

Steering Column -

General Specification

Item	Specification
Type	Two piece, articulated with flexible coupling to steering rack; fitted with energy absorption system and having a 120 mm (4.7 in) ride down capability with a 4.5 kN (0.45 ton force) maximum decoupling load on the intermediate shaft and a 77 mm (3.0 in) collapse stroke on the lower shaft.
Upper column adjustment:	
Reach	40 mm (1.57 in)
Rake	6°

Torque Specifications

Description	Nm	lb-ft
Steering angle sensor Torx screws	3	2
* Steering column intermediate shaft to lower shaft bolts	30	22
* Steering column intermediate shaft to steering column nut	22	16
Steering column switch assembly Torx bolts	3	2
Steering wheel bolt	63	46

*** New bolts/nut must be installed**

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Steering Column - Steering Column

Description and Operation

Component Location



E124335

Item	Part Number	Description
1	-	Steering wheel
2	-	Electronic steering lock
3	-	Electric motor
4	-	Steering angle sensor
5	-	Bulkhead mounting
6	-	Lower collapsible shaft yoke
7	-	Lower collapsible shaft
8	-	Intermediate shaft
9	-	Gaitor
10	-	Upper steering column assembly - Electric
11	-	Upper steering column assembly - Manual

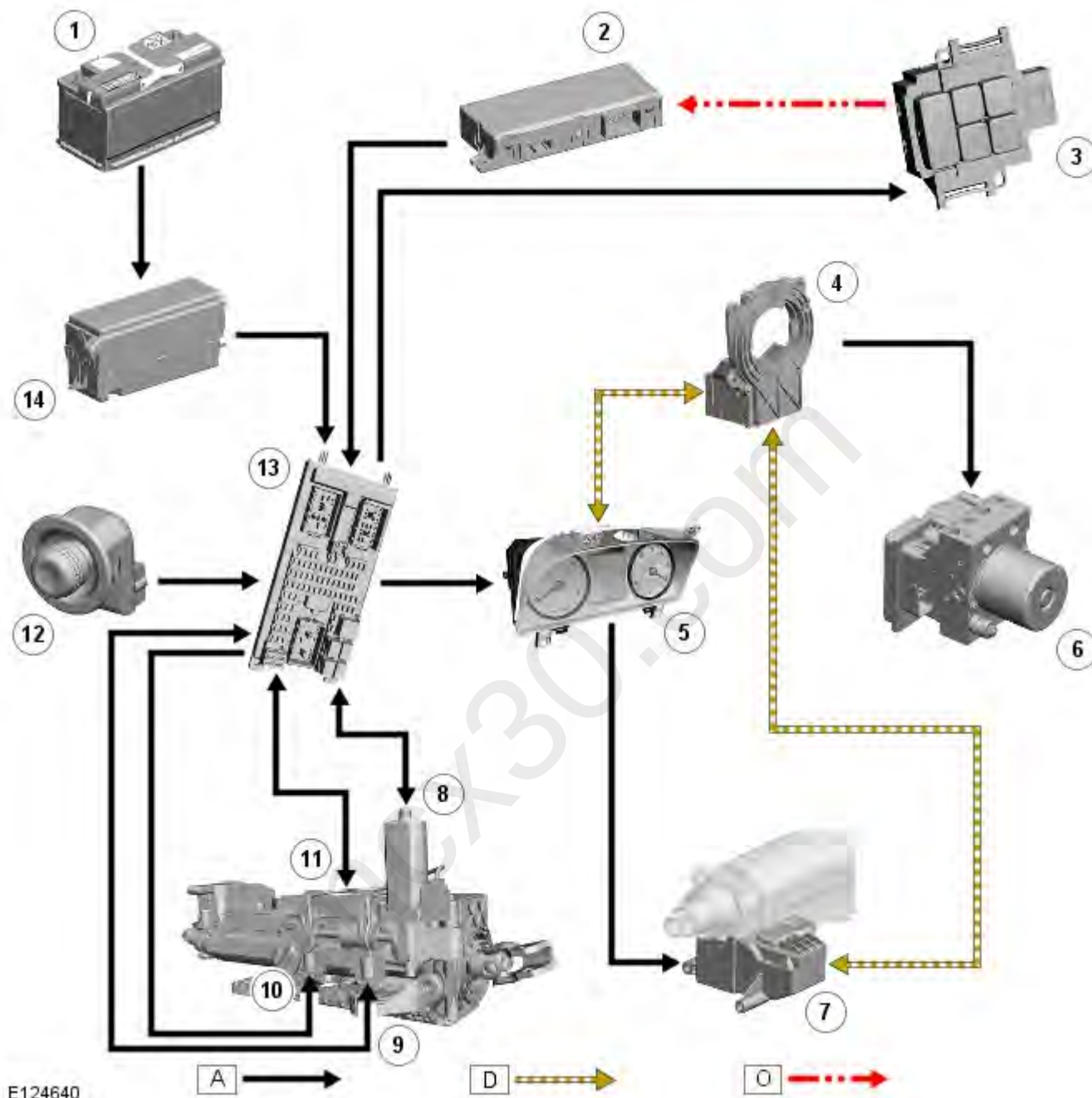
Overview

The steering column comprises the upper column assembly, the intermediate shaft and the lower collapsible shaft. The three components are positively connected together to pass driver rotary input from the steering wheel to a linear output of the steering rack.

The upper steering column assembly is electronically adjustable for steering wheel reach and rake and is controlled by the **CJB (central junction box)**. The upper steering column assembly also provides the location for the electronic steering lock mechanism and the steering angle sensor.

Control Diagram

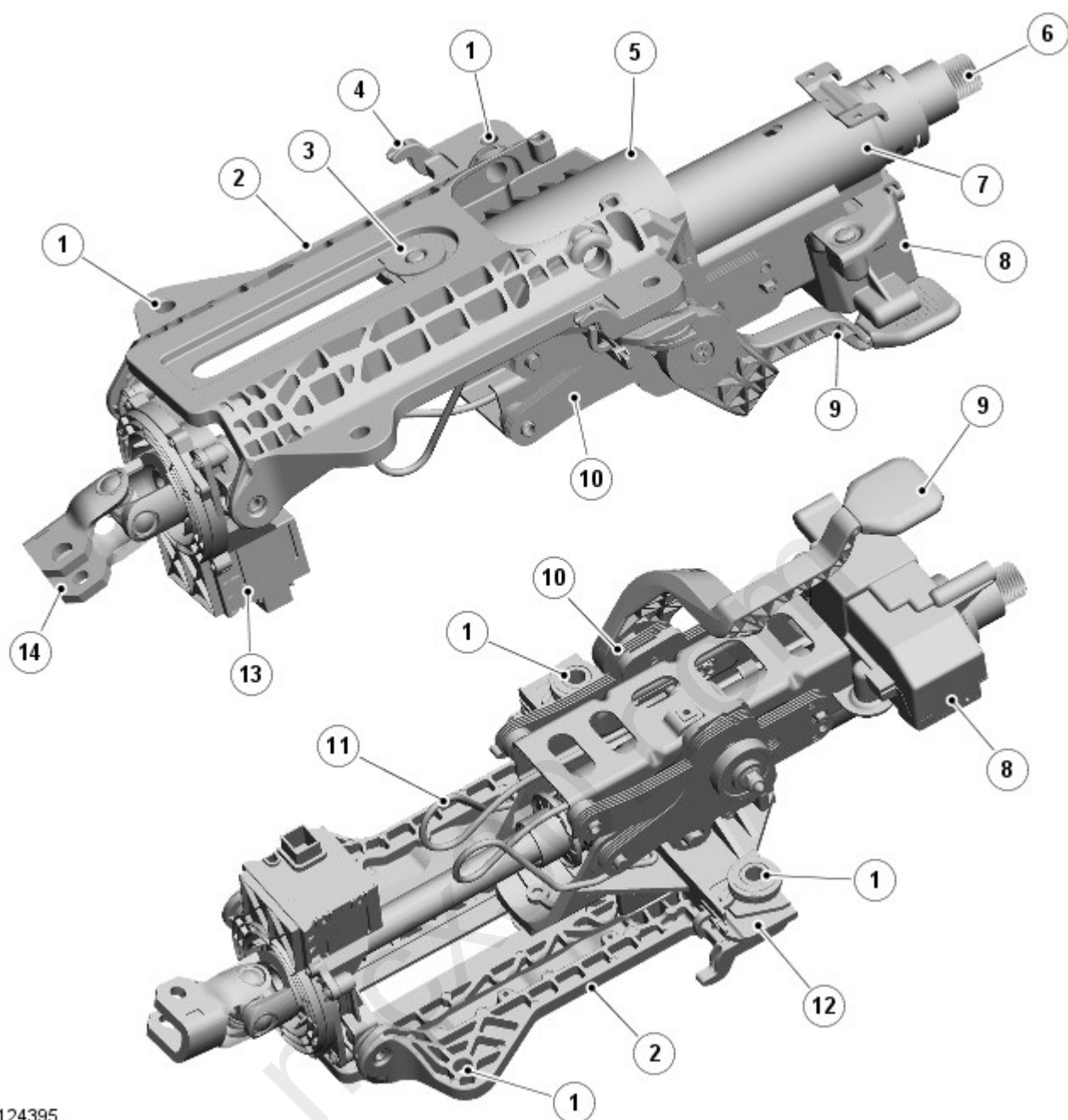
• NOTE: A = Hardwired; D = High-speed CAN (controller area network) bus; O = LIN (local interconnect network) bus



Item	Part Number	Description
1	-	Battery
2	-	Driver seat module
3	-	Driver memory switch pack
4	-	Steering angle sensor
5	-	Instrument cluster
6	-	ABS module
7	-	Electronic steering lock
8	-	Reach/rake motor
9	-	Reach solenoid and clutch
10	-	Rake solenoid and clutch
11	-	Potentiometer
12	-	Steering column switch
13	-	CJB
14	-	EJB

Component Description

Upper Column Assembly - Manual



E124395

Item	Part Number	Description
1	-	Attachment holes
2	-	Roof bracket
3	-	Screw
4	-	Locating hook
5	-	'U' bracket
6	-	Steering wheel splines
7	-	Main body
8	-	Electronic steering lock
9	-	Adjustment lever
10	-	Clamp plate assembly
11	-	Adjustment balance spring (2 off)
12	-	Shearing capsule (2 off)
13	-	Steering angle sensor
14	-	Swing yoke

The steering column is attached to the in-vehicle crossbeam and secured with four, 8 mm thread forming, pan head Torx drive screws. The two forward attachment screws are fixed through the column mounting bracket, the two rearward mounting screws also pass through the shearing capsules. In the event of a high energy frontal impact, the shearing capsules remain fixed to the crossbeam, but the 'U' bracket (with the main body) disengages from the capsules, allowing the column to shorten axially (collapse), with the coiled straps absorbing energy to reduce occupant loading.



WARNING: Take care when handling the column not to trap fingers if releasing the adjustment lever at any point during the removal procedure when the column is not in the vehicle. The balance springs will cause the column to rapidly

move to its upper-most position.

The column comprises a cast magnesium roof bracket which is attached to the in-vehicle crossbeam. Attached to the roof bracket is a pivot housing, a 'U' bracket, upper and lower shafts and a main body. The roof bracket has two hooks which locate in slots in the in-vehicle crossbeam. The hooks assist in supporting the weight of the column during removal or installation.

The pivot housing is attached to the forward end of the roof bracket with two pivot pins. The pivot housing allows for adjustment of the column rake and contains a bearing which supports the column lower shaft.

The 'U' bracket is attached to the roof bracket by a screw, bush and plastic washer assembly (third fixing) located in a slot in the top of the roof bracket. When the column is assembled into the vehicle, the shearing capsules, which are attached to the 'U' bracket, are clamped up against the roof bracket by the fixing screws, preventing movement of the 'U' bracket. The bolts also pass through rectangular section steel straps, which at one end, have coils that locate around a plastic bush (positioned on the shearing capsule). The straps are used to control the rate of column collapse, in the event of a high energy frontal impact.

The main body is positioned in the 'U' bracket via the lever bolt. The bolt is captive within the vertical slots in the 'U' bracket and the horizontal slots in the main body. The bolt also passes through the clamp plate assemblies (one on either side of the 'U' bracket). The body houses the middle and upper bearings through which the upper shaft is located. Two offset holes in the main body provide for the attachment of the electronic steering lock assembly.

The upper and lower shafts are located through the length of the column assembly. The upper shaft is supported in two bearings in the main body and the lower shaft is located in the upper shaft and supported in a bearing in the pivot housing. The lower shaft has a tubular section with external splines. These mate with the internal splines in the upper shaft. The purpose of the splines is to transmit rotational movement of the upper shaft to the lower shaft, but allowing the two components to telescope into each other in the event of a collision. The length of the splined sections allow for 120 mm (4.72 in) of linear movement. The lower shaft is fitted with a universal joint spider to which a swivel yoke is attached. The swivel yoke attaches to the intermediate shaft of the steering column on the interior side of the bulkhead using a special cam bolt and self-locking nut.

A steering angle sensor is attached to the pivot housing of the column and its centre gear is rotated by a drive collar which is attached to the lower shaft and rotates with movement of the steering wheel. The sensor transmits steering angle data on the high speed CAN bus which is used by various systems on the vehicle. The steering angle sensor is designed to become detached from the column in the event of a frontal impact. Care must be taken when handling the column assembly to prevent accidental damage to the sensor.

The upper steering column assembly houses the electronic column lock mechanism and control module.

The steering column is adjustable for reach and rake. The column can be adjusted for 40 mm (1.57 in) of reach adjustment and 6° of rake adjustment. The adjustment mechanism comprises an adjustment lever, a cam plate, a lever bolt and nut, two brake pads and two clamp plate assemblies.

A plastic adjustment lever is located on the underside of the column assembly and is attached to a cam plate. When the lever is pulled downwards, the cam plate rotates and releases tension in the lever bolt. The lever bolt also passes through two sets of clamp plate assemblies. When the lever is moved upwards, the cam plate rotates applying tension to the lever bolt, which applies pressure to the brake pads which in turn apply pressure to the clamp plate assemblies (which lock the column in the desired position). The lever bolt is retained by a self-locking lever nut, which abuts a thrust bearing.



WARNING: Under no circumstances should the lever nut torque be reduced, as this will reduce the clamping efficiency of the adjustment mechanism possibly affecting the stability of the column during a frontal impact.

The pivot housing is attached to the roof bracket with two pivot pins. When the rake adjustment is operated, the pivot housing rotates around the pivot pins to allow for the up and down adjustment, but maintains a positive location to the roof bracket. An adjustment spring is fitted between the 'U' bracket and the main body, to counteract the weight of the main body, upper shaft, steering wheel and airbag, preventing the steering wheel from dropping rapidly when the adjustment lever is released.

In the event of a high energy frontal impact, the upper column assembly is designed to axially collapse reducing impact injury to the driver. A number of components interact together to ensure that the collapse of the column is in a controlled manner. The following components control the column collapse:

- Pressure washer and bush (third fixing)
- Shearing capsules
- Straps
- Upper and lower shaft (splined) connection

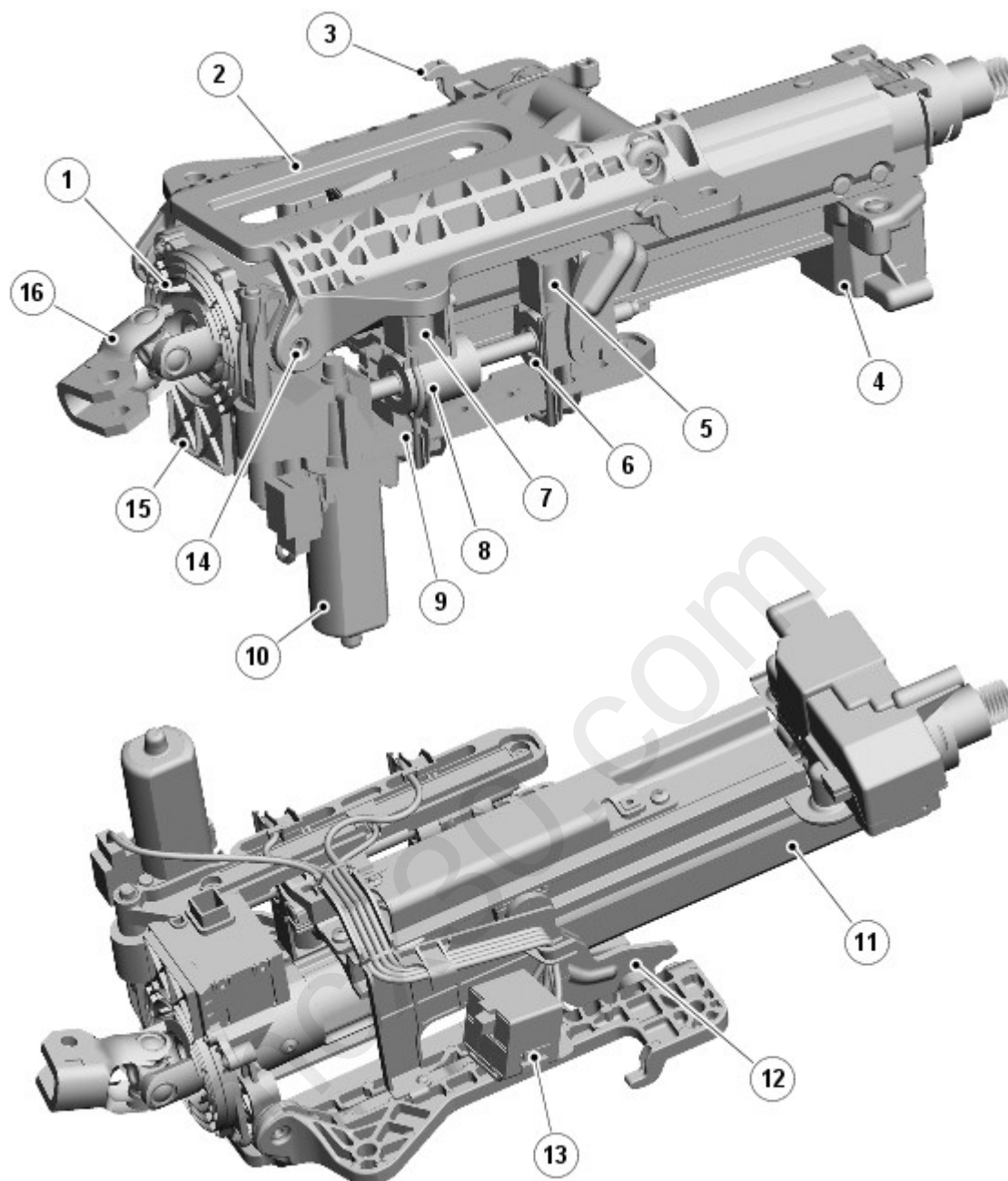
The shearing capsules have a central hole through which the rearward attachment bolts pass through into the roof bracket. The capsules are located in the 'U' bracket by tapered slots, which have small cut-outs in the inside faces. The shearing capsules have a number of small holes which align with the cut-outs in the 'U' bracket. When the capsules are installed, plastic is injected into the holes and cut-outs. This plastic retention of the capsules provides the initial controlled break-out force for the column in the event of a collision. After 10 mm of displacement, the 'U' bracket is no longer located by the shearing capsules. When handling the column, care should be taken that the shearing capsules are not impacted or dislodged.

The tension in the 'Third Fixing' screw, applies a clamp load to the roof bracket (via the bush and compression washers). In the event of a collision, this clamp load (supplementary to the shearing capsules) must be overcome before the column can collapse. When this load has been exceeded (and the fixing has been displaced 20 mm (0.79 in)) it slides easily within the roof bracket slot, providing directional control to the column, as it collapses. Under no circumstances should the screw torque be adjusted.

The straps are rectangular section steel, which at one end, have coils that locate around a plastic bush (positioned on the shearing capsule). The other end is formed into a hook which locates within a slot in the 'U' bracket. When a collision has occurred, and the 'U' bracket has been displaced from the shearing capsules by 8 mm (0.3 in), the straps begin to un-roll due to the displacement of the 'U' bracket. The straps provide the main element for energy absorption as the column collapses. The cross section of the straps change after approximately 40 mm (1.6 in) of extension, changing the amount of

energy that they absorb.

Upper Column Assembly - Electric



E124336

Item	Part Number	Description
1	-	Pivot housing
2	-	Roof bracket
3	-	Locating hook
4	-	Electronic steering lock
5	-	Rake solenoid
6	-	Rake clutch
7	-	Reach solenoid
8	-	Reach clutch
9	-	Potentiometer
10	-	Electric motor
11	-	Outer profile
12	-	Rake lever
13	-	Electrical connector
14	-	Pivot pin
15	-	Steering angle sensor
16	-	Swing yoke

The steering column is attached to the in-vehicle crossbeam and secured with four, 8mm, thread forming, pan head Torx drive screws. In the event of a high energy frontal impact, a strap and shear pin on the underside of the column provides a controlled collapse of the outer housing on the inner housing, allowing the column to shorten axially (collapse), absorbing energy to reduce occupant loading.

The column comprises a cast magnesium roof bracket which is attached to the in-vehicle crossbeam. Attached to the roof bracket is a pivot housing, a outer housing and upper and lower shafts. The roof bracket has two hooks which locate in slots in the in-vehicle crossbeam. The hooks assist in supporting the weight of the column during removal or installation.

The rake lever locates the aluminum outer profile, into which is fixed the electronic steering lock adaptor. The inner profile is located within the outer profile, by 2 linear bearing assemblies, which allow a telescopic action for the reach adjustment.

The assembly of the upper and lower shafts is located within the column by the bearings in the electronic steering lock adaptor and the pivot housing. Both shafts are tubular. The lower shaft has external splines (which are over molded with nylon), and these mate with the internal splines in the upper shaft. The purpose of the splines is to transmit rotational movement of the upper shaft to the lower shaft, yet allow telescopic movement during column axial collapse. The lower shaft is fitted with a universal joint spider to which a swivel yoke is attached. The swivel yoke attaches to the intermediate shaft of the steering column on the interior side of the bulkhead using a special cam bolt and self-locking nut.

A steering angle sensor is attached to the pivot housing of the column and its centre gear is rotated by a drive collar which is attached to the lower shaft and rotates with movement of the steering wheel. The sensor transmits steering angle data on the high speed [CAN](#) bus which is used by various systems on the vehicle. The steering angle sensor is designed to become detached from the column in the event of a frontal impact. Care must be taken when handling the column assembly to prevent accidental damage to the sensor.

The upper steering column assembly houses the electronic column lock mechanism and control module.

The steering column is adjustable electrically for reach and rake. The adjustment mechanism comprises an electric adjustment motor, a lead screw, a rake solenoid, a reach solenoid, a rake clutch and a reach clutch.

The column adjustment is controlled by the driver using a joystick switch located on the left hand side of the column cowl. The joystick can be moved forward and backward to adjust the column reach in and out and moved up and down to adjust the rake. The single electric motor is used for both adjustment ranges. The switch selection uses the applicable solenoid, engaging the applicable clutch on the lead screw.

When the auto function is activated, the steering column will adjust to the uppermost tilt position with ignition off, and re-adjust to the previous set position, with ignition on.

For the reach adjustment, the lead screw drives the outer housing in or out as required. For the rake adjustment, the lead screw drives a rake lever which moves the column up or down as applicable.

The pivot housing is attached to the roof bracket with two pivot pins. When the rake adjustment is operated, the pivot housing rotates around the pivot pins to allow for the up and down adjustment, but maintains a positive location to the roof bracket.

The electric steering column is linked to and controlled by the memory control module. The memory control module provides storage of three separate memory positions which are stored against three individual vehicle keys.

For additional information, refer to: Seats (501-10, Description and Operation).

. The electric column also has an easy egress feature which lifts the column to its maximum rake to allow easier access to the vehicle.

In the event of a high energy frontal impact, the upper column assembly is designed to collapse reducing impact injury to the driver. A number of components interact together to ensure that the collapse of the column is in a controlled manner. The following components control the column collapse:

- Shear pin
- Strap
- Upper and lower shaft (splined) connection

The strap is rectangular section steel, which is secured by two Allen screws to the outer housing and by a shear pin to the strap guide. The strap provides the main element for energy absorption as the column collapses. To initiate axial movement of the column, the shear pin has to be severed, friction between several column interfaces has to be overcome, and an axial load applied sufficient to initiate strap guide deformation. Once the column is telescoping, deformation of the strap guide, and sliding friction between column interfaces, absorbs the energy of the occupant in a controlled manner, as the column collapses.



WARNING: Do not attempt to dismantle the steering column. The crash safety of the unit will be compromised.

Intermediate Shaft



E124337

Item	Part Number	Description
1	-	Load limiter pins
2	-	Cam bolt
3	-	Self-locking nut
4	-	Retention spring
5	-	Attachment hole
6	-	Seal sleeve



CAUTION: Care should be taken when handling the intermediate shaft, to ensure that it is not subject to impacts or that the retention spring is not displaced.

The non-handed, intermediate shaft is attached at its upper end to the swivel yoke on the lower shaft of the steering column assembly. The intermediate shaft comprises two main parts; the upper and lower axis which are joined together with a shear joint.

The upper axis has a cut-out in the shaft which allows for the fitment of the cam bolt. Only when the shaft is located correctly in the swivel yoke, can the cam bolt be inserted. A self-locking nut is fitted to the cam bolt. The torque applied as the nut is tightened, rotates the bolt, forcing the cam against the shaft, positioning it correctly in the swivel yoke prior to the joint being clamped.

• **NOTE:** If the self-locking nut is removed for any reason, it is recommended that a new, correct nut is fitted to maintain the optimum torque on the cam bolt.

The lower axis is fitted with a plastic molded seal sleeve which provides a suitable surface for the location of the plastic bearings within the two bulkhead seals. The bottom of the lower axis is machined to a double 'D' shape which tapers at the end. One side of the taper has a slot which is used to align the intermediate shaft and the lower collapsible shaft to ensure that the correct orientation of the steering wheel to steering gear is maintained. A hole is drilled through the

double 'D' shape and provides for attachment of the intermediate shaft to the lower collapsible shaft.

The upper and lower axis, are joined together via a load limiter. The load limiter is designed to disconnect the upper and lower axis in the event of a high energy frontal impact preventing an excessive load being applied to the steering column (causing intrusion into the passenger compartment or an unstable airbag deployment).

The load limiter comprises two plates which are part of the upper and lower axis. The plates have a central 'guide' pin, and two retention pins, which pass through bushes in the plates, onto which a rubber and steel washer are staked in position. The size of the staking controls the load at which the lower axis separates from the upper axis. A wire 'retention' spring is also fitted to the load limiter.

Lower Collapsible Shaft



E124338

Item	Part Number	Description
1	-	Bolt
2	-	Heat shield
3	-	Female shaft
4	-	Male shaft
5	-	Plastic spacer
6	-	Flexible coupling
7	-	Universal joint
8	-	Torx bolt

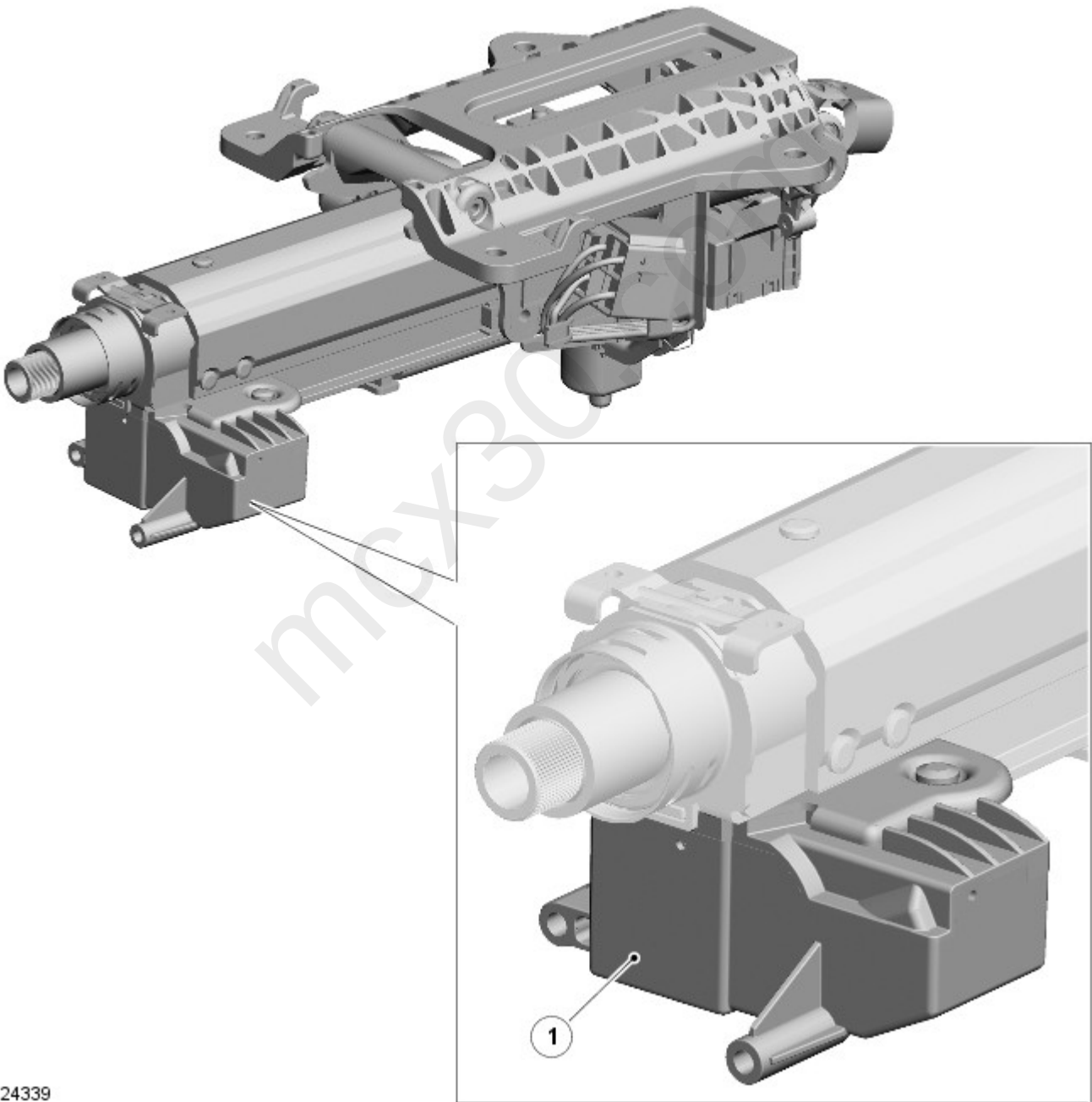
The lower collapsible shaft is a handed component and the correct component must be fitted to ensure that the steering phase angle is maintained. The shaft is attached at its upper end to the intermediate shaft and at its lower end to the valve unit pinion on the steering gear. These attachment joints can only be fitted in one orientation to ensure the correct alignment of the steering wheel to the steering gear. The shaft comprises two female and male shafts which are a telescopic fit on each other. The male shaft can slide up to 77 mm (3.03 in) within the female shaft in the event of a

frontal impact, to minimize the effect of frontal intrusion. The sliding fit also allows for dynamic displacement between the chassis and the body during severe off-road driving. A plastic spacer is fitted to the male shaft which is only used as an assembly aid during vehicle production and serves no function once the shaft is assembled to the vehicle.

The female shaft is a triangular section tube which is formed to a double 'D' hole at its upper end which mates with the intermediate shaft. An indentation pressed in the wall of the tube ensures the correct alignment between the intermediate shaft and the lower collapsible shaft. A captive nut, clinched to one side of a hole in the double 'D' section, allows for the fitment of a patchlock bolt to secure the intermediate shaft. Clamped around the end of the female shaft is a dust seal which prevents the ingress of dirt and moisture into the sliding joint, and a heat sleeve is also fitted to reflect radiant heat from the exhaust.

The male shaft is a triangular section tube which is staked at its lower end into a flange. A cage and curved 'spring plates' are fitted to its upper end, which slide in the female shaft. A pin is fitted into the side of the female tube, to secure the male tube in the bore. The lower end of the male shaft is fitted with a flexible coupling to absorb vibration and steering 'kick back', transmitted from the steering gear. A 'stabilizing pin' is fitted through the coupling to prevent coupling articulation (acting as a universal joint), while still allowing rotational flexing and plunge movement. The coupling is a rubber molding within which are nylon fibres wound around the attachment holes to transmit torque applied to the steering. The coupling is attached to a drive flange (which is part of the male shaft), and to the 'U' yoke which in turn is connected to the pinion yoke, by the universal joint assembly.

Electronic Steering Column Lock



E124339

Item	Part Number	Description
1	-	Electronic steering column lock

With the passive start system, a conventional steering lock mechanism cannot be used. An electronic system was developed which comprises a steering column assembly locking unit with an integrated control module. The steering lock is operated with the door locks when the vehicle is locked or unlocked. A control module, located inside the steering column, controls a motor, releasing the steering lock when appropriate.

The upper steering column assembly houses the column lock mechanism and control module. The components are assembled with non-removable pins for security reasons and are therefore non-serviceable. Failure of any steering lock components will require replacement of the upper steering column assembly.

The steering column lock comprises a locking motor and locking bolt. The locking motor drives a cam, which moves the locking bolt into and out of engagement with the locking sleeve on the steering column. The locking motor is fitted with a Hall effect sensor, which informs the control module of the position (locked/unlocked) of the steering lock mechanism.

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Steering Column - Steering Column

Removal and Installation

Removal



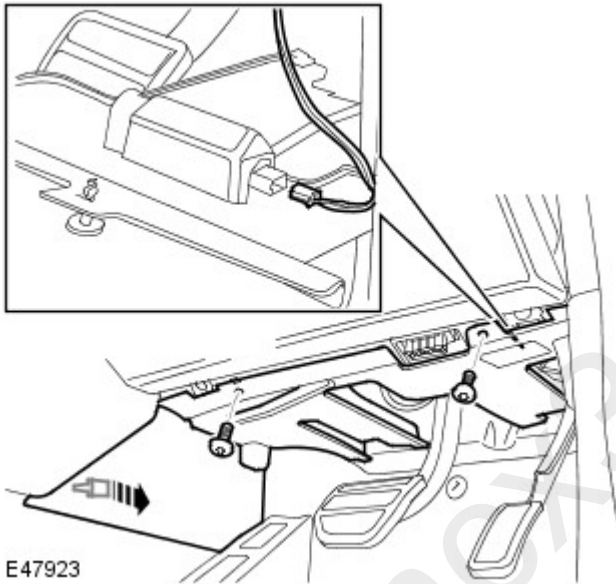
WARNING: Take care if releasing the adjustment lever when the column has been removed from the vehicle. The spring is under a high tension, and if released, could cause personal injury. Make sure fingers are clear from any areas, likely to be trapped.



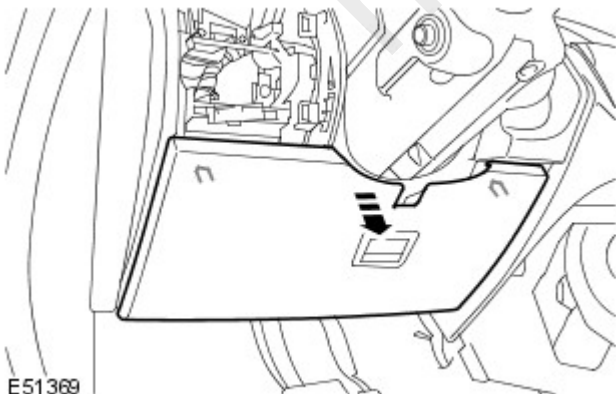
CAUTION: Air tools **MUST NOT** be used on steering column bolts.

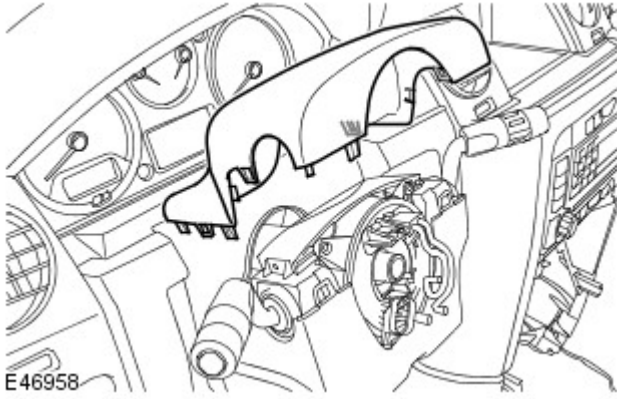
All vehicles

1. Fully extend the steering column for access.
2. Remove the steering wheel.
For additional information, refer to: [Steering Wheel](#) (211-04 Steering Column, Removal and Installation).
3. Remove the drivers side register trim panel.
For additional information, refer to: [Driver Side Register Trim Panel](#) (412-01 Air Distribution and Filtering, Removal and Installation).
4. Remove the driver side closing trim panel.
 - Release the clip.
 - Remove the 2 screws.
 - Disconnect the electrical connector.



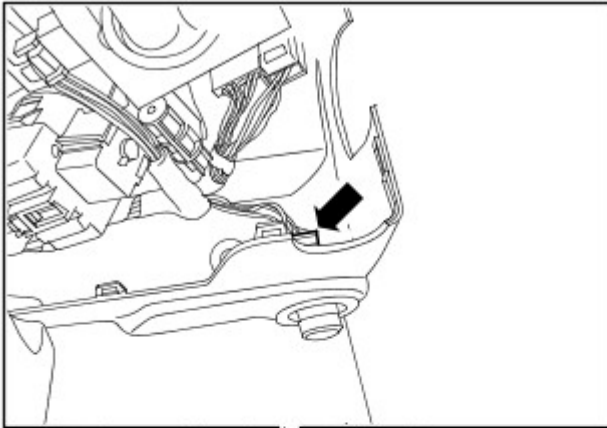
5. Remove the instrument panel access panel.
 - Release the 2 clips.





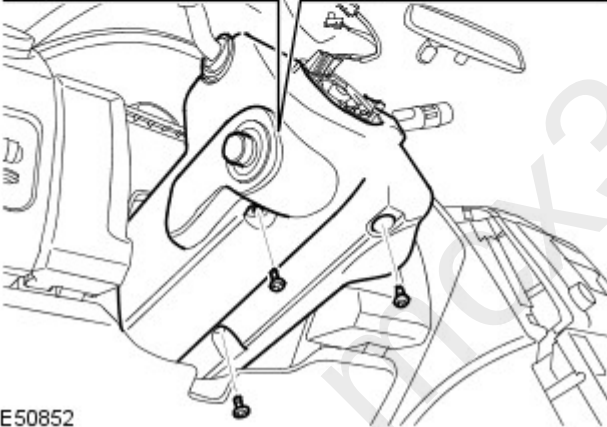
6. Remove the steering column upper shroud.

- Release the 6 clips.



7. Remove the steering column lower shroud.

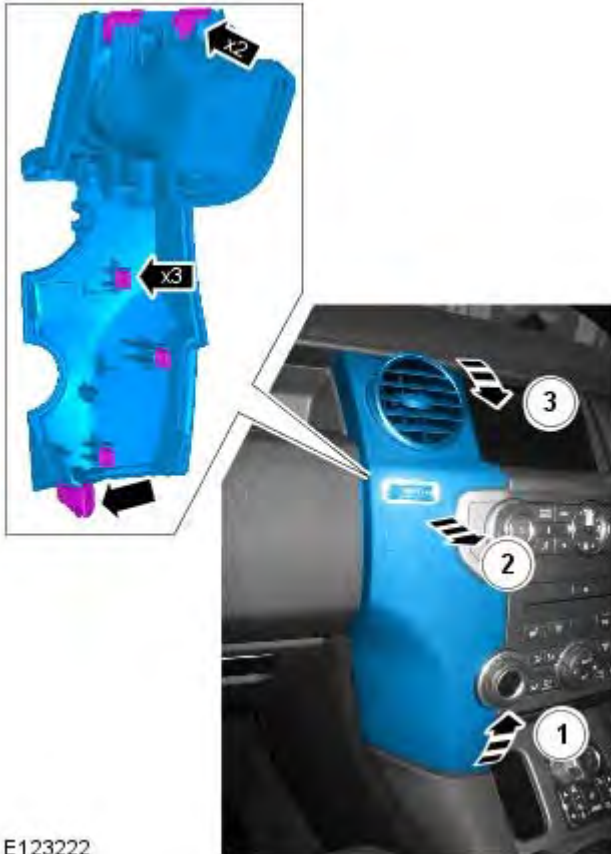
- Remove the 3 Torx screws.
- Disconnect the electrical connector.



E50852

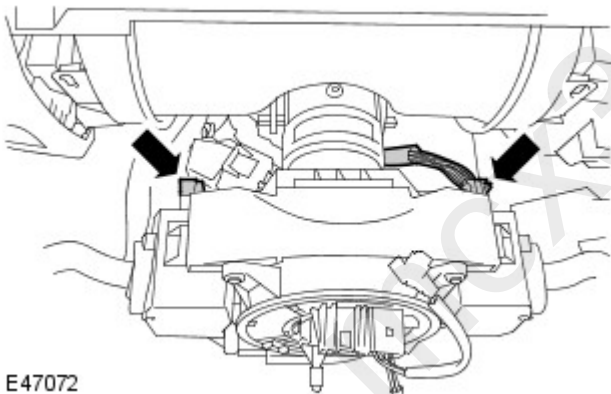
8. Remove the steering column side trim panel.

- Release the 4 clips.
- Disconnect 2 tabs.



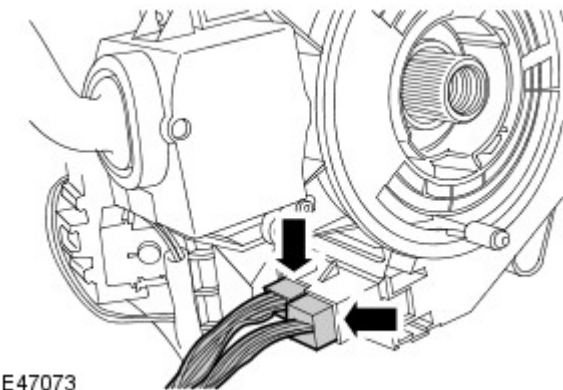
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9. Disconnect the 2 electrical connectors from the steering column multifunction switches.



E47072

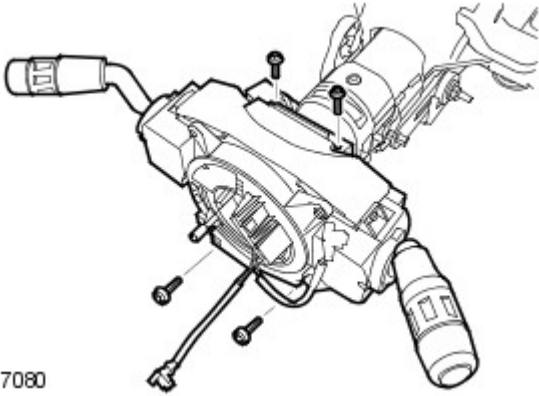
10. Disconnect the 2 electrical connectors from the clockspring.



E47073

11. Remove the steering column switch assembly.

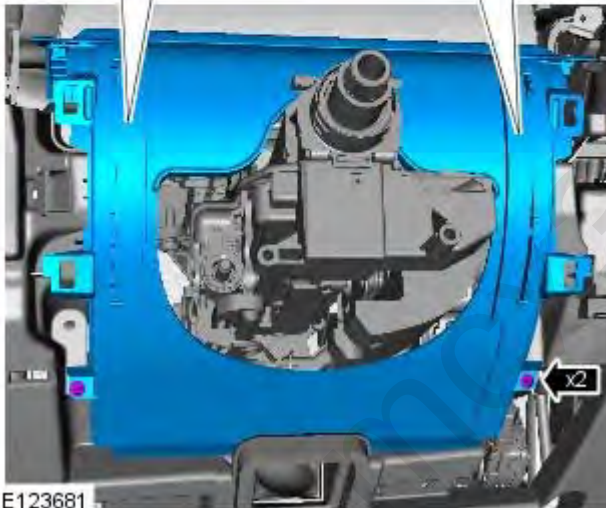
- Remove the 4 Torx bolts.



E47080

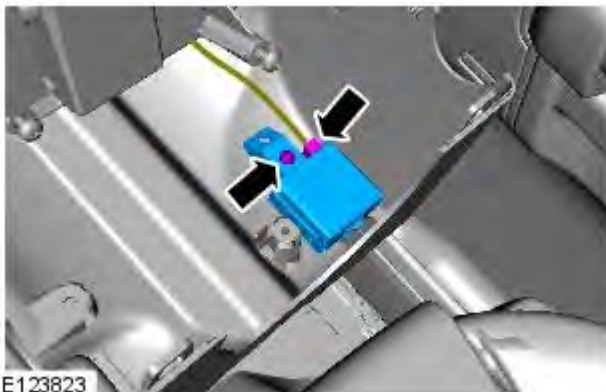
12. Remove the steering column gaiter panel.

- Remove the 2 Torx screws.
- Release the 2 clips.



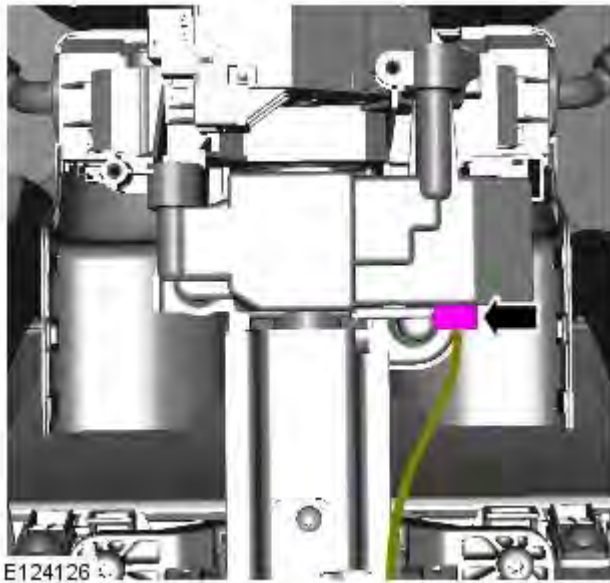
E123681

13. Disconnect the smart key antenna.

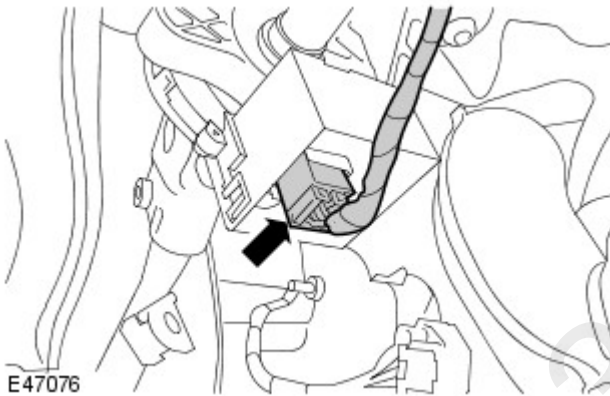


E123823

14. Disconnect the steering column lock electrical connector.



15. Disconnect the steering angle sensor electrical connector.



Vehicles with electric steering column

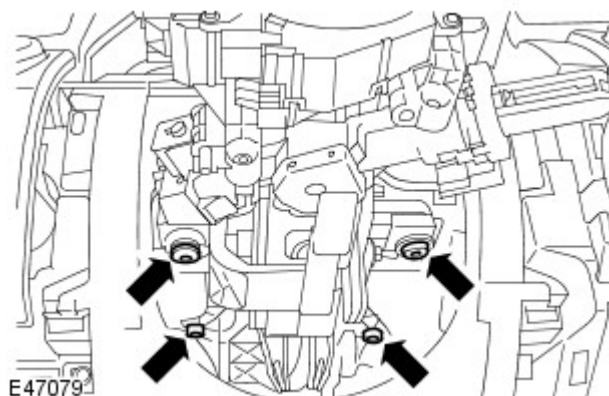
16. Disconnect the steering column adjustment motor electrical connector.





17. Disconnect the steering column intermediate shaft from the steering column.

- Note the fitted position.
- Remove the special bolt and discard the nut.

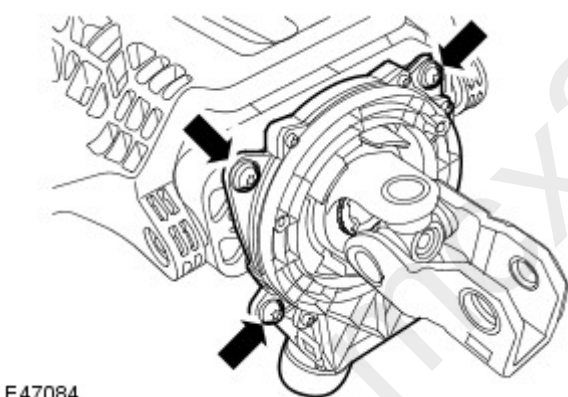


18. **WARNING:** Take care if releasing the adjustment lever when the column has been removed from the vehicle. The spring is under a high tension, and if released, could cause personal injury. Make sure fingers are clear from any areas, likely to be trapped.

CAUTION: If the steering angle sensor is damaged upon removal of the steering column, the sensor **MUST** be replaced.

With assistance, remove the steering column.

- Remove the 4 Torx bolts.



19. Remove the steering angle sensor.

- Remove the 3 Torx screws.

Installation

Vehicles with electric steering column

1. **CAUTION:** The potentiometer adjustment values are unique for each steering column. Failure to enter the correct code during calibration may result in damage to the vehicle.

Note the potentiometer hexadecimal code on the new steering column label for future reference.



E 102064

All vehicles

2. Install the steering angle sensor.

- Tighten the Torx screws to 3 Nm (2.2 lb.ft).

3. CAUTIONS:



Make sure the bolt holes are clean and free of swarf.



The steering column bolts must be tightened by hand a minimum of 3 revolutions.



Air tools **MUST NOT** be used on steering column bolts.

With assistance, install the steering column.

- Tighten the bolts in sequence to 25 Nm (18 lb.ft).

4. Connect the steering column intermediate shaft.

- Install the special bolt and tighten the new nut to 22 Nm (16 lb.ft).

5. Secure the wiring harness to the steering column.

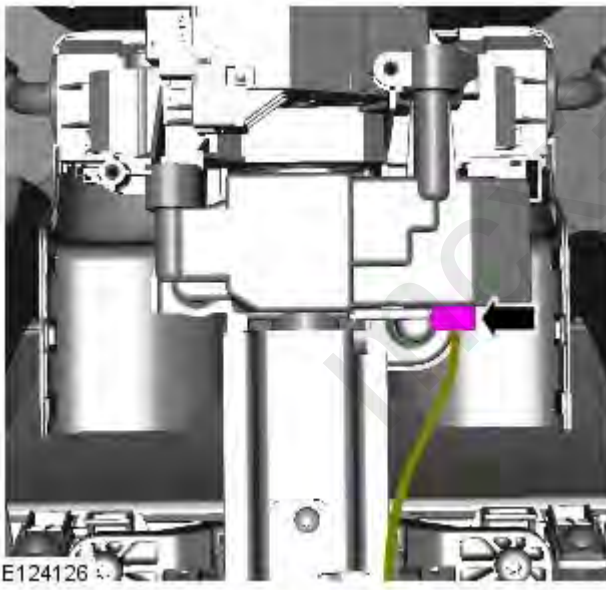
Vehicles with electric steering column

6. Connect the steering column adjustment motor electrical connector.

All vehicles

7. Connect the steering angle sensor electrical connector.

8. Connect the steering column lock electrical connector.



9. Connect the smart key antenna.

10. Install the steering column gaiter panel.

- Secure with the clips.
- Tighten the Torx screws.

11. Install the steering column switch assembly.

- Tighten the Torx bolts to 3 Nm (2 lb.ft).

12. Connect the clockspring and multifunction switch electrical connectors.

13. Install the steering column side trim panel.

- Secure with the clips.

14. Install the steering column shrouds.
15. Install the instrument panel access panel.
 - Secure with the clips.
16. Install the closing trim panel.
 - Connect the electrical connector.
 - Secure the clip.
 - Tighten the screws.
17. Install the steering wheel.

For additional information, refer to: [Steering Wheel](#) (211-04 Steering Column, Removal and Installation).
18. Install the drivers side register trim panel.

For additional information, refer to: [Driver Side Register Trim Panel](#) (412-01 Air Distribution and Filtering, Removal and Installation).
19. Calibrate the steering angle sensor using the Land Rover approved diagnostic tool.

Vehicles with electric steering column

20. If a new electric steering column is fitted re-calibrate the steering column potentiometer using the Land Rover approved diagnostic system.

Steering Column - Steering Column Shaft

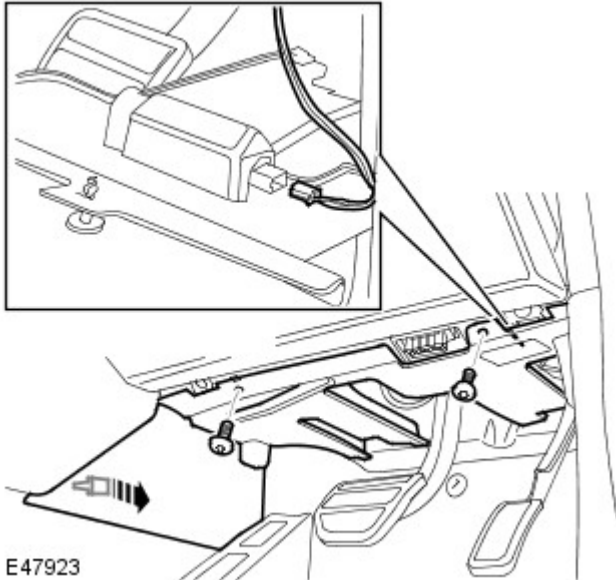
Removal and Installation

Removal

1. Disconnect the battery ground cable.
For additional information, refer to: [Specifications](#) (414-00 Battery and Charging System - General Information, Specifications).

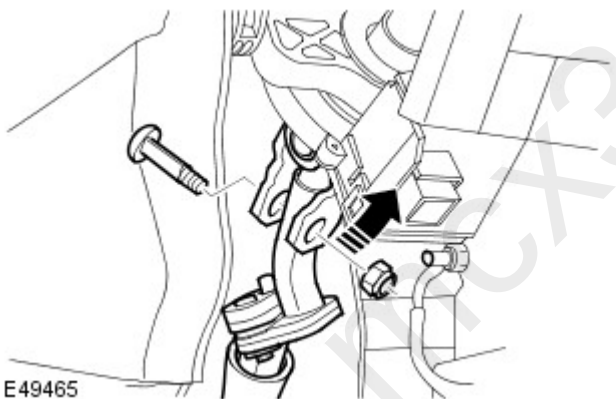
2. Remove the driver side closing trim panel.

- Release the clip.
- Remove the 2 screws.
- Disconnect the electrical connector.



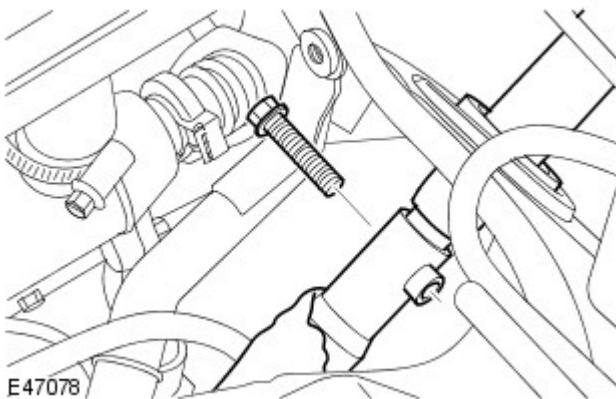
3. Disconnect the steering column intermediate shaft from the steering column.

- Note the fitted position.
- Remove the special bolt and discard the nut.



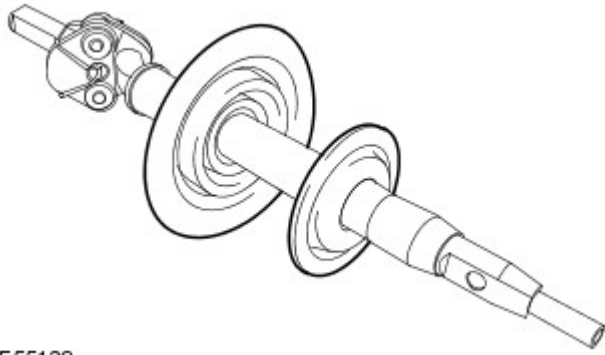
4. Disconnect the steering column intermediate shaft from the lower shaft.

- Note the fitted position.
- Remove and discard the bolt.



5. Remove the steering column intermediate shaft.

- Release the 2 grommets.



E55128

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

- NOTE: Note the fitted position.

Remove the 2 intermediate shaft grommets.

Installation

1. Install the steering column intermediate shaft.
 - Install the grommets.
2. Connect the steering column intermediate shaft to the lower shaft.
 - Tighten the new bolt to 25 Nm (18 lb.ft).
3. Connect the steering column intermediate shaft to the steering column.
 - Install the special bolt and tighten the new nut to 22 Nm (16 lb.ft).
4. Install the driver side closing trim panel.
 - Connect the electrical connector.
 - Secure the clip.
 - Tighten the screws.
5. Connect the battery ground cable.
For additional information, refer to: [Specifications](#) (414-00 Battery and Charging System - General Information, Specifications).

Steering Column - Steering Column Lower Shaft

Removal and Installation

Removal



CAUTION: Do not turn the steering wheel with the steering column lower shaft disconnected as damage to the clockspring and steering wheel switches may occur.

1. Disconnect the battery ground cable.
For additional information, refer to: [Specifications](#) (414-00 Battery and Charging System - General Information, Specifications).
2. Turn the steering wheel to the straight ahead position.

3. CAUTIONS:



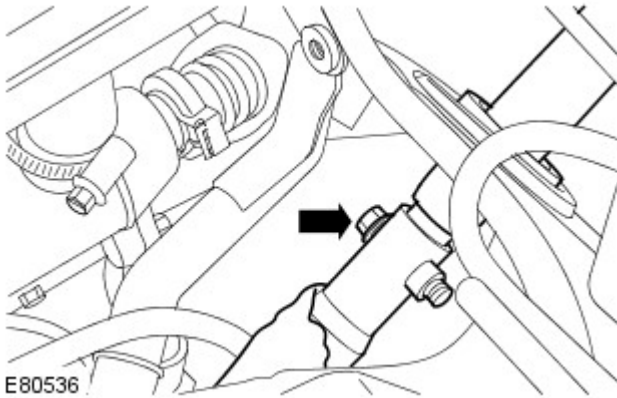
Make sure the steering wheel is in the straight ahead position.



Do not turn the steering wheel with the steering column lower shaft disconnected as damage to the clockspring and steering wheel switches may occur.

- **NOTE:** Note the fitted position.

Remove and discard the steering column lower shaft upper bolt.



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

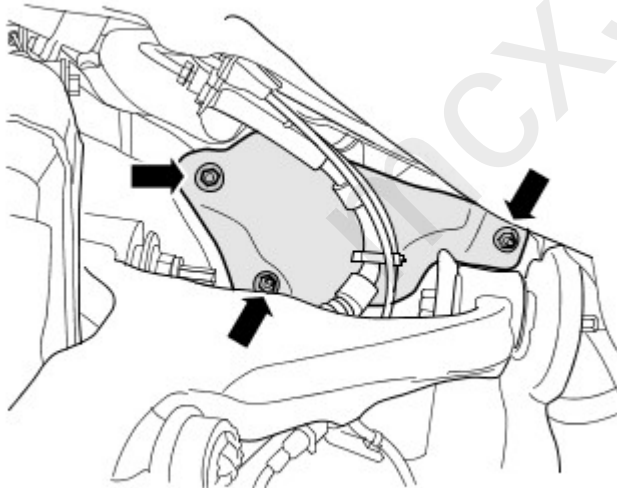
Raise and support the vehicle.



5. **CAUTION:** Make sure that the brake hose and the wiring harnesses are not damaged during the removal and installation of the heat shields.

Remove the upper suspension arm heat shield for access.

- Remove the 3 nuts.

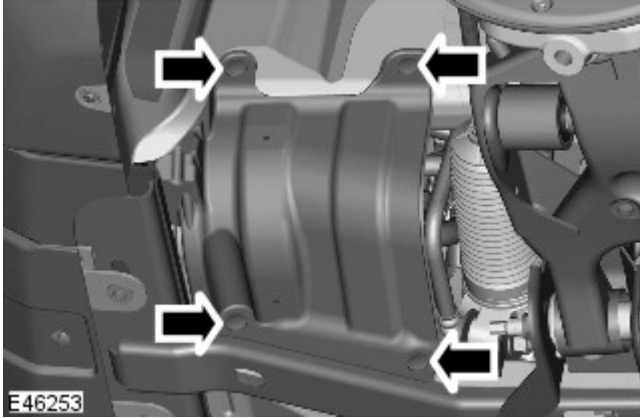


E102486



6. **CAUTION:** Do not turn the steering wheel with the steering column lower shaft disconnected as damage to the clockspring and steering wheel switches may occur.

Disconnect the steering column lower shaft from the intermediate shaft.

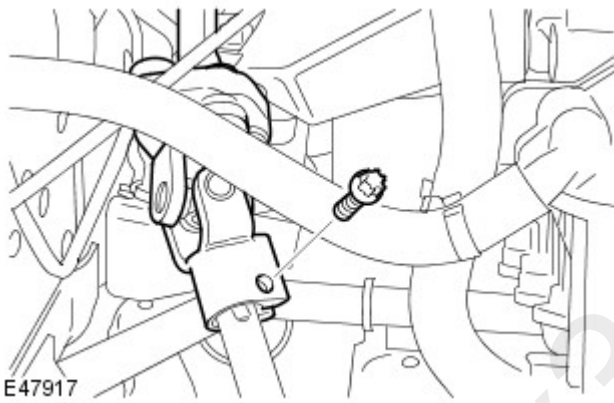


7. Remove the fender splash shield lower trim.

- Remove the 4 clips.

8.  **CAUTION:** Make sure that the steering is correctly positioned using the road wheels. Do not turn the steering wheel. Failure to follow this instruction may result in damage to the vehicle.

Turn the steering until access can be gained to the steering column lower shaft bolt.



9.  **CAUTION:** Do not turn the steering wheel with the steering column lower shaft disconnected as damage to the clockspring and steering wheel switches may occur.

Remove and discard the steering column lower shaft bolt.

10. Remove the steering column lower shaft.

- Disconnect the steering column lower shaft from the steering gear.

Installation

1. Clean the component mating faces.

2.  **CAUTION:** Make sure that the road wheels are in the straight ahead position.

Install the steering column lower shaft.

- Connect the steering column lower shaft to the steering gear.
- Connect the steering column intermediate shaft to the lower shaft.

3. Lower the vehicle on the lift.

4.  **CAUTION:** Make sure that a new bolt is installed.

Install the steering column lower shaft upper bolt.

- Install a new bolt and tighten to 30 Nm (22 lb.ft).

5. Raise the vehicle on the lift.

6. **CAUTIONS:**

 Do not turn the steering wheel with the steering column

lower shaft disconnected as damage to the clockspring and steering wheel switches may occur.



Make sure that the steering is correctly positioned using the road wheels. Do not turn the steering wheel. Failure to follow this instruction may result in damage to the vehicle.

Turn the steering until access can be gained to the steering column lower shaft bolt.

7. Install the steering column lower shaft to steering gear bolt.

- Install a new bolt and tighten to 30 Nm (22 lb.ft).

8. Install the fender splash shield lower trim.

- Install the 4 clips.

9. Install the upper suspension arm heat shield.

- Install the 3 nuts.

10. Lower the vehicle on the lift.

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Steering Column - Steering Wheel

Removal and Installation

Removal

1. Refer to: [Important Safety Instructions](#) (100-00 General Information, Description and Operation).

2. Disconnect the battery ground cable.

Refer to: [Specifications](#) (414-00 Battery and Charging System - General Information, Specifications).

3.  **WARNING:** To avoid accidental deployment and possible personal injury, the backup power supply must be depleted before repairing or replacing any air bag supplementary restraints system (SRS) components. To deplete the backup power supply energy, disconnect the battery ground cable and wait for one minute. Failure to follow this instruction may result in personal injury.

Refer to: [Driver Air Bag Module](#) (501-20B Supplemental Restraint System, Removal and Installation).

4.



5.





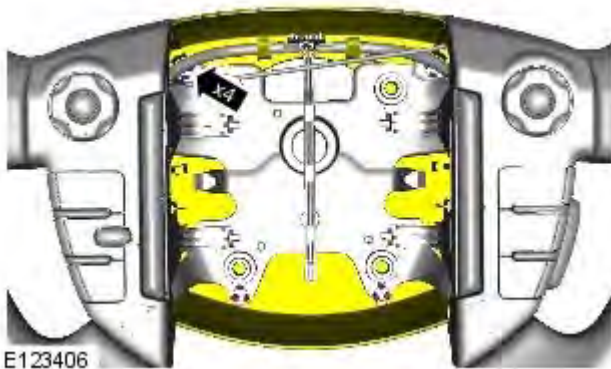
E123409

6. **6.** NOTE: Note the steering wheel to column alignment marks.



E123408

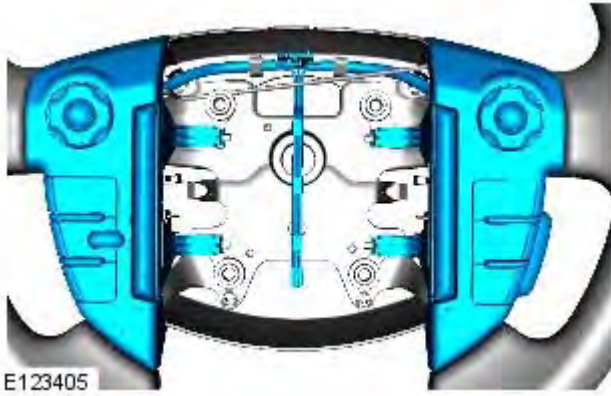
- 7.



E123406

- 8.

9.

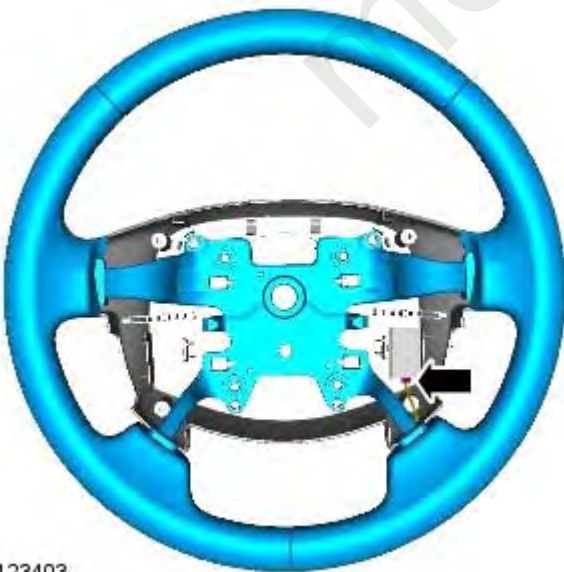


10.

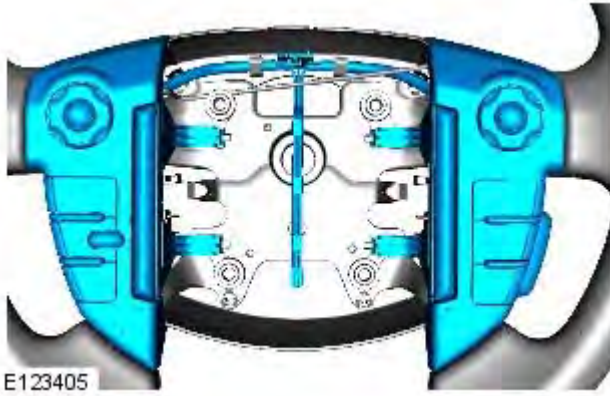


Installation

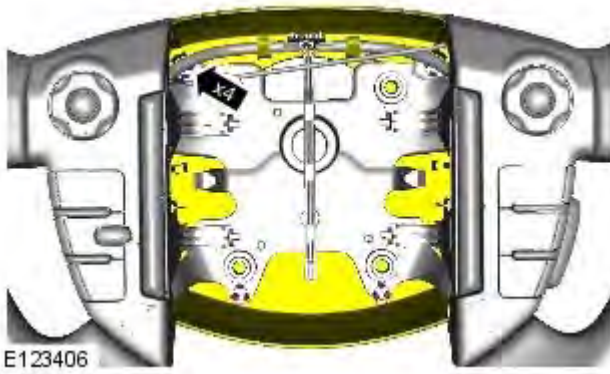
1.



2.



3.



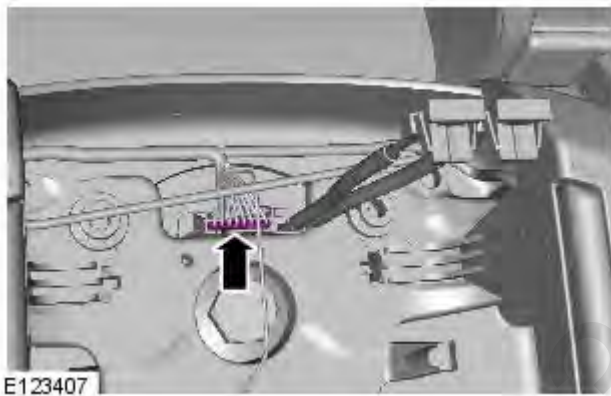
4. Torque: 6 Nm





5. **5.** NOTE: Note the steering wheel to column alignment marks.

Torque: 63 Nm



- 6.



- 7.

8. Refer to: [Driver Air Bag Module](#) (501-20B Supplemental Restraint System, Removal and Installation).

9. Connect the battery ground cable.

Refer to: [Specifications](#) (414-00 Battery and Charging System -

General Information, Specifications).

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