

FRONT SUSPENSION SYSTEM

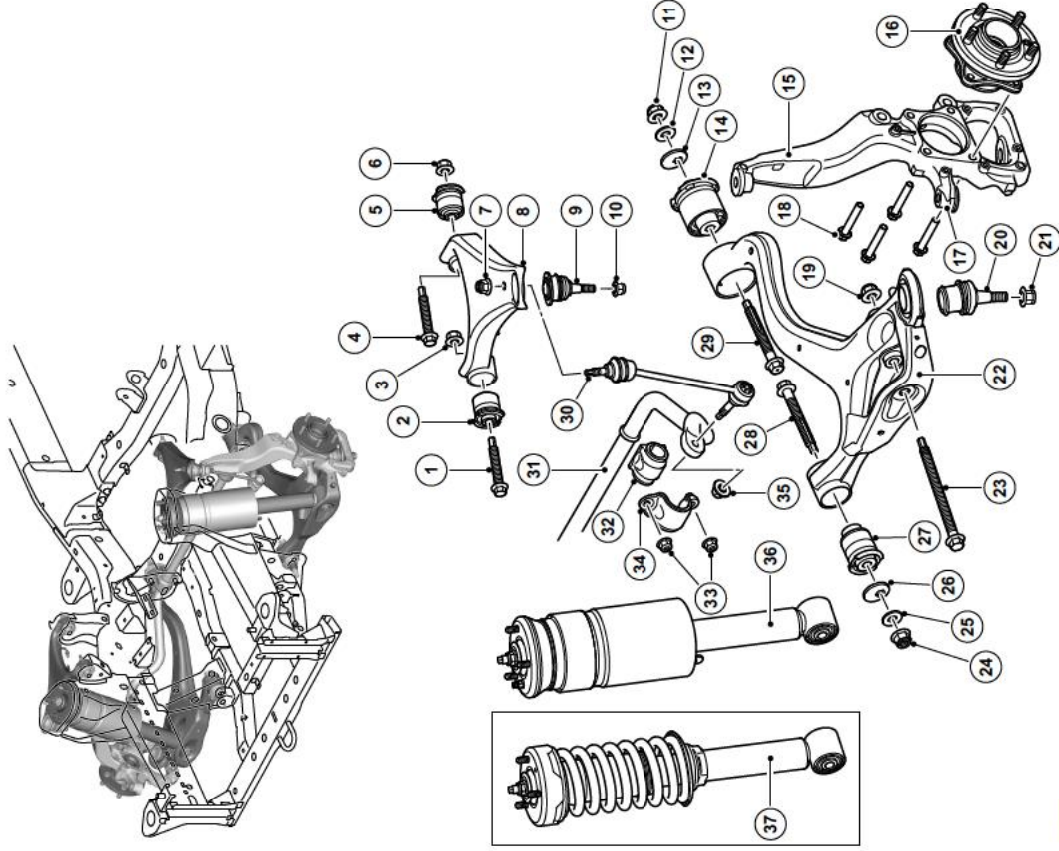
The front suspension is a fully independent design offering a reduction in unsprung weight compared to the beam axle design fitted to previous Land Rover models. The front suspension is comprised of upper and lower control arms, a wheel knuckle and hub, an anti-roll bar and links assembly, and a shock absorber assembly. The major components of the front suspension are secured with self-locking nuts.

The shock absorber uses either a coil spring or an air spring; both types are of 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 allow for adjustment of the camber and castor using cam adjusters.

COMPONENT LAYOUT

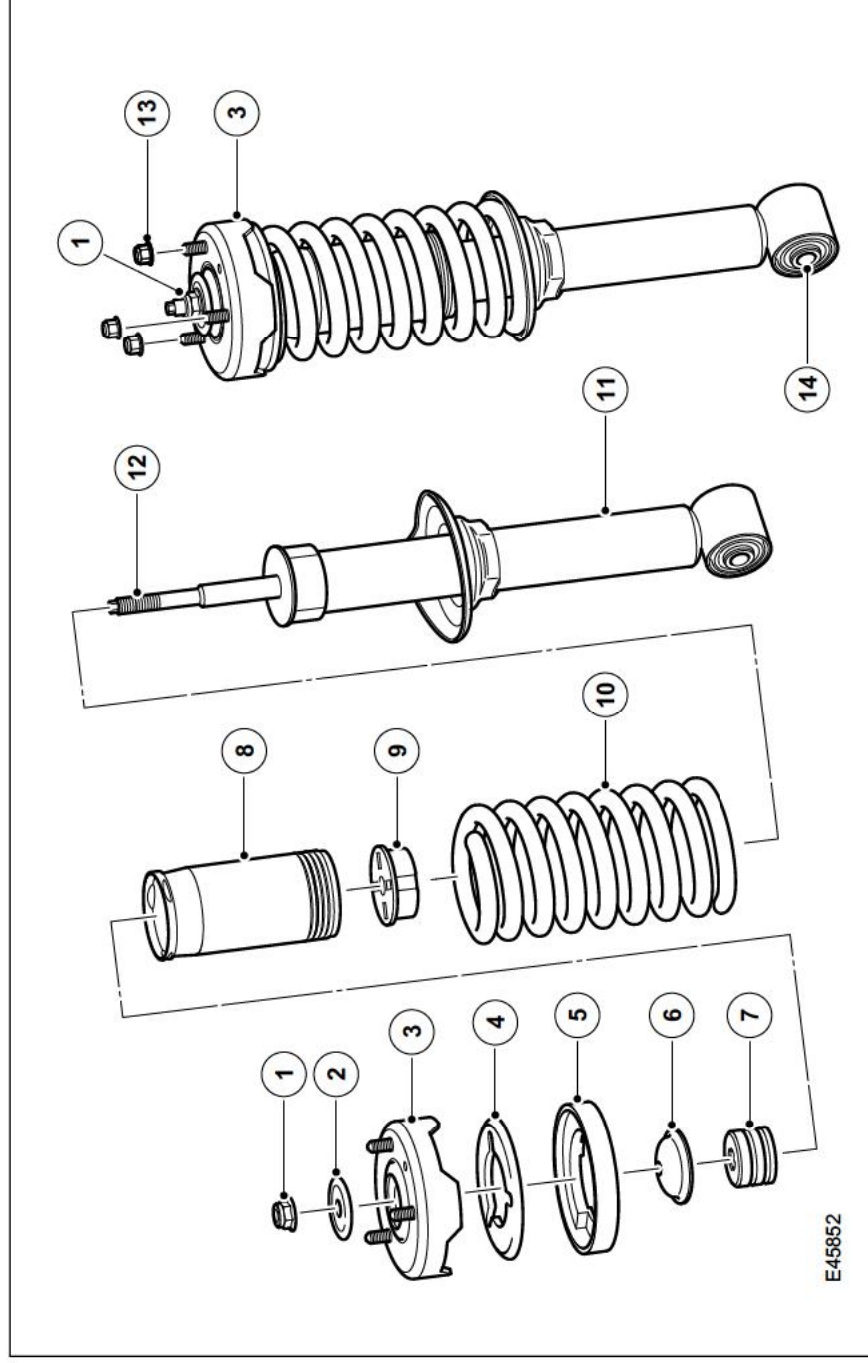
NOTE: Air suspension version shown at top of illustration.



E46850

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|----|--|----|---------------------------------------|
| 8 | Upper control arm | 22 | Lower control arm |
| 9 | Ball joint (Upper control arm to swivel hub) | 30 | Anti-roll bar link |
| 15 | Wheel knuckle | 31 | Anti-roll bar |
| 16 | Wheel hub and bearing assembly | 36 | Shock absorber assembly (Air) |
| 17 | Steering link attachment | 37 | Shock absorber assembly (Coil spring) |
| 20 | Ball joint (Lower control arm to swivel hub) | | |

SHOCK ABSORBER MODULE – COIL SPRING SUSPENSION



- 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 Shock absorber
- 12 Damper rod
- 14 Bushing

The coil spring shock absorber module is comprised of a shock absorber, coil spring and top mount.

Shock Absorber Assembly

The shock absorber assembly is a twin tube design using a conventional coil spring.

A spring aid is fitted to the damper rod to prevent the top mount contacting the top of the shock absorber during full suspension compression and to assist the suspension tune.

Coil Spring and Top Mount

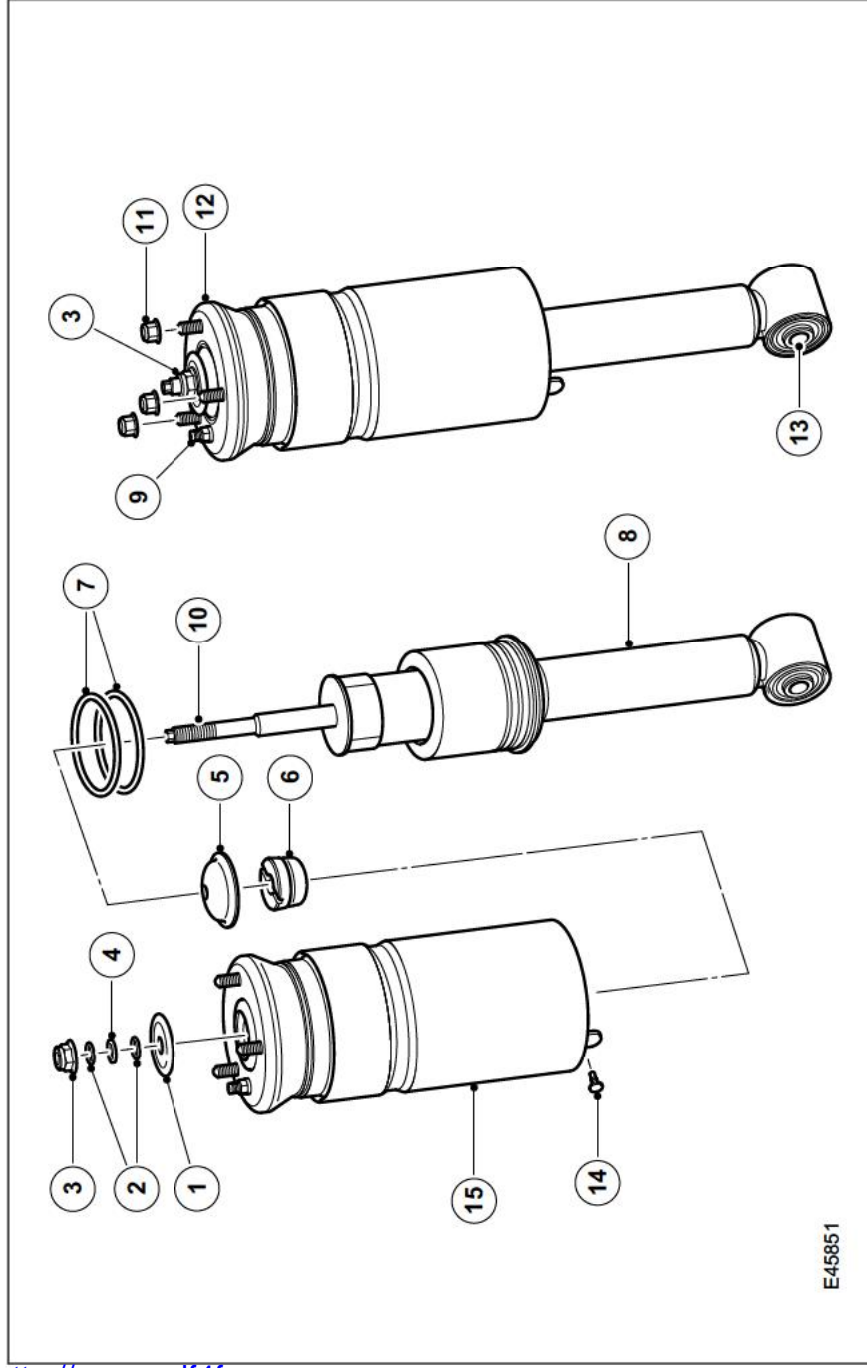
The coil spring fitted differs with vehicle specification. Each spring is color-coded to identify its rating and fitment requirements.

The lower end of the coil spring is located in a spring seat which is an integral part of the shock absorber body; the design of the spring seat prevents rotation of the spring. The upper end of the coil spring is located in a rubber spring isolator fitted in the top mount. The spring isolator prevents any noise produced during shock absorber and spring compression/extension from being transmitted to the vehicle body.

The top mount is fitted with a bushing and rebound washer located between the top mount plate and the damper rod. Self-locking nuts attach the top mount to the damper rod and to a housing on the chassis.

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

SHOCK ABSORBER MODULE – AIR SPRING SUSPENSION



- 1 Rebound washer*
- 2 O-ring – damper rod (2)*

- 4 Spacer – damper rod*
- 5 Bump washer

- 6 Spring aid*
- 7 O-ring – air sleeve support (2)*
- 8 Shock absorber assembly*
- 9 Voss air fitting
- 10 Damper rod

- 12 Top mount
- 13 Bushing
- 14 Retaining pin – air spring assembly*
- 15 Air spring assembly*

NOTE: * shows service items

The shock absorber module is comprised of an air spring assembly, top mount and shock absorber assembly. The shock absorber and air spring are only serviceable as complete assemblies.

crimp rings which provide an airtight seal. The support sleeve contains a seal carrier with O-rings sealing the support sleeve and the shock absorber body. The top of the air sleeve is crimped to the top mount.

A spring aid is fitted to the damper rod and prevents the top mount contacting the top of the shock absorber during full suspension compression. The lower end of the air spring is located over the shock absorber body and seated on a fabricated seat; the air spring is positively attached to the seat with a retaining pin.

The shock absorber assembly is a twin tube design with the conventional coil spring replaced by an air spring. The lower end of the shock absorber is fitted with a bushing and attaches to the lower control arm.

The top mount is an integral part of the air spring and is fitted with a bushing and rebound washer located between the top mount plate and the damper rod. Self-locking nuts attach the top mount to the damper rod and to a housing on the chassis. The top mount incorporates a 6 mm Voss air fitting to allow attachment of the air harness.

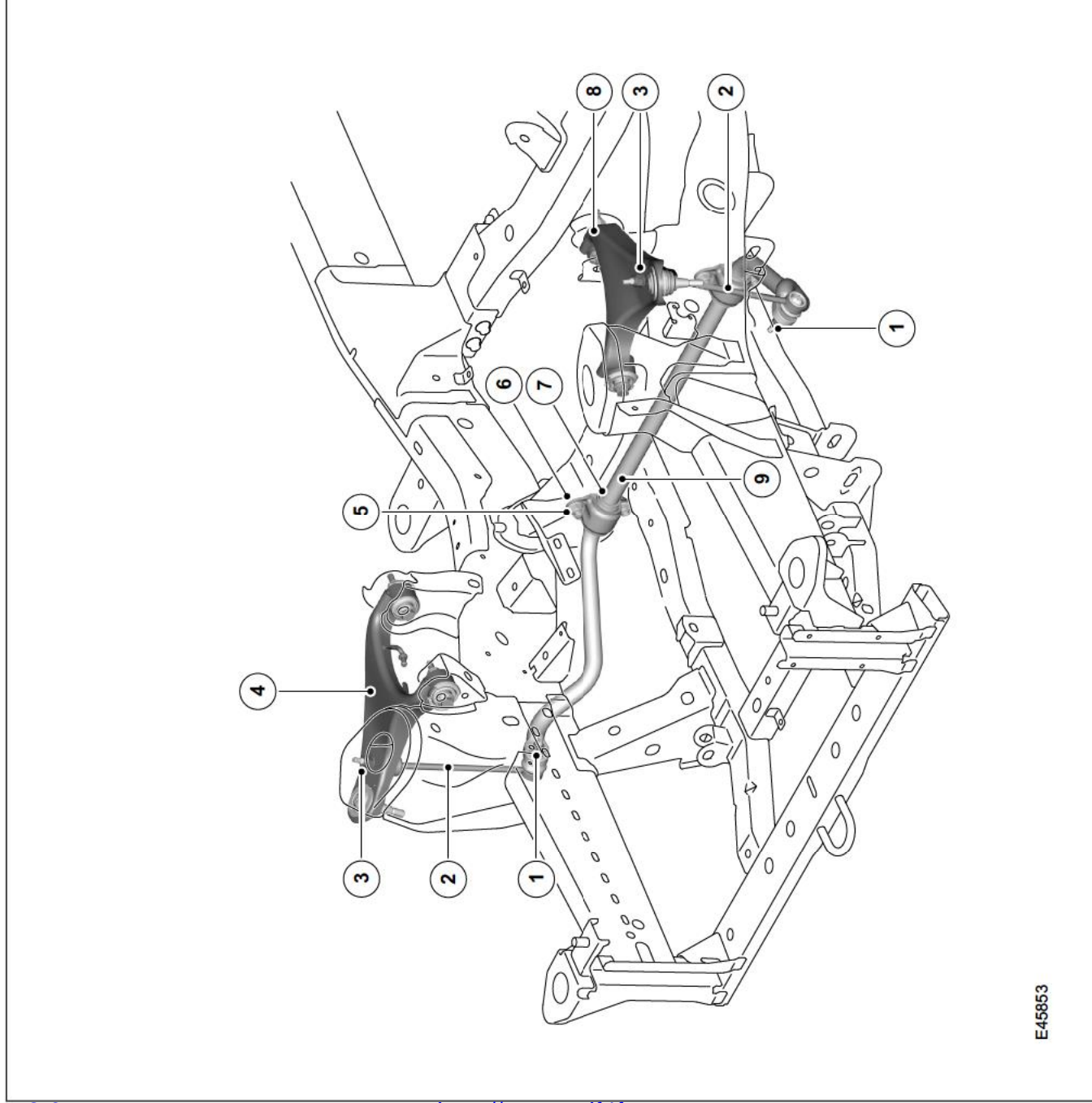
Shock Absorber Assembly**Air Spring and Top Mount**

The air spring is comprised of an aluminum 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

A gaiter is available as a dealer-fit component. Similar to the one fitted to the rear air spring shock absorber module, it prevents dirt and debris becoming trapped between the air sleeve and the restraining cylinder under extreme off-road conditions.

ANTI-ROLL BAR



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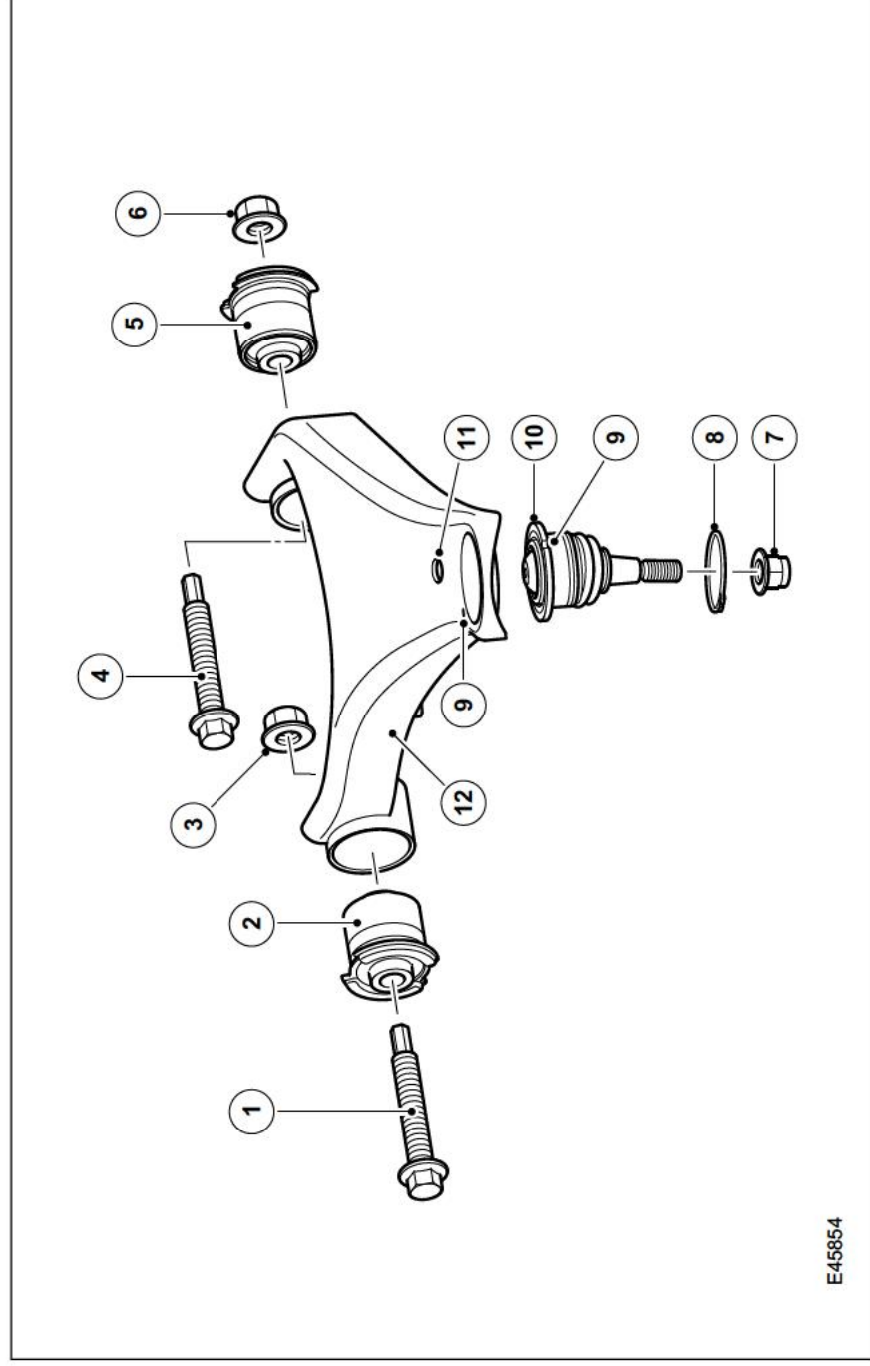
- 2 Link (2)
- 4 RH upper control arm
- 6 Bracket (2)
- 7 Bushing (2)
- 8 LH upper control arm
- 9 Anti-roll bar

The anti-roll bar is a hardened, solid spring steel bar which operates via a pair of links attached to the upper control arms.

The anti-roll bar is attached to the forward face of the chassis front cross member via two brackets pressed onto Teflon-lined bushings. The brackets attach to the cross member studs. The anti-roll bar has crimped, 'anti-shuffle' collars pressed in position on the inside edges of the bushings; the collars prevent sideways movement of the anti-roll bar.

The ends of the anti-roll bar attach 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 located in a hole in the upper control arm and is attached parallel with the link axis. The bottom ball joint is located in a hole in the end of the anti-roll bar and is attached to the link at 90 degrees to the link axis. The links are non-handed and therefore can be fitted to either side of the anti-roll bar.

UPPER CONTROL ARM



2, 5 Bushings

8 Circlip

9 Alignment marks

10 Ball joint

11 Anti-roll bar link attachment hole

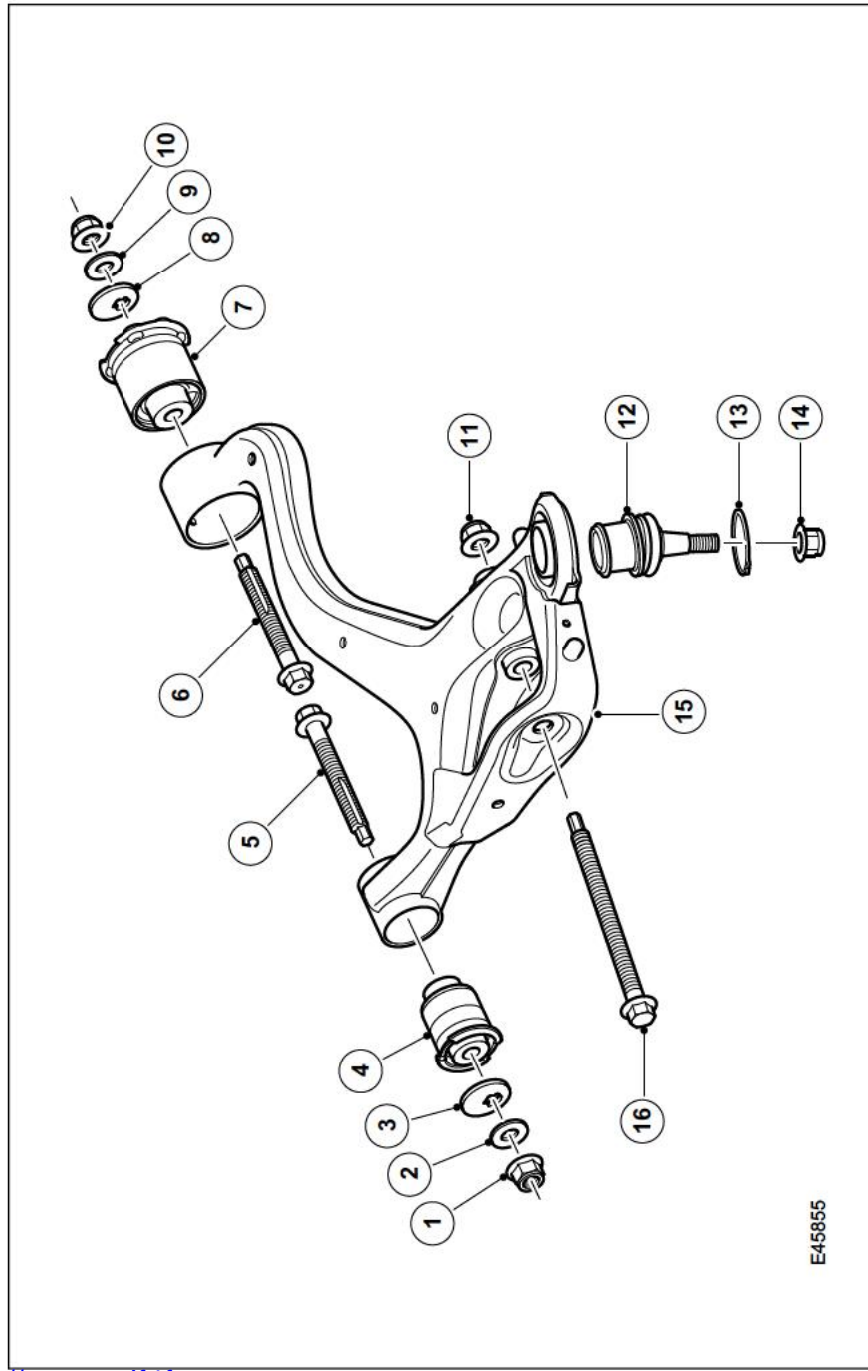
12 Upper control arm

The upper control arm is a pressed steel fabrication with a hole in its outer end to accept the ball joint. A small indentation is located adjacent to the ball joint hole to facilitate 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 bushing housings; a bushing pressed into each housing attaches to lugs on the chassis.

The ball joint is pressed into the upper control arm. An interference fit in the hole 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 alignment and operation of the ball joint.

LOWER CONTROL ARM



E45855

3 Cam washer

4 Bushing

7 Hydrobush

8 Cam washer

12 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 bushing housings; a bushing pressed into each housing attaches to lugs on the chassis. The rear bushing is a hydrobush, which provides a progressive increase in the hardness of the bushing as the deflection of the wheel increases. Both bushings are fitted with cam washers between the lugs on the chassis bracket. The front bushing cam washer

13 Circlip

15 Lower control arm

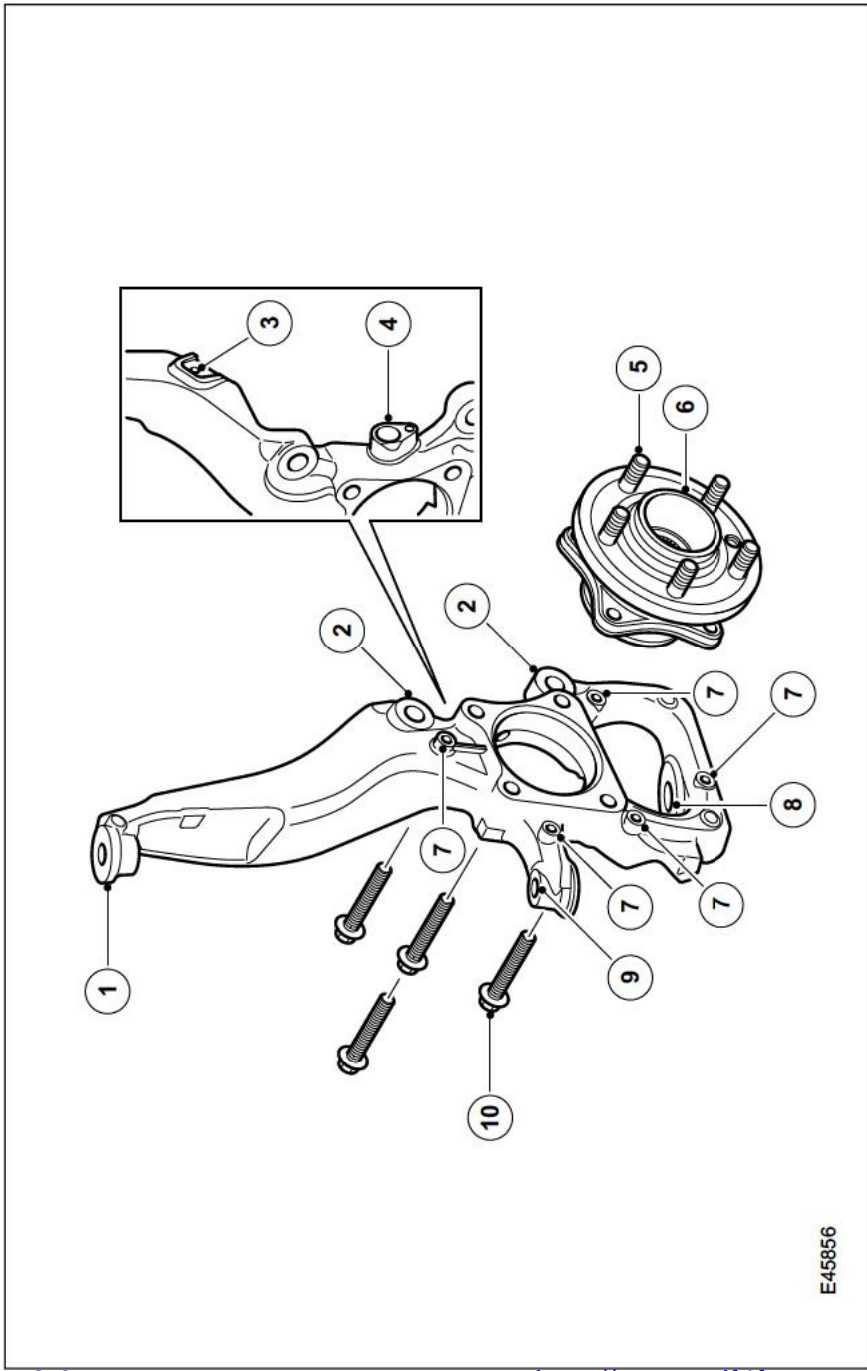
16 Shock absorber module lower attachment bolt

orientation can be adjusted to set the front suspension camber; the rear bushing cam washer can be adjusted to set front suspension castor.

A central aperture in the arm provides for the attachment of the shock absorber module lower bushing. The shock absorber is secured with a long bolt which is positioned through holes in the arm.

The ball joint is pressed into the lower control arm. An interference fit in the hole 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

- 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 and bearing assembly
- 7 Brake disc dust shield attachment holes
- 8 Lower control arm ball joint attachment
- 9 Steering rack ball joint attachment
- 10 Wheel speed sensor location

The wheel knuckle is a machined casting which is secured 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 to 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 is a non-serviceable component, comprised of the wheel hub housing, wheel hub and taper roller bearing. The wheel hub has a splined center bore which mates with corresponding splines on the halfshaft. Five M14 studs provide for the attachment of the road wheel.