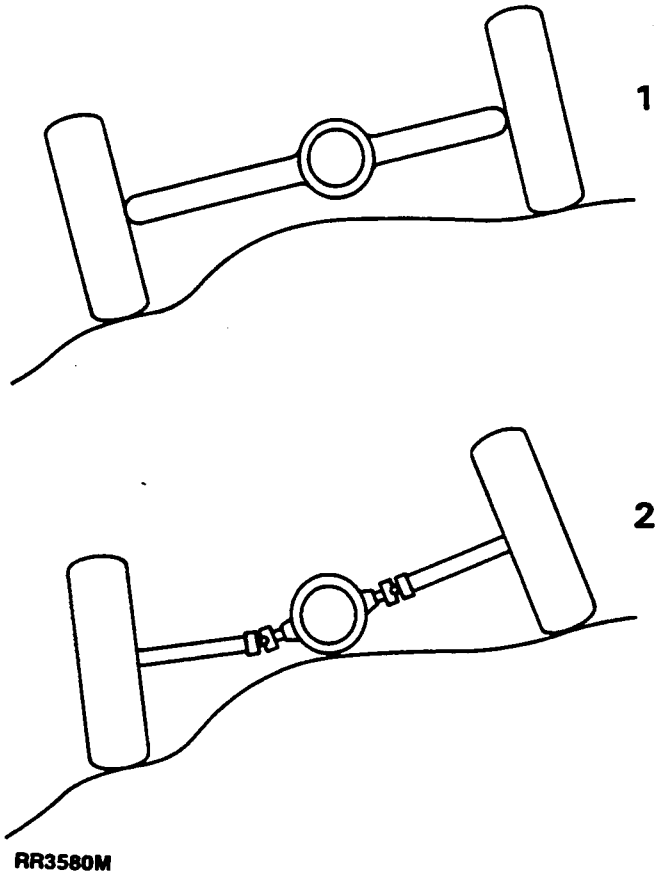
INTRODUCTION

Suspension design is a major factor in determining the comfort, safety and performance of any vehicle, but is particularly significant to 4 wheel drive cross country vehicles. The ideal suspension must allow maximum wheel travel and axle articulation, and provide good ground clearance without loss of traction or directional stability.

A well designed beam axle layout can embrace all of these qualities and also has the inherent advantage (over independent systems) of no variation in wheel track or camber angle.



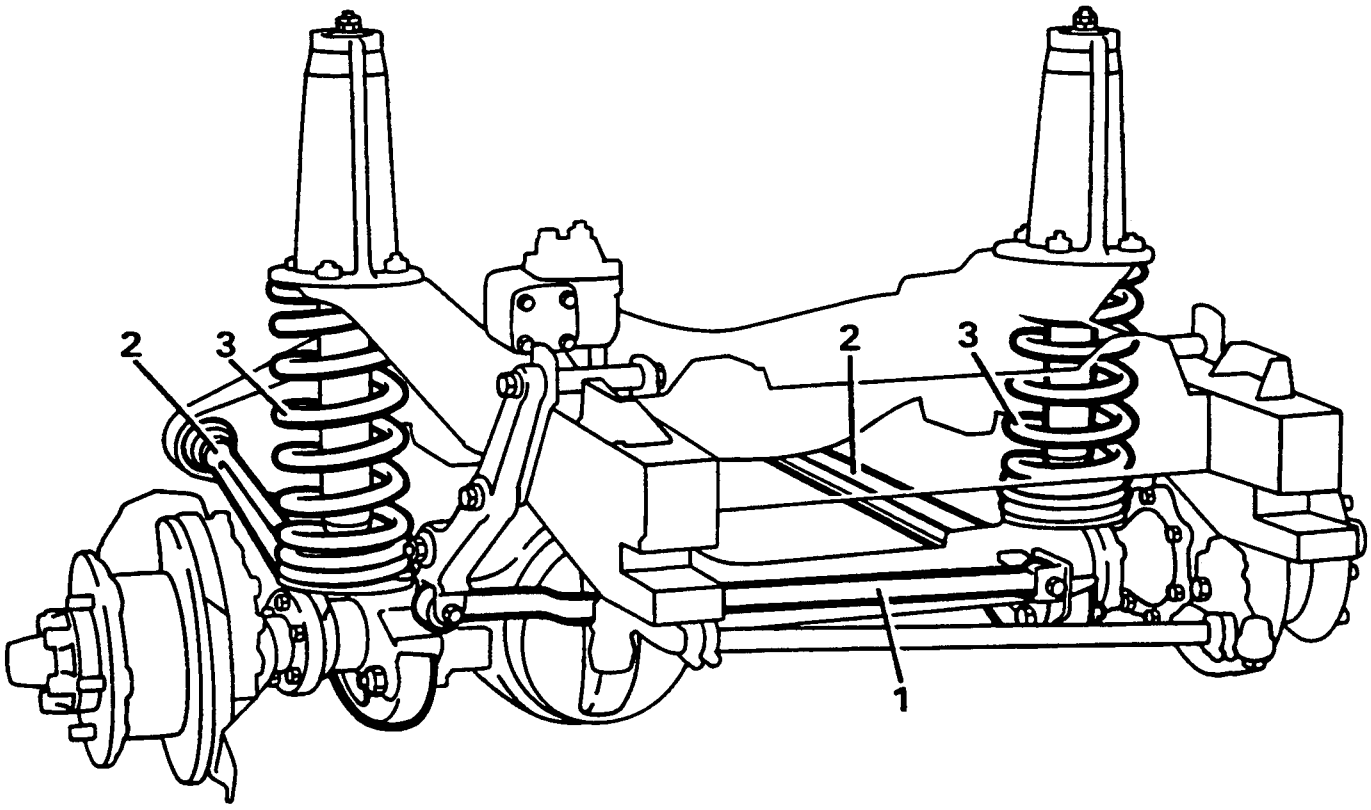
RR3580M

Suspension comparison

1. Beam axle system
2. Independent system

AXLE LOCATION

The front axle is controlled fore and aft, by two forged steel radius arms and transversely by a panhard rod.



RR3581M

Front axle suspension

1. Panhard rod - transverse location
2. Radius arms - fore aft location
3. Coil springs

Long travel coil springs and hydraulic shock absorbers, provide the springing for each wheel.

SELF LOCKING NUTS

WARNING: Where self locking nuts are removed, they must be replaced with new nuts of same specification.

PANHARD ROD

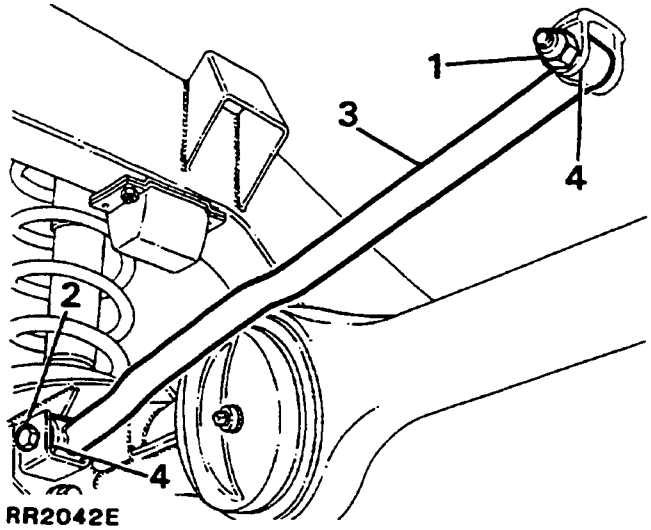
Service repair no - 60. 10. 07.

Remove and refit

Remove

WARNING: Air suspension vehicles: Depressurise system before commencing work, ***See AIR SUSPENSION, Repair, Depressurise system***

1. Remove fixings at mounting arm.
2. Remove fixings at axle bracket.
3. Remove Panhard rod.
4. Press out flexible bushes. Ensure the steel tubing locates on the outer edge of the bush and not on the rubber inner.



RR2042E

Refit

5. Fit replacement bushes.

CAUTION: Apply pressure to outer edge of bush, and not rubber inner.

6. Reverse removal procedure. 1 to 4. Tighten fixings to ***88Nm***

NOTE: Air suspension vehicles: Repressurise system

RADIUS ARM

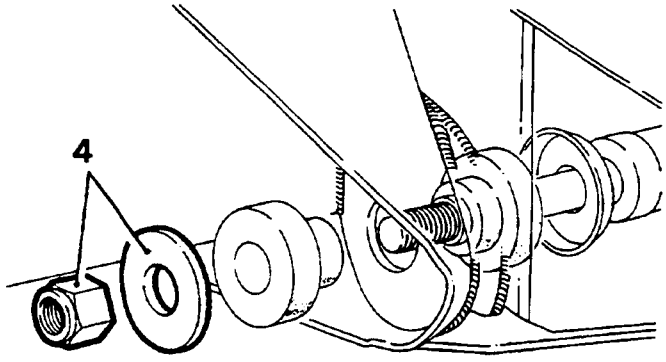
Service repair no - 60.10.16.

Remove and refit

Remove

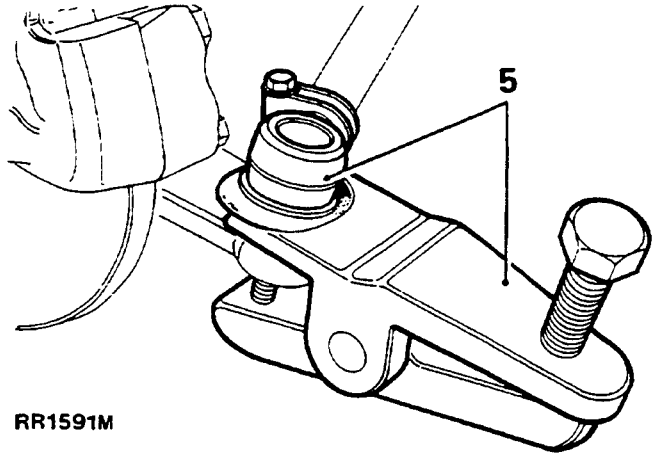
WARNING: Air suspension vehicles: Depressurise system before commencing work, ***See AIR SUSPENSION, Repair, Depressurise system***

1. Loosen road wheel retaining nuts.
2. Raise front of vehicle. Support chassis on stands and remove wheel.
3. Support front axle weight with jack.
4. Remove radius arm to chassis side member fixings.

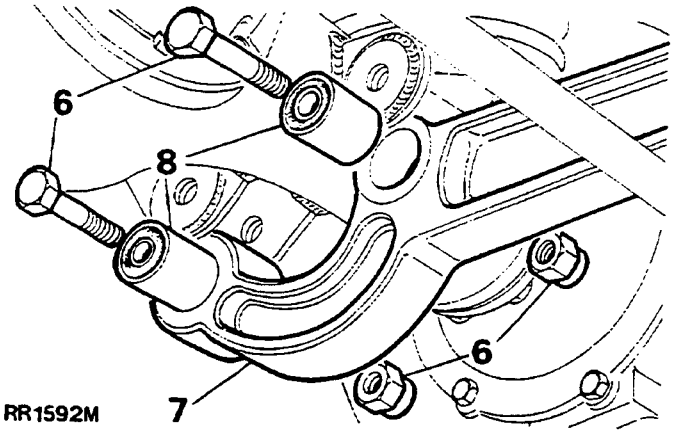


RR983M

5. Disconnect track rod at ball joint.
6. Remove fixings, radius arm to axle.
7. Lower radius arm front end to clear axle and remove from vehicle.



RR1591M



8. Press out flexible bushes.

Refit

9. Press in replacement bushes.

CAUTION: When pressing in new bushes press on outer edge of bush and not rubber inner.

10. Reverse removal procedure. 1 to 7. Tighten fixings to following torques:
Radius arm to chassiss ***176 Nm***
Radius arm to axle ***197 Nm***

NOTE: Air suspension vehicles: Repressurise system

FRONT SHOCK ABSORBER

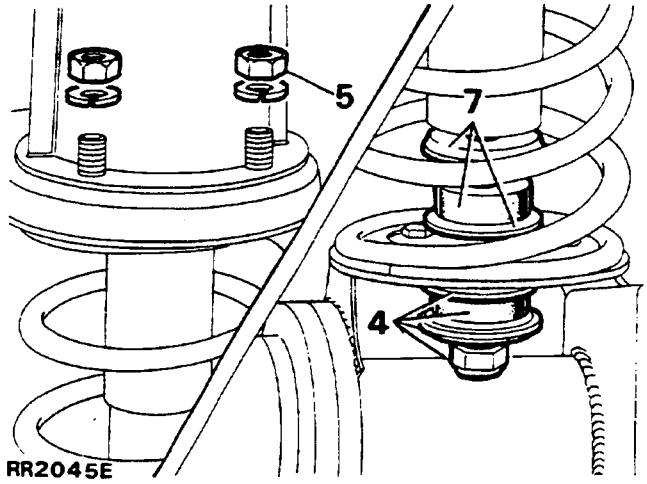
Service repair no - 60.30.02.

NOTE: Air suspension vehicles: *See AIR SUSPENSION, Repair, Front shock absorber*

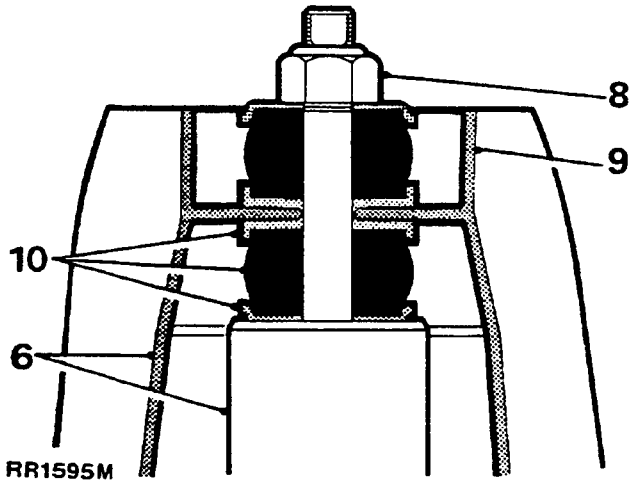
Remove and refit

Remove

1. Loosen road wheel retaining nuts.
2. Support chassis on stands and remove road wheel.
3. Support axle weight with jack.



4. Remove shock absorber lower fixing and withdraw cupwasher, rubber bush and seating washer.
5. Remove four shock absorber bracket fixings.
6. Withdraw shock absorber and bracket complete.



7. Withdraw lower seating washer, rubber bush and cupwasher.
8. Remove fixings, shock absorber to mounting bracket.
9. Withdraw mounting bracket.
10. Lift off top seating washer, rubber bush and cupwasher.

Refit

11. Reverse removal procedure. 1 to 10.

FRONT ROAD SPRING

Service repair no - 60.20.11.

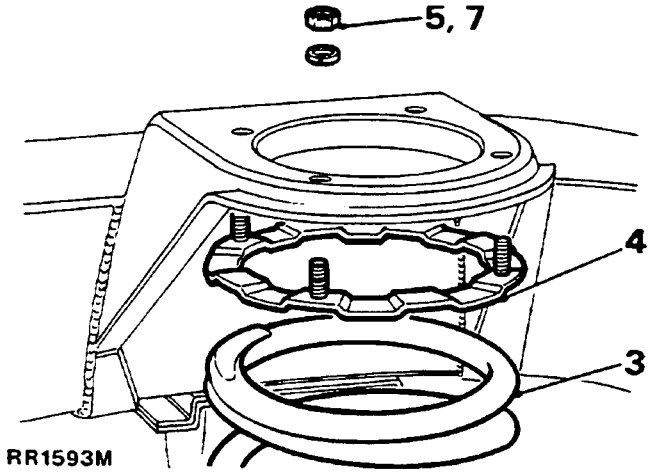
Remove and refit

Remove

1. Remove front shock absorber, ***See Front shock absorber***

⚠ **CAUTION: Avoid over stretching brake hoses. If necessary loosen hose connector locknuts to allow hoses to follow axle.**

2. Lower axle sufficient to free road spring.
3. Withdraw road spring.
4. Withdraw shock absorber bracket securing ring.



Refit

5. Fit shock absorber bracket retaining ring. Retain in position with a nut.
6. Reverse removal procedure. 2 and 3.
7. Remove nut retaining securing ring.
8. Fit front shock absorber.

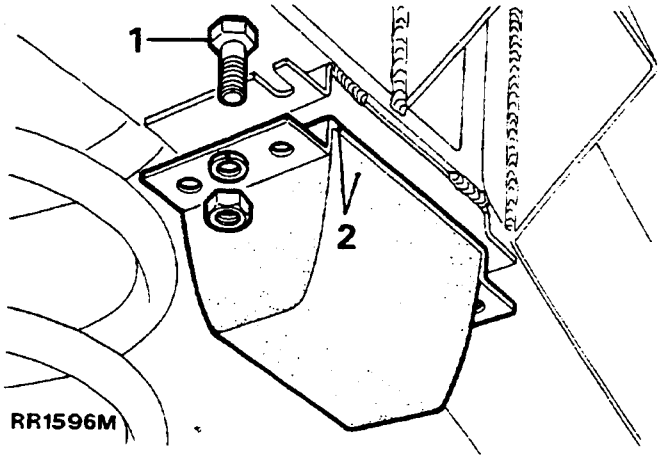
BUMP STOP

Service repair no - 60.30.10.

Remove and refit

Remove

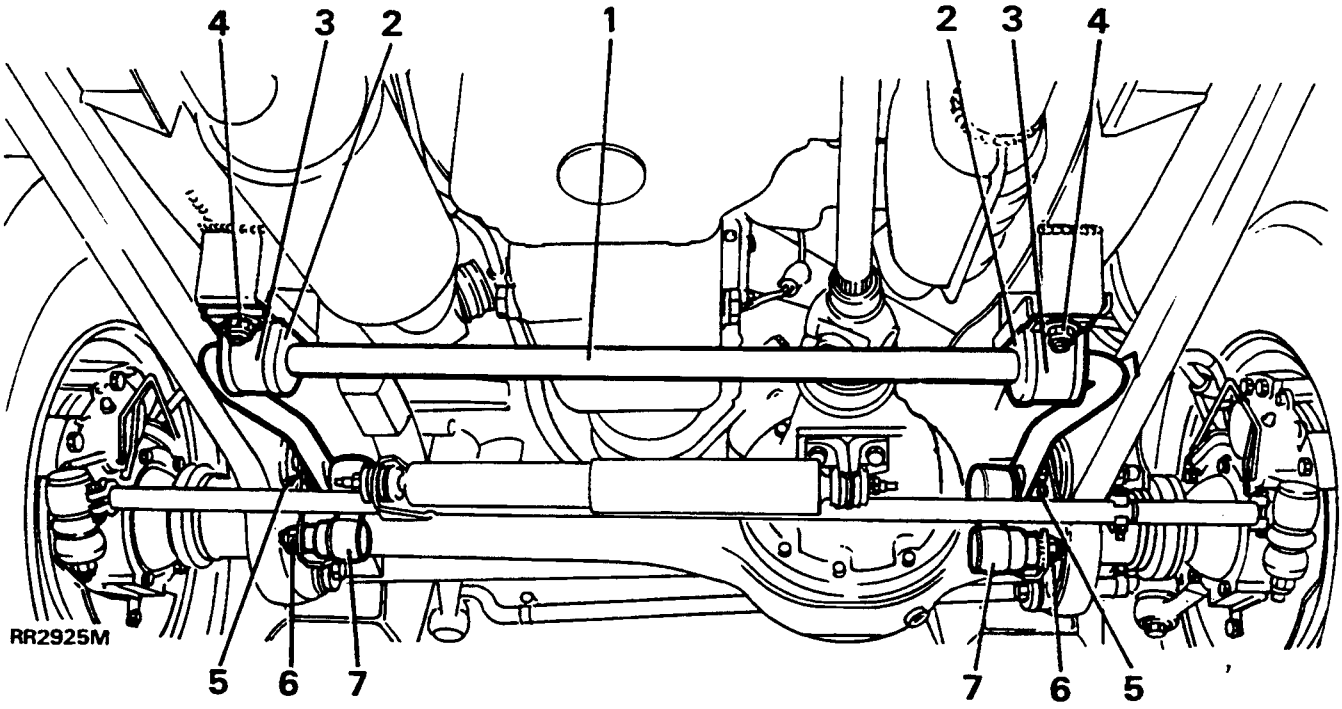
1. Remove fixings.
2. Remove bump stop.



Refit

3. Position bolts in slots in chassis brackets.
4. Fit bump stop, secure with washers and nuts.

ANTI-ROLL BAR ASSEMBLY



KEY

1. Anti-roll bar
2. Rubber bush
3. Strap
4. Nut, bolt, washer
5. Nut and washer
6. Castellated nut and cotter pin
7. Ball joint link arm

ANTI-ROLL BAR FRONT

Service repair no - 60.10.01.

Remove and refit

Remove

1. Mark for reassembly position of rubber bushes on anti-roll bar.
2. Remove four nuts, bolts and washers securing two bush straps.
3. Remove nuts, bolts, washers and rubber bushes from ball joint links and remove anti-roll bar.

Refit

4. Position bushes on anti-roll bar. Ensure split points towards axle.
5. Fit anti-roll bar with two straps. To ensure correct fit angled sides of bar should point down as shown. Loosely fit the bolts, washers and nyloc nuts.
6. Fit bolt, washers and rubber bushes. Using new nuts fit anti-roll bar to ball joint links. Tighten to ***68 Nm.***
7. Tighten nuts securing straps to ***30 Nm***

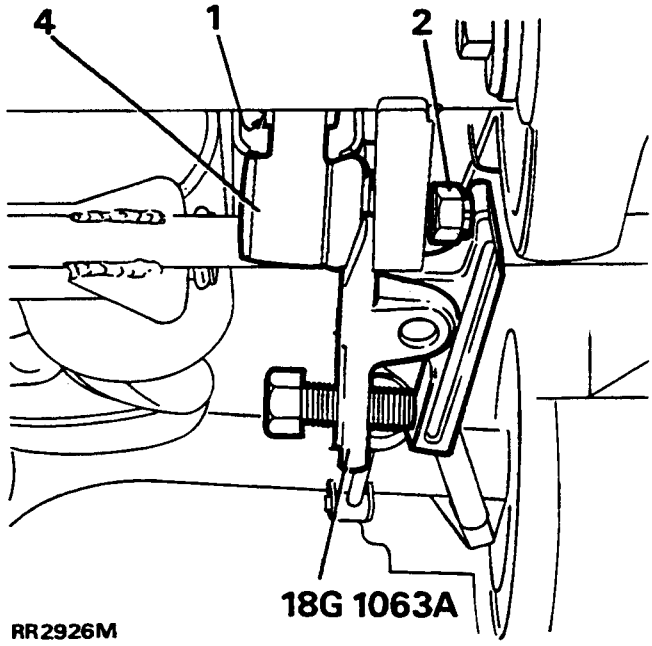
ANTI-ROLL BAR BALL JOINT LINKS

Service repair no - 60.10.04.

Remove and refit

Remove

1. Remove two nuts, bolts, washers and rubber bushes from ball joint links.
2. Remove cotter pin and loosen castellated nut a few turns.
3. Release ball joint using special tool 18G 1063A as shown.
4. Remove castellated nut and ball joint link.



Refit

5. Fit ball joint link and castellated nut. Ensure ball joint link arm points up. Tighten to ***40 Nm*** and fit new cotter pin.
6. Align anti-roll bar to ball joint links.
7. Fit bolts, washers and rubber bushes using new self locking nuts secure anti-roll bar to ball joint links. Tighten to ***68 Nm.***

TORQUE VALUES

NOTE: Torque wrenches should be regularly checked for accuracy to ensure that all fixings are tightened to the correct torque.

	Nm
Anti-roll bar front	
Strap nyloc nuts	30
Ball link self lock nut	68
Castellated nut	40
Drag link to axle	40
Securing ring for mounting turret	14
Radius arm to chassis	176
Panhard rod mounting arm to chassis	88
Panhard rod to axle	88
Panhard rod to mounting bracket	88
Tie bar to Panhard rod	110
Radius arm to axle (front only)	197

Torque values below are for all screws and bolts used except for those that are specified otherwise.

	Nm
METRIC	
M5	6
M6	9
M8	25
M10	45
M12	90
M14	105
M16	180
UNC / UNF	
1/4	9
5/16	24
3/8	39
7/16	78
1/2	90
5/8	136