

**Front Suspension -****Torque Specifications**

**CAUTION:** Nuts and bolts must be tightened with the weight of the vehicle on the suspension.

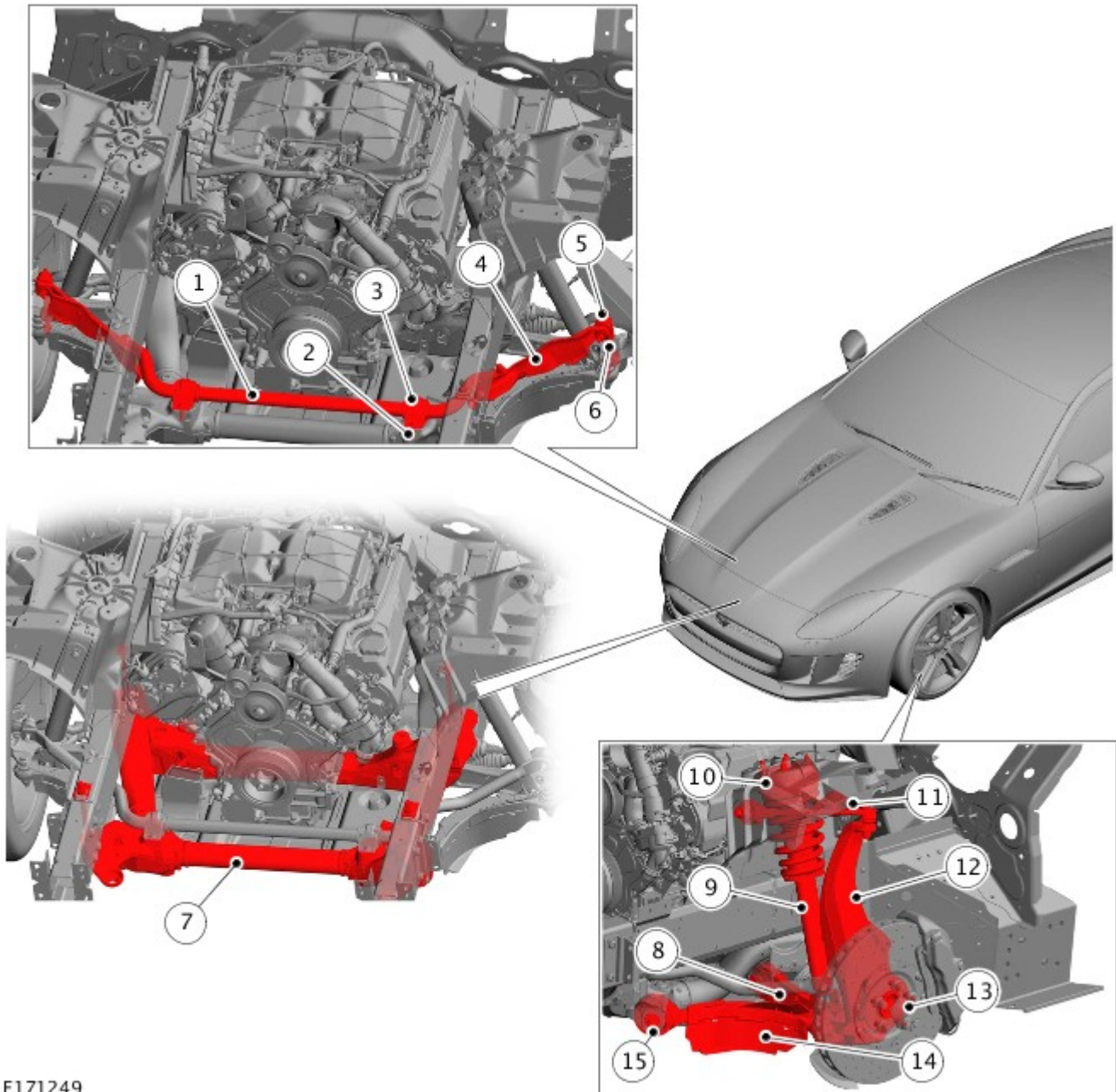
Description	Nm	lb-ft
Front lower arm to rear lower arm - nut *:		
Stage 1	60	44
Stage 2	135 degrees	135 degrees
Front lower arm to subframe - nut *	183	135
Rear lower arm to subframe - nut *	183	135
Rear lower arm to wheel knuckle ball joint - nut *	92	68
Shock absorber to spring - nut *		
Active shock absorber	27	20
Passive shock absorber	50	37
RWD. Shock absorber and spring assembly to lower arm - bolt	175	129
AWD. Shock absorber and spring assembly to yoke - bolt *	60	44
AWD. Shock absorber yoke to lower arm - bolt *		
Stage 1	60	44
Stage 2	90 degrees	90 degrees
RWD. Shock absorber and spring assembly to top mount - nuts	30	22
AWD. Shock absorber and spring assembly to top mount - nuts *	30	22
Stabilizer bar clamp to subframe - bolt	55	40
RWD. Stabilizer bar link to lower arm - nut *	70	52
RWD. Stabilizer bar link to stabilizer bar - nut *	48	32
AWD. Stabilizer bar link to knuckle - nut *	70	52
AWD. Stabilizer bar link to stabilizer bar - nut *	70	52
Stabilizer bar air scoop - bolt (vehicles with carbon ceramic brakes)	10	7
Upper arm ball-joint - nut *	90	66
Upper arm to body - nut *	70	52
RWD. Wheel bearing and hub assembly to wheel knuckle - bolts *	90	66
AWD. Wheel bearing and hub assembly to wheel knuckle - bolts *		
Stage 1	10	7
Stage 2	115	85

\* New nut/bolt must be installed.

## Front Suspension - Front Suspension

Description and Operation

### COMPONENT LOCATION - RWD

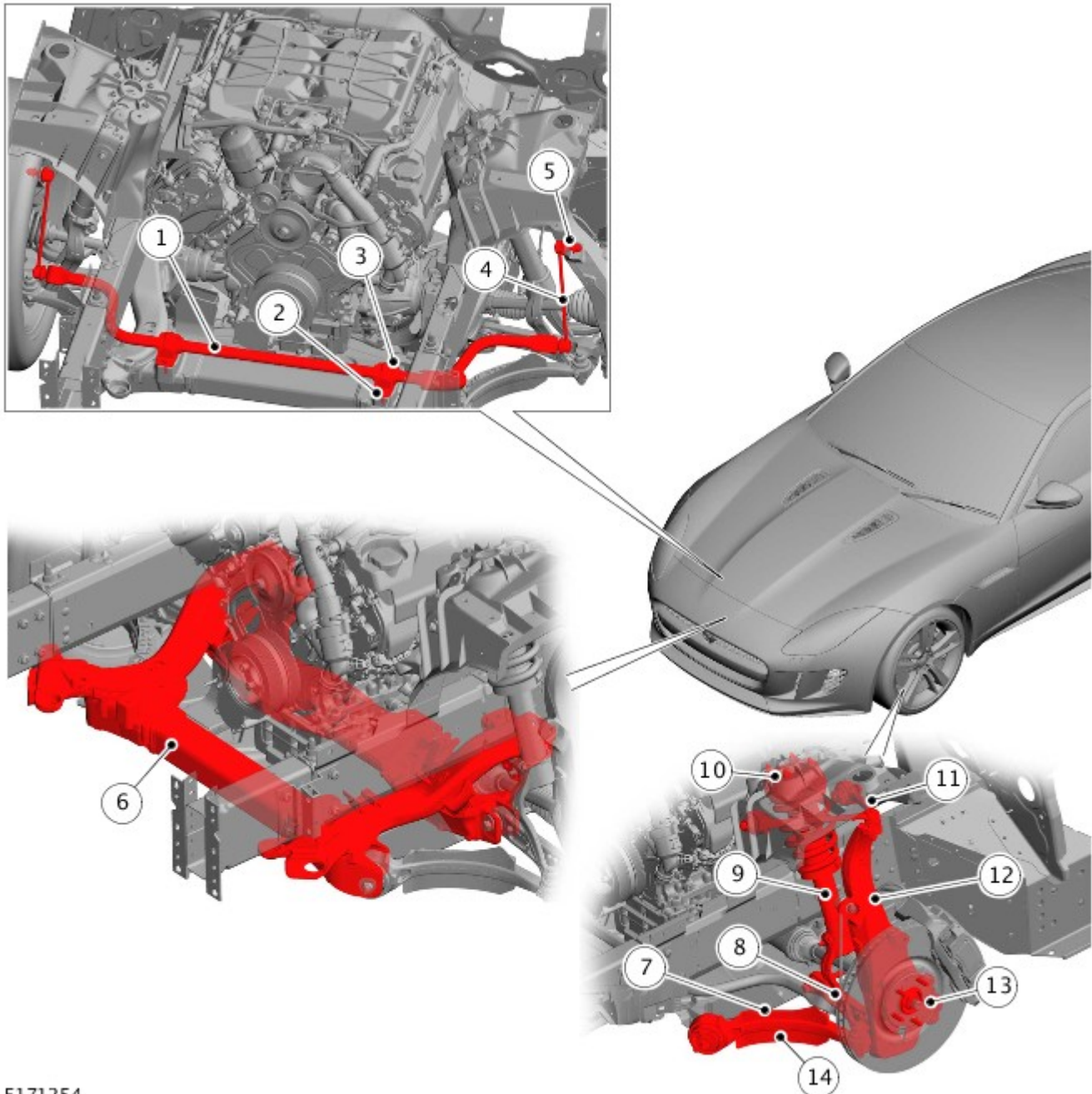


E171249

Item	Description
1	Stabilizer bar
2	Bolt (4 of)
3	Bracket (2 of)
4	Stabilizer bar - Brake scoop
5	Ball joint (2 of)
6	Stabilizer link
7	Subframe
8	Rear lower control arm
9	Left shock absorber and spring assembly
10	Left top mount
11	Left upper control arm

12	Left wheel knuckle
13	Front left wheel hub and bearing assembly
14	Front lower control arm - Brake scoop
15	Front lower control arm

## COMPONENT LOCATION - AWD



E171254

Item	Description
1	Stabilizer bar
2	Bolt (4 of)
3	Bracket (2 of)
4	Stabilizer link
5	Ball joint (2 of)
6	Subframe
7	Front lower control arm
8	Rear lower control arm
9	Left shock absorber and spring assembly
10	Left top mount

11	Left upper control arm
12	Left wheel knuckle
13	Front left wheel hub and bearing assembly
14	Front lower control arm - Brake scoop

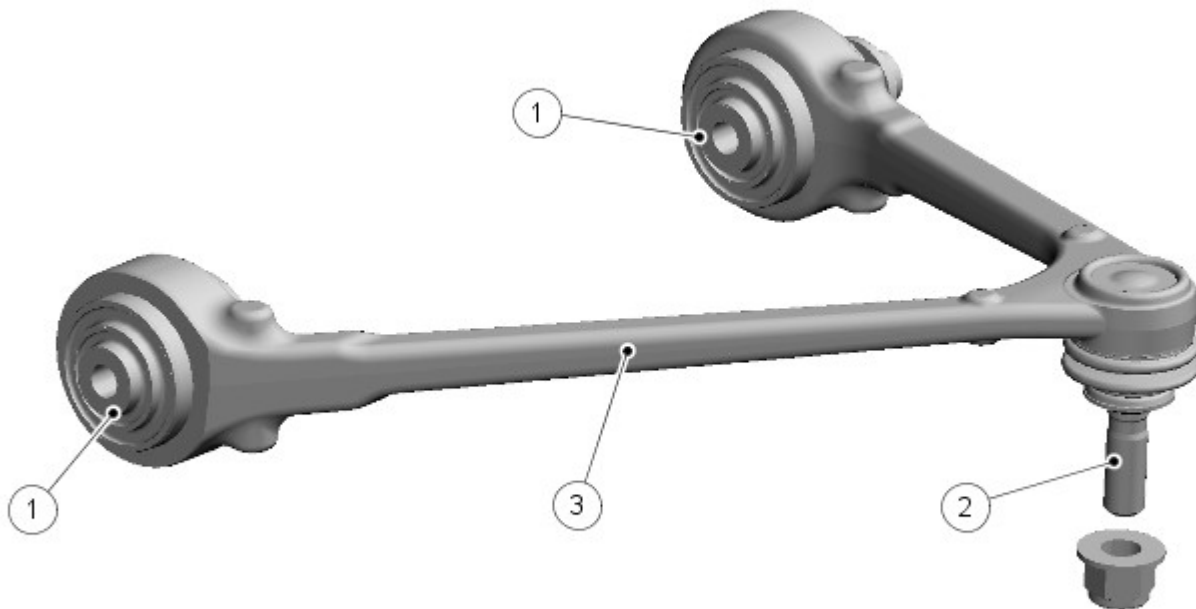
## INTRODUCTION

The front suspension is of a fully independent design. The front suspension components are attached to the front subframe and the vehicle body. The subframe is attached to the vehicle body with four long bolts which pass through bushes located in the subframe.

The front suspension on each side comprises:

- Upper control arm
- Front lower lateral control arm
- Rear lower control arm
- Wheel knuckle and hub assembly
- Stabilizer bar
- Spring and shock absorber assembly.

## UPPER CONTROL ARM



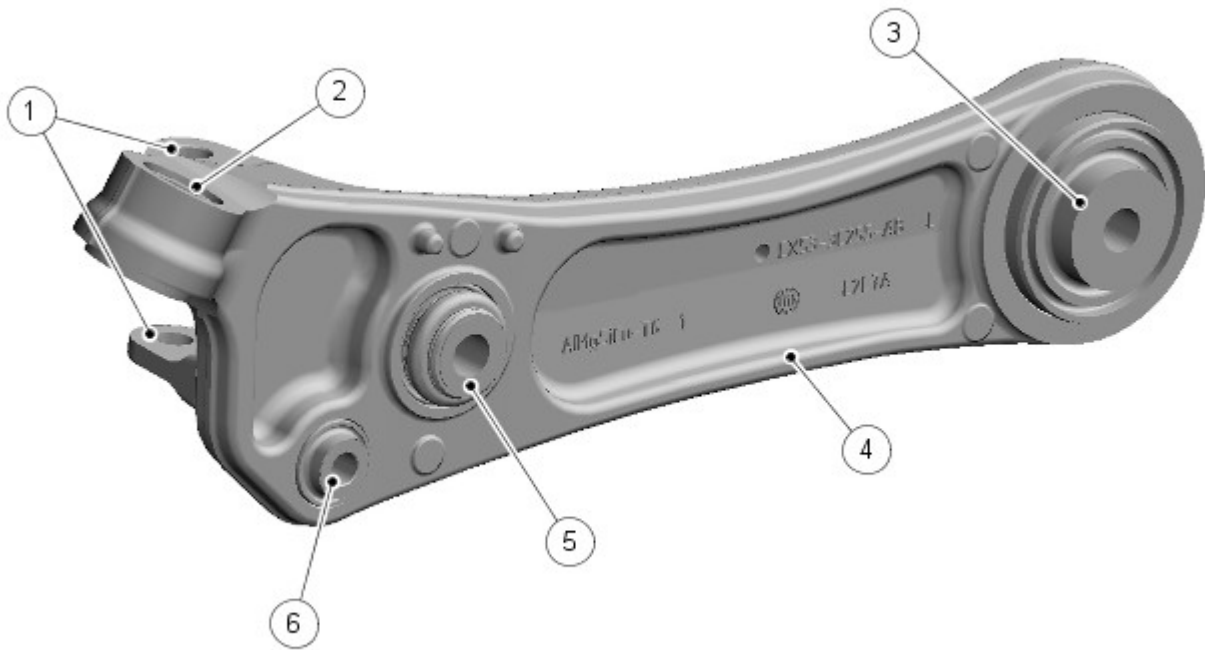
E153431

Item	Description
1	Bush (2 of)
2	Ball joint and locknut
3	Upper control arm

The forged aluminum upper control arm is a wishbone design with three mounting points. The two inner mounting points are fitted with bushes. The outer mounting is fitted with a ball joint which locates in a hole in the wheel knuckle and is secured with a locknut.

The inclination of the upper control arm axis provides an anti-dive and anti-squat action during vehicle braking and acceleration and also improves castor trail which in turn improves steering 'feel'.

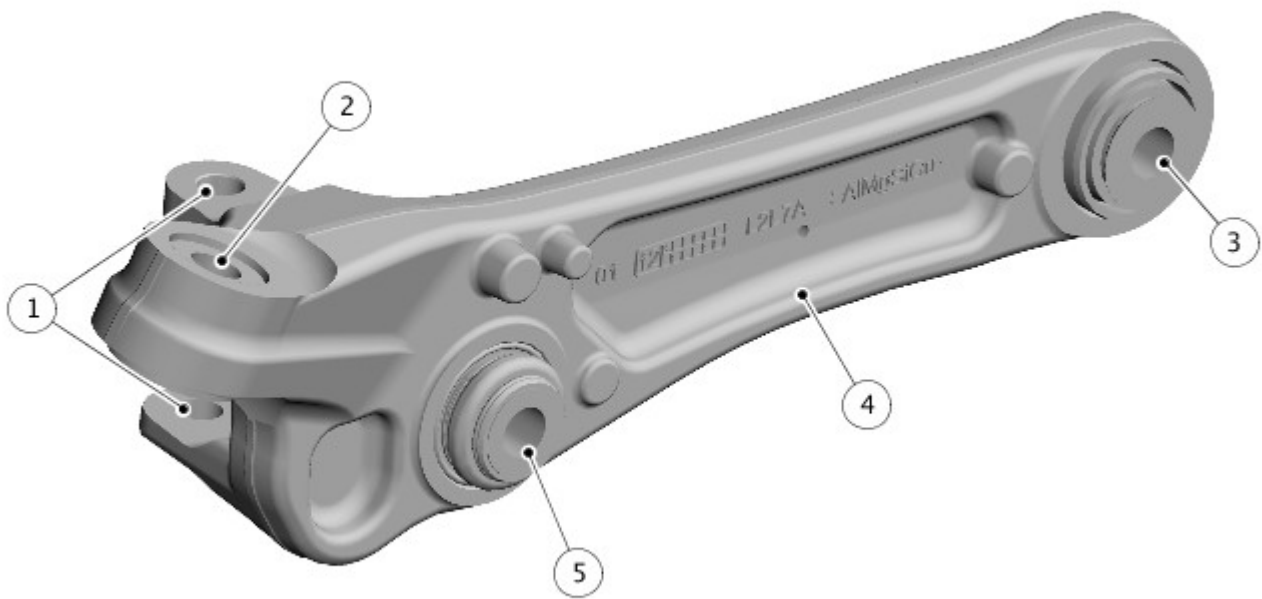
## REAR LOWER CONTROL ARM - RWD



E153432

Item	Description
1	Front lower control arm attachment
2	Wheel knuckle attachment
3	Rear bush - subframe attachment
4	Lower lateral control arm
5	Spring and shock absorber assembly attachment
6	Bush - stabilizer link attachment

**REAR LOWER CONTROL ARM - AWD**



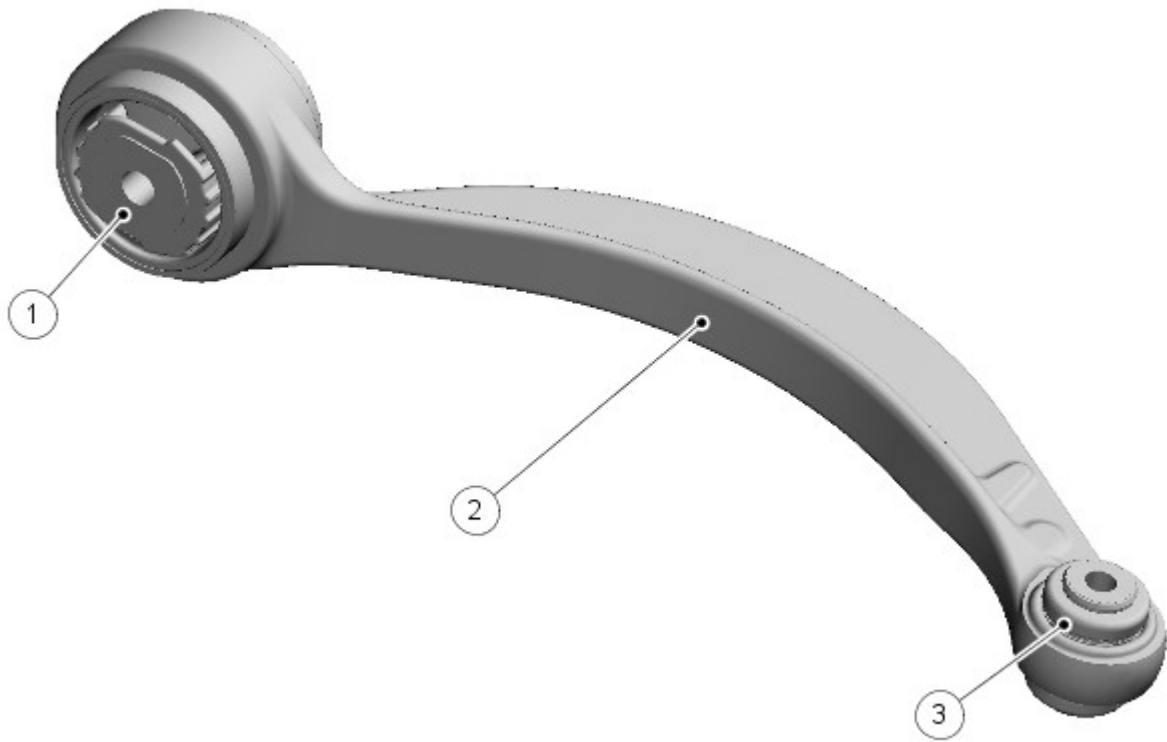
E171252

Item	Description
1	Front lower control arm attachment
2	Wheel knuckle attachment
3	Rear bush - subframe attachment
4	Rear lower control arm
5	Spring and shock absorber assembly attachment

The forged aluminum rear lower control arm is fitted with a bush in its inner end which locates between brackets on the subframe. The arm is secured with an eccentric bolt, an eccentric washer and a locknut which allow for the adjustment of the suspension camber geometry.

The outer end of the rear lower control arm has a tapered hole which locates on a ball joint fitted to the wheel knuckle. Two cast brackets on the forward face of the rear lower control arm allow for the attachment of the front lower control arm. A threaded insert is fitted behind the two cast brackets and provides for the attachment of the stabilizer link with a bolt. A bush is fitted to a cross-hole in the rear lower control arm which provides the location for the forked attachment of the spring and shock absorber assembly.

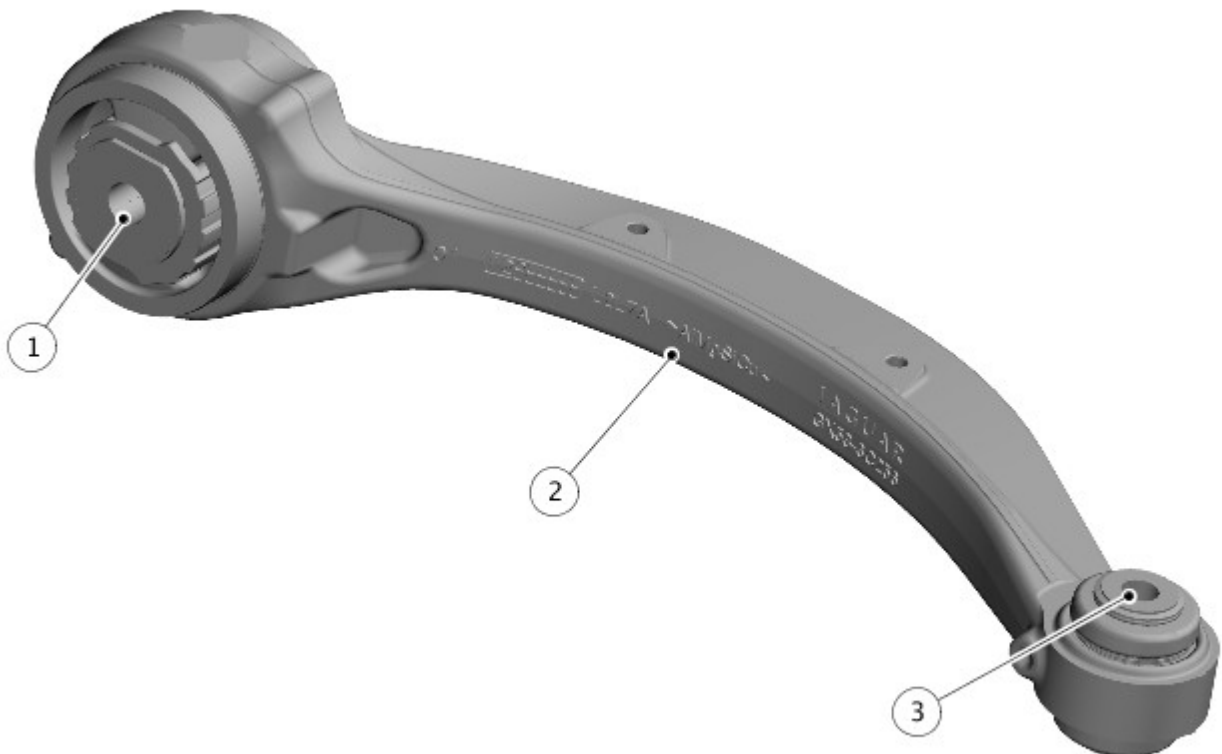
#### FRONT LOWER CONTROL ARM - RWD



E153433

Item	Description
1	Bush
2	Front lower control arm
3	Cross axis joint

FRONT LOWER CONTROL ARM - AWD



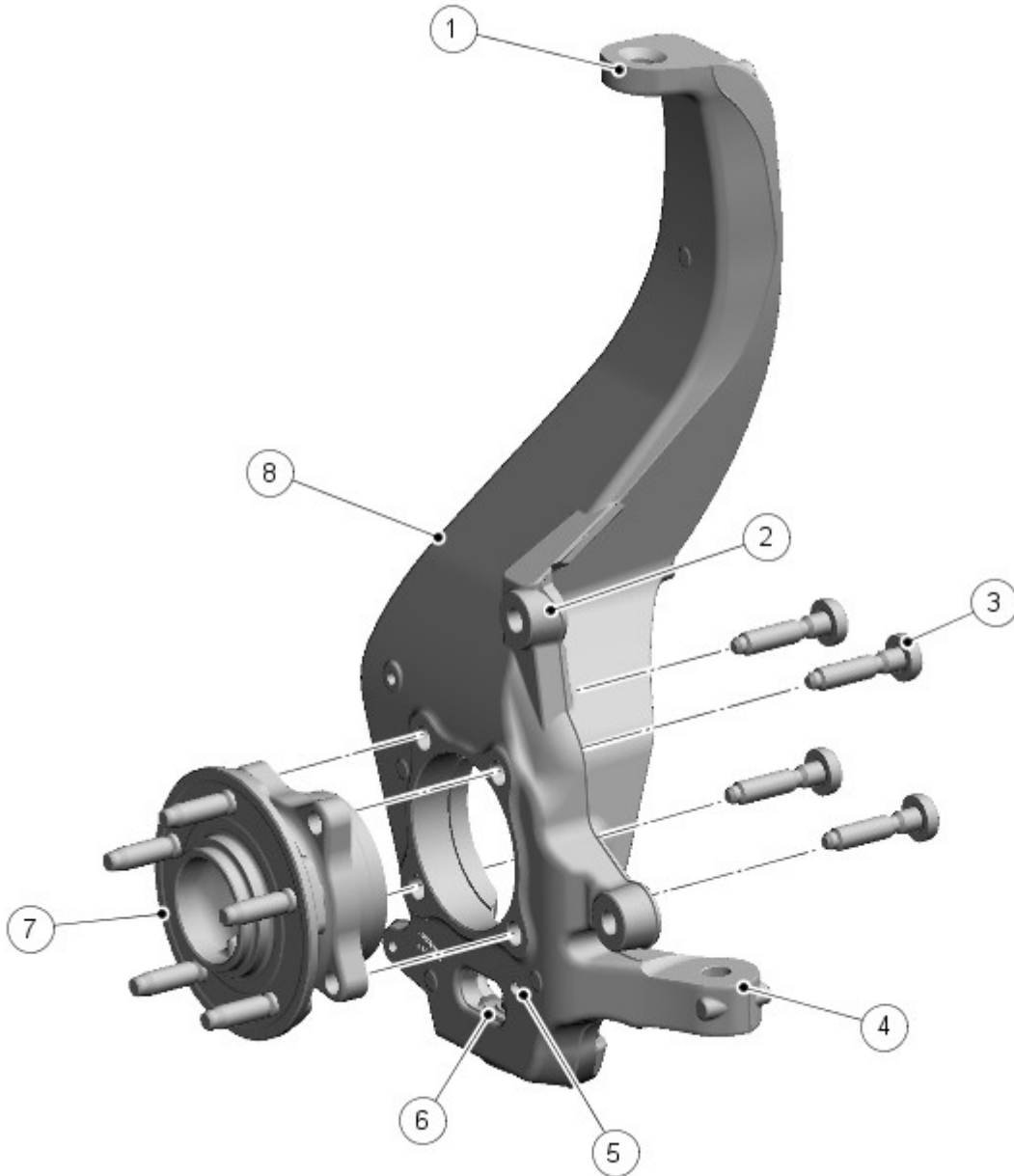
E171253

Item	Description
1	Bush
2	Front lower control arm
3	Cross axis joint

The cast front lower control arm is fitted with a bush in its inner end which locates between brackets on the subframe. The arm is secured with an eccentric bolt, an eccentric washer and a locknut which allow for adjustment of the castor and camber geometry.

The outer end of the front lower control arm is fitted with a cross axis joint and locates between the cast brackets on the rear lower lateral control arm. The front lower control arm and rear lower control arm together form a wishbone design.

**WHEEL KNUCKLE - RWD**



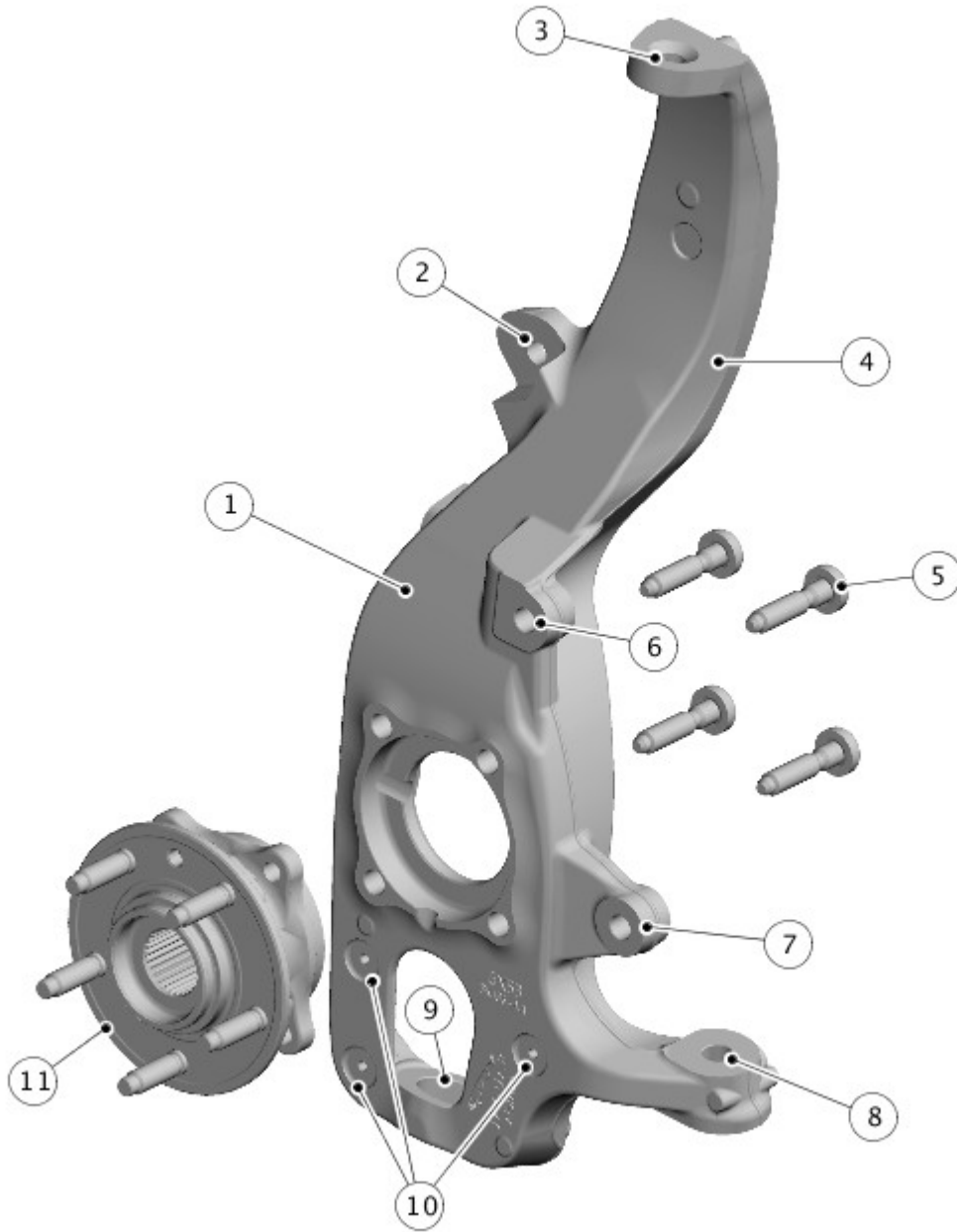
E153434

Item	Description
1	Upper control arm attachment
2	Brake caliper attachment
3	Internal torx bolt (4 of)
4	Steering tie rod ball joint attachment
5	Brake disc shield attachment (2 of)
6	Ball joint - rear lower lateral arm attachment



7	Wheel hub and bearing assembly
8	Wheel knuckle

**WHEEL KNUCKLE - AWD**



E171251

Item	Description
1	Wheel knuckle
2	Stabilizer link attachment
3	Upper control arm attachment
4	Steering tie rod ball joint attachment
5	Internal torx bolt (4 of)
6	Brake caliper attachment
7	Brake caliper attachment
8	Steering tie-rod ball joint attachment
9	Ball joint - rear lower lateral arm attachment
10	Brake disc shield attachment (2 of)
11	Wheel hub and bearing assembly

The cast aluminum wheel knuckle is a swan neck design which provides the attachment for the upper control arm and lower lateral control arm. The lower lateral control arm locates on a non-serviceable ball joint integral with the wheel knuckle. The lower boss on the knuckle provides for the attachment of the steering gear tie-rod ball joint.

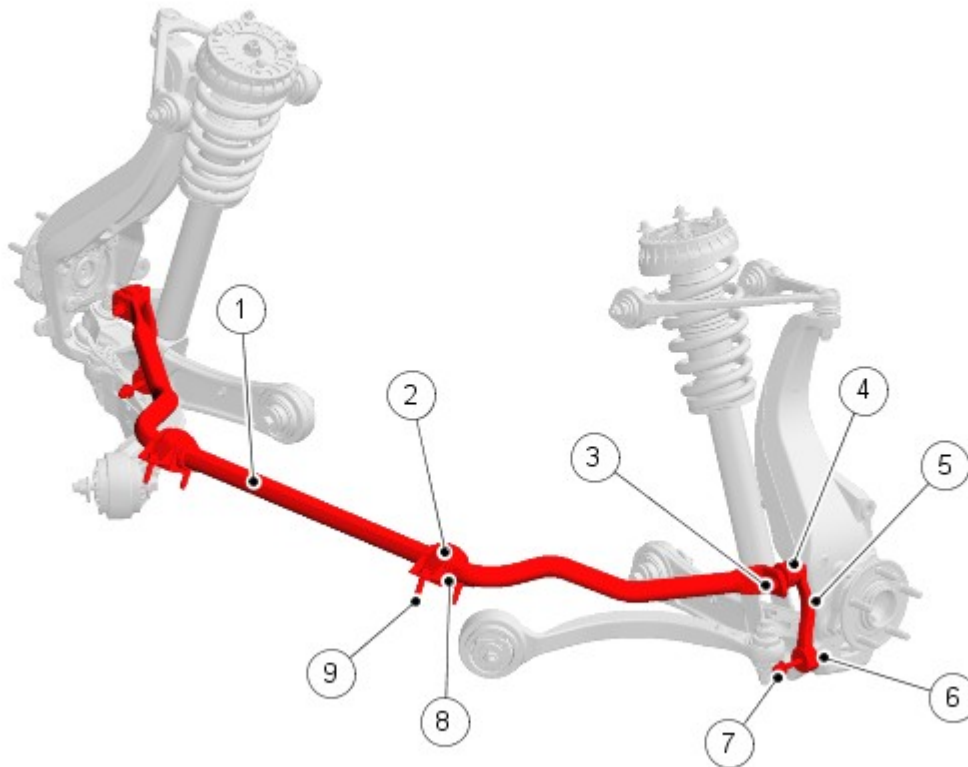
The wheel knuckle also provides the mounting locations for the wheel hub and bearing assembly, the wheel speed sensor, the brake caliper and the brake disc shield.

The wheel hub and bearing assembly is a non-serviceable component that requires replacement as a complete assembly. A Magnetic encoder ring for the wheel speed sensor is incorporated into the wheel bearing. The assembly is secured to the knuckle with 4 torx bolts.

## STABILIZER BAR



NOTE: RWD version shown, AWD version is similar.



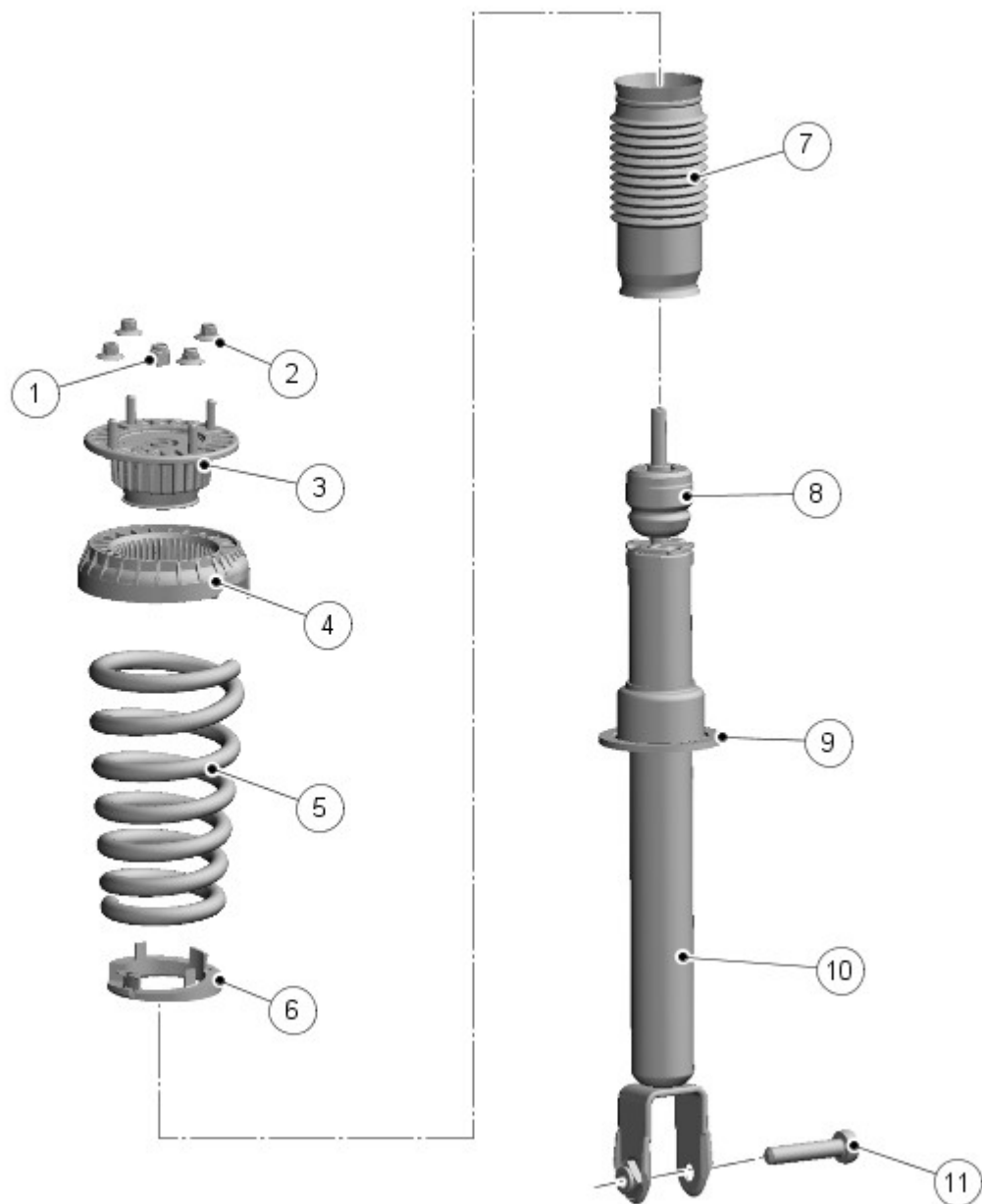
E153435

Item	Description
1	Stabilizer bar
2	Bracket (2 of)
3	Locknut (2 of)
4	Ball joint (2 of)
5	Stabilizer link (2 of)
6	Locknut (2 of)
7	Bolt (2 of)
8	Bush (2 of)
9	Bolt (4 of)

The stabilizer bar is attached to the front of the subframe with bushes and mounting brackets. The pressed steel brackets locate over the bushes and are attached to the cross member with bolts screwed into threaded locations in the subframe. The stabilizer bar has crimped, 'anti-shuffle' collars pressed in position on the inside edges of the bushes. The collars prevent sideways movement of the stabilizer bar.

The stabilizer bar is manufactured from 32 mm diameter, manganese steel bar. Each end of the stabilizer bar curves rearwards to attach to a ball joint on a stabilizer bar link. Each stabilizer bar link is secured to a bush in the lower lateral arm with a bolt and locknut. The links allow the stabilizer bar to move with the wheel travel providing maximum effectiveness.

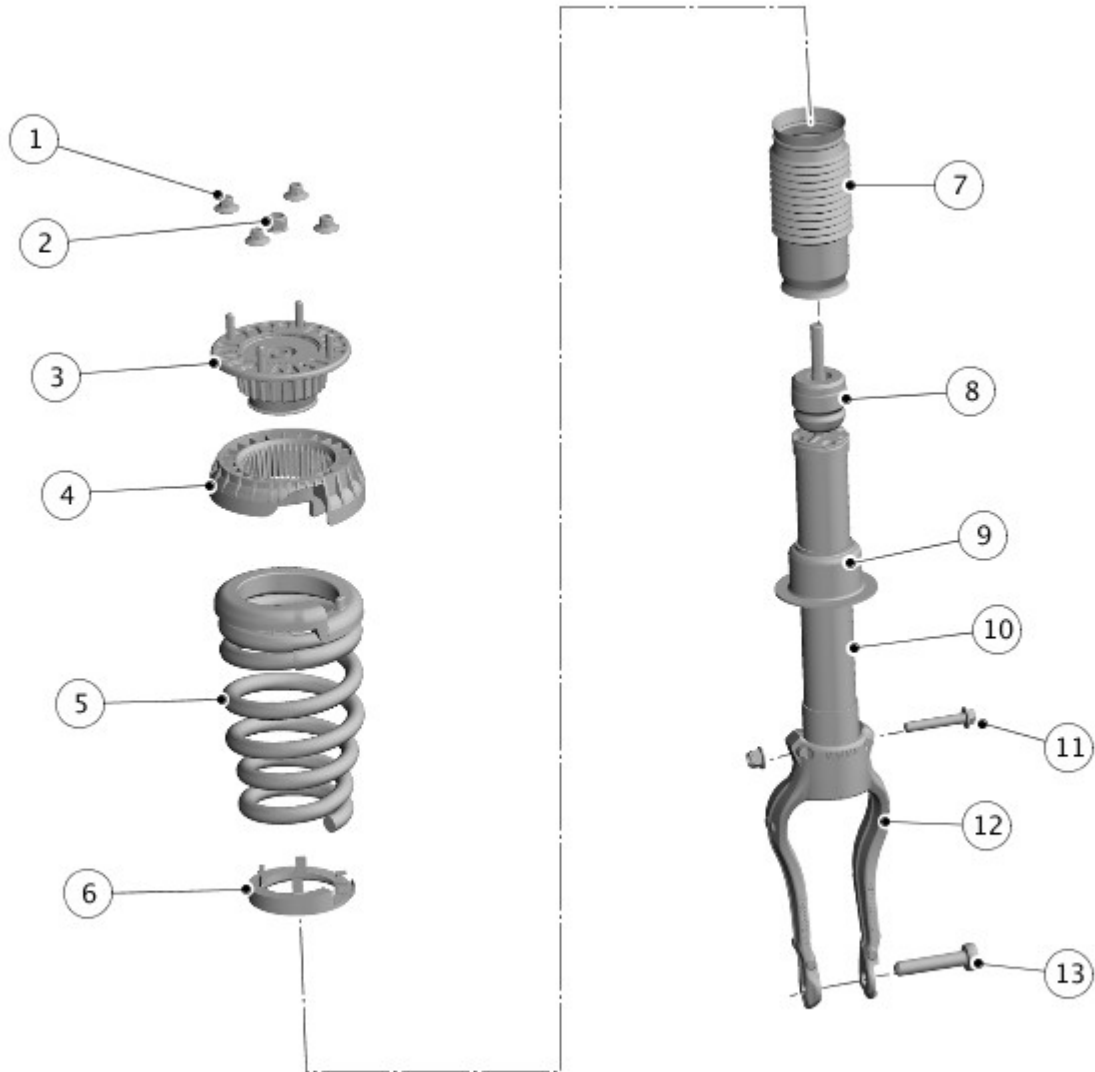
## SPRING AND SHOCK ABSORBER ASSEMBLY - RWD



E153436

Item	Description
1	Shock absorber self-locking nut
2	Top mount self-locking nut (4 of)
3	Top mount
4	Upper spring seat
5	Spring
6	Lower spring seat
7	Gaiter
8	Spring aid
9	Spring seat
10	Shock absorber
11	Bolt

SPRING AND SHOCK ABSORBER ASSEMBLY - AWD



E171250

Item	Description
1	Top mount self-locking nut (4 of)
2	Shock absorber self-locking nut
3	Top mount
4	Upper spring seat
5	Spring
6	Lower spring seat
7	Gaiter
8	Spring aid
9	Spring seat
10	Shock absorber
11	Bolt
12	Yoke
13	Bolt

The spring and shock absorber assemblies are located between the rear lower arm and the front suspension housing in the inner wing. There are two shock absorber variants:

- A conventional oil shock absorber shock absorber.

- On vehicles with the adaptive dynamics system, a continuously variable adaptive shock absorber. For additional information, refer to: [Vehicle Dynamic Suspension](#) (204-05 Vehicle Dynamic Suspension, Description and Operation).

Different combinations of springs and shock absorbers are available depending on the vehicle model. The conventional and adaptive shock absorber assemblies are of a similar construction.

The shock absorbers are a monotube design with a spring seat located on the shock absorber tube. The lower end of the shock absorber has a forked mounting with a cross hole and captive nut. The yoke locates over the rear lower control arm and is secured with a bolt.

The shock absorber functions by restricting the flow of oil through internal galleries in the shock absorber piston, providing damping of undulations in the road surface.

The shock absorber piston is connected to a shock absorber rod which is sealed at its exit point from the shock absorber body. The threaded outer end of the shock absorber rod locates through a hole in the top mount. A self-locking nut secures the top mount to the shock absorber rod. On adaptive shock absorbers an electrical connector is incorporated into the outer end of the shock absorber rod.

The shock absorber rod is fitted with a spring aid which prevents the top mount making contact with the top of the shock absorber body during full suspension compression and also assists with the suspension tune.

The spring rate of the coil springs can differ between models and are color coded for identification. The coil spring locates on a spring seat and a lower spring seat which is integral with the shock absorber body. The spring locates in an upper spring seat which is located on the underside of the top mount.

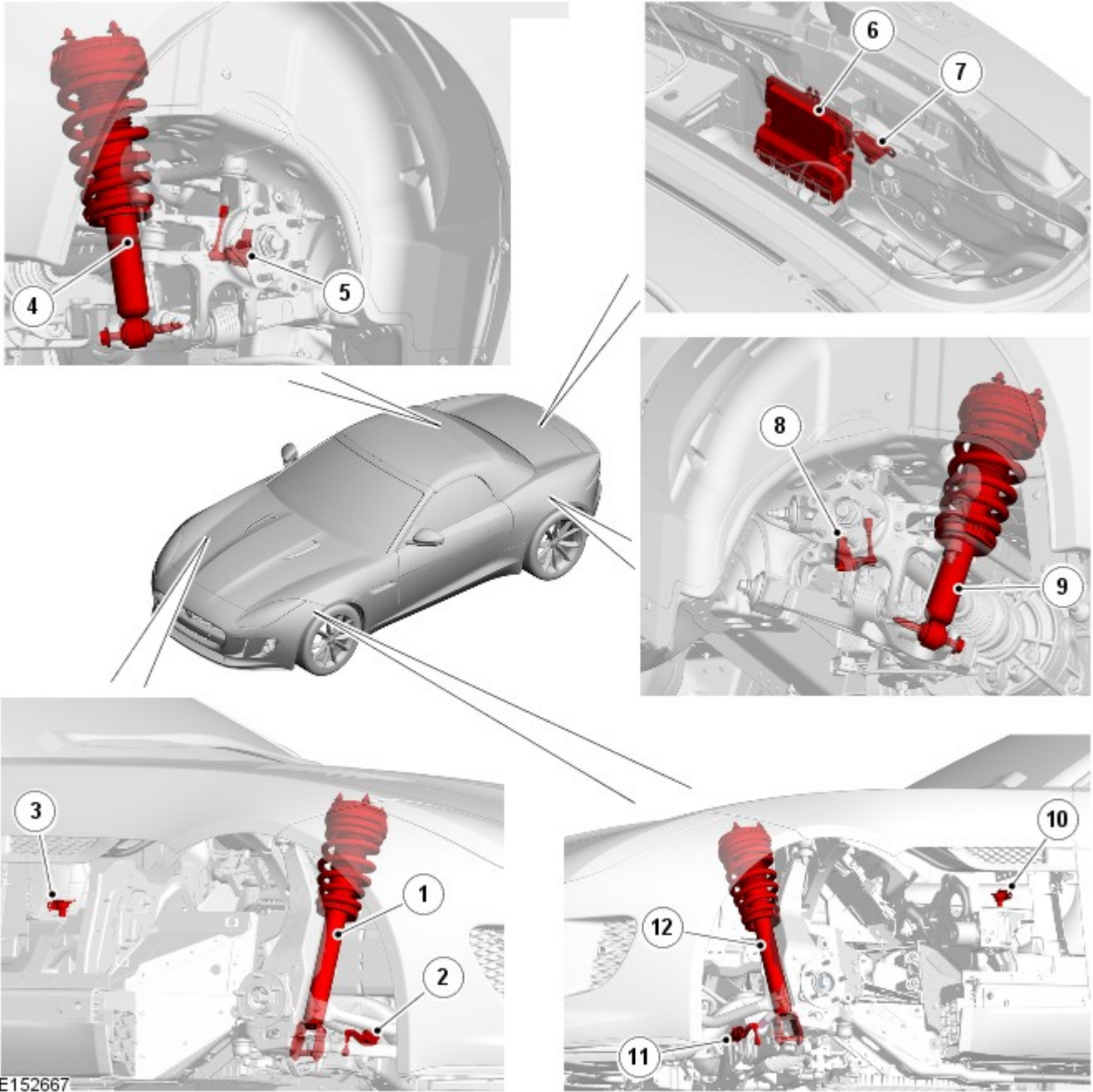
The top mount has four studs which locate through mating holes in the vehicle inner wing and are secured with self-locking nuts.

Published: 07-Jan-2015

## **Vehicle Dynamic Suspension - Vehicle Dynamic Suspension**

Description and Operation

### **COMPONENT LOCATION**



E152667

Item	Description
1	Shock absorber and spring - right front
2	Height sensor - right front
3	Accelerometer - right front
4	Shock absorber and spring - right rear
5	Height sensor - right rear
6	ISCM (Integrated Suspension Control Module)
7	Accelerometer - rear
8	Height sensor - left rear
9	Shock absorber and spring - left rear
10	Accelerometer - left front
11	Height sensor - left front
12	Shock absorber and spring - left front

## OVERVIEW

A continuously variable damping system, known as adaptive damping is available on certain models. Adaptive damping is an electronically controlled suspension system which continuously adjusts the damping characteristics of the suspension shock absorbers in reaction to the existing driving conditions.

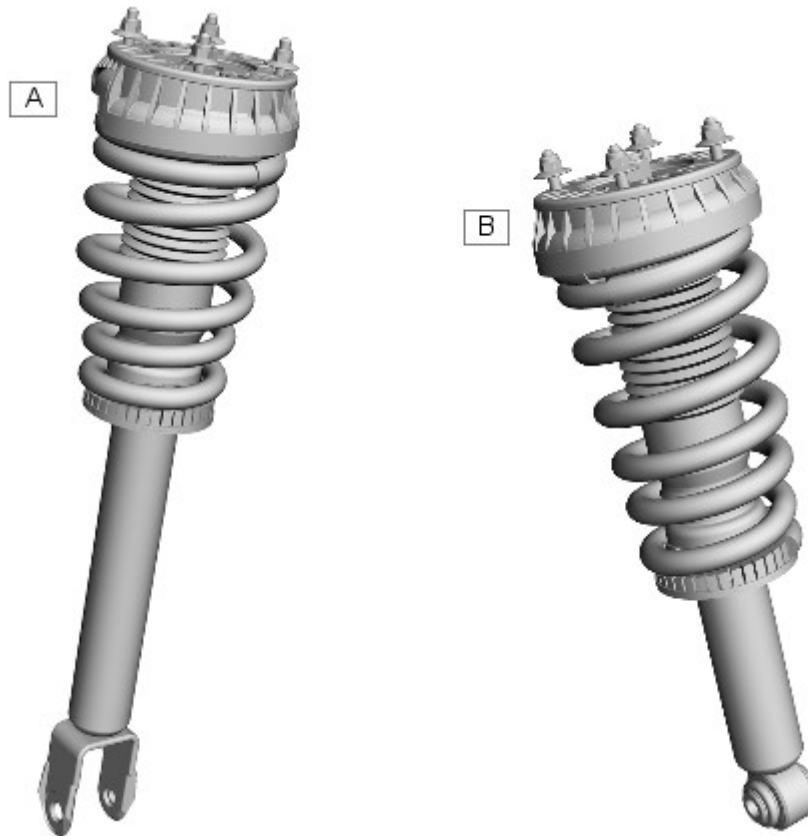
The system is controlled by an ISCM (Integrated Suspension Control Module). The ISCM receives signals from three accelerometers, four suspension height sensors and other vehicle systems to determine:

- vehicle state
- body and wheel motions
- driver inputs.

These signals are used by the ISCM to continuously control the damping characteristics of each shock absorber to the appropriate level to provide the optimum body control and vehicle ride.

## DESCRIPTION

### Shock Absorbers



E152669

Item	Description
A	Front shock absorber and spring
B	Rear shock absorber and spring

The adaptive shock absorbers are nitrogen gas and oil filled monotube units. The shock absorbers are continuously variable, which allows the damping force to be electrically adjusted when the vehicle is being driven. The shock absorbers provide the optimum compromise between vehicle control and ride comfort.

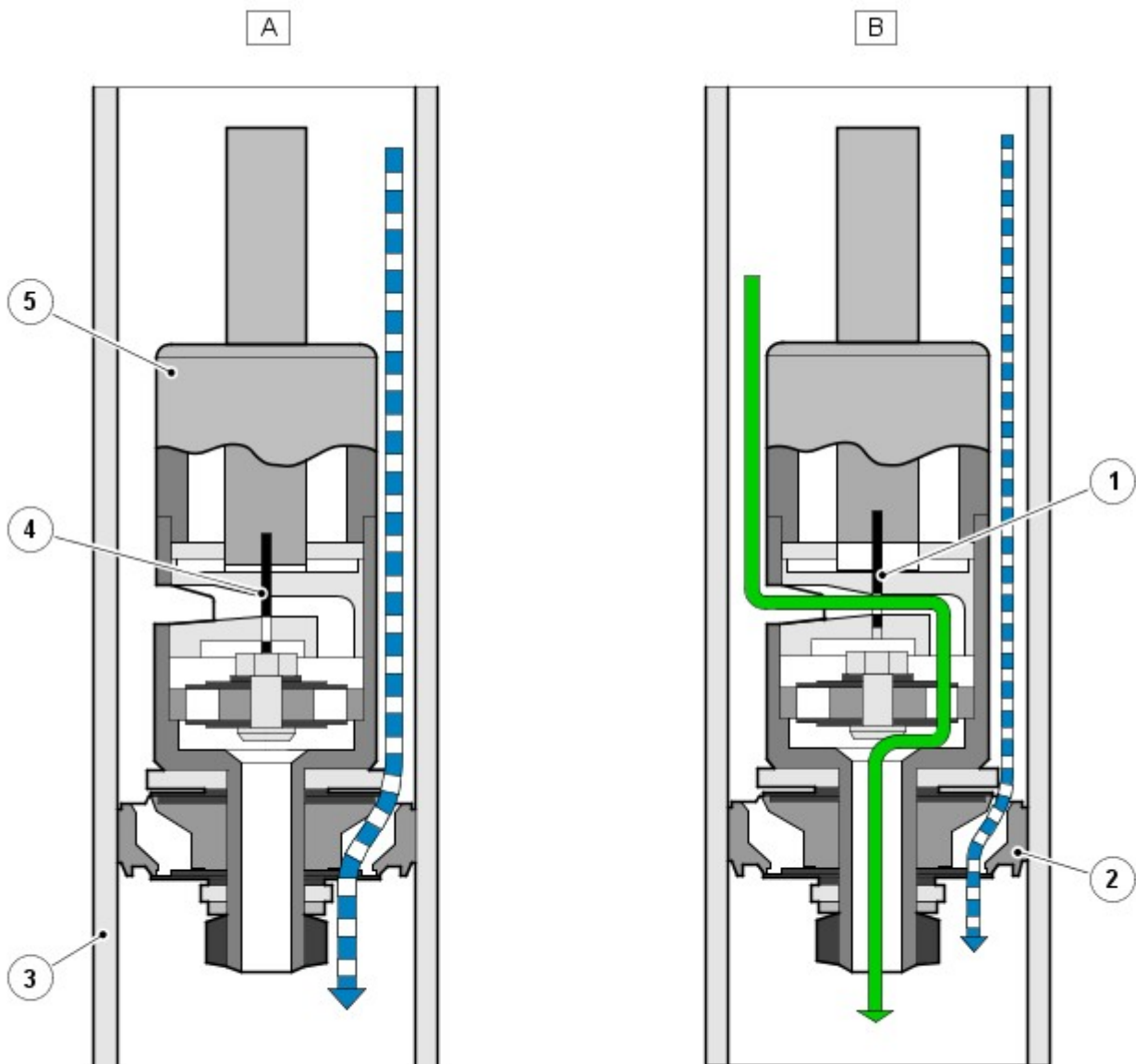
The shock absorbers have an electrical connector on the end of the piston rod, in the center of the top mount.

In each shock absorber, the damping adjustment is achieved by a variable orifice operated by a solenoid. The orifice is used to open up alternative paths to allow oil-flow within the shock absorber. When de-energized the bypass is closed and all the oil flows through the main (firm) piston. When energized the solenoid moves an armature and control blade, which work against a spring. The control blade incorporates an orifice which slides inside a sintered housing to open up the bypass as required. When the shock absorber is compressed the oil flows from the lower portion of the shock absorber then through a hollow piston rod, which is a separate soft (comfort) valve. The oil then flows through the slider housing and orifice and into the upper portion of the shock absorber, thereby bypassing the main (firm) valve. In rebound the oil flows in the opposite direction.

In the firm setting oil flows through the main (firm) valve only, although when the bypass is opened by variable amounts, the oil flows through both valves allowing the shock absorber to operate in a softer setting. When fully energized the solenoid moves the armature and therefore the slider to the maximum extension and opens the orifice completely. The shock absorber operates continuously between these two boundary conditions.

The solenoid in each shock absorber is operated by a 526 Hz PWM (Pulse Width Modulation) signal from the ISCM. The ISCM controls the PWM duty ratio to provide 1.5 A to operate the shock absorber in the soft setting. When de-energized (0.0 A) the shock absorber is in the firm setting. The current varies continuously as required to increase and decrease the damping individually in each of the shock absorbers.

### Sectioned Views of Shock Absorber Operating States



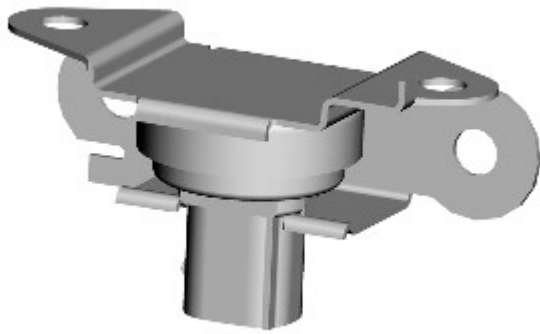
E105350



Item	Description
A	Firm setting
B	Soft setting
C	Main oil flow
D	Bypass oil flow
1	Bypass valve (open)
2	Main valve
3	Tube
4	Bypass valve (closed)
5	Piston and rod assembly

### Accelerometers





E105087

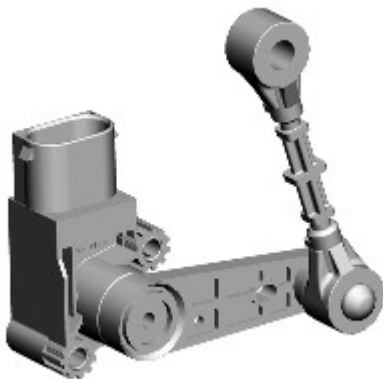
Three accelerometers are used in the adaptive damping system; two at the front of the vehicle and one at the rear.

The accelerometers measure acceleration in the vertical plane and output a corresponding analogue signal to the ISCM. The algorithms in the ISCM calculate the heave, pitch and roll motions of the vehicle, which are used by the controller to control road induced body motion.

Each accelerometer is connected to the ISCM via three wires, which supply ground, 5 V supply and signal return.

The sensing element comprises a single parallel plate capacitor, one plate of which moves relative to the other dependent on the force (acceleration) applied. This causes the capacitance to change as a function of applied acceleration. This capacitance is compared with a fixed reference capacitor in a bridge circuit and the signal is processed by means of a dedicated integrated circuit to generate an output voltage that varies as a function of applied acceleration. The sensors output a signal voltage of approximately  $1 \text{ V/g} \pm 0.05 \text{ V/g}$ . When the vehicle is stationary, each accelerometer outputs approximately 2 volts.

### Suspension Height Sensors



E105088

Four suspension height sensors are used in the adaptive damping system, two for the front suspension and two for the rear suspension. A front suspension height sensor is attached to each side of the front subframes and connected by a sensor arm and sensor link to the related lower lateral arm of the front suspension. A rear suspension height sensor is attached to each side of the rear subframe and connected by a sensor arm and sensor link to the related upper control arm of the rear suspension.

The right suspension height sensors are dual output, with separate outputs for the adaptive damping system and for the AFS (adaptive front lighting system). The left suspension height sensors are single output, for the adaptive damping system only.

On each suspension height sensor, the sensor arm and sensor link convert linear movement of the suspension into rotary movement of the sensor shaft. The suspension height sensors measure suspension displacement at each corner of the vehicle and output a corresponding analogue signal to the ISCM. The algorithms in the ISCM calculate the position, velocity and frequency content of the signals and use the results for wheel control.

Each suspension height sensor is connected to the ISCM via three wires, which supply ground, 5 V supply and signal return.

The sensing element consists of Hall effect devices arranged to measure the direction of the magnetic field of a small magnet attached to the end of the sensor shaft. As the sensor shaft rotates, so do the lines of magnetic flux from the magnet. The signals from the Hall effect devices are processed by means of a dedicated integrated circuit to generate an output voltage that varies as the sensor shaft is rotated. The sensor has a measurement range of  $\pm 40^\circ$  around its nominal position and the nominal sensitivity is  $57 \text{ mV/}^\circ$  of shaft rotation.

### Integrated Suspension Control Module (ISCM)



E152668

The ISCM is installed at the rear of the vehicle.

#### System Fault Message

If a fault is detected by the ISCM, a message is sent via the high speed CAN (controller area network) to the instrument cluster and the message ADAPTIVE DAMPING FAULT is displayed. The ISCM also logs an appropriate DTC (Diagnostic Trouble Code). The ISCM can be interrogated using a Jaguar approved diagnostic system.

When a fault is detected, the ISCM implements a strategy based on the type of fault. If there is an electrical power fault, or the ISCM cannot control the shock absorbers, they default to the firm condition. If a sensor fails that only affects one or more control modes then an intermediate damper setting is used as the lower threshold and the remaining working modes can demand higher damping as required. In the event of a high speed CAN bus fault, the shock absorbers are fixed at an intermediate setting (no control) or default to the firm condition, depending on the severity of the fault.

## OPERATION

The ISCM uses a combination of information from other system modules and data from the accelerometers and suspension height sensors to measure the vehicle and suspension states and driver inputs. Using this information, the ISCM applies algorithms to control the shock absorbers for the current driving conditions.

The ISCM receives the following signals on the high speed CAN bus from the stated system components:

- Brake Pressure - ABS (Anti-lock Brake System) control module.
- Brake Pressure Quality Factor - ABS control module.
- Centre Differential Range Actual - ECM (Engine Control Module).
- Engine Speed - ECM.
- Engine Speed Quality Factor - ECM.
- Engine Torque Flywheel Actual - ECM.
- Engine Torque Flywheel Actual Quality Factor - ECM.
- Gear Position Target - TCM (Transmission Control Module).
- Lateral Acceleration - ABS control module.
- Power Mode (Ignition Signal) - CJB (Central Junction Box).
- Power Mode Quality Factor - CJB.
- Roll Stability Control Mode - ABS control module.
- Steering Wheel Angle - ABS control module.
- Steering Wheel Angle Speed - ABS control module.
- Steering Wheel Angle Status - ABS control module.
- Terrain Mode Requested - TCS (Transmission Control Switch).
- Torque Converter Slip - TCM.
- Vehicle Speed - ABS control module.
- Vehicle Speed Quality Factor - ABS control module
- Front Left Wheel Speed - ABS control module.
- Front Left Wheel Speed Quality Factor - ABS control module.
- Front Right Wheel Speed - ABS control module.
- Front Right Wheel Speed Quality Factor - ABS control module.
- Rear Left Wheel Speed - ABS control module.
- Rear Left Wheel Speed Quality Factor - ABS control module.
- Rear Right Wheel Speed - ABS control module.
- Rear Right Wheel Speed Quality Factor - ABS control module.

The ISCM also outputs information on the HS (High Speed) CAN (Controller Area Network) Chassis bus for use by other systems as follows:

- Fault Message - instrument cluster.
- Terrain Mode Change Status - TCS.
- Terrain Mode - TCS.

The ISCM monitors the input signals and operates the damper solenoids. The input signals are used in control functions and a force required for each shock absorber, for each function, is calculated. An arbitrator monitors the force requirements from each function and apportions a force to a shock absorber. The force is converted to the appropriate current and sent to the shock absorber.

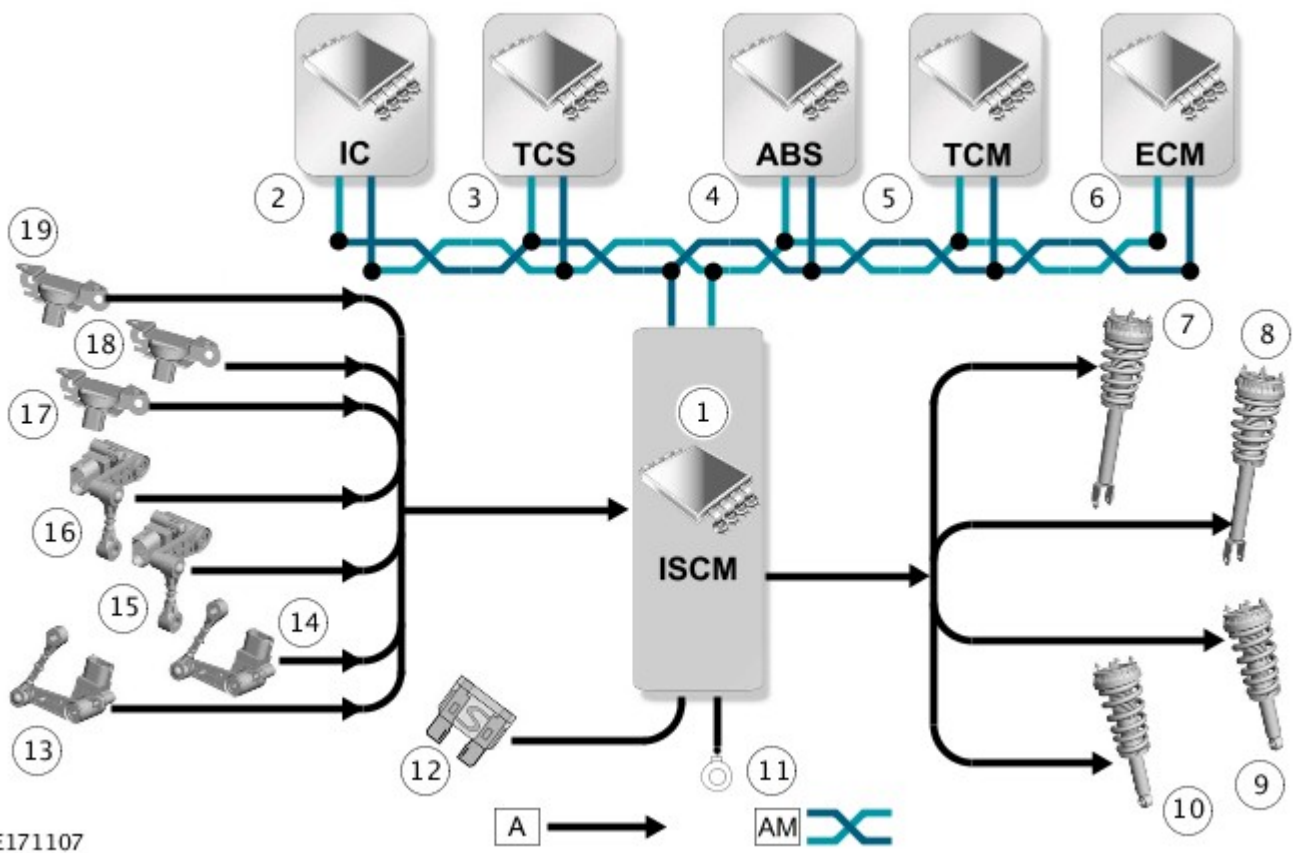
The control functions are as follows:

- Body Control – Uses CAN and accelerometer inputs. Calculates road induced body motions 100 times a second and sets each shock absorber to the appropriate level to maintain a flat and level body.
- Roll Rate Control – Uses CAN inputs. Predicts vehicle roll rate due to driver steering inputs 100 times a second and increases damping to reduce roll rate.
- Pitch Rate Control – Uses CAN inputs. Predicts vehicle pitch rate due to driver throttle and braking inputs 100 times a second and increases damping to reduce pitch rate.
- Bump Rebound Control – Uses suspension height sensor inputs. Monitors the position of the wheel 500 times a second and increases the damping rate as the shock absorber approaches the end of its travel.
- Wheel Hop Control – Uses suspension height sensor and CAN inputs. Monitors the position of the wheel 500 times a second and detects when the wheel begins to vibrate at its natural frequency and increases the damping to reduce vertical wheel motion.

Under normal road conditions when the vehicle is stationary with the engine running, the shock absorbers are set to the firm condition to reduce power consumption.

The ISCM receives its power supply via a relay and fuse in the CJB. The relay remains energized for a period of time after the ignition is off. This allows the ISCM to record and store any DTC relating to adaptive damping system faults.

### INPUT/OUTPUT DIAGRAM



E171107

A = Hardwired; D = HS (High Speed) CAN (Controller Area Network) chassis systems bus


Item	Description
1	Integrated Suspension Control Module (ISCM)
2	Instrument Cluster (IC)
3	Transmission Control Switch (TCS)
4	Anti-lock Brake System (ABS) control module
5	Transmission Control module (TCM)
6	Engine Control Module (ECM)
7	Spring and shock absorber assembly - right front
8	Spring and shock absorber assembly - left front
9	Spring and shock absorber assembly - right rear
10	Spring and shock absorber assembly - left rear
11	Ground wire

12	Power supply
13	Height sensor - left rear
14	Height sensor - right rear
15	Height sensor - left front
16	Height sensor - right front
17	Accelerometer - rear
18	Accelerometer - left front
19	Accelerometer - right front

## Front Suspension - Shock Absorber RWD

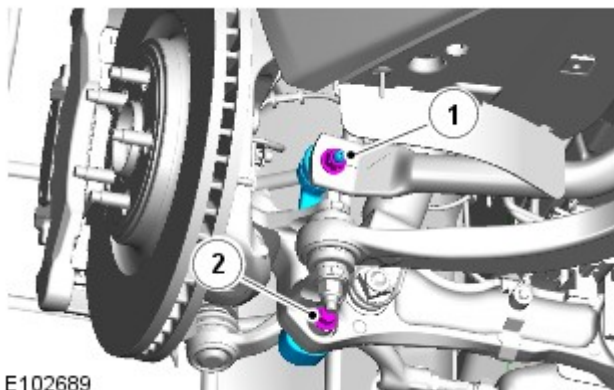
Removal and Installation

### Removal

1.  **WARNING:** Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Raise and support the vehicle.

2. Refer to: [Wheel and Tire](#) (204-04 Wheels and Tires, Removal and Installation).



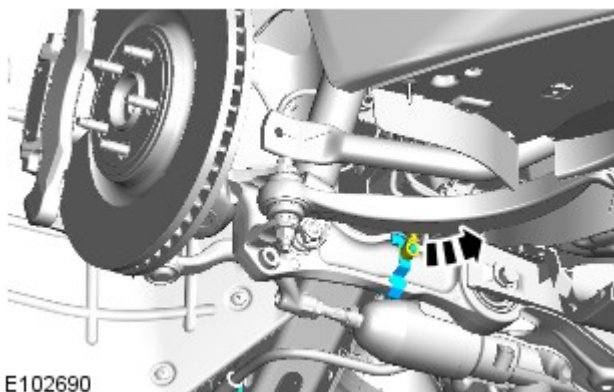
3.  **NOTE:** Use an additional wrench to prevent the ball joint rotating.

- 1

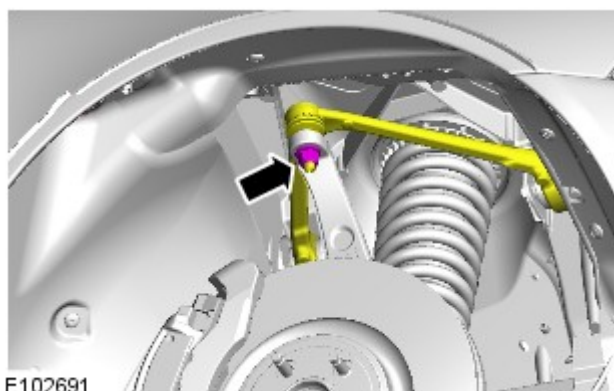
*Torque:* 43 Nm

- 2

*Torque:* 70 Nm



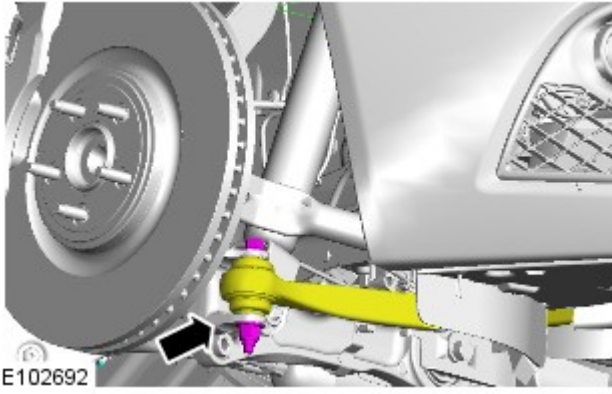
- 4.



5.  **CAUTION:** Discard the nut.

*Torque:* 90 Nm

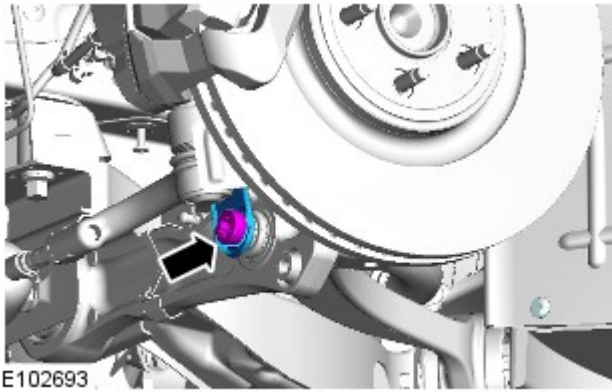
6. **CAUTIONS:**



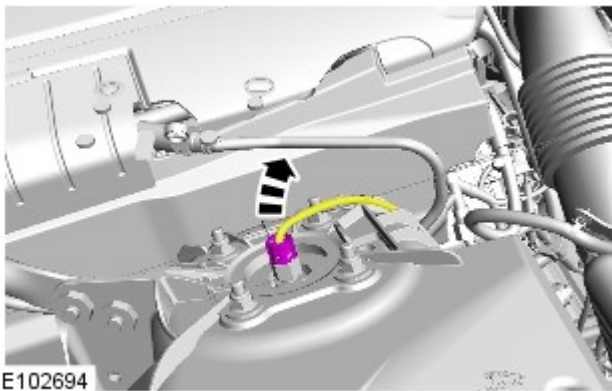
 Discard the bolt.

 Discard the nut.

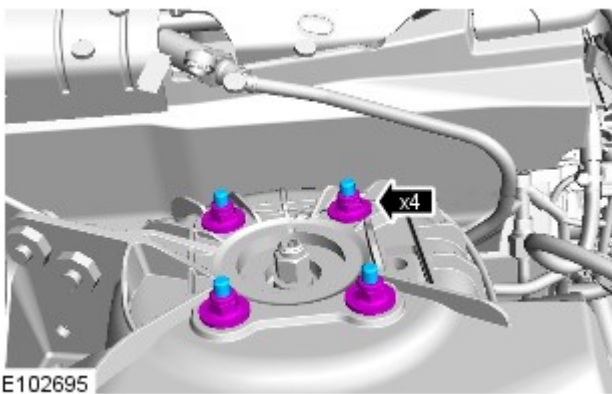
Torque:  
Stage 1: 60 Nm  
Stage 2: 135°



7. Torque: 175 Nm

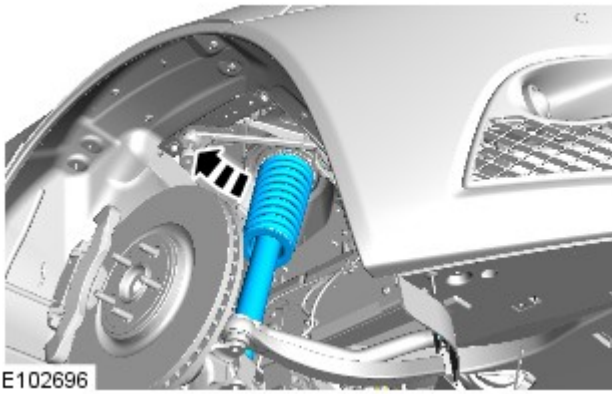


8.

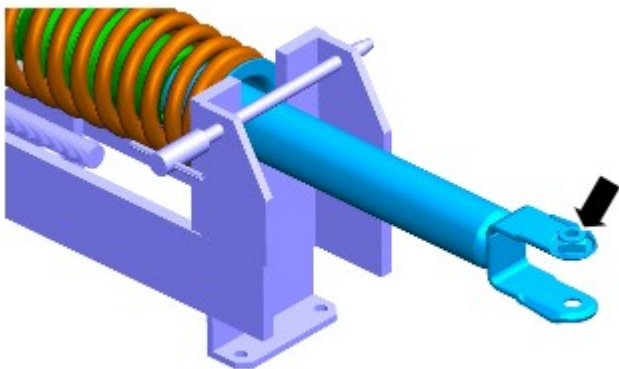



9. Torque: 30 Nm

10.

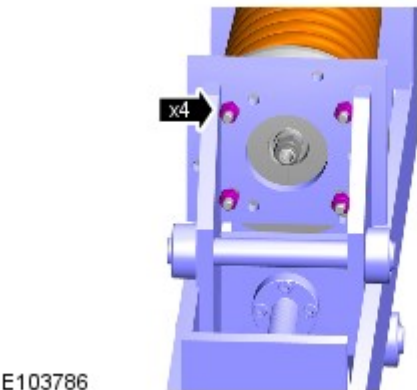


 NOTE: Do not disassemble further if removed for access only.

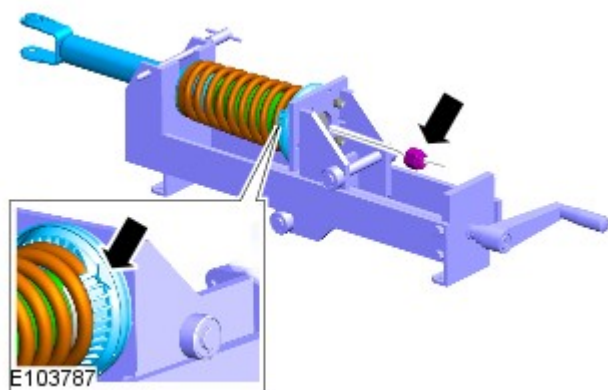


11.  CAUTION: Note the fitted position of the component prior to removal.



- Make sure that the shock absorber and spring assembly is installed to the special tool with the lower mount retaining nut facing upwards.



12.



13. CAUTIONS:

-  Take extra care when handling the component.
-  Note the fitted position of the component prior to removal.

- Make sure that the top mount assembly and isolator remain in position while removing shock absorber.

Torque:

Passive suspension 50 Nm  
Active suspension 27 Nm

Installation

1.  CAUTION: The final tightening of the suspension components must be carried out with the vehicle on its wheels

To install, reverse the removal procedure.

Published: 02-Jul-2014

## Wheels and Tires - Wheel and Tire


Removal and Installation

### Removal



NOTE: Removal steps in this procedure may contain installation details.

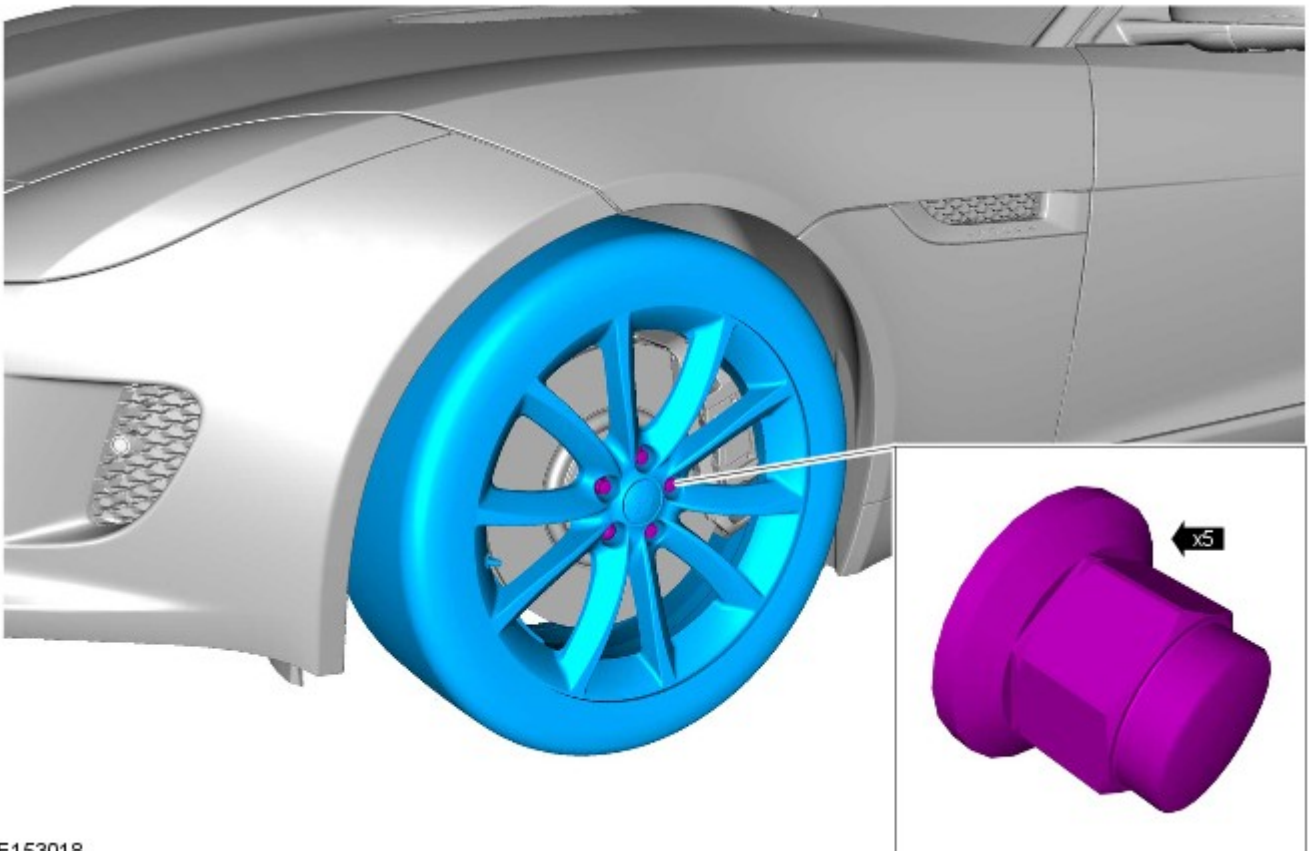
All vehicles

1.  WARNING: Make sure to support the vehicle with axle stands.

Raise and support the vehicle.

2. Torque:

Stage 1 15 Nm  
Stage 2 70 Nm  
Stage 3 125 Nm

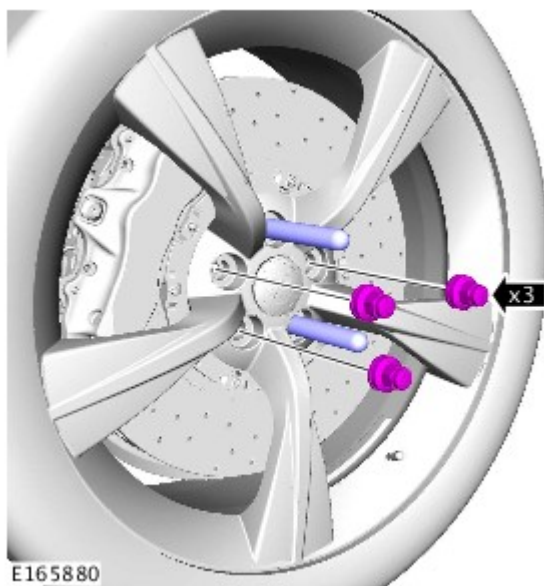
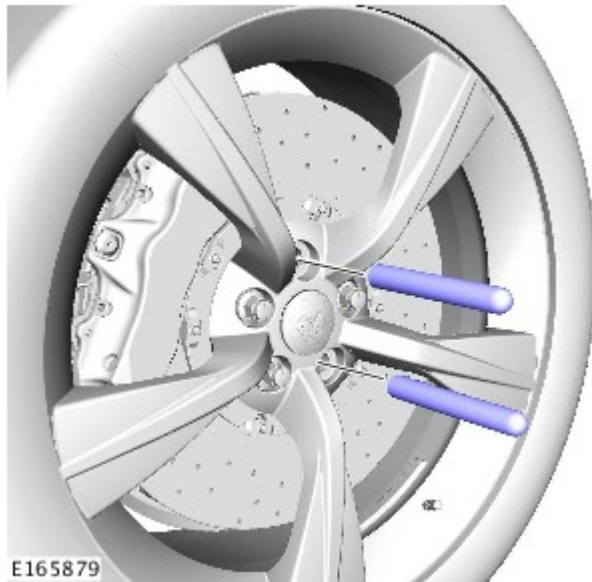
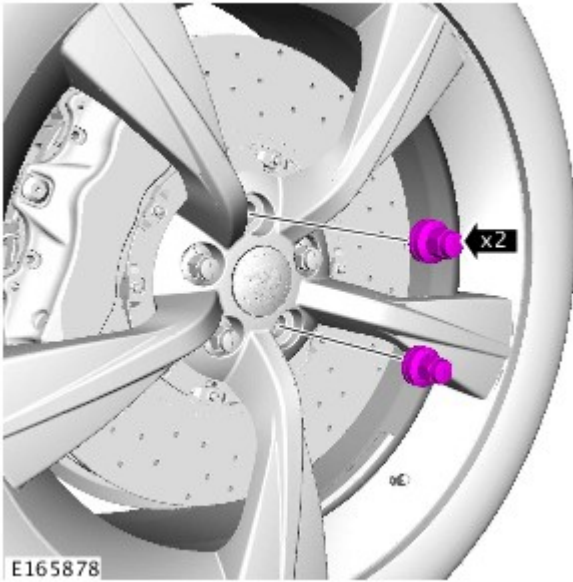


E153018

Vehicles with carbon ceramic brakes

3. Remove 2 opposing wheel nuts.

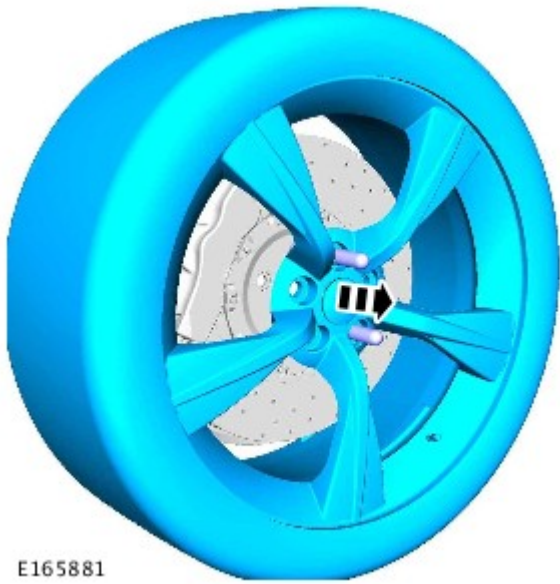




4.  NOTE: On vehicles fitted with carbon ceramic brake discs, remove two opposing wheel nuts and install the wheel guide pins supplied with the vehicle tool kit.

5. Remove the remaining wheel nuts and slide the wheel and tire over the guide tools.

6. Remove the road wheel.



E165881

## Installation

1. To install, reverse the removal procedure.

## Front Suspension - Front Shock Absorber AWD

Removal and Installation

### General Equipment

Suspension Spring Compressor

### Removal

#### NOTES:




Some variation in the illustrations may occur, but the essential information is always correct.



Some components shown removed for clarity.

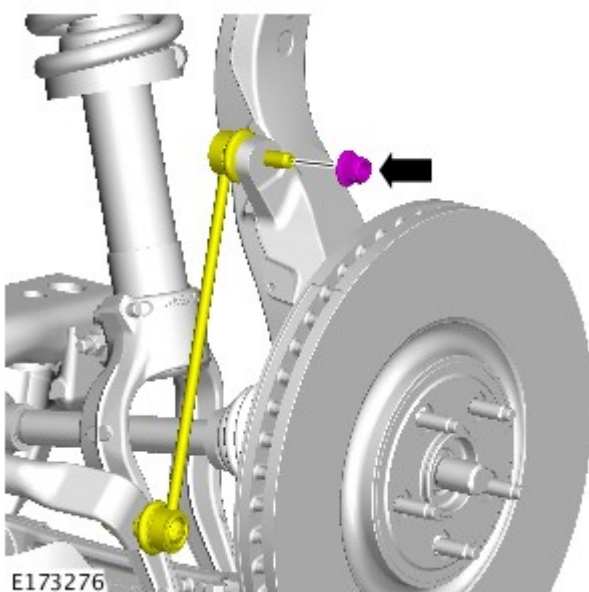


Removal steps in this procedure may contain installation details.

1.  **WARNING:** Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Raise and support the vehicle.

2. Refer to: [Wheel and Tire](#) (204-04 Wheels and Tires, Removal and Installation).

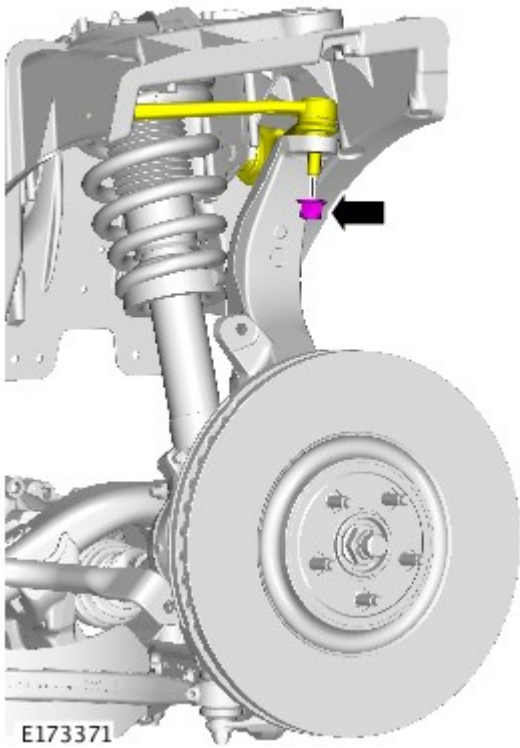


3.  **CAUTION:** Discard the nut.

Torque: 70 Nm

4.  **CAUTION:** Discard the nut.

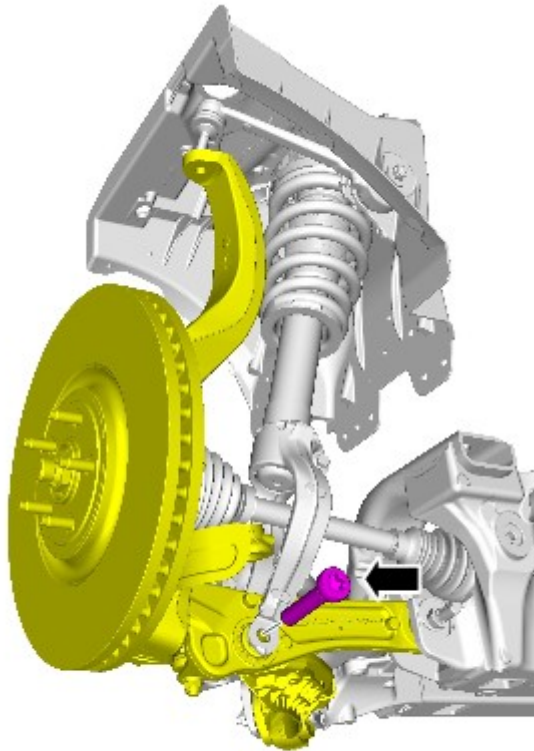
Torque: 90 Nm



E173371

5.  CAUTION: Discard the bolt.

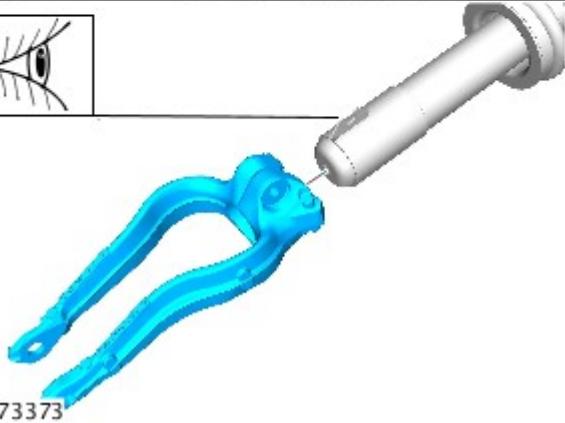
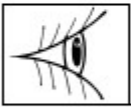
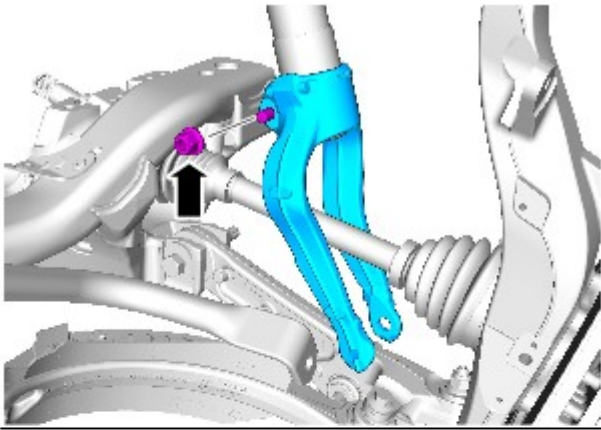
Torque:  
Stage 1: 60 Nm  
Stage 2: 90°



E173372

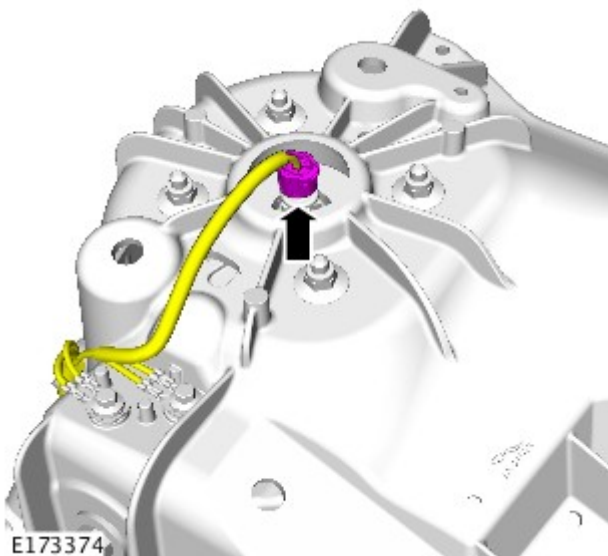
6.  CAUTION: Discard the nut and bolt.

Torque: 60 Nm




E173373

7.  NOTE: Vehicles with active dampers.

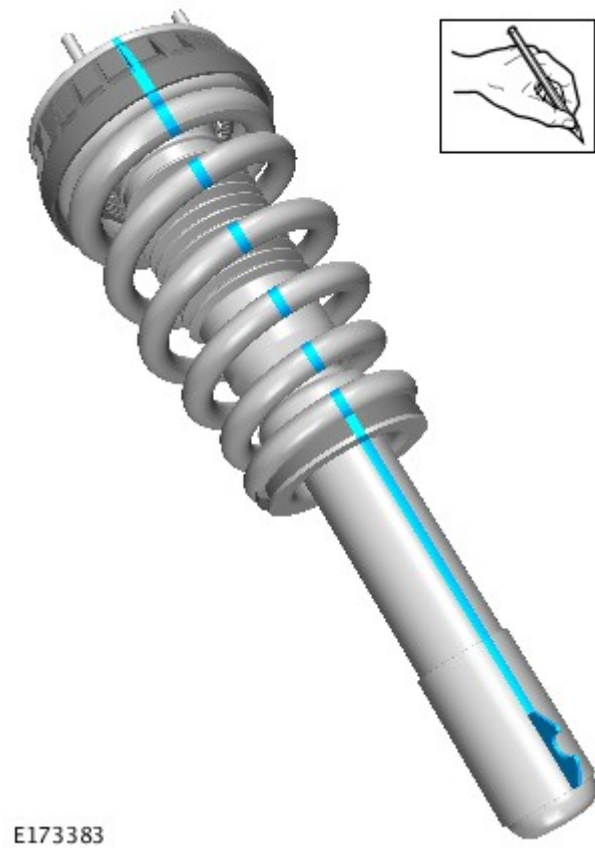
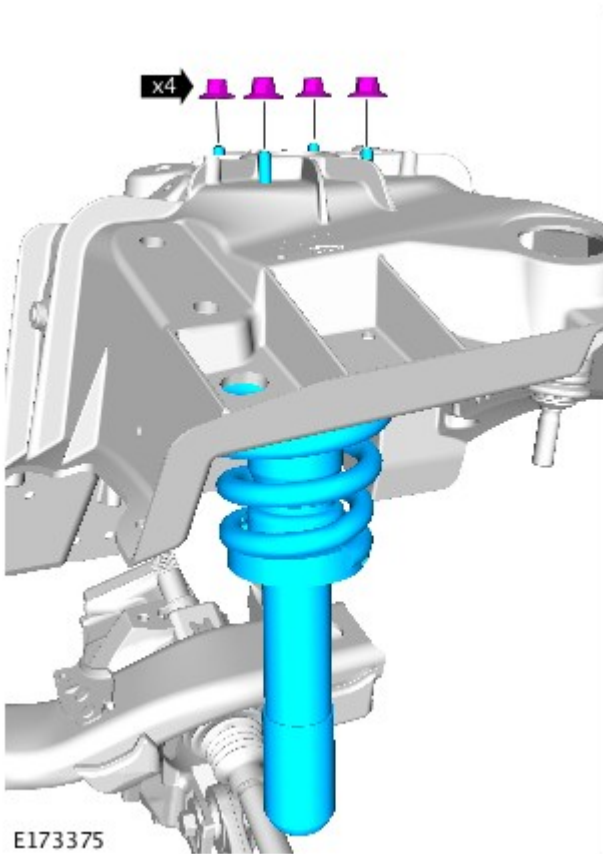


E173374

8.  CAUTION: Discard the nuts.

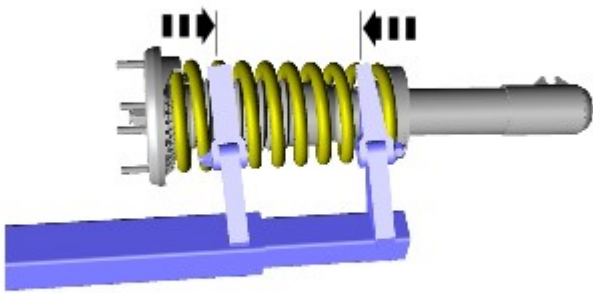
 NOTE: Do not disassemble further if the component is removed for access only.

Torque: 30 Nm



9.  CAUTION: Mark the components to aid installation.

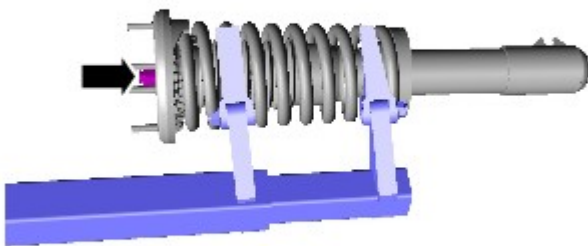
10. General Equipment: [Suspension Spring Compressor](#)



E151855

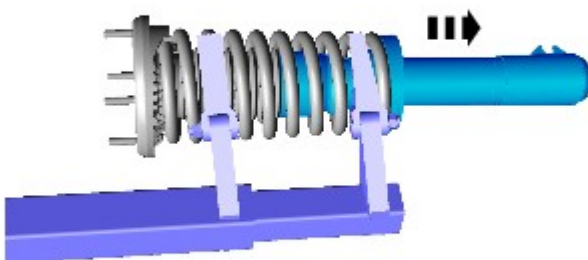
11.  CAUTION: Discard the nut.

Torque: 27 Nm



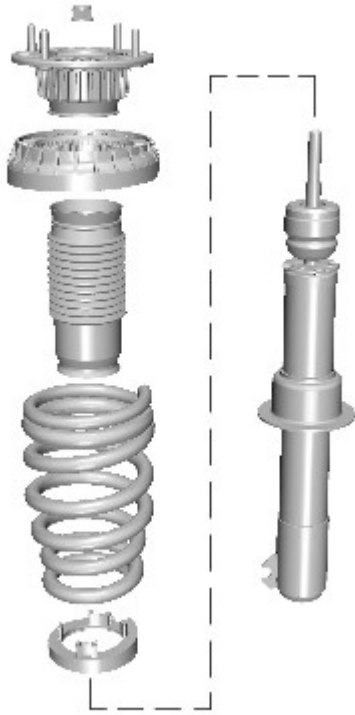
E151854

- 12.



E 151856

13. Inspect the components and renew if damaged or worn.



E173378

## Installation

1. To install, reverse the removal procedure.



## Front Suspension - Stabilizer Bar

Removal and Installation

### Removal

#### NOTES:



Removal steps in this procedure may contain installation details.




Some components shown removed for clarity.



Some variation in the illustrations may occur, but the essential information is always correct.

1. Refer to: [Air Deflector](#) (501-02 Front End Body Panels, Removal and Installation).

2. Refer to: [Fender Splash Shield](#) (501-02 Front End Body Panels, Removal and Installation).

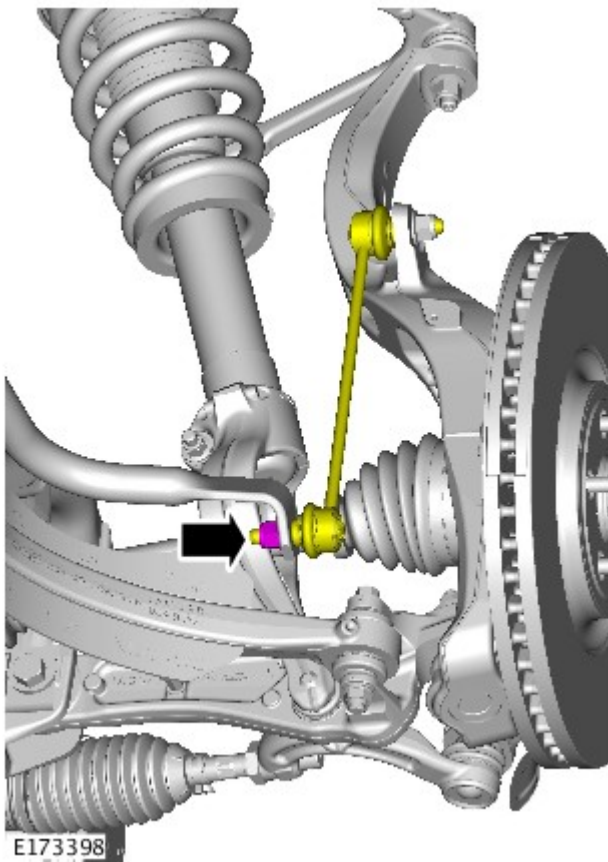
3.  NOTE: RWD vehicles only.

Refer to: [Stabilizer Bar Link - RWD](#) (204-01 Front Suspension, Removal and Installation).

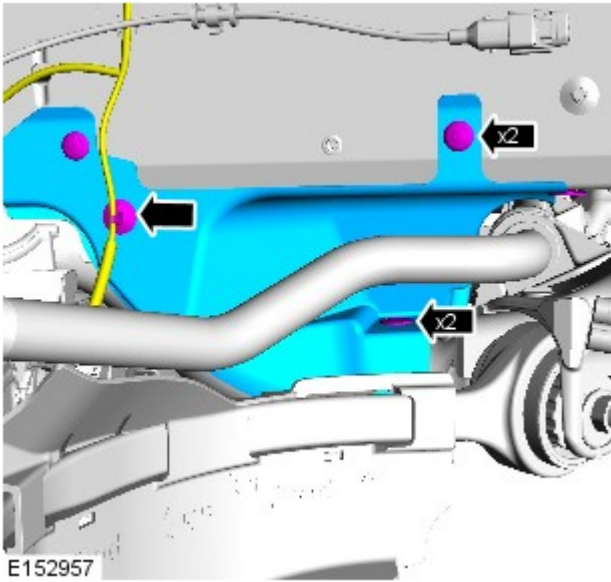
4.  CAUTION: Discard the nut.

 NOTE: AWD vehicles only.

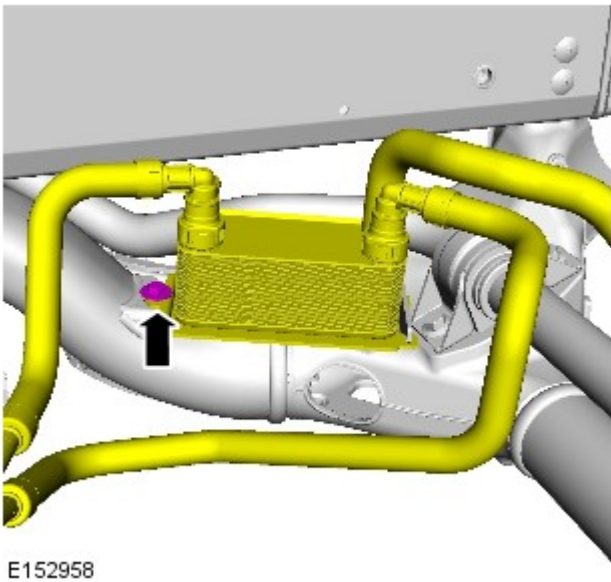
Torque: 70 Nm



5. Repeat this step for the other side.

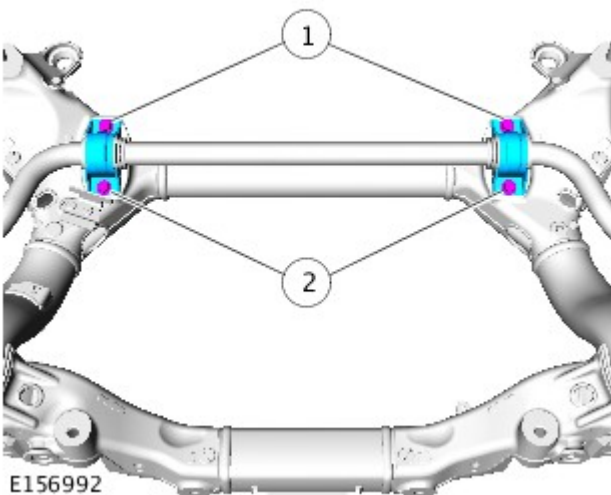


6. Torque: 12 Nm

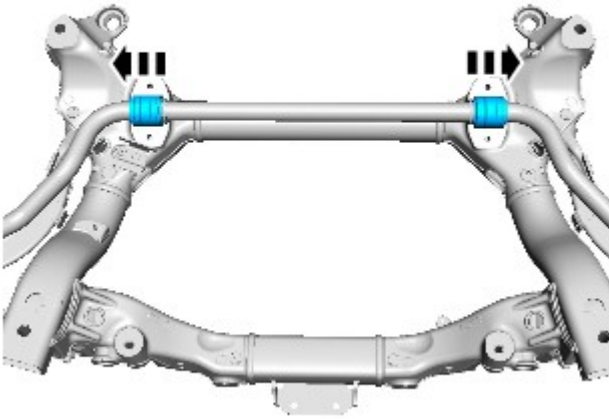


7. During installation tighten the bolts in the following sequence.

Torque:  
 Bolts 1 63 Nm  
 Bolts 2 63 Nm  
 Bolts 1 63 Nm

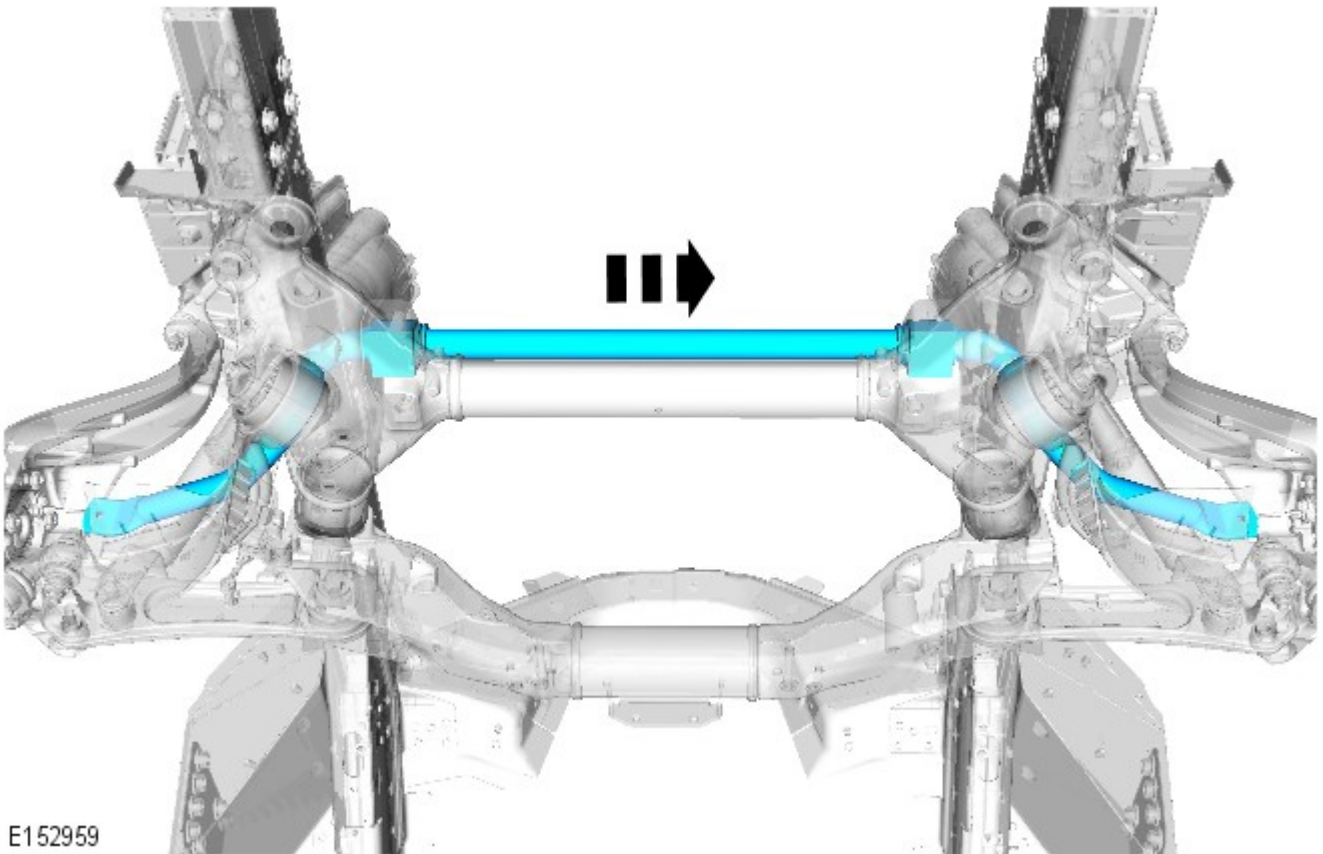


8.



E154239

9.



E152959

## Installation

1. To install, reverse the removal procedure.

Published: 17-Feb-2013

## Front End Body Panels - Fender Splash Shield

Removal and Installation

## Removal

NOTES:

 Removal steps in this procedure may contain installation details.

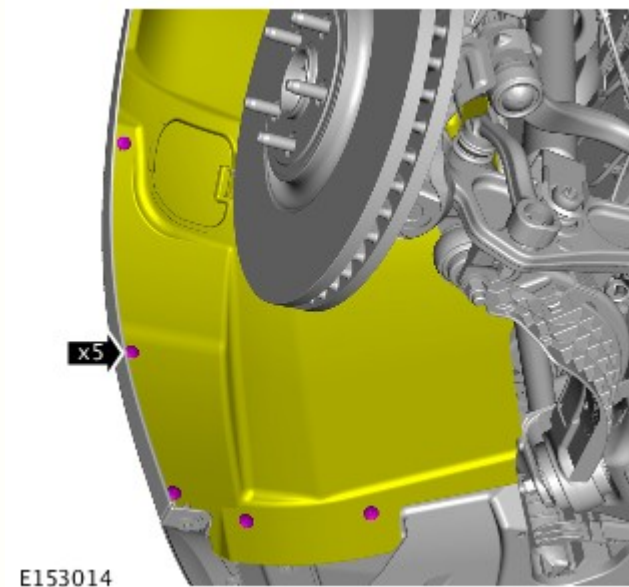
 LH illustration shown, RH is similar.

1.  **WARNING:** Make sure to support the vehicle with axle stands.

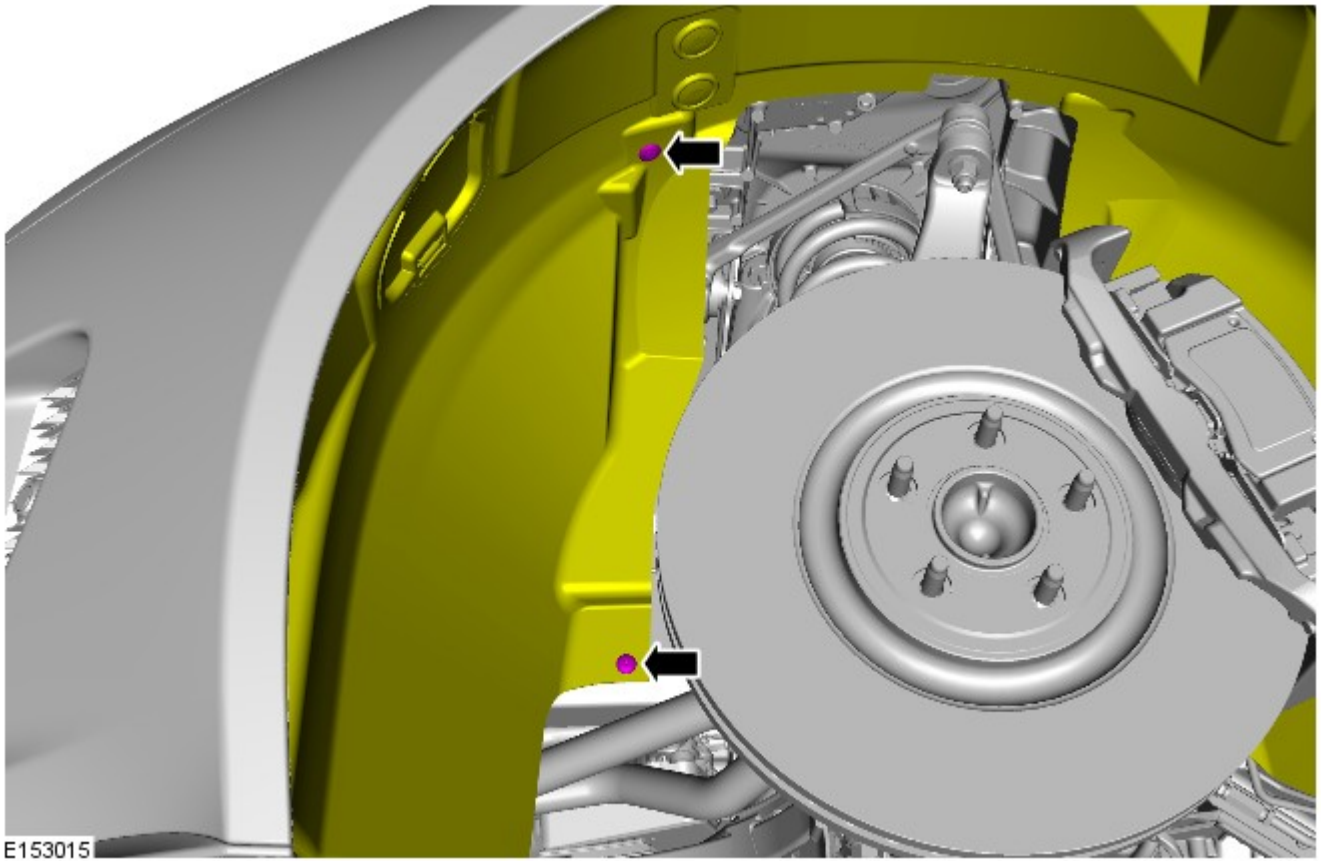
Raise and support the vehicle.

2. Refer to: [Wheel and Tire](#) (204-04 Wheels and Tires, Removal and Installation).

3.

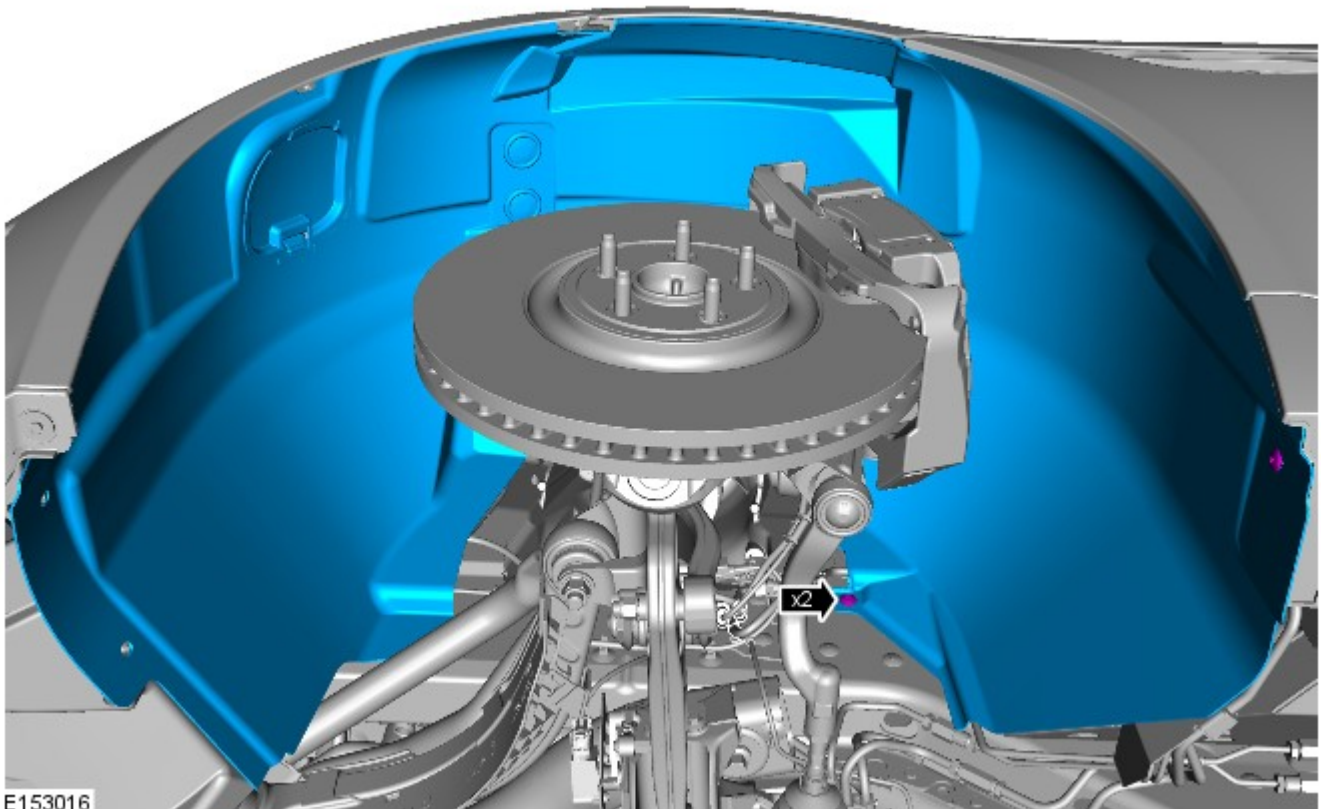


4.



E153015

5.



E153016

Installation

1. To install, reverse the removal procedure.

Published: 05-Nov-2013

## Front Suspension - Stabilizer Bar Link RWD

Removal and Installation

### Removal

#### NOTES:



Removal steps in this procedure may contain installation details.




Some components shown removed for clarity.



Some variation in the illustrations may occur, but the essential information is always correct.

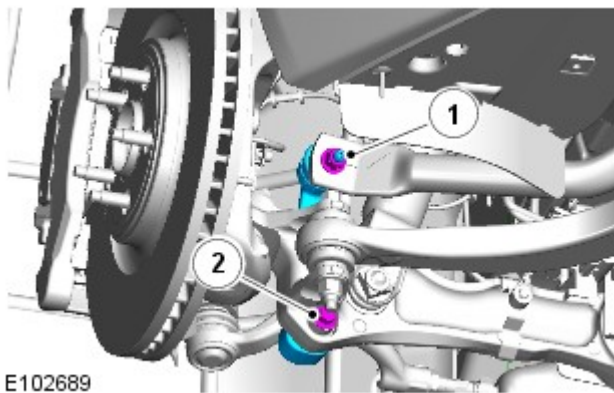


RH shown, LH similar.

1.  **WARNING:** Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Raise and support the vehicle.

2. Refer to: Wheel and Tire (204-04 Wheels and Tires, Removal and Installation).



3.  **CAUTION:** Discard the nuts.

*Torque:*

- |   |              |
|---|--------------|
| 1 | <u>48 Nm</u> |
| 2 | <u>70 Nm</u> |

### Installation

1. To install, reverse the removal procedure.

Published: 07-Jan-2015

## Front End Body Panels - Air Deflector

Removal and Installation

### Removal



**NOTE:** Removal steps in this procedure may contain installation details.

All vehicles

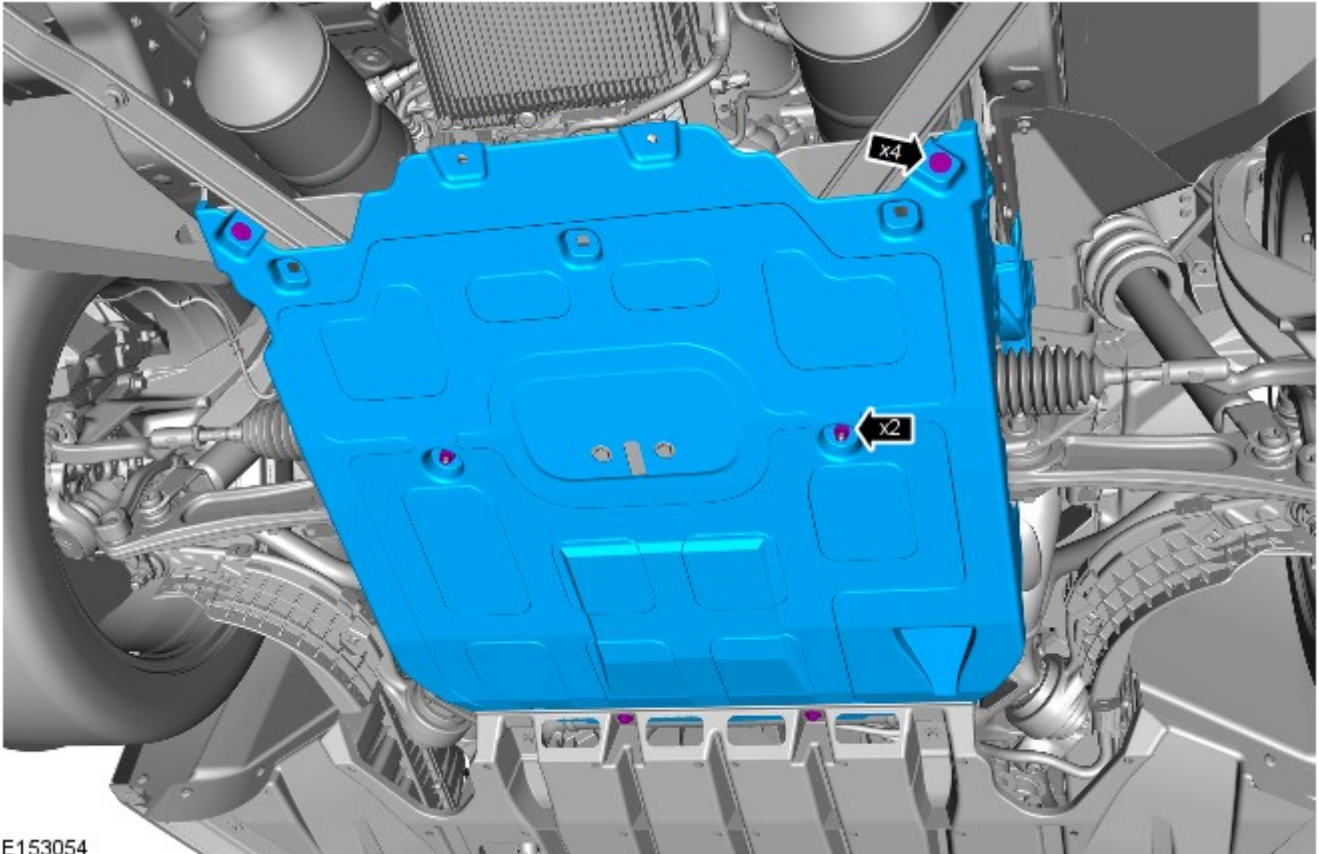
- 1.

 **WARNING:** Make sure to support the vehicle with axle stands.

Raise and support the vehicle.

2WD vehicles

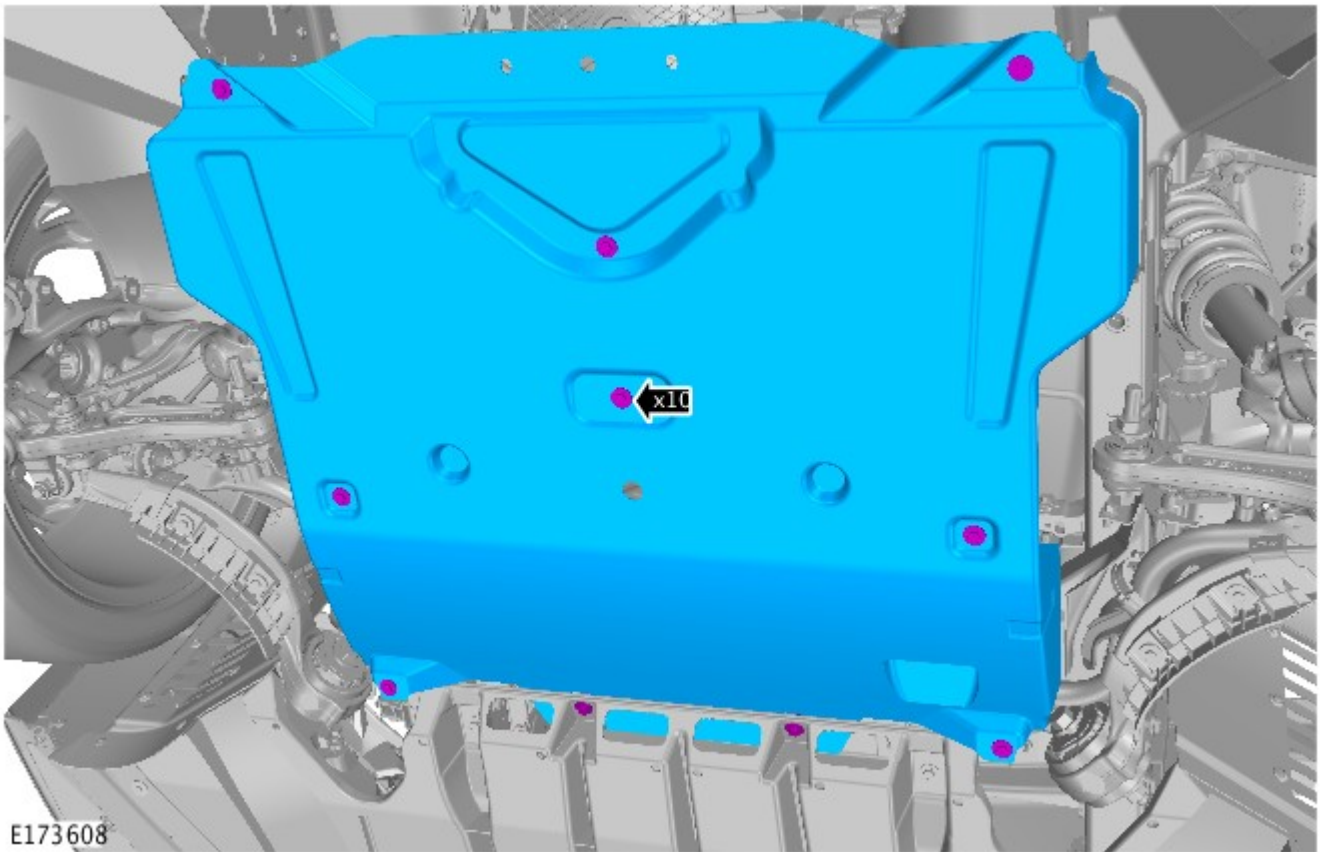
2. Torque: 9 Nm



E153054

4WD vehicles

3. Torque: 9 Nm



## Installation

1. To install, reverse the removal procedure.



## Front Suspension - Stabilizer Bar Link RWD

Removal and Installation

### Removal

#### NOTES:



Removal steps in this procedure may contain installation details.




Some components shown removed for clarity.



Some variation in the illustrations may occur, but the essential information is always correct.

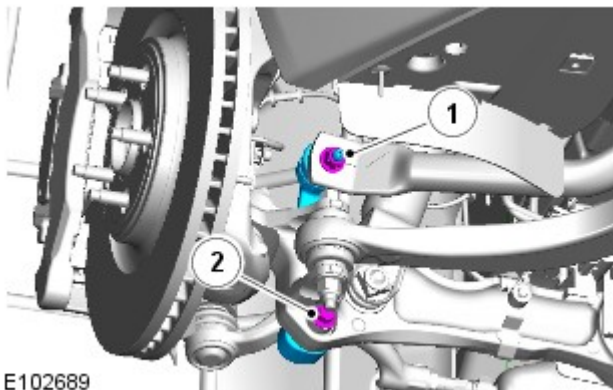


RH shown, LH similar.

1.  **WARNING:** Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Raise and support the vehicle.

2. Refer to: Wheel and Tire (204-04 Wheels and Tires, Removal and Installation).



E102689

3.  **CAUTION:** Discard the nuts.

*Torque:*

- |   |              |
|---|--------------|
| 1 | <u>48 Nm</u> |
| 2 | <u>70 Nm</u> |

### Installation

1. To install, reverse the removal procedure.

## Front Suspension - Stabilizer Bar Link AWD

Removal and Installation

### Removal

#### NOTES:




Some variation in the illustrations may occur, but the essential information is always correct.



Some components shown removed for clarity.



Removal steps in this procedure may contain installation details.

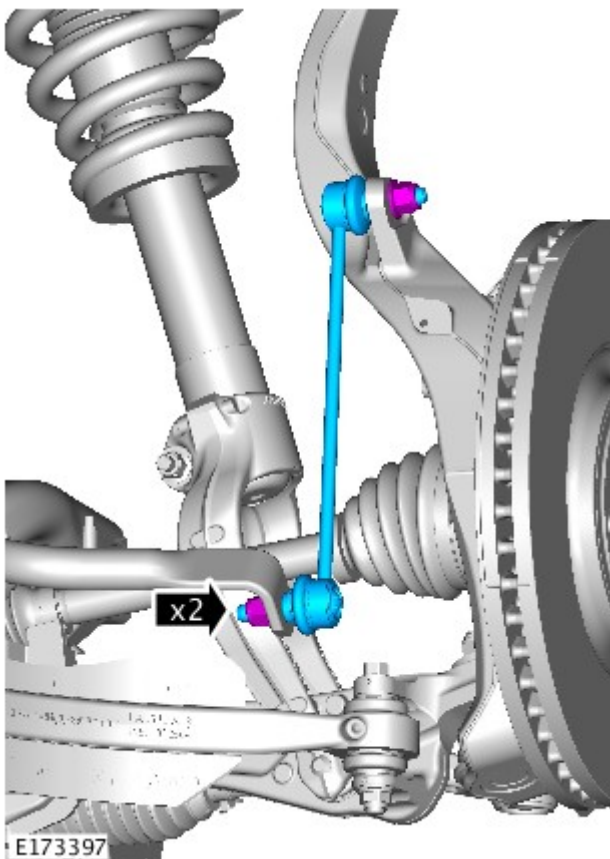
1.  **WARNING:** Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Raise and support the vehicle.

2. Refer to: [Wheel and Tire](#) (204-04 Wheels and Tires, Removal and Installation).

3.  **CAUTION:** Discard the nuts.

Torque: 70 Nm



### Installation

1. To install, reverse the removal procedure.

## Removal



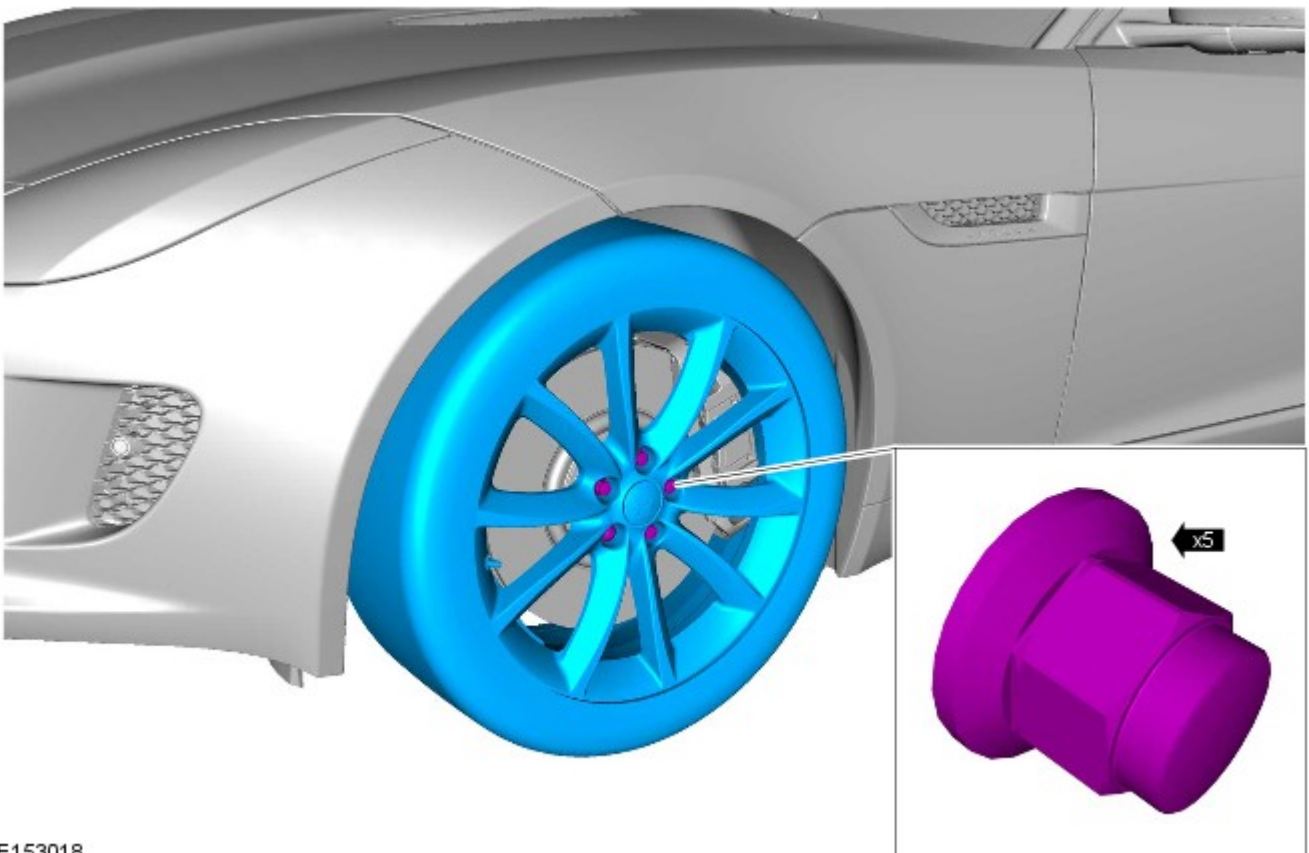
NOTE: Removal steps in this procedure may contain installation details.

All vehicles

1.  **WARNING:** Make sure to support the vehicle with axle stands.

Raise and support the vehicle.

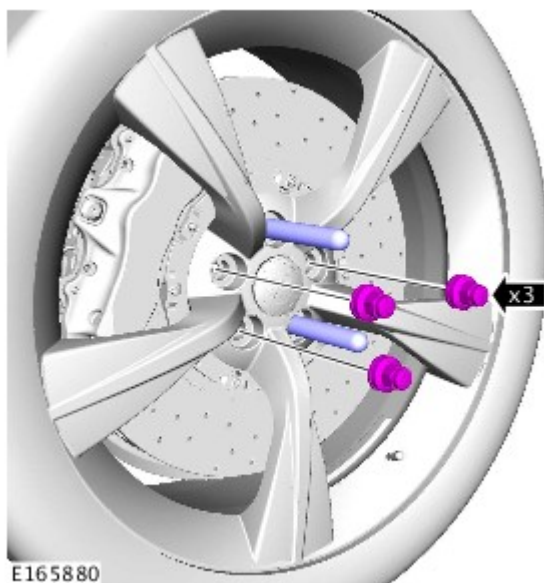
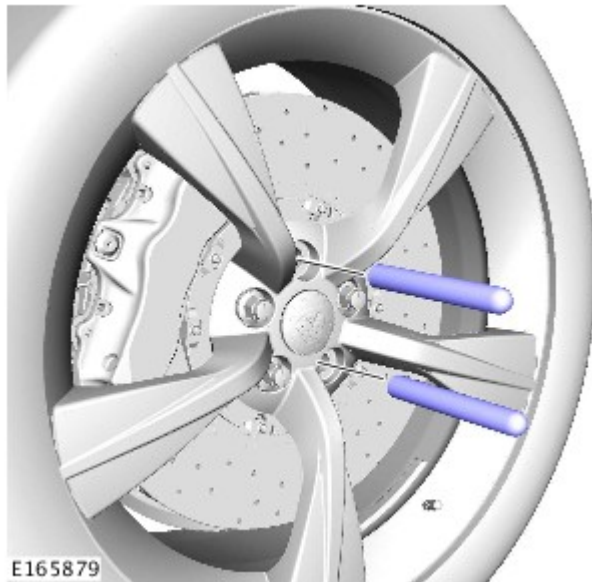
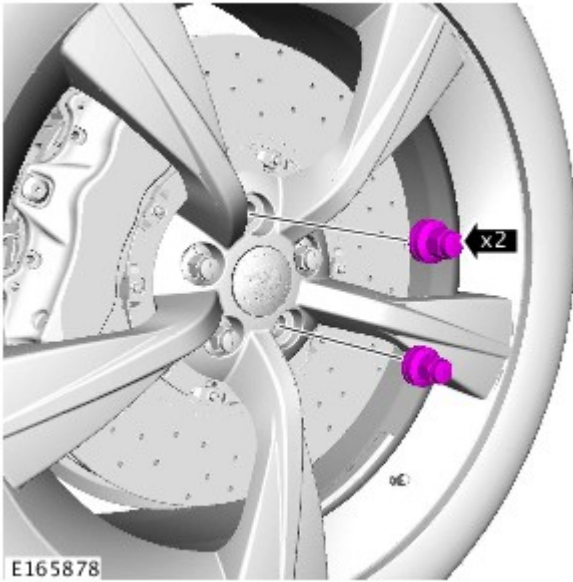
2. *Torque:*
  - Stage 1 15 Nm
  - Stage 2 70 Nm
  - Stage 3 125 Nm



E153018

Vehicles with carbon ceramic brakes

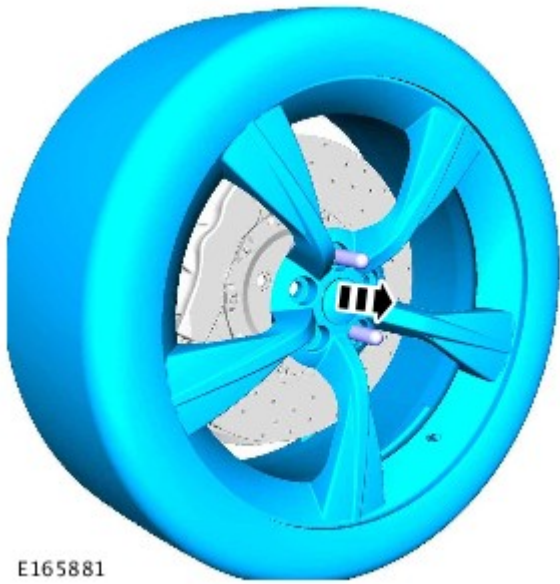
3. Remove 2 opposing wheel nuts.



4.  NOTE: On vehicles fitted with carbon ceramic brake discs, remove two opposing wheel nuts and install the wheel guide pins supplied with the vehicle tool kit.

5. Remove the remaining wheel nuts and slide the wheel and tire over the guide tools.

6. Remove the road wheel.



E165881

## Installation

1. To install, reverse the removal procedure.

## Rear Suspension - Stabilizer Bar


Removal and Installation

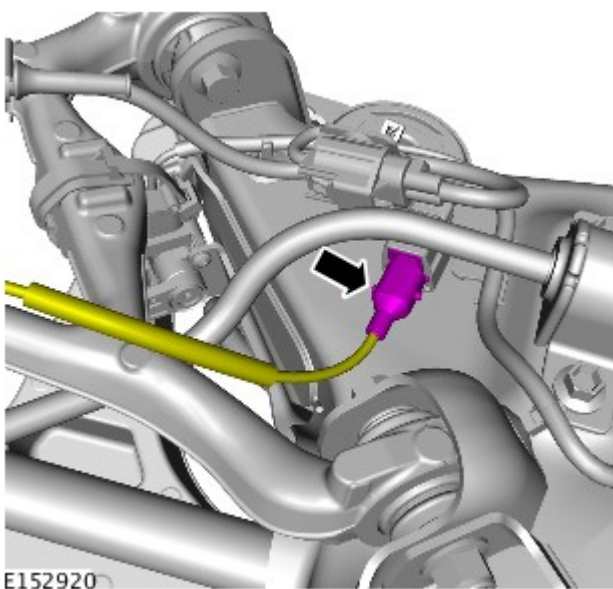
### Removal


1.  **WARNING:** Make sure to support the vehicle with axle stands.

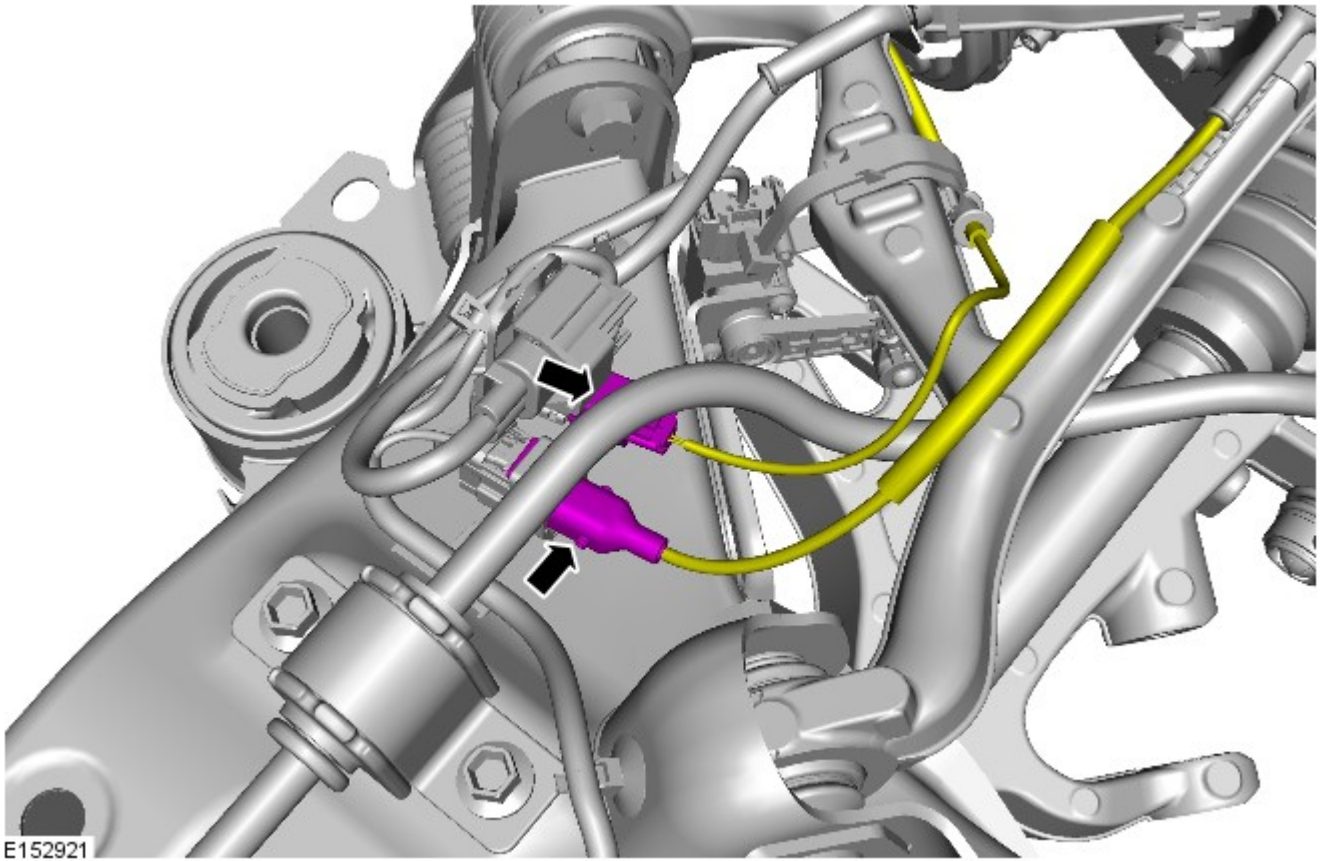
Raise and support the vehicle.

2. Refer to: [Rear Subframe](#) (502-00 Uni-Body, Subframe and Mounting System, Removal and Installation).

3.  **NOTE:** LH side only.



4.  **NOTE:** RH side only.



5. NOTES:

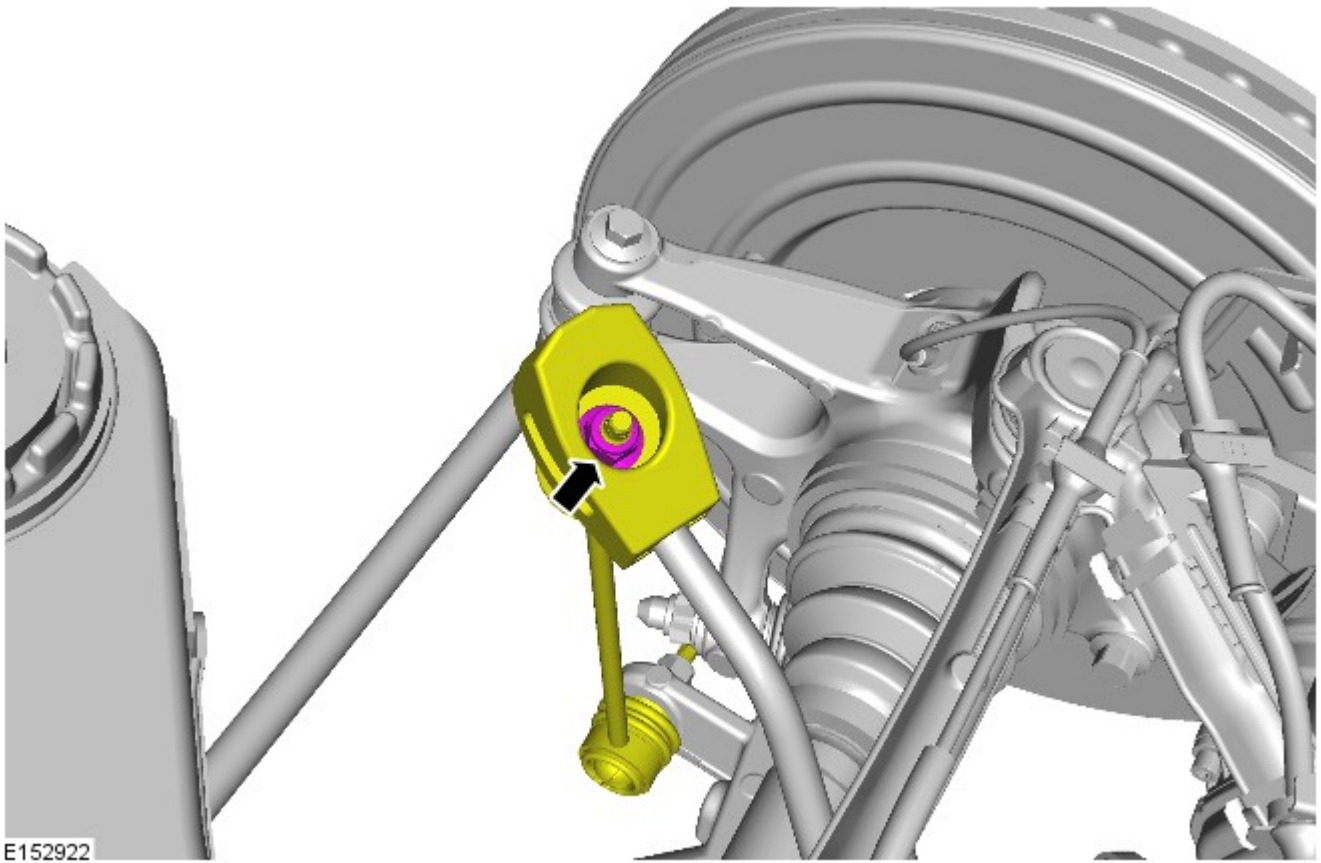


Use an additional wrench to prevent the component from rotating.



Repeat the procedure for the other side.

*Torque:* 48 Nm



E152922

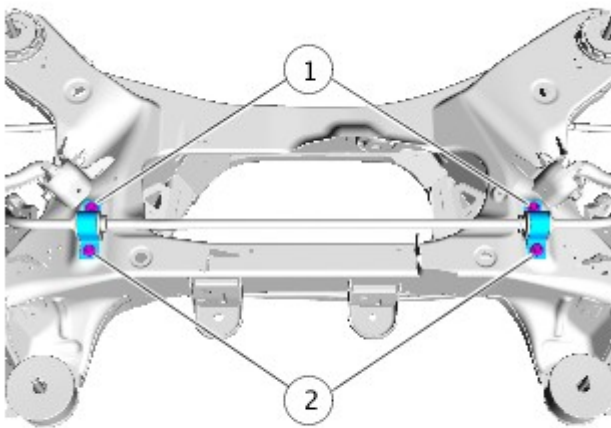
6. During installation tighten the bolts in the following sequence.

*Torque:*

Bolts 1 55 Nm

Bolts 2 55 Nm

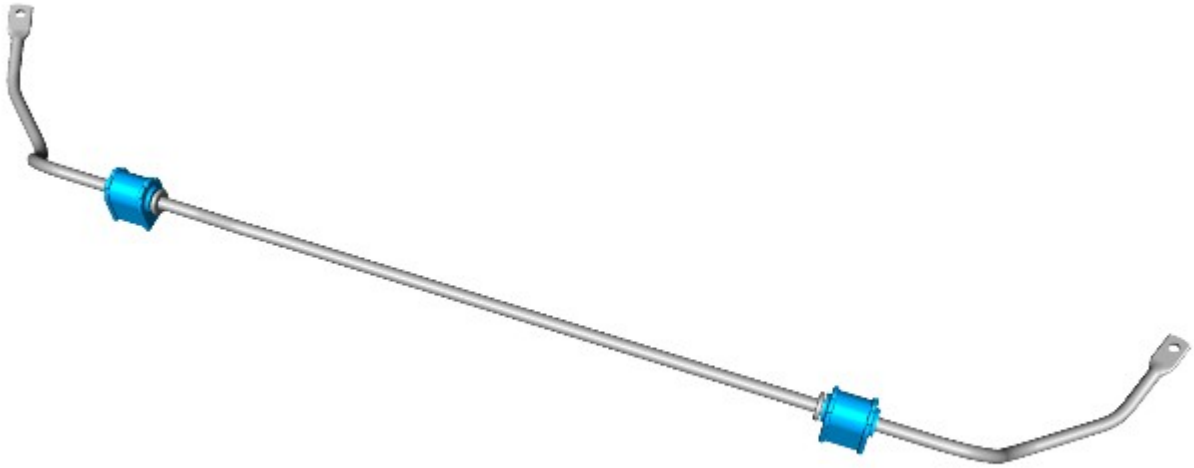
Bolts 1 55 Nm



E157003

7.





E152923

## Installation

1. To install, reverse the removal procedure.

Published: 15-Feb-2013

## Uni-Body, Subframe and Mounting System - Rear Subframe

Removal and Installation

### General Equipment

Powertrain Jack

## Removal

### NOTES:




Some variation in the illustrations may occur, but the essential information is always correct.

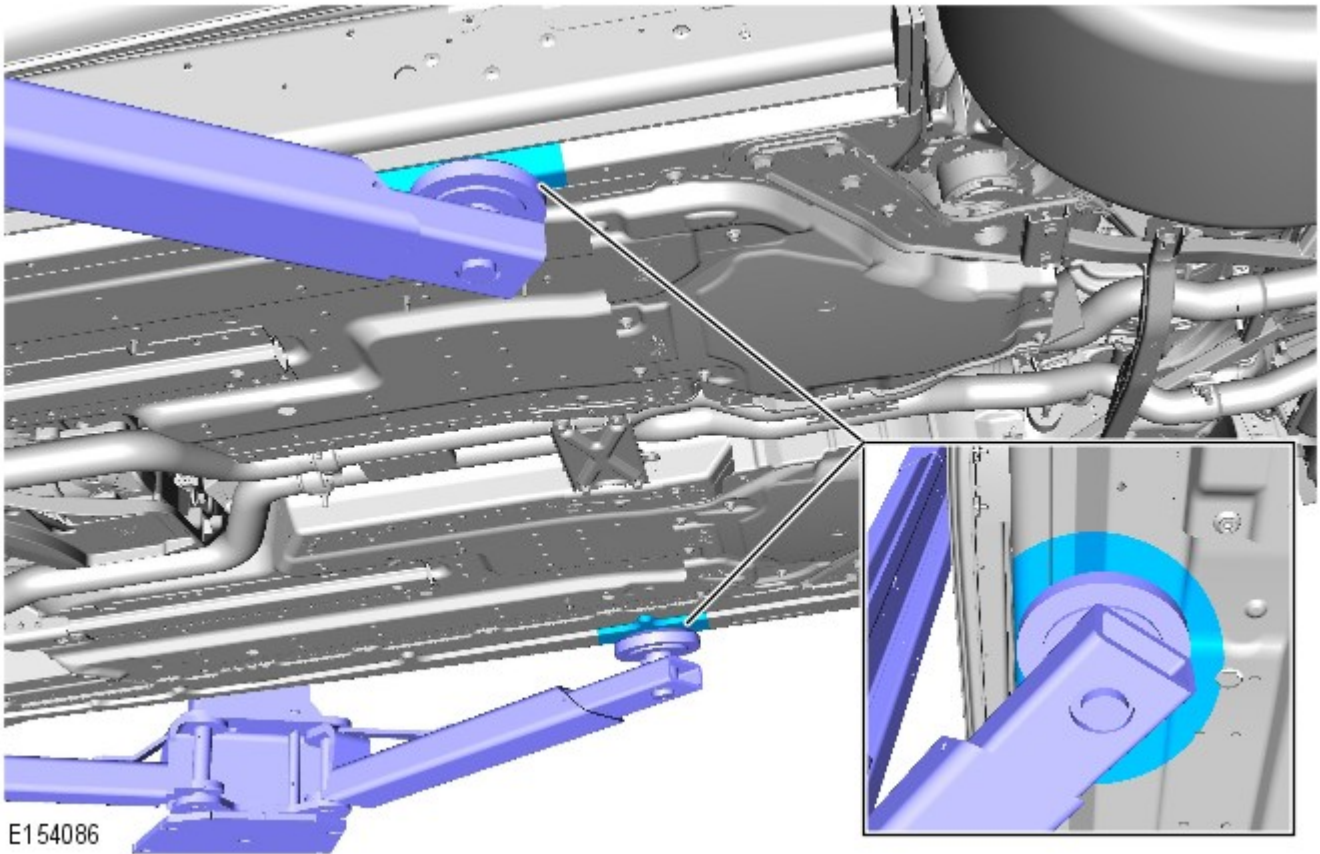


Removal steps in this procedure may contain installation details.

1. Refer to: [Rocker Panel Moulding](#) (501-08 Exterior Trim and Ornamentation, Removal and Installation).

2.  **WARNING:** Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

- Lower the vehicle.
- Reposition the ramp support arms.
- Raise the vehicle.



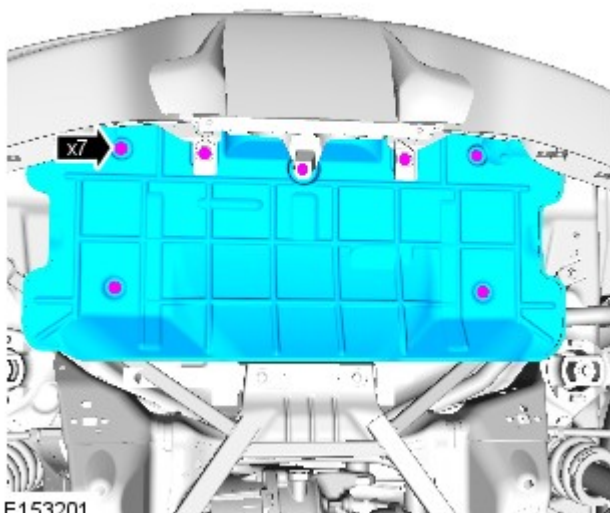
E154086

3. Refer to: [Wheel and Tire](#) (204-04 Wheels and Tires, Removal and Installation).

4. Refer to: [Exhaust System](#) (309-00A Exhaust System - V6 S/C 3.0L Petrol, Removal and Installation).  
Refer to: [Exhaust System](#) (309-00B Exhaust System - V8 S/C 5.0L Petrol, Removal and Installation).

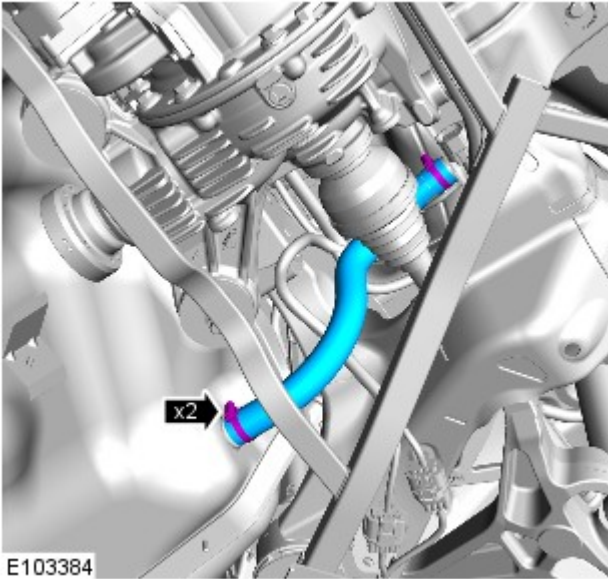
5. Refer to: [Driveshaft - RWD](#) (205-01 Driveshaft, Removal and Installation).

6. Torque: 10 Nm





E153201

7.

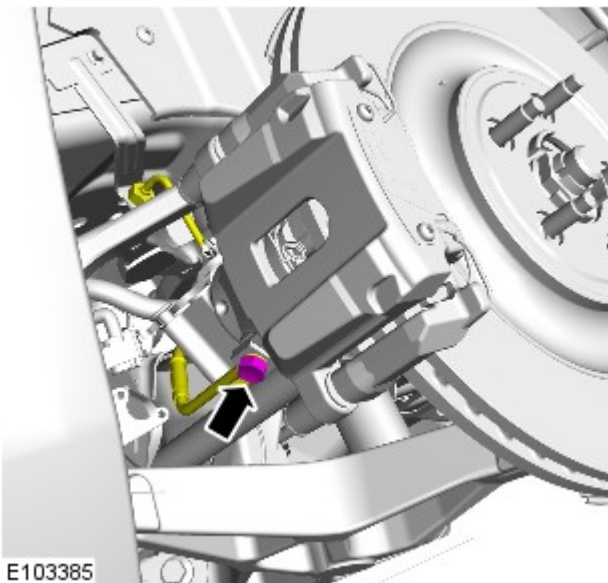



 CAUTION: Be prepared to collect escaping fluids.

 NOTE: The fuel tank has a non-return valve in the filler stub pipe, only the fuel present in the filler hose will be spilt.

8.  NOTE: To prevent the loss of brake fluid, using the special tool apply the brake pedal and set to 40mm ( 1.6 in ) below the rest position.

Using the special tool, press and hold the brake pedal.



9.  WARNING: If the fluid is spilled on the paintwork, the affected area must be immediately washed down with cold water.

CAUTIONS:

 Make sure that a new sealing washer is installed.


 Always plug any open connections to prevent contamination.

NOTES:

 LH illustration shown, RH is similar.

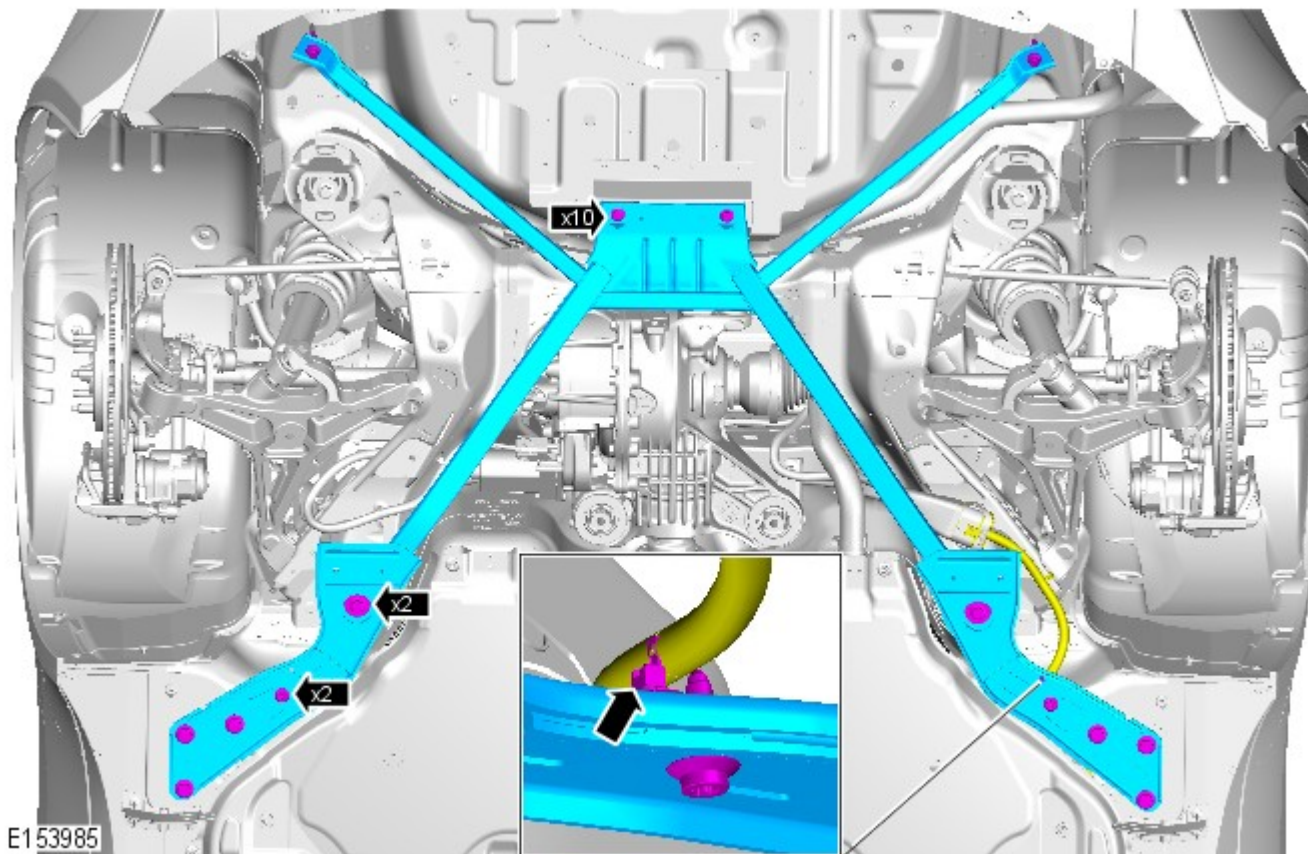
 Repeat the step for the other side.

Torque: 40 Nm

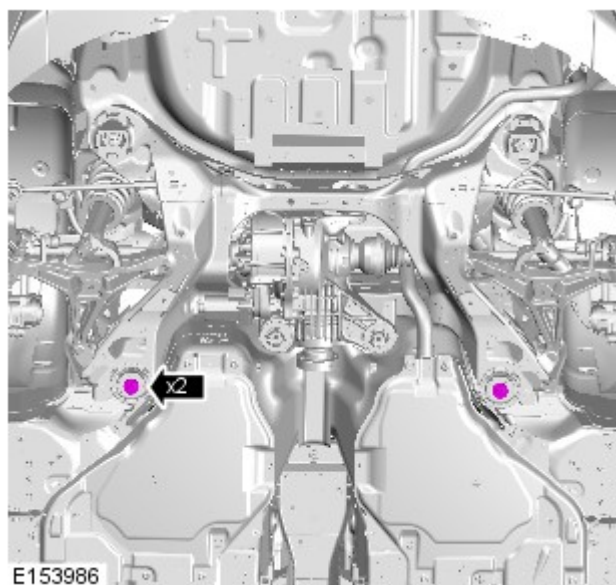
10.  WARNING: Make sure the axle assembly is supported.

 NOTE: This step requires the aid of another technician.


Torque:  
M8 25 Nm  
M10 40 Nm  
M12 133 Nm



E153985



E153986

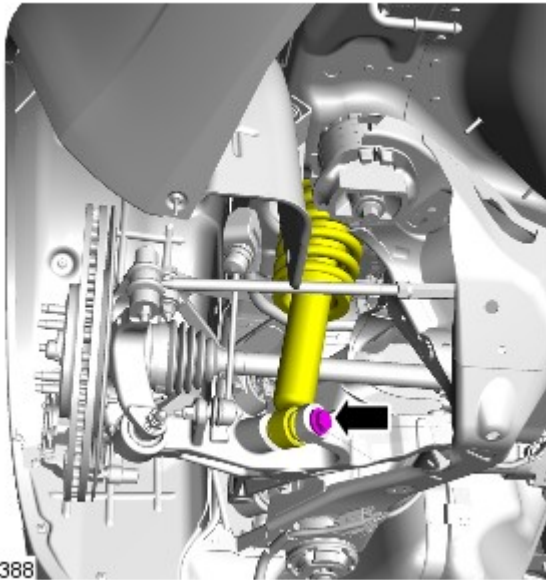
11.  **WARNING:** Install the M12 subframe bolts prior to removing axle support.

12. NOTES:

 LH illustration shown, RH is similar.

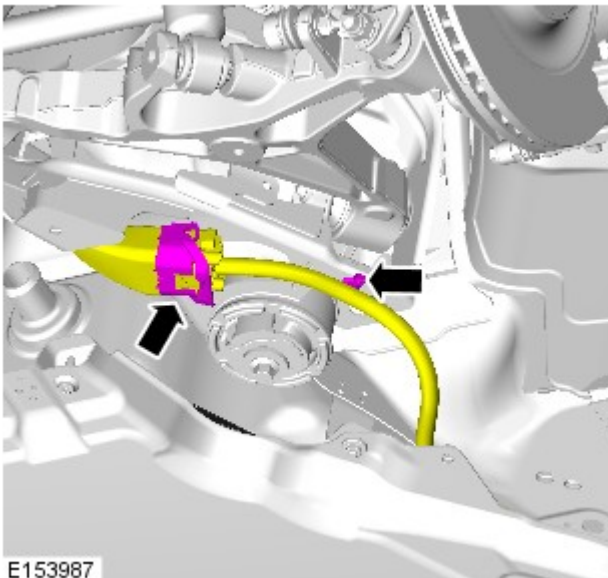
 Repeat the step for the other side.

Torque: 133 Nm



E103388

13.



E153987

14. WARNINGS:



Use a jack to support the sub-frame.



Make sure the axle assembly is supported.



CAUTION: Make sure that new bolts are installed.



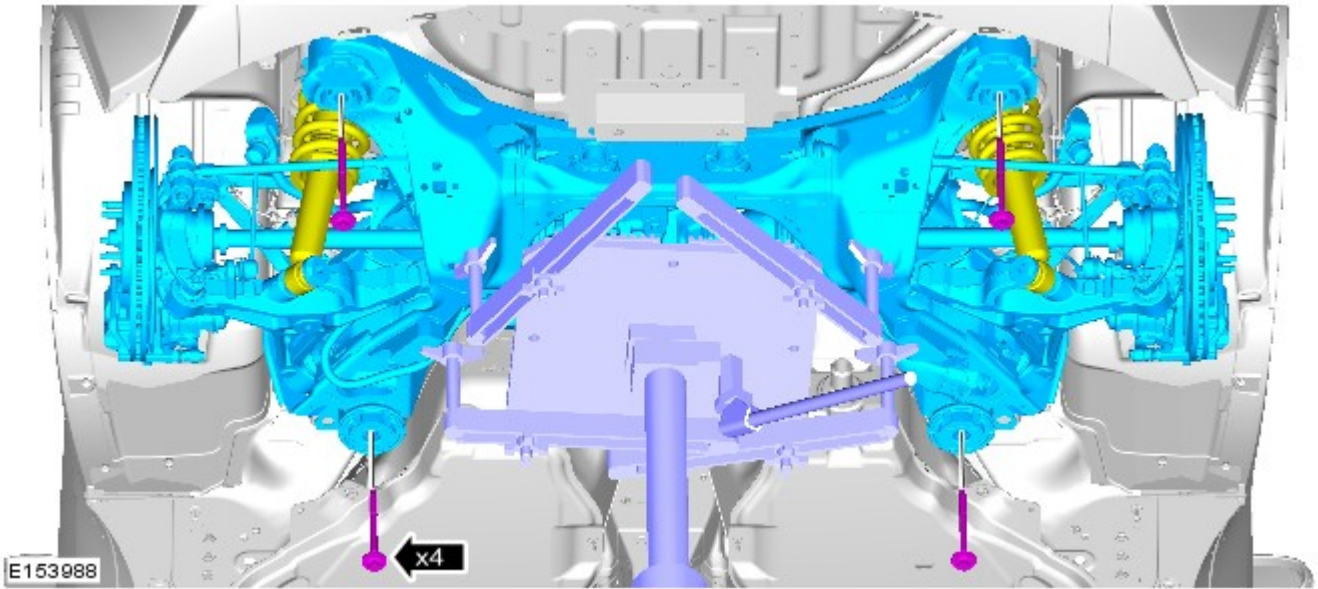
NOTE: This step requires the aid of another technician.

General Equipment: [Powertrain Jack](#)

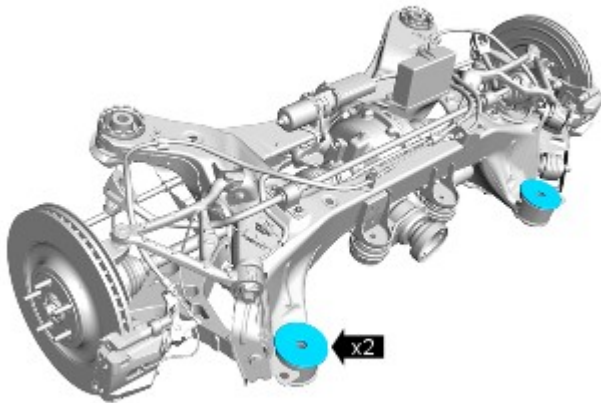
Torque:

Stage 1: 60 Nm

Stage 2: 240°



15.



E103390

## Installation

1. To install, reverse the removal procedure.
2. Refer to: [Brake System Bleeding - Vehicles Without: Carbon Ceramic Brakes](#) (206-00 Brake System - General Information, General Procedures).
3. Refer to: [Rear Toe Adjustment](#) (204-00 Suspension System - General Information, General Procedures).

## Rear Suspension - Stabilizer Bar Link

Removal and Installation

### Removal


#### NOTES:



Removal steps in this procedure may contain installation details.

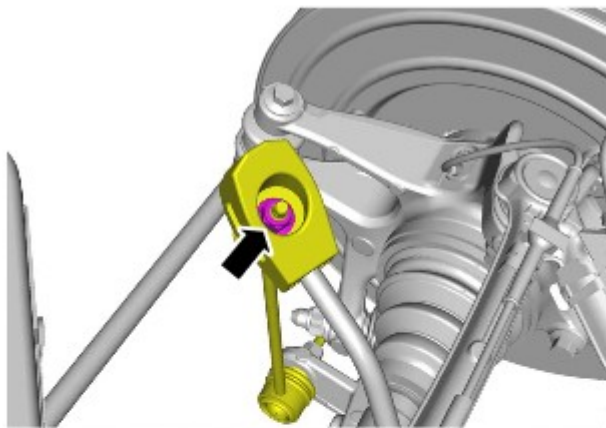



LH illustration shown, RH is similar.

1.  **WARNING:** Make sure to support the vehicle with axle stands.

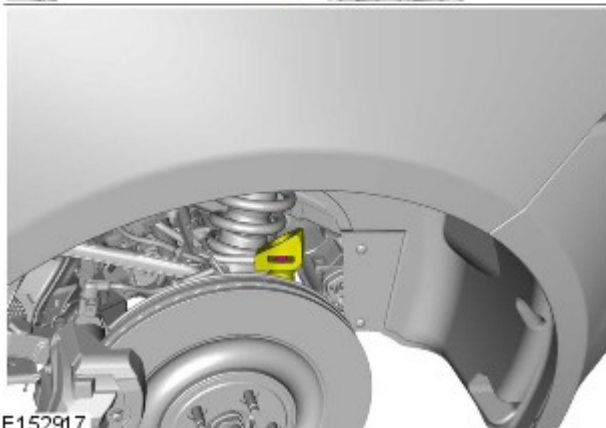
Raise and support the vehicle.

2. Refer to: [Wheel and Tire](#) (204-04 Wheels and Tires, Removal and Installation).




3.  **CAUTION:** Use a wrench on the hexagon provided to prevent the ball joint rotating.

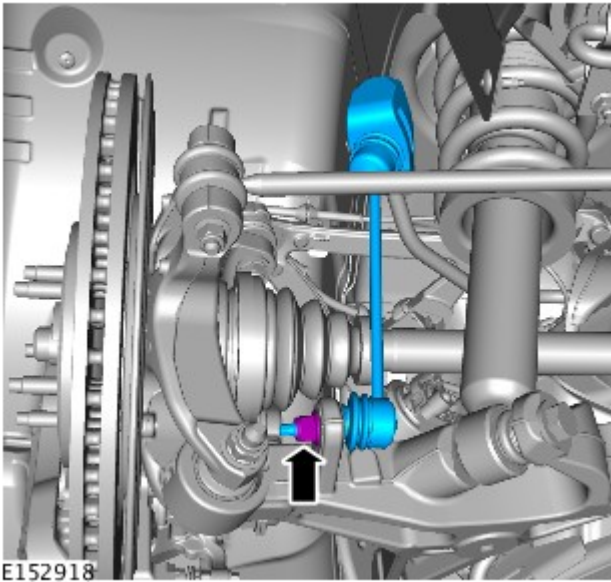
*Torque:* 48 Nm



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4.  **CAUTION:** Use a wrench on the hexagon provided to prevent the ball joint rotating.

*Torque:* 48 Nm



## Installation

1. To install, reverse the removal procedure.

Published: 02-Jul-2014

## Wheels and Tires - Wheel and Tire

Removal and Installation

## Removal



NOTE: Removal steps in this procedure may contain installation details.

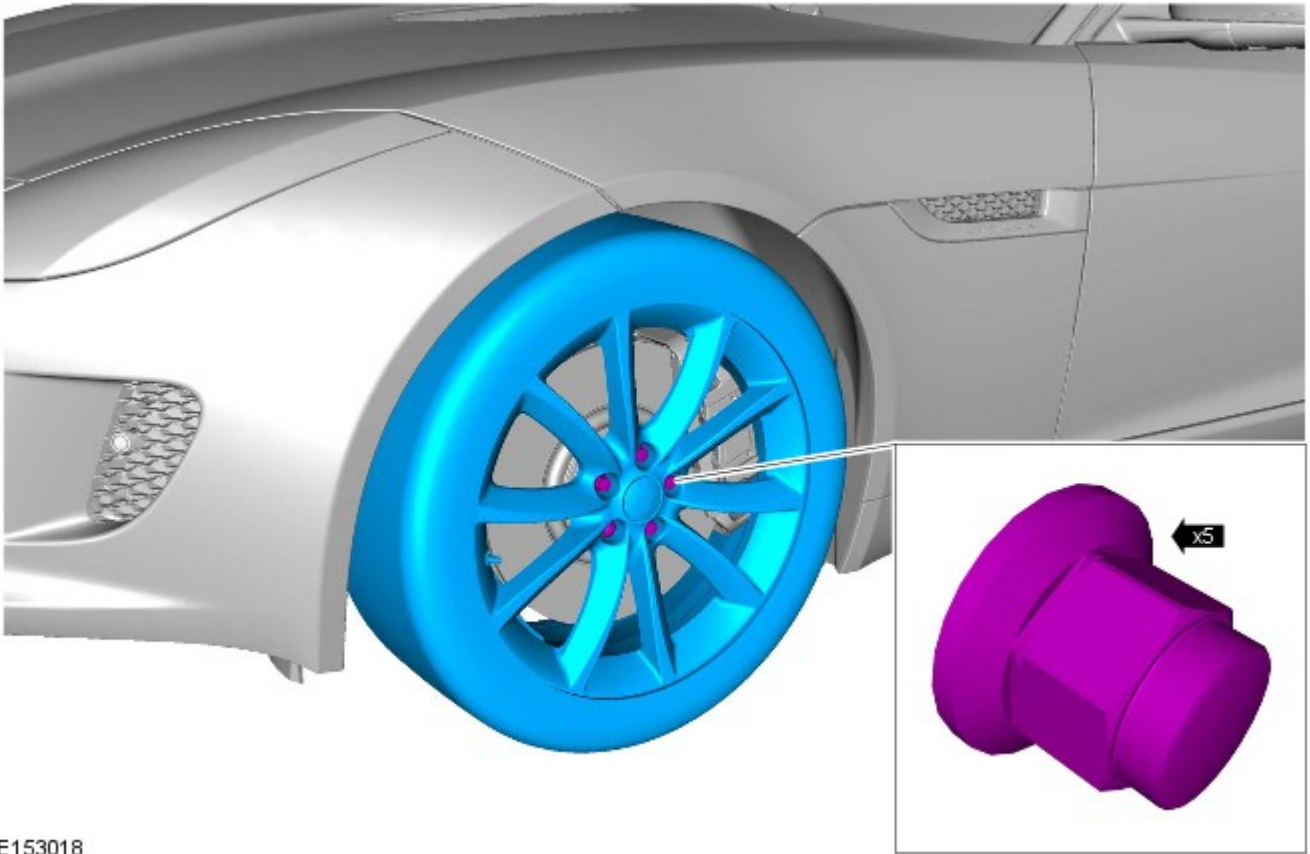
All vehicles

1.  **WARNING:** Make sure to support the vehicle with axle stands.

Raise and support the vehicle.

2. *Torque:*
  - Stage 1 15 Nm
  - Stage 2 70 Nm
  - Stage 3 125 Nm

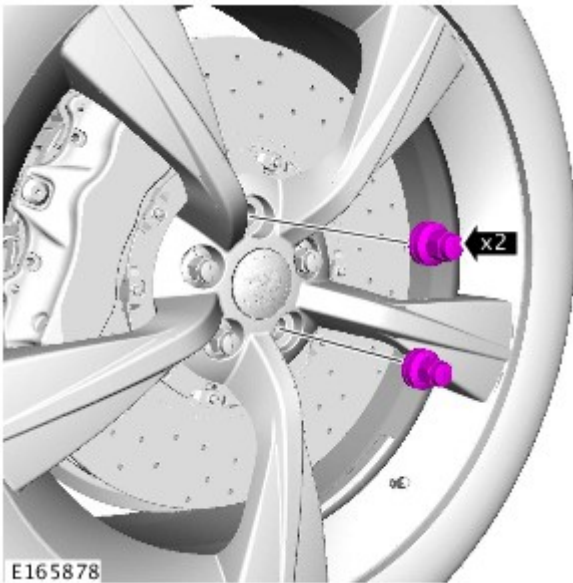




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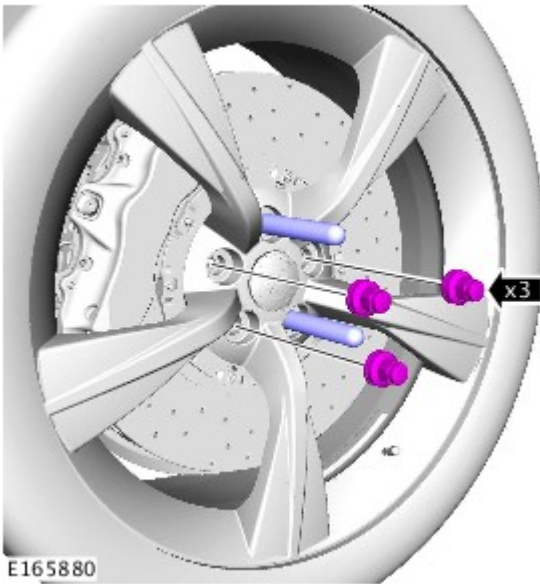
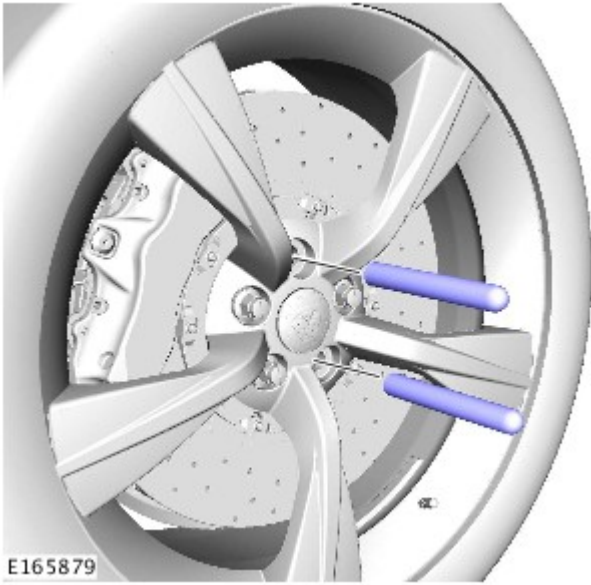
Vehicles with carbon ceramic brakes

3. Remove 2 opposing wheel nuts.



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4.  NOTE: On vehicles fitted with carbon ceramic brake discs, remove two opposing wheel nuts and install the wheel guide pins supplied with the vehicle tool kit.



5. Remove the remaining wheel nuts and slide the wheel and tire over the guide tools.



6. Remove the road wheel.

## Installation

1. To install, reverse the removal procedure.