

Driveshaft -

Front Drive (Propeller) Shaft

Item	Specification
Type	One piece, variable length steel tube.
Constant velocity joints	Plunging type, fitted at front and rear.

Rear Drive (Propeller) Shaft

Item	Specification
Type	Two piece, variable length steel tube with isolated centre bearing and swaged front section to provide controlled collapse of the shaft during a crash.
Constant velocity joints	Plunging constant velocity joints are positioned at the front and centre of the shaft with a fixed, Hookes type universal joint at the rear.

Torque Specifications

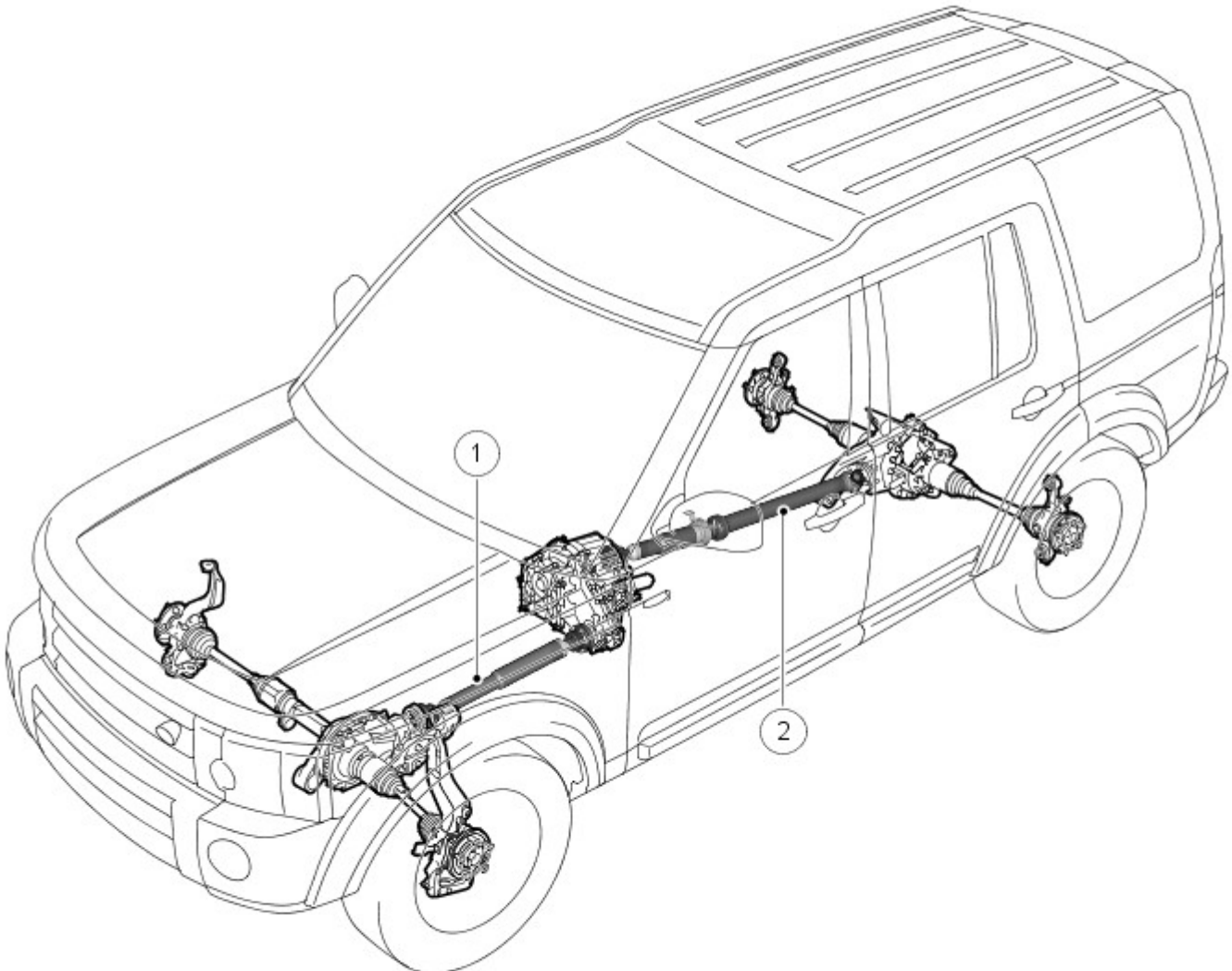
Description	Nm	lb-ft
* Front driveshaft to front axle drive flange Torx bolts:		
Stage 1	45	33
Stage 2	Further 90°	Further 90°
* Front driveshaft to transfer case drive flange Torx bolts:		
Stage 1	45	33
Stage 2	Further 90°	Further 90°
* Rear driveshaft to rear axle drive flange Torx bolts	150	110
Rear driveshaft to transfer case drive flange Torx bolts	73	54
Rear driveshaft center bearing bolts	30	22
Fuel tank heat shield bolts	5	4
Fuel tank heat shield nuts	3	2

*** New 'Patched' Torx bolts must be installed**

Driveshaft - Driveshaft

Description and Operation

Drive shaft Component Location



E46304

Item	Part Number	Description
1	-	Front drive shaft
2	-	Rear drive shaft

GENERAL

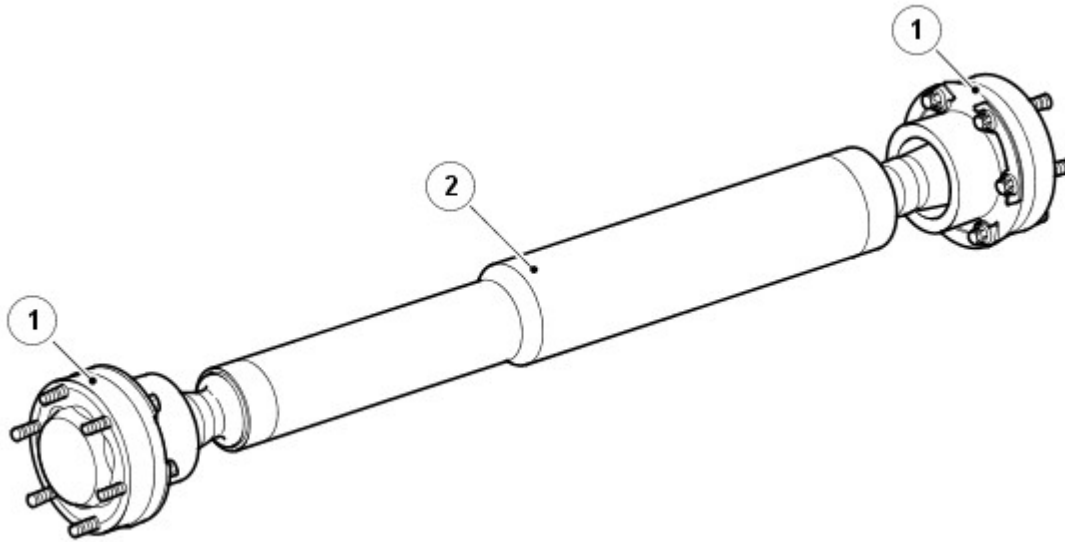
Drive shafts are used to transmit drive from the transfer box to the front and rear differentials.

The front drive shaft is a one-piece unit, connected to the transfer box and front differential unit via Constant Velocity (CV) joints.

The rear drive shaft is a two-piece unit, supported on a central bearing due to its increased length. The rear drive shaft is connected to the transfer box via a CV joint and the rear differential with a universal joint. These joints allow for angular deviations of the drive shaft due to acceleration and braking.

The front and rear drive shafts are not serviceable items and a failure will require the replacement of the complete drive shaft assembly.

FRONT DRIVE SHAFT



E46305

Item	Part Number	Description
1	-	CV joint
2	-	Front drive shaft

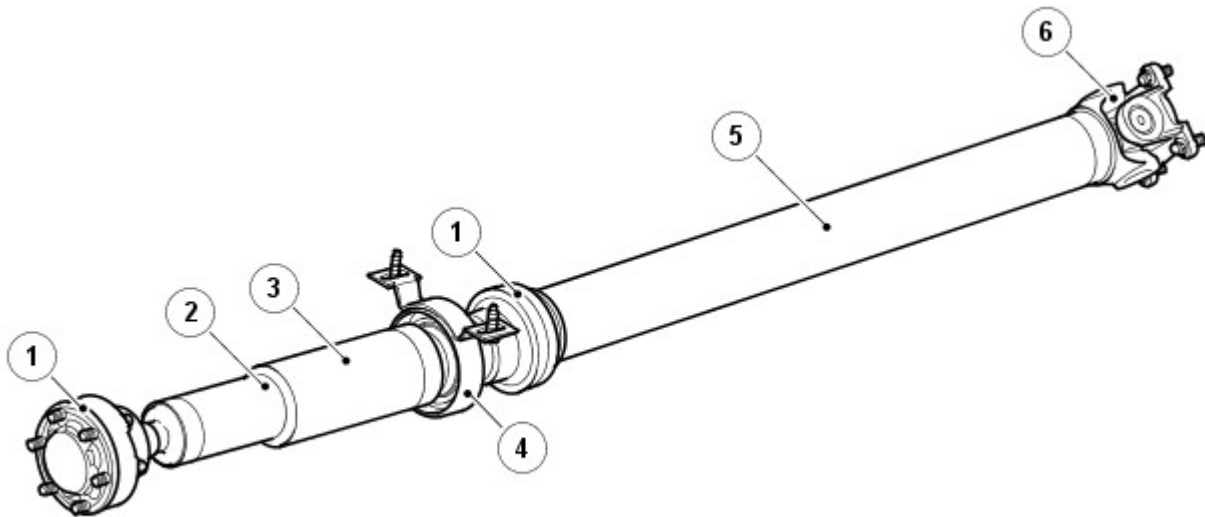
The front drive shaft is constructed from 1.7 mm wall tubular steel. A CV joint is attached to each end of the drive shaft (see 'Halfshaft Joint' section for more information on CV joints). The shaft has an overall nominal length of 713 mm.

Each CV joint has six holes, which allow for attachment to the input flange of the front differential and the front output flange of the transfer box. The CV joints are secured to the front differential and transfer box with six Torx head adhesive retained bolts.

Three compression link washers are fitted under each pair of bolts. The washers are required to prevent compression of the CV joints attachment flange.

A shroud is pressed over the CV joint. The shroud seals to the joint body using an internal gasket and to the front output flange of the transfer box using an end cap and internal gasket. This prevents the ingress of dirt and moisture. The CV joints allow for movement of the drive shaft caused by small movements in the transmission and transfer box mountings.

REAR DRIVE SHAFT ASSEMBLY



E46306

Item	Part Number	Description
1	-	CV joints
2	-	Collapsible crash section
3	-	Front shaft assembly
4	-	Support bearing
5	-	Rear shaft assembly
6	-	Universal joint

The rear drive shaft assembly comprises front and rear shaft assemblies and a centrally mounted shaft bearing. The rear drive shaft assembly has an overall nominal length of 1309 mm.

Front Shaft Assembly

The front shaft assembly incorporates a crash feature within the tube, which controls the collapse of the drive shaft during a crash.

The front shaft assembly comprises a CV joint at each end (see 'Halfshaft Joint' section for more information on CV joints).

The front CV joint (transfer box end) has six radial holes, which provide for the attachment to the transfer box rear output flange. The joint is secured to the output flange with six torx bolts, which screw into threaded holes in the flange. Three compression link washers are fitted under each pair of bolts. The rear splined shaft mates with splines in the rear shaft CV joint hub and is pressed in and fixed with Loctite. A machined surface on the shaft accepts the shaft bearing, which is a press fit.

Rear Shaft Assembly

The rear shaft assembly comprises a Hookes type universal joint at the rear (rear differential end).

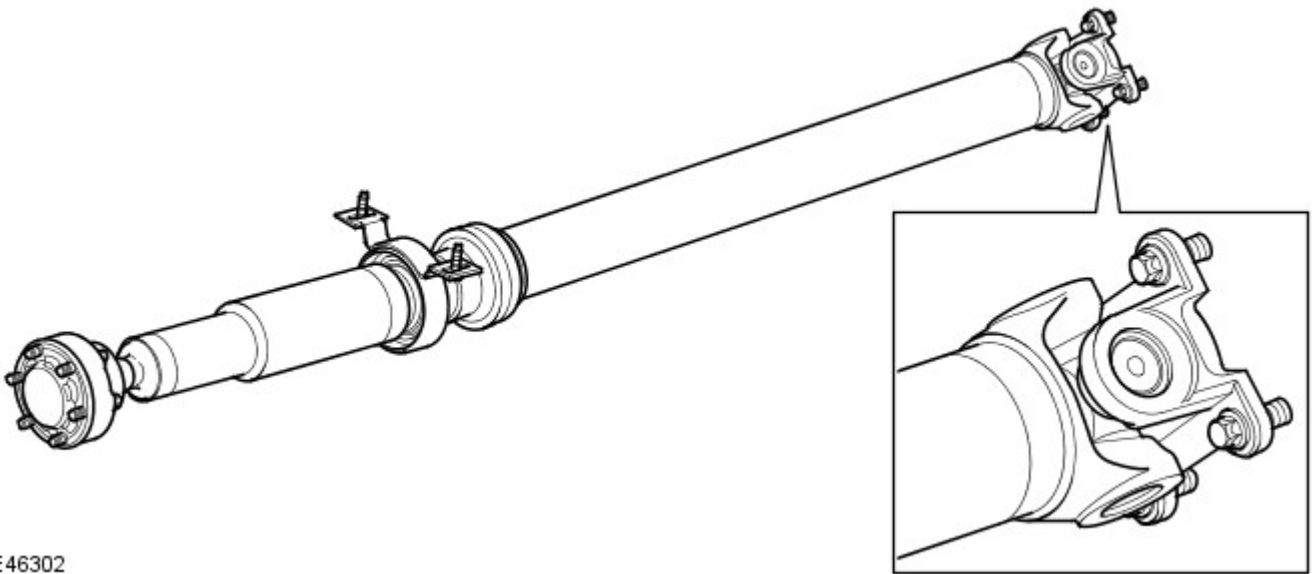
The universal joint is welded to the rear shaft tube and is secured to the input shaft of the rear differential with four flanged nuts. The opposite end of the rear shaft tube is welded directly to the CV joint body.

Shaft Bearing Assembly

The shaft bearing assembly comprises a pressed steel housing, a rubber diaphragm and a ball bearing. The diaphragm is bonded into the housing. An internal metal ring, bonded to the bush, allows for the bearing to be press fitted into it. The rubber bush allows for small deviations in alignment and also absorbs vibrational forces. The shaft bearing assembly is located by screws, which pass through plain holes in the bearing assembly and locate into nuts welded on the inside face of the chassis cross-member.

Driveshaft - Universal Joints

Description and Operation



E46302

A Hookes type universal joint is used to connect the rear drive shaft assembly to the rear differential, allowing for angular deviations of the drive shafts due to acceleration and braking.

The joint is bolted to the input shaft of the rear differential with four flanged adhesive screws and is lubricated during manufacture and sealed for life.

Driveshaft - Front Driveshaft V8 5.0L Petrol

Removal and Installation

Removal



CAUTION: It is possible to fit the driveshaft incorrectly. Note the orientation before removal.

- **NOTE:** A small amount of oil may weep from the driveshaft joints during storage. The loss of this oil will not affect the operation or durability of the joint.

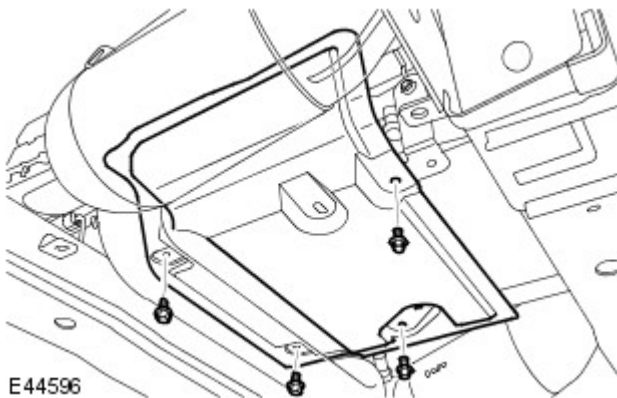
1. **WARNING:** Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Raise and support the vehicle.

2. Remove the transmission crossmember.
For additional information, refer to: [Transmission Support Crossmember - V8 5.0L Petrol](#) (502-02 Full Frame and Body Mounting, Removal and Installation).

3. Remove the transmission heat shield.

- Remove the 4 bolts.



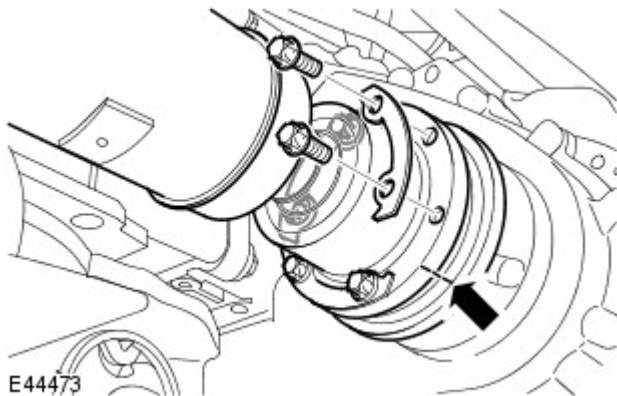
4. **CAUTIONS:**

Mark the position of the driveshaft flange in relation to the drive pinion flange.

To avoid damage to the joint or gaiter, do not allow the driveshaft to hang.

Release the driveshaft from the transfer case drive flange.

- Remove the 6 Torx bolts and washers, discard the bolts.



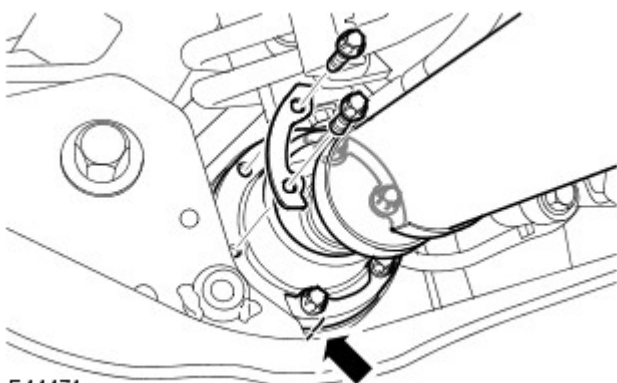
5. **CAUTIONS:**

Mark the position of the driveshaft flange in relation to the drive pinion flange.

To avoid damage to the joint or gaiter, do not allow the driveshaft to hang.

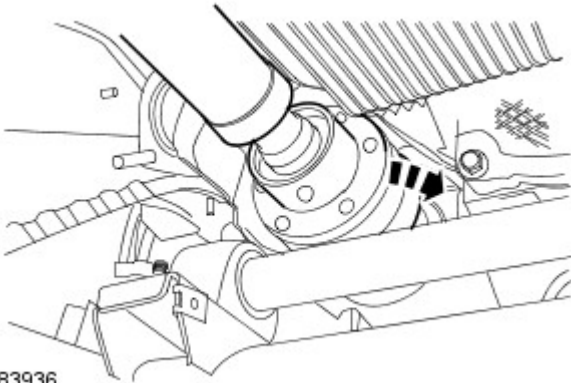
Release the driveshaft from the front axle drive flange.

- Remove the 6 Torx bolts and washers, discard the bolts.



6. Remove the front driveshaft.

- Compress the joints to disengage the drive flanges.




E83936

Installation

1. NOTE: A small amount of oil may weep from the driveshaft joints during storage. The loss of this oil will not affect the operation or durability of the joint.


Install the driveshaft.

- Clean the components.
- Compress the joints to engage the drive flanges.

2.  CAUTION: Make sure that new bolts are installed.

Secure the driveshaft to the front axle drive flange.

- Stage 1: Tighten the bolts to 45 Nm (33 lb.ft).
- Stage 2: Tighten the bolts a further 90 degrees.

3.  CAUTION: Make sure that new bolts are installed.

Secure the driveshaft to the transfer case drive flange.

- Stage 1: Tighten the bolts to 45 Nm (33 lb.ft).
- Stage 2: Tighten the bolts a further 90 degrees.

4. Install the transmission heat shield.

- Tighten the bolts to 10 Nm (7 lb.ft).

5. Install the transmission crossmember.

For additional information, refer to: [Transmission Support Crossmember - V8 5.0L Petrol](#) (502-02 Full Frame and Body Mounting, Removal and Installation).

Driveshaft - Front DriveshaftV6 4.0L Petrol

Removal and Installation


Removal



CAUTION: It is possible to fit the driveshaft incorrectly. Note the orientation before removal.

- **NOTE:** A small amount of oil may weep from the driveshaft joints during storage. The loss of this oil will not affect the operation or durability of the joint.

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

2.  **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.

3. Remove the exhaust system.
For additional information, refer to: [Exhaust System](#) (309-00C Exhaust System - V6 4.0L Petrol, Removal and Installation).

4. CAUTIONS:



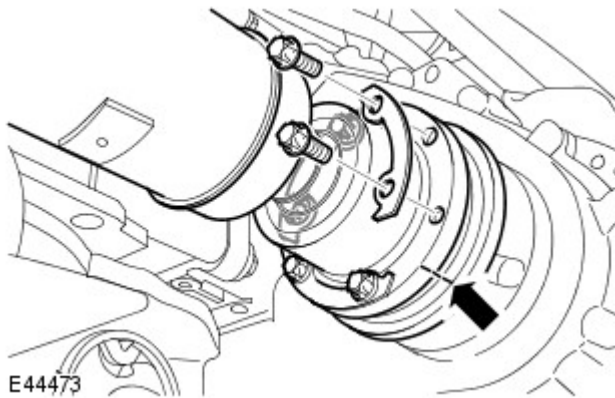
Mark the position of the driveshaft flange in relation to the drive pinion flange.



To avoid damage to the joint or gaiter, do not allow the driveshaft to hang.

Release the driveshaft from the transfer case drive flange.

- Remove the 6 Torx bolts and washers, discard the bolts.



5. CAUTIONS:



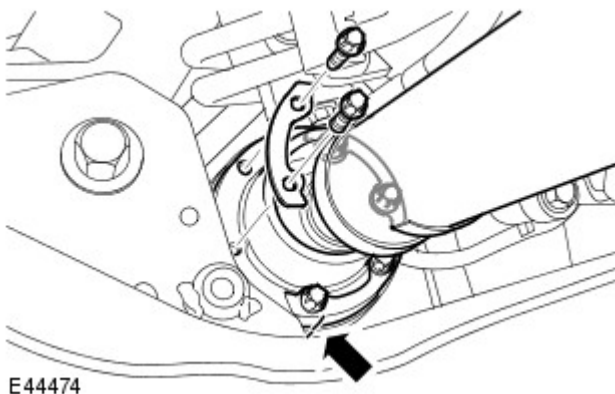
Mark the position of the driveshaft flange in relation to the drive pinion flange.



To avoid damage to the joint or gaiter, do not allow the driveshaft to hang.

Release the driveshaft from the front axle drive flange.

- Remove the 6 Torx bolts and washers, discard the bolts.



6. Remove the front driveshaft.

Installation

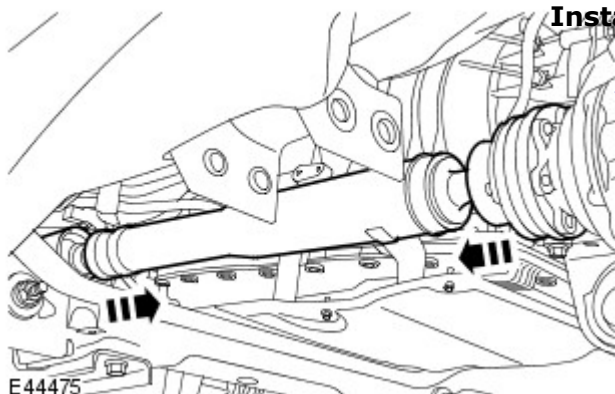
1. **NOTE:** A small amount of oil may weep from the driveshaft joints during storage. The loss of this oil will not affect the operation or durability of the joint.
Compress the joints to disengage the drive flanges.

Install the driveshaft.

- Clean the components.
- Compress the joints to engage the drive flanges.

2. Attach the driveshaft to the front axle drive flange.

- Tighten the new Torx bolts to 45 Nm (33 lb.ft), then a further 90 degrees.



3. Attach the driveshaft to the transfer case drive flange.

- Tighten the new Torx bolts to 45 Nm (33 lb.ft), then a further 90 degrees.

4. Install the exhaust system.

For additional information, refer to: [Exhaust System](#) (309-00C Exhaust System - V6 4.0L Petrol, Removal and Installation).

5. Connect the battery ground cable.

For additional information, refer to: [Specifications](#) (414-00 Battery and Charging System - General Information, Specifications).

Driveshaft - Front DriveshaftTDV6 2.7L Diesel

Removal and Installation


Removal



CAUTION: It is possible to fit the driveshaft incorrectly. Note the orientation before removal.

- **NOTE:** A small amount of oil may weep from the driveshaft joints during storage. The loss of this oil will not affect the operation or durability of the joint.

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

2.  **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.

3. Remove the engine undershield.
For additional information, refer to: [Engine Undershield](#) (501-02 Front End Body Panels, Removal and Installation).
4. Remove the crossmember.
For additional information, refer to: [Transmission Support Crossmember - V8 5.0L Petrol](#) (502-02 Full Frame and Body Mounting, Removal and Installation).

5. CAUTIONS:



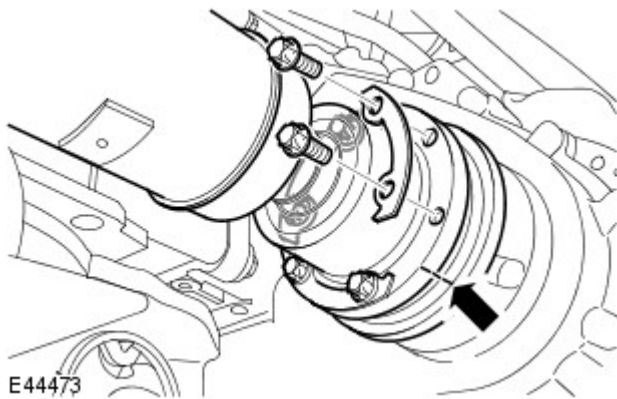
Mark the position of the driveshaft flange in relation to the drive pinion flange.



To avoid damage to the joint or gaiter, do not allow the driveshaft to hang.

Release the driveshaft from the transfer case drive flange.

- Remove the 6 Torx bolts and washers, discard the bolts.



6. CAUTIONS:



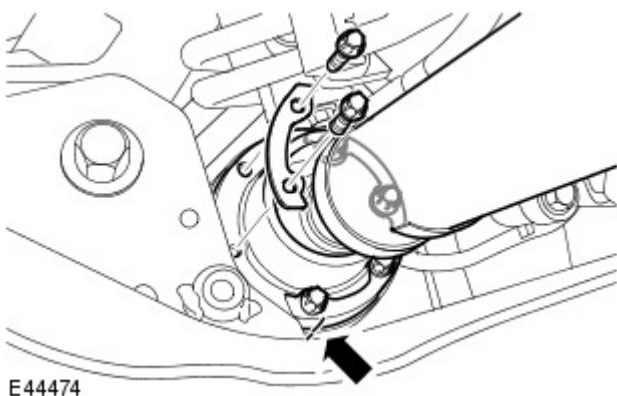
Mark the position of the driveshaft flange in relation to the drive pinion flange.

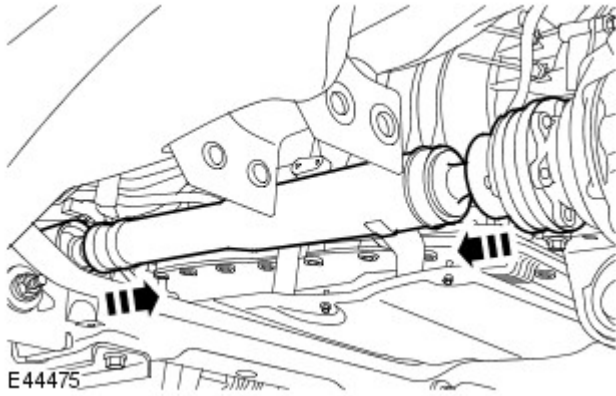


To avoid damage to the joint or gaiter, do not allow the driveshaft to hang.

Release the driveshaft from the front axle drive flange.

- Remove the 6 Torx bolts and washers, discard the bolts.





7. Remove the front driveshaft.

- Compress the joints to disengage the drive flanges.
- Remove the washer from the transfer case drive flange.

Installation

1. NOTE: A small amount of oil may weep from the driveshaft joints during storage. The loss of this oil will not affect the operation or durability of the joint.

Install the driveshaft.

- Clean the components.
- Install the washer.
- Compress the joints to engage the drive flanges.

2. Attach the driveshaft to the front axle drive flange.

- Tighten the new Torx bolts to 45 Nm (33 lb.ft), then a further 90 degrees.

3. Attach the driveshaft to the transfer case drive flange.

- Tighten the new Torx bolts to 45 Nm (33 lb.ft), then a further 90 degrees.

4. Install the transmission crossmember.

For additional information, refer to: [Transmission Support Crossmember - V8 5.0L Petrol](#) (502-02 Full Frame and Body Mounting, Removal and Installation).

5. Install the engine undershield.

For additional information, refer to: [Engine Undershield](#) (501-02 Front End Body Panels, Removal and Installation).

6. Connect the battery ground cable.

For additional information, refer to: [Specifications](#) (414-00 Battery and Charging System - General Information, Specifications).

Driveshaft - Front Driveshaft TDV6 3.0L Diesel

Removal and Installation

Removal

! CAUTION: It is possible to fit the driveshaft incorrectly. Note the orientation before removal.

• NOTE: A small amount of oil may weep from the driveshaft joints during storage. The loss of this oil will not affect the operation or durability of the joint.

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

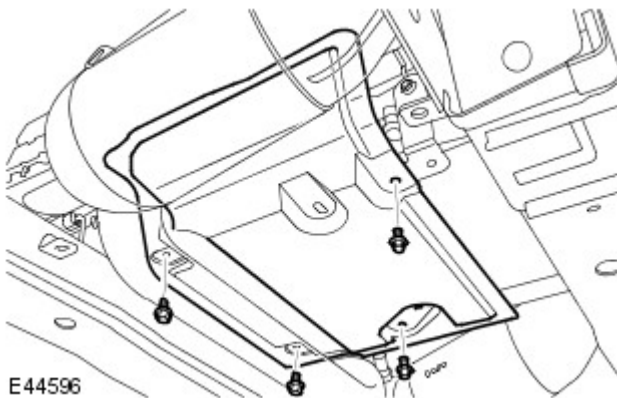
Raise and support the vehicle.

2. Remove the transmission crossmember.
For additional information, refer to: [Transmission Support Crossmember - TDV6 3.0L Diesel](#) (502-02 Full Frame and Body Mounting, Removal and Installation).

3. NOTE: If equipped.

Remove the transmission heat shield.

- Remove the 4 bolts.



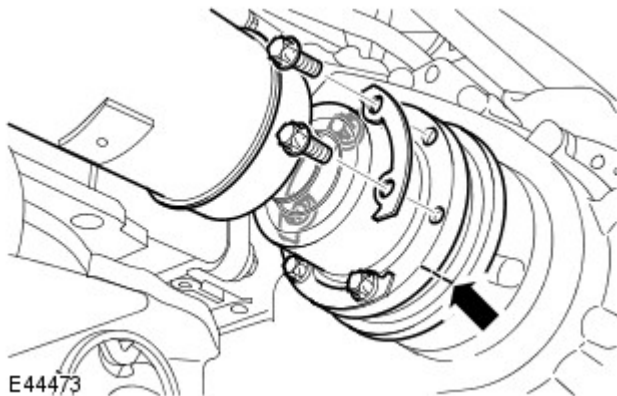
4. CAUTIONS:

! Mark the position of the driveshaft flange in relation to the drive pinion flange.

! To avoid damage to the joint or gaiter, do not allow the driveshaft to hang.

Release the driveshaft from the transfer case drive flange.

- Remove the 6 Torx bolts and washers, discard the bolts.



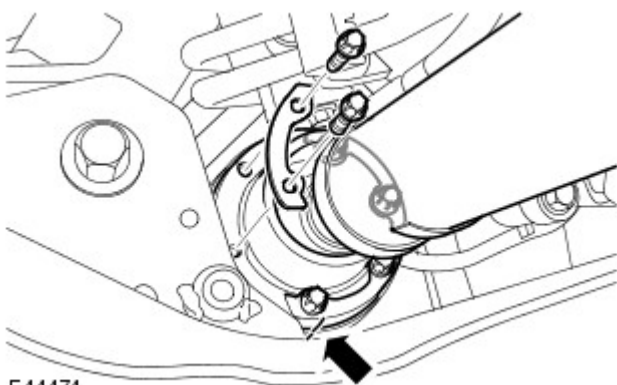
5. CAUTIONS:

! Mark the position of the driveshaft flange in relation to the drive pinion flange.

! To avoid damage to the joint or gaiter, do not allow the driveshaft to hang.

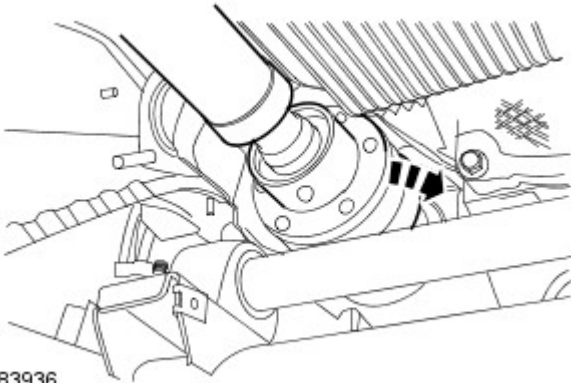
Release the driveshaft from the front axle drive flange.

- Remove the 6 Torx bolts and washers, discard the bolts.



6. Remove the front driveshaft.

- Compress the joints to disengage the drive flanges.




E83936

Installation

1. NOTE: A small amount of oil may weep from the driveshaft joints during storage. The loss of this oil will not affect the operation or durability of the joint.


Install the driveshaft.

- Clean the components.
- Compress the joints to engage the drive flanges.

2.  CAUTION: Make sure that new bolts are installed.

Secure the driveshaft to the front axle drive flange.

- Stage 1: Tighten the bolts to 45 Nm (33 lb.ft).
- Stage 2: Tighten the bolts a further 90 degrees.

3.  CAUTION: Make sure that new bolts are installed.

Secure the driveshaft to the transfer case drive flange.

- Stage 1: Tighten the bolts to 45 Nm (33 lb.ft).
- Stage 2: Tighten the bolts a further 90 degrees.

4. Install the transmission heat shield.

- Tighten the bolts to 10 Nm (7 lb.ft).

5. Install the transmission crossmember.


For additional information, refer to: [Transmission Support Crossmember - TDV6 3.0L Diesel](#) (502-02 Full Frame and Body Mounting, Removal and Installation).

Driveshaft - Rear Driveshaft

Removal and Installation

Removal

- NOTE: A small amount of oil may weep from the driveshaft joints during storage. The loss of this oil will not affect the operation or durability of the joint.

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. Remove the fuel tank heat shield.
 - Remove the 3 bolts and 2 nuts.



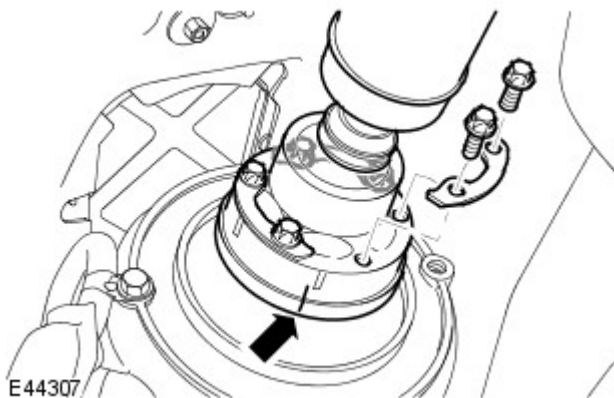
3. CAUTIONS:

 Mark the position of the driveshaft flange in relation to the drive pinion flange.

 To avoid damage to the joint or gaiter, do not allow the driveshaft to hang.

Release the driveshaft from the transfer case drive flange.

- Remove the 6 Torx bolts and washers.



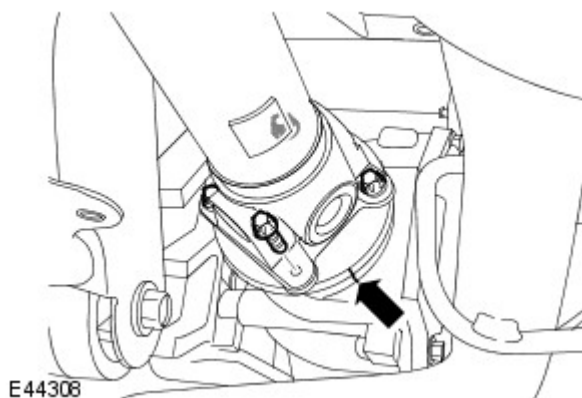
4. CAUTIONS:

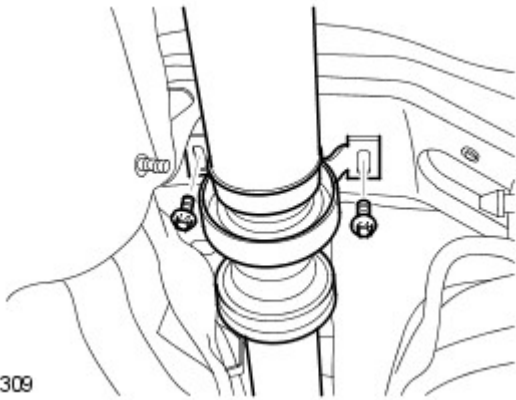
 Mark the position of the driveshaft flange in relation to the drive pinion flange.

 To avoid damage to the joint or gaiter, do not allow the driveshaft to hang.

Release the driveshaft from the rear axle drive flange.

- Remove and discard the 4 Torx bolts.





E44309

5. With assistance, remove the driveshaft.

- Remove the 2 driveshaft center bearing mount bolts.

Installation

1. NOTE: A small amount of oil may weep from the driveshaft joints during storage. The loss of this oil will not affect the operation or durability of the joint.

Attach the driveshaft to the rear axle drive flange.

- Clean the component mating faces.
- Attach the driveshaft to the rear axle drive flange.
- Tighten the new Torx bolts to 150 Nm (110 lb.ft).

2. NOTE: A small amount of oil may weep from the driveshaft joints during storage. The loss of this oil will not affect the operation or durability of the joint.

Attach the driveshaft to the transfer case drive flange.

- Clean the component mating faces.
- Tighten the Torx bolts to 73 Nm (54 lb.ft).

3. CAUTIONS:



Align the driveshaft center bearing mount by moving the floating front section of the shaft backward or forwards until the bolt holes in the mount align with the holes in the chassis.



Make sure the center bearing mount is not under tension.

Install the driveshaft center bearing mount bolts.

- Align the center bearing mount.
- Tighten the driveshaft center bearing retaining bolts to 30 Nm (22 lb.ft).

4. Install the fuel tank heat shield.

- Tighten the bolts to 6 Nm (4 lb.ft).
- Tighten the nuts to 3 Nm (2 lb.ft).

Rear Drive Axle/Differential -

Sealers

Item	Land Rover Part No.
Input shaft flange nut	STC 50553
Input shaft splines	STC 50554
Differential (ETM) unit locking motor	STC 50550

Lubricants

Item	Specification
* Recommended lubricant:	
'Open' unit	Castrol SAF-XO - 75W/90
Electronic torque managed (ETM) unit	Castrol SAF Carbon Mod Plus

*** Do not use any lubricant other than that specified**

Capacities

Unit	Capacity
'Open' differential	1.1 litres (2.3 US pints) (1.16 US quarts)
Electronic torque managed (ETM) differential	1.5 litres (3.17 US pints) (1.6 US quarts)

Rear 'Open' Differential

Item	Specification
Reduction ratio:	
V6 Diesel engine - Manual transmission	3.07:1
V6 Diesel engine - Automatic transmission	3.54:1
V6 Petrol engine - Automatic transmission	3.73:1
V8 Petrol engine - Automatic transmission	3.54:1

Rear Electronic Torque Managed (ETM) Differential

Item	Specification
Electronic torque managed (ETM) range	Up to 2500 Nm (98.5 lbf/ft)
Electronic torque managed (ETM) motor	Operates the ball/ramp mechanism and wet clutch. Motor incorporates a temperature sensor and is controlled by an ECU
Differential type	4 pin
Reduction ratio:	
V6 Diesel engine - Manual transmission	3.07:1
V6 Diesel engine - Automatic transmission	3.54:1
V6 Petrol engine - Automatic transmission	3.73:1
V8 Petrol engine - Automatic transmission	3.54:1

Torque Specifications

Description	Nm	lb-ft
Oil drain plug, with Hexagonal drive plug	54	40
Oil drain plug, with 3/8" square drive plug	28	21
Oil filler plug	34	25
Oil temperature sensor	22	16
++ Differential locking motor	10	7
Differential front mounting bolt	275	203
Differential rear mounting bolts	175	129
* Driveshaft to rear axle drive flange Torx bolts	150	110
Lower arm to wheel knuckle	275	203
Toe link bolt	175	129
Stabilizer bar link nuts	115	85
**+ Halfshaft retaining nut	350	258
Fuel tank heat shield nuts and bolts	10	7
Road wheel nuts	140	103

*** New 'Patchlok' Torx bolts must be installed**

**** New nut must be installed**

+ Stake nut on completion of tightening operation

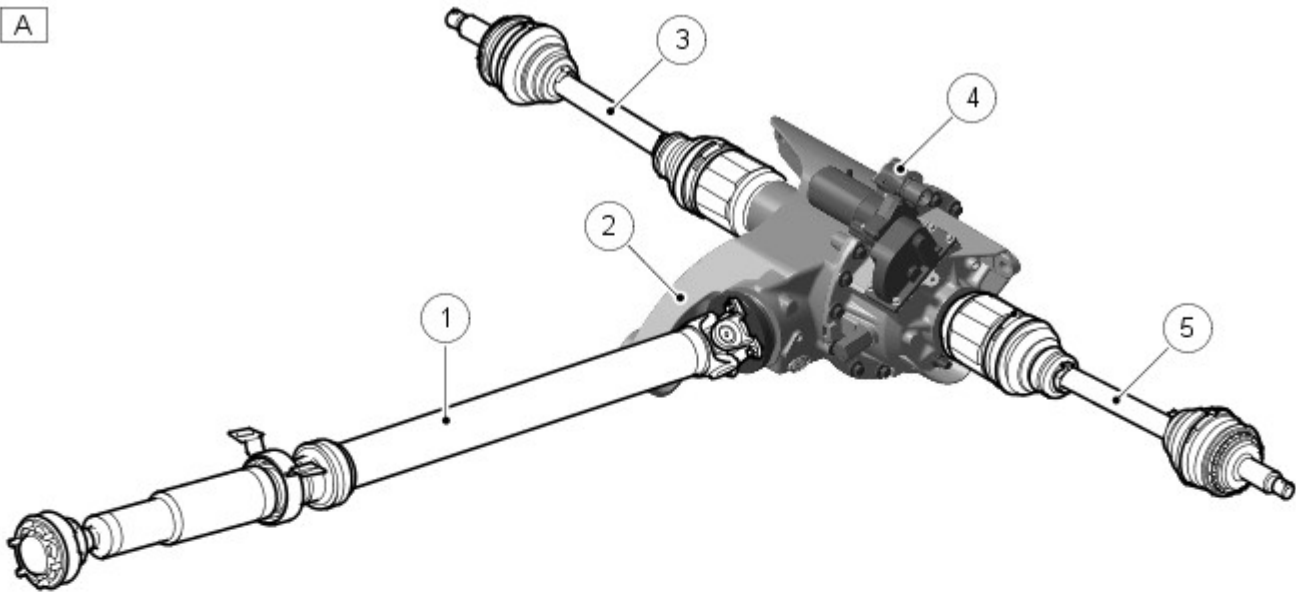
++ Apply sealant, Part No. STC 50550 to flange of locking motor

Rear Drive Axle/Differential - Rear Drive Axle and Differential

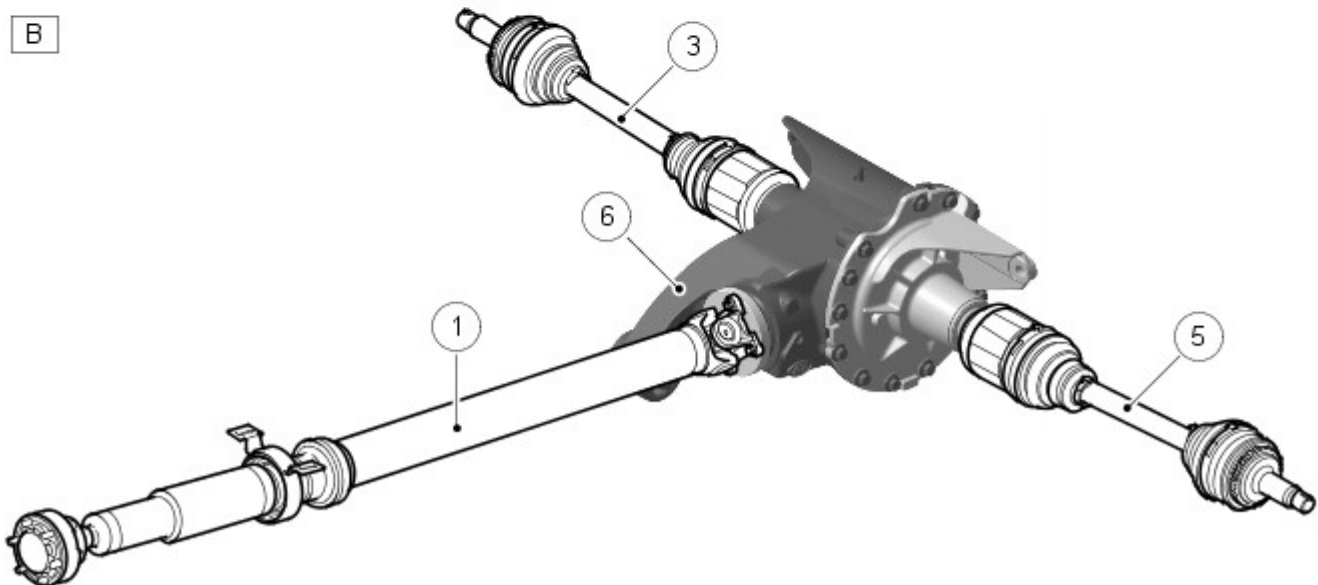
Description and Operation

GENERAL

A



B



E51166

Item	Part Number	Description
A	-	Electronic rear differential
B	-	Open rear differential
1	-	Rear driveshaft
2	-	Electronic rear differential
3	-	RH rear drive halfshaft
4	-	Actuator (locking) motor assembly
5	-	LH rear drive halfshaft
6	-	Rear differential

The open rear differential converts the 'angle of drive' through 90° and distributes drive, via the rear drive halfshafts, to the rear wheels.

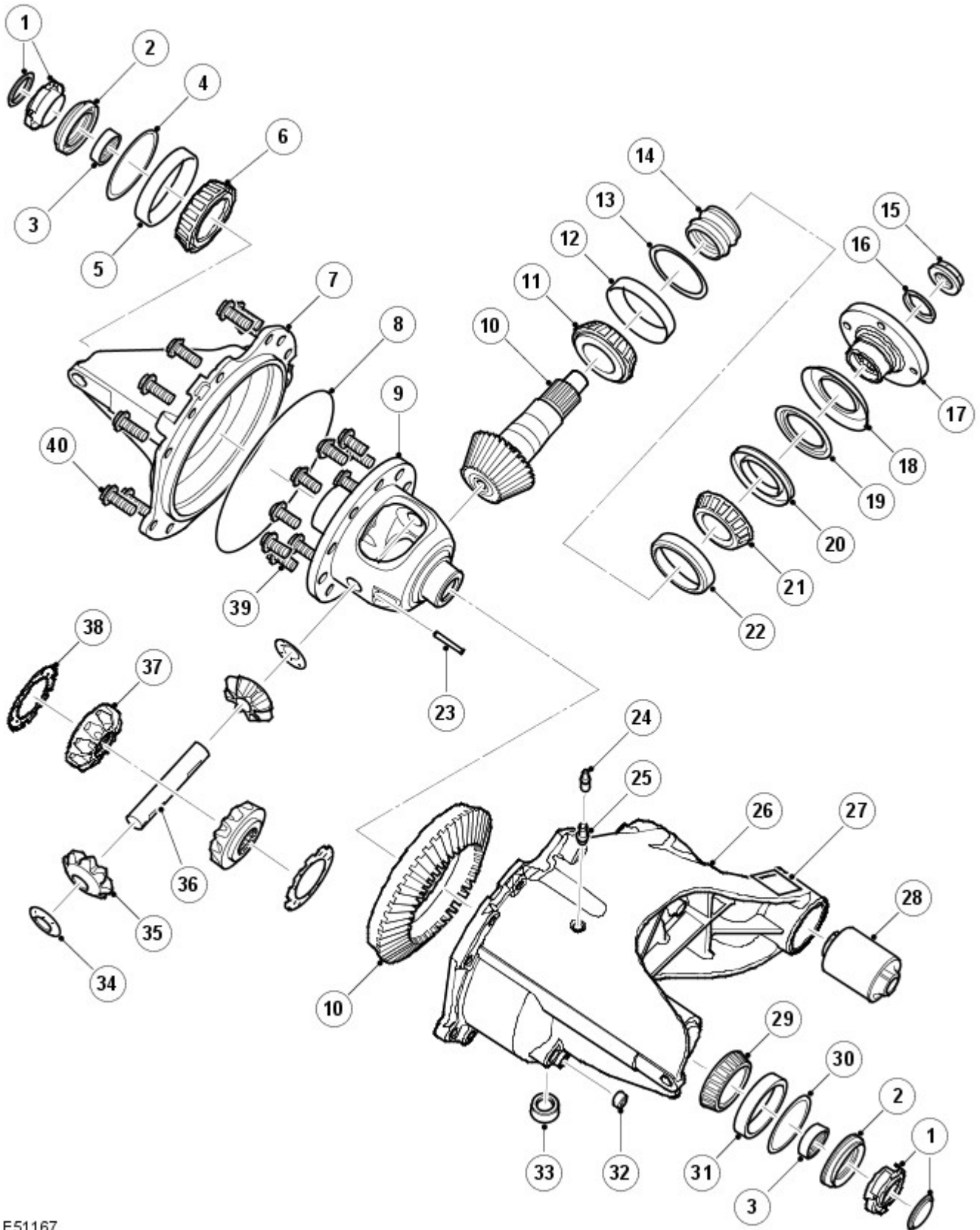
The open rear differential for the V6 and V8 petrol variants has the same output ratio, but the output ratios for the TdV6 diesel are different, depending on whether automatic or manual transmission is fitted.

The open rear differential is located centrally in the rear of the chassis.

The units are mounted to the chassis via rubber bushes and bolts; two mounting points at the rear of the unit and one at the front.

OPEN REAR DIFFERENTIAL ASSEMBLY

Open Rear Differential - Exploded View



E51167

Item	Part Number	Description
1	-	Cap
2	-	Seal
3	-	Bearing assembly, without race
4	-	Bearing pre-load spacer
5	-	Bearing
6	-	Roller bearing cup
7	-	Cover

8	-	Seal
9	-	Differential carrier
10	-	Gear and pinion assembly
11	-	Bearing
12	-	Roller bearing cup
13	-	Shim
14	-	Collapsible spacer
15	-	Pinion nut
16	-	Retainer
17	-	Flange
18	-	Outer deflector
19	-	Inner deflector
20	-	Oil seal
21	-	Bearing
22	-	Roller bearing cup
23	-	Roll pin
24	-	Breather cap
25	-	Breather
26	-	Case
27	-	Data location
28	-	Mounting bush
29	-	Bearing
30	-	Bearing pre-load spacer
31	-	Roller bearing cup
32	-	Plug
33	-	Drain plug
34	-	Thrust washer
35	-	Planet gears
36	-	Crosspin shaft
37	-	Sunwheel
38	-	Thrust washer
39	-	Bolt, 10 of
40	-	Bolt, 12 of

The cast iron casing comprises two parts; a cover and a carrier. The carrier provides locations for all the internal components. The carrier is sealed to the cover via an O-ring seal and secured with twelve bolts. The cover and carrier have cast fins, which assist mobility. A breather tube is fitted to the top of the carrier. This allows a plastic tube to be fitted and routed to a high point under the vehicle body, preventing the ingress of water when the vehicle is wading.

The carrier contains an oil drain plug. The differential unit contains approximately 1.16 litres of oil from a dry fill. If oil is being replaced, a smaller quantity of oil will be required due to residual oil retained in the pinion housing.

The differential is a conventional design using a hypoid gear layout, similar to the front differential. The open rear differential is available in three ratios. V8 petrol engine vehicles use a differential with a final drive ratio of 3.73:1, V6 petrol engine vehicles use a differential with a final drive ratio of 3.73:1 and TdV6 engine vehicles use a final drive ratio of 3.54, for vehicles with automatic transmission and 3.07 for vehicles with manual transmission. Changing the number of teeth between the crown wheel drive gear and pinion gear changes the ratio.

The differential comprises a pinion shaft and hypoid pinion gear and a crown wheel drive gear with an integral cage, which houses two planet gears. Two sun wheels are also located in the cage and pass the rotational drive to the drive shafts.

The pinion shaft is mounted on two opposed taper roller bearings, with a collapsible spacer located between them. The spacer is used to hold the bearings in alignment and also collapses under the pressure applied to the pinion flanged nut. This allows the flanged nut to be tightened to a predetermined torque, which collapses the spacer, setting the correct bearing preload.

The pinion shaft has an externally splined outer end, which accepts and locates the input flange, which is retained by the pinion nut and retainer. The input flange has four threaded holes and mates with the rear drive shaft. Four bolts secure the rear drive shaft to the input flange. An oil seal is pressed into the pinion housing and seals the input flange to the pinion housing. The pinion shaft has a hypoid gear at its inner end, which mates with the crown wheel drive gear.

The crown wheel drive gear is located on the differential case and secured with ten screws. The differential case is mounted on taper roller bearings located in machined bores on each side of the pinion housing. Shims are retained in the casing behind the bearing cups, the shim thickness is selected to apply the correct bearing preload and hypoid backlash.

The differential carrier has a through hole, which provides location for the shaft. The shaft is supported by a sun gear and a needle roller bearing. The shaft is fitted with a snap ring at one end, which locates in a machined groove in the sun gear, locking the shaft in position.

The sun gears are located in pockets in the carrier cage and mesh with the planet gears. Spacers are fitted between the sun wheels and the carrier and set the correct mesh contact between the planet gears and the sun wheels. Each sun wheel has a machined bore with internal splines and machined groove near the splined end. The groove provides positive location for a snap ring fitted to the end of each output flange.

Each output shaft has a spline, which locates in each sun wheel. A snap ring fitted to the splined shaft locates in the groove the sun wheel bore and positively locates the output shaft. Oil seals are pressed into each side of the pinion housing and seal the seal the output shaft.

Differential Operation

The operating principles of the front and rear differentials are the same. Rotational input from the drive shaft is passed via the input flange to the pinion shaft and pinion gear. The angles of the pinion gear to the crown wheel drive gear moves the rotational direction through 90°.

The transferred rotational motion is now passed to the crown wheel drive gear, which in turn rotates the differential casing. The shaft, which is secured to the casing, also rotates at the same speed as the casing. The planet gears, which are mounted on the shaft, also rotate with the casing. In turn, the planet gears transfer their rotational motion to the left and right hand sun wheels, rotating the drive halfshafts.

When the vehicle is moving in a forward direction, the torque applied through the differential to each sun wheel is equal. In this condition both drive halfshafts rotate at the same speed. The planet gears do not rotate and effectively lock the sun wheels to the differential casing.

If the vehicle is turning, the outer wheel will be forced to rotate faster than the inner wheel by having a greater distance to travel. The differential senses the torque difference between the sun wheels. The planet gears rotate on their axes to allow the outer wheel to rotate faster than the inner one.

SERVICE

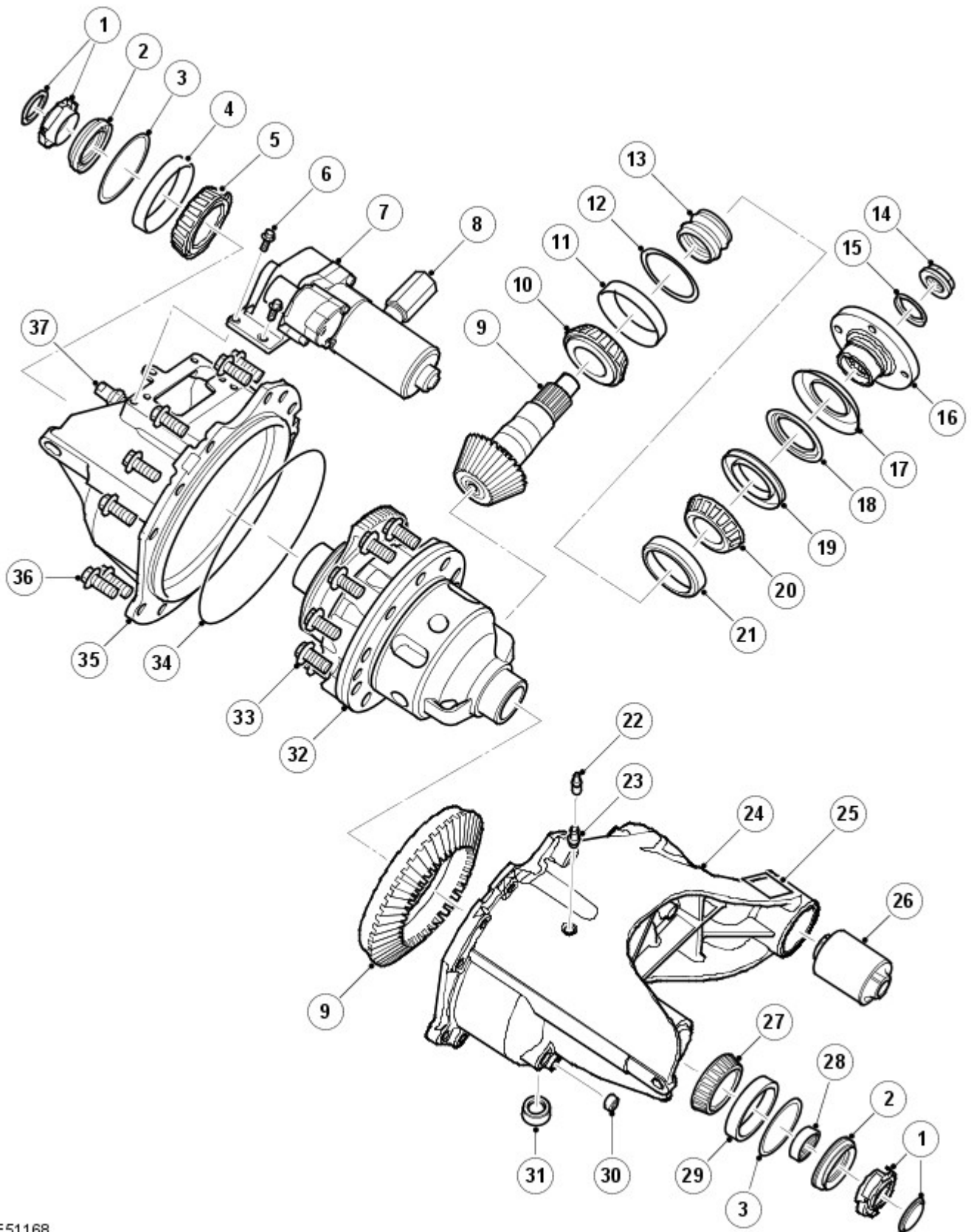
The oil used in the open rear differential is Castrol SAF-XO. The oil contains unique additives, which enhance the differentials operation. No other oil must be used in the open rear differential.

Open Rear Differential Serviceable Components

- Needle roller bearing assemblies
- Halfshaft seals
- Chassis bush/fixings
- Lubricant.

ELECTRONIC REAR DIFFERENTIAL ASSEMBLY

Electronic Rear Differential - Exploded View



E51168

Item	Part Number	Description
1	-	Cap
2	-	O ring
3	-	Bearing pre-load spacer
4	-	Bearing
5	-	Bearing cup
6	-	Bolt, 4 of
7	-	Housing and motor assembly
8	-	Damper
9	-	Gear and pinion assembly
10	-	Bearing
11	-	Bearing cup

12	-	Shim
13	-	Collapsible spacer
14	-	Pinion nut
15	-	Retainer
16	-	Flange
17	-	Deflector, outer
18	-	Deflector, inner
19	-	Seal
20	-	Bearing
21	-	Bearing cup
22	-	Breather cap
23	-	Breather
24	-	Case
25	-	Data location
26	-	Mounting bush
27	-	Bearing
28	-	Bearing assembly without race
29	-	Bearing cup
30	-	Filler plug
31	-	Drain plug
32	-	Electronic differential assembly
33	-	Bolt, 10 of
34	-	O ring
35	-	Cover
36	-	Bolt, 12 of
37	-	Temperature sensor

The electronic rear differential has the same functionality as the open rear differential but incorporates a locking feature.

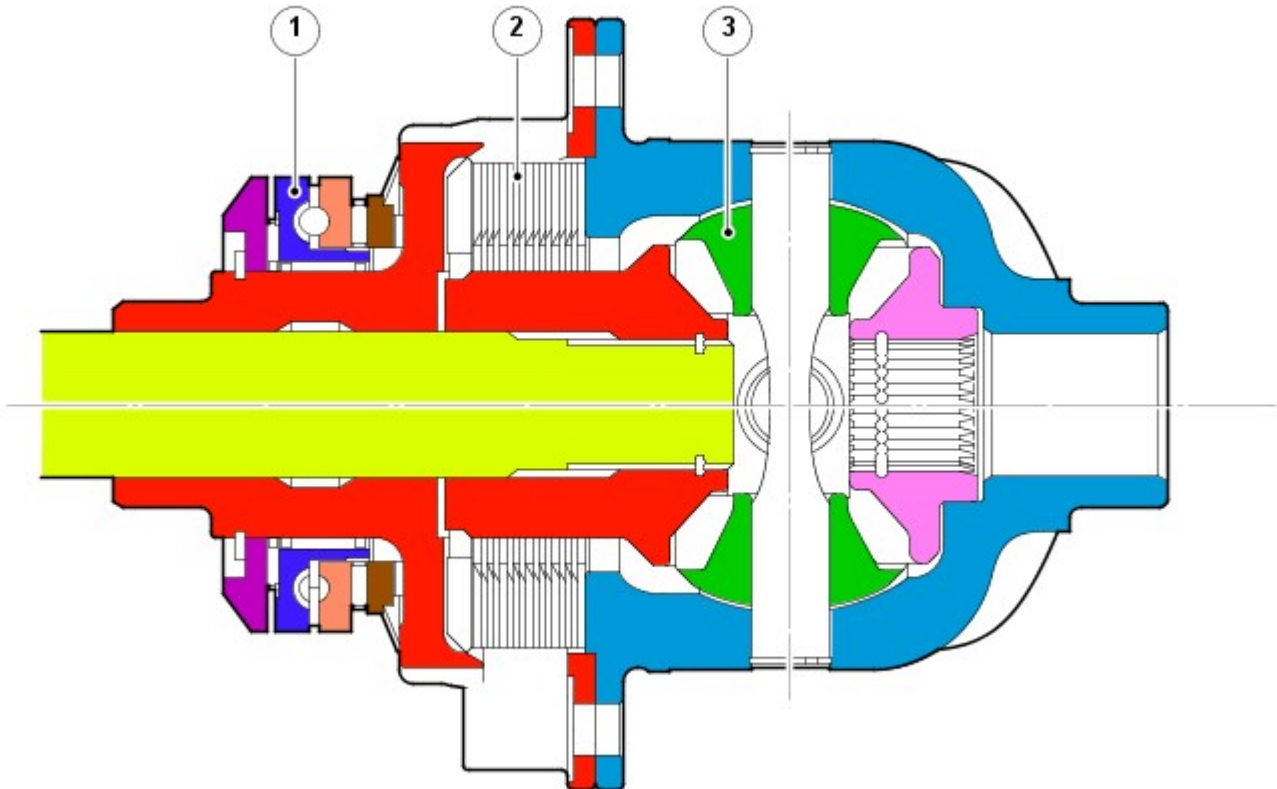
An electronically controlled multi-plate clutch provides a rear differential lock and torque biasing function to give improved traction performance and vehicle dynamic stability.

A strategy, to electronically control the rear differential multi-plate clutch assembly, has been developed to provide:

- a pre-loading function, increasing locking torque with increased driving torque
- a slip controller to increase locking torque under off-road conditions and decrease locking torque for optimum comfort, e.g. parking.

The unit receives a torque input from the transfer box output shaft, which is passed through the unit to two outputs for the rear drive halfshafts.

The unit detects wheel slip via various vehicle system inputs to the electronic rear differential control module and locks the differential accordingly.



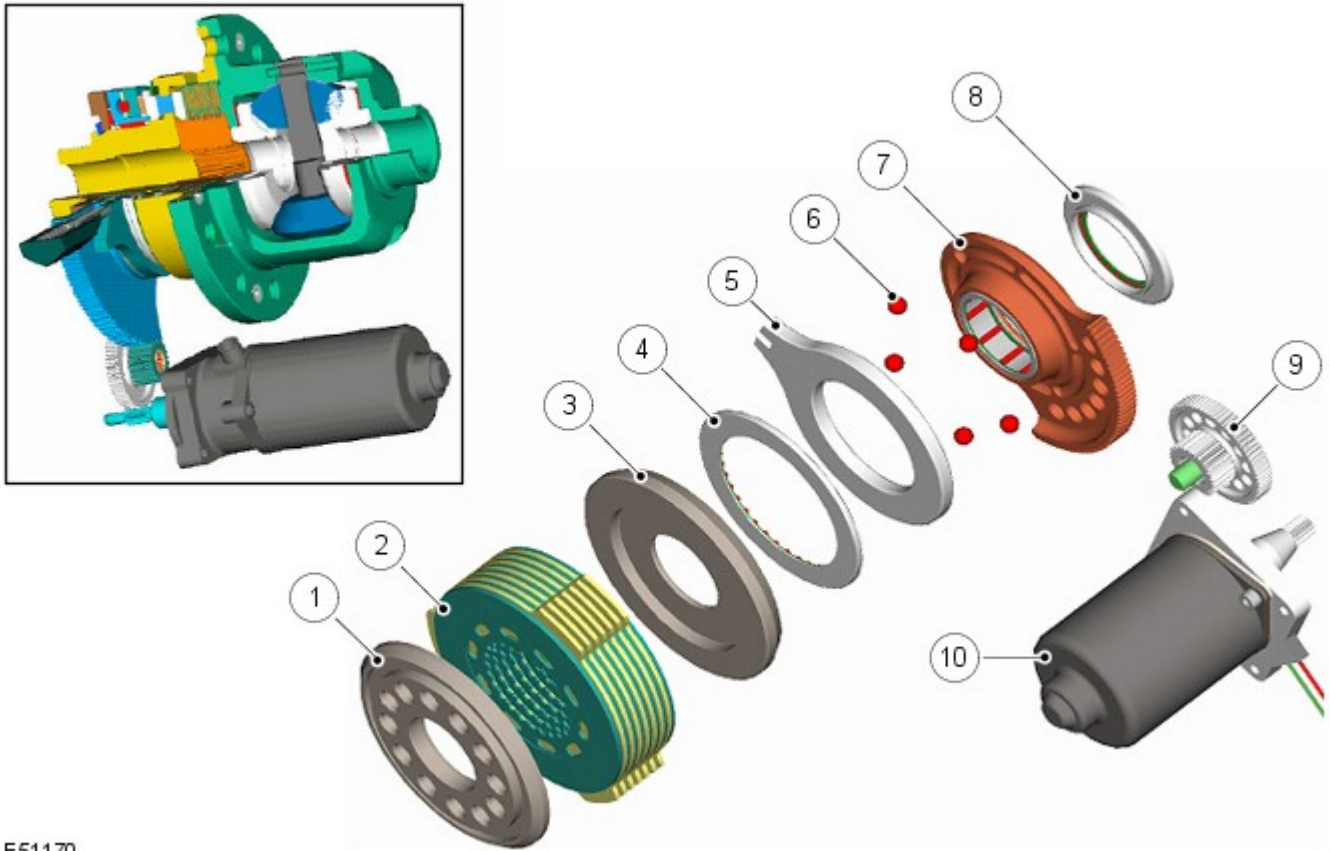
E51169

Item	Part Number	Description
1	-	Actuator

2	-	Clutch pack
3	-	Differential

The electronic rear differential locking and biasing feature is actuated via a DC motor, which is controlled by the electronic rear differential control module, via a Pulse Width Modulation (PWM) signal.

Multi-plate Clutch Assembly



E51170

Item	Part Number	Description
1	-	Pressure disc
2	-	Clutch plate assembly
3	-	Pressure disc
4	-	Thrust race
5	-	Output actuator
6	-	Actuator balls
7	-	Input actuator
8	-	Bearing pre-load spacer
9	-	Reduction gearset
10	-	Actuator motor

The multi-plate clutch assembly for both centre (transfer box) and electronic rear differentials act in a similar way. The aim of the multi-plate clutch assembly is to prevent excessive differential slip and therefore maximise the traction performance of the vehicle. This is fundamentally different from the 'braked' traction control, which can only counter act differential slip when it occurs.

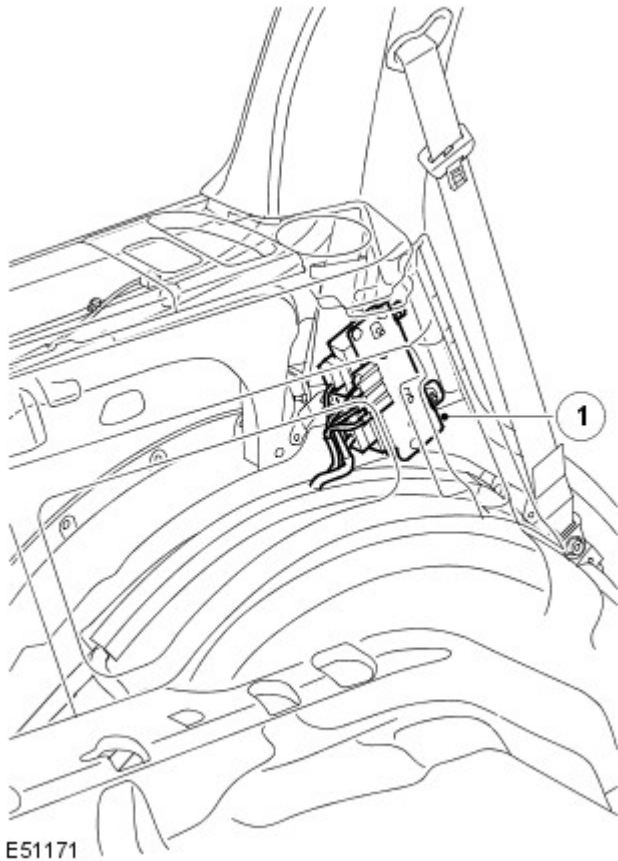
A certain amount of differential slip is required to allow the vehicle to turn corners and to remain stable under control of the Anti-lock Braking System (ABS). The transfer box control module monitors the driver's demands through primary vehicle controls and automatically sets the slip torque at the rear differential via the electronic rear differential control module. The system is completely automatic and does not require any special driver input.

The multi-plate clutch assembly actively controls the torque flow through the rear differential and optimises the torque distribution in the driveline. The clutch assembly biases the torque from the differential to the wheels with the higher grip and prevents the wheels with the lower grip from spinning.

By turning the input actuator disc, via the motor shaft, the output actuator is rotated. This movement acts on 5 balls in a ramp mechanism between the input and output actuators and gives a defined axial movement. The movement forces the pressure disc to induce friction between the sun gear and differential case via the clutch plates supported by the sun gear and the plates supported by the clutch basket on the differential case. This frictional force inhibits the differential rotation; the differential case and left hand differential side gear are locked together.

Electronic Rear Differential Control Module

The electronic rear differential control module controls the multi-plate clutch actuation. The control module is mounted on a bracket located on the LH C-pillar, behind the trim.



E51171

Item	Part Number	Description
1	-	Electronic rear differential control module

The control module is connected on the Controller Area Network (CAN) bus and controls the differential operation using CAN messages from other control modules on the network.

The control module uses three connectors for all inputs and outputs. It receives a permanent power supply via a 40A fusible link located in the Battery Junction Box (BJB), and an ignition supply via fuse 24 located in the Central Junction Box (CJB).

The control module memorises the position of the electronic rear differential motor when the ignition is switched off.

The control module controls the closed loop position sensing system within the motor and regulates the power supply to the motor.

If the control module is replaced, T4 must be connected to the vehicle and the electronic rear differential control module self-calibration procedure must be performed. This procedure must also be performed if the motor or differential assembly is replaced.

If a fault occurs with the electronic rear differential, the control module records an error code and a warning lamp, in the instrument cluster, illuminates permanently.

Electronic Rear Differential Control Module Pin Out Details

Connector C2162

Pin No.	Description	Input/output
1	Not used	-
2	CAN bus low	Input/output
3	CAN bus high	Input/output
4	Not used	-
5	CAN bus high	Input/output
6	CAN bus low	Input/output

Connector C2163

Pin No.	Description	Input/output
1	Not used	-
2	Not used	-
3	Ground	-
4	Ignition feed	Input
5	Not used	-
6	Ground	-
7	Battery feed	Input
8	Battery feed	Input

Connector C2164

Pin No.	Description	Input/output
---------	-------------	--------------

Pin No.	Description	Input/output
1	+ve for actuator Hall sensor	Input
2	Not used	-
3	Actuator motor	Output
4	Hall sensor - Signal A	Input
5	Not used	-
6	Not used	-
7	Hall sensor - Signal B	Input
8	Differential oil temperature sensor	Input
9	Not used	-
10	Ground - Hall sensor	-
11	Differential oil temperature sensor	Output
12	Actuator motor	Input
13	Motor temperature sensor	Output
14	Not used	-
15	Not used	-
16	Motor temperature sensor	Input
17	Motor brake solenoid	Output
18	Motor brake solenoid	Input

CAN Bus Messages

The CAN bus is a high speed broadcast network connected between various vehicle control modules. It allows the fast exchange of data between control modules every few microseconds. The bus comprises two wires, which are twisted together to minimise electromagnetic interference (noise) produced by the CAN messages.

For additional information, refer to: Communications Network (418-00 Module Communications Network, Description and Operation).

The electronic rear differential control module is connected on the CAN bus, via the transfer box control module, and controls differential operation using CAN messages from other control units on the network. Wheel speed, steering angle, automatic transmission speed, temperature information, car configuration, axle ratios and mode inputs, are some of the main signals received by the control module.

The control module also sends messages via the CAN bus to tell other control modules on the network, the status of the electronic rear differential. The clutch torque and default mode status are some of the main signals sent out by the control module.

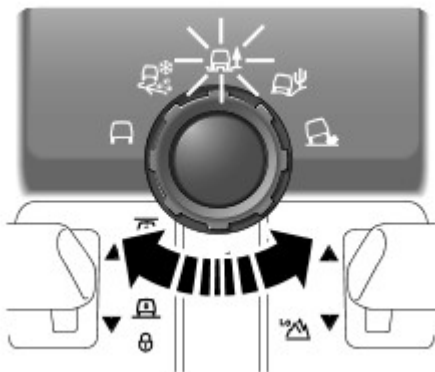
The following table shows the messages that can be displayed in the message centre of a high-line instrument cluster relating to the electronic rear differential:

Message	Description	Chime
'TRANSMISSION OVERHEAT' 'SLOW DOWN'	Rear differential temperature has reached or is approaching the overheat threshold.	None
'TRANSMISSION FAULT' 'TRACTION REDUCED'	Transfer box control module has stopped transmitting CAN bus messages. Defaults to open centre differential. Message also displayed when fault occurs with electronic rear differential.	None
'TRANSMISSION FAULT' 'STOP SAFELY'	Fault has occurred with electronic rear differential. Stop vehicle at earliest opportunity.	Single

On vehicles fitted with the low line instrument cluster, in place of the message centre there will be a status lamp, which has the following logic:

- Amber - Over temperature
- Red - Failure, stop vehicle

TERRAIN RESPONSE™



The Terrain Response™ system allows the driver to select a program, which will provide the optimum settings for traction and performance for the prevailing terrain conditions.

The system is controlled by a rotary control located on the centre console.

The system uses a combination of vehicle subsystems to achieve the required vehicle characteristics for the terrain selected. The following subsystems form the Terrain Response™ system:

- Engine management system
- Automatic transmission (if fitted)
- Transfer box
- Brake system
- Air suspension.

Each subsystem control module provides a feedback for the selected program so that the Terrain Response™ control module can check that all systems are controlling the system correctly. The exception to this is the electronic rear differential control module which does not provide feedback to the Terrain Response™ system as it is a slave to the transfer box control module.

For additional information, refer to: [Ride and Handling Optimization](#) (204-06 Ride and Handling Optimization, Description and Operation).

SERVICE

The oil used in the electronic rear differential is Castrol SAF-Carbon Mod Plus. The oil contains unique additives and friction modifiers, which enhance the differentials operation. No other oil must be used in the electronic rear differential.

Electronic Rear Differential Serviceable Components

- Halfshaft seals
- Needle roller bearing assembly
- Chassis bush/fixings
- Actuator motor
- Temperature sensor
- Control module and bracket
- Lubricant.

DIAGNOSTICS

The electronic rear differential control module can store fault codes, which can be retrieved using T4 or a diagnostic tool using ISO-14229 protocol.

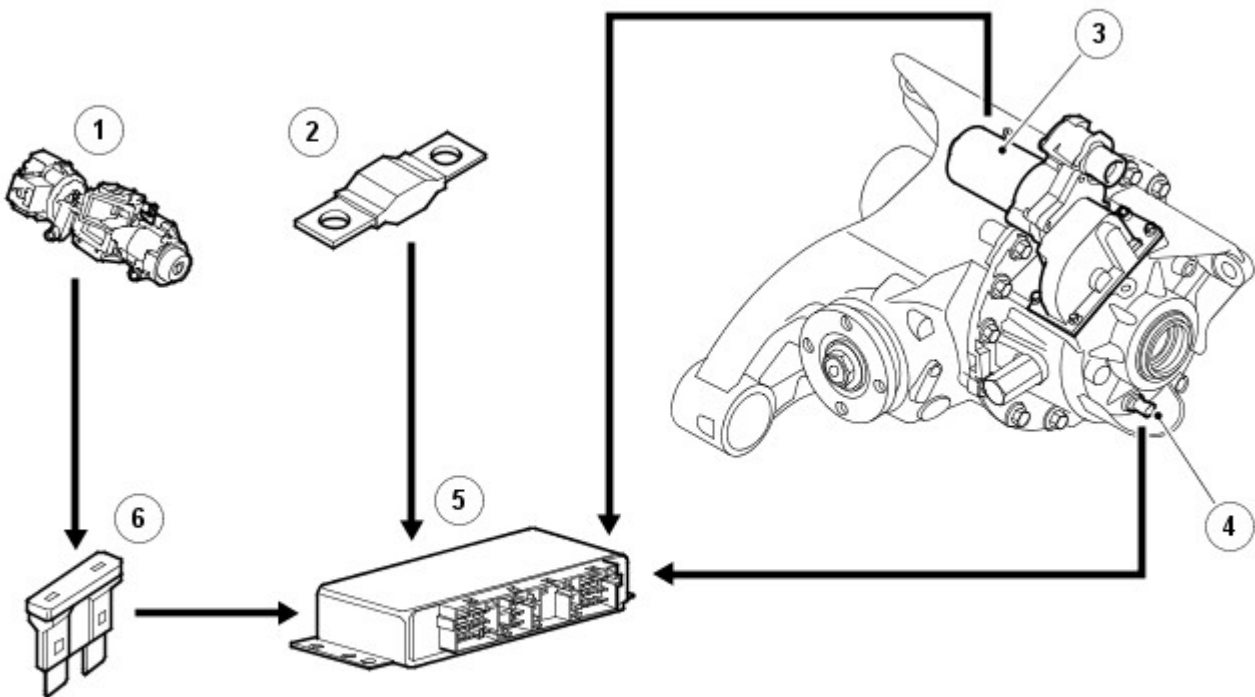
The information is communicated via a diagnostic socket.

The diagnostic socket allows the exchange of information between the various control modules on the bus systems and T4 or another suitable diagnostic tool. The information is communicated to the socket via the CAN bus. This allows the retrieval of diagnostic information and programming of certain functions using T4 or another suitable diagnostic tool.

The electronic rear differential control module uses Diagnostic Trouble Codes (DTC), which relate to electronic rear differential electrical faults.

ELECTRONIC REAR DIFFERENTIAL CONTROL DIAGRAM

- NOTE: A = Hardwired



Item	Part Number	Description
1	-	Ignition switch
2	-	Fusible link (battery)
3	-	Actuator motor
4	-	Oil temperature sensor
5	-	Electronic rear differential control module
6	-	Fuse (ignition)

Rear Drive Axle/Differential - Rear Drive Axle and Differential

Diagnosis and Testing

Principles of Operation

For a detailed description of the Rear Drive Axle and Differential and operation, refer to the relevant Description and Operation section of the workshop manual.

REFER to: [Rear Drive Axle and Differential](#) (205-02 Rear Drive Axle/Differential, Description and Operation).

Inspection and Verification



CAUTION: Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault and may also cause additional faults in the vehicle being checked and/or the donor vehicle.

• **NOTE:** Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

1. **1.** Verify the customer concern.
2. **2.** Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection

Mechanical	Electrical
<ul style="list-style-type: none"> ● Differential oil leakage ● Sensor installation 	<ul style="list-style-type: none"> ● power ● Fuse(s) ● Wiring harness physical damage or water ingress ● Loose or corroded electrical connectors ● Controller Area Network (CAN) circuits ● Sensors ● Rear differential control module

3. **3.** If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. **4.** If the cause is not visually evident, verify the symptom and refer to the Symptom Chart, alternatively check for Diagnostic Trouble Codes (DTCs) and refer to the DTC Index.

Symptom Chart

Symptom	Possible Message	Possible Other Warnings	Possible Causes	Action
Running at reduced capability with fault present	<ul style="list-style-type: none"> ● Rear differential fault 	<ul style="list-style-type: none"> ● Driveline overheat warning lamp illuminated ● Rear differential/driveline fault warning lamp illuminated 	<ul style="list-style-type: none"> ● Water ingress to wiring harness or connectors ● Reduced differential capability ● Differential increased tolerances ● Internal fault ● Rear differential control module fault (Rear differential control module) 	Visually inspect the wiring harness and connectors for water ingress. Refer to the warranty policy and procedures manual if a module is suspect.
Rear differential overheat	<ul style="list-style-type: none"> ● Rear Differential Overheat Slow Down 	<ul style="list-style-type: none"> ● Driveline overheat warning lamp illuminated 	<ul style="list-style-type: none"> ● Oil level incorrect ● Oil level incorrect specification ● Sensor fault ● Internal fault 	Check for correct oil quantity and specifications. Refer to the relevant section of the workshop manual.

DTC Index

For a list of Diagnostic Trouble Codes (DTCs) that could be logged on this vehicle, please refer to Section 100-00.

REFER to: [Diagnostic Trouble Code \(DTC\) Index - DTC: Rear Differential Control Module \(RDCM\)](#) (100-00 General Information, Description and Operation).

Rear Drive Axle/Differential - Differential Draining and Filling

General Procedures



CAUTION: Do not fill the differential with lubricant up to the filler plug. The filler plug is only used to fill the differential with lubricant, and not to act as a level indicator.

• **NOTE:** The only way to check the fluid level in the differential is to drain all the fluid out and refill with the correct quantity, shown in the specification section.
For additional information, refer to: [Specifications](#) (205-02 Rear Drive Axle/Differential, Specifications).

- 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.

- CAUTION:** Do not undo or remove the large protruding hexagon on the differential casing.

Remove the differential case lubricant filler plug.

- Clean the area around the lubricant filler plug.
- Position container to collect fluid loss.



- Drain the differential lubricant.

- Clean the area around the drain plug.
- Remove the fluid drain plug.



- CAUTION:** There has been 2 different types of fixings used for the drain plug. Note the type and make sure the correct torque is applied, see below.

Install the lubricant drain plug.

- Clean the drain plug.
- Up to differential serial number 254325: Tighten the hexagonal drive drain plug to 54 Nm (40 lb.ft).
- From differential serial number 254326: Tighten the 3/8" square drive drain plug to 28 Nm (21 lb.ft).

5. CAUTIONS:

There have been 2 different types of fixings used for the drain plug. Note the type and differential serial number, and make sure the correct torque is applied, see below.

Make sure the correct specification and quantity of oil is used.

Fill the differential with the correct amount of lubricant.
For additional information, refer to: [Specifications](#) (205-02 Rear Drive Axle/Differential, Specifications).


6. Install the differential filler plug.

- Clean the filler plug.
- Tighten the filler plug to 34 Nm (25 lb.ft).

Rear Drive Axle/Differential - Differential Locking Motor

In-vehicle Repair

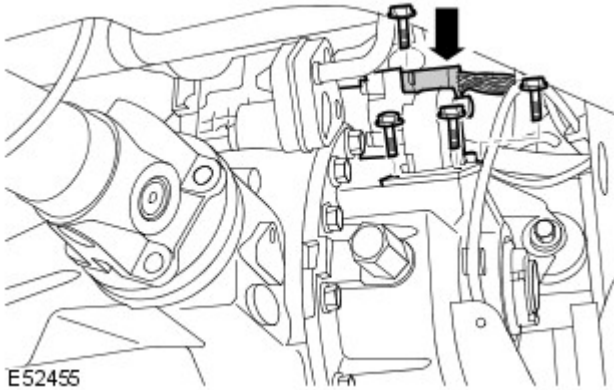
Removal

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.

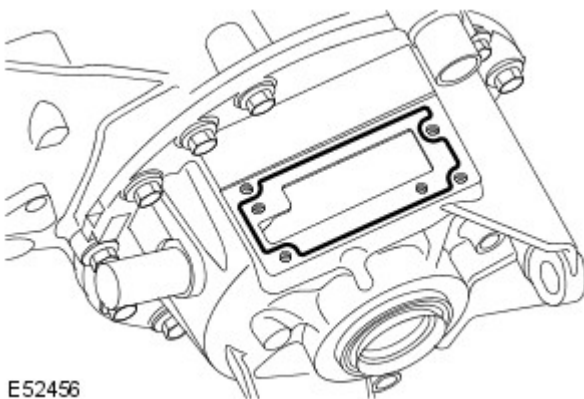
2. Remove the differential locking motor.

- Disconnect the electrical connector.
- Remove the 4 bolts.



Installation

1. Clean the component mating faces.
2. Apply continuous bead of sealant to the motor mating face on the differential.



3. Install the differential locking motor.
 - Tighten the bolts to 10 Nm (7 lb.ft).
 - Connect the electrical connector.
4. Lower the vehicle.
5. Calibrate the differential locking motor using the diagnostic tool.

Rear Drive Axle/Differential - Rear Axle Oil Temperature Sensor

In-vehicle Repair

Removal

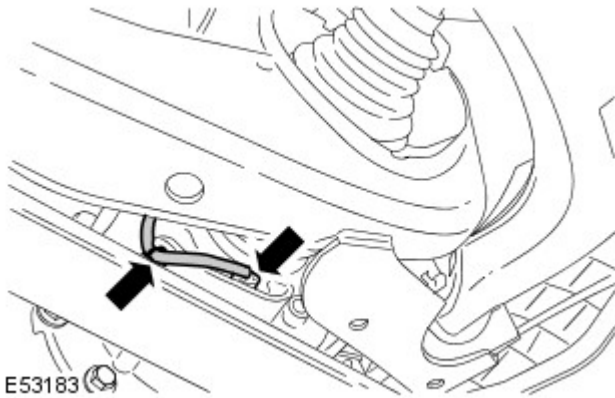
- 1. ⚠️ WARNING:** Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Raise and support the vehicle.

- 2.** Drain the differential lubricant.
For additional information, refer to: [Differential Draining and Filling](#) (205-02 Rear Drive Axle/Differential, General Procedures).

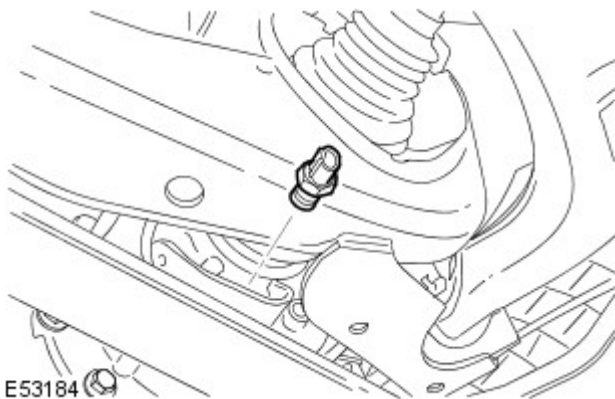
- 3.** Disconnect the electrical connector.

- Release the wiring harness retaining clip.



- 4.** Remove the oil temperature sensor.

- Remove and discard the O-ring seal.

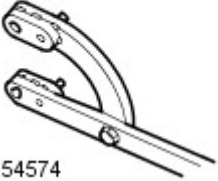

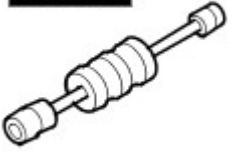






Installation

- 1.** Clean the component mating faces.
- 2.** Install the oil temperature sensor.
 - Tighten to 22 Nm (16 lb.ft).
- 3.** Connect the electrical connector.
 - Secure the wiring harness clip.
- 4.** Fill the differential with the correct amount of lubricant.
For additional information, refer to: [Differential Draining and Filling](#) (205-02 Rear Drive Axle/Differential, General Procedures).


Rear Drive Axle/Differential - Drive Pinion Seal

In-vehicle Repair


Special Tool(s)	
<p>205-053</p>  <p>E54574</p>	<p>Flange holding tool</p> <p>205-053</p>
<p>205-053</p>  <p>E54585</p>	<p>Adapter for</p> <p>205-053</p>
<p>100-012</p>  <p>E54135</p>	<p>Impulse extractor</p> <p>100-012(LRT-99-004)</p>
<p>205-821</p>  <p>E54586</p>	<p>Installer drive pinion oil seal</p> <p>205-821</p>
<p>205-824</p>  <p>E54587</p>	<p>Remover drive flange</p> <p>205-824</p>
<p>205-823</p>  <p>E54700</p>	<p>Remover drive pinion seal</p> <p>205-823</p>
<p>205-821-01</p>  <p>E 112195</p>	<p>Seal installer, adaptor</p> <p>205-821-01</p>

Removal

- CAUTIONS:

 The input flange must not be change for one from another unit.

 The drive pinion seal must only be renewed for 1 repair.

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. Drain the differential lubricant.
For additional information, refer to: [Differential Draining and Filling](#) (205-02 Rear Drive Axle/Differential, General Procedures).

3. Remove the fuel tank heat shield.

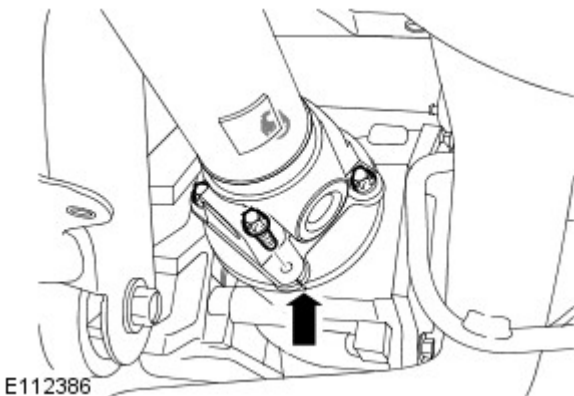
- Remove the 3 bolts and 2 nuts.



4.  **CAUTION:** Mark the position of the driveshaft flange in relation to the drive pinion flange.

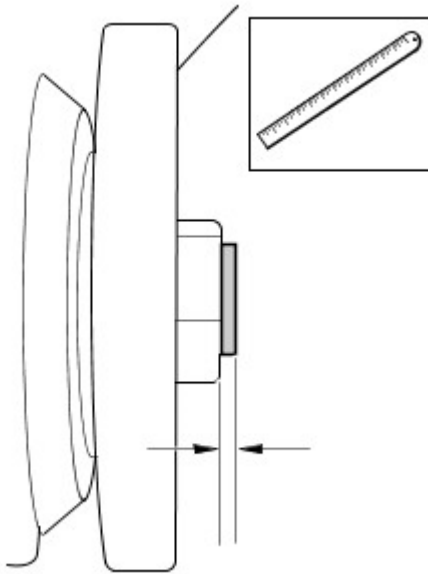
Release the driveshaft from the rear axle drive pinion flange.

- Remove and discard the 4 Torx bolts.




5. Measure the depth of the pinion nut on the pinion shaft.

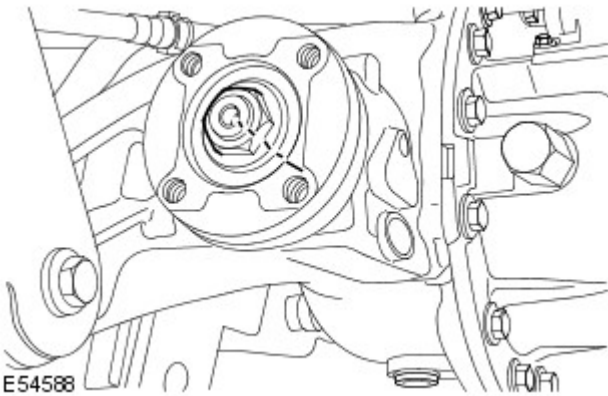
- Note measurement for installation.



E112387

6.  CAUTION: This step must be carried out to make sure that the drive pinion nut is correctly tightened on assembly.

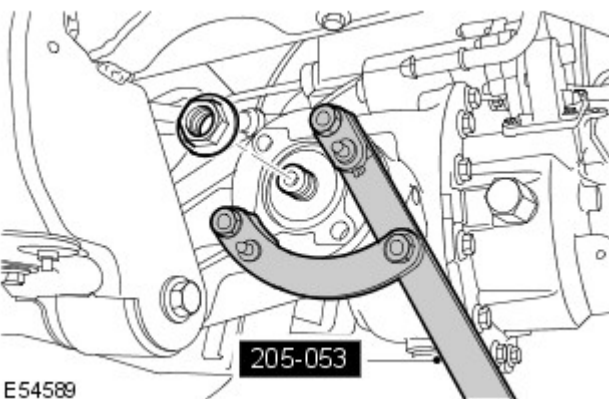
Accurately scribe a line to mark the drive pinion shaft to the drive pinion nut and pinion flange.



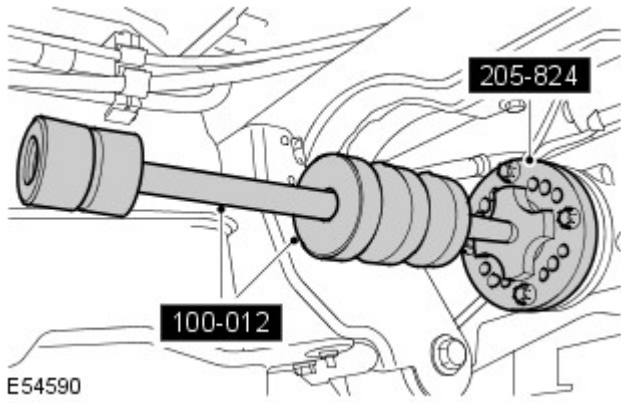
E54588

7. Remove the drive pinion flange retaining nut.

- Using the special tool, counter hold the drive pinion flange.
- Note number of turns for installation.

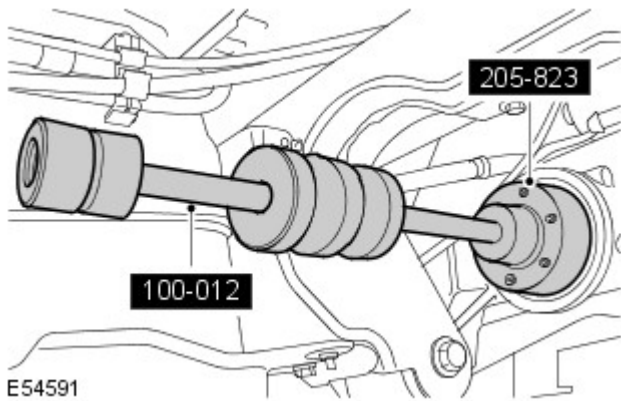


E54589



8. Using the special tool, remove the drive pinion flange.

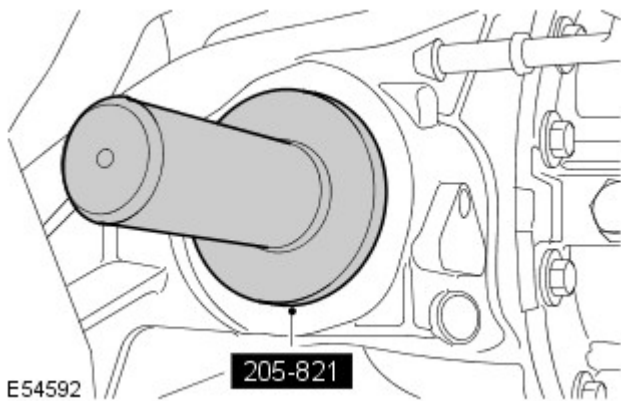
- Check flange seal journal for any damage.



9. Using the special tool, remove the drive pinion seal.

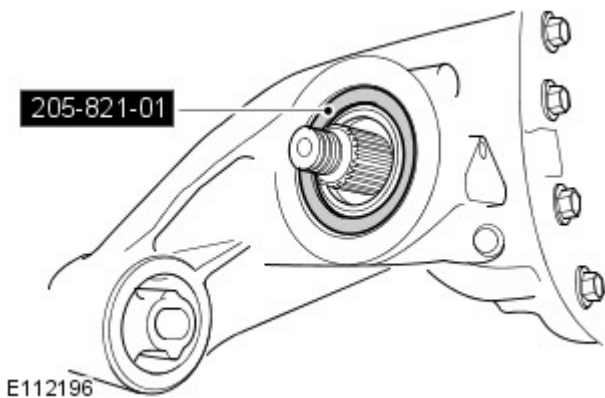
Installation

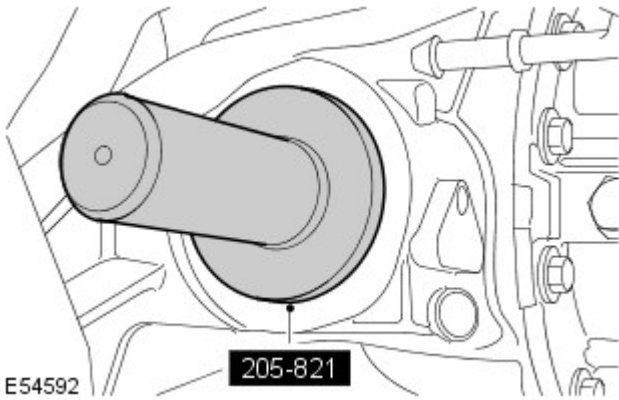
1. Clean the drive pinion flange.
2. Clean the drive pinion seal mating faces.
3. Using the special tool, install the new drive pinion seal.



4. Remove the special tool.

- Install special tool 205-821-01 to the seal face.





5.  **CAUTION:** Make sure adaptor is removed or damage to the vehicle may occur.


Using the special tool, install the new drive pinion seal.

- Remove the special tools.

6.  **CAUTION:** Make sure the drive pinion flange scribed marks are aligned.

Install the drive pinion flange.

7. CAUTIONS:

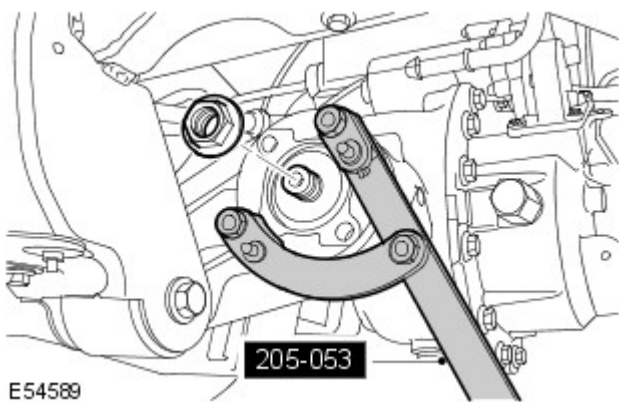
 Make sure the mark on the drive pinion nut is never tightened short of the scribed mark on the drive pinion shaft.

 Make sure the drive pinion flange has no end float and is free to rotate.

 Make sure the scribed mark on the drive pinion nut is no more than a maximum of 5 degrees past the scribed mark on the drive pinion shaft.

Install the drive pinion flange retaining nut.

- Using the special tool, counter hold the drive pinion flange.
- Install nut to previously noted number of turns.
- Measure the depth of the pinion nut on the pinion shaft.




8. Attach the driveshaft to the rear axle drive flange.

- Clean the component mating faces.
- Attach the driveshaft to the rear axle drive flange.
- Tighten the new Torx bolts to 150 Nm (110 lb.ft).

9. Install the fuel tank heat shield.

- Tighten the bolts and nuts to 10 Nm (7 lb.ft).

10.  **CAUTION:** Make sure the correct specification and quantity of oil is used.

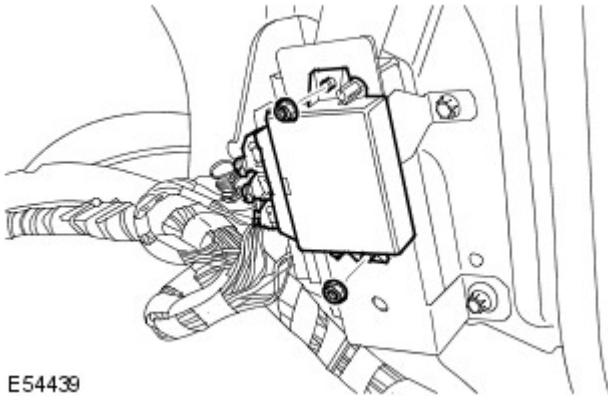
Fill the differential with the correct amount of lubricant. For additional information, refer to: [Differential Draining and Filling](#) (205-02 Rear Drive Axle/Differential, General Procedures).

Rear Drive Axle/Differential - Differential Locking Module

In-vehicle Repair

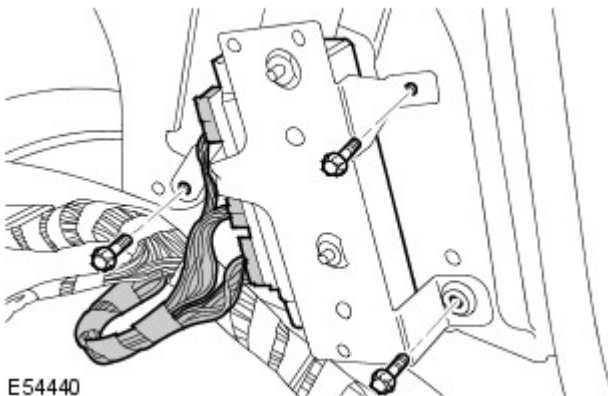
Removal

1. Disconnect the battery ground cable.
For additional information, refer to: [Specifications](#) (414-00 Battery and Charging System - General Information, Specifications).
2. Remove the rear quarter trim panel.
For additional information, refer to: [Rear Quarter Trim Panel](#) (501-05 Interior Trim and Ornammentation, Removal and Installation).
3. Release the parking aid module.
 - Remove the 2 nuts.



E54439

4. Remove the differential locking module.
 - Disconnect the 3 electrical connectors.
 - Remove the 3 bolts.



E54440

Installation

1. Install the differential locking module.
 - Install the bolts and tighten to 10 Nm (7 lb.ft).
 - Connect and secure the electrical connectors.
2. Install the parking aid module.
 - Tighten the nuts to 10 Nm (7 lb.ft).
3. Install the rear quarter trim panel.
For additional information, refer to: [Rear Quarter Trim Panel](#) (501-05 Interior Trim and Ornammentation, Removal and Installation).
4. Connect the battery ground cable.
For additional information, refer to: [Specifications](#) (414-00 Battery and Charging System - General Information, Specifications).
5. Use T4 to calibrate a new differential locking module.

Rear Drive Axle/Differential - Axle Assembly

Removal and Installation

Removal



CAUTION: Do not loosen or remove the large protruding hexagon on the differential casing.

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

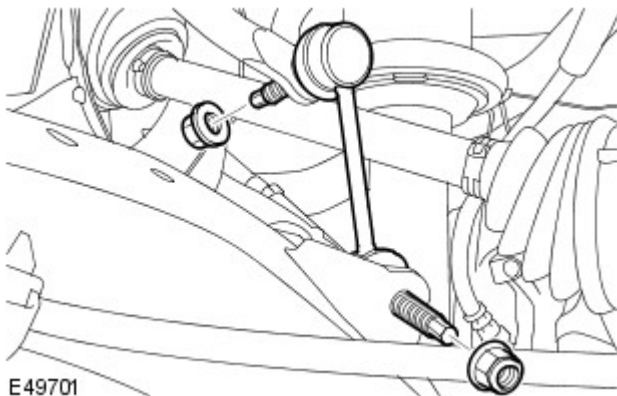
Raise and support the vehicle.

- Remove the rear wheels and tires.
- Remove the muffler assembly.
For additional information, refer to: [Muffler](#) (309-00C Exhaust System - V6 4.0L Petrol, Removal and Installation) / [Muffler](#) (309-00 Exhaust System - 4.4L, Removal and Installation) / [Muffler - Vehicles Without: Diesel Particulate Filter \(DPF\)](#) (309-00A Exhaust System - TDV6 2.7L Diesel, Removal and Installation).
- Drain the differential fluid.
For additional information, refer to: [Differential Draining and Filling](#) (205-02 Rear Drive Axle/Differential, General Procedures).
- Remove the RH rear halfshaft.
For additional information, refer to: [Rear Halfshaft](#) (205-05 Rear Drive Halfshafts, Removal and Installation).

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

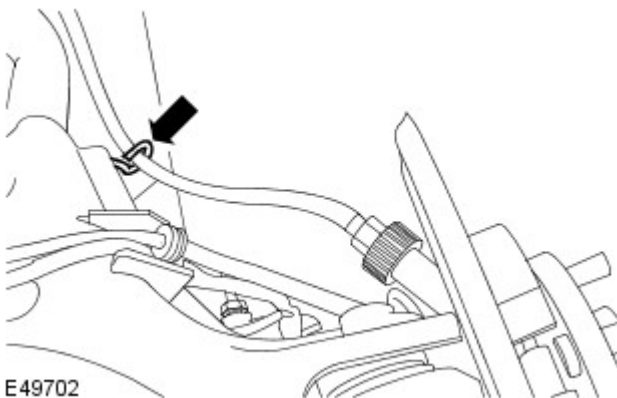
Remove the LH rear stabilizer bar link.

- Remove and discard the 2 nuts.



E49701

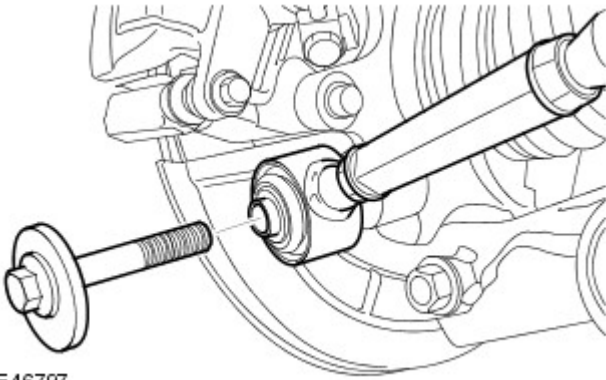
- Release the parking brake cable from the LH lower arm.




E49702

8. Release the LH rear toe link.

- Remove the bolt.

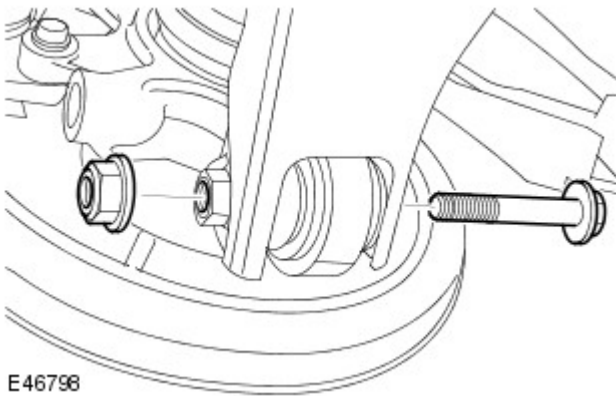


E46797

9.  **CAUTION:** Make sure the ball joint seal is not damaged. A damaged seal will lead to the premature failure of the joint.

Release the LH rear wheel knuckle from the lower arm.

- Remove the bolt.
- Using a suitable stand, support the LH rear wheel knuckle.

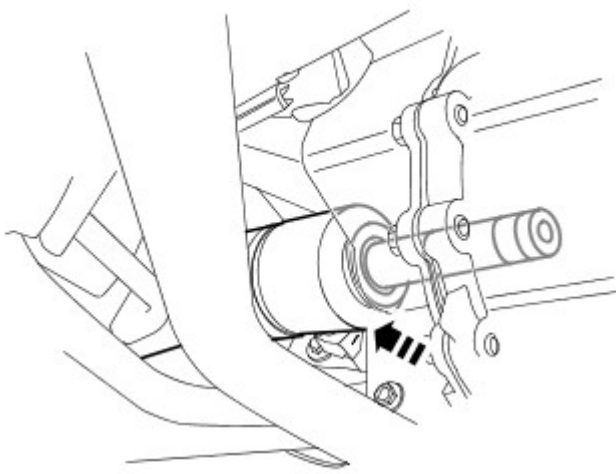


E46798

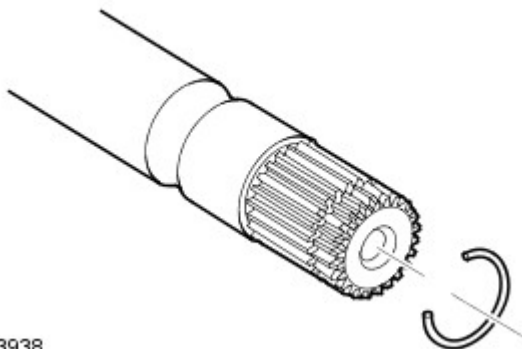
10. **NOTE:** RH illustration shown, LH is similar

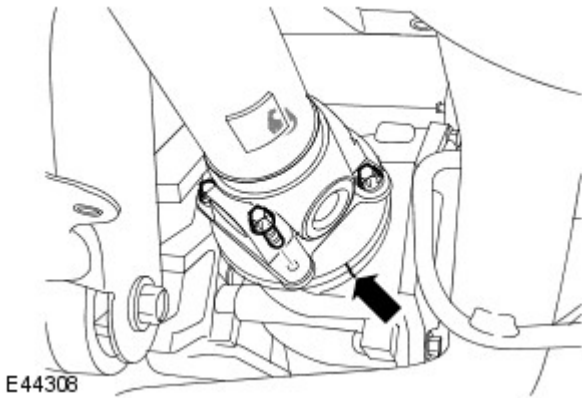
Release the LH rear halfshaft from the axle assembly.

- Remove and discard the snap ring.



E63938

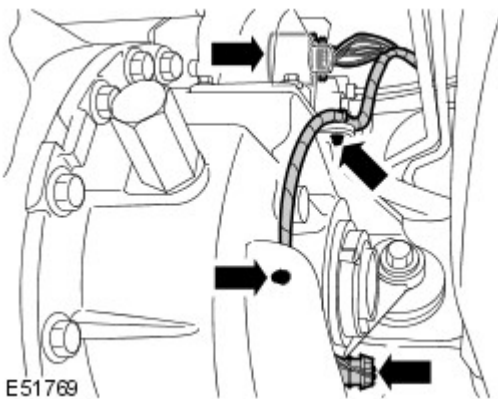




11.  **CAUTION:** Mark the position of the driveshaft flange in relation to the drive pinion flange.

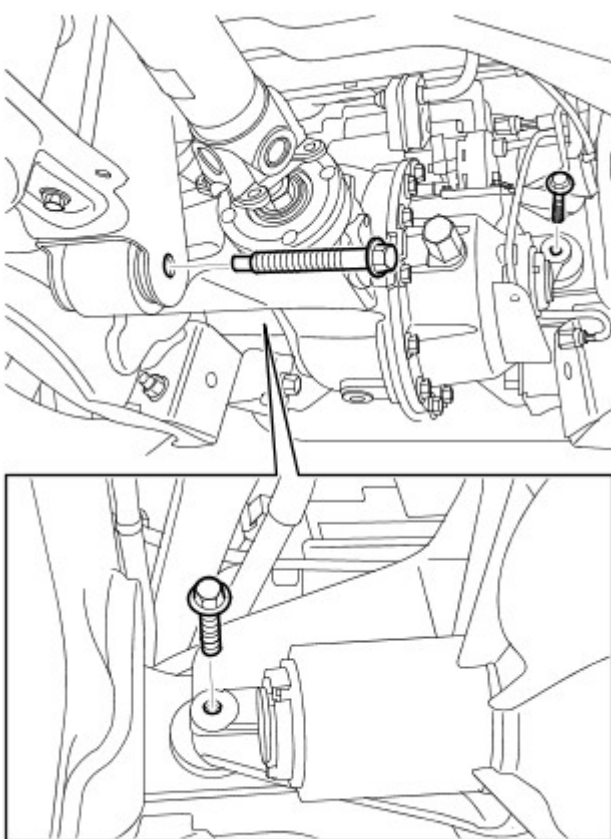
Release the driveshaft from the rear axle drive flange.

- Remove and discard the 4 bolts.
- Support the driveshaft using a suitable tie strap.




12. Vehicles with differential locking motor: Disconnect the 2 electrical connectors.

- Release the 2 wiring harness clips.



13. Using a transmission jack, support the rear axle assembly.

14.  **CAUTION:** Before disconnecting or removing the components, make sure the area around the joint faces and connections are clean. Plug open connections to prevent contamination.

With assistance, remove the rear axle assembly.

- Remove the 3 bolts.
- Disconnect the breather line.

Installation

1. With assistance, install the rear axle assembly.

- Tighten the front mounting bolt to 275 Nm (203 lb.ft).
- Tighten the rear mounting bolts to 175 Nm (129 lb.ft).
- Connect the breather line.

2. Vehicles with differential locking motor: Connect the electrical connectors.

- Secure the wiring harness clips.

3. NOTE: Install new bolts.

Secure the driveshaft to the rear axle drive flange.

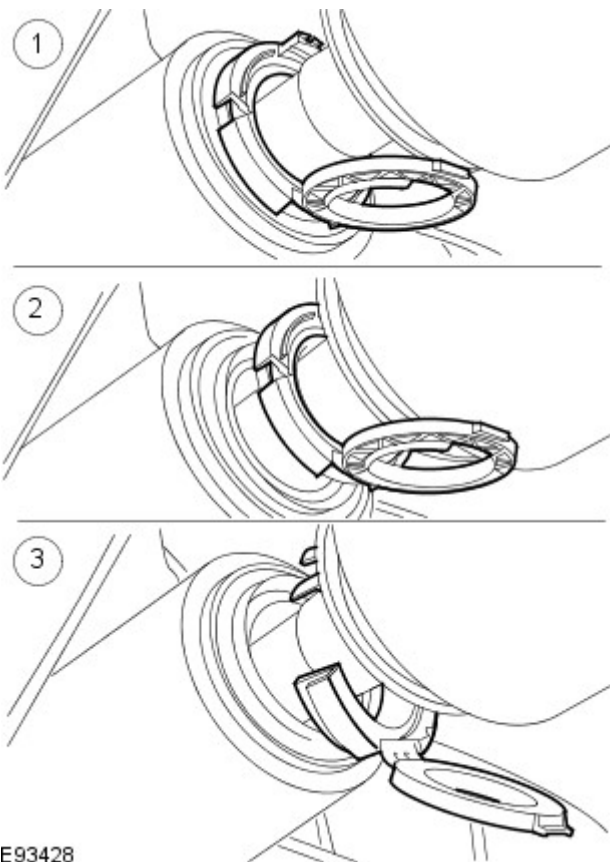
- Clean the component mating faces.
- Tighten the bolts to 150 Nm (110 lb.ft).

4. Install a new snap ring to the LH halfshaft.


5. NOTE: Do not fully engage the halfshaft until the oil seal protector has been removed.

Secure the LH halfshaft in the axle assembly.

1. Open the halfshaft seal protector and install the halfshaft.
2. Release the halfshaft seal protector from the halfshaft seal.
3. Remove the halfshaft seal protector.
4. Fully install the halfshaft.
5. Make sure the snap ring is fully engaged and retains the halfshaft.



E93428

6.  **CAUTION:** Make sure the ball joint seal is not damaged. A damaged seal will lead to the premature failure of the joint.

Secure the LH rear wheel knuckle to the lower arm.

- Tighten the nut and bolt to 275 Nm (203 lb.ft).

7. Secure the LH rear toe link.

- Tighten the bolt to 175 Nm (129 lb.ft).

8. Secure the parking brake cable to the LH lower arm.

9. NOTE: Install new nuts.

Install the LH rear stabilizer bar link.

- Tighten the nuts to 115 Nm (85 lb.ft).

10. Install the RH rear halfshaft.

For additional information, refer to: [Rear Halfshaft](#) (205-05 Rear Drive Halfshafts, Removal and Installation).

11. Fill the differential with fluid.

For additional information, refer to: [Differential Draining and Filling](#) (205-02 Rear Drive Axle/Differential, General Procedures).

12. Install the muffler assembly.








For additional information, refer to: [Muffler](#) (309-00C Exhaust System - V6 4.0L Petrol, Removal and Installation) / [Muffler](#) (309-00 Exhaust System - 4.4L, Removal and Installation) / [Muffler - Vehicles Without: Diesel Particulate Filter \(DPF\)](#) (309-00A Exhaust System - TDV6 2.7L Diesel, Removal and Installation).



13. Install the wheels and tires.

- Tighten the wheel nuts to 140 Nm (103 lb.ft).

Rear Drive Axle/Differential - Axle Housing Bushing


Removal and Installation

Special Tool(s)	
<p>502-009/2</p>  <p>E54205</p>	<p>Remover rear differential rear bush</p> <p>502-009/2</p>
<p>211-294</p>  <p>E54206</p>	<p>Hydraulic two legged puller</p> <p>211-294</p>
<p>205-825/4</p>  <p>E54207</p>	<p>Adaptor/button</p> <p>205-825/4</p>
<p>205-825/3</p>  <p>E54208</p>	<p>Installer rear differential front bush</p> <p>205-825/3</p>
<p>205-825/5</p>  <p>E54209</p>	<p>Receiver cup rear differential front bush</p> <p>205-825/5</p>
<p>205-825/6</p>  <p>E54210</p>	<p>Bearing Housing</p> <p>205-825/6</p>
<p>51203</p>  <p>E54149</p>	<p>Bearing Set for 16mm Bolt 51203</p>

 <p>205-825/7</p> <p>E54211</p>	<p>Remover/Installer long 16mm bolt</p> <p>205-825/7</p>
 <p>205-825/8</p> <p>E55277</p>	<p>Nut for long 16mm bolt</p> <p>205-825/8</p>

Removal

- NOTE: Take note of the fitted position of the bush.

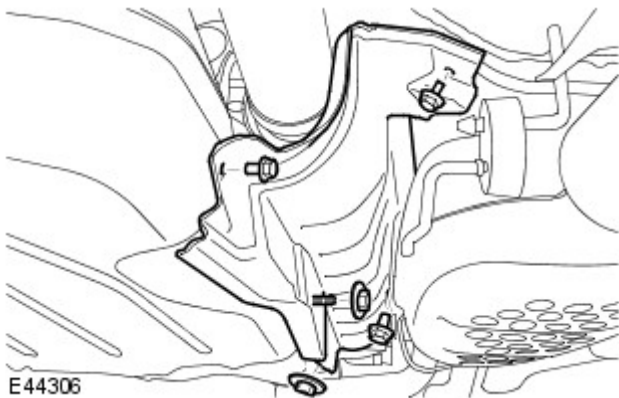
1.  **WARNING:** Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Raise and support the vehicle.

2. Remove the muffler assembly.
For additional information, refer to: Muffler (309-00, Removal and Installation).

3. Remove the fuel tank heat shield.

- Remove the 3 bolts and 2 nuts.



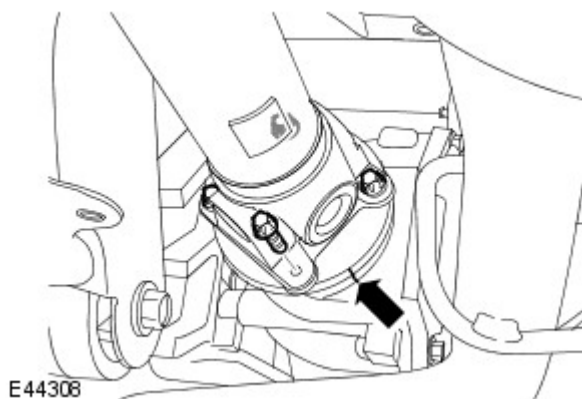
4. CAUTIONS:

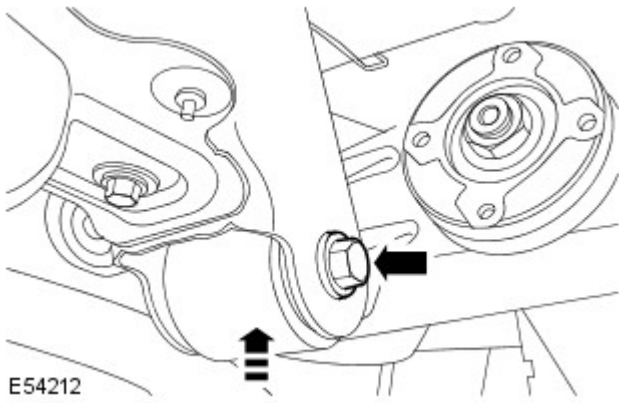
 Mark the position of the driveshaft flange in relation to the drive pinion flange.

 To avoid damage to the joint or gaiter, do not allow the driveshaft to hang.

Release the driveshaft from the rear axle drive flange.

- Remove and discard the 4 Torx bolts.

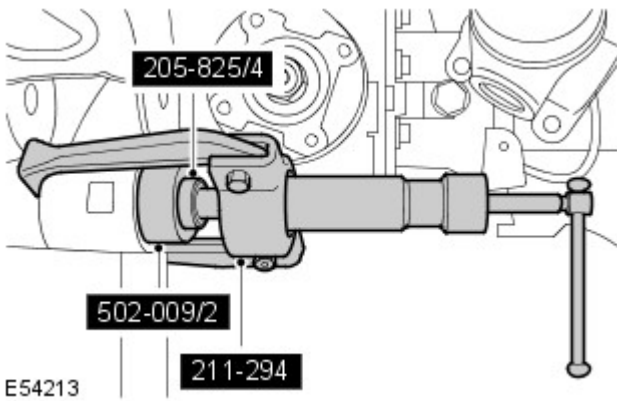




5. **⚠ CAUTION:** Make sure the weight of the axle is always supported.

Using a suitable jack, lower the front of the axle.

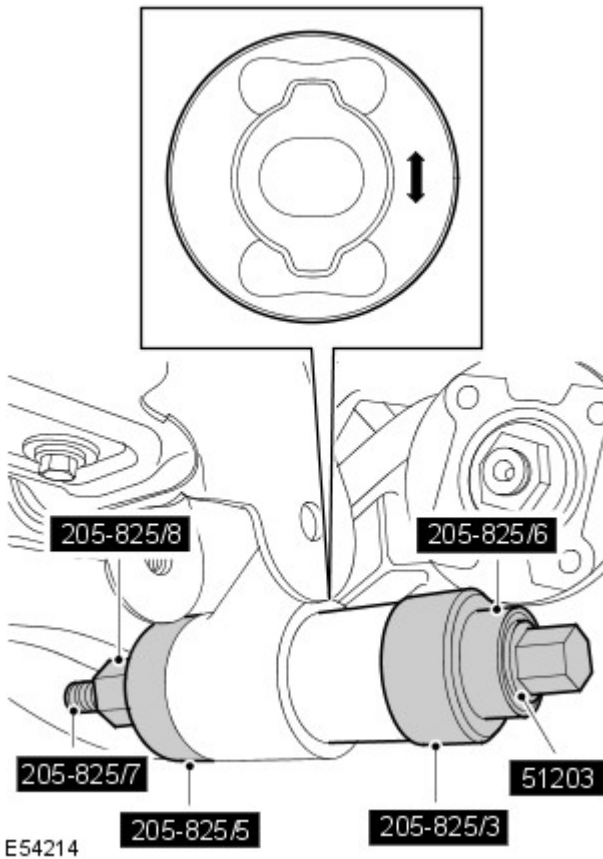
- Remove the axle front retaining bolt.



6. Using the special tools, remove the axle housing bushing.

Installation

1. Using the special tools, install the axle housing bushing.



2. **⚠ CAUTION:** Make sure the weight of the axle is always supported.

Using a suitable jack, raise the front of the differential.

- Install the axle front retaining bolt.
- Tighten to 275 Nm (203 lb.ft).

3. Attach the driveshaft to the rear axle drive flange.

- Clean the component mating faces.
- Attach the driveshaft to the rear axle drive flange.
- Tighten the new Torx bolts to 150 Nm (110 lb.ft).

4. Install the fuel tank heat shield.



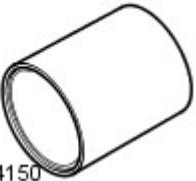


- Tighten the bolts and nuts to 10 Nm (7 lb.ft).

5. Install the muffler assembly.

For additional information, refer to: Muffler (309-00, Removal and Installation).


Rear Drive Axle/Differential - Rear Axle Housing Support Insulator

Removal and Installation

Special Tool(s)	
 <p>502-009/5 E54148</p>	<p>Remover/Installer long 14mm bolt 502-009/5</p>
 <p>51203 E54149</p>	<p>Bearing set for 14mm and 16mm bolt, 51203</p>
 <p>502-009/1 E54150</p>	<p>Receiver cup rear differential rear bush 502-009/1</p>
 <p>502-009/2 E54151</p>	<p>Remover rear differential rear bush 502-009/2</p>
 <p>502-009/3 E54152</p>	<p>Installer rear differential rear bush 502-009/3</p>

Removal

- NOTE: Take note of the fitted position of the bush.

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.

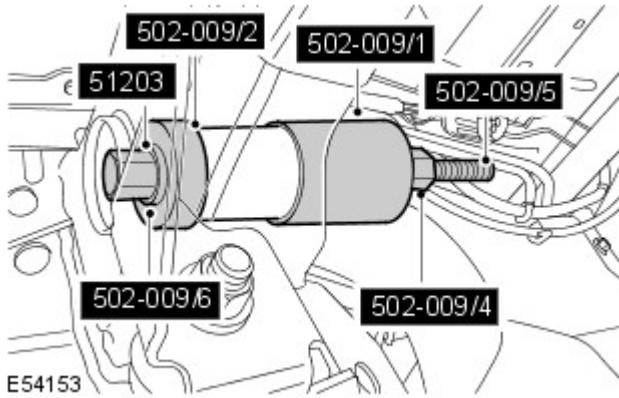
2. Remove the wheels and tires.

3. Remove the rear differential.

For additional information, refer to: [Axle Assembly](#) (205-02 Rear Drive Axle/Differential, Removal and Installation).

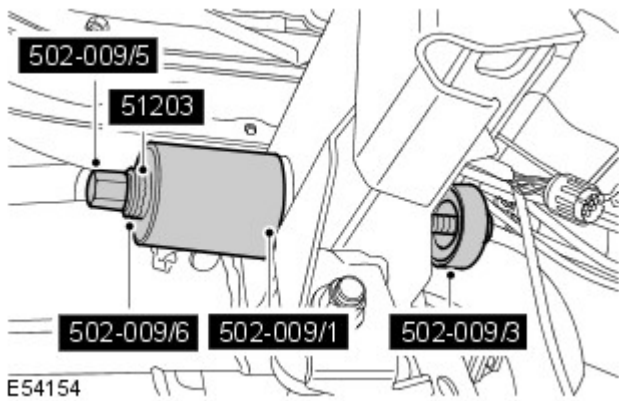
4. NOTE: Take note of the fitted position of the bush.

Using the special tools, remove the rear axle housing support insulator.



Installation

1. Using the special tools, install the rear axle housing support insulator.



2. Install the rear differential.
For additional information, refer to: [Axle Assembly](#) (205-02 Rear Drive Axle/Differential, Removal and Installation).
3. Install the wheels and tires.
 - Tighten the wheel nuts to 140 Nm (103 lb.ft).

Front Drive Axle/Differential -

Sealers

Item	Land Rover Part No.
Input shaft flange nut	STC 50553
Input shaft splines	STC 50554

Lubricants

Item	Specification
* Recommended lubricant	Castrol SAF-XO - 75W/90

*** Do not use any lubricant other than that specified**

Capacities

Item	Capacity
Front differential	0.61 litres (1.07 pints) (0.64 US quarts)

Axle Tube

Item	Specification
Axle tube seal (Used on later models. Earlier models used an o-ring)	Land Rover Part No: STC 50550

Front Differential

Item	Specification
Reduction ratio:	
V6 Diesel engine - Manual transmission	3.07:1
V6 Diesel engine - Automatic transmission	3.54:1
V6 Petrol engine - Automatic transmission	3.73:1
V8 Petrol engine - Automatic transmission	3.54:1

Torque Specifications

Description	Nm	lb-ft
Oil drain plug	54	40
Oil filler plug	34	25
Differential locking module bolts	10	7
Parking aid module nuts	10	7
Differential case bolts:		
M14 Front bolt	105	77
*Axle carrier to differential bolts - Stage 1	80	59
*Axle carrier to differential bolts - Stage 2	Further 60°	Further 60°
Front axle crossmember bolts	115	85
** Driveshaft to front axle drive flange Torx bolts		
Stage 1	45	33
Stage 2	Further 90°	Further 90°
Road wheel nuts	140	103

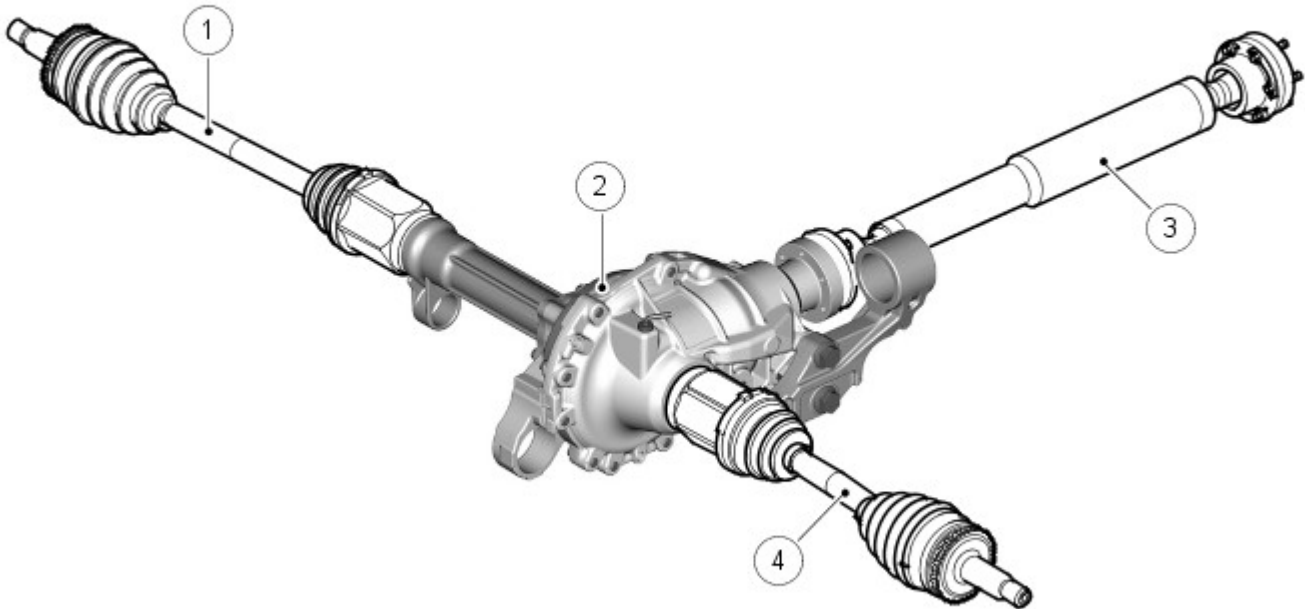
*** New bolts must be fitted**

**** New 'Patchlok' Torx bolts must be fitted**

Front Drive Axle/Differential - Front Drive Axle and Differential

Description and Operation

GENERAL



E50981

Item	Part Number	Description
1	-	RH front drive halfshaft
2	-	Front differential assembly
3	-	Front driveshaft
4	-	LH front drive halfshaft

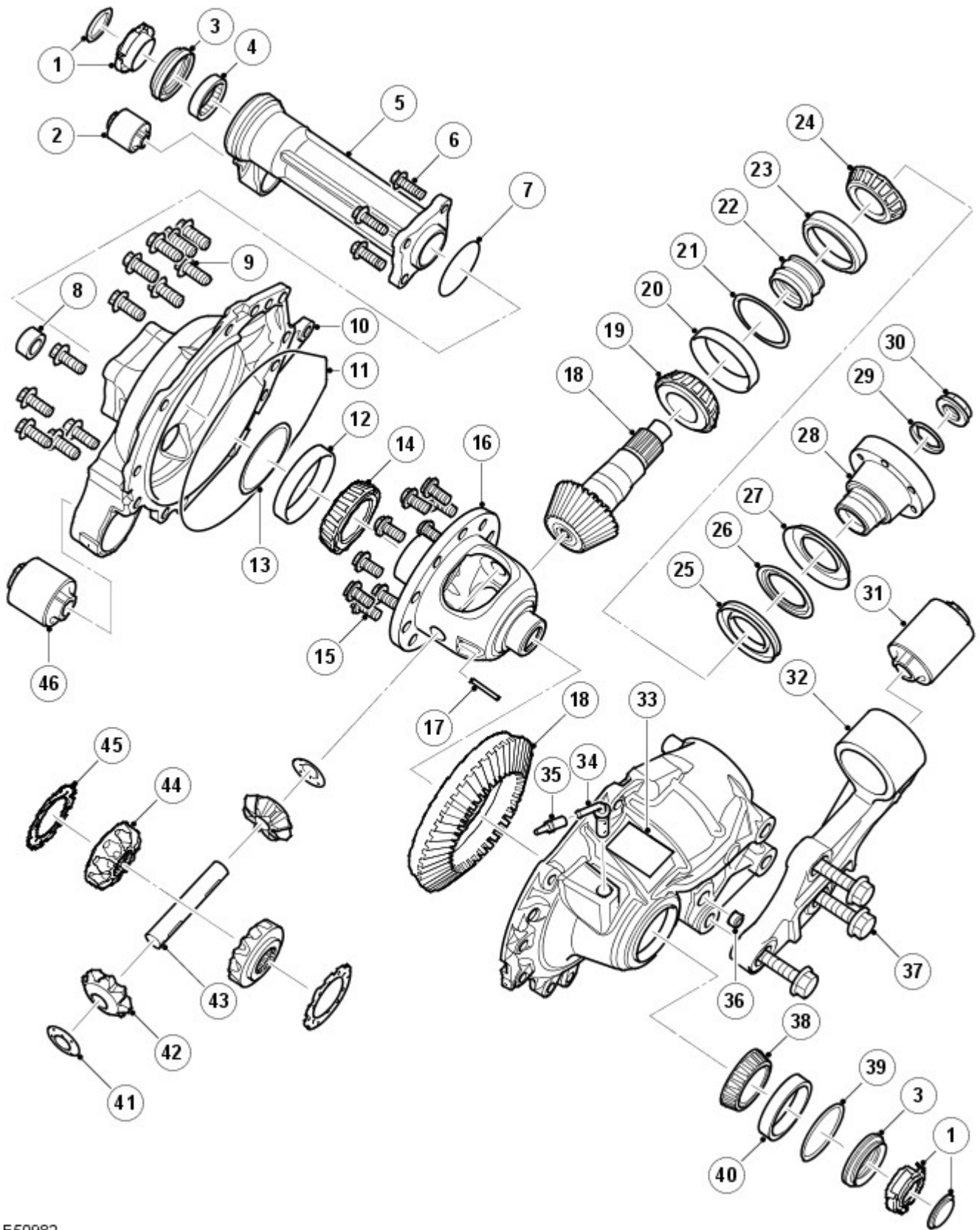
The front differential converts the 'angle of drive' through 90° and distributes drive, via the front drive halfshafts, to the front wheels.

The front differential for the V6 and V8 petrol variants have the same output ratio, but the output ratios for the TdV6 are different, depending on whether automatic or manual transmission is fitted.

The front differential is mounted on the LH side of the chassis.

FRONT DIFFERENTIAL ASSEMBLY

Front Differential - Exploded View



E50982

Item	Part Number	Description
1	-	Protection cap
2	-	Mounting bush assembly
3	-	Seal
4	-	Bearing assembly
5	-	Front tube
6	-	Bolt, 4 of
7	-	O-ring
8	-	Drain plug
9	-	Bolt, 14 of
10	-	Cover assembly
11	-	Cover seal

12	-	Roller bearing cup
13	-	Bearing preload spacer
14	-	Taper roller bearing
15	-	Bolt, 10 of
16	-	Differential case
17	-	Roll pin
18	-	Gear and pinion assembly
19	-	Taper roller bearing
20	-	Roller bearing cup
21	-	Shim
22	-	Collapsible spacer
23	-	Roller bearing cup
24	-	Taper roller bearing
25	-	Oil seal
26	-	Inner deflector
27	-	Outer deflector
28	-	Flange
29	-	Pinion nut retainer
30	-	Pinion nut
31	-	Mounting bush assembly
32	-	Axle mounting bracket
33	-	Data label
34	-	Breather tube
35	-	Cap
36	-	Fill plug
37	-	Bolt, 3 of
38	-	Taper roller bearing
39	-	Bearing preload spacer
40	-	Roller bearing cup
41	-	Thrust washer
42	-	Planet gear
43	-	Shaft
44	-	Sunwheel
45	-	Thrust washer
46	-	Mounting bush assembly

The casing comprises two halves with machined mating faces. When assembled, the cast iron casing halves are sealed with a thin film of Loctite 5999 sealant and secured together with fourteen bolts. A breather tube is fitted to the casings. This allows a plastic tube to be fitted and routed to a high point in the engine compartment, preventing the ingress of water when the vehicle is wading.

The RH casing is fitted with a drain plug. The front differential unit contains approximately 0.7 litre of oil for a dry fill.

The differential is a conventional design using a hypoid gear layout. This employs a hypoid bevel pinion gear and crown wheel, with the pinion offset above the centre line of the crown wheel. This design allows for a larger pinion gear to be used, which has the advantages of increased gear strength and reduced operating noise.

The front differential is available in three ratios. V8 and V6 petrol engine vehicles use a front differential with a final drive ratio of 3.73:1 and TdV6 diesel engine vehicles use a final drive ratio of 3.07:1, for vehicles with manual transmission, and 3.54:1 for vehicles with automatic transmission. Changing the number of teeth between the crown-wheel drive gear and pinion gear changes the ratio.

The differential comprises a pinion shaft and hypoid bevel gear, a crown wheel drive gear with an integral cage, which houses two planet gears. Two sun wheels are also located in the cage and pass the rotational drive to the drive shaft shafts.

The pinion shaft is mounted on two opposed taper roller bearings with a collapsible spacer located between them. The spacer is used to hold the bearings in alignment and also collapses under the pressure applied to the pinion nut. This allows the nut to be tightened to a predetermined torque, which collapses the spacer, setting the correct bearing preload.

The pinion shaft has an externally splined outer end which accepts and locates the input flange, which is retained by the pinion nut. The opposite end of the output flange has an internal spline which provides positive location for the front propeller shaft. The flange has an external O-ring seal which seals against the front propeller shaft shroud preventing the ingress of dirt and moisture into the splines. An oil seal is pressed into the LH casing and seals the input flange to the differential unit. The pinion shaft has a hypoid bevel gear at its inner end which mates with the crown wheel drive gear.

The crown wheel drive gear is located on the carrier and secured with ten screws. The carrier is mounted on taper roller bearings located in each casing half. The bearings are press fitted into the casing and a spacer is located on the outside face to set backlash and apply preload to the bearing.

The carrier is fitted with a shaft onto which the two planet gears are mounted. The shaft is secured in the carrier with a roll pin. The sun wheels are located in pockets within the carrier and mesh with the planet gears. Thrust washers are located between the carrier and the sun wheels and hold the sun wheels in mesh with the planet gears. Each sun wheel has a machined, splined, bore to accept the drive shaft. A groove is machined in the bore to locate the snap ring fitted to the drive shaft, providing positive drive shaft location.

Differential Operation

The operating principles of the front and rear differentials are the same. Rotational input from the propeller shaft is passed via the input flange to the pinion shaft and pinion gear. The angles of the pinion gear to the crown wheel drive gear moves the rotational direction through 90°.

The transferred rotational motion is now passed to the crown wheel drive gear, which in turn rotates the carrier. The shaft,

which is secured to the carrier, also rotates at the same speed as the carrier. The planet gears, which are mounted on the shaft, also rotate with the carrier. In turn, the planet gears transfer their rotational motion to the left and right hand sun wheels, rotating the drive shafts.

When the vehicle is moving in a forward direction, the torque applied through the differential to each sun wheel is equal. In this condition both drive shafts rotate at the same speed. The planet gears do not rotate and effectively lock the sun wheels to the carrier.

If the vehicle is turning, the outer wheel will be forced to rotate faster than the inner wheel by having a greater distance to travel. The differential senses the torque difference between the sun wheels. The planet gears rotate on their axes to allow the outer wheel to rotate faster than the inner one.

SERVICE

The oil used in the front differential is Castrol SAF-XO. The oil contains unique additives, which enhance the differentials operation. No other oil must be used in the front differential.

Front Differential Serviceable Components

- Halfshaft seals
- Needle roller bearing assemblies
- Chassis bush/fixings
- Lubricant.

Front Drive Axle/Differential - Differential Draining and Filling

General Procedures



CAUTION: Do not fill the differential with lubricant up to the filler plug. The filler plug is only used to fill the differential with lubricant, not to act as a level indicator.

• **NOTE:** The only way to check the fluid level in the differential is to drain all the fluid out and refill with the correct quantity, shown in the specification section.
For additional information, refer to: [Specifications](#) (205-03 Front Drive Axle/Differential, Specifications).

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. Remove the engine undershield.
For additional information, refer to: [Engine Undershield](#) (501-02 Front End Body Panels, Removal and Installation).

3. Remove the differential case lubricant filler plug.

- Clean the area around the lubricant filler plug.
- Position container to collect fluid loss.



4. Drain the differential lubricant.

- Clean the area around the drain plug.
- Remove the fluid drain plug.



5. ⚠ CAUTION: There have been 2 different types of fixings used for the drain plug. Note the type and differential serial number, and make sure the correct torque is applied, see below.

Install the lubricant drain plug.

- Clean the drain plug.
- Up to differential serial number 254845: Tighten the hexagonal drive drain plug to 54 Nm (40 lb.ft).
- From differential serial number 254846: Tighten the 3/8" square drive drain plug to 28 Nm (21 lb.ft).

6. ⚠ CAUTION: Do not fill the differential with lubricant up to the filler plug. The filler plug is only used to fill the differential with lubricant, not to act as a level indicator.

Fill the differential with the correct amount of lubricant.
For additional information, refer to: [Specifications](#) (205-03 Front Drive Axle/Differential, Specifications).

7. Install the differential filler plug.





- Tighten the filler plug to 34 Nm (25 lb.ft).

8. Install the engine undershield.

For additional information, refer to: [Engine Undershield](#)
(501-02 Front End Body Panels, Removal and Installation).

Front Drive Axle/Differential - Drive Pinion Seal


In-vehicle Repair

Special Tool(s)	
 <p>205-053 E54574</p>	<p>Flange holding tool 205-053</p>
 <p>205-824 E54587</p>	<p>Remover drive flange 205-824</p>
 <p>205-820 E54703</p>	<p>Installer - drive pinion oil seal 205-820</p>
 <p>100-012 E54135</p>	<p>Impulse extractor 100-012(LRT-99-004)</p>

Removal



CAUTION: The drive pinion seal must only be renewed once.

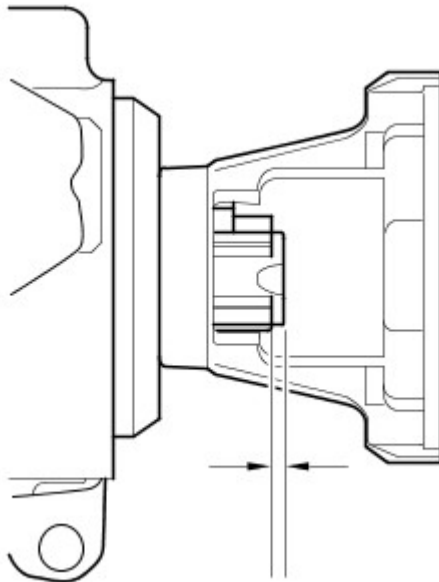
-  **WARNING:** Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Raise and support the vehicle.


- Drain the differential lubricant.
For additional information, refer to: [Differential Draining and Filling](#) (205-03 Front Drive Axle/Differential, General Procedures).
- Remove the front driveshaft.
For additional information, refer to: [Front Driveshaft - V8 5.0L Petrol](#) (205-01 Driveshaft, Removal and Installation) / [Front Driveshaft - V6 4.0L Petrol](#) (205-01 Driveshaft, Removal and Installation) / [Front Driveshaft - TDV6 3.0L Diesel](#) (205-01 Driveshaft, Removal and Installation) / [Front Driveshaft - TDV6 2.7L Diesel](#) (205-01 Driveshaft, Removal and Installation).

4. Measure the depth of the pinion nut on the pinion shaft.

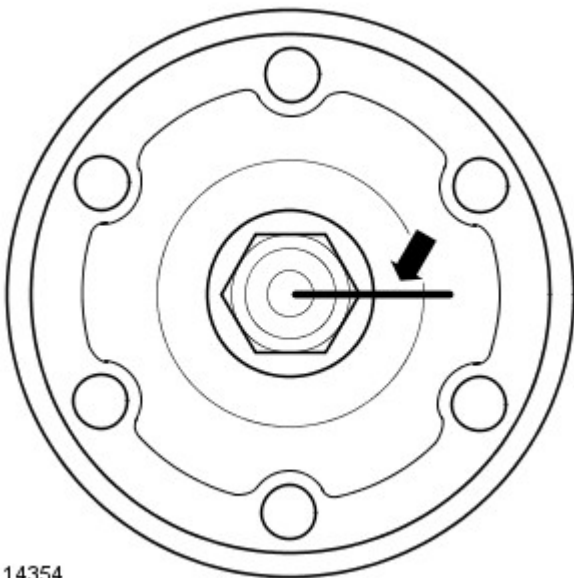
- Note measurement for installation.



E114355

5.  CAUTION: This step must be carried out to make sure that the drive pinion nut is correctly tightened on assembly.

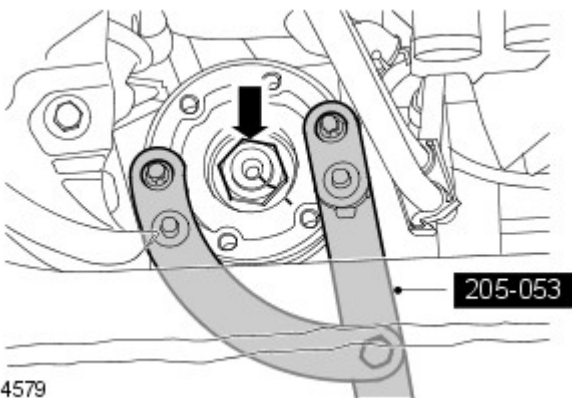
Accurately scribe a line to mark the drive pinion shaft to the drive pinion nut and pinion flange.



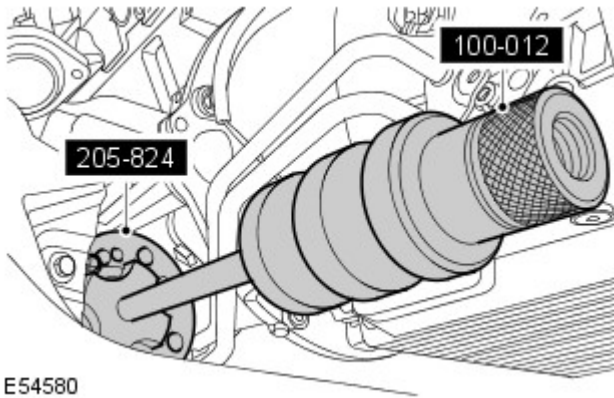
E114354


6. Remove the drive pinion flange retaining nut.

- Using the special tool, counter hold the drive pinion flange.
- Discard the drive pinion nut retainer.

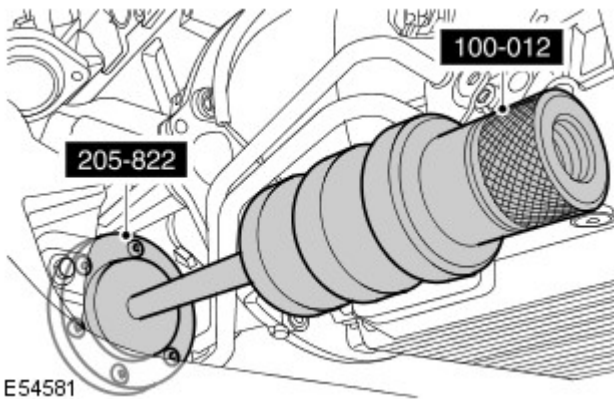


E54579



7.  CAUTION: Make sure only a bolt is used with the special tool, to draw the drive pinion flange off the drive pinion shaft.

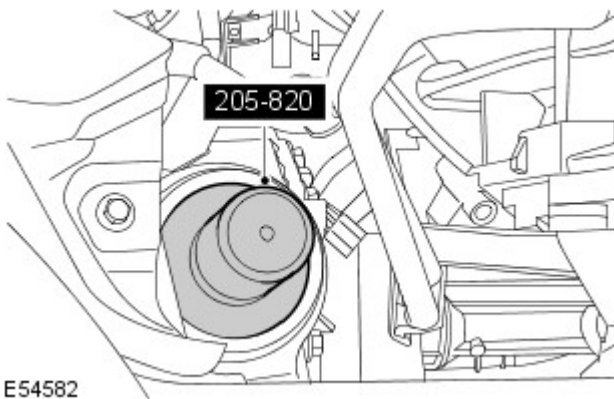
Using the special tool, remove the drive pinion flange.




8. Using the special tool, remove the drive pinion seal.

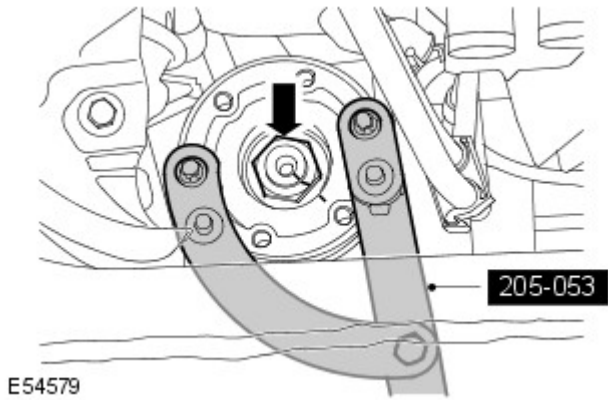
Installation

1. Clean the drive pinion flange.
2. Clean the drive pinion seal mating faces.
3. Using the special tool, install the new drive pinion seal.






4.  CAUTION: Make sure the drive pinion flange scribed marks are aligned.

Install the drive pinion flange.



5. CAUTIONS:

-  Make sure the mark on the drive pinion nut is never tightened short of the scribed mark on the drive pinion shaft.
-  Make sure the drive pinion flange has no end float and is free to rotate.
-  Make sure the scribed mark on the drive pinion nut is no more than a maximum of 5 degrees past the scribed mark on the drive pinion shaft.

Install the drive pinion flange retaining nut.

- Using the special tool, counter hold the drive pinion flange.
- Install nut to previously noted number of turns.
- Measure the depth of the pinion nut on the pinion shaft.

6. Install the front driveshaft.

For additional information, refer to: [Front Driveshaft - V8 5.0L Petrol](#) (205-01 Driveshaft, Removal and Installation) / [Front Driveshaft - V6 4.0L Petrol](#) (205-01 Driveshaft, Removal and Installation) / [Front Driveshaft - TDV6 3.0L Diesel](#) (205-01 Driveshaft, Removal and Installation) / [Front Driveshaft - TDV6 2.7L Diesel](#) (205-01 Driveshaft, Removal and Installation).

7. CAUTION: Make sure the correct specification and quantity of oil is used.

Fill the differential with the correct amount of lubricant. For additional information, refer to: [Differential Draining and Filling](#) (205-03 Front Drive Axle/Differential, General Procedures).

Front Drive Axle/Differential - Axle Tube

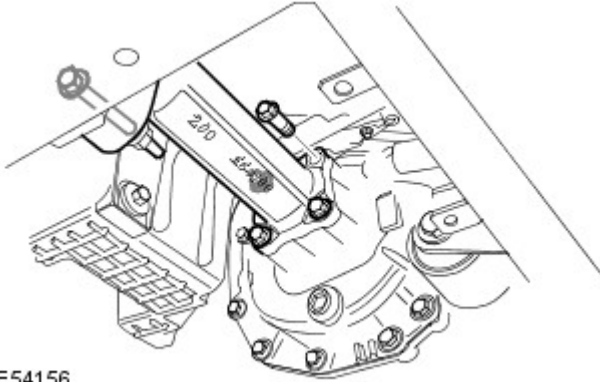
In-vehicle Repair

Removal

1. Remove the RH halfshaft.
For additional information, refer to: [Front Halfshaft RH](#) (205-04 Front Drive Halfshafts, Removal and Installation).

2. Remove the axle tube.

- Remove the bolt from the bushing.
- Remove the 4 bolts.
- Rotate and remove the axle tube.
- Early models: Remove and discard the O-ring seal.
- Later models: Remove the sealant.



E54156

Installation

1. Install the axle tube.

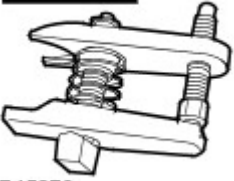


- Clean the component mating faces.
- Early models: Install a new O-ring seal.
- Later models: Apply sealant to the mating face.
For additional information, refer to: [Specifications](#) (205-03 Front Drive Axle/Differential, Specifications).
- Tighten the 4 axle tube bolts to 50 Nm (37 lb.ft).
- Tighten the axle tube bushing bolt to 63 Nm (46 lb.ft).

2. Install the RH halfshaft.

For additional information, refer to: [Front Halfshaft RH](#) (205-04 Front Drive Halfshafts, Removal and Installation).

Front Drive Axle/Differential - Axle Assembly

Removal and Installation

Special Tool(s)	
 <p>205-754A E45276</p>	Ball joint separator 205-754(LRT-54-027)
 <p>204-703 E99557</p>	Front Stabilizer Bar Bushing Tightening Tool 204-703
 <p>204-705 E99558</p>	Front Stabilizer Bar Bushing Tightening Tool 204-705

Removal

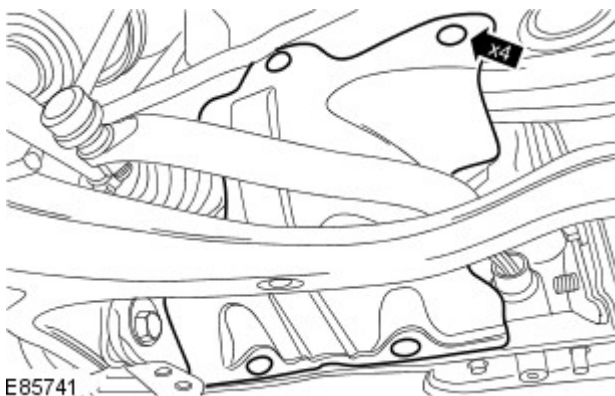
- NOTE: Some variation in the illustrations may occur, but the essential information is always correct.

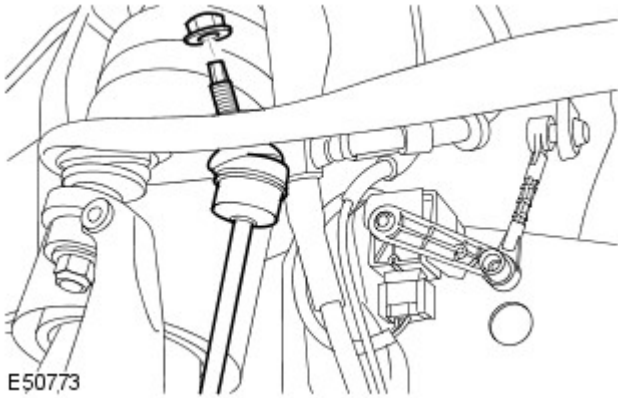
All vehicles

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

Raise and support the vehicle.

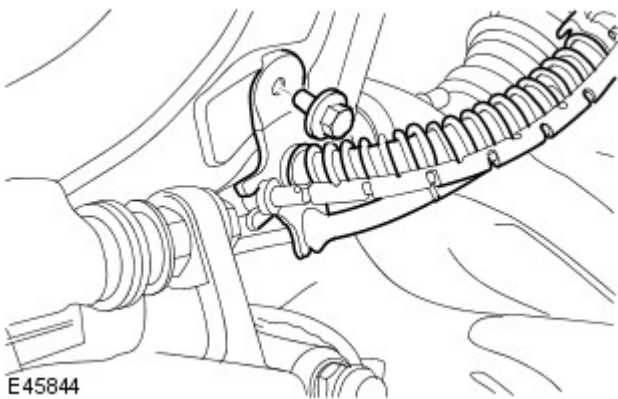
- Remove the front wheels and tires.
- Remove the axle tube.
For additional information, refer to: [Axle Tube](#) (205-03 Front Drive Axle/Differential, In-vehicle Repair).
- Remove the LH splash shield.
 - Remove the 4 clips.





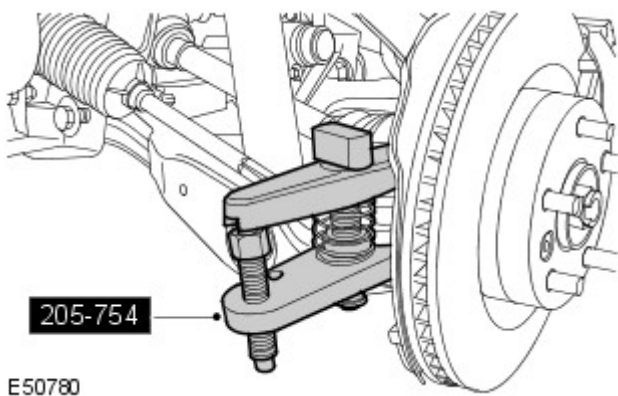
5. Release the LH stabilizer bar link.

- Remove and discard the nut.



6. Release the LH brake hose bracket from the wheel knuckle.

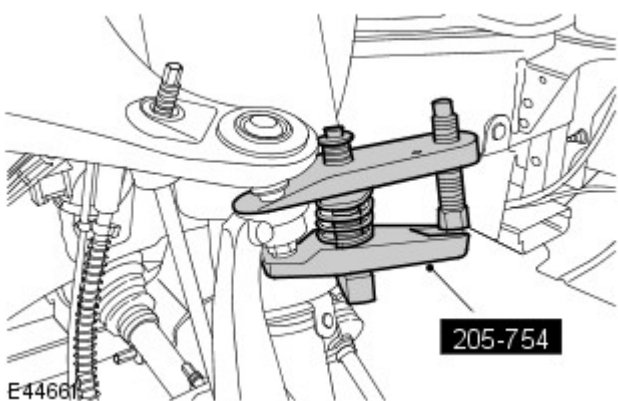
- Remove the bolt.



7. ⚠ CAUTION: Make sure the ball joint seal is not damaged. A damaged seal will lead to the premature failure of the joint.

Using the special tool, release the LH tie-rod end ball joint from the wheel knuckle.

- Remove and discard the nut.



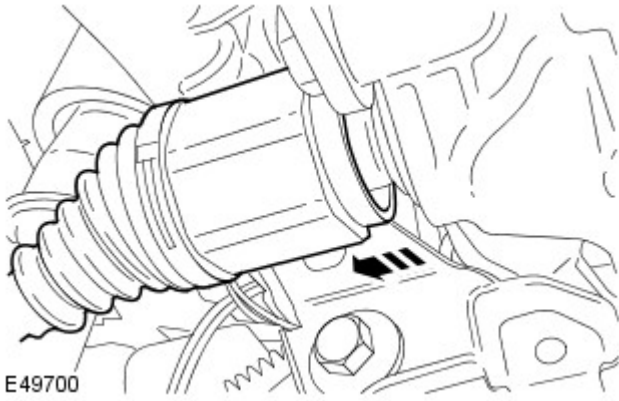
8. CAUTIONS:

⚠ Make sure the ball joint seal is not damaged. A damaged seal will lead to the premature failure of the joint.

⚠ The lower arm ball joint can be damaged by excessive articulation. The wheel knuckle must be fully supported at all times. Do not allow the wheel knuckle to hang on the lower arm. Failure to follow this instruction will result in damage to vehicle.

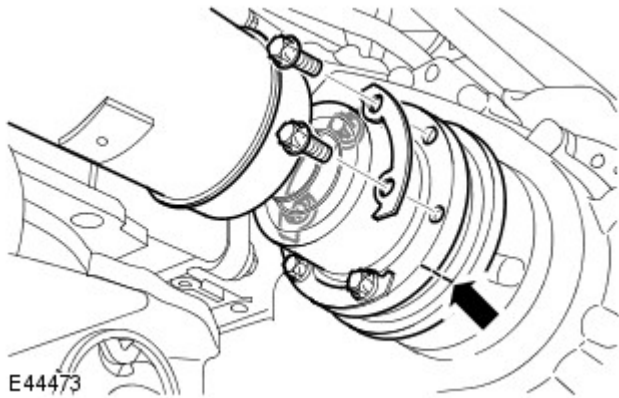
Using the special tool, release the LH upper arm ball joint.

- Remove and discard the nut.



9. Release the LH halfshaft from the axle assembly.

- Remove and discard the snap ring.
- Using a suitable tie strap, support the LH halfshaft.



10. CAUTIONS:

 Mark the position of the driveshaft flange in relation to the drive pinion flange.

 To avoid damage to the joint or gaiter, do not allow the driveshaft to hang.

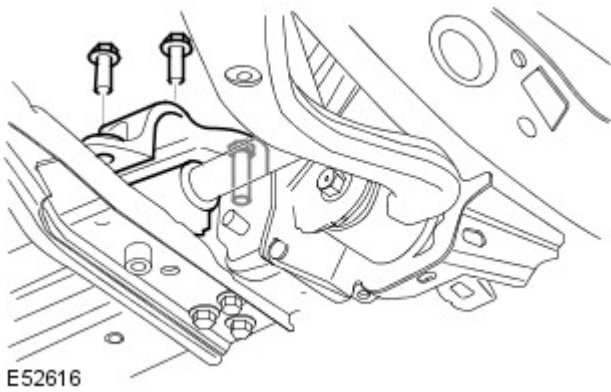
Release the driveshaft from the front axle drive flange.

- Remove the 6 Torx bolts and washers, discard the bolts.
- Using a suitable tie strap, secure the driveshaft end plate.

Vehicles with Active Stabilization

11. Remove the stabilizer bar bushing.

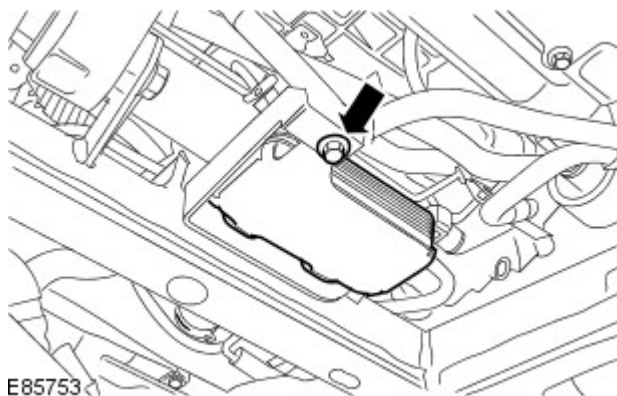
- Remove the 3 bolts.
- Remove the clamp.
- Remove the stabilizer bar bushing.



Vehicles with diesel engine

12. Release the fuel cooler.

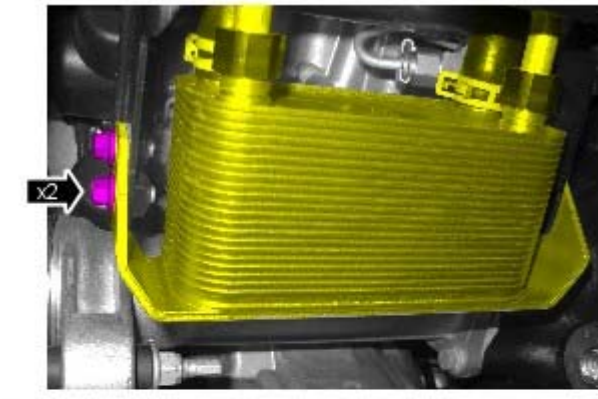
- Remove the bolt.



Vehicles with 5.0L engine

13. Release the automatic transmission fluid cooler.

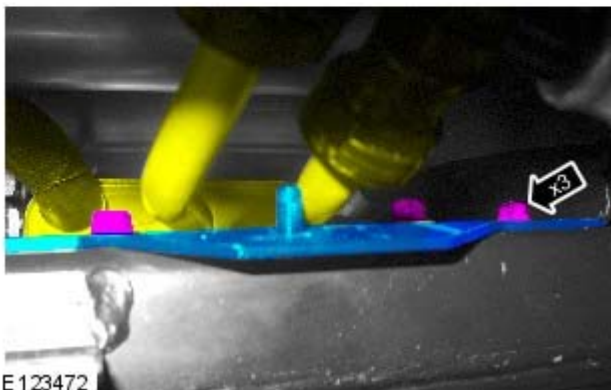
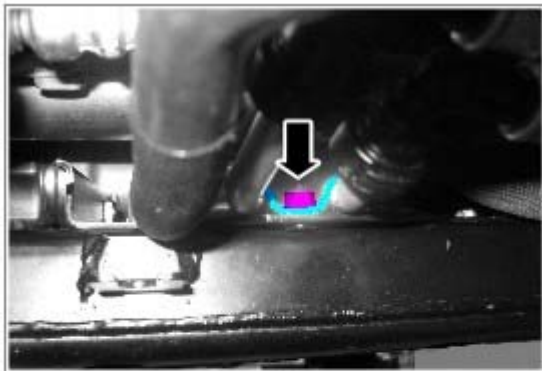
- Remove the 4 bolts.



E123471

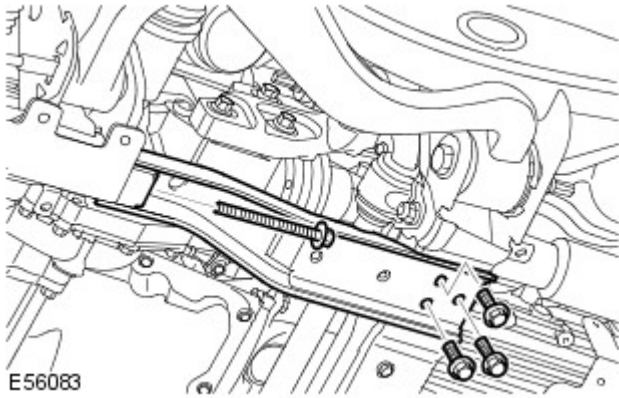
14. Remove the transmission fluid cooler mounting bracket.

- Release the transmission fluid cooler pipe bracket.
- Remove the nut.
- Remove the 3 bolts.



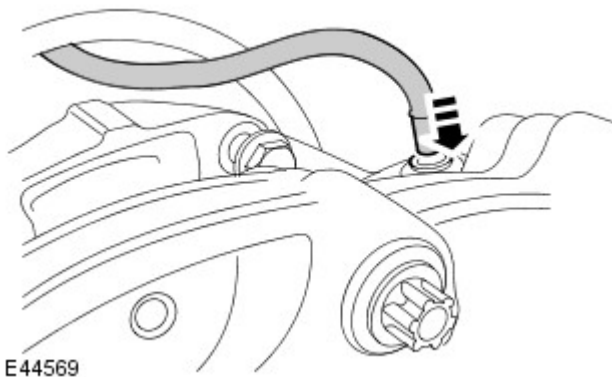
E123472


All vehicles



15. Remove the front axle crossmember.

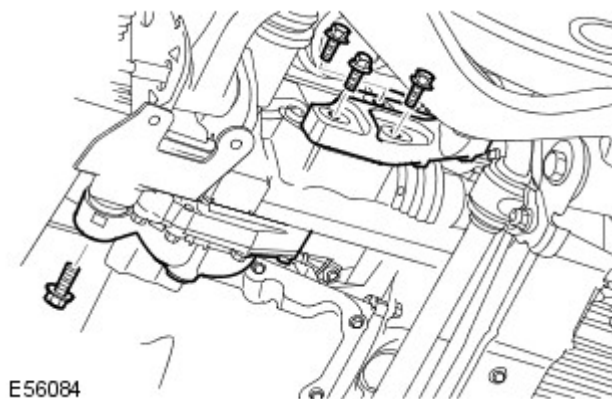
- Remove the 4 bolts.



16.  **CAUTION:** Before the disconnection or removal of any components, make sure the area around joint faces and connections are clean. Plug any open connections to prevent contamination.

Disconnect the breather line.

- Release the clip.



17. Using a transmission jack, support the front axle assembly.

18. With assistance, remove the front axle assembly.

- Remove and discard the 3 axle assembly rear mounting bolts.
- Remove the front axle assembly front mounting bolt.

Installation

All vehicles

1. With assistance, install the front axle assembly.

- With assistance, raise and manoeuvre the front final drive unit.
- Tighten the 3 new bolts in the front axle assembly to 80 Nm (59 lb.ft), then a further 60 degrees.
- Tighten the front axle assembly front mounting bolt to 105 Nm (77 lb.ft).

2. Connect the breather line.

3. Install the front axle crossmember.

- Tighten the 4 bolts to 115 Nm (85 lb.ft).

Vehicles with 5.0L engine

4. Install the transmission fluid cooler mounting bracket.
 - Tighten the 3 bolts to 25 Nm (18 lb.ft.).
 - Secure the transmission fluid cooler coolant pipe to the coolant hose bracket.
 - Tighten the nut to 15 Nm (11 lb.ft.).
5. Install the automatic transmission fluid cooler.
 - Tighten the 4 bolts to 25 Nm (18 lb.ft.).

Vehicles with diesel engine

6. Secure the fuel cooler.
 - Tighten the bolt to 23 Nm (17 lb.ft.).

Vehicles with Active Stabilization

7. Install the stabilizer bar bushing.
 - Install the clamp.
 - Install the bolts.
 - Tighten the bolts to 115 Nm (85 lb.ft.).

All vehicles

8. **NOTE: Make sure that new bolts are installed.**

Secure the driveshaft to the front axle drive flange.

- Stage 1: Tighten the bolts to 45 Nm (33 lb.ft).
- Stage 2: Tighten the bolts a further 90 degrees.
- Remove and discard the tie strap.

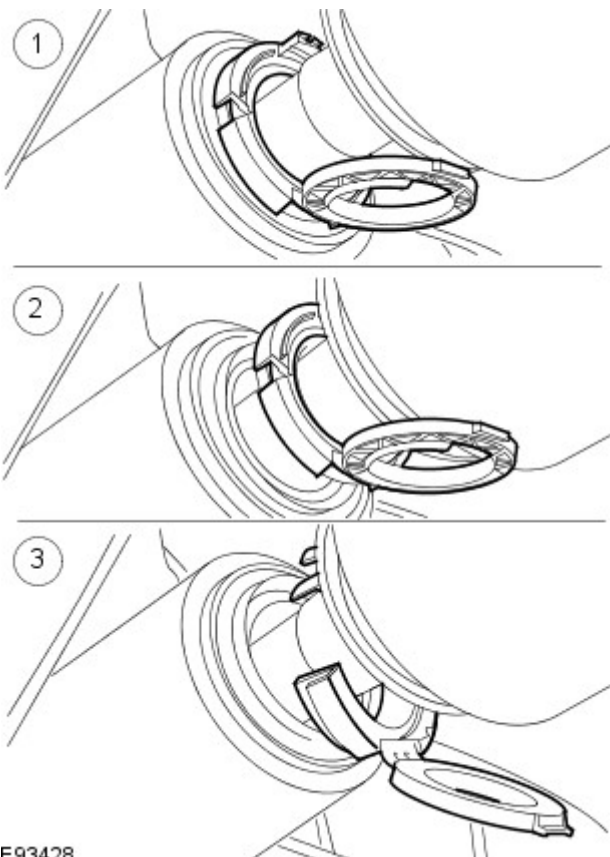
9. Install a new snap ring to the LH halfshaft.

- Remove and discard the tie strap.

10. **NOTE: Do not fully engage the halfshaft until the oil seal protector has been removed.**

Secure the LH halfshaft in the axle assembly.

1. Open the halfshaft seal protector and install the halfshaft.
2. Release the halfshaft seal protector from the halfshaft seal.
3. Remove the halfshaft seal protector.
4. Fully install the halfshaft.



11.  **WARNING:** Make sure that a new nut is installed.

Secure the LH upper arm to the wheel knuckle.

- Install a new nut and tighten to 70 Nm (52 lb.ft).

12.  **WARNING:** Make sure that a new nut is installed.

Secure the LH tie-rod end ball joint to the wheel knuckle.

- Install a new nut and tighten to 70 Nm (52 lb.ft).

13. Secure the LH brake hose bracket to the wheel knuckle.

- Tighten the bolt to 22 Nm (16 lb.ft).

14. Secure the LH stabilizer bar link.

- Install a new nut and tighten to 115 Nm (85 lb.ft).

15. Install the LH splash shield.

- Install the clips.

16. Install the axle tube.

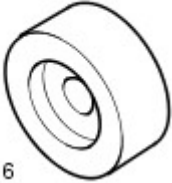


For additional information, refer to: [Axle Tube](#) (205-03 Front Drive Axle/Differential, In-vehicle Repair).

17. Install the wheels and tires.

- Tighten the wheel nuts to 140 Nm (103 lb.ft).

Front Drive Axle/Differential - Axle Carrier Bushing

Removal and Installation


Special Tool(s)	
 <p>205-825/3 E54216</p>	<p>Installer rear axle front bush 205-825/3</p>
 <p>205-825/5 E54209</p>	<p>Receiver cup rear differential front bush 205-825/5</p>
 <p>502-009/2 E54205</p>	<p>Remover rear differential rear bush 502-009/2</p>

Removal



CAUTION: Make sure the bush is correctly aligned.

- **NOTE:** Take note of the fitted position of the bush.

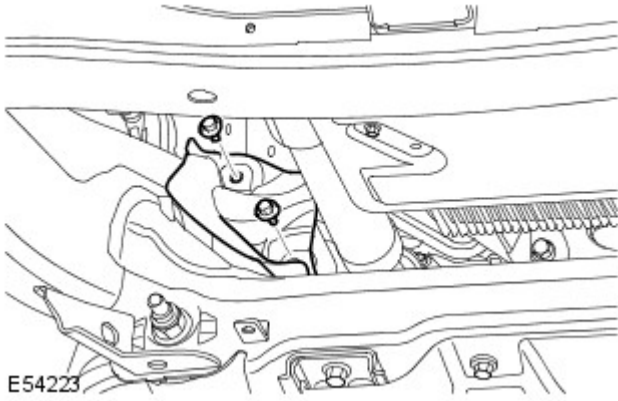
-  **WARNING:** Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Raise and support the vehicle.

- Remove the exhaust system.
For additional information, refer to: [Exhaust System](#) (309-00D Exhaust System - V8 5.0L Petrol, Removal and Installation).
For additional information, refer to:
[Exhaust System](#) (309-00C Exhaust System - V6 4.0L Petrol, Removal and Installation),
[Exhaust System](#) (309-00B Exhaust System - TDV6 3.0L Diesel, Removal and Installation),
[Exhaust System - Vehicles With: Diesel Particulate Filter \(DPF\)](#) (309-00A Exhaust System - TDV6 2.7L Diesel, Removal and Installation),
[Exhaust System - Vehicles Without: Diesel Particulate Filter \(DPF\)](#) (309-00A Exhaust System - TDV6 2.7L Diesel, Removal and Installation).
- Using a jack, support the axle assembly.

4. Remove the axle carrier bushing heat shield.

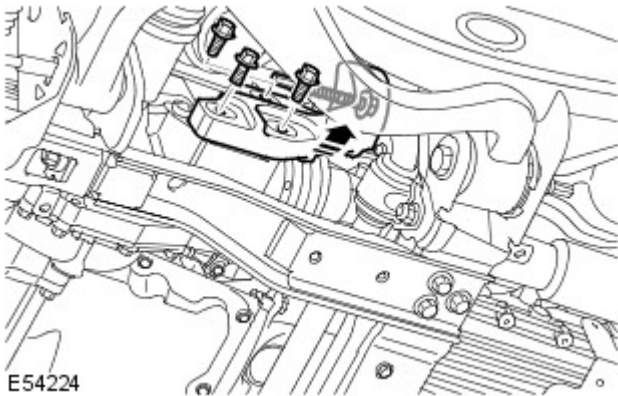
- Remove the two retaining bolts.



5.  CAUTION: The bolts must only be used once.

Remove the axle carrier.

- Remove and discard the three bolts retaining the axle carrier to the axle.
- Remove the axle carrier bushing bolt.

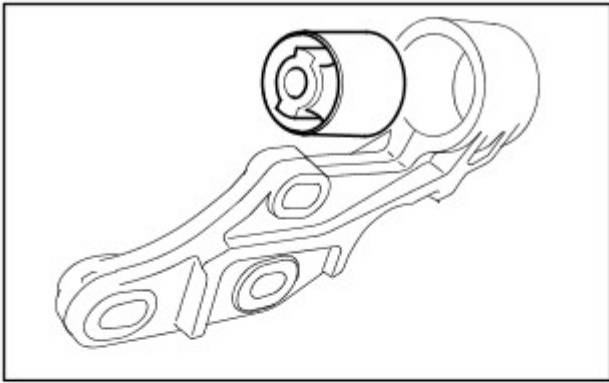



6. NOTE: Take note of the fitted position of the bush.

Using the special tools, remove the axle carrier bushing.

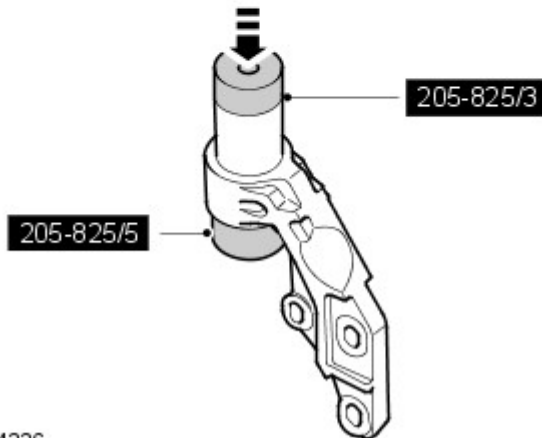


Installation



1.  **CAUTION:** Make sure the bush is correctly aligned.

Using the special tools, install the axle carrier bushing.



E54226




2. Install the axle carrier.
 - Tighten the M14 bolt to 105 Nm (77 lb.ft).
 - Tighten the new axle carrier bracket bolts to 80 Nm (59 lb.ft), then a further 60 degrees.
3. Install the axle carrier bushing heat shield.
4. Remove the axle support.
5. Install the exhaust system.

For additional information, refer to: [Exhaust System](#) (309-00D Exhaust System - V8 5.0L Petrol, Removal and Installation).
For additional information, refer to:

 - [Exhaust System](#) (309-00C Exhaust System - V6 4.0L Petrol, Removal and Installation),
 - [Exhaust System](#) (309-00B Exhaust System - TDV6 3.0L Diesel, Removal and Installation),
 - [Exhaust System - Vehicles With: Diesel Particulate Filter \(DPF\)](#) (309-00A Exhaust System - TDV6 2.7L Diesel, Removal and Installation),
 - [Exhaust System - Vehicles Without: Diesel Particulate Filter \(DPF\)](#) (309-00A Exhaust System - TDV6 2.7L Diesel, Removal and Installation).

Front Drive Axle/Differential - Axle Tube Bushing

Removal and Installation

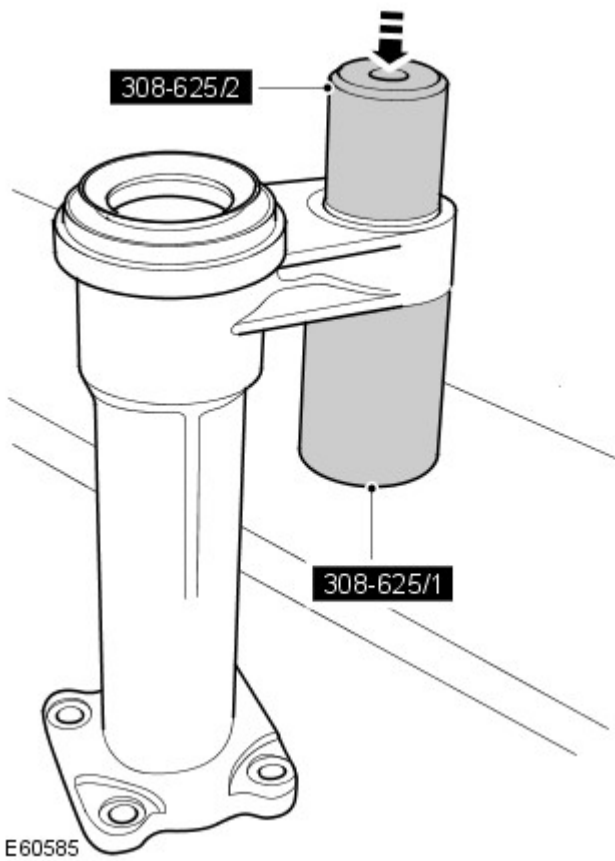
Special Tool(s)	
 <p>308-625/1</p> <p>E60582</p>	<p>Remover/installer - Front axle extension support bush</p> <p>308-625/1</p>
 <p>308-625/2</p> <p>E60583</p>	<p>Remover/installer - Front axle extension support bush</p> <p>308-625/2</p>
 <p>308-625/3</p> <p>E60584</p>	<p>Remover/installer - Front axle extension support bush</p> <p>308-625/3</p>

Removal

1. Disconnect the battery ground cable.
For additional information, refer to: [Specifications](#) (414-00 Battery and Charging System - General Information, Specifications).
2. Raise and support the vehicle.
3. Remove the axle tube.
For additional information, refer to: [Axle Tube](#) (205-03 Front Drive Axle/Differential, In-vehicle Repair).

4. NOTE: Note the fitted position.

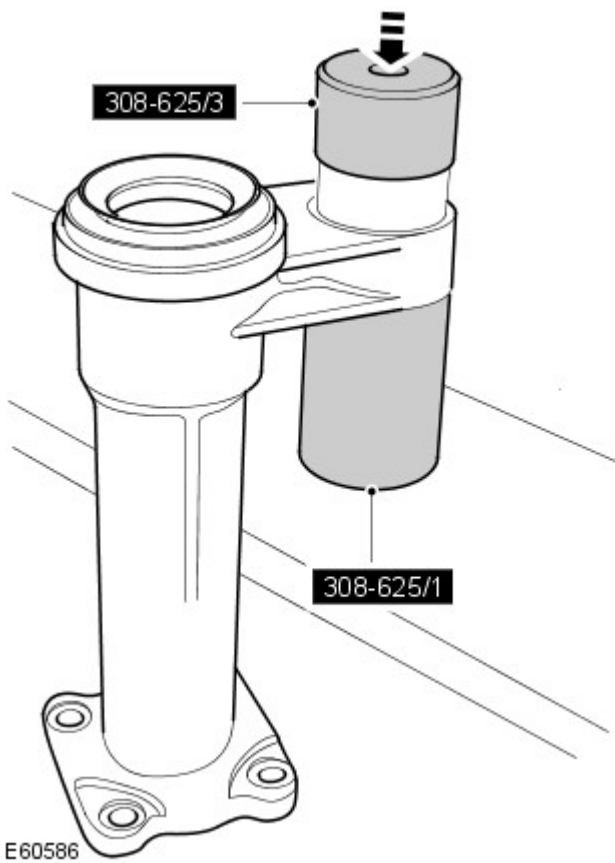
Using the special tools, remove the bushing.



Installation

1. NOTE: Note the fitted position.

Using the special tools, install the bushing.










2. Install the axle tube.
For additional information, refer to: [Axle Tube](#) (205-03 Front Drive Axle/Differential, In-vehicle Repair).

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

Front Drive Axle/Differential - Axle Cover Bushing


Removal and Installation

Special Tool(s)	
<p>502-009/6</p>  <p>E55285</p>	<p>Bearing Housing</p> <p>502-009/6</p>
<p>51204</p>  <p>E55278</p>	<p>Bearing set for 14mm bolt</p> <p>51204</p>
<p>205-825/3</p>  <p>E54216</p>	<p>Installer rear axle front bush</p> <p>205-825/3</p>
<p>502-009/2</p>  <p>E54205</p>	<p>Remover rear differential rear bush</p> <p>502-009/2</p>
<p>502-009/5</p>  <p>E54148</p>	<p>Remover/Installer long 14mm bolt</p> <p>502-009/5</p>
<p>502-009/4</p>  <p>E55284</p>	<p>Nut for long 14mm bolt</p> <p>502-009/4</p>
<p>205-825/1</p>  <p>E54219</p>	<p>Receiver cup front axle front bush</p> <p>205-825/1</p>

Removal

 CAUTION: Make sure the bush is correctly aligned.

- NOTE: Take note of the fitted position of the bush.

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.

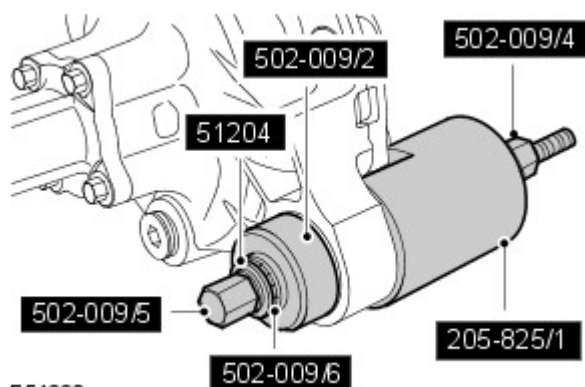
2. Remove the front wheels and tires.

3. Remove the front differential.

For additional information, refer to: [Axle Assembly](#) (205-03 Front Drive Axle/Differential, Removal and Installation).


4. NOTE: Take note of the fitted position of the bush.

Using the special tools, remove the front axle housing support insulator.

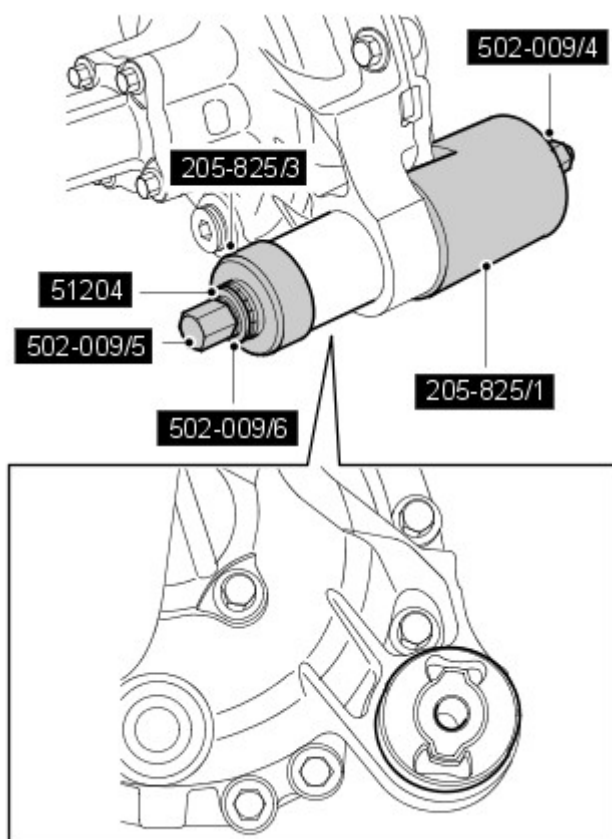


E54220

Installation

1.  CAUTION: Make sure the bush is correctly aligned.

Using the special tools, install the front axle housing support insulator.



E54221

2. Install the front differential.

For additional information, refer to: [Axle Assembly](#) (205-03 Front Drive Axle/Differential, Removal and Installation).

3. Install the front wheels and tires.

- Tighten the wheel nuts to 140 Nm (103 lb.ft).

Front Drive Halfshafts -

General Specification

Item	Specification
Type	Fully floating, fixed length, solid shafts incorporating constant velocity joints at each end of shaft

Lubricant

Item	Specification
Outboard joint	Use grease supplied with replacement boot kit (Optimol MS139G)
Inboard joint	Use grease supplied with replacement boot kit (1 Luber C MS132G)

General Specification

Item	Specification
Type	Fully floating, solid shafts incorporating 'plug-in' constant velocity joint at inboard end and fixed constant velocity joint at outboard end of shaft

Torque Specifications

Description	Nm	lb-ft
* Stabilizer bar link nut	115	85
* Stabilizer link nut	115	85
* Tie rod end ball joint nut	76	56
Brake hose retaining bracket to wheel knuckle bolt	25	18
*+ Halfshaft retaining nut	230	169
Road wheel nuts	140	103

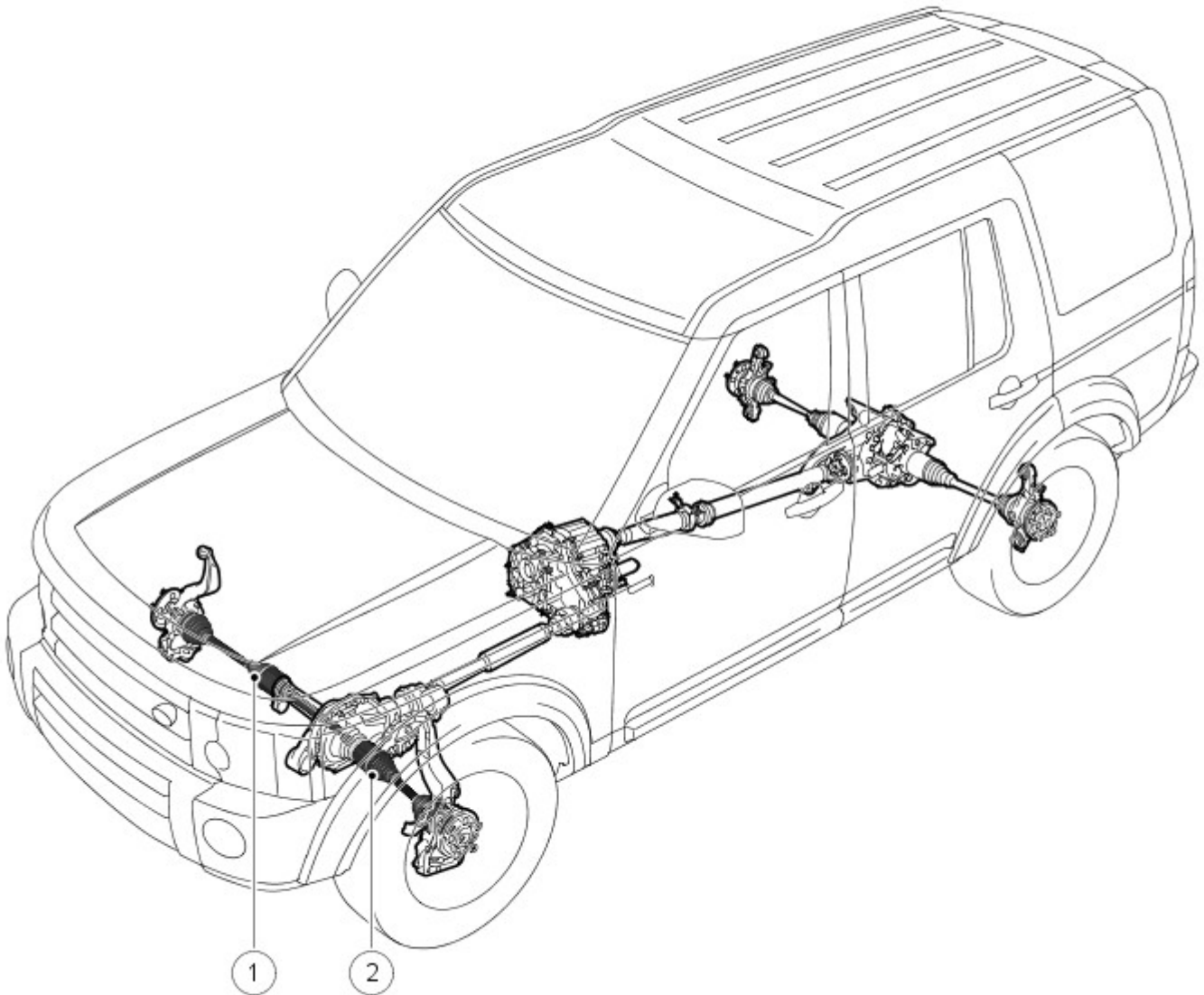
*** New nut must be fitted**

+ Stake nut on completion

Front Drive Halfshafts - Front Drive Halfshafts

Description and Operation

Front Drive Halfshaft Component Location



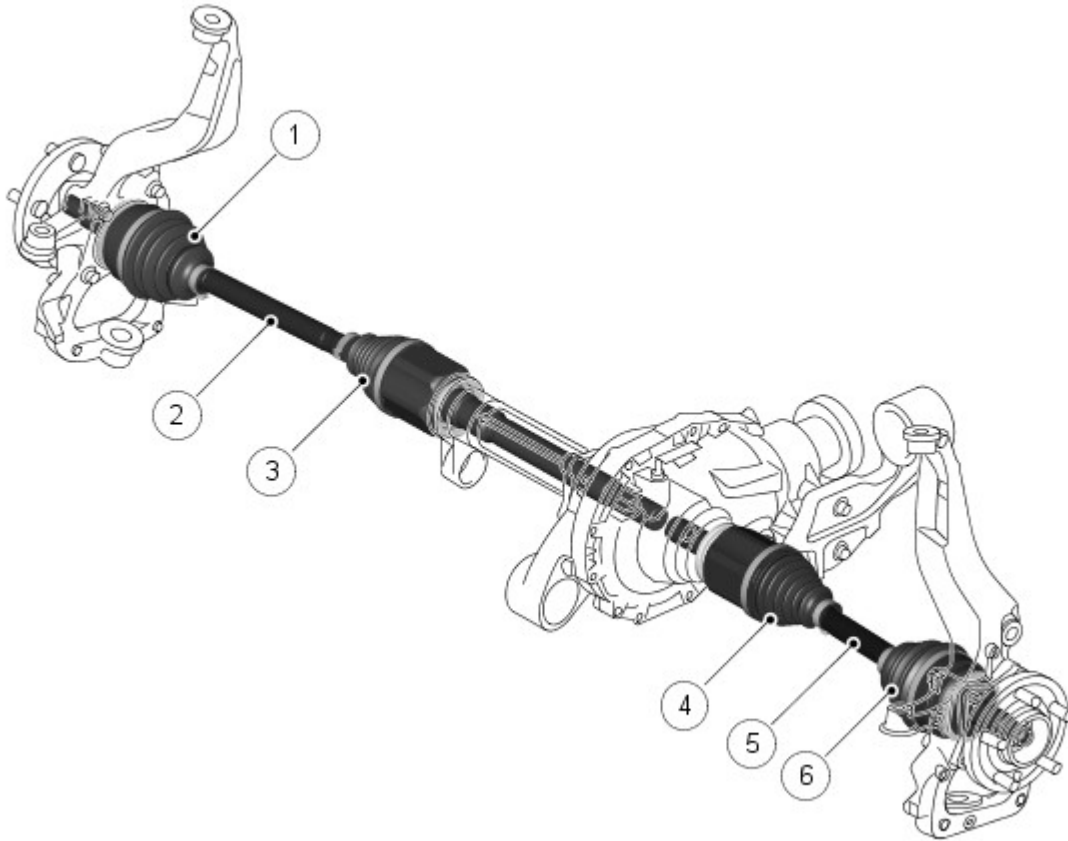
E46376

Item	Part Number	Description
1	-	RH front drive halfshaft
2	-	LH front drive halfshaft

GENERAL

The front drive shafts are handed components with the RH drive shaft being longer than the LH drive shaft. Both shafts are of similar construction with Constant Velocity (CV) joints at each end to allow for steering and suspension movement.

FRONT DRIVE HALFSHAFT ASSEMBLY



E46377

Item	Part Number	Description
1	-	RH outer CV joint
2	-	RH front drive halfshaft
3	-	RH inner CV joint
4	-	LH inner CV joint
5	-	LH front drive halfshaft
6	-	LH outer CV joint

The front drive shafts are similar in their construction. The only difference is the lengths of each shaft, the LH drive shaft is a longer shaft with an extended stem.

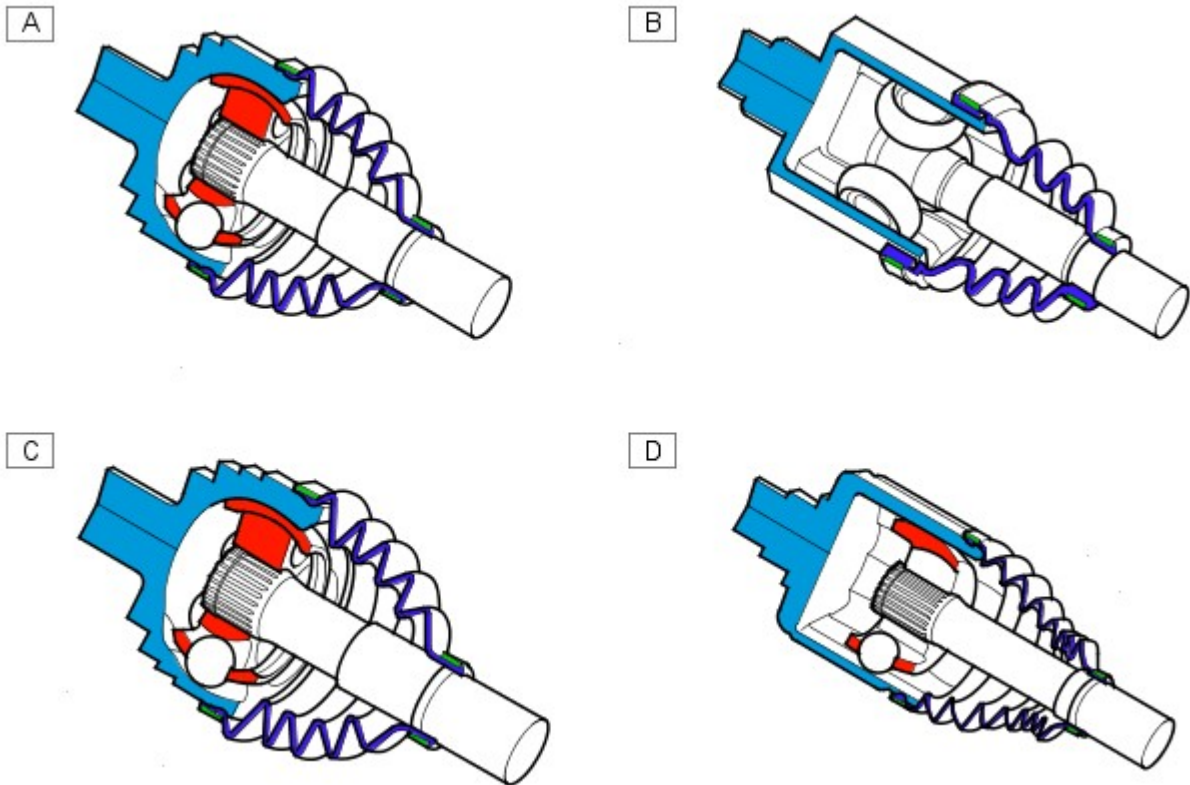
The outer CV joints have a target wheel on the outer diameter. This is used by the ABS wheel speed sensor for vehicle and wheel speed calculations.

Each drive shaft comprises two CV joints (inner and outer), boots, an outer tube and a solid barshaft, which is retained in the front differential by a circlip (see 'Halfshaft Joint' section for more information on CV joints).

Front Drive Halfshafts - Halfshaft Joint

Description and Operation

Front Drive HalfShaft – Sectional Views



E50637

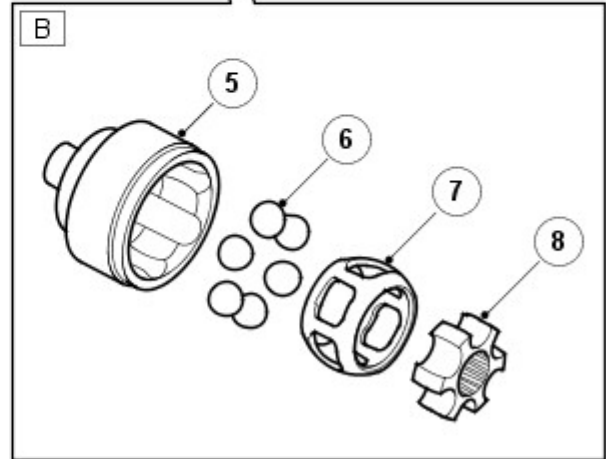
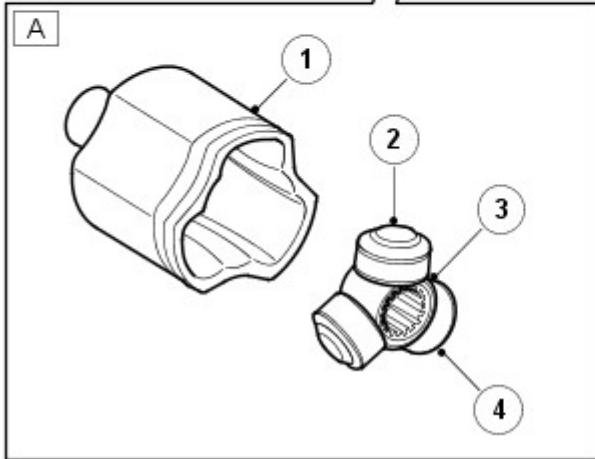
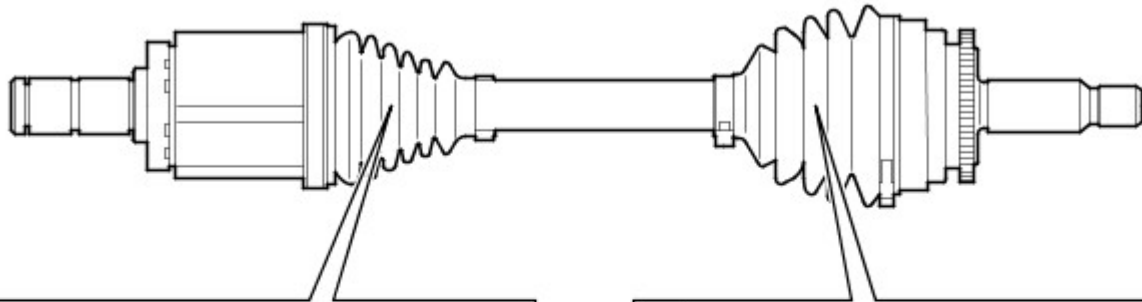
Item	Part Number	Description
A	-	Front outboard halfshaft joint
B	-	Rear outboard halfshaft joint
C	-	Rear inboard halfshaft joint
D	-	Front inboard halfshaft joint

The outboard and rear inboard CV joints are of the Birfield design. This design uses longitudinal, elliptical grooves, which retain six steel balls. The balls are further retained by a cage. The constant velocity is achieved by the position of the steel balls. If a centre line is drawn through the balls and the driven hub or differential shaft, the two centre lines always bisect each other at the angle of drive. This condition allows the rotational speed of the driven shaft to be passed to the driven hub or differential shaft with no loss of rotational speed regardless of the shaft angle. The CV joints are packed with grease, which is retained in the joint by a synthetic rubber gaiter. The gaiter is retained at each end by a metal clamp, which provides a water tight seal to prevent the ingress of dirt and moisture. The CV joints are retained on their respective shaft or tube by an internal snap ring. The snap rings are located in a groove on each shaft or tube end and locate in a mating groove in the CV joint.

⚠ CAUTION: The inner hub is not retained in the joint body on this type of joint. The joint is held together in its unfitted state only by the boot. Pulling on the barshaft can therefore pull the hub out of the joint body. For this reason care must be taken when handling and fitting the front driveshafts.

The shaft is a sliding fit inside the outer tube, which allows for the small length changes, which occur with articulation of the suspension. The shaft is located in a ball cage, which is retained inside the outer tube. The ball cage ensures that the shaft is held rigidly in the outer tube whilst allowing it to freely move in and out of the tube as necessary. A sealing plug is pressed into the outer tube and retains grease around the balls in the cage.

The inner CV joints are similar in design and operation to the outer joints except that the inner joints use rollers rather than balls to transmit the drive.



E46396

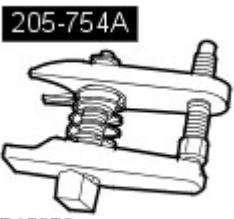






Item	Part Number	Description
A	-	Inner CV joint
B	-	Outer CV joint
1	-	Tulip outer race
2	-	Trunions (3 of)
3	-	Spider
4	-	Rollers (3 of)
5	-	Outer race
6	-	Steel balls (6 of)
7	-	Cage
8	-	Inner race



The front inboard joint is a 'tripode joint', having three 'feet' or 'podes'. The torque is transmitted from the outer race to the connecting shaft by means of rollers running on needle rollers around the trunions of the tripod spider. The roller tracks of the outer race enable the tripod assembly to move angularly and axially within the joint.

The inner CV joint shaft is splined and mates with splines in the front differential. There is no internal retaining mechanism for this type of joint so care must be taken during service as the shaft and CV joint can separate.

Front Drive Halfshafts - Front Halfshaft LH

Removal and Installation

Special Tool(s)	
 <p>205-754A E45276</p>	Ball joint separator 205-754(LRT-54-027)
 <p>204-506/1 E49618</p>	Halfshaft remover/replacer 204-506/1(LRT-60-030/1)
 <p>204-506/3 E49620</p>	Halfshaft remover/replacer 204-506/3(LRT-60-030/3)
 <p>204-506-01 E49622</p>	Halfshaft installer adapter 204-506-01(LRT-60-030/4)
 <p>204-506/5 E49621</p>	Retainers - halfshaft remover/replacer 204-506/5(LRT-60-030/5)
 <p>308-005 E54134</p>	Axle oil seal remover 308-005(LRT-37-004/2)
 <p>100-012 E54135</p>	Impulse extractor 100-012(LRT-99-004)

<p>308-626/2</p>  <p>E54137</p>	<p>Installer/Guide halfshaft oil seal 308-626/2</p>
<p>308-626/1</p>  <p>E54136</p>	<p>Installer halfshaft oil seal 308-626/1</p>

Removal

- CAUTIONS:




Do not store or install halfshafts with joints at maximum articulation or damage may occur to the joint.



Do not allow halfshafts to hang unsupported at one end or joint damage will occur.

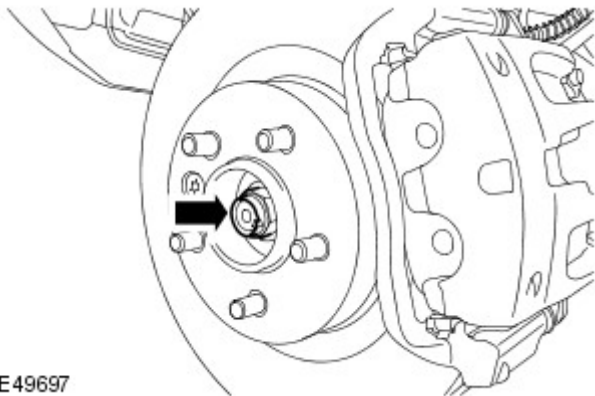


Angularly Adjusted Roller (AAR) joints, used at the inboard end of some halfshafts have no internal retaining mechanism and can separate.

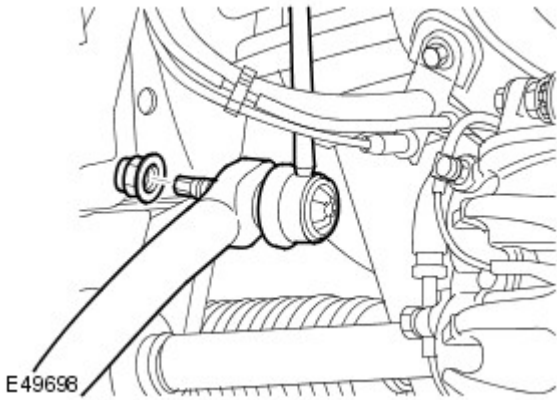
1.  **WARNING:** Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Raise and support the vehicle.

2. Drain the differential lubricant.
For additional information, refer to: [Differential Draining and Filling](#) (205-03 Front Drive Axle/Differential, General Procedures).
3. Remove the wheel and tire.
4. Remove the halfshaft retaining nut.
 - Discard the nut.



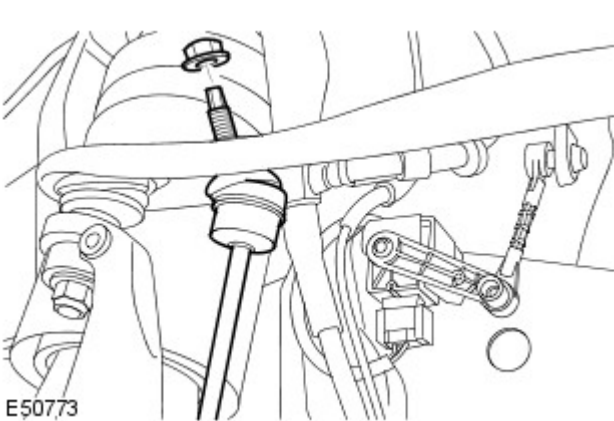
E49697



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

Disconnect the RH stabilizer bar link.

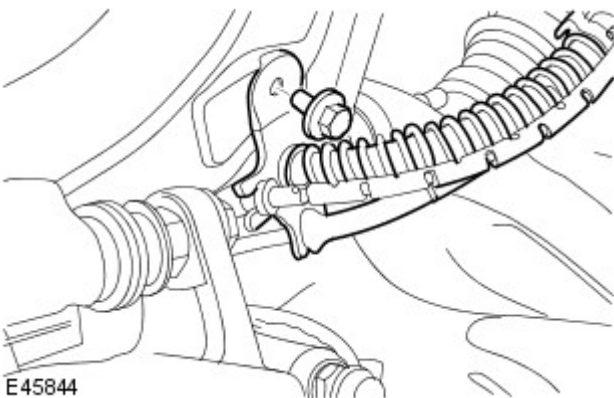
- Remove and discard the nut.



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

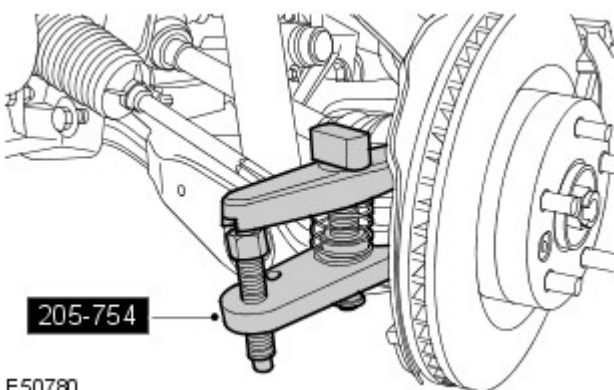
Remove the stabilizer bar link nut.

- Remove and discard the nut.



7. Release the brake hose bracket from the wheel knuckle.

- Remove the bolt.



8. Loosen the tie-rod end ball joint retaining nut.

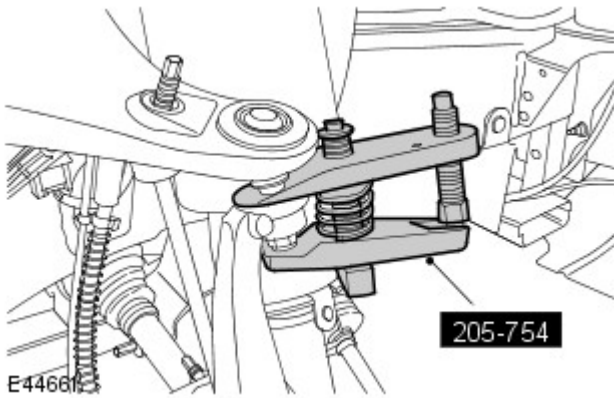
9. **⚠ CAUTION:** Make sure the ball joint seal is not damaged. A damaged seal will lead to the premature failure of the joint.


Using the special tool, release the tie-rod end ball joint from the wheel knuckle.

- Discard the nut.

10. **⚠ CAUTION:** To prevent the wheel knuckle falling outwards and disconnection of the halfshaft inner joint, support the wheel knuckle.

Loosen the upper arm retaining nut.




11.  **CAUTION:** Make sure the ball joint seal is not damaged. A damaged seal will lead to the premature failure of the joint.

Using the special tool, release the upper arm ball joint.

- Remove and discard the retaining nut.

12. CAUTIONS:

 The lower arm ball joint can be damaged by excessive articulation. The wheel knuckle must be fully supported at all times. Do not allow the wheel knuckle to hang on the lower arm. Failure to follow this instruction will result in damage to vehicle.

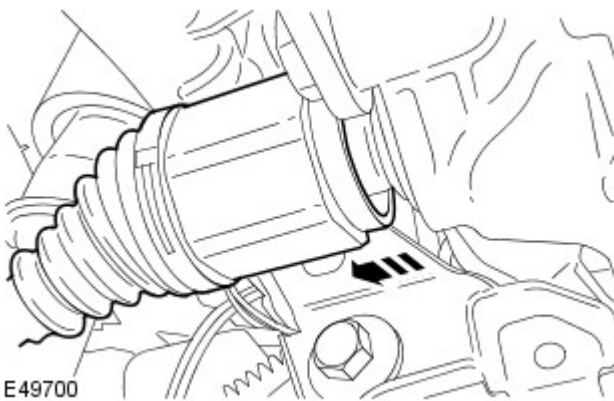
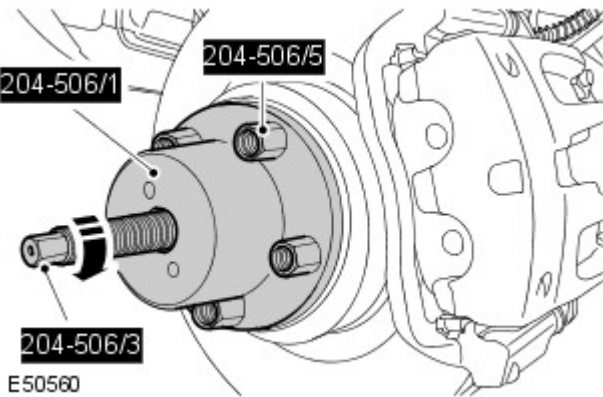
 Do not use a hammer to detach the halfshaft from the hub assembly, failure to follow this instruction may result in damage to the halfshaft.

 Do not use a hammer to detach the halfshaft from the hub assembly, failure to follow this instruction may result in damage to the halfshaft.

Using the special tools, release the halfshaft from the wheel hub.

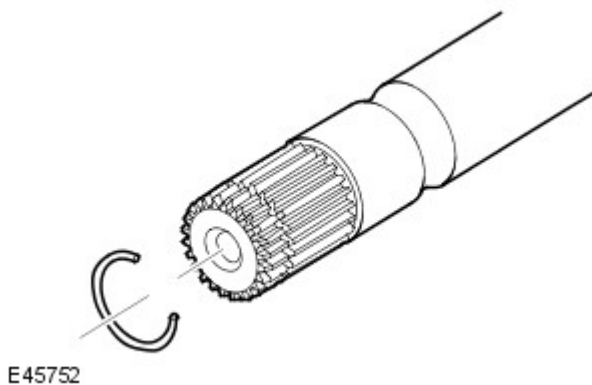
13. Release the halfshaft from the wheel knuckle.

14. Release the halfshaft from the differential housing.

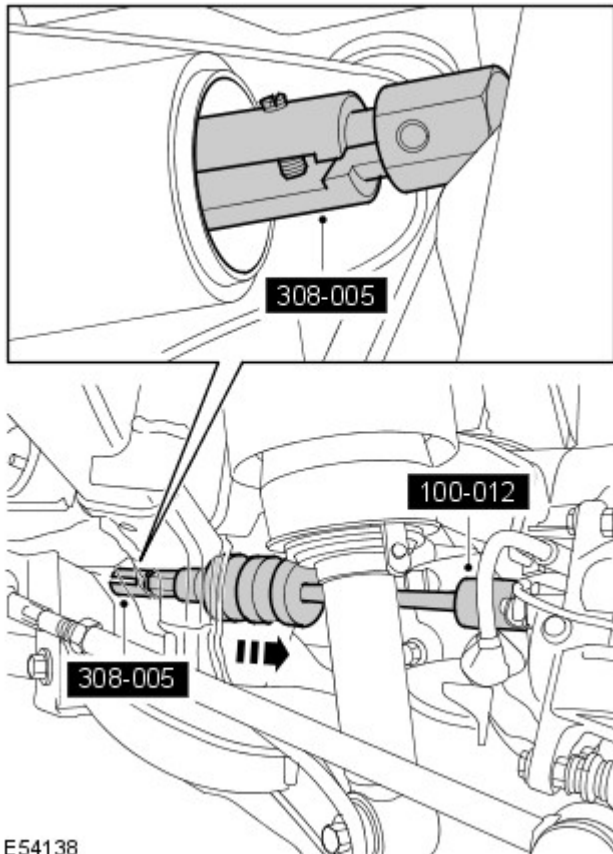


15. Remove the halfshaft.

- Raise the stabilizer bar to allow removal of the halfshaft.
- Remove and discard the snap ring.



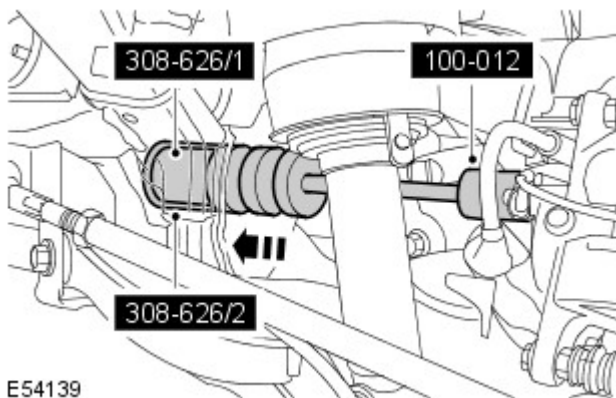
16. Using the special tools, remove and discard the halfshaft oil seal.



E54138

Installation

1. Clean the components.
2. Using the special tools, install a new halfshaft oil seal.
 - The halfshaft oil seal protector must be left in place, until the halfshaft is fully installed.

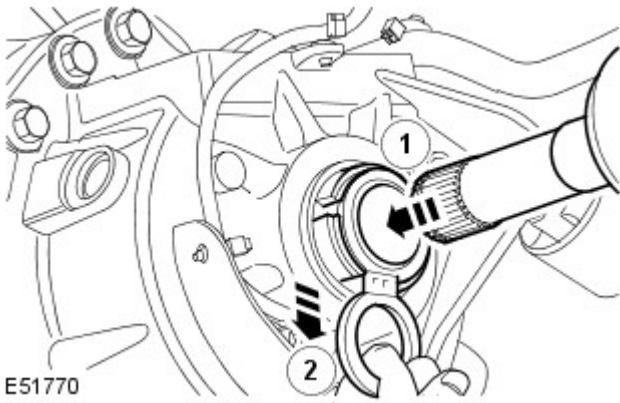


E54139

3. **NOTE:** Do not fully engage the halfshaft until the oil seal protector has been removed.

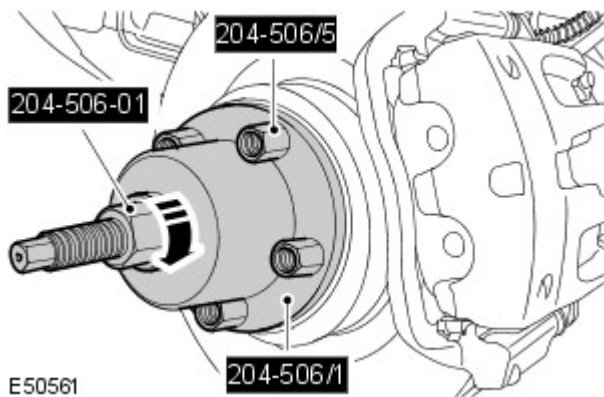
Install the halfshaft.

- Install the snap ring.
- Lubricate the seal and the bearing running surfaces with clean axle oil.
- Make sure the snap ring is fully engaged and retains the halfshaft.
- Open the halfshaft oil seal protector.



4. NOTE: The oil seal protector is designed to break into two pieces.

Remove and discard the halfshaft oil seal protector.



5. CAUTION: The lower arm ball joint can be damaged by excessive articulation. The wheel knuckle must be fully supported at all times. Do not allow the wheel knuckle to hang on the lower arm. Failure to follow this instruction will result in damage to vehicle.

Using the special tools, install the halfshaft in the wheel hub.

6. Connect the upper arm and wheel knuckle.

- Install a new nut and tighten to 70 Nm (52 lb.ft).

7. Secure the stabilizer bar link.

- Install a new nut and tighten to 115 Nm (85 lb.ft).

8. Connect the tie-rod end ball joint.

- Install a new nut and tighten to 76 Nm (56 lb.ft).

9. CAUTION: Install the halfshaft nut finger tight.

Install a new halfshaft retaining nut and lightly tighten.

10. Secure the brake hose retaining bracket to the wheel knuckle.

- Tighten the bolt to 22 Nm (16 lb.ft).

11. Secure the RH stabilizer link.

- Install a new nut and tighten to 115 Nm (85 lb.ft).

12. CAUTION: Do not use air tools to install the nut. Failure to follow this instruction may result in damage to the component.

Tighten the new halfshaft retaining nut to 230 Nm (170 lb.ft).

- Stake the nut to the halfshaft.

13. Install the wheels and tires.

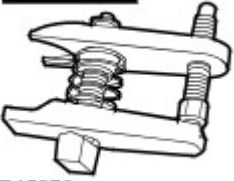

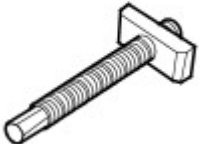

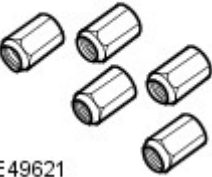


- Tighten the wheel nuts to 140 Nm (103 lb.ft).




14. CAUTION: Do not fill the differential with lubricant up to the filler plug. The filler plug is only used to fill the differential with lubricant, and not to act as a level indicator.

Fill the differential with the correct amount of lubricant.
For additional information, refer to: [Differential Draining and Filling](#) (205-03 Front Drive Axle/Differential, General Procedures).

Front Drive Halfshafts - Front Halfshaft RH

Removal and Installation

Special Tool(s)	
 <p>205-754A E45276</p>	Ball joint separator 205-754(LRT-54-027)
 <p>204-506/1 E49618</p>	Halfshaft remover/replacer 204-506/1(LRT-60-030/1)
 <p>204-506/3 E49620</p>	Halfshaft remover/replacer 204-506/3(LRT-60-030/3)
 <p>204-506-01 E49622</p>	Halfshaft installer adapter 204-506-01(LRT-60-030/4)
 <p>204-506/5 E49621</p>	Retainers - halfshaft remover/replacer 204-506/5(LRT-60-030/5)
 <p>308-005 E54134</p>	Axle oil seal remover 308-005(LRT-37-004/2)
 <p>100-012 E54135</p>	Impulse extractor 100-012(LRT-99-004)

 <p>308-626/2</p> <p>E54137</p>	<p>Installer/Guide halfshaft oil seal 308-626/2</p>
 <p>308-626/1</p> <p>E54136</p>	<p>Installer halfshaft oil seal 308-626/1</p>
 <p>205-819</p> <p>E54141</p>	<p>Halfshaft bearing installer 205-819</p>

Removal

- CAUTIONS:




Angularly Adjusted Roller (AAR) joints, used at the inboard end of some halfshafts have no internal retaining mechanism and can separate.



Do not allow halfshafts to hang unsupported at one end or joint damage will occur.

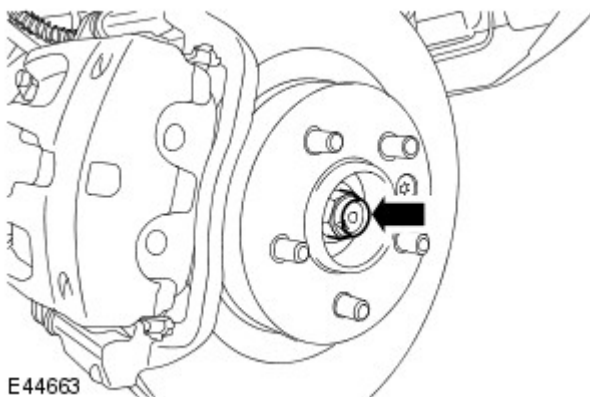


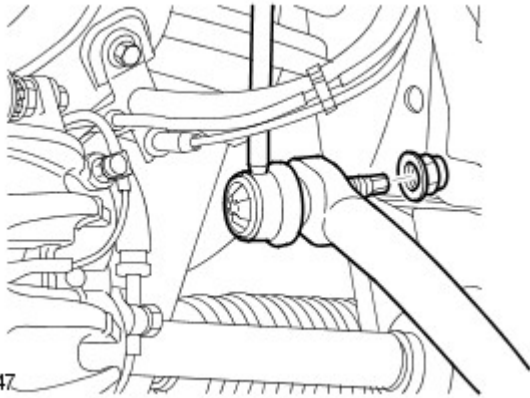
Do not store or install halfshafts with joints at maximum articulation or damage may occur to the joint.

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. Drain the differential lubricant.
For additional information, refer to: [Differential Draining and Filling](#) (205-03 Front Drive Axle/Differential, General Procedures).
3. Remove the wheels and tires.
4. Remove the halfshaft retaining nut.
 - Discard the nut.

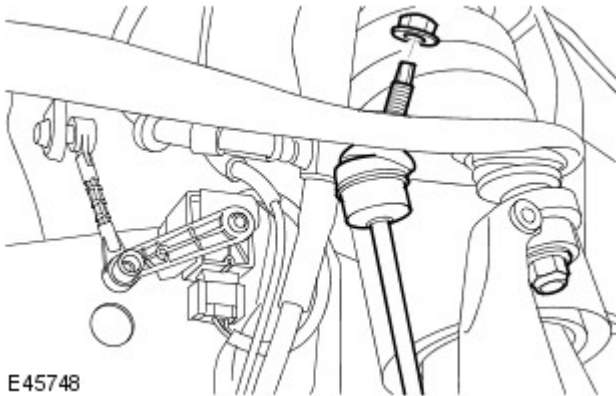




5.  CAUTION: Use a wrench on the hexagon provided to prevent the ball joint rotating.

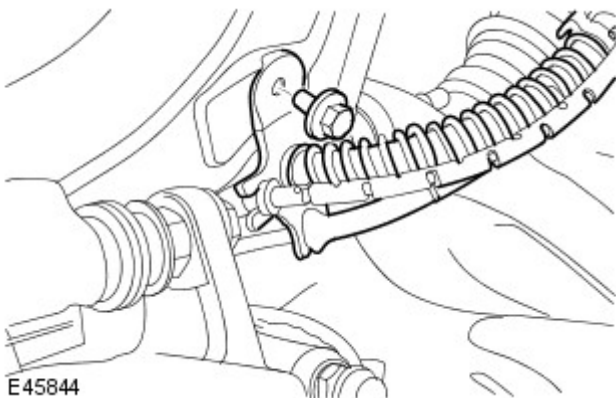
Disconnect the LH stabilizer bar link.

- Remove and discard the nut.



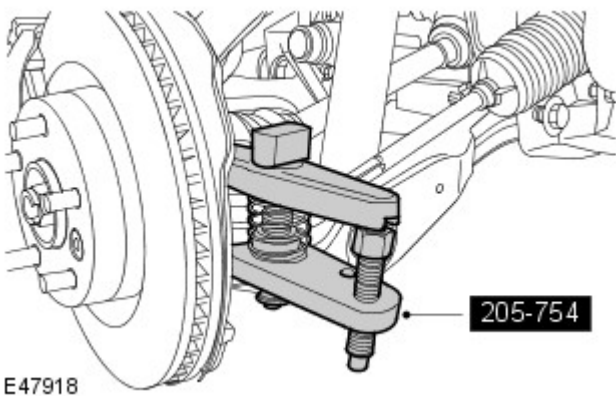
6.  CAUTION: Use a wrench on the hexagon provided to prevent the ball joint rotating.

Remove the stabilizer bar link nut.




7. Release the brake hose bracket from the wheel knuckle.

- Remove the bolt.




8. Loosen the tie-rod end ball joint retaining nut.

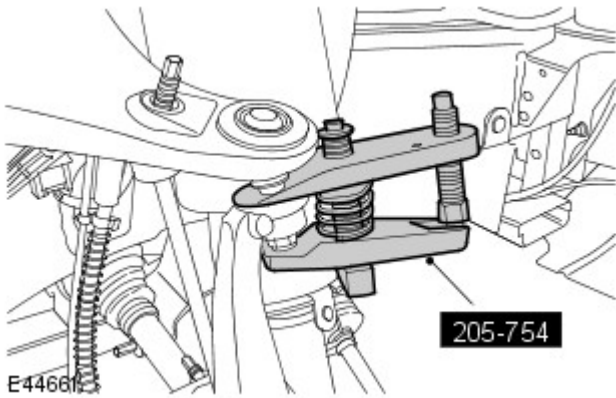
9.  CAUTION: Make sure the ball joint seal is not damaged. A damaged seal will lead to the premature failure of the joint.


Using the special tool, release the tie-rod end ball joint from the wheel knuckle.

- Discard the nut.

10.  CAUTION: To prevent the wheel knuckle falling outwards and disconnection of the halfshaft inner joint, support the wheel knuckle.

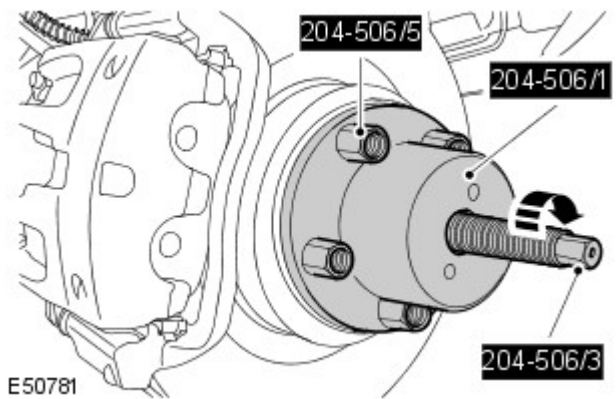
Loosen the upper arm retaining nut.




11.  **CAUTION:** Make sure the ball joint seal is not damaged. A damaged seal will lead to the premature failure of the joint.


Using the special tool, release the upper arm ball joint.

- Remove and discard the retaining nut.



12. CAUTIONS:

 The lower arm ball joint can be damaged by excessive articulation. The wheel knuckle must be fully supported at all times. Do not allow the wheel knuckle to hang on the lower arm. Failure to follow this instruction will result in damage to vehicle.

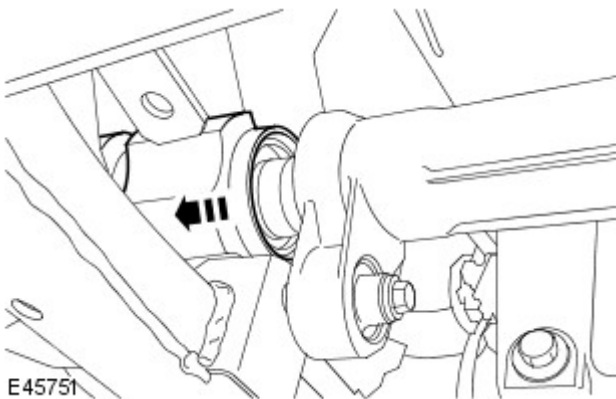
 Do not use a hammer to detach the halfshaft from the hub assembly, failure to follow this instruction may result in damage to the halfshaft.

Using the special tools, release the halfshaft from the wheel hub.

13. Release the halfshaft from the wheel knuckle.

14. Position a container to collect the oil spillage.

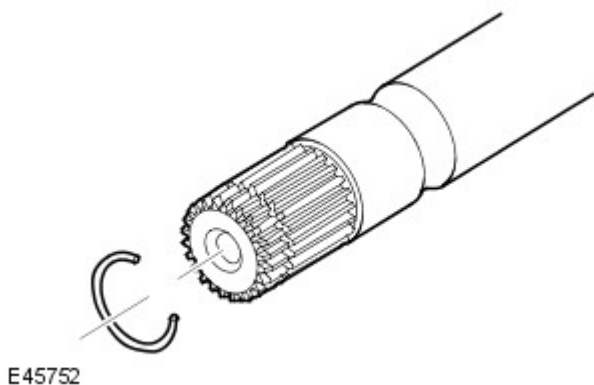
15. Release the halfshaft from the differential housing.



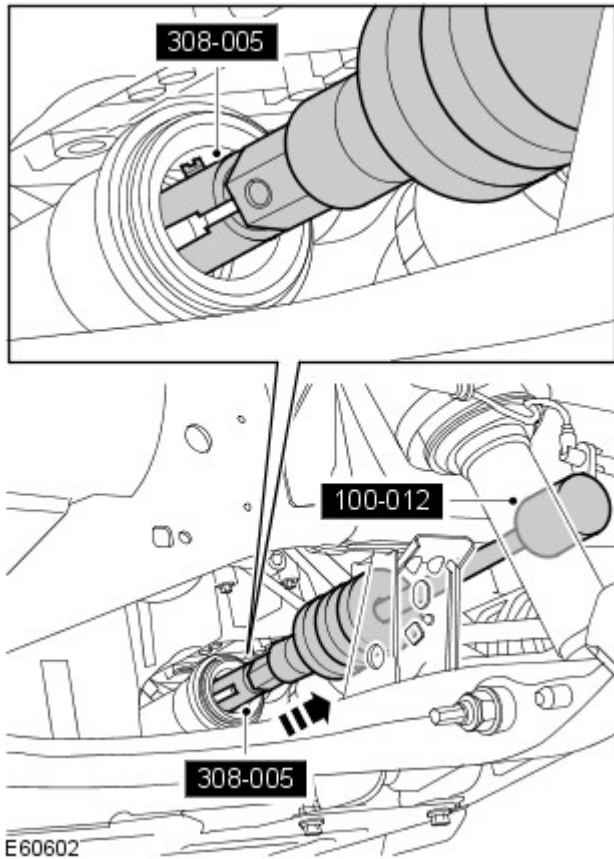
16.  **CAUTION:** Keep the halfshaft horizontal to avoid damaging the oil seal.

Remove the halfshaft.

- Raise the stabilizer bar to allow removal of the halfshaft.
- Remove and discard the snap ring.

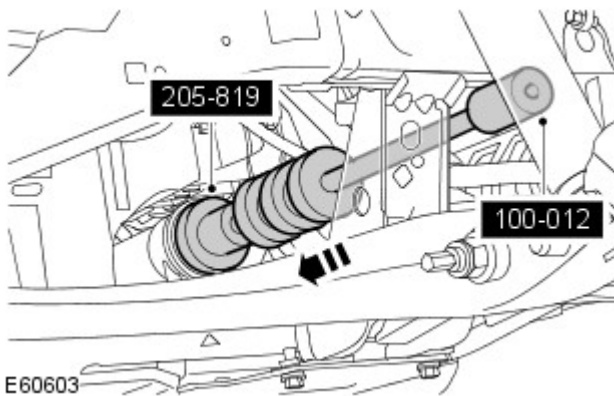


17. Using the special tools, remove and discard the halfshaft oil seal.



Installation

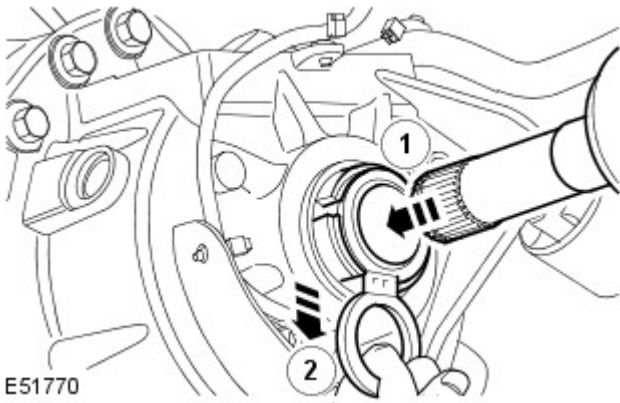
1. Clean the components.
2. Using the special tools, install a new halfshaft oil seal.
 - The halfshaft oil seal protector must be left in place, until the halfshaft is fully installed.



3. **NOTE:** Do not fully engage the halfshaft until the oil seal protector has been removed.

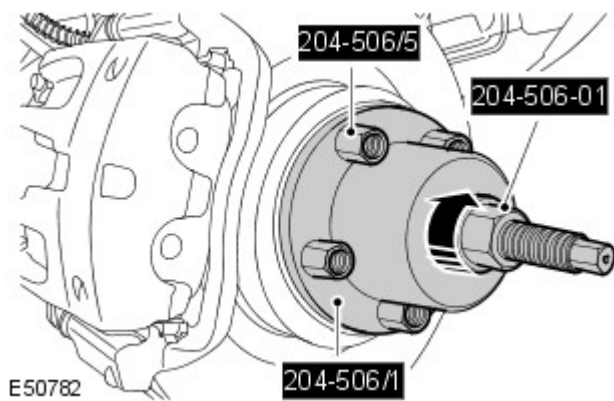
Install the halfshaft.

- Install the snap ring.
- Lubricate the seal and the bearing running surfaces with clean axle oil.
- Make sure the snap ring is fully engaged and retains the halfshaft.
- Open the halfshaft oil seal protector.



4. NOTE: The oil seal protector is designed to break into two pieces.

Remove and discard the halfshaft oil seal protector.



5. CAUTION: The lower arm ball joint can be damaged by excessive articulation. The wheel knuckle must be fully supported at all times. Do not allow the wheel knuckle to hang on the lower arm. Failure to follow this instruction will result in damage to vehicle.

Using the special tools, install the halfshaft in the wheel hub.

6. Connect the upper arm and wheel knuckle.

- Install a new nut and tighten to 70 Nm (52 lb.ft).

7. Secure the stabilizer bar link.

- Install a new nut and tighten to 115 Nm (85 lb.ft).

8. Connect the tie-rod end ball joint.

- Install a new nut and tighten to 76 Nm (56 lb.ft).

9. CAUTION: Install the halfshaft nut finger tight.

Install a new halfshaft retaining nut and lightly tighten.

10. Secure the brake hose retaining bracket to the wheel knuckle.

- Tighten the bolt to 22 Nm (16 lb.ft).

11. Secure the LH stabilizer link.

- Install a new nut and tighten to 115 Nm (85 lb.ft).

12. CAUTION: Do not use air tools to install the nut. Failure to follow this instruction may result in damage to the component.

Tighten the new halfshaft retaining nut to 230 Nm (170 lb.ft).

- Stake the nut to the halfshaft.

13. Install the wheels and tires.

- Tighten the wheel nuts to 140 Nm (103 lb.ft).


14. CAUTION: Do not fill the differential with lubricant up to the filler plug. The filler plug is only used to fill the differential with lubricant, and not to act as a level indicator.

Fill the differential with the correct amount of lubricant.
For additional information, refer to: [Differential Draining and Filling](#) (205-03 Front Drive Axle/Differential, General Procedures).

Front Drive Halfshafts - Outer Constant Velocity (CV) Joint Boot

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.

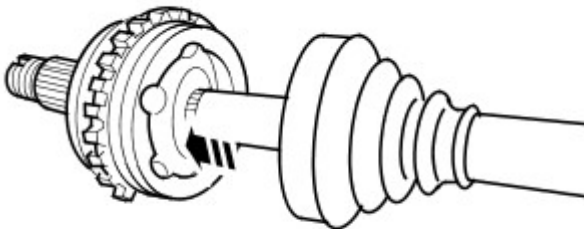
Raise and support the vehicle.

2. Remove the wheel and tire.
3. Remove the halfshaft.
For additional information, refer to: [Front Halfshaft LH](#) (205-04 Front Drive Halfshafts, Removal and Installation).
4. Clamp the halfshaft in a vise.
5. Remove and discard the CV joint boot retaining clamps.



6. Slide the CV joint boot along the halfshaft to gain access to the joint.
7. Using a drift against the inner part of the CV joint, remove the CV joint from the halfshaft.

- Remove and discard the snap ring.



E46875

8. Remove the outer CV joint boot.


Installation


1. Clean the components.
2. Install the CV joint boot.
3. Install the outer CV joint.
 - Install the snap ring.
 - Position the CV joint on the halfshaft, press the snap ring into its groove and push the CV joint fully on to the halfshaft.
 - Pull on the CV joint to ensure the snap ring has fully engaged.
4. Pack the CV joint with the grease supplied.



E137494

5. CAUTIONS:

 Make sure the CV boot is not pushed too far onto the drive shaft and the recess is exposed, failure to follow this instruction may result in damage to the component.

 After the clamps have been secured do not adjust them, failure to follow this instruction may result in damage to the component.

Install the CV joint boot to the CV joint.

- Using a suitable tool, secure the CV joint boot with the new clamps.

6. Install the halfshaft.

For additional information, refer to: [Front Halfshaft LH](#) (205-04 Front Drive Halfshafts, Removal and Installation).


7. Install the wheel and tire.

- Tighten the wheel nuts to 140 Nm (103 lb.ft).

Front Drive Halfshafts - Outer Constant Velocity (CV) Joint

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.

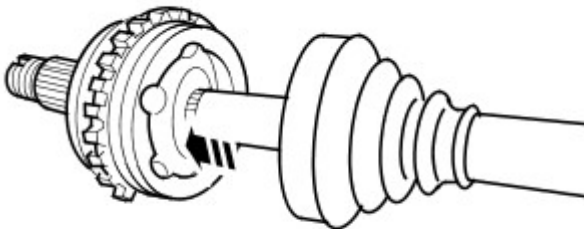
Raise and support the vehicle.

2. Remove the wheel and tire.
3. Remove the halfshaft.
For additional information, refer to: [Front Halfshaft LH](#) (205-04 Front Drive Halfshafts, Removal and Installation).
4. Clamp the halfshaft in a vise.
5. Remove and discard the CV joint boot retaining clamps.



6. Slide the CV joint boot along the halfshaft to gain access to the joint.
7. Using a drift against the inner part of the CV joint, remove the CV joint from the halfshaft.

- Remove and discard the snap ring.



E46875

8. Remove the outer CV joint boot.


Installation


1. Clean the components.
2. Install the CV joint boot.
3. Install the outer CV joint.
 - Install the snap ring.
 - Position the CV joint on the halfshaft, press the snap ring into its groove and push the CV joint fully on to the halfshaft.
 - Pull on the CV joint to ensure the snap ring has fully engaged.
4. Pack the CV joint with the grease supplied.



E137494

5. CAUTIONS:

 Make sure the CV boot is not pushed too far onto the drive shaft and the recess is exposed, failure to follow this instruction may result in damage to the component.

 After the clamps have been secured do not adjust them, failure to follow this instruction may result in damage to the component.

Install the CV joint boot to the CV joint.

- Using a suitable tool, secure the CV joint boot with the new clamps.

6. Install the halfshaft.

For additional information, refer to: [Front Halfshaft LH](#) (205-04 Front Drive Halfshafts, Removal and Installation).


7. Install the wheel and tire.

- Tighten the wheel nuts to 140 Nm (103 lb.ft).

Front Drive Halfshafts - Inner Constant Velocity (CV) Joint Boot

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. Remove the wheel and tire.
3. Remove the halfshaft.
For additional information, refer to: [Front Halfshaft LH](#) (205-04 Front Drive Halfshafts, Removal and Installation).
4. Clamp the halfshaft in a vise.
5. Remove and discard the CV joint boot retaining clamps.

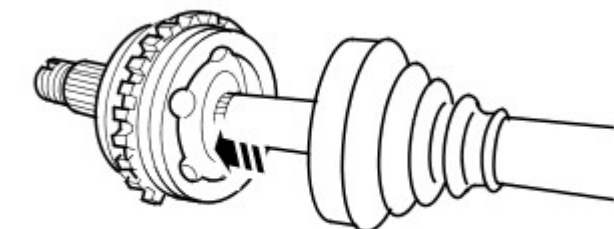


6. Slide the CV joint boot along the halfshaft to gain access to the joint.



7. Using a drift against the inner part of the CV joint, remove the CV joint from the halfshaft.

- Remove and discard the snap ring.



8. Remove the inner joint boot.

Installation

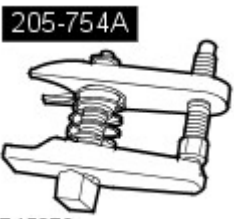






1. Clean the components.
2. Install the inner joint boot.



- 3.** Install the inner joint.
 - Install a new snap ring.
 - Position the CV joint on the halfshaft, press the snap ring into its groove and push the CV joint fully on to the halfshaft.
 - Pull on the CV joint to ensure the snap ring has fully engaged.
- 4.** Pack the joint with the grease supplied.
- 5.** Install the CV joint boot to the CV joint.
 - Secure with the new clamps.
- 6.** Install the halfshaft.

For additional information, refer to: [Front Halfshaft LH](#) (205-04 Front Drive Halfshafts, Removal and Installation).
- 7.** Install the wheel and tire.
 - Tighten the wheel nuts to 140 Nm (103 lb.ft).

Front Drive Halfshafts - Halfshaft Seal LH


Removal and Installation

Special Tool(s)	
 <p>205-754A</p> <p>E45276</p>	Ball joint separator (LRT-54-027) 205-754
 <p>204-506/1</p> <p>E49618</p>	Halfshaft remover/replacer (LRT-60-030/1) 204-506/1
 <p>204-506/3</p> <p>E49620</p>	Halfshaft remover/replacer (LRT-60-030/3) 204-506/3
 <p>204-506-01</p> <p>E49622</p>	Halfshaft installer adapter 204-506-01
 <p>204-506/5</p> <p>E49621</p>	Retainers - halfshaft remover/replacer (LRT-60-030/5) 204-506/5
 <p>308-005</p> <p>E54134</p>	Axle oil seal remover (LRT-37-004/2) 308-005
 <p>100-012</p> <p>E54135</p>	Impulse extractor (LRT-99-004) 100-012

 <p>308-626/2 E54137</p>	<p>Installer/Guide halfshaft oil seal 308-626/2</p>
 <p>308-626/1 E54136</p>	<p>Installer halfshaft oil seal 308-626/1</p>


Removal

- CAUTIONS:

 Do not store or install halfshafts with joints at maximum articulation or damage may occur to the joint

 Do not allow halfshafts to hang unsupported at one end or joint damage will occur.

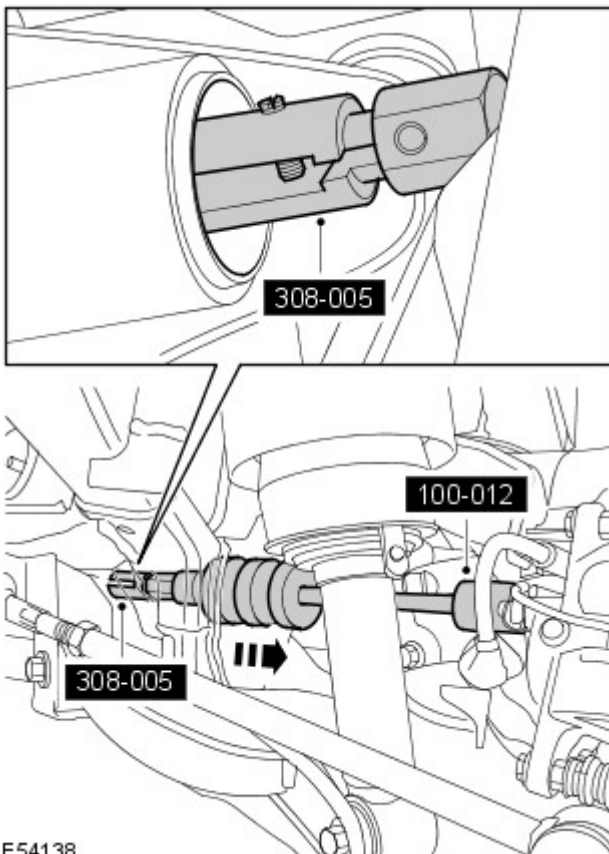
 Angularly Adjusted Roller (AAR) joints, used at the inboard end of some halfshafts have no internal retaining mechanism and can separate.

 **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. Remove the LH halfshaft.
For additional information, refer to: [Front Halfshaft LH](#) (205-04 Front Drive Halfshafts, Removal and Installation).

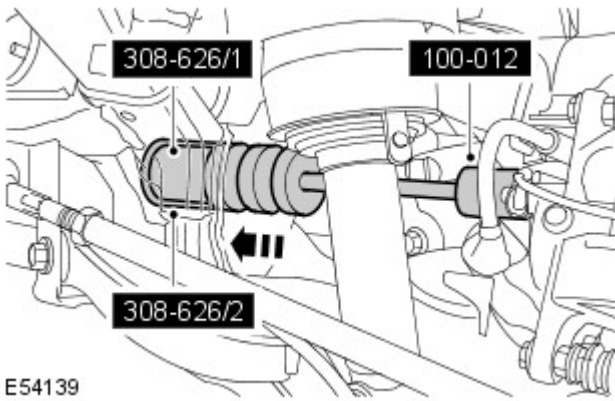
3. Using the special tools, remove and discard the halfshaft oil seal.



Installation

1. Using the special tools, install a new halfshaft oil seal.

- The halfshaft oil seal protector must be left in place, until the halfshaft is fully installed.



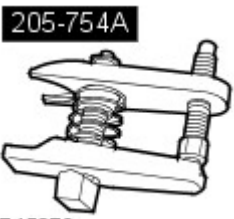






E54139



2. Install the LH halfshaft.

For additional information, refer to: [Front Halfshaft LH](#) (205-04 Front Drive Halfshafts, Removal and Installation).

Front Drive Halfshafts - Halfshaft Seal RH

Removal and Installation

Special Tool(s)	
 <p>205-754A E45276</p>	Ball joint separator (LRT-54-027) 205-754
 <p>204-506/1 E49618</p>	Halfshaft remover/replacer (LRT-60-030/1) 204-506/1
 <p>204-506/3 E49620</p>	Halfshaft remover/replacer (LRT-60-030/3) 204-506/3
 <p>204-506-01 E49622</p>	Halfshaft installer adapter 204-506-01
 <p>204-506/5 E49621</p>	Retainers - halfshaft remover/replacer (LRT-60-030/5) 204-506/5
 <p>308-005 E54134</p>	Axle oil seal remover (LRT-37-004/2) 308-005
 <p>100-012 E54135</p>	Impulse extractor (LRT-99-004) 100-012

<p>308-626/2</p>  <p>E54137</p>	<p>Installer/Guide halfshaft oil seal 308-626/2</p>
<p>308-626/1</p>  <p>E54136</p>	<p>Installer halfshaft oil seal 308-626/1</p>

Removal


- CAUTIONS:



Angularly Adjusted Roller (AAR) joints, used at the inboard end of some halfshafts have no internal retaining mechanism and can separate.

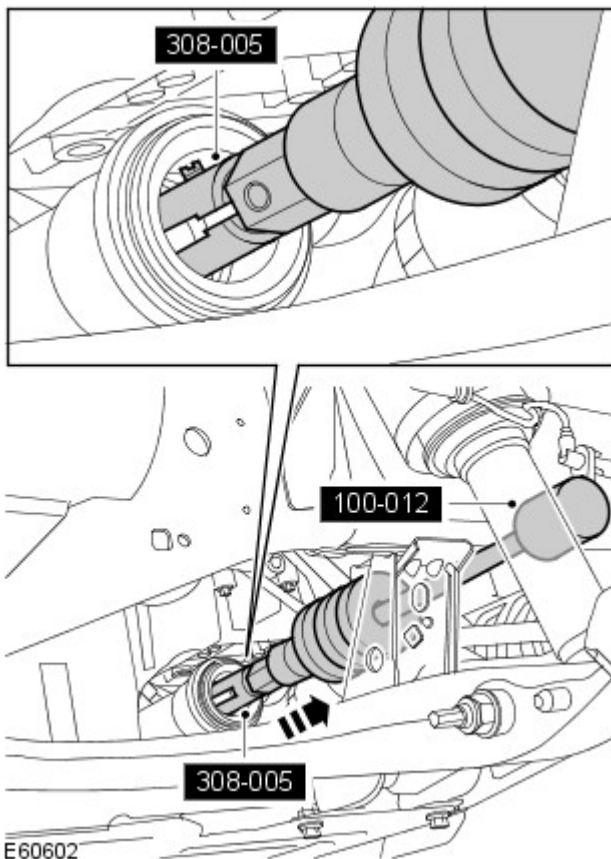


Do not allow halfshafts to hang unsupported at one end or joint damage will occur.

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

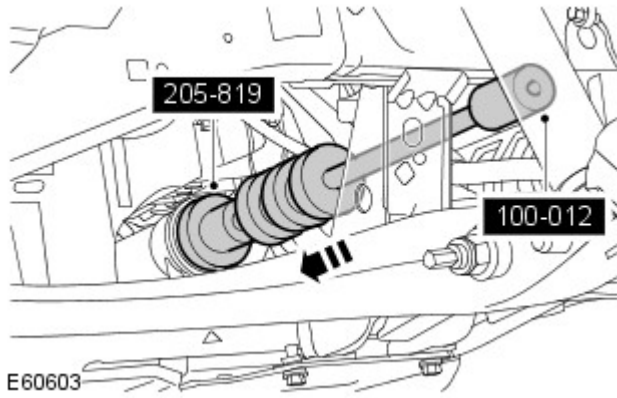
Raise and support the vehicle.

2. Remove the RH halfshaft.
For additional information, refer to: [Front Halfshaft RH](#) (205-04 Front Drive Halfshafts, Removal and Installation).
3. Using the special tools, remove and discard the halfshaft oil seal.



Installation

1. Using the special tools, install a new halfshaft oil seal.



2. Install the RH halfshaft.
For additional information, refer to: [Front Halfshaft RH](#) (205-04 Front Drive Halfshafts, Removal and Installation).

Rear Drive Halfshafts -

Recommended Lubricant

Item	Specification
Outboard joint	Use grease supplied with replacement boot kit (Optimol MS139G)
Inboard joint	Use grease supplied with replacement boot kit (Thermax MS141G)

General Specification

Item	Specification
Type	Fully floating, solid shafts incorporating plunging constant velocity joint at inboard end and fixed constant velocity joint at outboard end of shaft

Torque Specifications

Description	Nm	lb-ft
* Lower arm to wheel knuckle nut	275	203
Toe link bolt	175	129
*+ Halfshaft nut	350	258
Road wheel nuts	140	103

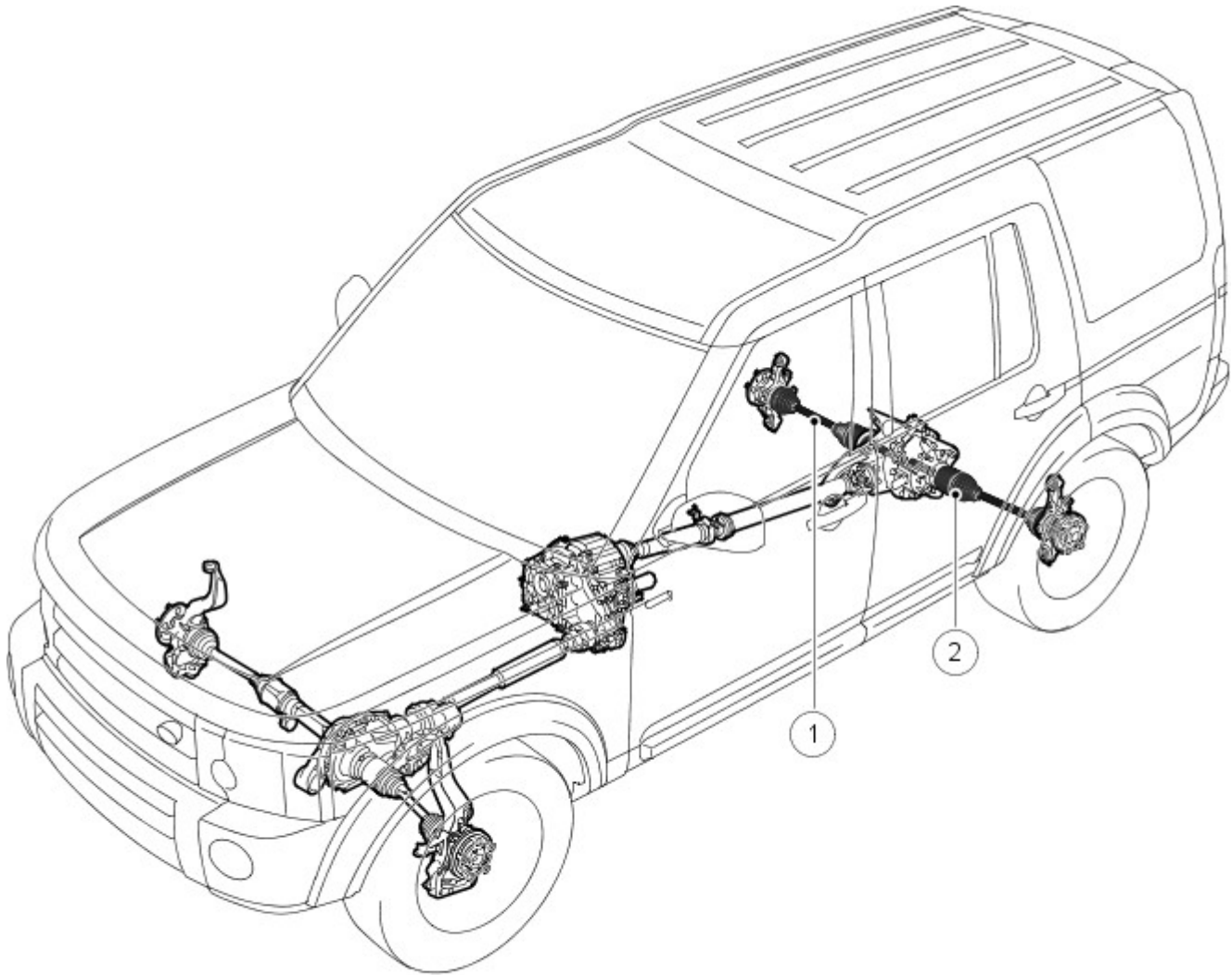
* **New nut must be fitted**

+ **Stake nut on completion**

Rear Drive Halfshafts - Rear Drive Halfshafts

Description and Operation

Rear Drive Halfshaft Component Locations



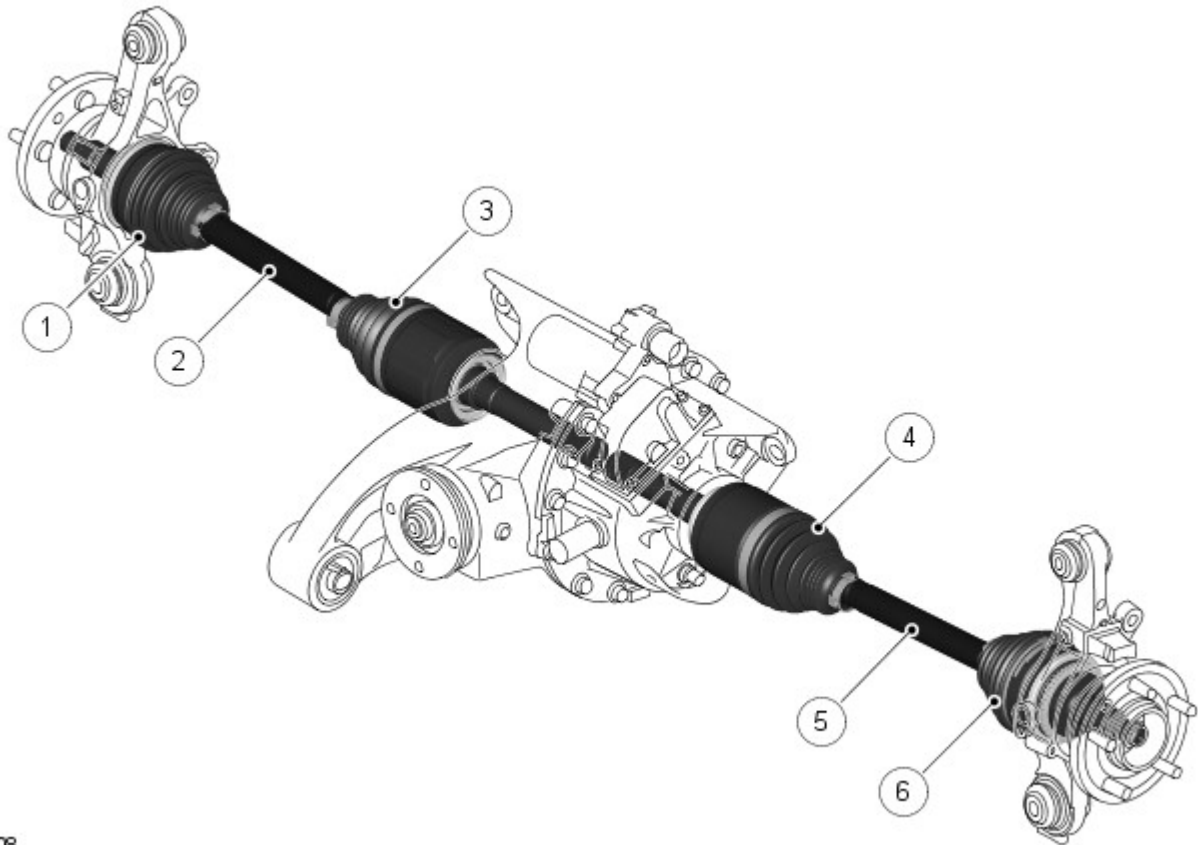
E46407

Item	Part Number	Description
1	-	RH rear drive halfshaft
2	-	LH rear drive halfshaft

GENERAL

The rear drive halfshafts are identical in their construction with a Constant Velocity (CV) joint at each end to allow for suspension movement.

REAR DRIVE SHAFT ASSEMBLY



E46408

Item	Part Number	Description
1	-	RH outer CV joint
2	-	RH rear drive halfshaft
3	-	RH inner CV joint
4	-	LH inner CV joint
5	-	LH rear drive halfshaft
6	-	LH outer CV joint



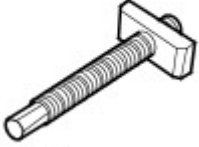


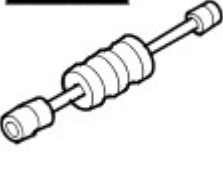

Each outer CV joint has a target wheel on the outer diameter. This target is used by the ABS wheel speed sensor for vehicle and wheel speed calculations.

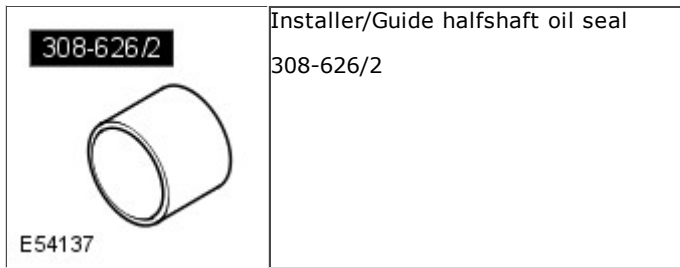
Each rear drive halfshaft comprises two CV joints (inner and outer), boots and a solid barshaft, which is retained in the rear differential by a circlip.

The CV joints used on the rear drive halfshafts share the same design and operating principles as the front drive halfshafts CV joints (see 'Halfshaft Joint' section for more information on CV joints). The rear drive halfshaft inner joint hubs are retained by peening over the lip of the joint body.

Rear Drive Halfshafts - Rear Halfshaft

Removal and Installation

Special Tool(s)	
 <p>204-506/1</p> <p>E49618</p>	<p>Halfshaft remover/replacer 204-506/1(LRT-60-030/1)</p>
 <p>204-506/5</p> <p>E49621</p>	<p>Retainers - halfshaft remover/replacer 204-506/5(LRT-60-030/5)</p>
 <p>204-506/3</p> <p>E49620</p>	<p>Halfshaft remover/replacer 204-506/3(LRT-60-030/3)</p>
 <p>204-506-01</p> <p>E49622</p>	<p>Halfshaft installer adapter 204-506-01(LRT-60-030/4)</p>
 <p>308-005</p> <p>E54134</p>	<p>Axle oil seal remover 308-005(LRT-37-004/2)</p>
 <p>100-012</p> <p>E54135</p>	<p>Impulse extractor 100-012(LRT-99-004)</p>
 <p>308-626/1</p> <p>E54136</p>	<p>Installer halfshaft oil seal 308-626/1</p>



Removal

- CAUTIONS:



Do not allow halfshafts to hang unsupported at one end or joint damage will occur.




Do not store or install halfshafts with joints at maximum articulation or damage may occur to the joint.



Angularly Adjusted Roller (AAR) joints, used at the inboard end of some halfshafts have no internal retaining mechanism and can separate.

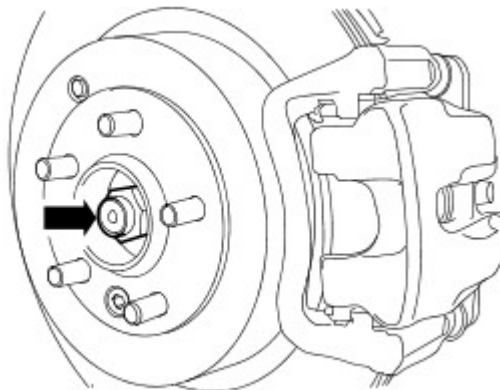


Do not undo or remove the large protruding hexagon on the differential casing.

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

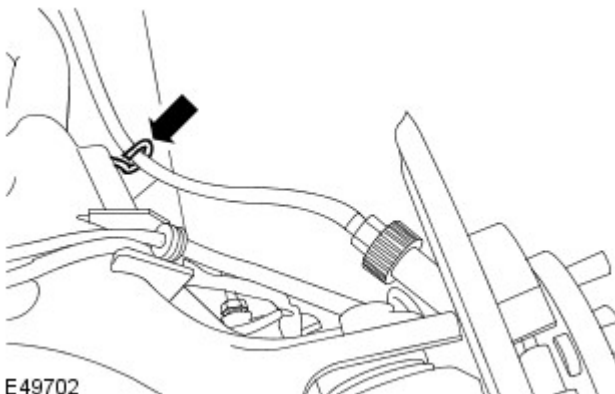
Raise and support the vehicle.

2. Drain the differential lubricant.
For additional information, refer to: [Differential Draining and Filling](#) (205-02 Rear Drive Axle/Differential, General Procedures).
3. Remove the wheel and tire.
4. Loosen the halfshaft retaining nut.
 - Discard the nut.



E46796

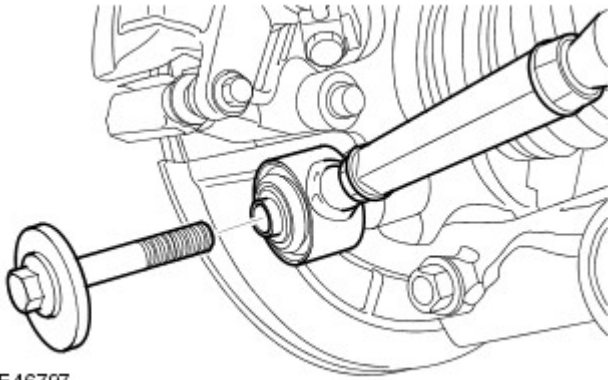
5. Remove the stabilizer bar link.
For additional information, refer to: [Rear Stabilizer Bar Link](#) (204-02 Rear Suspension, Removal and Installation).
6. Release the parking brake cable from the lower arm.



E49702


7. Disconnect the toe link.

- Remove the bolt.



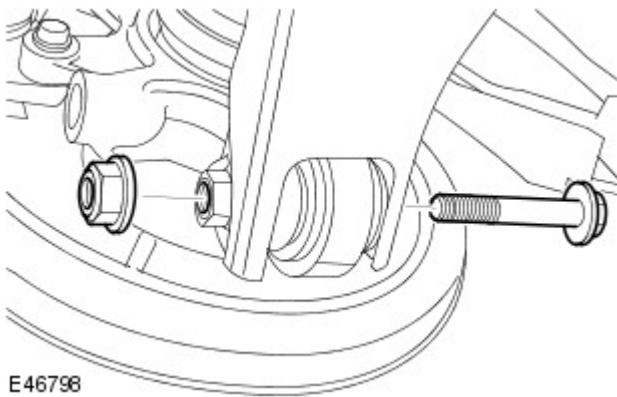
E46797

8. Remove and discard the halfshaft retaining nut.


- 9.**  **CAUTION:** Make sure the ball joint seal is not damaged. A damaged seal will lead to the premature failure of the joint.

Release the knuckle from the lower arm.

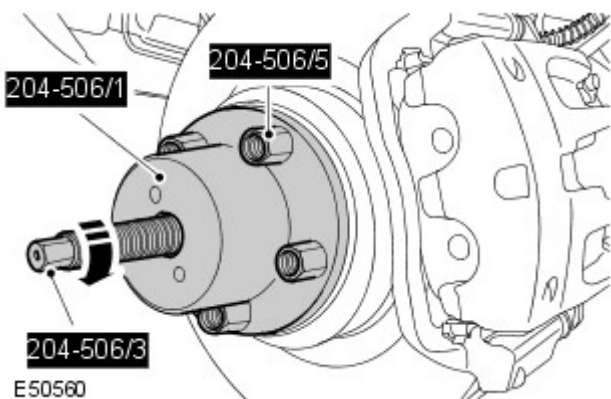
- Remove the bolt.



E46798

- 10.**  **CAUTION:** Do not use a hammer to detach the halfshaft from the hub assembly, failure to follow this instruction may result in damage to the halfshaft.

Using the special tools, release the halfshaft from the wheel hub.



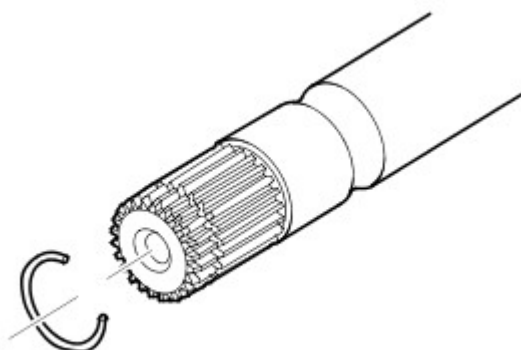
E50560

11. Position a container to collect the oil spillage.

12. Release the halfshaft from the differential housing.

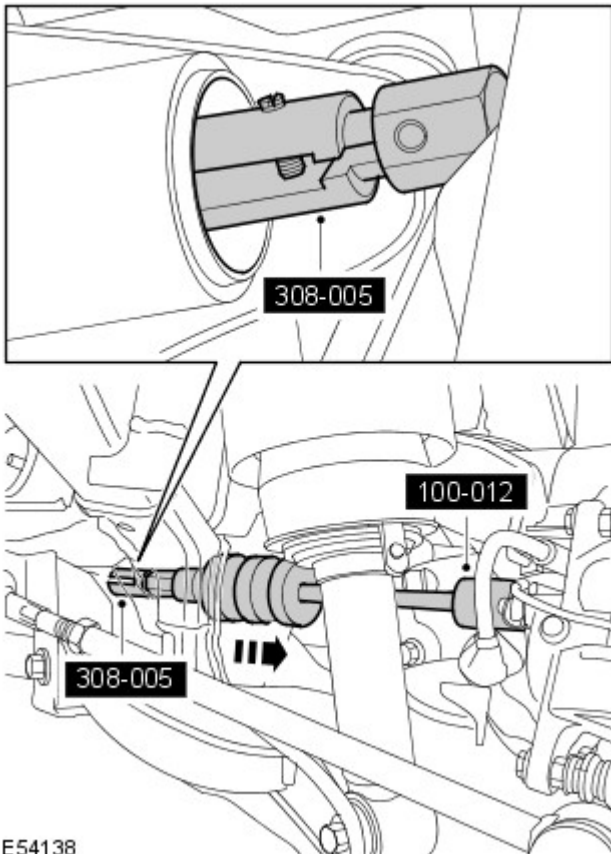
13. With assistance, remove the halfshaft.

- Remove and discard the snap ring.



E45752

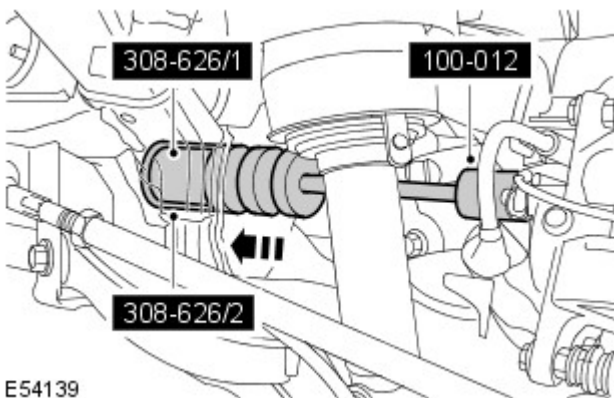
14. Using the special tools, remove and discard the halfshaft oil seal.



E54138

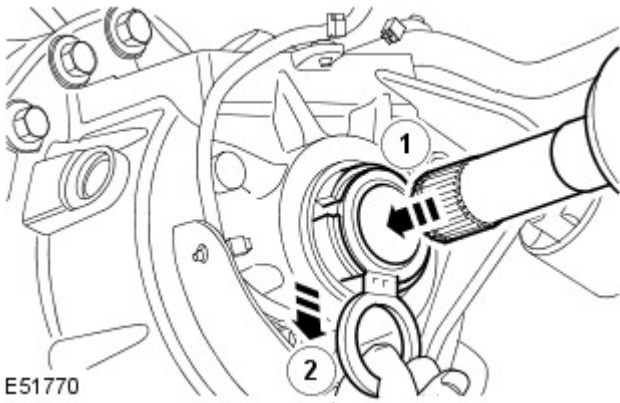
Installation

1. Clean the components.
2. Using the special tools, install a new halfshaft oil seal.
 - The halfshaft oil seal protector must be left in place, until the halfshaft is fully installed.



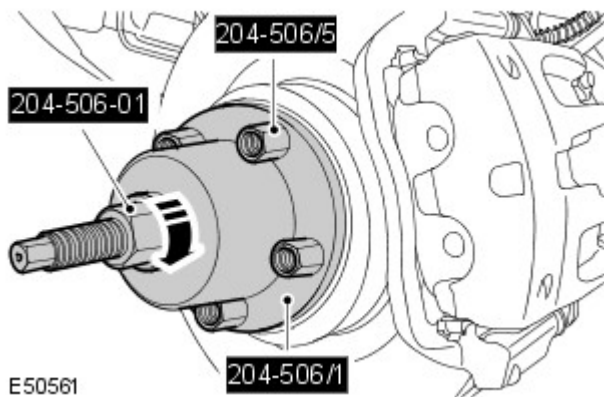
E54139

3. With assistance, install the halfshaft.
 - Install the snap ring.
 - Open the halfshaft oil seal protector.
 - Make sure the snap ring is fully engaged and retains the halfshaft.



4. NOTE: The oil seal protector is designed to break into two pieces.

Remove and discard the halfshaft oil seal protector.



5. Using the special tools, install the halfshaft in the wheel hub.

6. ⚠ CAUTION: Make sure the ball joint seal is not damaged. A damaged seal will lead to the premature failure of the joint.

Connect the lower arm to the wheel knuckle.

- Tighten to 275 Nm (203 lb.ft).
- Tighten the new nut to 275 Nm (203 lb.ft).

7. ⚠ CAUTION: Install the halfshaft nut finger tight.

Install a new halfshaft retaining nut and lightly tighten.

8. Connect the toe link.

- Tighten the bolt to 175 Nm (129 lb.ft).

9. Secure the parking brake cable to the lower arm.

10. Install the stabilizer bar link.

For additional information, refer to: [Rear Stabilizer Bar Link](#) (204-02 Rear Suspension, Removal and Installation).

11. ⚠ CAUTION: Do not use air tools to install the nut. Failure to follow this instruction may result in damage to the component.

Tighten the new halfshaft retaining nut to 350 Nm (258 lb.ft).

- Stake the nut to the halfshaft.

12. Install the wheel and tire.

- Tighten the wheel nuts to 140 Nm (103 lb.ft).

13. ⚠ CAUTION: Do not fill the differential with lubricant up to the filler plug. The filler plug is only used to fill the differential with lubricant, and not to act as a level indicator.

Fill the differential with the correct amount of lubricant.


For additional information, refer to: [Differential Draining and](#)

[Filling](#) (205-02 Rear Drive Axle/Differential, General Procedures).

Rear Drive Halfshafts - Outer Constant Velocity (CV) Joint Boot

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.

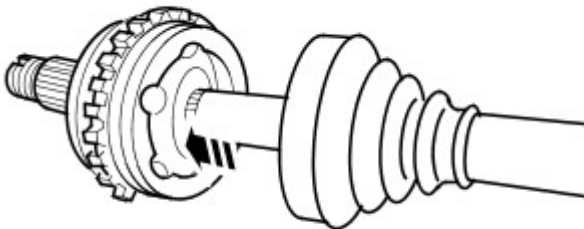
Raise and support the vehicle.

2. Remove the wheel and tire.
3. Remove the halfshaft.
For additional information, refer to: [Rear Halfshaft](#) (205-05 Rear Drive Halfshafts, Removal and Installation).
4. Clamp the halfshaft in a vise.
5. Remove and discard the CV joint boot retaining clamps.



6. Slide the CV joint boot along the halfshaft to gain access to the joint.
7. Using a drift against the inner part of the CV joint, remove the CV joint from the halfshaft.

- Remove and discard the snap ring.



E46875

8. Remove the outer CV joint boot.

Installation

1. Clean the components.
2. Install the CV joint boot.
3. Install the outer CV joint.
 - Install the snap ring.
 - Position the CV joint on the halfshaft, press the snap ring into its groove and push the CV joint fully on to the halfshaft.
 - Pull on the CV joint to ensure the snap ring has fully engaged.
4. Pack the CV joint with the grease supplied.
5. Install the CV joint boot to the CV joint.
 - Secure with the new clamps.

6. Install the halfshaft.

For additional information, refer to: [Rear Halfshaft](#) (205-05 Rear Drive Halfshafts, Removal and Installation).

7. Install the wheel and tire.

- Tighten the wheel nuts to 140 Nm (103 lb.ft).

Rear Drive Halfshafts - Inner Constant Velocity (CV) Joint Boot

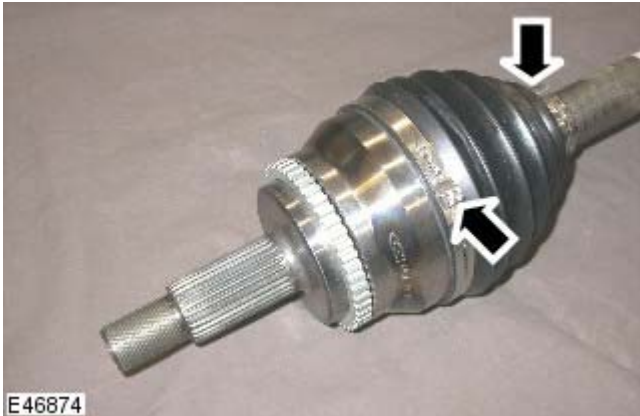
Removal and Installation

Removal

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

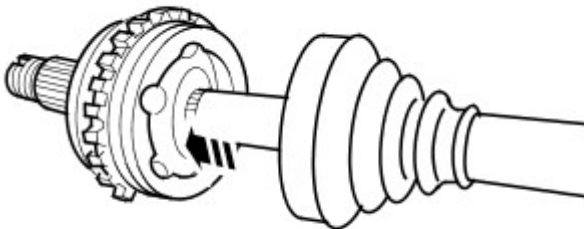
Raise and support the vehicle.

- 2.** Remove the wheel and tire.
- 3.** Remove the halfshaft.
For additional information, refer to: [Rear Halfshaft](#) (205-05 Rear Drive Halfshafts, Removal and Installation).
- 4.** Clamp the halfshaft in a vise.
- 5.** Remove and discard the CV joint boot retaining clamps.



- 6.** Slide the CV joint boot along the halfshaft to gain access to the joint.
- 7.** Using a drift against the inner part of the CV joint, remove the CV joint from the halfshaft.

- Remove and discard the snap ring.



E46875

- 8.** Remove the inner CV joint boot.

Installation

- 1.** Clean the components.
- 2.** Install the inner CV joint boot.
- 3.** Install the inner joint.
 - Install a new snap ring.
 - Position the CV joint on the halfshaft, press the snap ring into its groove and push the CV joint fully on to the halfshaft.
 - Pull on the CV joint to ensure the snap ring has fully engaged.
- 4.** Pack the joint with the grease supplied.
- 5.** Install the boot to the joint.
 - Secure with the new clamps.

6. Install the halfshaft.




For additional information, refer to: [Rear Halfshaft](#) (205-05 Rear Drive Halfshafts, Removal and Installation).

7. Install the wheel and tire.


- Tighten the wheel nuts to 140 Nm (103 lb.ft).

Rear Drive Halfshafts - Halfshaft Bearing

Removal and Installation

Special Tool(s)	
 <p>308-005</p> <p>E54134</p>	<p>Axle oil seal remover 308-005 (LRT-37-004/2)</p>
 <p>100-012</p> <p>E54135</p>	<p>Impulse extractor 100-012 (LRT-99-004)</p>
 <p>205-819</p> <p>E54141</p>	<p>Halfshaft bearing installer 205-819</p>

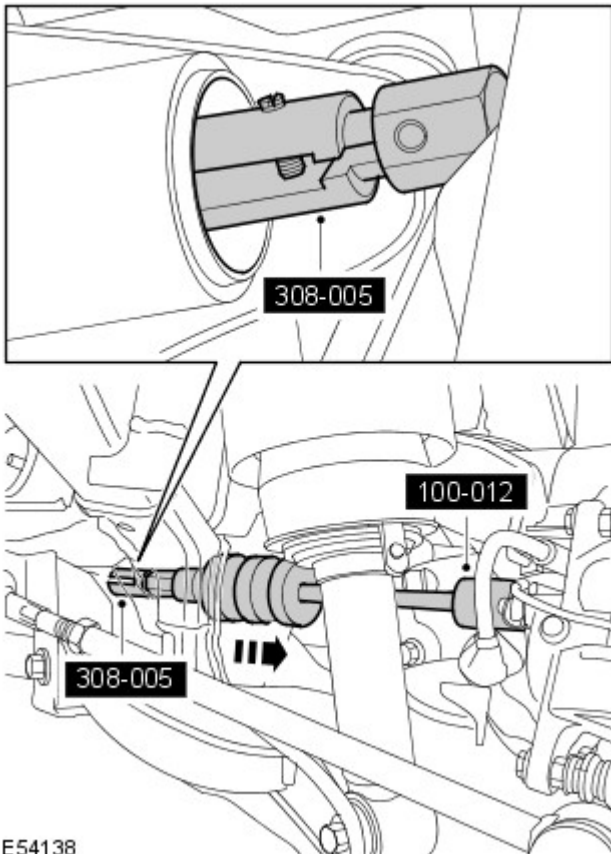
Removal

-  **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.

- Remove the wheel and tire.
- Remove and discard the halfshaft oil seal.
For additional information, refer to: [Rear Halfshaft](#) (205-05 Rear Drive Halfshafts, Removal and Installation).

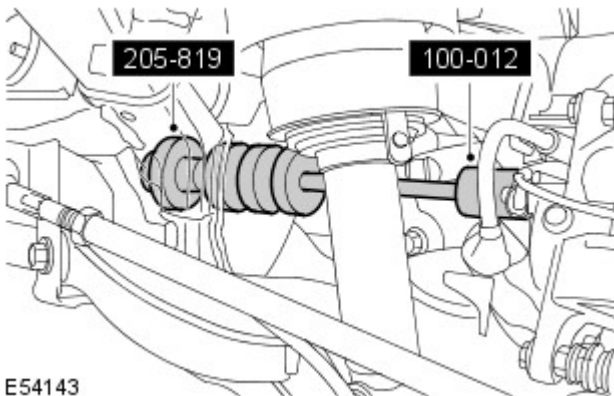
- Using the special tool, remove and discard the halfshaft bearing.



E54138

Installation

- Using the special tools, install a new halfshaft bearing.



E54143

- Install a new halfshaft oil seal.
For additional information, refer to: [Rear Halfshaft](#) (205-05 Rear Drive Halfshafts, Removal and Installation).
- Install the wheel and tire.
 - Tighten the wheel nuts to 140 Nm (103 lb.ft).