly.

If the toe-in and the tie rod lengths are satisfactory examine the tie-rods for distortion. The tie rod ball joints should also be checked for wear or looseness.

Rear Wheel Alignment Independent Rear Suspension

Camber and Toe-In

Wheel alignment for the independent suspension is non-adjustable, however often the wheel alignment may be incorrect due to mechanical work having been carried out on the vehicle.

When checking for toe-in, one side can often be excessively out while the other side is excessively in, this can be caused by the trailing arms having been tightened when the vehicle was not at kerb height, or the rear crossmember installed when not parallel.

Correct these by checking the procedure in this manual, that is loosen the rear crossmember and trailing arm to crossmember bolts and nuts, bounce the rear of the car at least three times and allow to settle, bounce the car again two/three times and allow to settle, then tighten the bolts and nuts to the correct specification in the order listed below.

Rear Crossmember Front Bolt specified torque:
125Nm + 30°-45° turn

Rear Crossmember Rear bolt specified torque: 30-40Nm

Trailing Arm to Rear Crossmember Nut specified torque:
95-105Nm

Suspension Ride Height - Front and Rear

Loading Requirements

1. Full tank of fuel.
2. Cooling system filled.
3. Crankcase oil at full.
4. Spare wheel and tyre stowed in design position.
5. Front seat one notch forward from rearmost position.

Measuring Procedure

1. Position vehicle on level surface at kerb weight.

Suspension Height Chart (VR)

Suspension Height V6-standard suspension, no options.

Model VR	Sedan Front	Sedan Rear	S'Wagon Front	S'Wagon Rear
Executive Man	613	600	614	588
Berlina Auto	606	600	606	589
Calais Auto	600	602	---	---
Statesman Auto	596	549	---	---
Utility	632	610	---	---
		----	567	----

VR Front Spring ID Code	ID Code
VR V6 Sedan & S' Wagon Standard Sus	XZ
VR V6 Sedan & S' Wagon FE 2 Sus	VU
VR V6 Sedan & S' Wagon V5W Sus	XL
VR V8 Sedan & S' Wagon Standard Sus	ED
VR V8 Sedan & S' Wagon FE 2 Sus	EG
VR V8 Sedan & S' Wagon V5W Sus	XL
VR V6 Utility	XL
VR V8 Utility	XL
VR V6 Statesman Standard Sus	XZ
VR V8 Statesman & Caprice	AB

2. Roll vehicle at least one wheel revolution backwards or forwards (or both) to allow the vehicle to assume normal attitude.

3. Bounce the front and rear of the vehicle up and down approx. 50mm in each direction.

4. With the parking brake disconnected, push the vehicle front end at the centre of the front bumper evenly down, approx. 25mm, and release slowly.

5. With appropriate instruments measure from the top of the wheel opening arch, to the lowest wheel rim centre line, as shown in diagram, on both sides and record these measurements.

6. Raise the vehicle front end at the centre of the front bumper evenly, approx. 25mm, and release slowly.

7. Repeat number 5.

8. Average the above measurements for each side and record as front ride heights left and right.

9. Repeat operations 4 to 8 at the rear end of the vehicle.

* Suspension ride height specifications for coil springs must be measured after the springs have settled in after operation. When the new springs are fitted a further 6mm may be added to the max. allowable height (refer to table above). Ride height also depends on the options fitted to the base vehicle and the amount of fuel in the fuel tank.

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Wheel Balancing

Ensure wheels are correctly balanced to give correct road handling properties.

Strut

Vehicles are equipped with hydraulic acting struts of the direct-acting type and are non-adjustable but can be refilled, and repaired.

Before replacing a strut, check the strut action as follows.

On Vehicle Tests

1. Bounce the vehicle up and down. If the struts and rear shock absorbers are in good condition the vehicle will immediately settle into a normal position after the car is released.

2. Check the strut to be sure it is securely and properly installed. Check the strut insulators for damage and wear. Replace any defective insulators and tighten attachments to the specified torque.

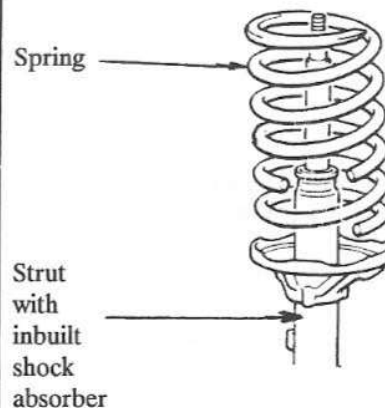
3. Inspect the strut for evidence of fluid leakage. (A light film of fluid on the upper shaft is permissible. Be sure any fluid observed is not from sources other than the strut).

4. Replace the strut if leakage is severe.

Bench Test

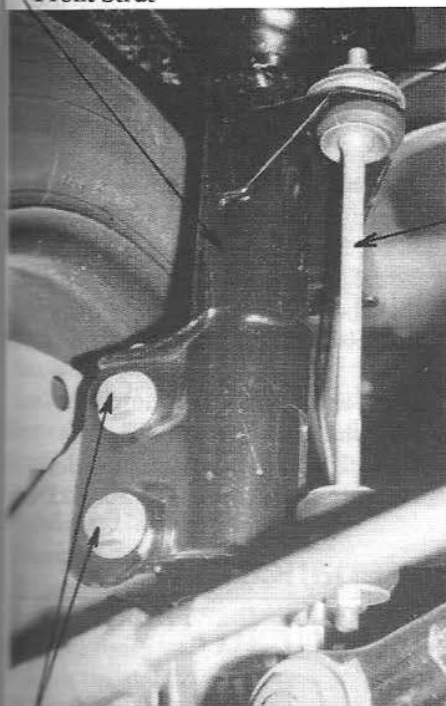
1. With the strut right side up (as installed in vehicle), pause for 15 seconds then extend it fully. Then turn the strut upside down, pause for 15 seconds and completely compress it. Repeat this procedure at least three times to ensure that any entrapped air has been expelled. Now

Hydraulic shock absorbers of the direct-acting type and are non-adjustable and non-refillable, and cannot be repaired.

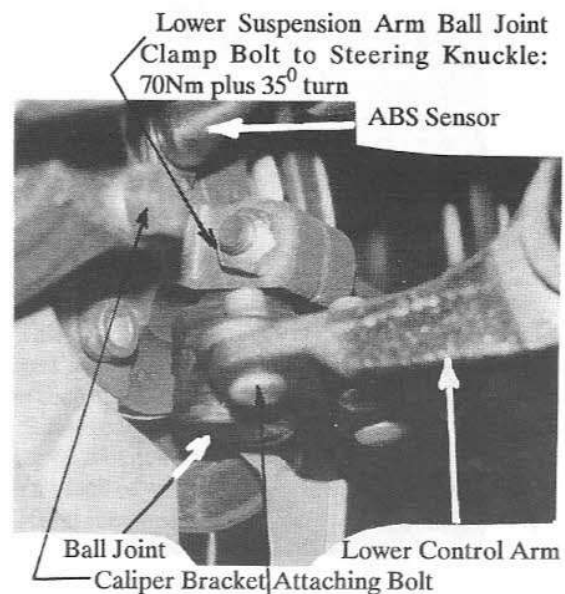


place the strut right side up in a vice, and hand stroke the strut. There should be a constant drag during the complete cycle. Any sudden loss of drag indicates air in the system, loss of fluid, or faulty internal valve operation.

2. Extend and compress the strut shaft as fast as possible, using as much travel as possible.

Front Suspension**Front Strut**

Steering Knuckle to Front Strut Bolt Torque:
Step 1 85Nm, Step 2 170Nm, Step 3 Plus 30°-45° Turn

**Ball Joint Removal**

Remove 3 rivet collar with a angle grinder or cold chisel, if the ball joint has previously been replaced, remove the 3 bolts and nuts.

Action should become smooth and uniform throughout each stroke. Higher resistance on extension than on compression is a normal condition. Faint swish noises are also normal.

3. If the action is smooth, but the struts are suspected of being weak, repeat Step 2 on a new strut or the mating strut on the opposite side of the vehicle, and compare results of both tests.

Ball Joint Inspection

1. Raise vehicle.
2. Adjust the wheel bearings as described in this chapter.
3. Hold the tyre at the top and bottom and try to move it in and out.

4. There should be no perceptible movement in either joint.

If movement is detected in either joint that joint should be replaced.

FRONT WHEEL BEARINGS

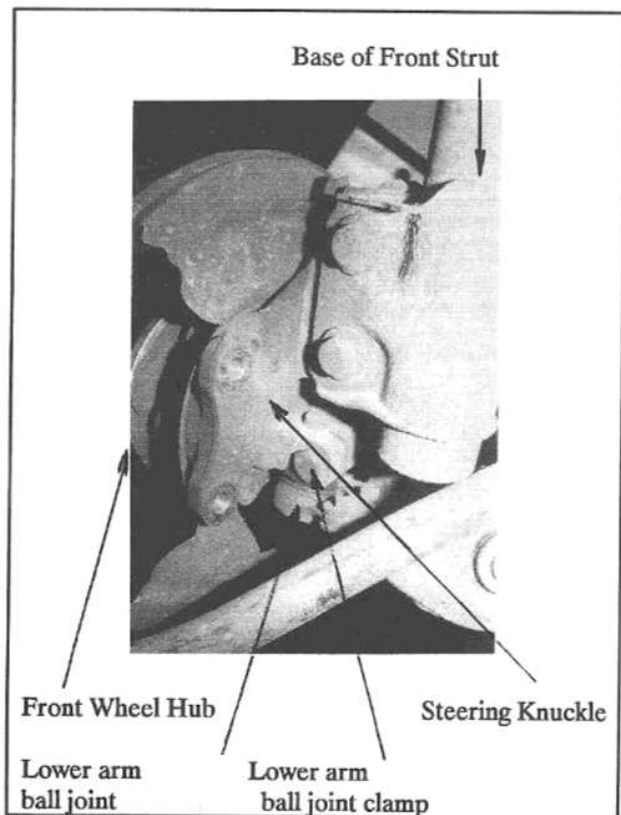
The front hub is a sealed unit therefore does not require any special service or lubrication, if there is a failure with the hub it must be replaced as a unit.

FRONT WHEEL HUB and or STEERING KNUCKLE

Note: Vehicles with ABS need the correct front hub check with part numbers in brake specifications.

Remove

1. Jack the front wheel concerned up, removed wheel trim, wheel nuts and wheel.



2. Remove the front brake caliper bracket attaching bolts, lift the caliper off the disc and tie the caliper up. Do not leave the caliper hanging by the brake fluid hose, as this will cause possible hose damage.

3. Take care and slide the front disc off the axle hub.

4. If ABS is fitted to the vehicle use a 5mm allen key to remove lock screw, gently pull the the ABS sensor unit out.

5. If necessary remove the brake back plate, this is attached by 3 bolts around the diameter of the plate to the steering knuckle.

6. Remove the 3 wheel hub to steering knuckle attaching bolts, use a 10mm allen key, if hub is hard to remove replace bolts and tap bolts with hammer top loosen.

7. Remove the two bolts attaching steering knuckle to the front strut, remove the steering knuckle.

Install

1. Install the steering knuckle and the two bolts attaching steering knuckle to the front strut, tighten the new bolts to specified torque.

Steering Knuckle to Front Strut Bolt Torque:

Step 1 85Nm

Step 2 170Nm

Step 3 Plus 30°-45° Turn

2. If necessary replace the brake back plate, tighten the 3 bolts around the diameter of the plate to the steering knuckle, to specification.

Brake Back Plate to Hub Bolt Specified Torque: 6-14Nm

3. Apply specified sealant to hub to knuckle contact surface.

Specified Sealant Hub to Knuckle Surface: Loctite 515

4. Install the hub to the steering knuckle. Replace the 3 wheel hub to steering knuckle attaching bolts, use a 10mm allen key, tighten to specification.

Note: If ABS fitted align the steering knuckle hole with the sensor connection on hub during assembly of hub.

Hub to Steering Knuckle Allen Head Bolts Torque: 120-140Nm

5. If ABS is fitted to the vehicle push sensor unit into place and use a 5mm allen key to replace lock screw.

6. Take care and fit the front disc onto the axle hub.

7. Install front brake caliper, lift the caliper over the disc. Install calliper attaching bolts and tighten to specification.

Front Brake Calliper Attaching Bolts Torque: 80-90 plus 45° turn

8. Install the wheel and tighten the wheel nuts.

9. Spin wheel to check that the wheel spins freely.

10. Lower front of wheel and tighten to specification.

Wheel Attaching Nut torque specification: 100-125Nm

Major Maintenance

Stabilizer Bar Centre Insulators (Front or Rear Bar)

Remove

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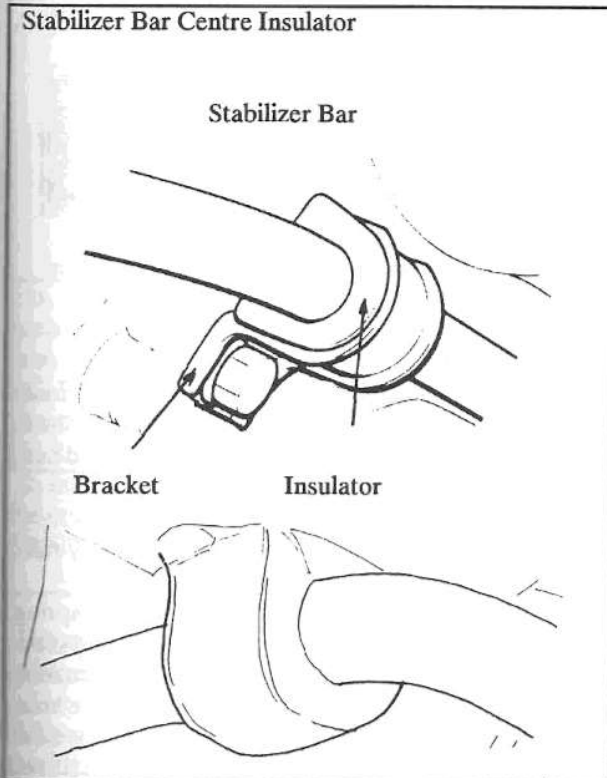
Remove the hardware and brackets attaching the centre section of the stabilizer bar. Remove the insulators from the bar.

Install

1. Position the insulators on the stabilizer bar. Make sure that the links on each end of the bar are located at approx. the same angle relative to the centre line of the vehicle and install the attaching brackets, tighten nuts to specification.

Stabilizer Centre Insulator Bracket Nuts & Bolts

Stabilizer Bar Centre Insulator



specified torque: 24-30Nm

2. Lower the vehicle.

Stabilizer Bar Link Insulators**Remove**

Raise vehicle on a hoist positioning the suspension in the curb load position. Remove the nut, washers, insulators and link bolt attaching the ends of the stabilizer bar.

Install

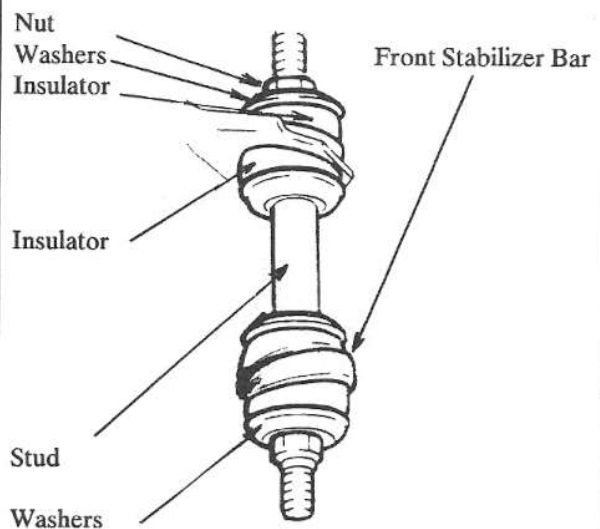
Install the bolt, washers, insulators, spacer and nut as illustrated. Make sure that the insulators are correctly located in the respective mounting holes. Lower vehicle.

Stabiliser Bar - Front or Rear**Remove**

Raise the vehicle with the suspension in the curb load attitude. Disconnect the stabilizer bar from each link. Remove both stabilizer bar retaining brackets, and remove the stabilizer bar.

Install

Front Stabilizer Bar



Place the bar in position and install the retaining brackets and the links. Make sure that the insulators on the link are correctly in their respective mounting holes. Tighten the nuts to specification.

Stabilizer Bar Nut specified torque: 13-16Nm

FRONT LOWER CONTROL ARM ASSEMBLY**Remove Lower Control Arm Assembly**

1. Raise the vehicle and support it under the body rails. Then remove the wheel.
2. Disconnect the tension bar rod from the lower arm.
3. Remove the ball joint split pin and nut.
4. Remove the nut and bolt from the inside of the control arm at the crossmember and free lower control arm.
5. Free the control arm from the axle spindle, use a small press and hit with a hammer on the lower control arm. This will force the ball joint from the axle hub assembly.

Replace Lower Control Arm Inside Bushes

Press the bush from the rear side of the control arm.

Fit a new bush, do not lubricate the bush. Press the bush into the control arm until it is correctly pushed into place.

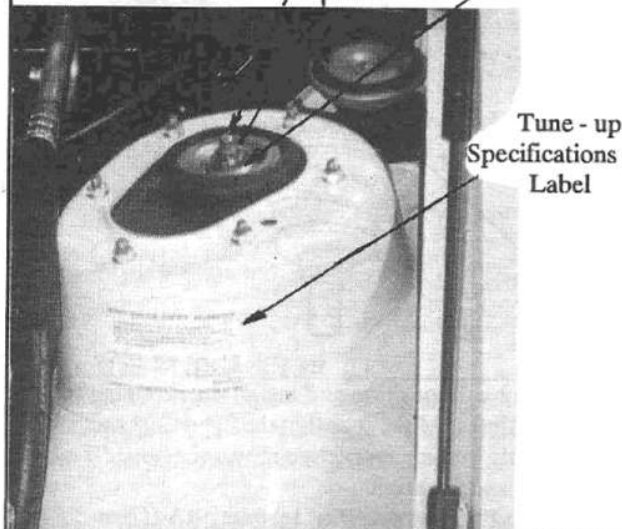
Replace Lower Control Arm Ball Joint.

* This maintenance work can be carried out with lower control arm either installed on the vehicle or removed from the vehicle.

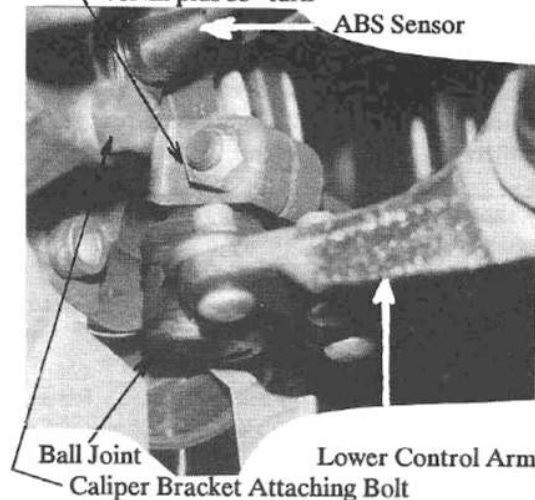
1. Remove the ball joint by supporting the control arm either on a bench or if the arm is installed to the vehicle, with a block of wood.
2. If arm removed hold in a vice or arm on vehicle support on block of wood.
3. Remove 3 rivet collar with a angle grinder or cold chisel, if the ball joint has previously been replaced, remove the 3 bolts and nuts.
4. Remove the ball joint unit.

VR Front Suspension Tower

Top Plate Attaching Nuts
Burgular Alarm horn
Strut Top Shaft Thread
Strut Top Nut
Strut Top Washer



Lower Suspension Arm Ball Joint
Clamp Bolt to Steering Knuckle:
70Nm plus 35° turn

**Ball Joint Removal**

Remove 3 rivet collar with a angle grinder or cold chisel, if the ball joint has previously been replaced, remove the 3 bolts and nuts.

5. Clean the control arm where the ball joint was located.
6. Install a new ball joint to the lower control arm, use bolts and nuts that are supplied with ball joint, tight to specification.

Ball Joint Attaching Bolts Torque: 25-35Nm

Replace Lower Control Arm Tension Rod Bush

1. Press the lower control arm tension rod bush from the control arm, clean the bush hole if there is any of the old bush present.
2. Lubricate the new bush with warm soapy water.
3. Press the new bush into position from the rear of the lower control arm.

Note: Larger ID bush hole to front.

Install Lower Control Arm Assembly

1. Install the lower control arm to the crossmember, install bolt and new nut, tighten a little over finger tight.
2. Install the ball joint into the steering knuckle assembly, use a new nut, tighten to specification.

Lower Control Arm Ball Joint nut spec torque: 70Nm plus 30°-40° turn

3. Install tension rod to lower control arm and fit washer and nut, tighten to specification.

Tension Rod Nut specified torque: 95-110Nm

4. Install wheel, lower vehicle and tighten wheel nuts to specification.

Wheel Nuts specified torque: 100-125Nm

5. Tighten the inside bolt of the lower control arm (at crossmember) to specification.

Lower Control Arm Inside nut spec torque: 95-110Nm

Strut Suspension Unit**Remove**

1. Raise the vehicle and support under the body rails, remove the wheel.
2. Fit a spring compression tool to the front spring, compress so that there is no pressure on the top end plate.
3. Remove the brake caliper from the steering knuckle and suspend it so that there is no strain on the brake hose.
4. Loosen the tie rod end nut and using a taper breaker free the stud taper. Remove the nut and detach the tie rod end from the spindle.
5. Remove the ABS if fitted loom from the bracket on the strut. Remove the brake hose from the strut, turn plastic clip section, slides out of bracket cut away section.
6. Remove the nut from the stabilizer arm stud, remove the bushes, washers and the stabilizer arm stud from the strut bracket.
7. Loosen the nut on the steering knuckle clamp bolt, which holds the lower arm ball joint to the steering knuckle.

(If the ball joint needs replacing use a cold chisel to remove the top 3 rivet heads, replace with 3 bolts and nuts included in ball joint kit and tighten to specification of 25-35Nm)

8. Remove the two bolts attaching the lower section of the strut to the steering knuckle, lower the steering knuckle and lower control arm from the strut.

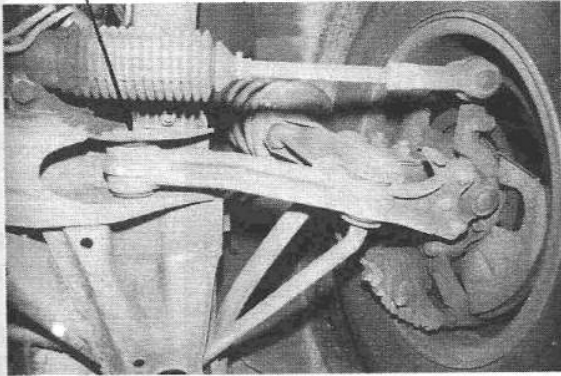
9. Lower the strut suspension unit down and away from the strut tower and away from the vehicle

10. Disconnect the tension bar rod from the lower arm.

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Remove the nut and bolt from the inside of the control arm at the crossmember and free lower control arm.

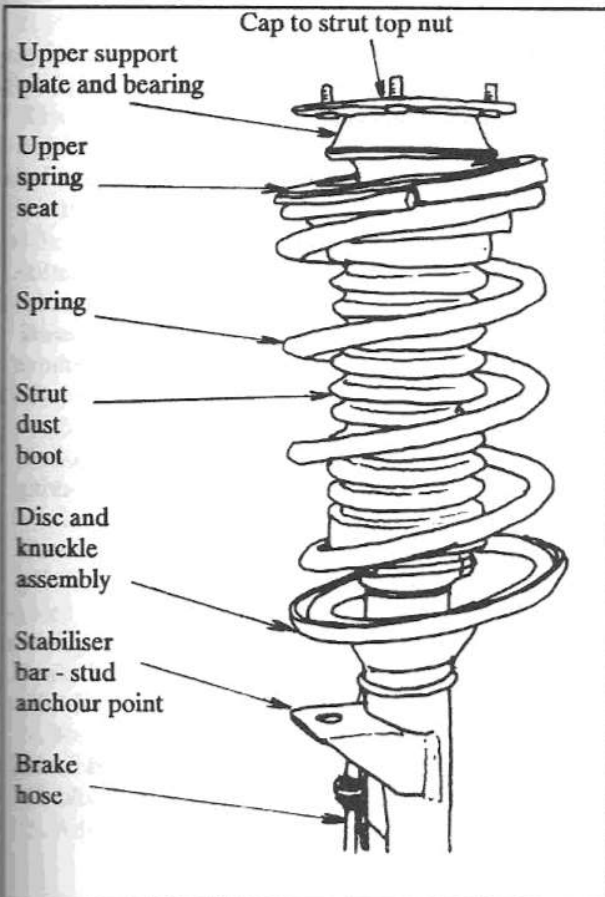


11. Remove the nut and bolt from the inside of the control arm at the crossmember and free lower control arm.

12. Lower the suspension unit assembly from the vehicle.

Install

1. Raise the vehicle and support it under the body rails.
2. Install the lower control arm and steering knuckle to the crossmember, install bolt and nut, tighten a little over finger tight.



3. Install the strut assembly with front spring compression tool fitted to the spring on the strut.

4. Fit the top end of the strut into the opening at the top of the spring tower.

5. Raise the steering knuckle and lower control arm to the strut. Replace the two bolts attaching the lower section of the strut to the steering knuckle, tighten to specification.

Lower Strut to Steering Knuckle Bolt Torque:

Step One: 85Nm

Step Two: 170Nm Plus 40° Turn

6. (If the ball joint needs replacing use a cold chisel to remove the top 3 rivet heads, replace with 3 bolts and nuts included in ball joint kit and tighten to specification of 25-35Nm)

7. Tighten the nut on the steering knuckle clamp bolt, which holds the lower arm ball joint to the steering knuckle, tighten to specification.

Lower Suspension Arm Ball Joint Clamp Bolt to Steering Knuckle: 70Nm plus 35° turn

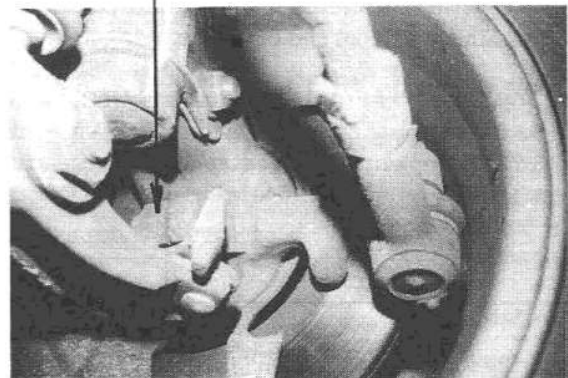
8. Tighten the inside bolt of the lower control arm (at crossmember) to specification.

Lower Control Arm Inside Nut spec torque: 95-110Nm

9. Install tension rod to lower control arm and fit washer and nut, tighten to specification.

Tension Rod Nut specified torque: 95-110Nm

Tighten the lower control arm ball joint nut to specification and fit split pin.



10. Replace the stabilizer arm stud to the strut bracket, fitting the washers, bushes and nut, tighten the nut to specification.

Stabilizer Bar Nut specified torque: 7-10Nm

11. Install the tie rod end to the steering knuckle, install the nut and tighten to specification, fit split pin.

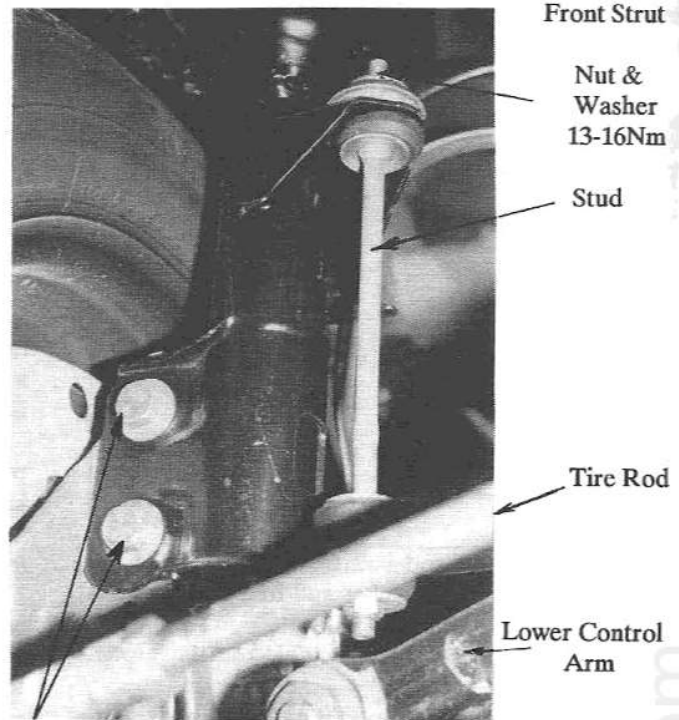
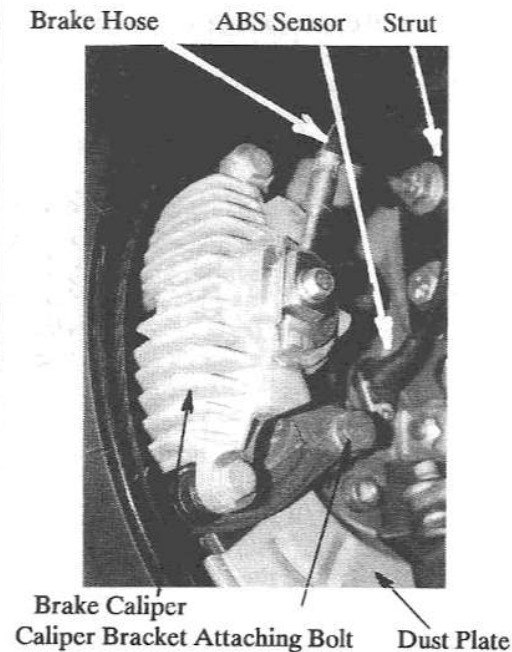
Tie Rod to Steering Knuckle Nut spec torque: 60-70Nm

12. Connect the brake fluid hose to the brake caliper, tighten to specification. Bleed Brake system as described in Brake chapter.

Brake Hose to Caliper bolt: 32-37Nm

13. Remove the spring compression tool.

Front Suspension



Steering Knuckle to Front Strut Bolt Torque:
Step 1 85Nm, Step 2 170Nm, Step 3 Plus 30°-45° Turn

14. Replace wheel to hub, tighten nuts, lower vehicle, tighten wheel nuts to specification and road test vehicle.

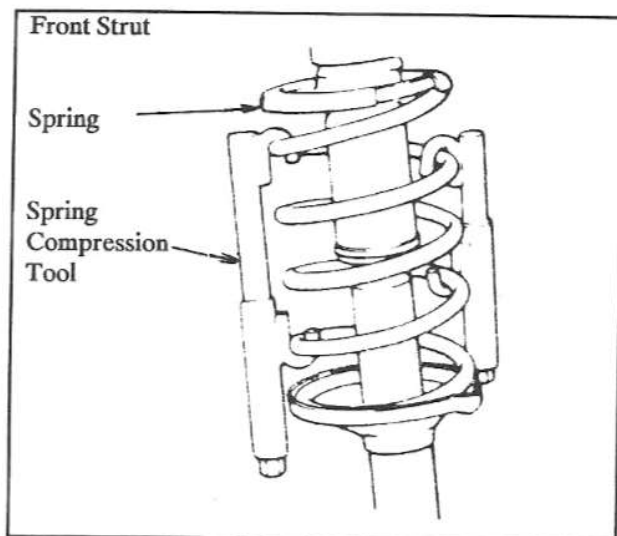
Wheel Nuts specified torque: 100-125Nm

15. Adjustment of front end of vehicle.

Strut Top Bearing / Front Spring / Strut Housing.

* Note the complete assembly does not have to be dismantled, if the top bearing or front spring need replacing, only carry out the work needed to achieve the replacement of the faulty part

Dismantle



1. Raise the vehicle and support under the body rails, remove the wheel.

2. Fit a spring compression tool to the front spring, compress so that there is no pressure on the top end plate.

3. Remove the brake caliper from the steering knuckle and suspend it so that there is no strain on the brake hose.

4. Loosen the tie rod end nut and using a taper breaker free the stud taper. Remove the nut and detach the tie rod end from the spindle.

5. Remove the ABS if fitted loom from the bracket on the strut. Remove the brake hose from the strut, turn plastic clip section, slides out of bracket cut away section.

6. Remove the nut from the stabilizer arm stud, remove the bushes, washers and the stabilizer arm stud from the strut bracket.

7. Loosen the nut on the steering knuckle clamp bolt, which holds the lower arm ball joint to the steering knuckle.

8. Remove the two bolts attaching the lower section of the strut to the steering knuckle, lower the steering knuckle and lower control arm from the strut.

9. Lower the strut suspension unit down and away from the strut tower.

10. Remove the upper bearing and spring as required.

Assemble and Install

1. Replace the strut dust boot over the shaft and fit the dust boot retaining strap to the top of the strut. Hold the

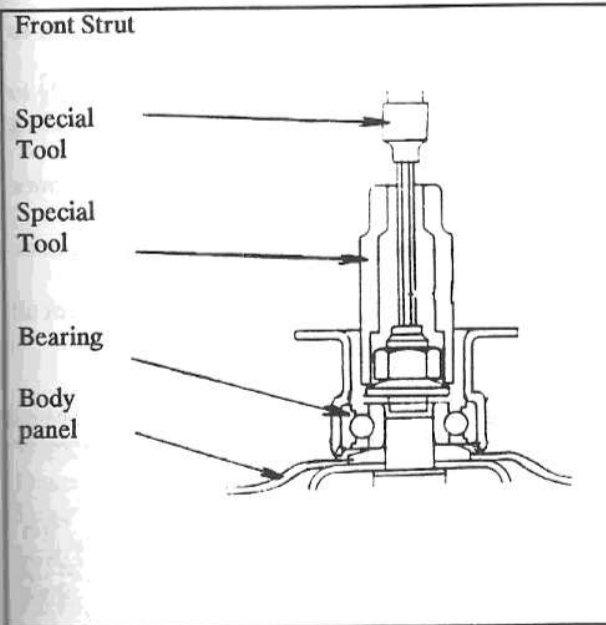
shaft up by loosely fitting the old top end locking nut, this will stop the shaft top from sliding down into the dust boot.

2. Replace the front spring and fit the spring compression tool with care.

3. Install the top end plate and bearing assembly.

4. Repace the old top end nut and install insulator, top spring plate and small sealing plate.

5. Install top bearing, washer and nut.



6. Hold the strut shaft (do not clamp the seal area of the shaft) with a special tool or a 10mm ring spanner and tighten the top end to specification.

Top Bearing Retaining Nut Specified Torque: 50-60Nm

7. Install the strut assembly with front spring compression tool fitted to the spring on the strut.

8. Fit the top end of the strut into the opening at the top of the spring tower.

9. Install tension rod to lower control arm and fit washer and nut, tighten to specification.

Tension Rod Nut specified torque: 95-110Nm

10. Replace the stabilizer arm stud to the strut bracket, fitting the washers, bushes and nut, tighten the nut to specification.

Stabilizer Bar Nut specified torque: 7-10Nm

11. Install the tie rod end to the steering knuckle, install the nut and tighten to specification, fit split pin.

Tie Rod to Steering Knuckle Nut spec torque: 60-70Nm

12. Connect the brake fluid hose to the brake caliper, tighten to specification. Bleed Brake system as described in Brake chapter.

Brake Hose to Caliper bolt: 32-37Nm

13. Remove the spring compression tool.

14. Replace wheel to hub, tighten nuts, lower vehicle, tighten wheel nuts to specification and road test vehicle.

Wheel Nuts specified torque: 100-125Nm

15. Adjustment of front end of vehicle.

Front Hub

Remove

1. Remove the caliper assembly as described above.

There is no need to disconnect the brake hose, if the caliper does not require servicing. Place the caliper out of the way, and support it with a wire to avoid damaging the caliper or the hose.

2. Lift the brake disc from the front hub.

3. Remove the front hub from the steering knuckle, attached by 3 Allen head bolts.

4. Remove the disc shield from the front hub, attached by 3 bolts.

Install

1. Install the disc shield to the front hub, attached by 3 bolts, tighten to specification.

Disc Shield to Front Hub Bolt Torque: 9-14Nm

2. Install the front hub to the steering knuckle, attached by 3 Allen head bolts, tighten to specification.

Front Hub to Steering Knuckle bolt Torque: 120-140Nm

3. Install the brake disc onto the front hub.

4. Install the caliper assembly as described above.

Front Caliper Attaching Bolts: 80-90Nm + 45° turn

PROBLEM DIAGNOSIS

Problem: Wanders/pulls !

Possible Causes & Remedies:

* Tyres worn or improperly inflated. Remedy- Replace tyre or inflate tyres to proper pressure.

* Wheel alignment incorrect. Remedy- Inspect front wheel alignment.

* Front or rear suspension parts loose or broken. Remedy- Tighten or replace suspension parts.

* Steering linkage loose or worn. Remedy-Tighten or replace steering linkage.

* Steering gear out of adjustment or broken. Remedy- Adjust or repair steering gear.

Problem: Bottoming !

Possible Causes & Remedies:

* Vehicle overloaded. Remedy-Inspect loading.

* Shock absorber worn out. Remedy-Replace shock absorber.

* Springs weak. Remedy-Replace spring.

Problem: Sways/pitches !

Possible Causes & Remedies:

* Tyres improperly inflated. Remedy-Inflate tyres to proper pressure.

* Stabiliser bar bent or broken. Remedy-Examine stabiliser bar.

* Shock absorber worn out. Remedy-Replace shock absorber.

Problem: Front Wheel Vibrations I**Possible Causes & Remedies:**

- * Tyres worn or improperly inflated. Remedy-Replace or inflate tyres to correct pressure.
- * Wheels out of balance. Remedy-Balance wheels.
- * Shock absorber worn out. Remedy-Replace shock absorber.
- * Wheel alignment incorrect. Remedy-Inspect front wheel alignment.
- * Ball joints or bushings worn. Remedy-Examine ball joints and bushings.
- * Steering linkage loosen or worn. Remedy-Tighten or replace steering linkage.
- * Steering gear out of adjustment or broken. Remedy-Adjust or repair steering gear.

Problem: Abnormal Tyre Wear I**Possible Causes & Remedies:**

- * Tyres improperly inflated. Remedy-Inflate tyres to correct pressure.
- * Shock absorbers worn out. Remedy-Replace shock absorber.
- * Wheel alignment incorrect. Remedy-Check wheel alignment.
- * Suspension parts worn. Remedy-Replace suspension parts.

Problem: Steering Wheel Play I**Possible Causes and Remedies:**

- * Tyres worn or improperly inflated. Remedy- Replace tyre or inflate tyres to proper pressure.
- * Front or rear suspension parts loose or broken. Remedy- Tighten or replace suspension parts.
- * Steering linkage loose or worn. Remedy-Tighten or replace steering linkage.
- * Faulty control arm ball joints.

Problem: Steering hard when braking I**Possible Causes and Remedies:**

- * Tyres improperly inflated. Remedy-Inflate tyres to correct pressure.
- * Front disc buckled. Remedy - Check and machine or replace front discs.
- * Faulty brake pads. Remedy - Replace brake pads.
- * Incorrect front wheel alignment. Remedy - Check front wheel alignment and adjust.
- * Steering rack and pinion not attached correctly to front frame. Remedy - Check all attachments of steering rack and pinion.

Problem: Vehicle pulls to one side I**Possible Causes and Remedies:**

- * Suspension parts worn. Remedy-Replace suspension parts.
- * Wheel alignment incorrect. Remedy-Check wheel alignment.

- * Tyres improperly inflated. Remedy-Inflate tyres to correct pressure.

- * Rear axle alignment incorrect or badly worn components. Remedy - Check rear wheel alignment, rear axle bushes and IRS vehicles check for correct installation of differential centre to crossmember.

Problem: Steering Excessively Heavy**Possible Causes and Remedies:**

- * Tyres improperly inflated. Remedy-Inflate tyres to correct pressure.
- * Steering rack and pinion not attached correctly to front frame. Remedy - Check all attachments of steering rack and pinion.
- * Power Steering Unit faulty. Remedy- Check power system unit and pressure test power steering system.
- * Power Steering fluid low. Remedy- Top-up power steering fluid reservoir.
- * Steering damaged due to accident. Remedy- Check all components of steering and front suspension.

SPECIFICATIONS

Wheel Alignment

Toe-in (Deg total) 0deg. 20min +/- 0 deg. 5min

Toe-in (mm total) 2.0mm +/- 1.0mm

Caster at kerb weight 5deg.0min +/- 30min

Camber:

Standard Suspension-minus 0deg12min +/- 0 deg 12min

FE2 Suspension-minus- 0deg48min +/- 0 deg 12min

V5W Suspension-minus- 0deg0min +/- 0 deg 12min

Utility Suspension-minus- 0deg0min +/- 0 deg 12min

Torque Specifications Nm

Top Bearing Retaining Nut Specified Torque: 50-60Nm

Strutto Spring Tower Nuts specified torque: 24-30Nm

Tie Rod to Steering Knuckle Nut spec. torque: 60-70Nm

Stabilizer Bar Stud Nut specified torque: 7-10Nm

Brake Hose to Caliper bolt: 32-37Nm

Lower Control Arm Inside nut spec torque: 95-110Nm

Lower Control Arm Ball Joint Clamp Nut to Steering Knuckle: 70Nm + 35° turn

Ball Joint Attaching Bolts Torque: 25-35Nm

Stabilizer Centre Insulator Bracket Nuts & Bolts specified torque: 24-30Nm

Stabilizer Bar Nut specified torque: 13-16Nm

Hub to Steering Knuckle Allen Head Bolts Torque: 120-140Nm

Front Brake Calliper Attaching Bolts: 80-90 + 45° turn

Strut To Front Hub/Knuckle Bolt Torque:

Step One: 85Nm

Step Two: 170Nm Plus 40° Turn

Road Wheels Nuts specified torque: 100-125Nm