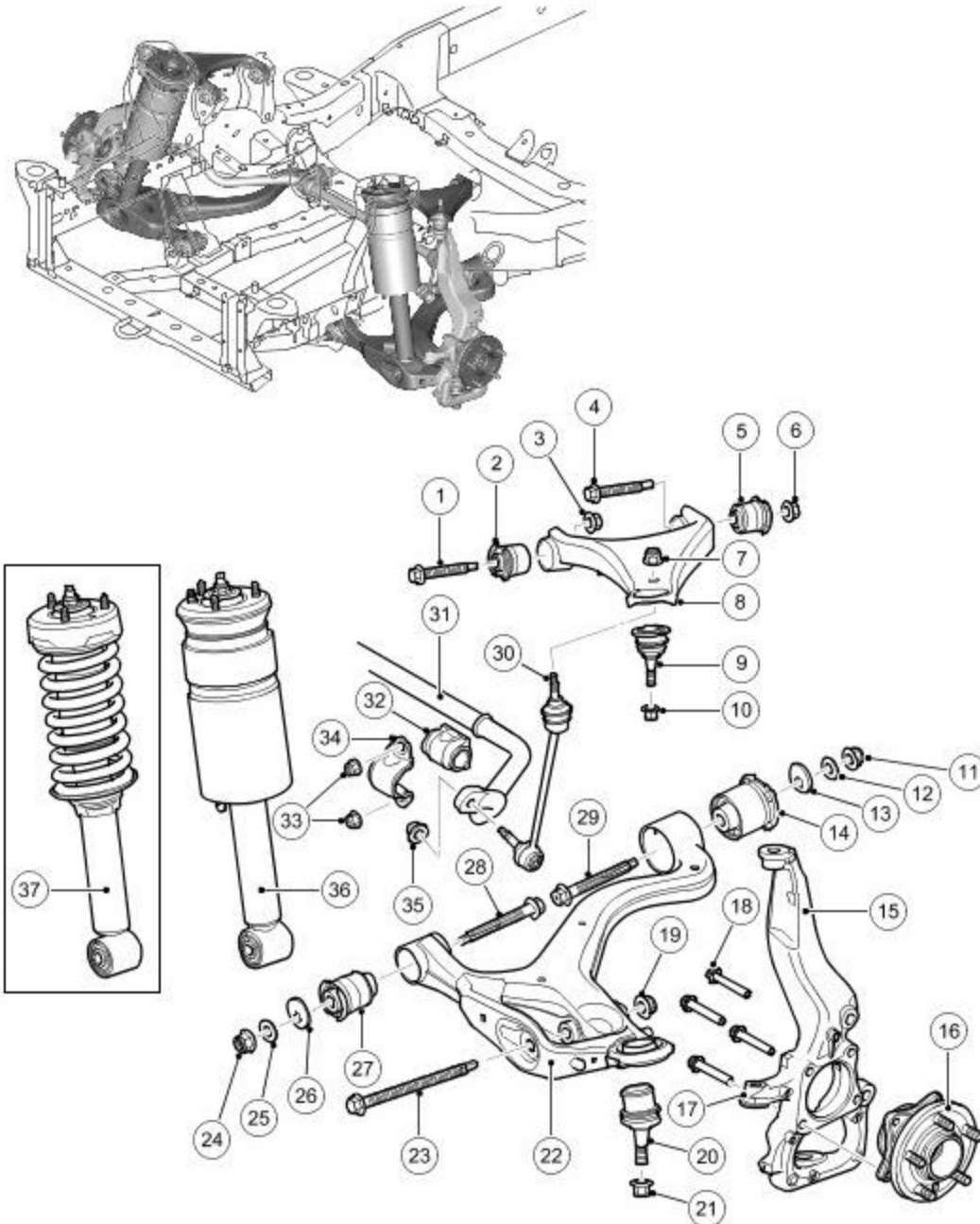


Front Suspension

Front Suspension Component Layout

NOTE:

Air suspension version shown



E45850

Item	Part Number	Description
1	-	Flanged bolt (Upper control arm forward bush)
2	-	Bush - forward (Upper control arm)
3	-	Nut (Upper control arm forward bush)
4	-	Flanged bolt (Upper control arm forward bush)

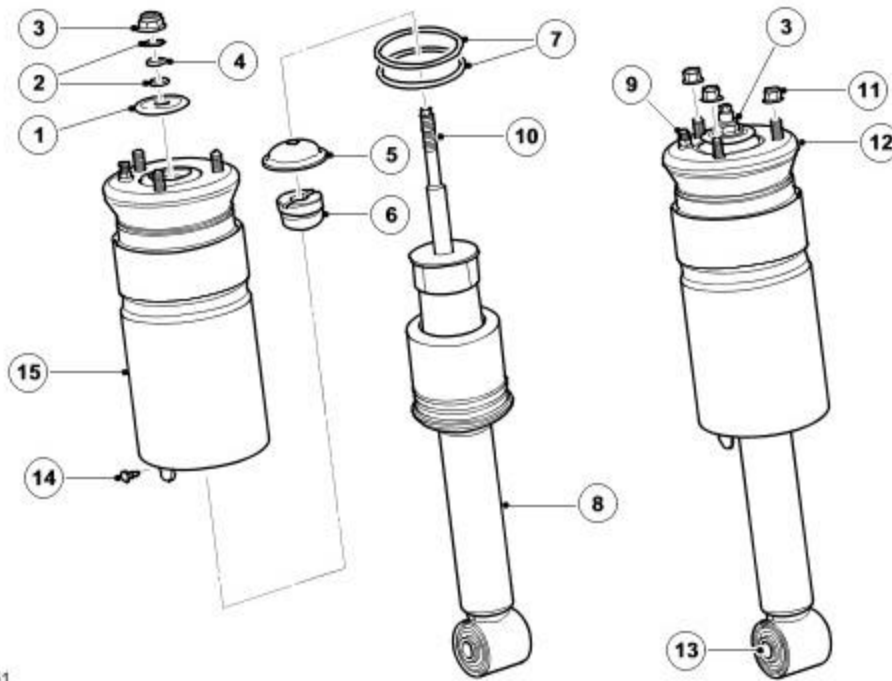
5	-	Bush - rearward (Upper control arm)
6	-	Nut (Upper control arm rearward bush)
7	-	Nut (Anti-roll bar link to upper control arm)
8	-	Upper control arm
9	-	Ball joint (Upper control arm to swivel hub)
10	-	Nut (Ball joint to swivel hub attachment)
11	-	Nut (Lower control arm rearward bush)
12	-	Flat washer
13	-	Cam washer (Lower control arm rearward bush)
14	-	Bush - rearward (lower control arm)
15	-	Wheel knuckle
16	-	Wheel hub and bearing assembly
17	-	Steering rack attachment
18	-	Wheel hub bolt (4 off)
19	-	Nut (Damper assembly lower attachment)
20	-	Ball joint (Lower control arm to swivel hub)
21	-	Nut (Ball joint to swivel hub attachment)
22	-	Lower control arm (air suspension version shown)
23	-	Bolt (Damper assembly lower attachment)
24	-	Nut (Lower control arm forward bush)
25	-	Flat washer
26	-	Cam washer (Lower control arm forward bush)
27	-	Lower control arm forward bush
28	-	Bolt (Lower control arm forward bush)
29	-	Bolt (Lower control arm rearward bush)
30	-	Anti-roll bar link
31	-	Anti-roll bar
32	-	Anti-roll bar bush
33	-	Nut (anti-roll bar bracket)
34	-	Anti-roll bar bracket
35	-	Nut (anti-roll bar link to anti-roll bar)
36	-	Damper assembly (air)
37	-	Damper assembly (coil spring)

GENERAL

The front suspension is a fully independent design which offers a reduction in unsprung weight over the beam axle design fitted to previous Land Rover models. The front suspension comprises an upper control arm, a lower control arm, a wheel knuckle and hub, an anti-roll bar and links assembly and a damper assembly. The damper can have a coil spring or air spring, both damper types use a similar design. The suspension components are common to both coil and air spring versions.

The suspension control arms have been designed for maximum ground clearance and also allow for adjustment of the camber and castor using cam adjusters.

DAMPER MODULE - AIR SUSPENSION



E45851

Item	Part Number	Description
1	-	Rebound washer*
2	-	O-ring - damper rod (2 off)*
3	-	Self-locking nut*
4	-	Spacer - damper rod*
5	-	Bump washer
6	-	Spring aid*
7	-	O-ring - air spring sleeve support (2 off)*
8	-	Damper assembly*
9	-	Voss air fitting
10	-	Damper rod
11	-	Self-locking nut (3 off)
12	-	Top mount
13	-	Bush
14	-	Retaining pin - air spring assembly*
15	-	Air spring assembly*

NOTE:

* shows service items

The damper module comprises an air spring assembly, top mount and a damper assembly. The damper and air spring are only serviceable as complete assemblies.

Damper

The damper assembly is a twin tube design with the conventional coil spring replaced by the air spring. The lower end of the damper is fitted with a bush and is attached to the lower control arm with a bolt and nut.

The damper functions by restricting the flow of hydraulic fluid through internal galleries within the damper. The damper rod moves axially within the damper, its movement limited by the flow of fluid through the galleries, providing damping of undulations in the terrain. The damper rod is sealed at its exit point from the damper body to maintain the fluid within the

unit and to prevent the ingress of dirt and moisture. The seal also incorporates a wiper to keep the rod clean.

Air Spring

The air spring comprises an aluminium restraining cylinder, top mount, spring aid, air sleeve and an inner support sleeve.

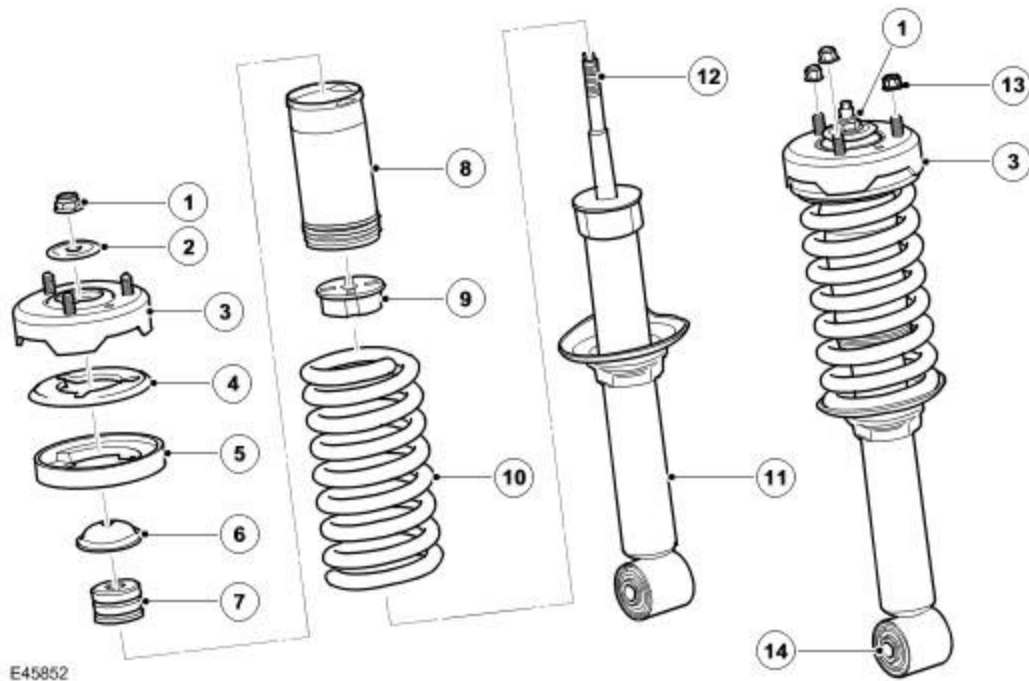
The air sleeve is made from a flexible rubber material which allows the sleeve to roll up and down the air spring piston as the vehicle changes height. The air sleeve is attached to the restraining cylinder and support sleeve by crimp rings which provide an air tight seal. The support sleeve contains a seal carrier which has two O-rings sealing the support sleeve and two O-rings sealing to the damper body. The top of the air sleeve is crimped to the top mount which attaches to the body inner wing with 3 integral studs and self-locking nuts.

A spring aid is fitted to the damper rod and prevents the top mount contacting the top of the damper during full suspension compression and assists the suspension tune. The lower end of the air spring is located over the damper body and seats on a fabricated seat on the damper body. The air sleeve is positively attached to the seat with a retaining pin. The damper rod is located through a central hole in the top mount. The rod is threaded at its outer end. A self-locking nut secures the air spring to the damper rod.

The top mount is an integral part of the air spring and is fitted with a bush and rebound washer which are located between the top mount plate and the damper rod. The top mount is secured to the damper rod with a self-locking nut. The top mount attaches to a housing on the chassis with 3 integral studs and self-locking nuts. The top mount also incorporates a 6 mm Voss air fitting which allows for the attachment of the air harness.

A gaitor is available as a dealer fit component. The gaitor is similar to the one fitted to the rear air damper module and is available if a customer experiences dirt and debris becoming trapped between the air sleeve and the restraining cylinder under certain terrain conditions.

DAMPER MODULE - COIL SPRING SUSPENSION



Item	Part Number	Description
1	-	Self locking nut
2	-	Rebound washer
3	-	Top mount assembly
4	-	Spring spacer (selective)
5	-	Spring isolator

6	-	Bump washer
7	-	Spring aid
8	-	Dust tube
9	-	Bump cup
10	-	Coil spring
11	-	Damper
12	-	Damper rod
13	-	Self locking nut (3 off)
14	-	Bush

The coil spring damper module comprises a damper, coil spring and top mount.

Damper

The damper assembly is a twin tube design with the conventional coil spring located on a welded spring seat on the damper tube. The lower end of the damper is fitted with a bush and is attached to the lower control arm with a bolt and nut.

The damper functions by restricting the flow of hydraulic fluid through internal galleries within the damper. The damper rod moves axially within the damper, its movement limited by the flow of fluid through the galleries, providing damping of undulations in the terrain. The damper rod is sealed at its exit point from the damper body to maintain the fluid within the unit and to prevent the ingress of dirt and moisture. The seal also incorporates a wiper to keep the rod clean.

The damper rod is located through a central hole in the top mount. The rod is threaded at its outer end. A self-locking nut secures the top mount to the damper rod.

A spring aid is fitted to the damper rod and prevents the top mount contacting the top of the damper during full suspension compression and also assists the suspension tune.

Spring and Top Mount

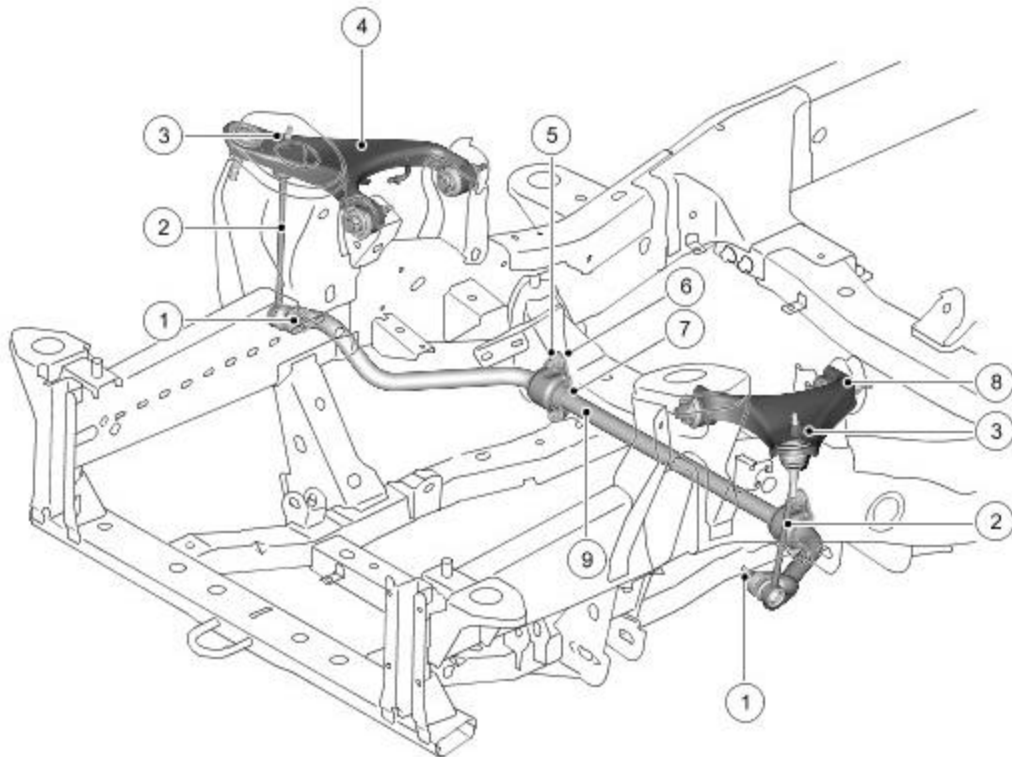
The coil spring fitted differs with vehicle specification. Each spring is colour coded to identify its rating and fitment requirements.

The coil spring is located in a spring seat which is an integral part of the damper body. The design of the spring seat prevents the spring rotating. The opposite end of the coil spring is located in a spring isolator which is fitted in the top mount. The spring isolator is made from rubber and prevents any noise produced during damper and spring compression/extension from being transmitted to the vehicle body.

The top mount is fitted with a bush and rebound washer which are located between the top mount plate and the damper rod, a self locking nut secures the damper rod to the top mount. The top mount attaches to a housing on the chassis with 3 integral studs and self-locking nuts.

The spring is fitted with spring spacers which are located between the spring isolator and the top mount. The spring spacers control the length of the spring to maintain the correct trim height. The spring spacers are colour coded and are supplied with a replacement spring.

ANTI-ROLL BAR



E45853

Item	Part Number	Description
1	-	Nut - link to anti-roll bar (2 off)
2	-	Link (2 off)
3	-	Nut - link to upper control arm (2 off)
4	-	RH upper control arm
5	-	Nut (4 off)
6	-	Bracket (2 off)
7	-	Bush (2 off)
8	-	LH upper control arm
9	-	Anti-roll bar

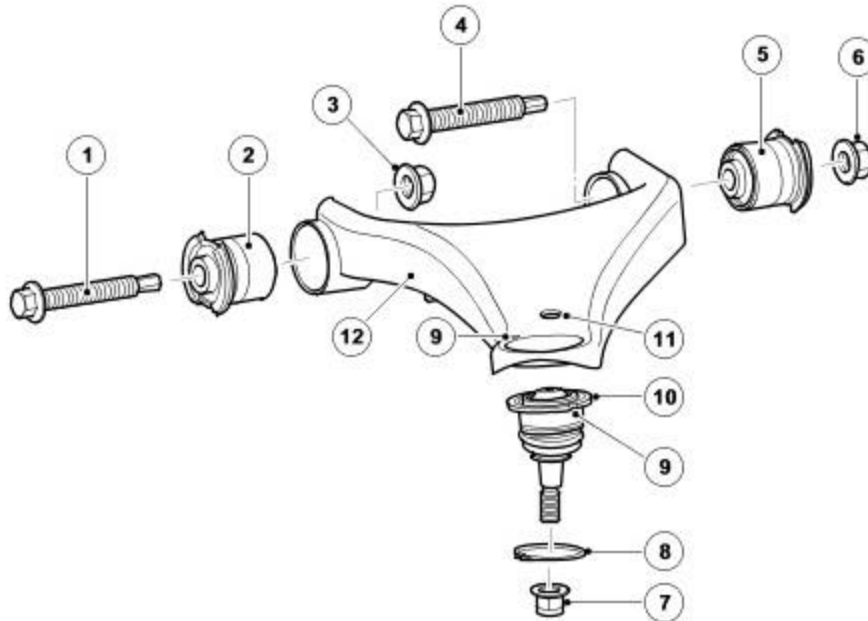
The anti-roll bar is fabricated from induction hardened, solid spring steel bar. The anti-roll bar operates, via a pair of links, from their attachment to the upper control arm.

The anti-roll bar is attached to the forward face of the chassis front cross member. The anti-roll bar is attached to the cross member with two, Teflon lined bushes. Brackets, which are pressed onto the bushes, are attached to the cross member with nuts, screwed onto studs in the cross member. The anti-roll bar has crimped, 'anti-shuffle' collars pressed in position on the inside edges of the bushes. The collars prevent sideways movement of the anti-roll bar.

The ends of the anti-roll bar are attached to the upper control arms via links. This allows the anti-roll bar to move with the wheel travel providing maximum effectiveness. Each link has a ball joint at each end. The top ball joint is attached to the link, parallel with the link axis. The ball joint is located in a hole in the upper control arm and secured with a self-locking

nut. The bottom ball joint is attached to the link at 90 degrees to the link axis. The ball joint is located in a hole in the end of the anti-roll bar and secured with a self-locking nut. The links are not handed and therefore can be fitted to either side of the anti-roll bar.

UPPER CONTROL ARM



E45854

Item	Part Number	Description
1	-	Flanged bolt
2	-	Bush
3	-	Self locking nut
4	-	Flanged bolt
5	-	Bush
6	-	Self locking nut
7	-	Self locking nut
8	-	Circlip
9	-	Timing marks
10	-	Ball joint
11	-	Anti-roll bar link attachment hole
12	-	Upper control arm

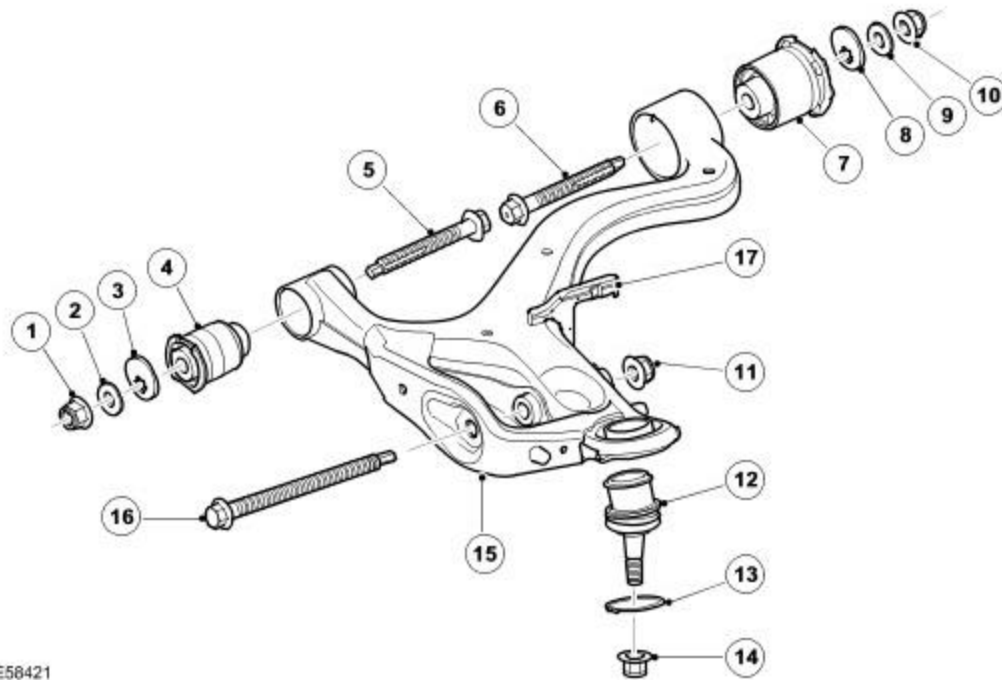
The upper control arm assembly comprises, the control arm, two bushes and a ball joint. The upper control arm is a pressed steel fabrication. Its outer end has a hole to accept the ball joint. A small indentation is located adjacent to the ball joint hole and is used to obtain the correct orientation of the ball joint. A smaller hole near the ball joint provides for the attachment of the anti-roll bar link. The underside of the upper control arm has a bracket for attachment of the height sensor link arm and two further brackets which secure the brake hose, pad wear sensor and wheel speed sensor cables.

The inner end of the arm has two fabricated bush housings which are welded to the arm pressing. A bush is pressed into each housing. The bushes are located between lugs on the chassis and are secured with bolts and self-locking nuts through metal inserts in the centre of the bushes.

The ball joint is pressed into the upper control arm. The ball joint is an interference fit in the hole which prevents the ball joint from moving. A circlip is fitted to the ball joint to retain it in the hole. The top face of the ball joint has two semi-circular cut-outs. One of these cut-outs must be aligned with the small indentation in the upper control arm to ensure the correct

operation of the ball joint.

LOWER CONTROL ARM



E58421

Item	Part Number	Description
1	-	Self locking nut
2	-	Flat washer
3	-	Cam washer
4	-	Bush
5	-	Special bolt
6	-	Bolt
7	-	Hydrobush
8	-	Cam washer
9	-	Flat washer
10	-	Self locking nut
11	-	Self locking nut - damper lower attachment
12	-	Ball joint
13	-	Circlip
14	-	Self locking nut
15	-	Lower control arm
16	-	Bolt - damper lower attachment
17		Jacking bracket

The lower control arm assembly comprises, the control arm, two bushes and a ball joint. The lower control arm is a pressed steel fabrication with a hole at its outer end to accept the ball joint.

The inner end of the arm has two fabricated bush housings which are welded to the arm pressing. A bush is pressed into each housing. The rear bush is a hydrobush which provides a progressive increase in the hardness of the bush as the deflection of the wheel increases. The bushes are located between lugs on the chassis and are secured with bolts and self-locking nuts through metal inserts in the centre of the bushes. The forward bush, self-locking nut, has a cam washer located beneath it. The cam washer is located between lugs on the chassis bracket and its orientation can be adjusted to

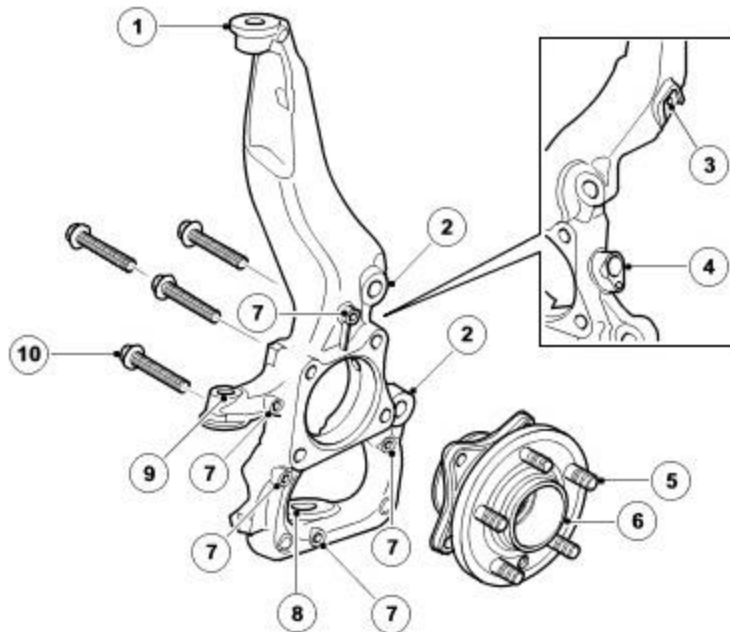
set the front camber. The rear bush, self-locking nut, also has a cam washer located beneath it. The cam washer is located between lugs on the chassis bracket and its orientation can be adjusted to set the front castor.

On vehicles fitted with coil springs there is a jacking bracket located on the lower control arm.

A central aperture in the arm provides for the attachment of the damper module lower bush. The damper is secured with a long bolt which is positioned through holes in the arm and secured with a self-locking nut.

The ball joint is pressed into the lower control arm. The ball joint is an interference fit in the hole which prevents the ball joint from moving. A circlip is fitted to the ball joint to retain it in the hole.

WHEEL KNUCKLE, HUB AND BEARING ASSEMBLY



E45856

Item	Part Number	Description
1	-	Upper control arm attachment
2	-	Brake caliper attachment holes
3	-	Brake hose bracket attachment point
4	-	Wheel speed sensor location
5	-	Wheels studs
6	-	Wheel hub
7	-	Brake disc dust shield attachment holes
8	-	Lower control arm ball joint attachment
9	-	Steering rack ball joint attachment
10	-	Wheel hub bolts (4 off)

The wheel knuckle is a machined casting which is located between the ball joints of the upper and lower control arms. The knuckle has four clearance holes which allow for the fitment of four bolts which secure the wheel hub housing. A cast boss on the forward edge of the knuckle provides for attachment of the steering gear, tie rod ball joint.

The wheel hub and bearing assembly comprises the wheel hub housing, wheel hub and taper roller bearing. The wheel hub and bearing assembly is a non-serviceable component. Five M14 studs are pressed into the wheel hub and provide for the attachment of the road wheel with wheel nuts.

The wheel hub housing is a machined forging which houses a taper roller bearing. The housing has four threaded holes

which provide for the attachment to the wheel knuckle with four bolts.

The wheel hub has a splined centre bore which mates with corresponding splines on the half shaft. Rotation of the half shaft is passed, via the splines, to the wheel hub which rotates on the taper roller bearing.