REAR DRIVE AXLE/DIFFERENTIAL

SPECIFICATIONS

General Specifications

VIN CODE (VIN POSITION 4)	DESCRIPTION	DIFFERENTIAL FITMENT	RATIO
60	Coupe ST1	Open differential	3.15: 1
61	Coupe ST2	Limited slip differential (LSD)	3.31: 1
63	Coupe ST4	Electronic torque managed (ETM)	2.56: 1
64	Convertible ST1	Open differential	3.15: 1
65	Convertible ST2	Limited slip differential (LSD)	3.31: 1
66	Convertible ST3	Electronic torque managed (ETM)	2.56: 1

Lubricants, Capacities

ENGINE TYPE	OIL	DRY FILL (LITERS)	WET FILL (LITERS)
Vehicles with 3.0L petrol (340 PS)	SAFXO	0.84 - 0.86	0.815 - 0.835
Vehicles with 3.0L petrol (360 PS)	BOT720	0.84 - 0.86	0.815 - 0.835
Vehicles with 5.0L petrol	BOT720	1.24 - 1.26	1.200 - 1.220

Torque Specifications

ITEM	NM	LB-FT	LB-IN
Differential flange to driveshaft flange - nuts/bolts*	73	54	-
Differential flange to pinion shaft - nut*	A**	-	-
Differential front mounting - bolt*	90	66	-
Differential rear mounting - bolt*	163	120	-

NOTE: **A = refer to the procedure for correct torque sequence.**

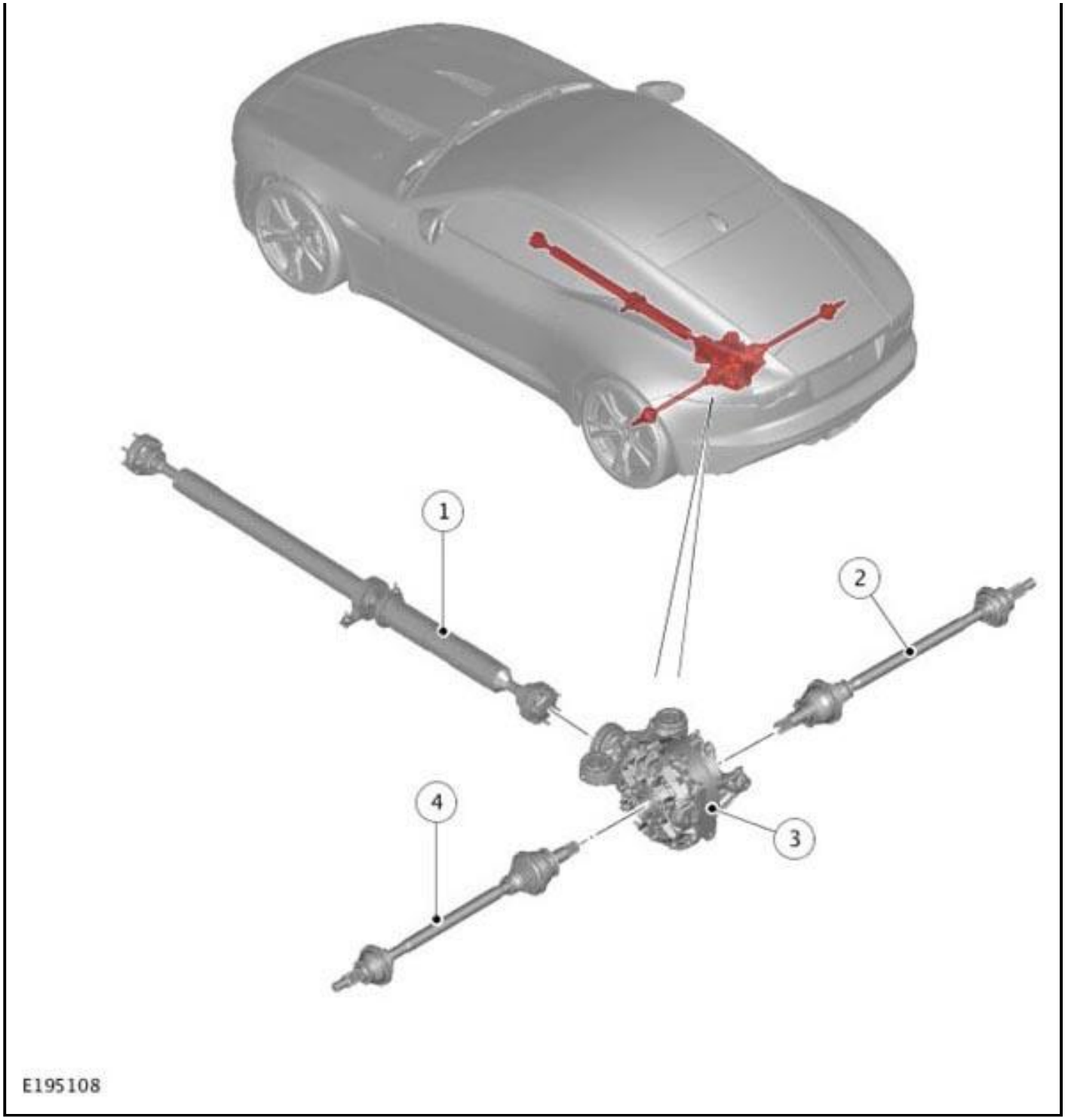
* New nut/bolt must be installed.

DESCRIPTION AND OPERATION

COMPONENT LOCATION

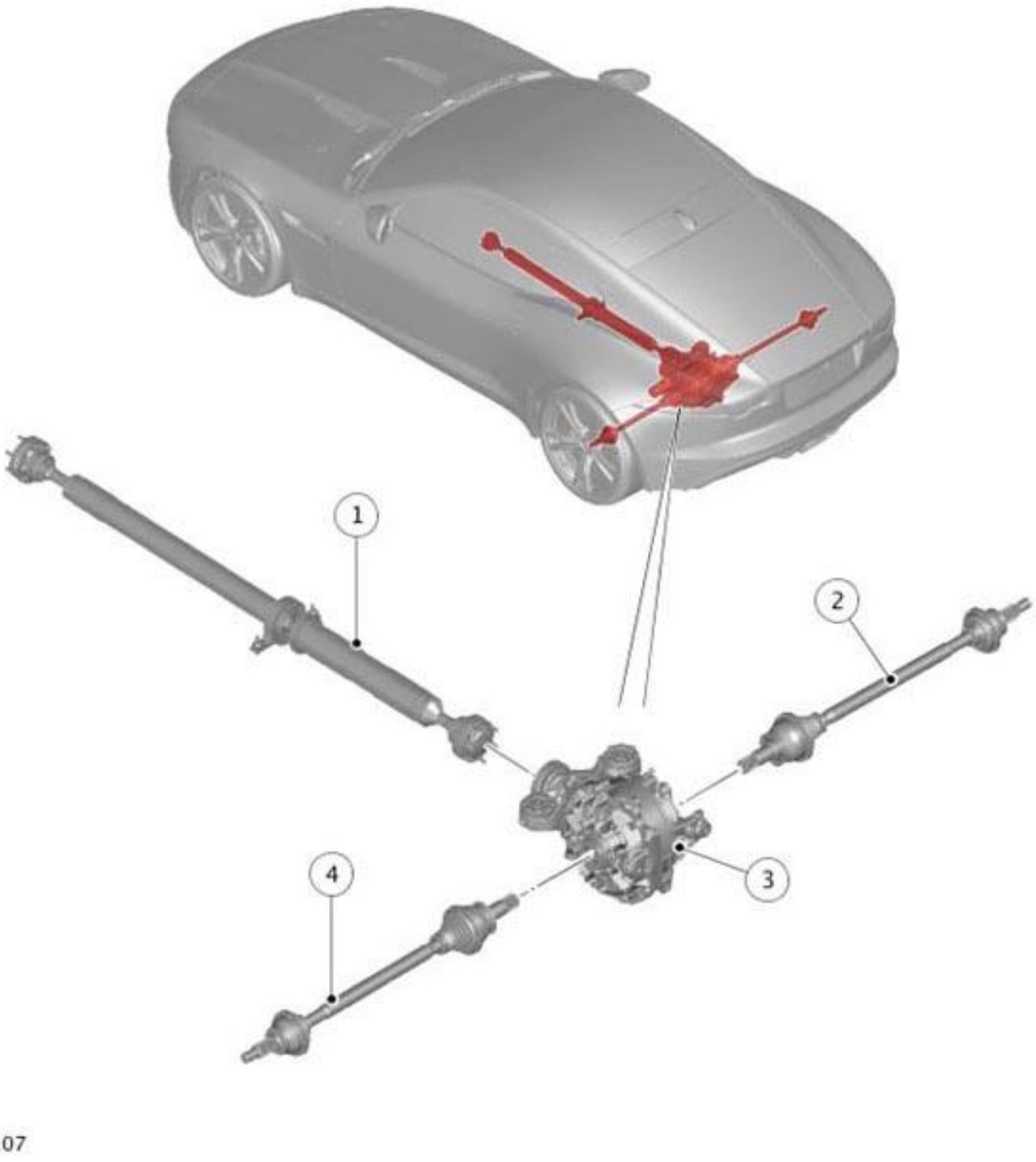
COMPONENT LOCATION - 1 OF 3 - REAR DIFFERENTIAL

NOTE: **Coupe installation shown, convertible installation is similar.**



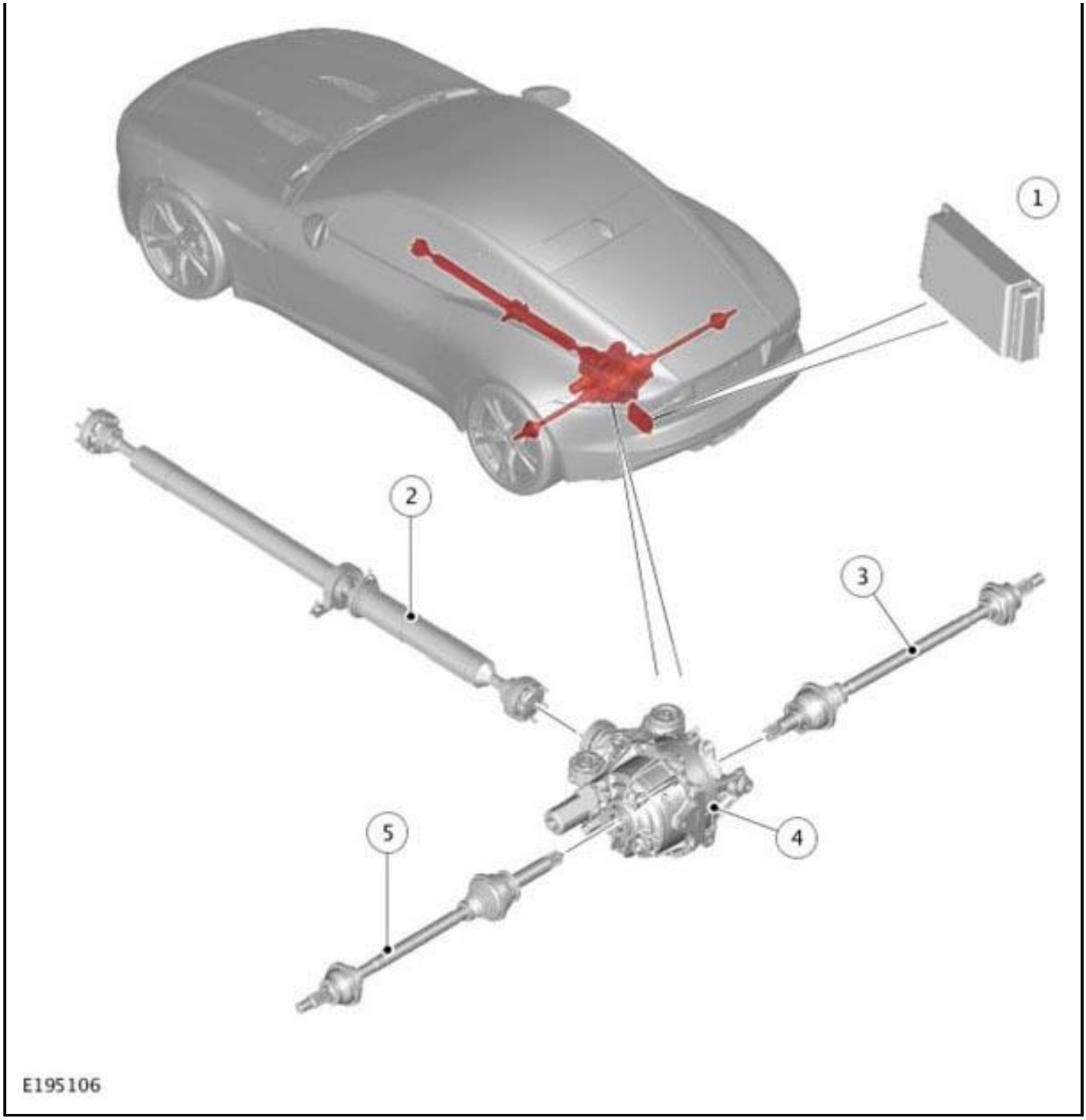
ITEM	DESCRIPTION
1	Rear driveshaft
2	Right halfshaft
3	Rear differential
4	Left halfshaft

COMPONENT LOCATION - 2 OF 3 - REAR LIMITED SLIP DIFFERENTIAL



ITEM	DESCRIPTION
1	Rear driveshaft
2	Right halfshaft
3	Rear Limited Slip Differential (LSD)
4	Left halfshaft

COMPONENT LOCATION - 3 OF 3 - ELECTRIC REAR DIFFERENTIAL



ITEM	DESCRIPTION
1	Rear Differential Control Module (RDCM)
2	Rear driveshaft
3	Right halfshaft
4	Rear electric differential
5	Left halfshaft

INTRODUCTION

The rear differential has two functions:

- Convert the 'angle of drive' through 90Â° and distribute drive, via the rear drive halfshafts, to the rear wheels.

- Compensate for differences in the rotational speeds of the vehicle's rear wheels during cornering.

Three types of differentials are installed on the vehicles:

- Rear differential is only available with 2.0L I4 Petrol 310PS and 3.0L V6 S/C 340PS engine variants.
- Rear Limited Slip Differential (LSD) is only available with 3.0L V6 S/C 400PS engine variants.
- Rear electric differential is only available with 5.0L V8 S/C 550PS and 575PS engine variants.

All types of differential are attached to the rear subframe at four mounting points. Each mounting point incorporates an insulator to reduce the Noise, Vibration and Harshness (NVH). The insulators in the forward mounting points are installed in the differential. The insulators in the rear mounting points are installed in the rear subframe.

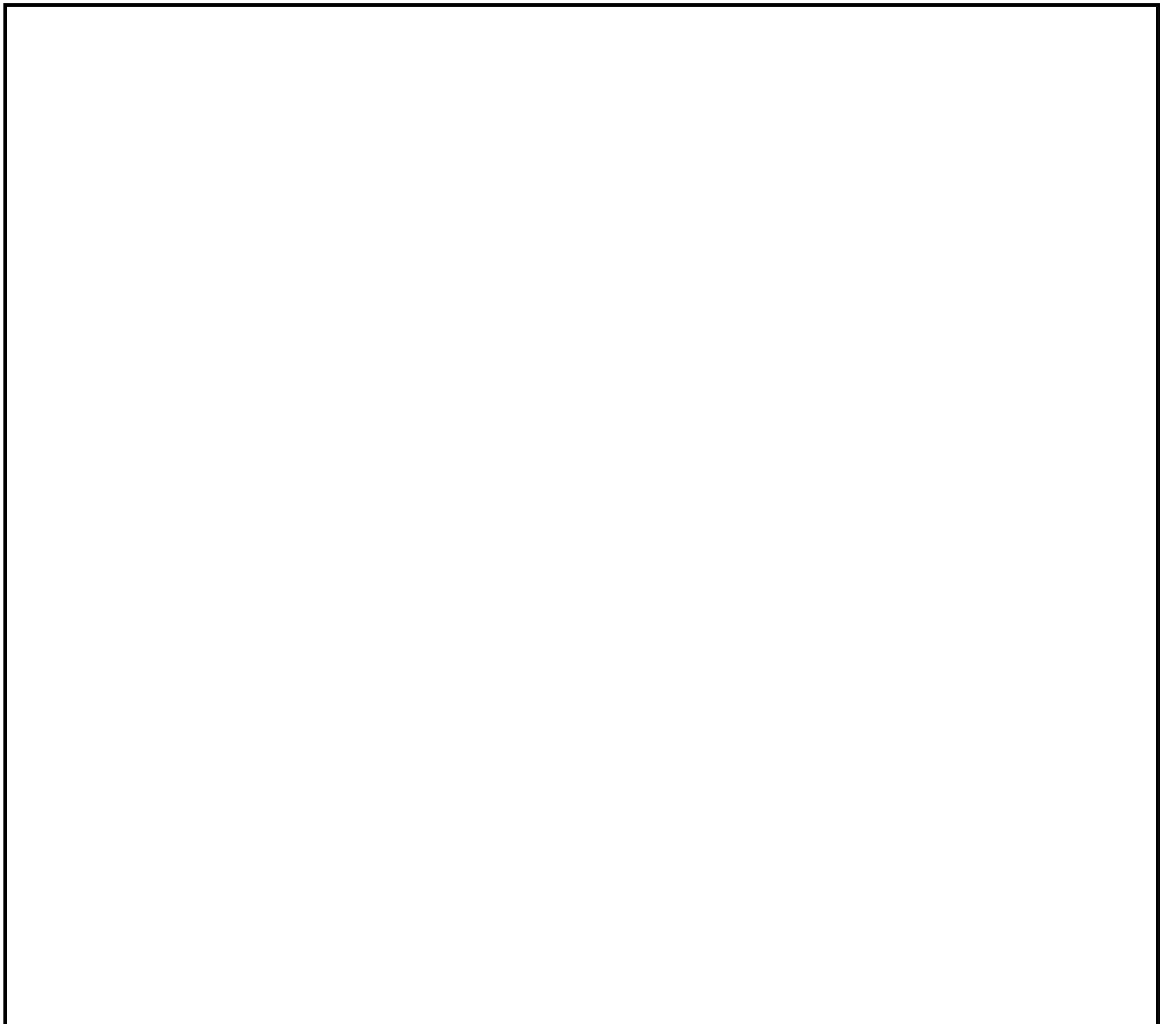
The output ratio of the rear differential varies depending on the engine variant.

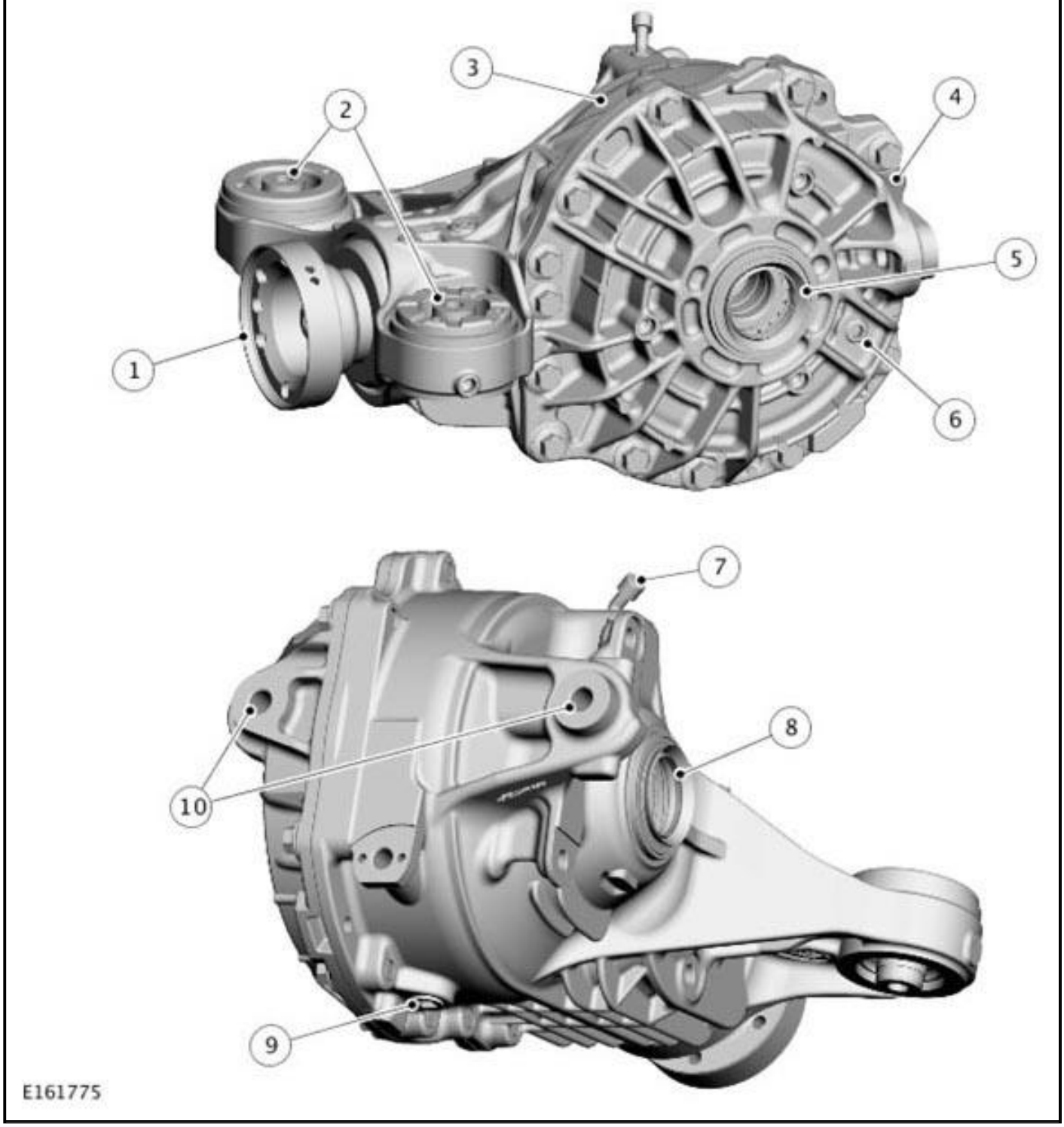
For additional information, refer to: **Specifications** (Specifications).

DESCRIPTION

REAR DIFFERENTIAL

Rear Differential External View





ITEM	DESCRIPTION
1	Input flange
2	Front mounting points with insulators
3	Carrier
4	Cover
5	Left rear drive halfshaft oil seal
6	Filler/Level plug
7	Breather stub
8	Right rear drive halfshaft oil seal
9	Magnetic drain plug

ITEM	DESCRIPTION
10	Rear mounting points

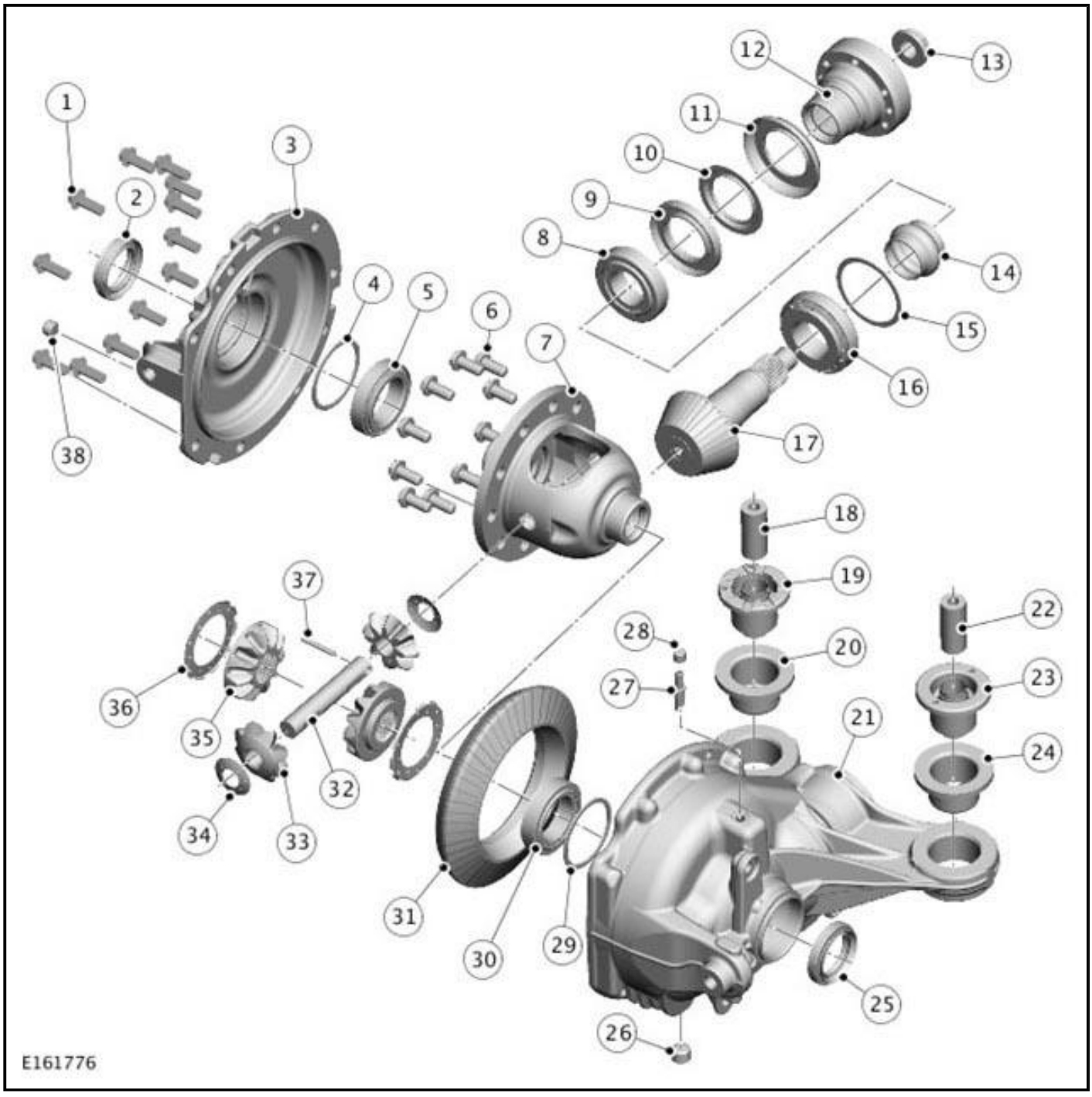
The open differential is a conventional design using a hypoid gear layout. The final drive ratio is 3.31:1.

The aluminum casing comprises two parts:

- Cover
- Carrier.

The carrier provides locations for all the internal components. The cover is sealed to the carrier with recommended sealant and secured with bolts. The cover and carrier have cast fins, which assist rigidity and cooling. A breather cap is fitted to the top of the carrier.

Exploded View of Open Differential



ITEM	DESCRIPTION
1	Bolt (12 off)
2	Oil seal
3	Cover
4	Shim
5	Bearing assembly
6	Bolt (10 off)
7	Differential case
8	Bearing assembly
9	Oil seal
10	Oil slinger inner
11	Oil slinger outer
12	Input flange
13	Pinion nut
14	Collapsible spacer
15	Shim
16	Bearing assembly
17	Pinion shaft
18	Left mounting insulator inner
19	Left mounting insulator rubber
20	Left mounting insulator outer
21	Carrier
22	Right mounting insulator inner
23	Right mounting insulator rubber
24	Right mounting insulator outer
25	Oil seal
26	Drain plug
27	Breather tube
28	Breather cap
29	Shim
30	Bearing assembly
31	Drive gear
32	Shaft
33	Planet gear (2 off)
34	Thrust washer (2 off)
35	Sun gear (2 off)
36	Spacer (2 off)
37	Roll pin
38	Fill/Level plug

The rear differential is a conventional design using a hypoid gear layout.

The rear differential contains a quantity of oil for splash lubrication of the internal components. A magnetic drain plug is installed in the bottom of the carrier and a filler/level plug is installed in the cover.

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 carrier and secured with bolts. The differential carrier is mounted on taper roller bearings located in machined bores in the carrier and the cover. Shims are installed behind the

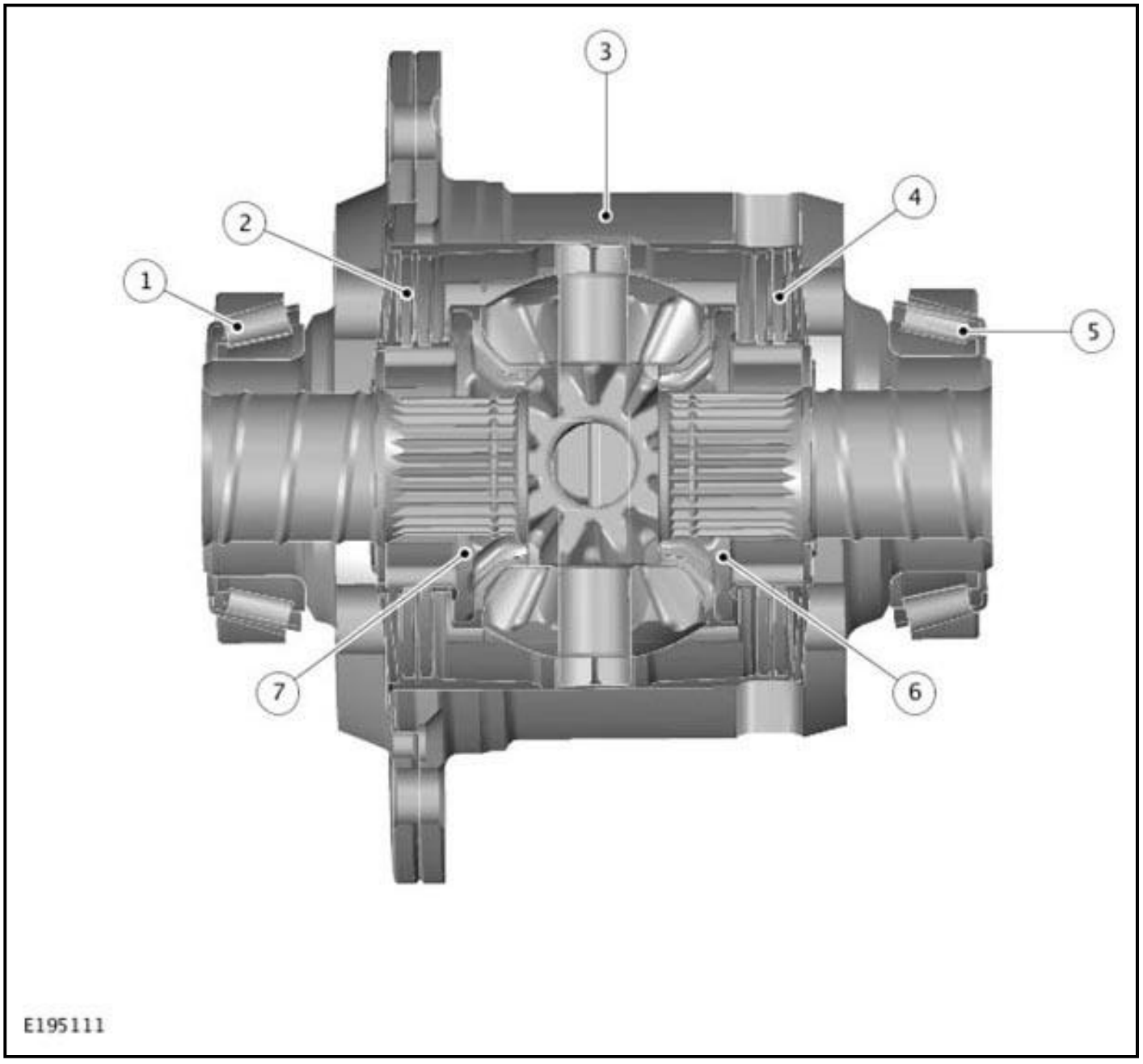
bearing cups to apply the correct bearing preload and hypoid backlash.

The differential carrier has a through hole, which provides location for a cross shaft. The planet gears are installed on the cross shaft, with thrust washers between the planet gears and the differential carrier. A roll pin locks the cross shaft to the differential carrier.

The sun gears are located in pockets in the differential carrier and mesh with the planet gears. Belville washers are fitted between the sun gears and the differential carrier and set the correct mesh contact between the planet gears and the sun gears. Each sun gear has a machined bore with internal splines and a machined groove. The splines transfer drive to the rear drive halfshafts. The groove provides positive location for the snap ring fitted to the inboard end of the rear drive halfshafts.

Oil seals are installed in the carrier and the cover to seal the rear drive halfshafts.

LIMITED SLIP DIFFERENTIAL



ITEM	DESCRIPTION
1	Left differential case bearing

ITEM	DESCRIPTION
2	Left multi-plate clutch
3	Differential case
4	Right multi-plate clutch
5	Right differential case bearing
6	Right sun gear
7	Left sun gear

The Limited Slip Differential (LSD) has the same functionality as the rear differential, but it also incorporates a locking and torque biasing function to give improved traction performance and vehicle dynamic stability.

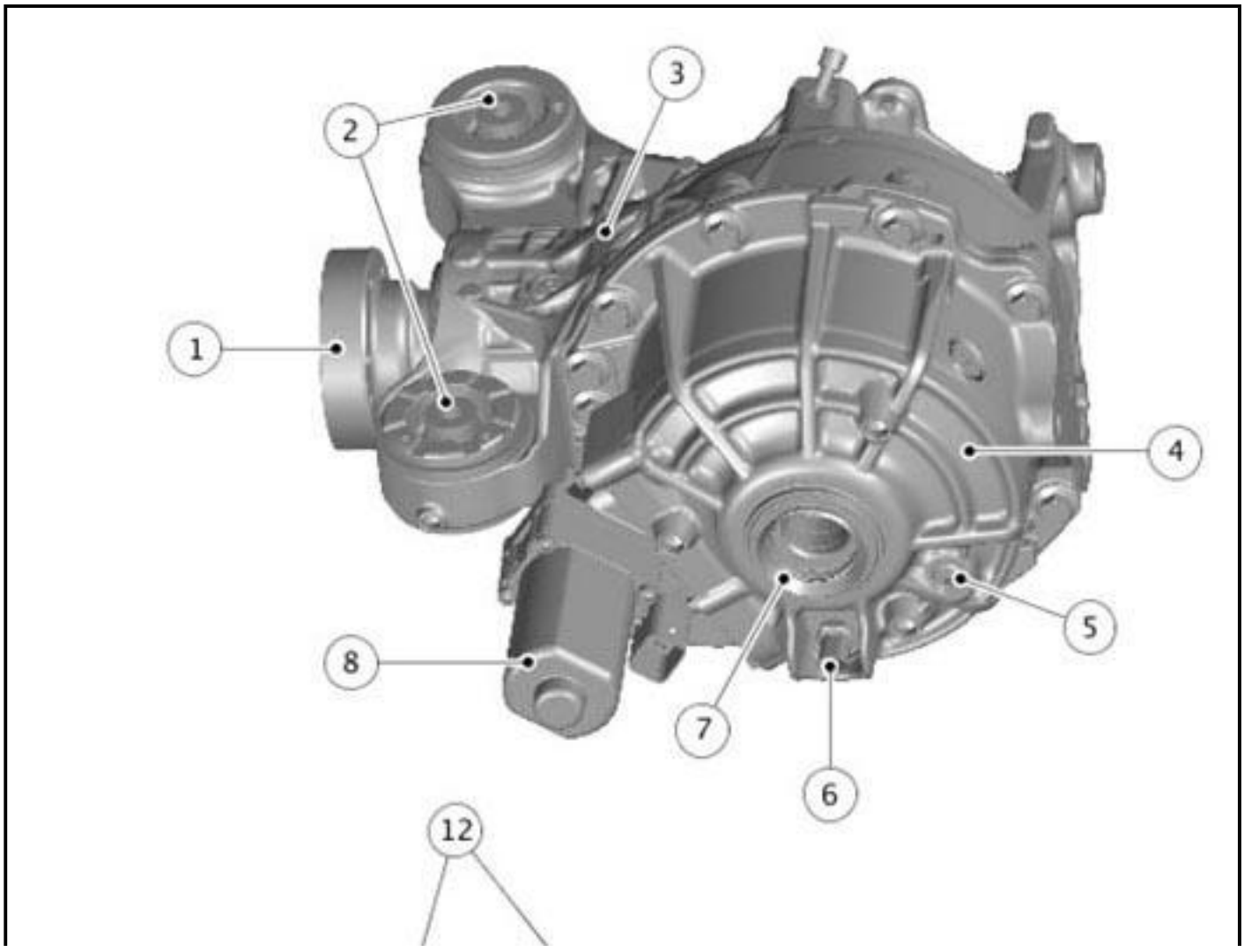
The basic construction of the LSD is similar to the rear differential.

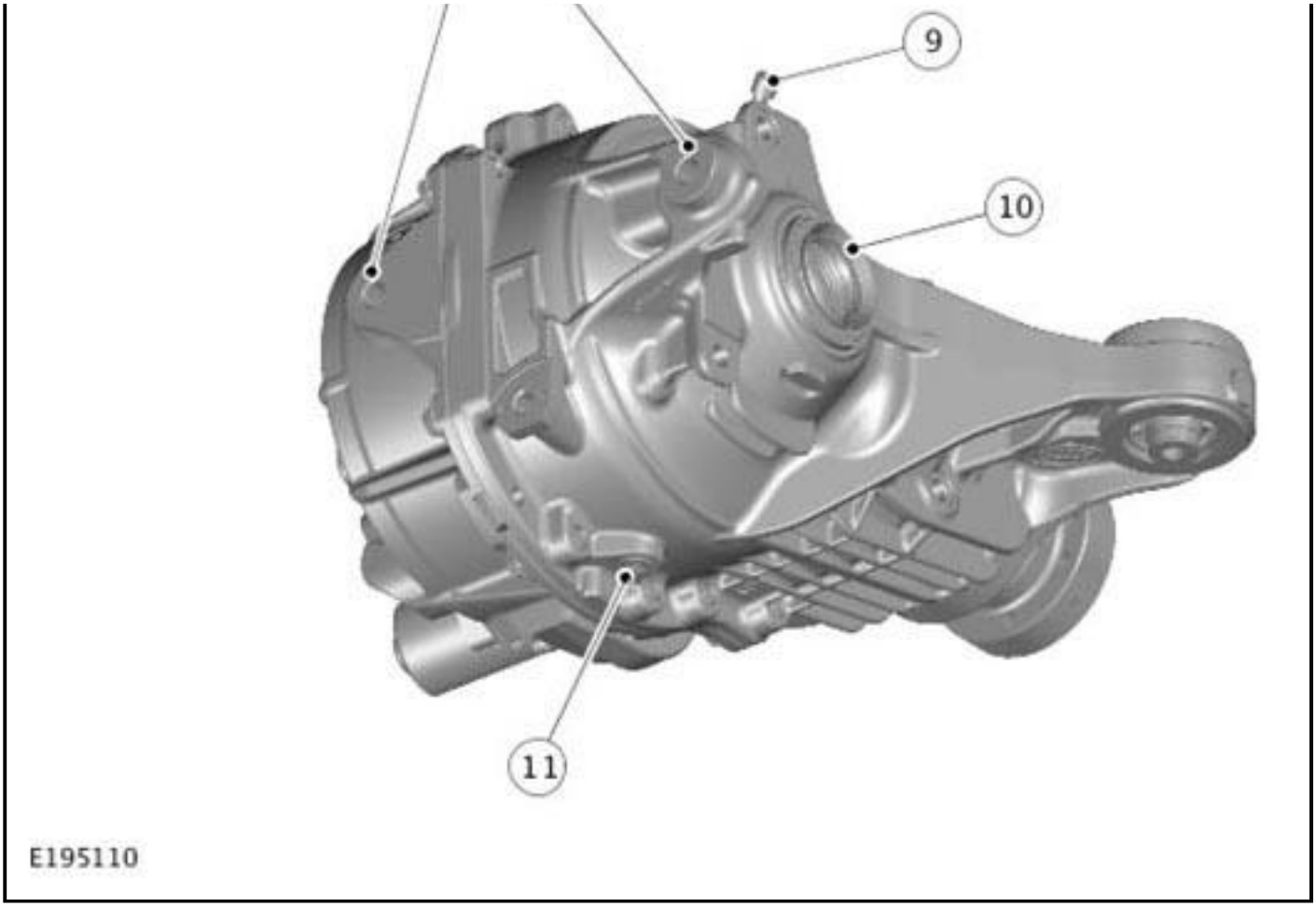
The LSD has the following parts additional:

- Two additional planet gears in the differential case, to cater for the higher torque.
- A multi-plate clutch is installed on both sun gears.

The LSD contains a multi-plate clutch on each side. The multi-plate clutches are in the differential case. Each multi-plate clutch contains two steel plates, two clutch plates and a disc spring. The steel plates are connected to the differential case and the clutch plates are connected to the sun gears. The disc springs are preloaded between the differential case and the planet gear carrier.

REAR ELECTRIC DIFFERENTIAL





ITEM	DESCRIPTION
1	Input flange
2	Front mounting points with insulator assemblies
3	Carrier
4	Cover
5	Filler/Level plug
6	Differential oil temperature sensor
7	Left drive halfshaft oil seal
8	Differential locking motor
9	Breather stub
10	Right drive halfshaft oil seal
11	Magnetic drain plug
12	Rear mounting points

The rear electric differential has the same functionality as the rear differential. The rear differential also incorporates a locking and torque biasing function to give improved traction performance and vehicle dynamic stability. Operation of the rear electric differential is controlled by the Rear Differential Control Module (RDCM).

The basic construction of the rear electric differential is similar to the rear differential.

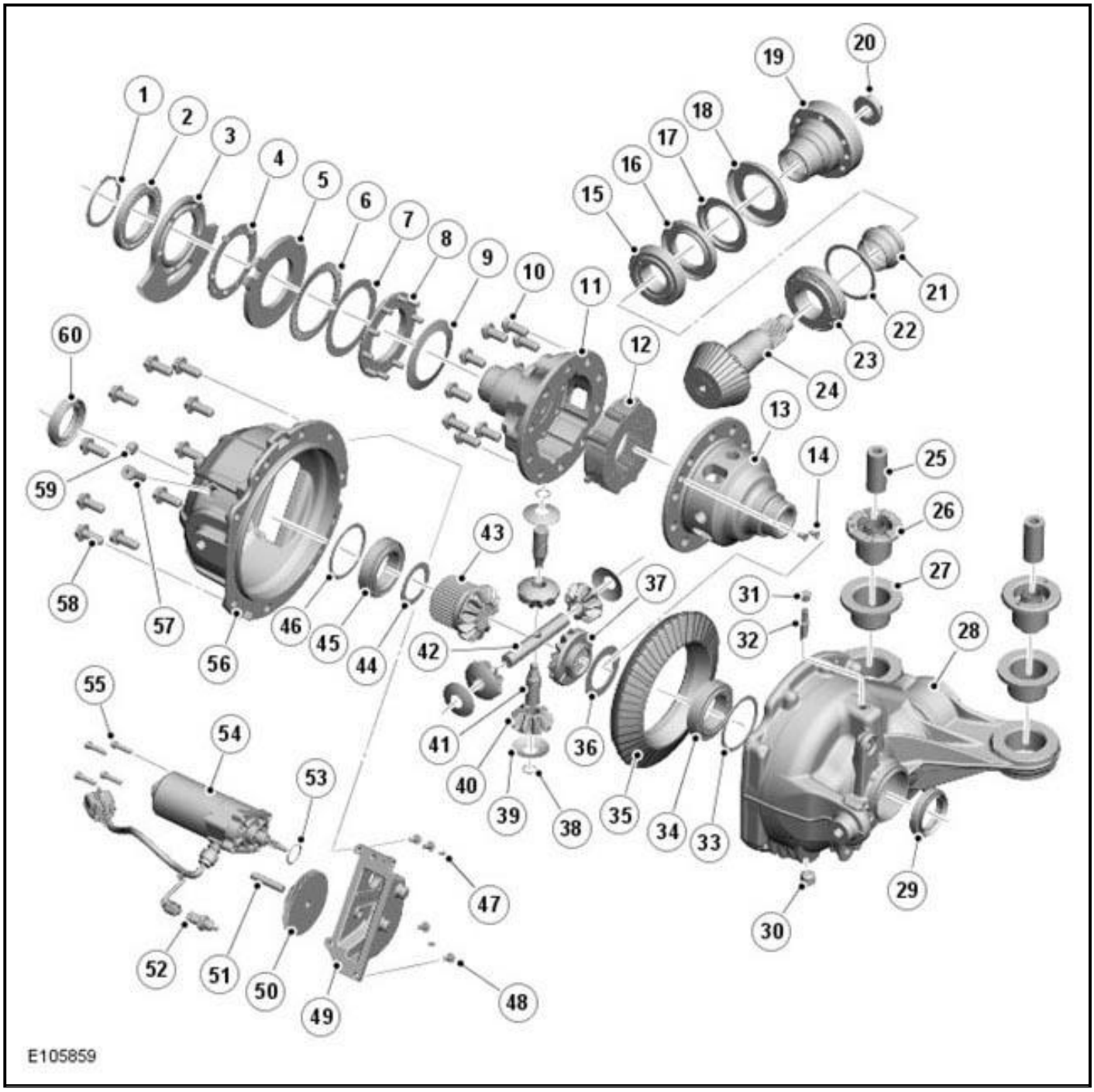
The rear electric differential has the following parts additional:

- Two additional planet gears in the differential case, to cater for the higher torque of the supercharged engine.
- A multi-plate clutch and actuator assembly installed on the left-hand sun gear.
- A differential locking motor and reduction gearbox, attached to the cover.

- An oil temperature sensor installed in the cover.

The RDCM operates the differential locking motor under the control of the Chassis Control Module (CHCM).

Exploded View of Electric Rear Differential



ITEM	DESCRIPTION
1	Circlip
2	Bearing assembly
3	Input actuator
4	Actuator balls
5	Output actuator
6	Thrust race
7	Shim

ITEM	DESCRIPTION
8	Thrust plate
9	Dished washer
10	Bolt (10 off)
11	Clutch basket
12	Multi-plate clutch and pressure disc
13	Differential case
14	Screw (2 off)
15	Bearing assembly
16	Oil seal
17	Oil slinger inner
18	Oil slinger outer
19	Input flange
20	Pinion nut
21	Collapsible spacer
22	Shim
23	Bearing assembly
24	Pinion shaft
25	Mounting insulator inner (2 off)
26	Mounting insulator rubber (2 off)
27	Mounting insulator outer (2 off)
28	Carrier
29	Oil seal
30	Drain plug
31	Breather tube
32	Breather cap
33	Shim
34	Bearing assembly
35	Drive gear
36	Shim
37	Right sun gear
38	Circlip
39	Thrust washer (4 off)
40	Planet gear (4 off)
41	Pin (2 off)
42	Shaft
43	Left sun gear
44	Shim
45	Bearing assembly
46	Shim
47	Dowel (2 off)
48	Bolt (4 off)
49	Reduction gear casing
50	Reduction gear
51	Shaft
52	Temperature sensor
53	O-ring seal
54	Motor

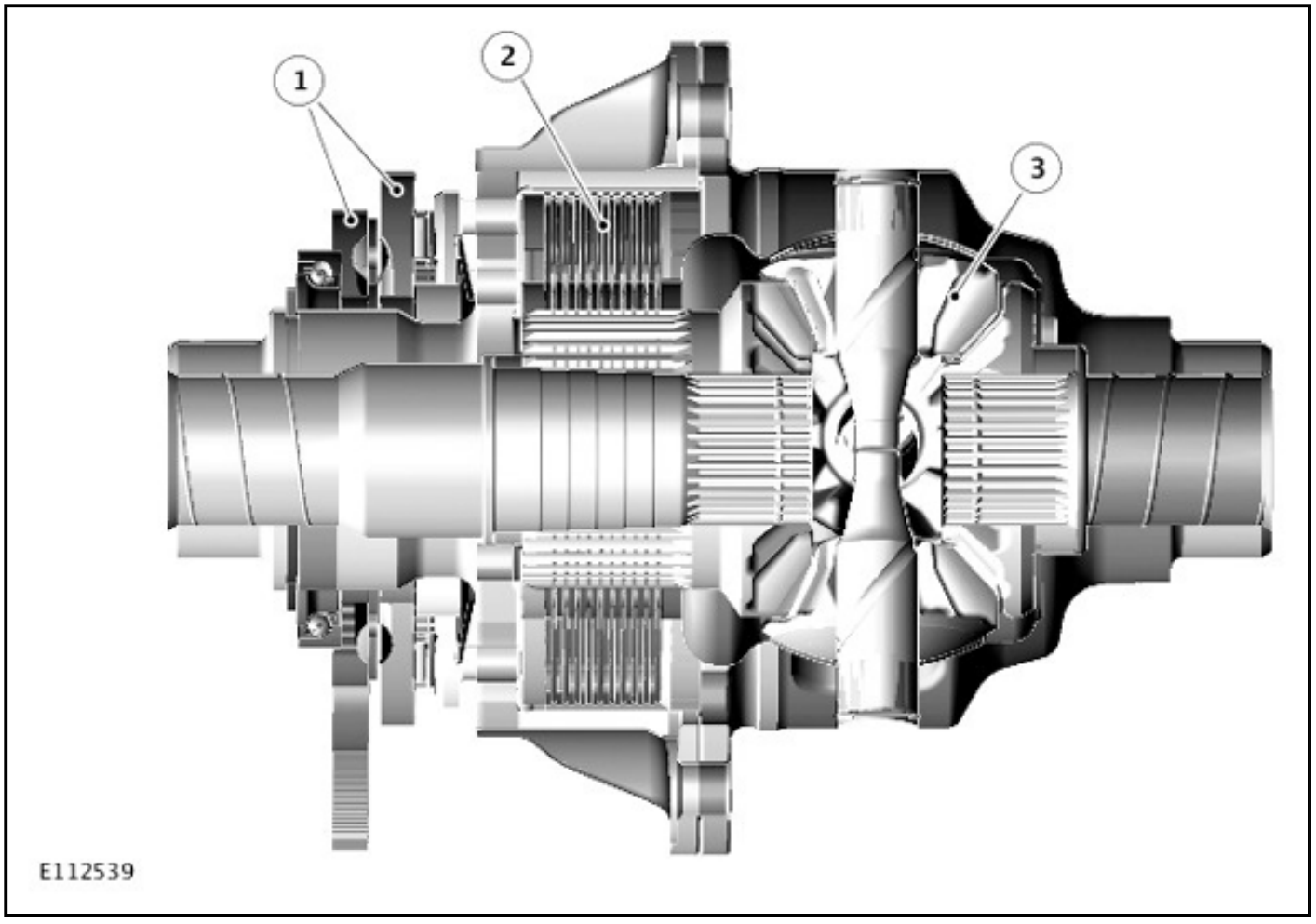
ITEM	DESCRIPTION
55	Screw (4 off)
56	Cover
57	Output actuator locking pin
58	Bolt (9 off)
59	Filler/Level plug
60	Oil seal

The multi-plate clutch is contained in a clutch basket attached to the differential case with the drive gear securing bolts. Alternate plates of the clutch pack are keyed to the clutch basket and the left sun gear.

A pressure disc is installed on the outer end of the clutch pack and keyed to the clutch basket. A thrust plate on the end of the clutch basket incorporates lugs which extend through the clutch basket onto the pressure disc.

The actuator assembly is mounted on bearings on the outboard end of the clutch basket, against the thrust race. The actuator assembly consists of input and output actuators separated by five ball bearings. A locking pin in the cover engages with a slot in the output actuator to prevent it turning, but allow it to move axially. The input actuator engages with the reduction gearbox and is free to rotate relative to the cover. Ball bearings locate in curved grooves in the mating faces of the input and output actuators. The bottom surface of each groove incorporates a ramp. Rotation of the input actuator forces the ball bearings up the ramps in the grooves and induces an axial movement in the output actuator. The thrust race and pressure disc transfer the axial movement from the output actuator to the clutch pack.

Section Through Multi-plate Clutch



ITEM	DESCRIPTION
1	Actuator

ITEM	DESCRIPTION
2	Multi-plate clutch
3	Differential

The differential locking motor is a 12 V Direct Current (DC) motor that adjusts the frictional loading of the multi-plate clutch via the reduction gearbox and the actuator assembly. The RDCM controls the differential locking motor via hardwired connections. Adjusting the frictional loading of the multi-plate clutch adjusts the locking torque between the crown wheel drive gear and the sun gear.

Four bolts attach the motor to the reduction gearbox, which is located in position on the cover with two dowels, and secured with four bolts. An O-ring seals the joint between the motor and the reduction gearbox.

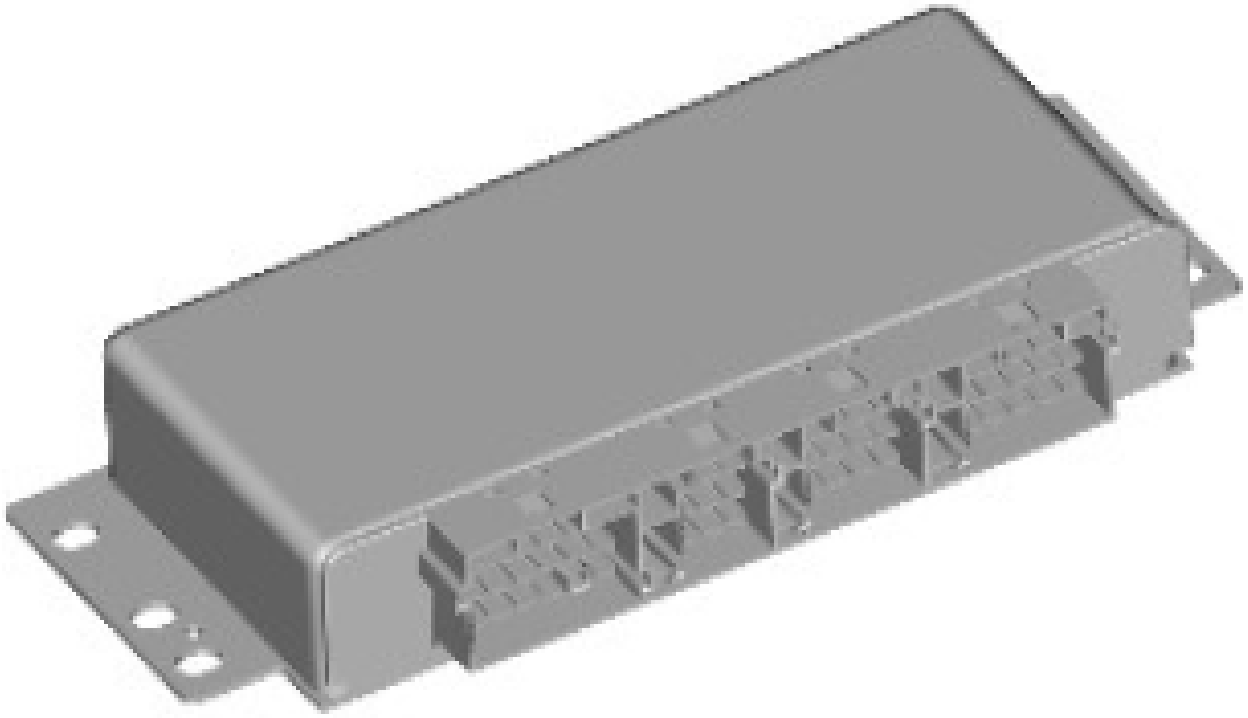
The motor is driven by a 12 V feed from the RDCM.

The differential locking motor also incorporates the following connections with the RDCM:

- A motor temperature sensor, to prevent excessive use from damaging the motor.
- Two hall effect motor position sensors, to enable closed loop control of the motor.

The temperature sensor provides a differential oil temperature signal to the RDCM, to prevent excessive use from damaging the multi-plate clutch.

REAR DIFFERENTIAL CONTROL MODULE



The RDCM controls the operation of the motor on the electric differential. The RDCM is attached to a bracket located on the left side of the luggage compartment, below the floor trim.

The RDCM receives power supply from the Rear Junction Box (RJB) and an ignition feed from the Body Control Module/Gateway Module (BCM/GWM) assembly. A connection with the High Speed (HS) Controller Area Network (CAN) powertrain systems bus allows the RDCM to communicate with other systems on the vehicle.

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 Brake System (ABS) control module. The CHCM monitors the driver's demands through primary vehicle controls and automatically sets the slip torque in the differential. The system is completely automatic and does not require any special driver input.

The differential strategy in the RDCM includes:

- A pre-loading function, increasing locking torque with increased driving torque.
- A slip controller to decrease locking torque for optimum comfort, for example when parking.

The RDCM memorizes the position of the motor when the ignition is switched off.

The RDCM also sends messages via the HS CAN powertrain systems bus to inform other control modules on the network the status of the electric differential. The clutch torque and default mode status are some of the main signals sent out by the RDCM.

If the RDCM or CHCM are replaced, a Jaguar approved diagnostic tool must be connected to the vehicle and the differential self-calibration procedure must be performed. This procedure must also be performed if the differential locking motor or the electric differential is replaced.

If a fault occurs with the rear electric differential, the CHCM, the RDCM, or one of the required input signals, the CHCM records a Diagnostic Trouble Code (DTC). When a DTC is recorded, a warning displays in the message center. The message center is in the middle of Instrument Cluster (IC).

OPERATION

REAR DIFFERENTIAL

Rotational input from the driveshaft 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 90Â°.

The transferred rotational motion is now passed to the drive gear, which in turn rotates the differential case. The planet gears rotate with the differential case and transfer rotational motion to the left and right sun gears, which rotate the rear drive halfshafts.

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

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 gears. The planet gears rotate on their shaft to allow the outer wheel to rotate faster than the inner one.

LIMITED SLIP DIFFERENTIAL (LSD)

The multi-plate clutches prevent excessive differential slip and therefore maximizes the traction performance of the vehicle. This is fundamentally different from 'braked' traction control systems, which can only counteract differential slip when it occurs.

The multi-plate clutches actively control the torque flow through the differential and optimizes the torque distribution in the driveline. The clutches distribute the torque from the differential to the wheel with the higher grip and prevents the wheel with the lower grip from spinning. The system is completely automatic and does not require any special driver input.

ELECTRIC REAR DIFFERENTIAL

The multi-plate clutch prevents excessive differential slip and therefore maximizes the traction performance of the vehicle. This is fundamentally different from 'braked' traction control systems, which can only counteract 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 Brake System (ABS) system. The Rear Differential Control Module (RDCM) monitors the driver's demands through primary vehicle controls and automatically sets the slip torque in the differential. The system is completely automatic and does not require any special driver input.

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

The differential strategy in the RDCM includes:

- A pre-loading function, increasing locking torque with increased driving torque.
- A slip controller to decrease locking torque for optimum comfort, e.g. parking.

The RDCM memorizes the position of the motor when the ignition is switched off.

The RDCM uses the High Speed (HS) Controller Area Network (CAN) powertrain systems bus messages include:

- the wheel speed
- the steering angle
- the automatic transmission speed
- the temperature information
- the car configuration
- the axle ratios and mode inputs

The RDCM also sends messages via the HS CAN powertrain systems bus to tell other control modules on the network the status of the electric differential. The clutch torque and default mode status are some of the main signals sent out by the RDCM.

If the RDCM is replaced, a Jaguar approved diagnostic system must be connected to the vehicle and the differential self-calibration procedure must be performed. This procedure must also be performed if the motor or electric differential is replaced.

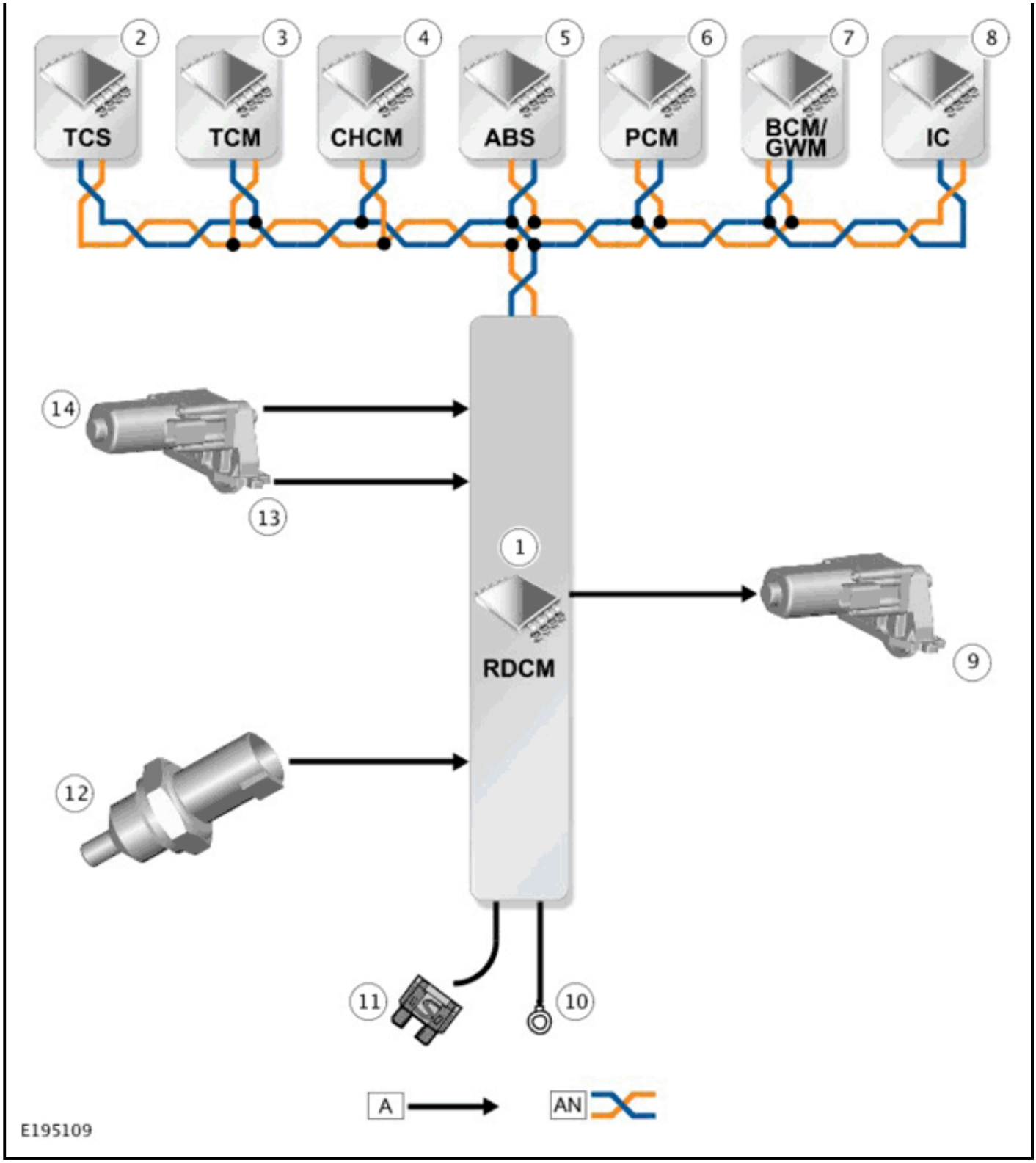
If a fault occurs with the electric differential, the RDCM, or one of the required input signals, the RDCM records an error code and displays a warning in the message center.

The following messages can be displayed:

MESSAGE	DESCRIPTION	CHIME
EDIFF NOT AVAILABLE	Differential temperature has reached the overheat threshold. System deactivated until temperature returns within limits.	Single
EDIFF SYSTEM FAULT	Fault has occurred with electric differential. System deactivated until fault rectified.	Single

CONTROL DIAGRAM

CONTROL DIAGRAM - REAR ELECTRIC DIFFERENTIAL



A = HARDWIRED; D = HS (HIGH SPEED) CAN (CONTROLLER AREA NETWORK) POWERTRAIN SYSTEMS BUS; AL = PWM (PULSE WIDTH MODULATION).

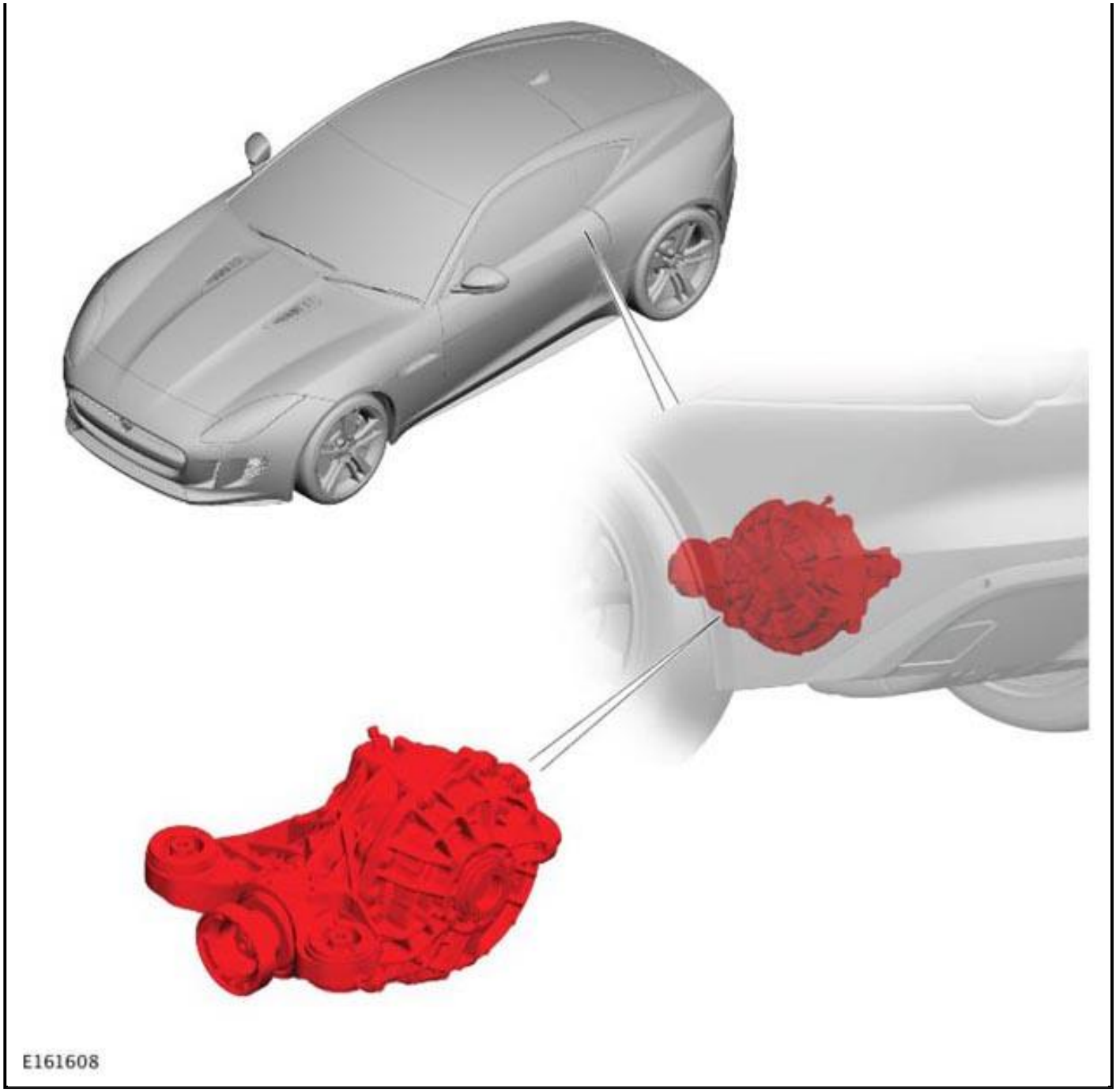
ITEM	DESCRIPTION
1	Rear Differential Control Module (RDCM)
2	Transmission Control Switch (TCS)
3	Transmission Control Module (TCM)
4	Chassis Control Module (CHCM)
5	Anti-lock Brake System (ABS) control module

ITEM	DESCRIPTION
6	Powertrain Control Module (PCM)
7	Body Control Module/Gateway Module (BCM/GWM) assembly
8	Instrument Cluster (IC)
9	Differential locking motor
10	Ground
11	Power supply
12	Temperature sensor - Differential oil
13	Temperature sensor - Differential locking motor
14	Position sensor - Differential locking motor

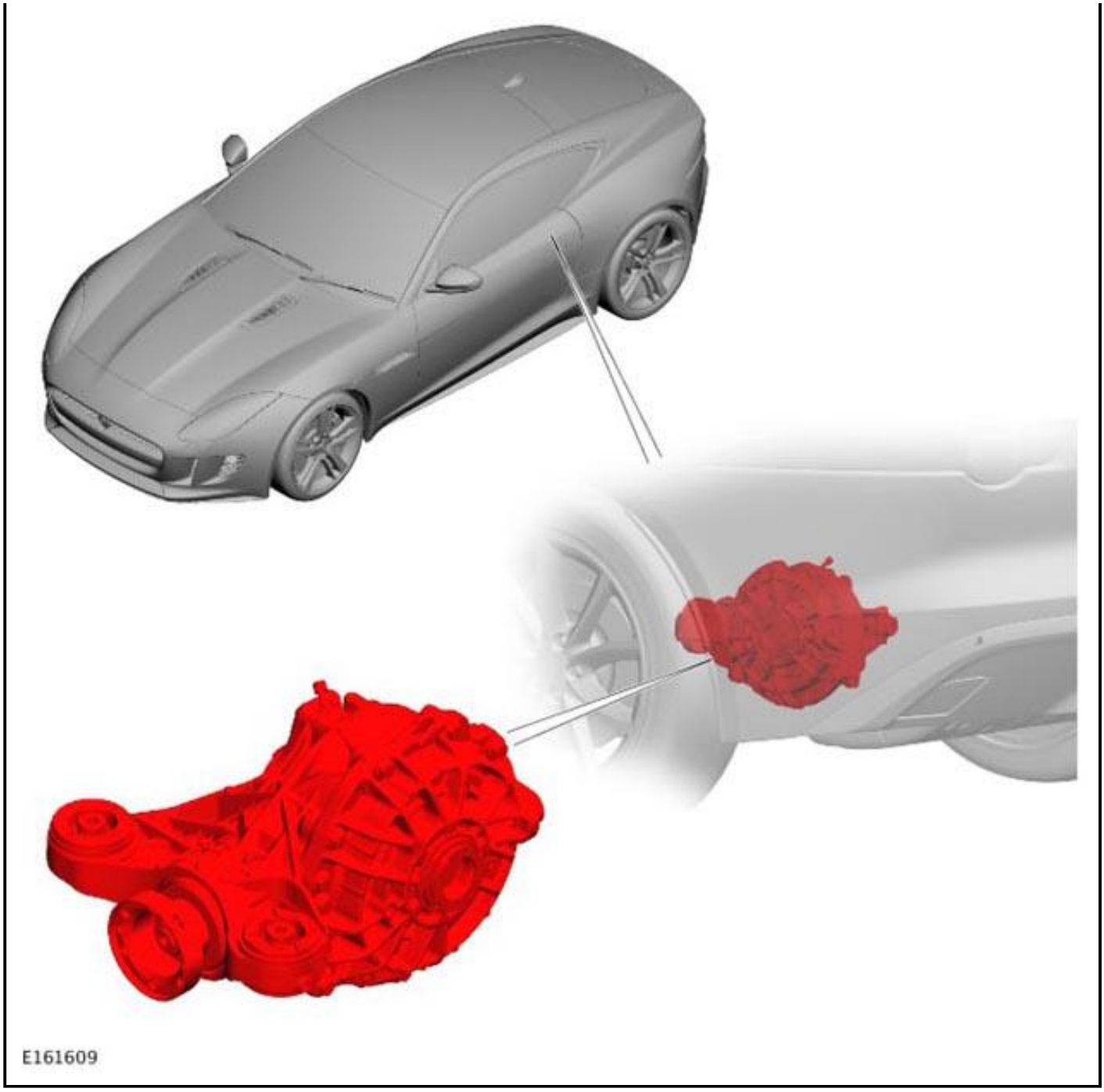
OPEN DIFFERENTIAL - 3.0L V6 PETROL N/A

COMPONENT LOCATION - SHEET 1 OF 3 - OPEN DIFFERENTIAL - 3.0L V6 PETROL N/A

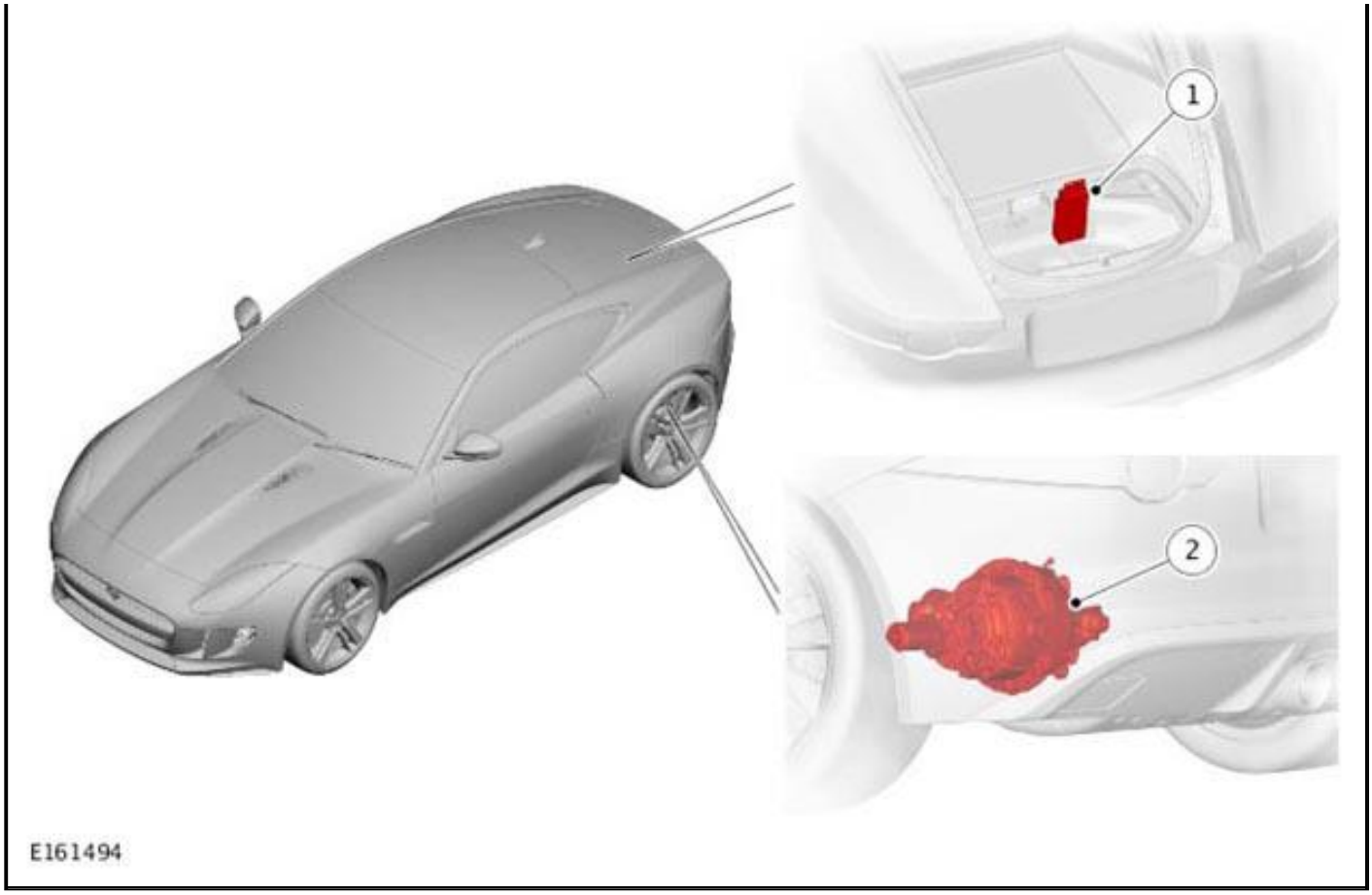
NOTE: **Coupe installation shown, convertible installation is similar.**



COMPONENT LOCATION - SHEET 2 OF 3 - LIMITED SLIP DIFFERENTIAL - 3.0L V6 PETROL S/C



COMPONENT LOCATION - SHEET 3 OF 3 - ELECTRIC REAR DIFFERENTIAL - 5.0 L V8 PETROL S/C



ITEM	DESCRIPTION
1	Rear Differential Control Module (RDCM)
2	Electric rear differential

INTRODUCTION

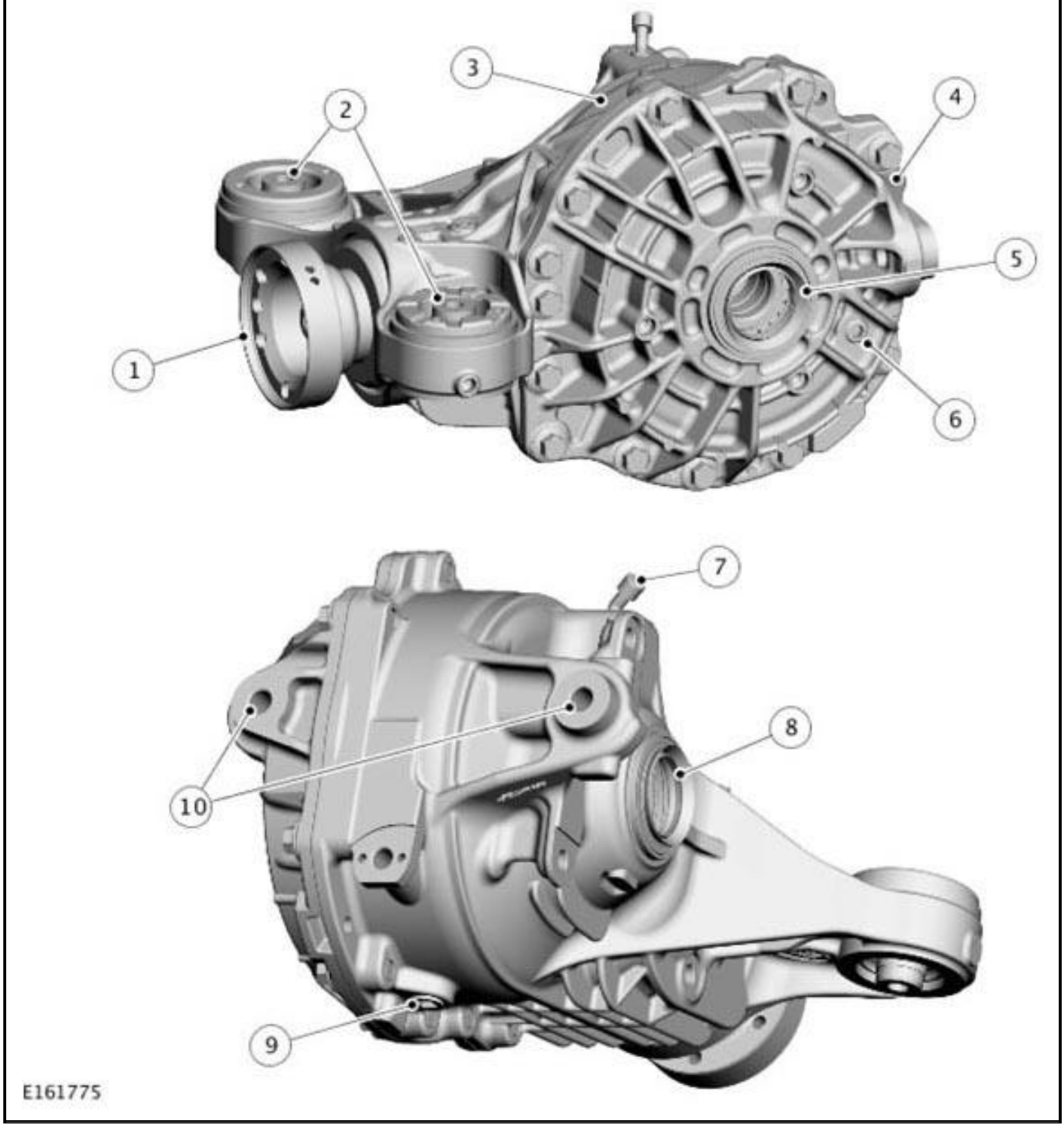
The differential converts the 'angle of drive' through 90Â° and distributes drive, via the rear drive halfshafts, to the rear wheels.

Three types of differentials are installed on X152 models:

- 3.0L V6 S/C Petrol with open Differential
- 3.0L V6 S/C Petrol Limited Slip Differential (LSD)
- V8 S/C with electric rear Differential

All types of differential are attached to the rear subframe at four mounting points. Each mounting point incorporates an insulator to reduce NVH (Noise, Vibration and Harshness). The insulators in the forward mounting points are installed in the differential. The insulators in the rear mounting points are installed in the rear subframe.

OPEN DIFFERENTIAL



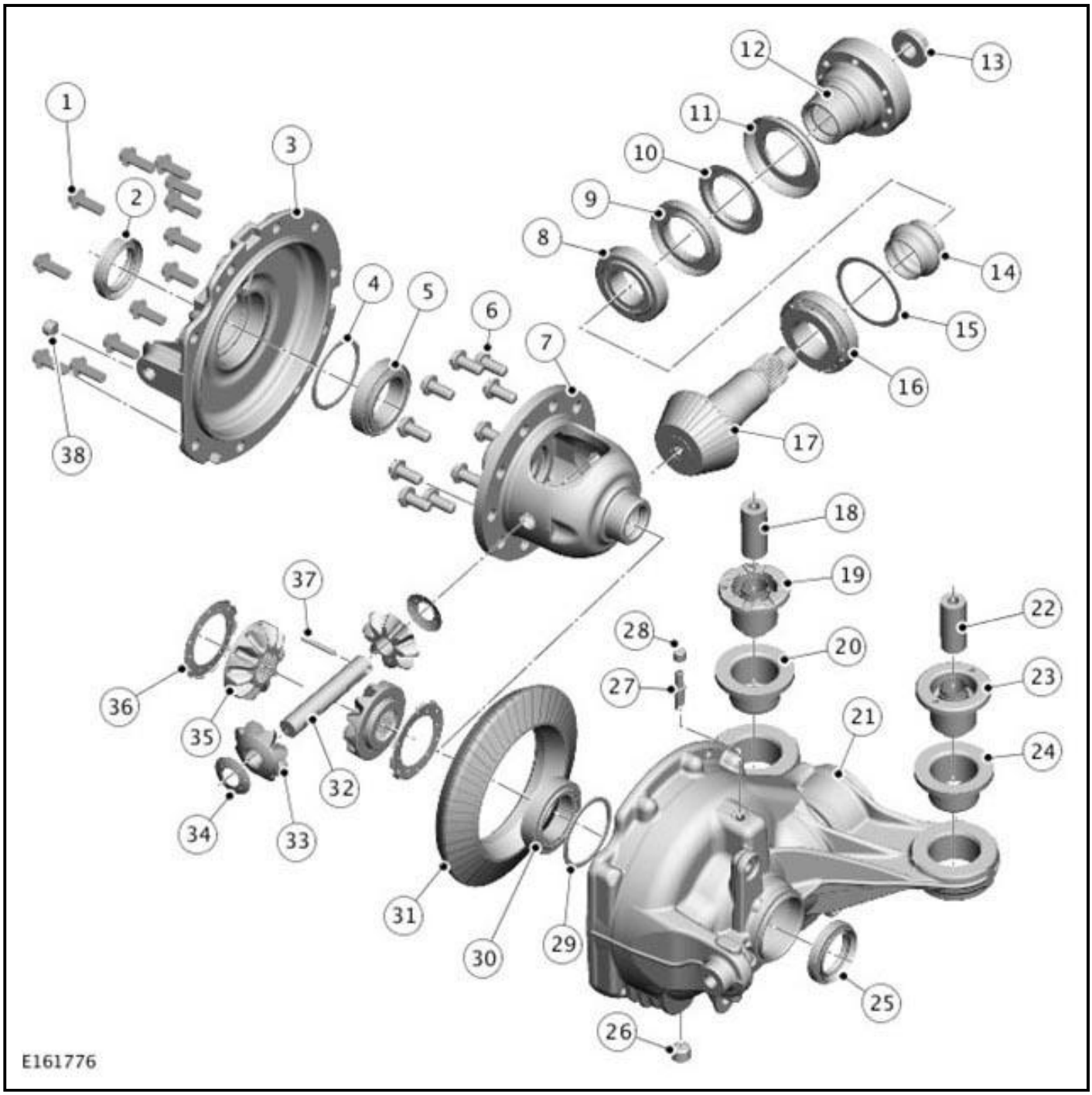
ITEM	DESCRIPTION
1	Input flange
2	Front mounting points with insulators
3	Carrier
4	Cover
5	Left rear drive halfshaft oil seal
6	Filler/Level plug
7	Breather
8	Right rear drive halfshaft oil seal
9	Magnetic drain plug

ITEM	DESCRIPTION
10	Rear mounting points

The open differential is a conventional design using a hypoid gear layout. The final drive ratio is 3.31:1.

The outer casing comprises two parts; a cover and a carrier. The carrier provides locations for all the internal components. Twelve bolts attach the cover to the carrier. The cover and carrier have cast fins, which assist rigidity and cooling. A breather is fitted to the top of the carrier.

Exploded View of Open Differential



ITEM	DESCRIPTION
1	Bolt (12 of)
2	Oil seal

ITEM	DESCRIPTION
3	Cover
4	Shim
5	Bearing assembly
6	Bolt (10 of)
7	Differential case
8	Bearing assembly
9	Oil seal
10	Oil slinger inner
11	Oil slinger outer
12	Input flange
13	Pinion nut
14	Collapsible spacer
15	Shim
16	Bearing assembly
17	Pinion shaft
18	Left mounting insulator inner
19	Left mounting insulator rubber
20	Left mounting insulator outer
21	Carrier
22	Right mounting insulator inner
23	Right mounting insulator rubber
24	Right mounting insulator outer
25	Oil seal
26	Drain plug
27	Breather tube
28	Breather cap
29	Shim
30	Bearing assembly
31	Drive gear
32	Shaft
33	Planet gear (2 of)
34	Thrust washer (2 of)
35	Sun gear (2 of)
36	Spacer (2 of)
37	Roll pin
38	Fill/Level plug

The open differential comprises a pinion shaft with a hypoid gear, and a crown wheel drive gear attached to a differential case. The differential case houses two planet gears and two sun gears.

An input flange is installed on the externally splined outer end of the pinion shaft and retained by a pinion nut. The input flange has six threaded holes for the driveshaft attachment bolts. An oil slinger and oil seal are installed in the carrier to seal the input flange. The hypoid gear of the pinion shaft mates with the drive gear.

Ten bolts attach the drive gear to the differential case. The differential case is mounted on taper roller bearings located in machined bores in the carrier and the cover. Shims are installed behind the bearing cups to apply the correct bearing preload and hypoid backlash.

The differential case has a through hole, which provides location for a shaft. Two planet gears are installed on the shaft, with thrust washers between the planet gears and the differential case. A roll pin locks the shaft to the differential case.

Two sun gears are located in pockets in the differential case and mesh with the planet gears. Spacers are fitted between the sun gears and the differential case to give the correct mesh contact between the planet gears and the sun gears. Each sun gear has a machined bore with internal splines and a machined groove. The splines transfer drive to the rear drive halfshafts. The groove provides positive location for the snap ring fitted to the inboard end of the rear drive halfshafts.

Oil seals are installed in the carrier and the cover to seal the rear drive halfshafts.

The open differential contains a quantity of oil for splash lubrication of the internal components. A magnetic drain plug is installed in the bottom of the carrier and a filler/level plug is installed in the cover.

LIMITED SLIP DIFFERENTIAL

The LSD (Limited Slip Differential) has the same functionality as the open differential, but it also incorporates a locking and torque biasing function to give improved traction performance and vehicle dynamic stability. The final drive ratio is 3.31:1.

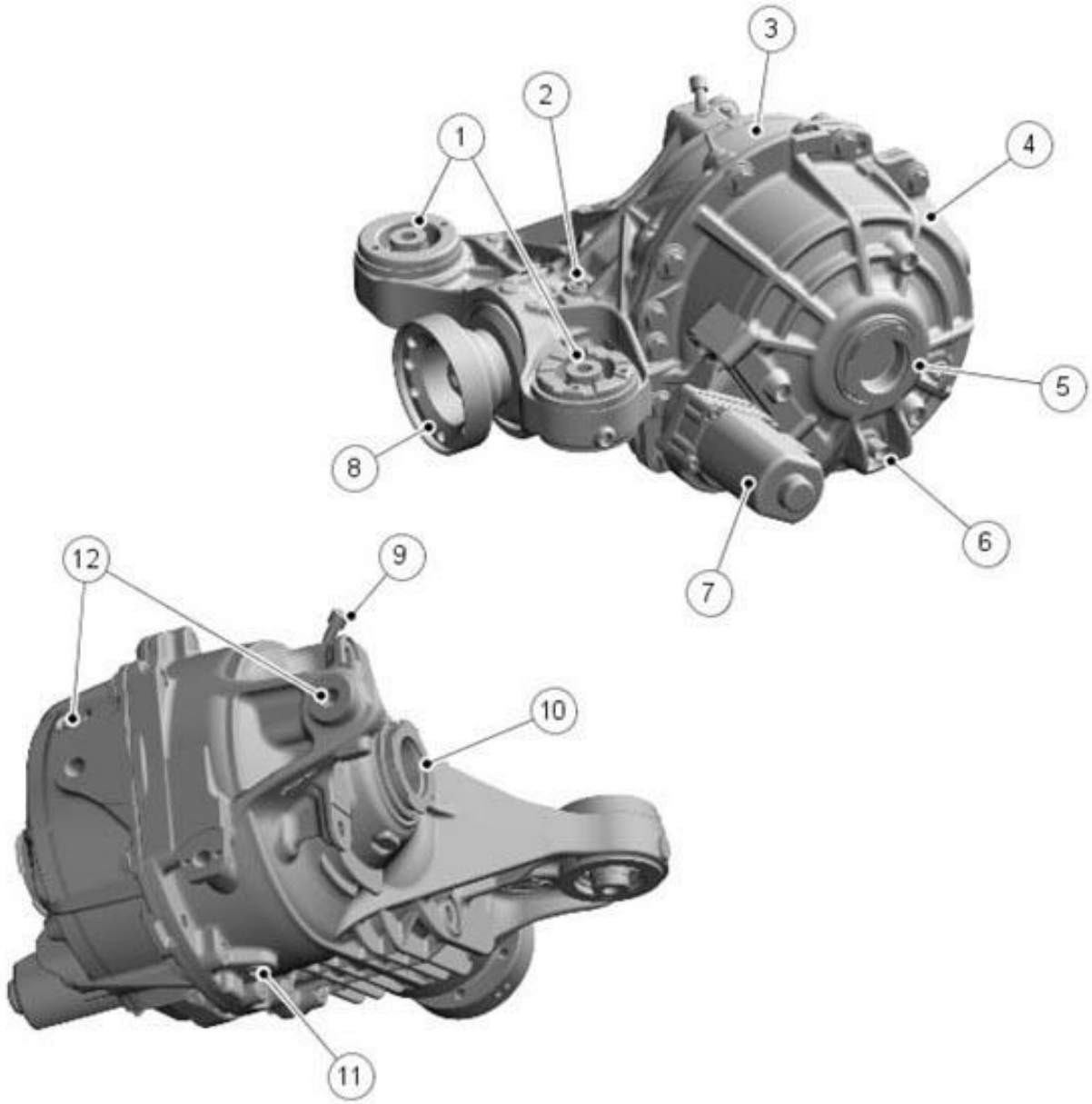
The basic construction of the LSD is similar to the open differential. However, the LSD also has the following:

- Two additional planet gears in the differential case, to cater for the higher torque of the supercharged engine.
- A multi-plate clutch and actuator assembly installed on the left sun gear.

The LSD contains a multi-plate clutch. The multi-plate clutch is contained in a clutch basket attached to the differential case with the drive gear securing bolts. Alternate plates of the clutch pack are keyed to the clutch basket and the left sun gear. A pressure disc is installed on the outer end of the clutch pack and keyed to the clutch basket. A thrust plate on the end of the clutch basket incorporates lugs which extend through the clutch basket onto the pressure disc.

The actuator assembly is mounted on bearings on the outboard end of the clutch basket, against the thrust race. The actuator assembly consists of input and output actuators separated by five ball bearings. A locking pin in the cover engages with a slot in the output actuator to prevent it turning, but allow it to move axially. The input actuator engages with the reduction gearbox and is free to rotate relative to the cover. Ball bearings locate in curved grooves in the mating faces of the input and output actuators. The bottom surface of each groove incorporates a ramp. Rotation of the input actuator forces the ball bearings up the ramps in the grooves and induces an axial movement in the output actuator. The thrust race and pressure disc transfer the axial movement from the output actuator to the clutch pack.

ELECTRIC REAR DIFFERENTIAL



ITEM	DESCRIPTION
1	Front mounting points with insulator assemblies
2	Filler/Level plug
3	Carrier
4	Cover
5	Rear left drive halfshaft oil seal
6	Temperature sensor
7	Motor
8	Input flange
9	Breather
10	Rear right drive halfshaft oil seal
11	Magnetic drain plug
12	Rear mounting points

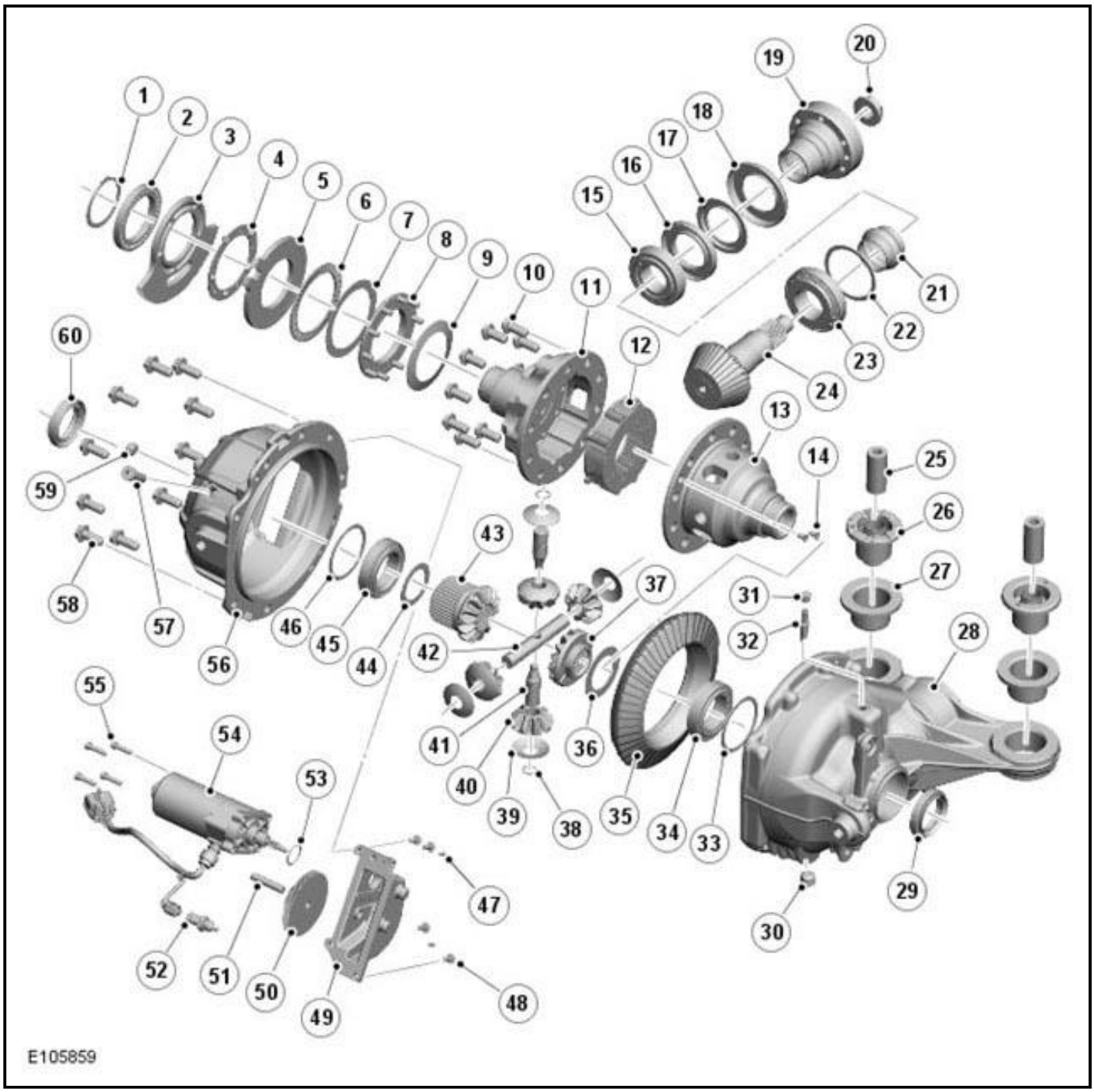
The electric differential has the same functionality as the open differential, but it also incorporates a locking and torque biasing function to give improved traction performance and vehicle dynamic stability. The final drive ratio is 2.56:1

The basic construction of the electric differential is similar to the open differential. However, the electric differential also has the following:

- Two additional planet gears in the differential case, to cater for the higher torque of the supercharged engine.
- A multi-plate clutch and actuator assembly installed on the left sun gear.
- A motor and reduction gearbox, attached to the cover.
- A temperature sensor installed in the cover.

The RDCM (Rear Differential Control Module) operates the motor of the electric differential.

Exploded View of Electric Rear Differential



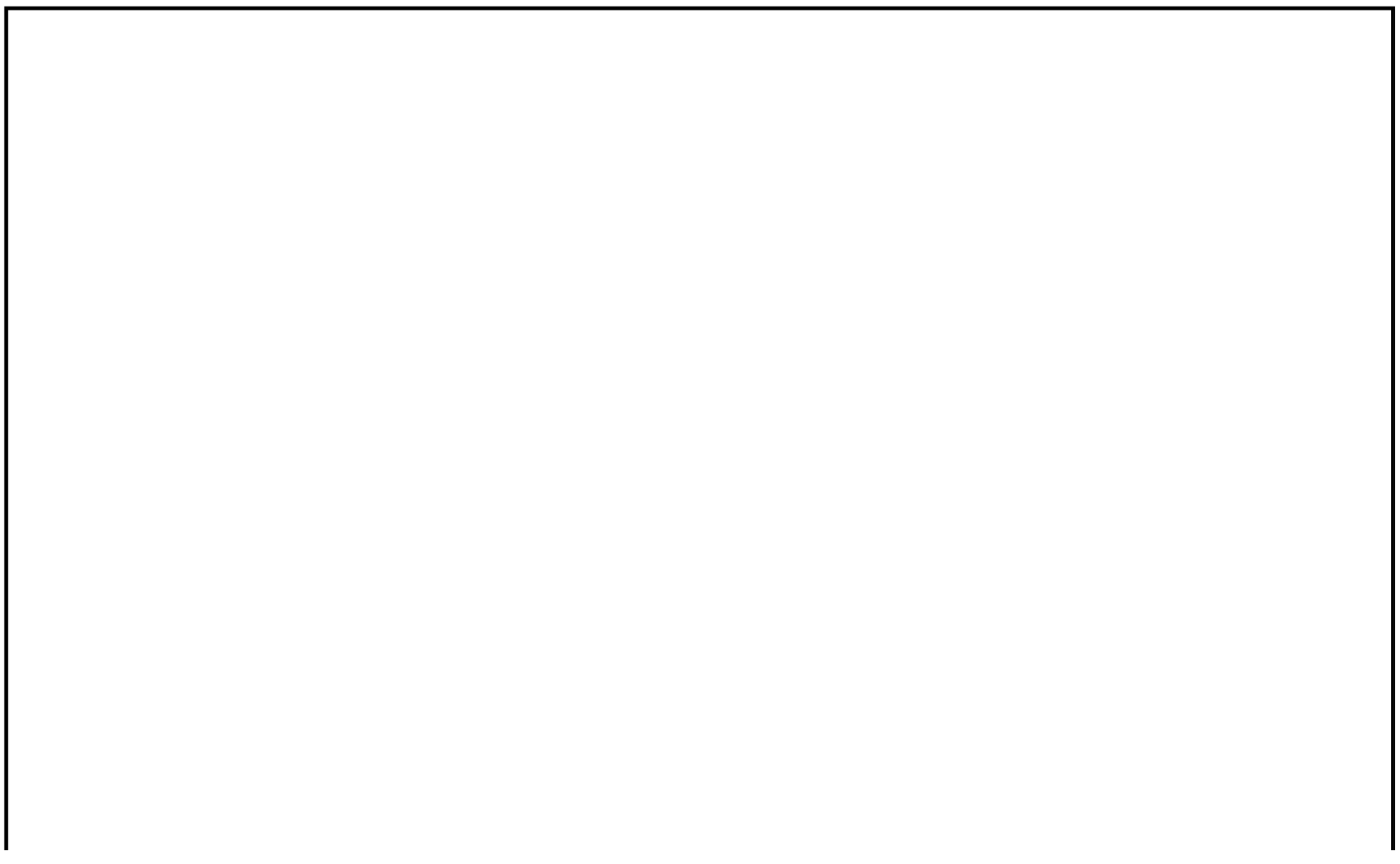
ITEM	DESCRIPTION
1	Circlip
2	Bearing assembly
3	Input actuator
4	Actuator balls
5	Output actuator
6	Thrust race
7	Shim
8	Thrust plate
9	Dished washer
10	Bolt (10 of)
11	Clutch basket
12	Multi-plate clutch and pressure disc
13	Differential case
14	Screw (2 of)
15	Bearing assembly
16	Oil seal
17	Oil slinger inner
18	Oil slinger outer
19	Input flange
20	Pinion nut
21	Collapsible spacer
22	Shim
23	Bearing assembly
24	Pinion shaft
25	Mounting insulator inner (2 of)
26	Mounting insulator rubber (2 of)
27	Mounting insulator outer (2 of)
28	Carrier
29	Oil seal
30	Drain plug
31	Breather tube
32	Breather cap
33	Shim
34	Bearing assembly
35	Drive gear
36	Shim
37	Right sun gear
38	Circlip
39	Thrust washer (4 of)
40	Planet gear (4 of)
41	Pin (2 of)
42	Shaft
43	Left sun gear
44	Shim
45	Bearing assembly
46	Shim
47	Dowel (2 of)

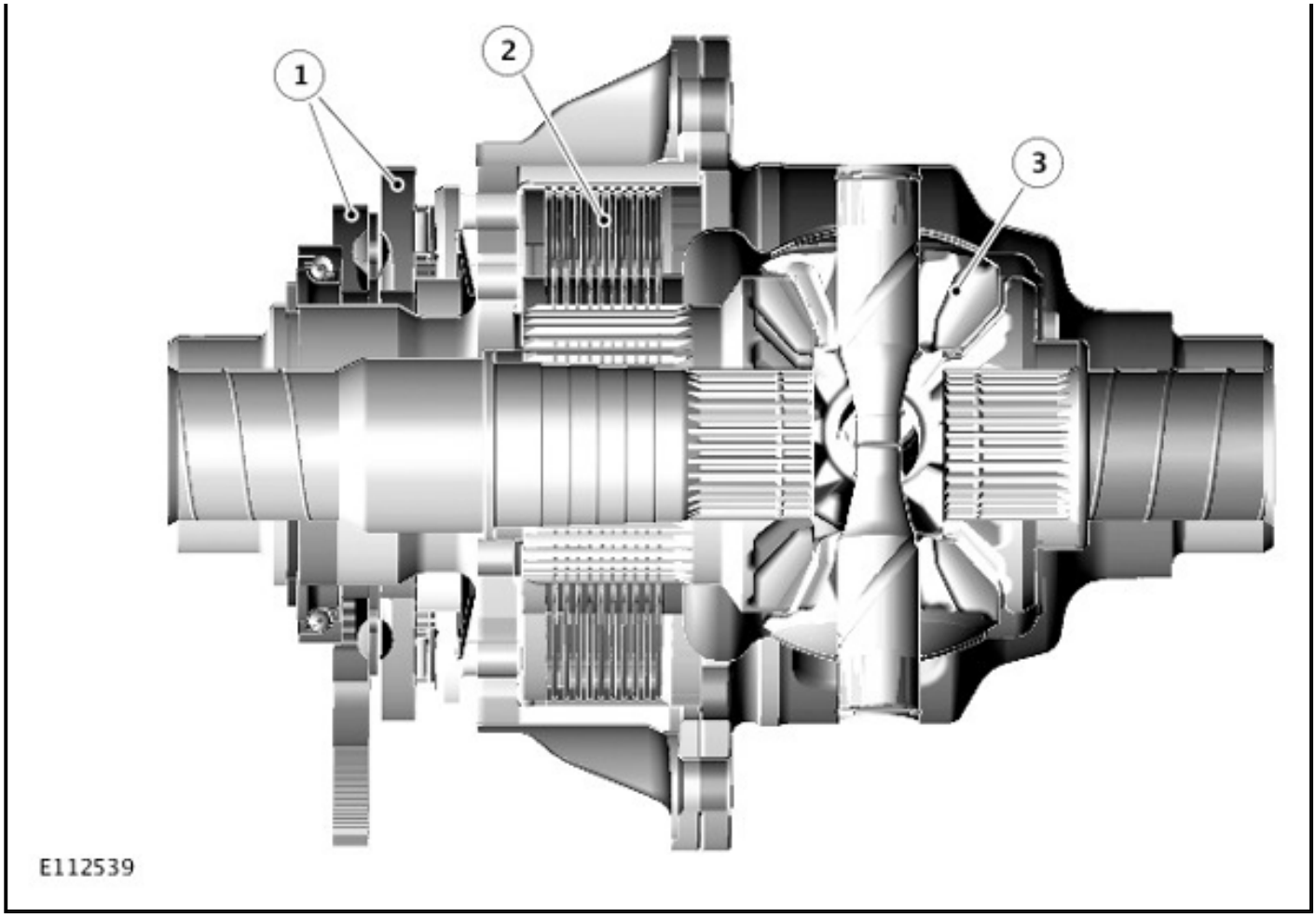
ITEM	DESCRIPTION
48	Bolt (4 of)
49	Reduction gear casing
50	Reduction gear
51	Shaft
52	Temperature sensor
53	O-ring seal
54	Motor
55	Screw (4 of)
56	Cover
57	Output actuator locking pin
58	Bolt (9 of)
59	Filler/Level plug
60	Oil seal

The multi-plate clutch is contained in a clutch basket attached to the differential case with the drive gear securing bolts. Alternate plates of the clutch pack are keyed to the clutch basket and the left sun gear. A pressure disc is installed on the outer end of the clutch pack and keyed to the clutch basket. A thrust plate on the end of the clutch basket incorporates lugs which extend through the clutch basket onto the pressure disc.

The actuator assembly is mounted on bearings on the outboard end of the clutch basket, against the thrust race. The actuator assembly consists of input and output actuators separated by five ball bearings. A locking pin in the cover engages with a slot in the output actuator to prevent it turning, but allow it to move axially. The input actuator engages with the reduction gearbox and is free to rotate relative to the cover. Ball bearings locate in curved grooves in the mating faces of the input and output actuators. The bottom surface of each groove incorporates a ramp. Rotation of the input actuator forces the ball bearings up the ramps in the grooves and induces an axial movement in the output actuator. The thrust race and pressure disc transfer the axial movement from the output actuator to the clutch pack.

Section Through Multi-plate Clutch





ITEM	DESCRIPTION
1	Actuator
2	Multi-plate clutch
3	Differential

The motor is a 12 V DC (Direct Current) motor that adjusts the frictional loading of the multi-plate clutch, via the reduction gearbox and the actuator assembly, under the control of the RDCM. Adjusting the frictional loading of the multi-plate clutch adjusts the locking torque between the crown wheel drive gear and the sun gear.

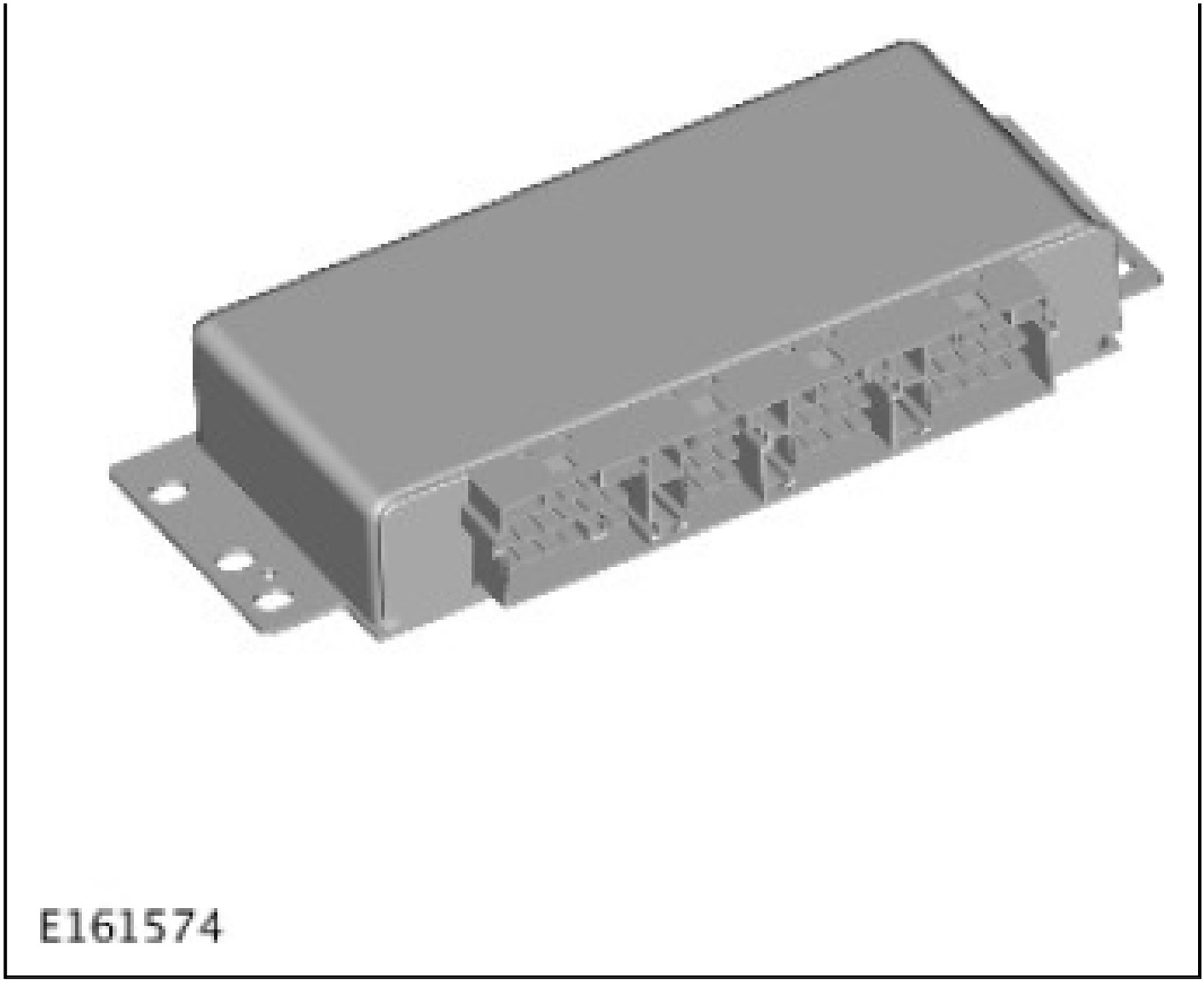
Four bolts attach the motor to the reduction gearbox, which is located in position on the cover with two dowels, and secured with four bolts. An O-ring seals the joint between the motor and the reduction gearbox.

The motor is driven by a 12 V PWM (Pulse Width Modulated) feed from the RDCM. The motor also incorporates the following connections with the RDCM:

- A motor temperature sensor, to prevent excessive use from damaging the motor.
- Two Hall effect motor position sensors, to enable closed loop control of the motor.

The temperature sensor provides a differential oil temperature signal to the RDCM, to prevent excessive use from damaging the multi-plate clutch.

REAR DIFFERENTIAL CONTROL MODULE (RDCM)



The RDCM controls the operation of the motor on the electric differential. The RDCM is attached to a bracket located on the left side of the luggage compartment, below the floor trim.

The RDCM receives battery feed from the AJB (Auxiliary Junction Box) and an ignition feed from the CJB (Central Junction Box). A connection with the HS (High Speed) CAN (Controller Area Network) bus allows the RDCM to communicate with other modules.

PRINCIPLES OF OPERATION

OPEN DIFFERENTIAL

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 drive gear moves the rotational direction through 90Â°.

The transferred rotational motion is now passed to the drive gear, which in turn rotates the differential case. The planet gears rotate with the differential case and transfer rotational motion to the left and right sun gears, which rotate the rear drive halfshafts.

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

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 gears. The planet gears rotate on their shaft to allow the outer wheel to rotate faster than the inner one.

LIMITED SLIP DIFFERENTIAL

The multi-plate clutch prevents excessive differential slip and therefore maximizes the traction performance of the vehicle. This is fundamentally different from 'braked' traction control systems, which can only counteract 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 ABS. The RDCM monitors the driver's demands through primary vehicle controls and automatically sets the slip torque in the differential. The system is completely automatic and does not require any special driver input.

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

ELECTRIC REAR DIFFERENTIAL

The multi-plate clutch prevents excessive differential slip and therefore maximizes the traction performance of the vehicle. This is fundamentally different from 'braked' traction control systems, which can only counteract 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 ABS. The RDCM monitors the driver's demands through primary vehicle controls and automatically sets the slip torque in the differential. The system is completely automatic and does not require any special driver input.

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

The differential strategy in the RDCM includes:

- A pre-loading function, increasing locking torque with increased driving torque.
- A slip controller to decrease locking torque for optimum comfort, e.g. parking.

The RDCM memorizes the position of the motor when the ignition is switched off.

HS CAN bus messages used by the RDCM include wheel speed, steering angle, automatic transmission speed, temperature information, car configuration, axle ratios and mode inputs.

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

If the RDCM is replaced, a Jaguar approved diagnostic system must be connected to the vehicle and the differential self-calibration procedure must be performed. This procedure must also be performed if the motor or electric differential is replaced.

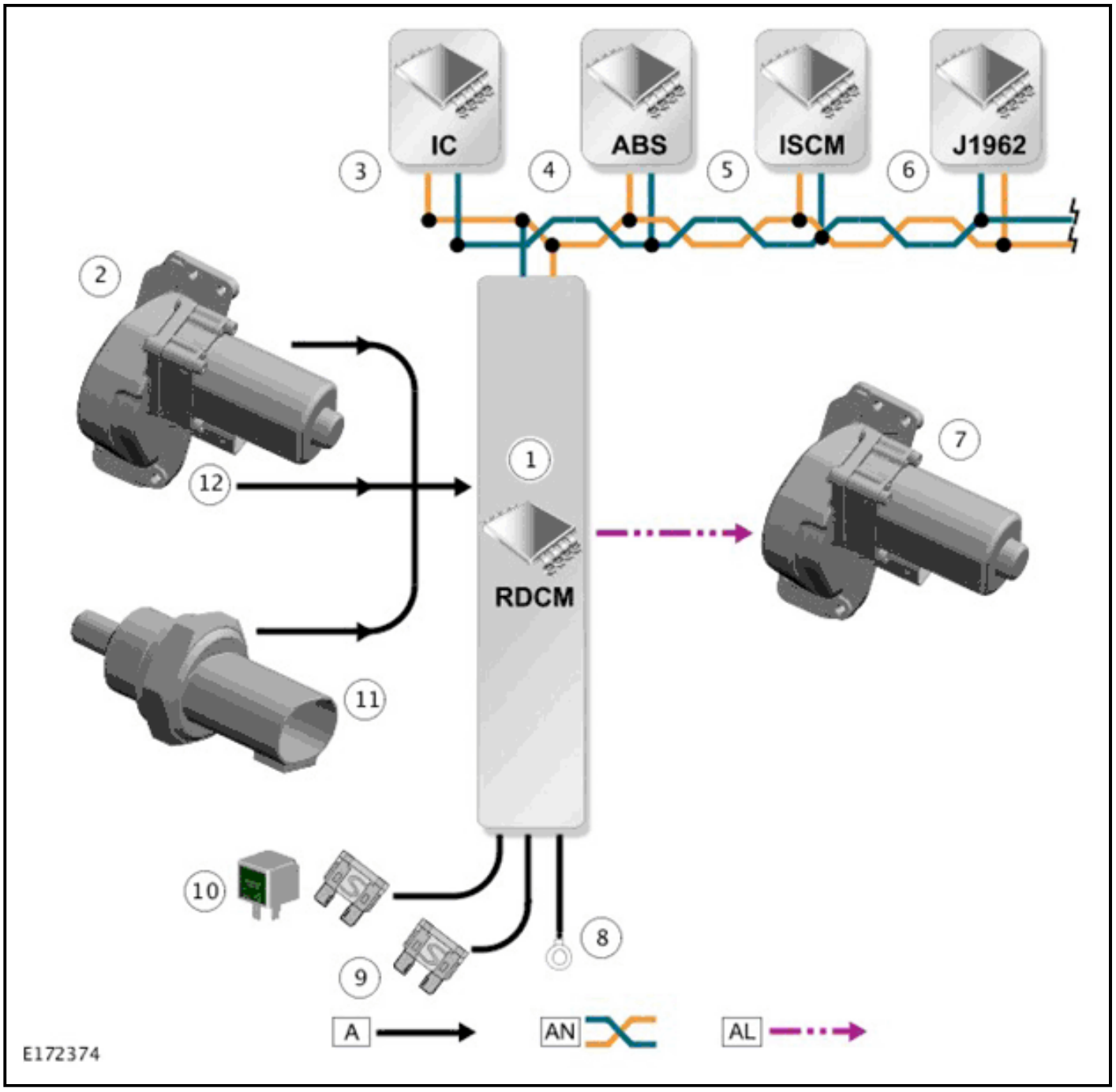
If a fault occurs with the electric differential, the RDCM, or one of the required input signals, the RDCM records an error code and displays a warning in the message center.

The following messages can be displayed:

MESSAGE	DESCRIPTION	CHIME
EDIFF NOT AVAILABLE	Differential temperature has reached the overheat threshold. System deactivated until temperature returns within limits.	Single

MESSAGE	DESCRIPTION	CHIME
EDIFF SYSTEM FAULT	Fault has occurred with electric differential. System deactivated until fault rectified.	Single

INPUT/OUTPUT DIAGRAM - ELECTRIC REAR DIFFERENTIAL



A = HARDWIRED; D = HS (HIGH SPEED) CAN (CONTROLLER AREA NETWORK) POWERTRAIN SYSTEMS BUS; AL = PWM (PULSE WIDTH MODULATION).

ITEM	DESCRIPTION
1	Differential locking motor position sensor
2	Instrument Cluster (IC)
3	Anti-lock Brake System (ABS) control module
4	Integrated Suspension Control Module (ISCM)

ITEM	DESCRIPTION
5	Diagnostic socket
6	Differential locking motor
7	Rear Differential Control Module (RDCM)
8	Ground
9	Fused power supply from Auxiliary Junction Box (AJB)
10	Ignition feed from Central Junction Box (CJB)
11	Temperature sensor - Differential oil
12	Temperature sensor - Differential locking motor

DIAGNOSIS AND TESTING

For additional information,

REFER to: **Driveline System** (Diagnosis and Testing).

GENERAL PROCEDURES

DIFFERENTIAL DRAINING AND FILLING (G1580092)

51.25.01	FINAL DRIVE UNIT - DRAIN AND REFILL	ALL DERIVATIVES	0.2

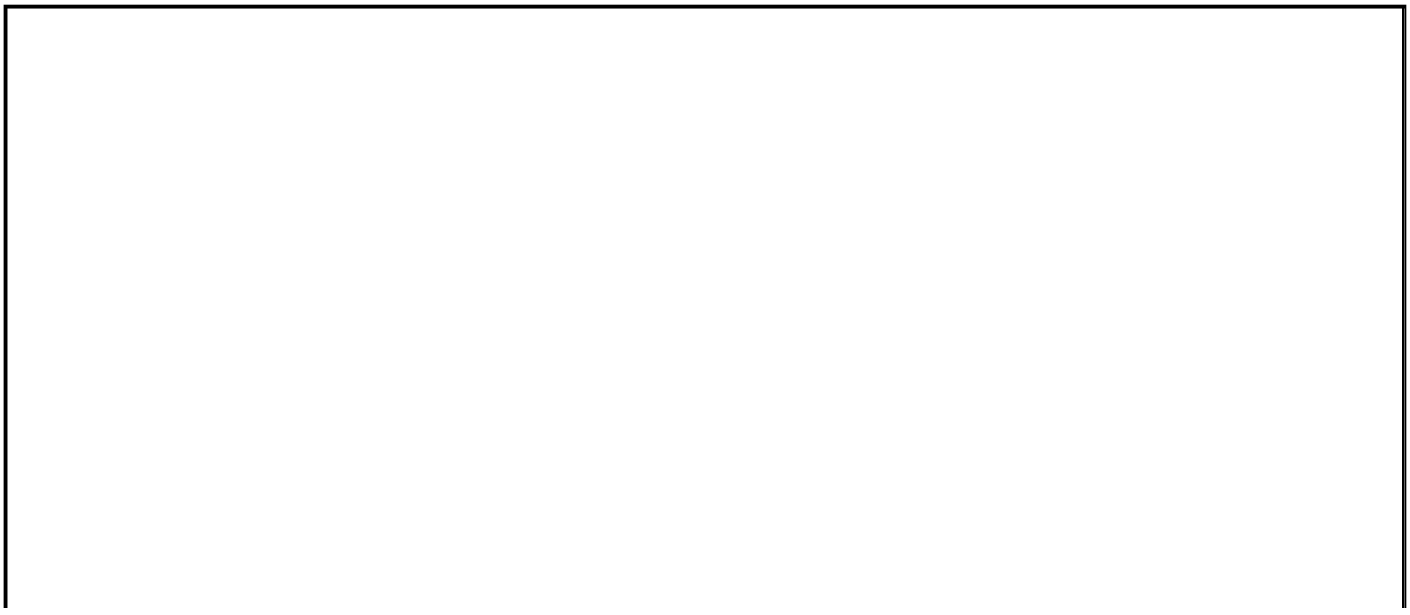
PART(S)

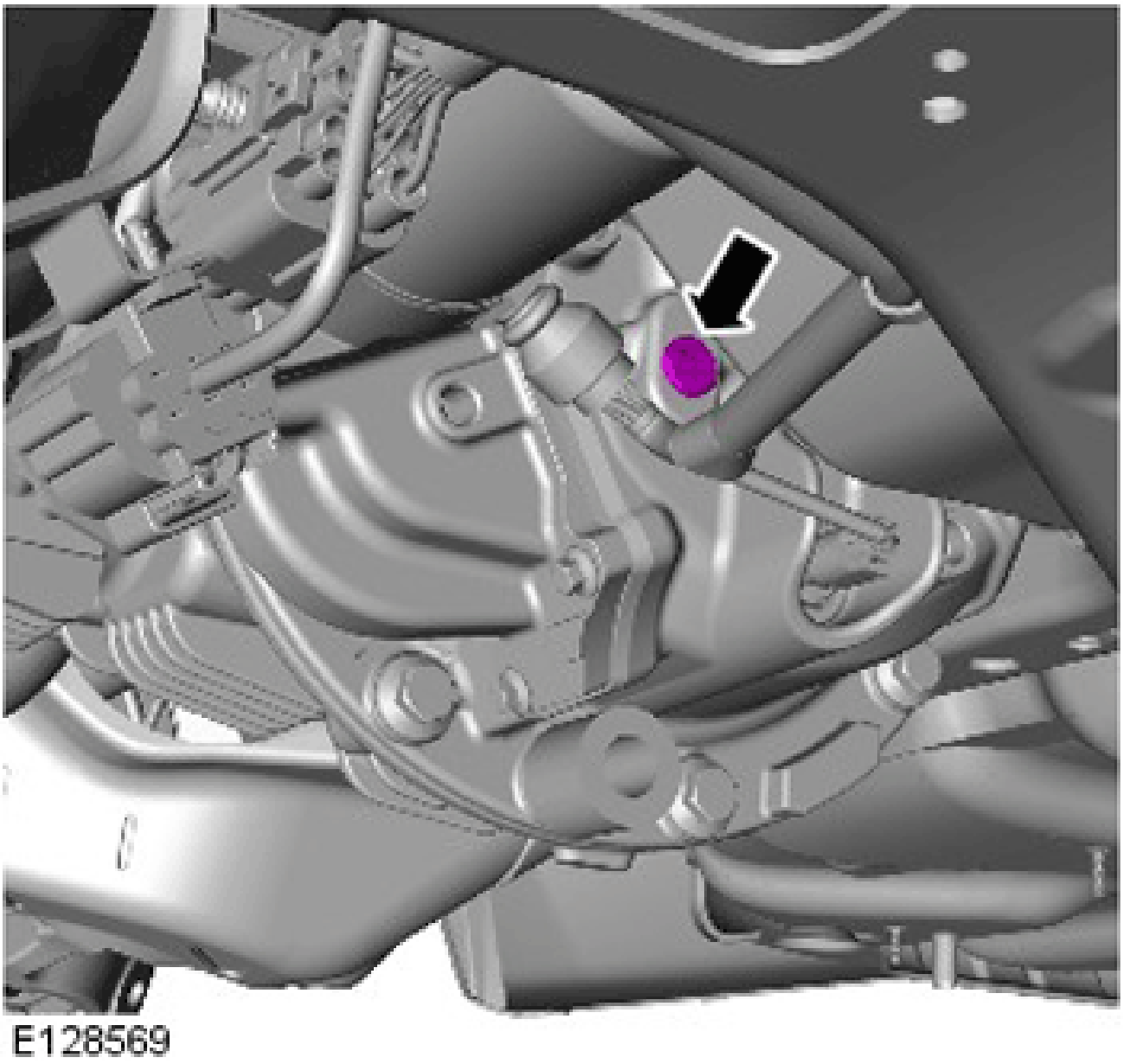
STEP	REPLACE PART/RENEW PART	PART NAME
Adjustment Step 3	Renew Part	Rear differential drain plug

CHECK

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

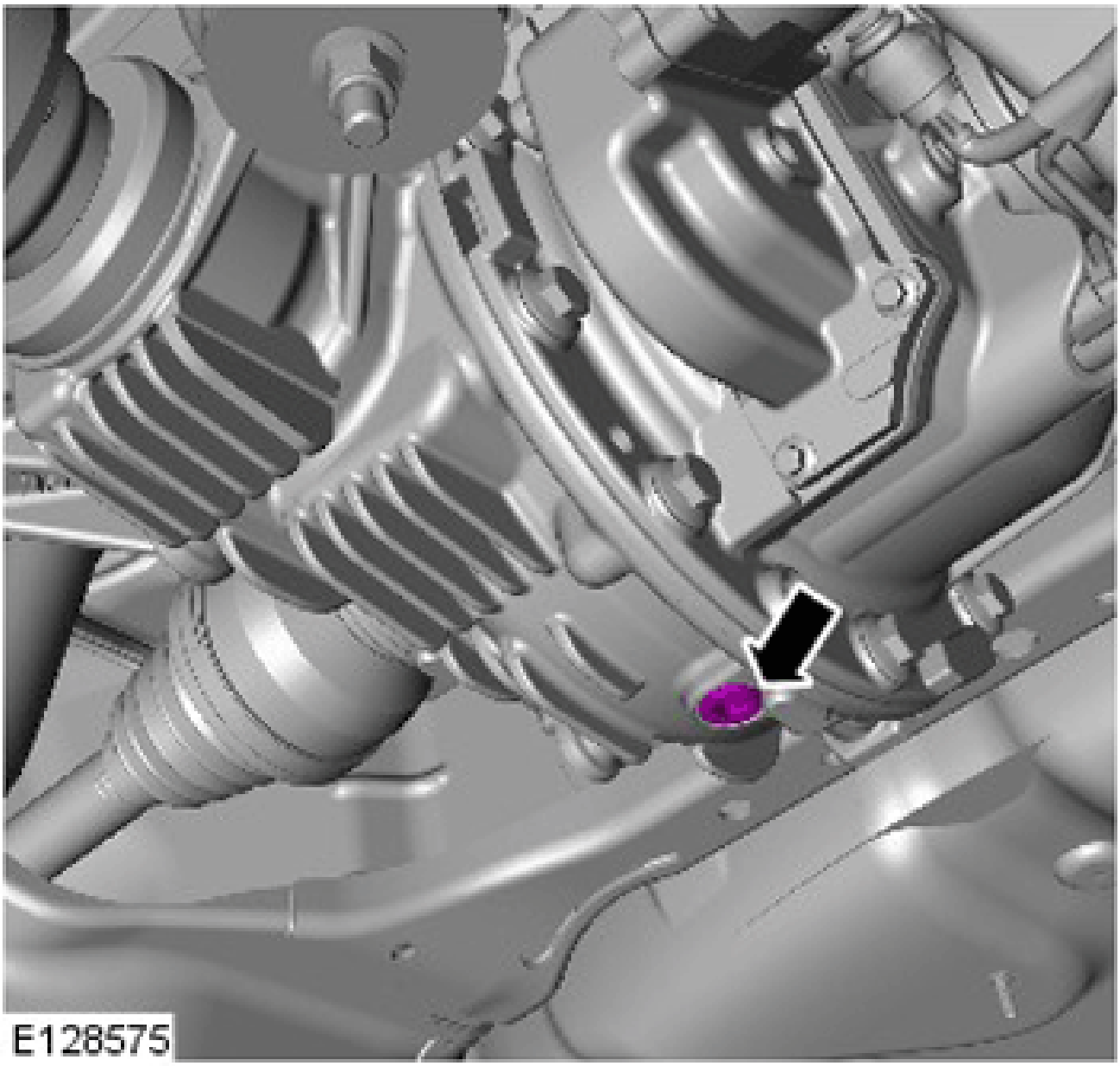
1. Refer to: **Specifications** (Specifications).
2. WARNING: **Make sure to support the vehicle with axle stands.**

   Raise and support the vehicle.
3. 



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

4.

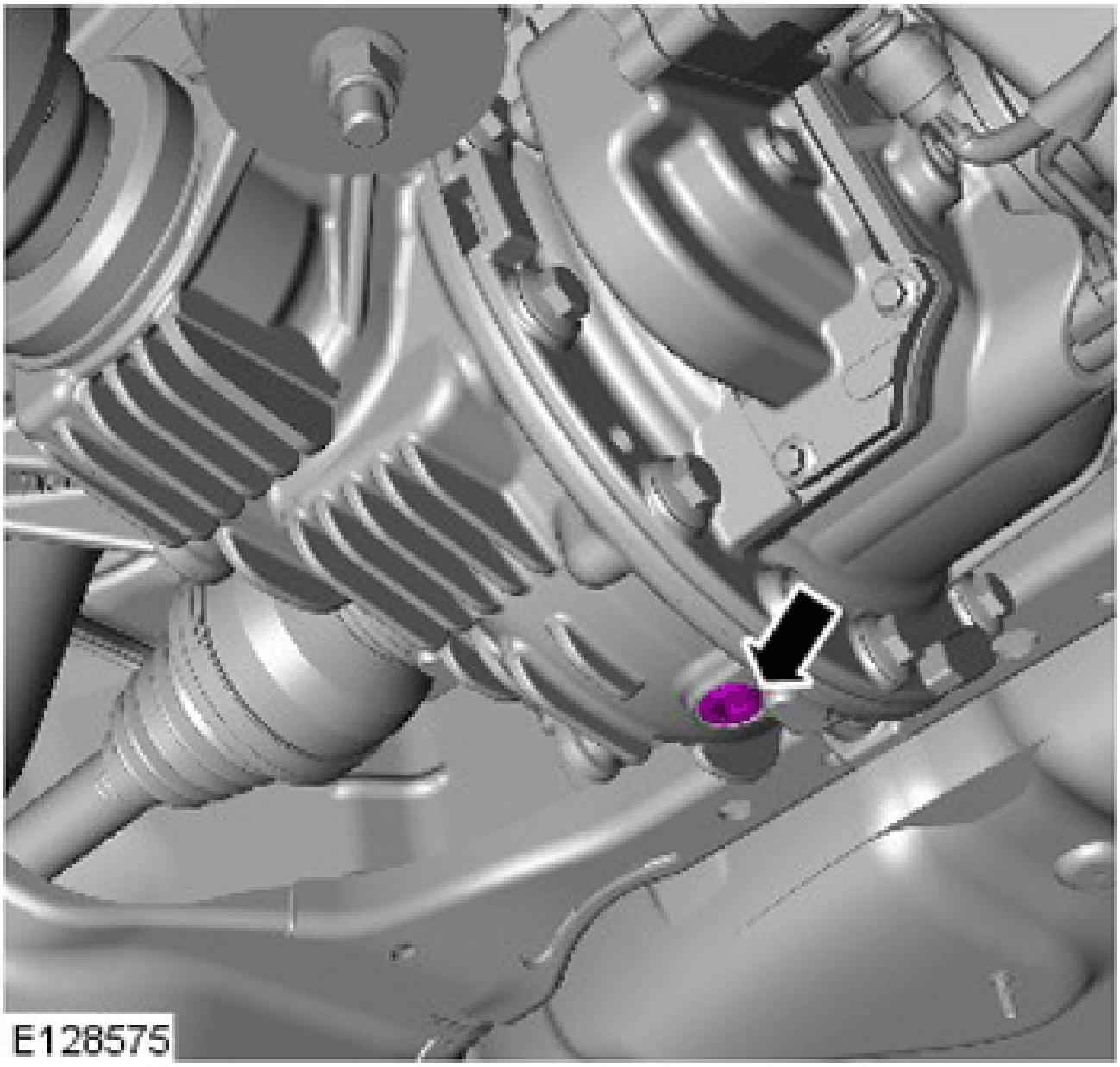


- Clean the area around the drain plug.
- Remove and discard the fluid drain plug.
- Drain the differential lubricant.

ADJUSTMENT

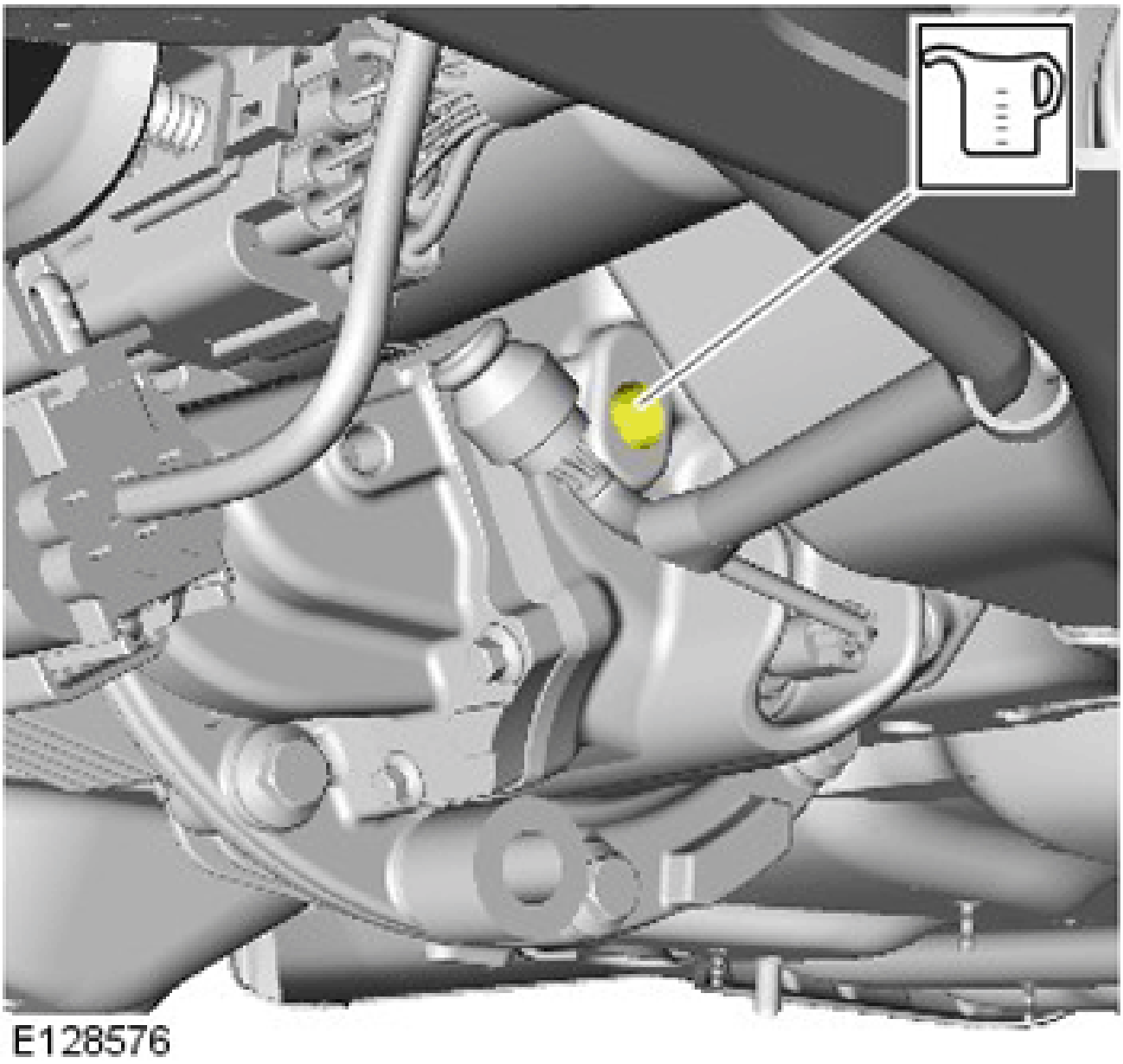
NOTE: **Some variation in the illustrations may occur, but the essential information is always correct.**

1.



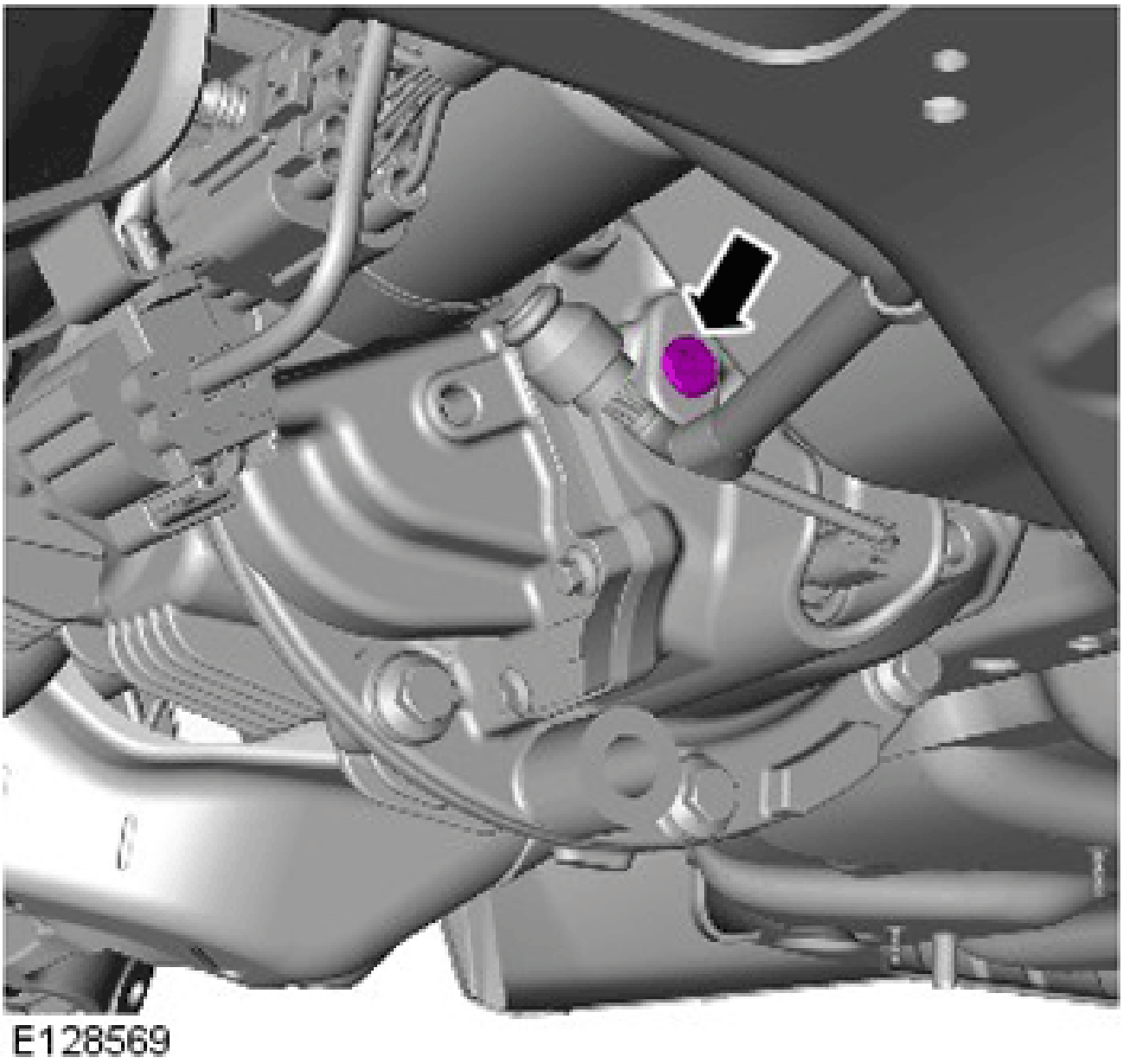
- Clean the drain plug.
- *Torque Specification:* **27 Nm**

2. **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.**
   - **Make sure the correct specification and quanity of oil is used.**



- Fill the differential with the correct amount of lubricant. Refer to: **Specifications** (Specifications).

3.



- Install a new differential fluid drain plug.

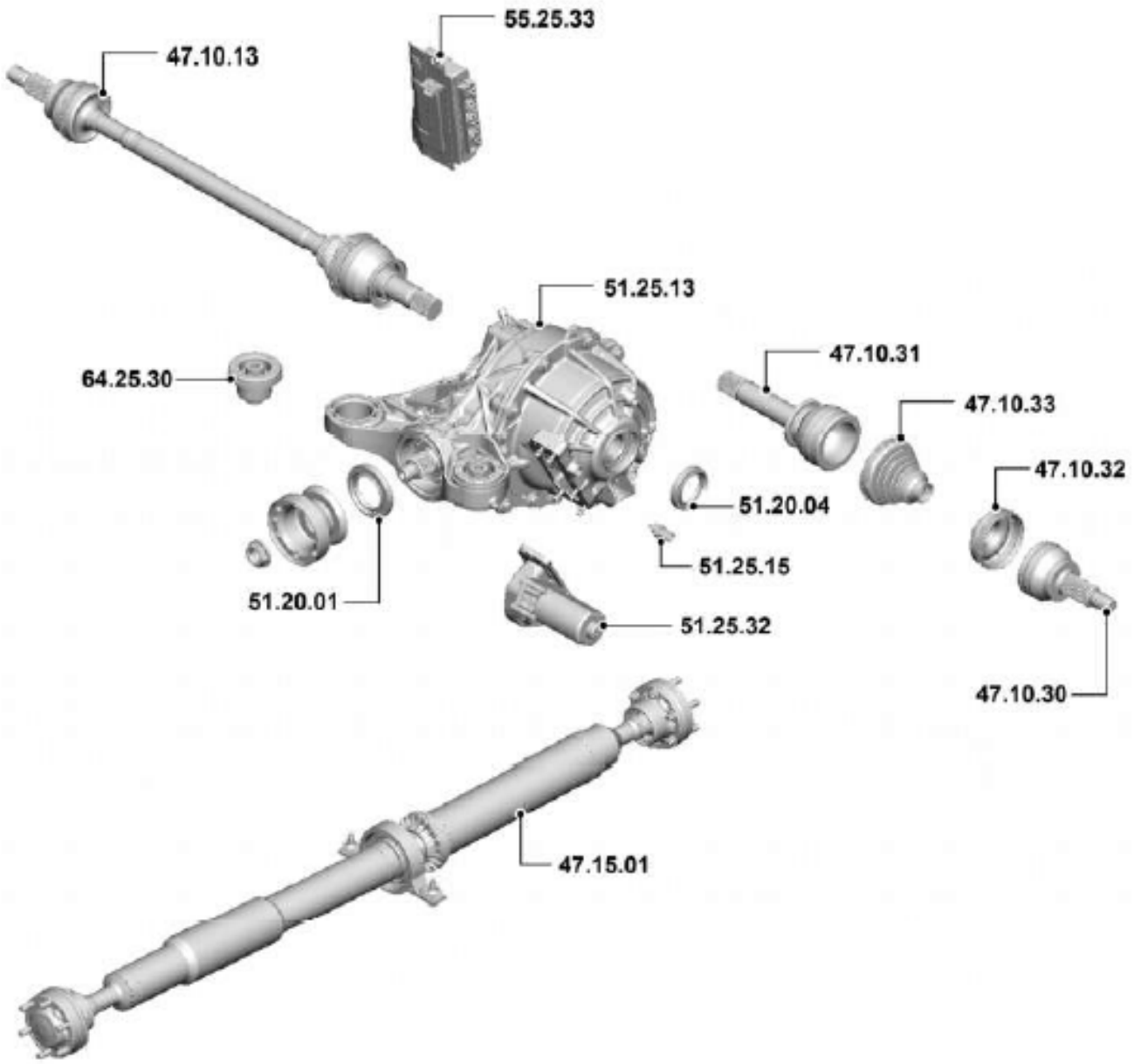
  Renew Part: Rear differential drain plug.

- *Torque Specification:* **27 Nm**

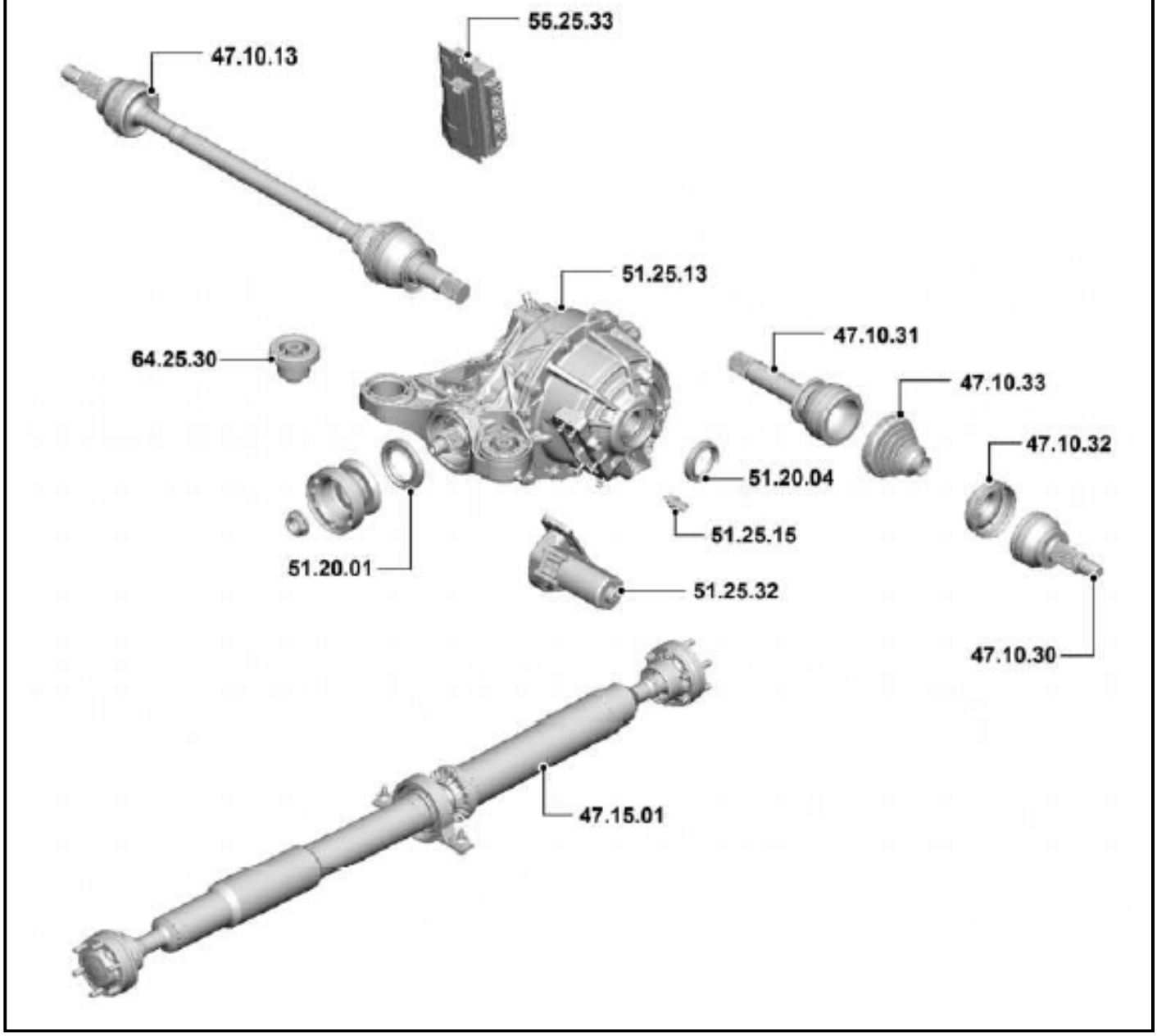
REMOVAL AND INSTALLATION

DIFFERENTIAL CASE (G1580093)

51.25.13	FINAL DRIVE UNIT - RENEW	3000 CC, AJ V6 (AJ126)	3.4

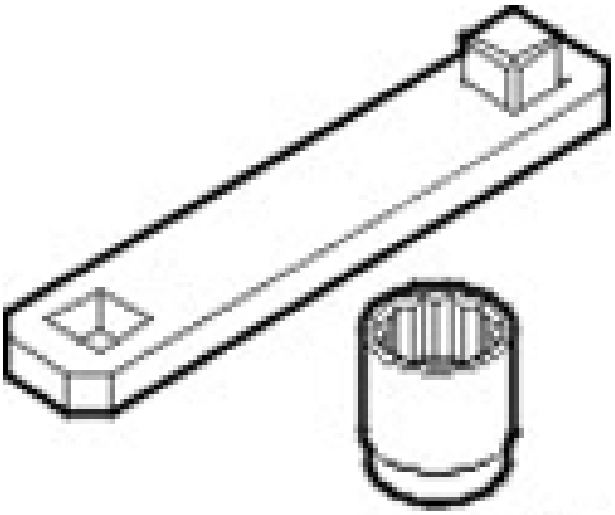
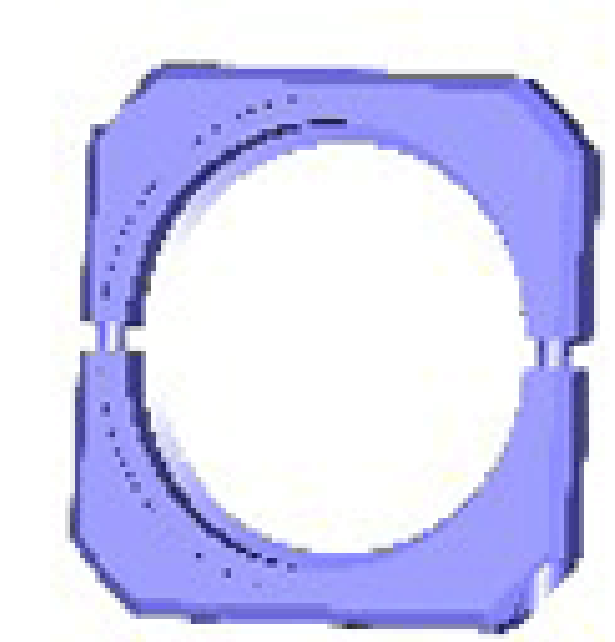


51.25.13	FINAL DRIVE UNIT - RENEW	5000 CC, AJ V8	3.3



SPECIAL TOOL(S)

	204-477 Replacer - Mounting Bolts Final Drive To Subframe

 204-477	
 E117586	**205-932** Remover, Driveshaft

GENERAL EQUIPMENT

EQUIPMENT NAME
Transmission jack

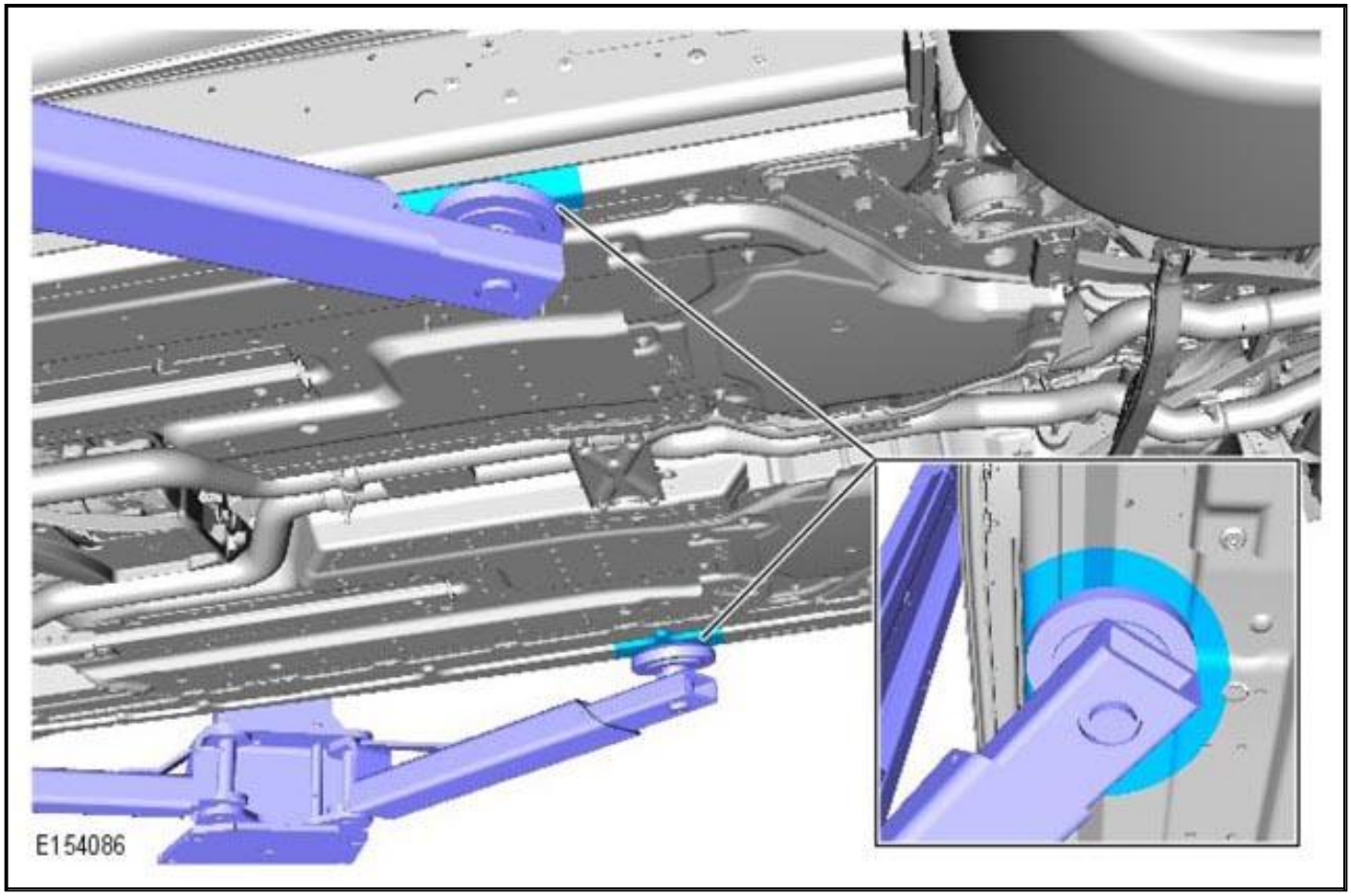
REMOVAL

NOTE:

- **Some components shown removed for clarity.**
- **Some variation in the illustrations may occur, but the essential information is always correct.**

1. Raise and support the vehicle.
2. **NOTE:** **This step must be performed on both sides.**

   Remove the rocker panel mouldings.

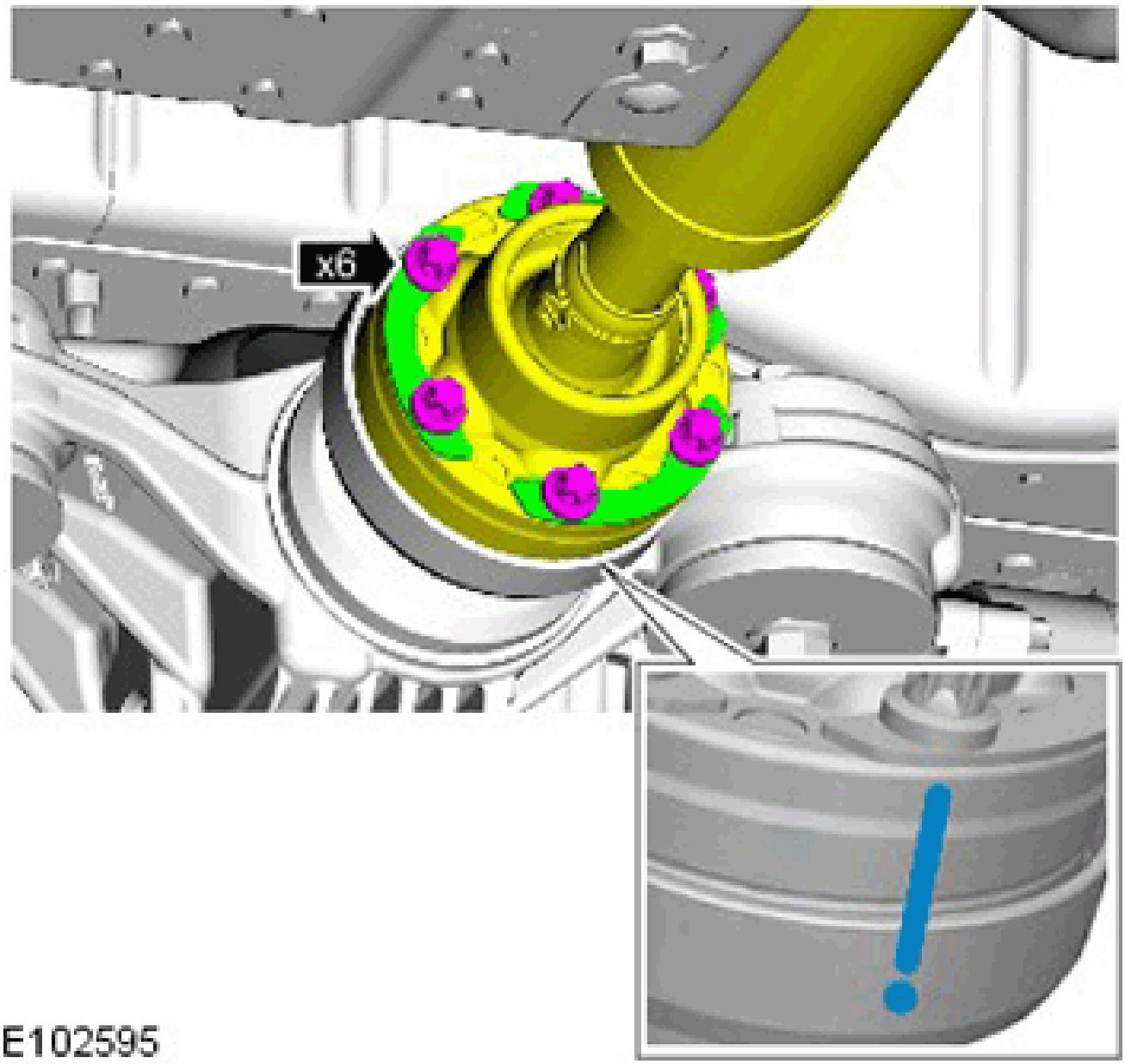
   Refer to: **Rocker Panel Moulding** (Removal and Installation).
3. Lower the vehicle from the ramp.
4. 

   Raise the vehicle in the positions shown.
5. Drain the rear differential.

   Refer to: **Differential Draining and Filling** (General Procedures).
6. **NOTE:** **This step must be performed on both sides.**

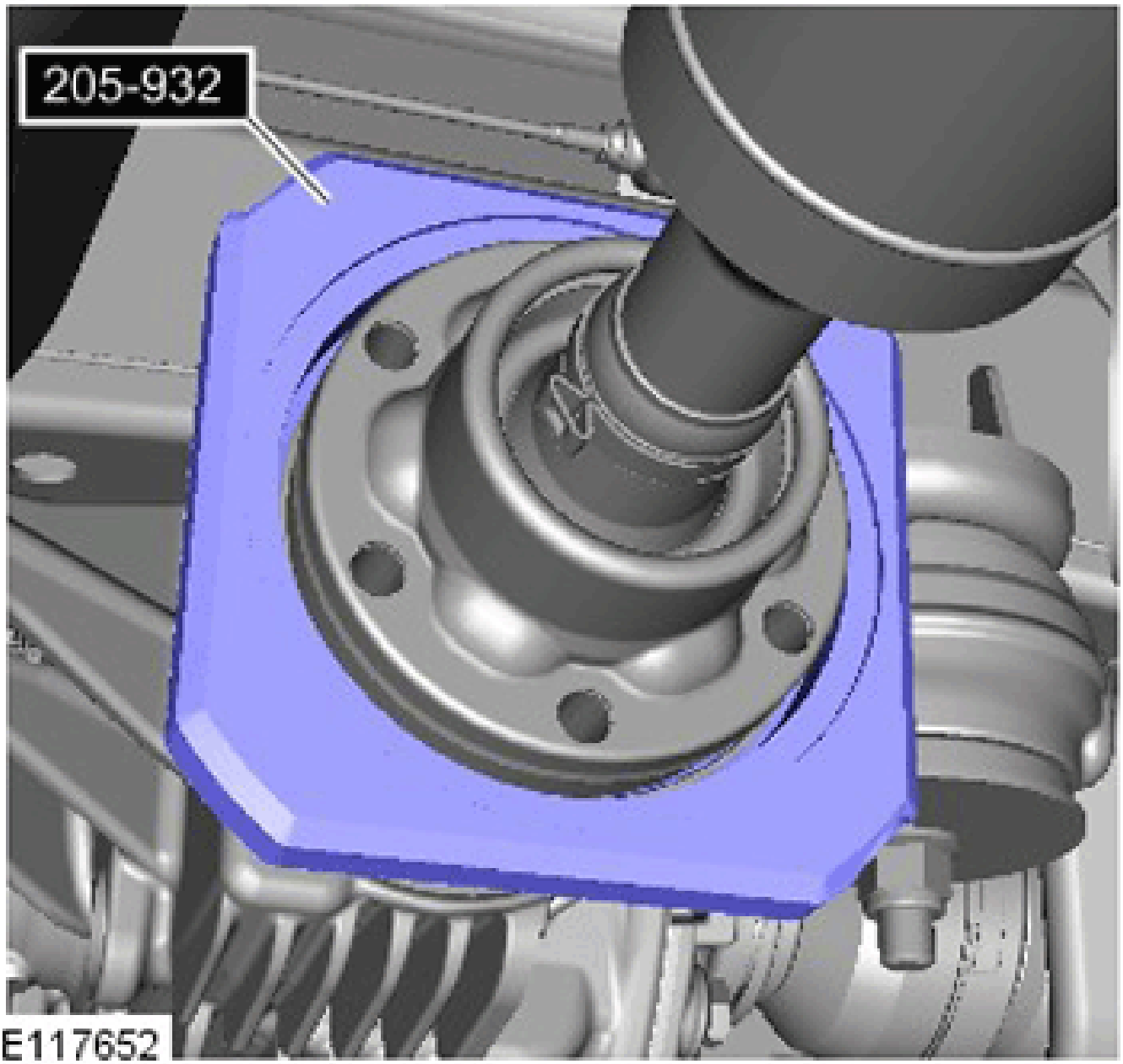
   Remove the rear halfshafts.

   Refer to: **Rear Halfshaft** (Removal and Installation).
7.



Remove the driveshaft bolts and washers.

8.

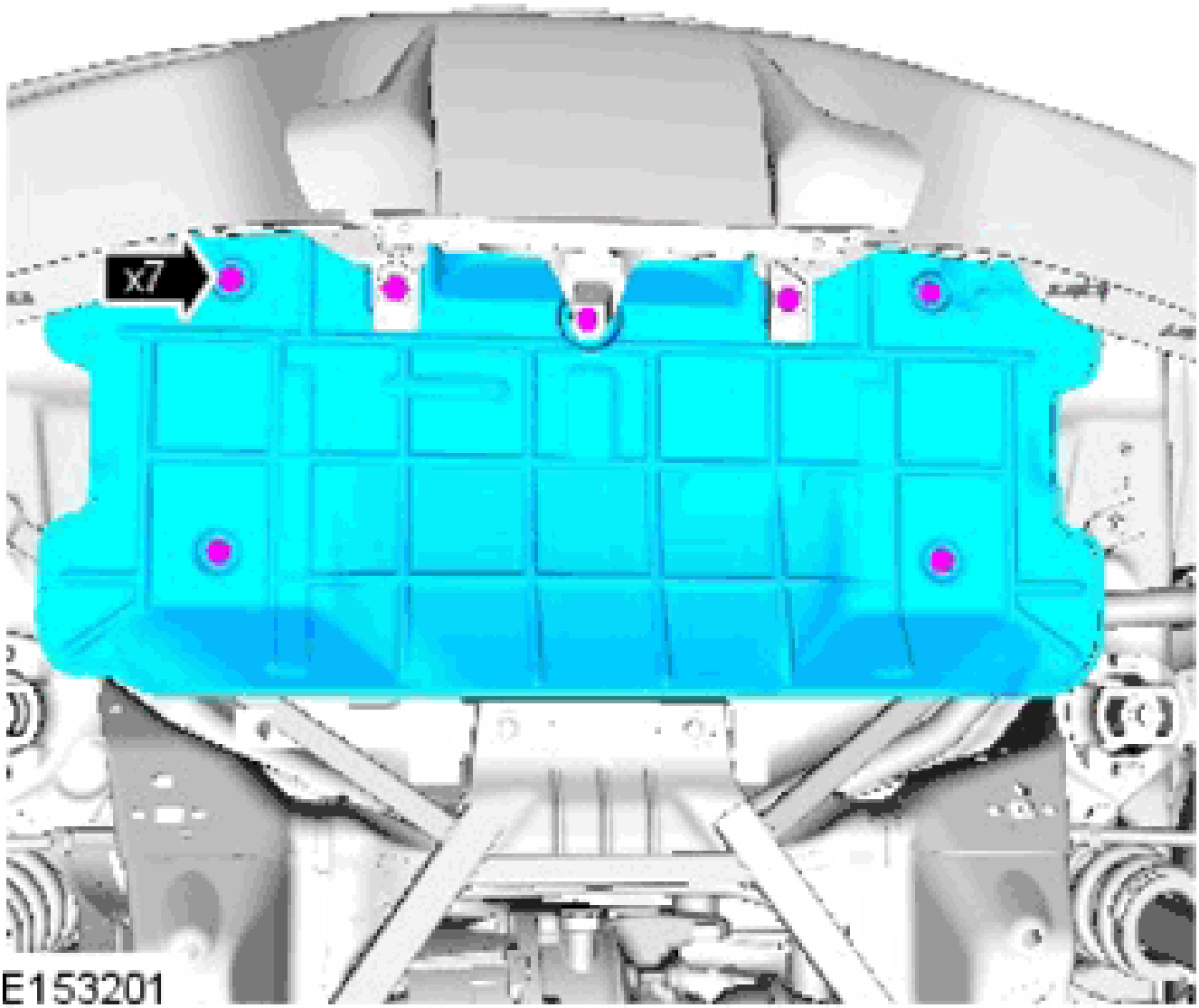


1. Using the special tool release the driveshaft from the rear differential.

Special Tool(s): 205-932

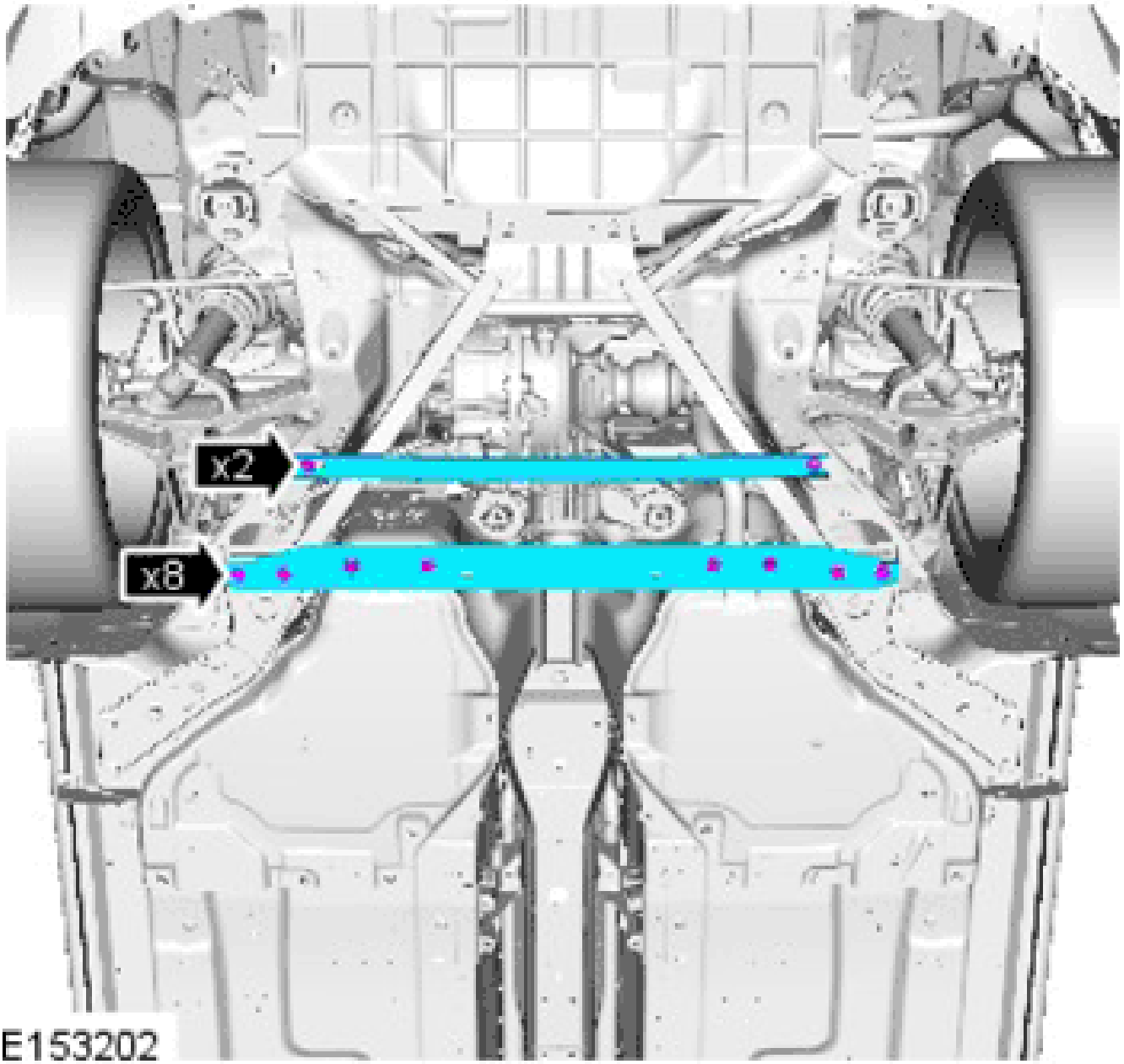
1. Using suitable straps, tie the driveshaft to one side.

9.



Remove the rear air shield.

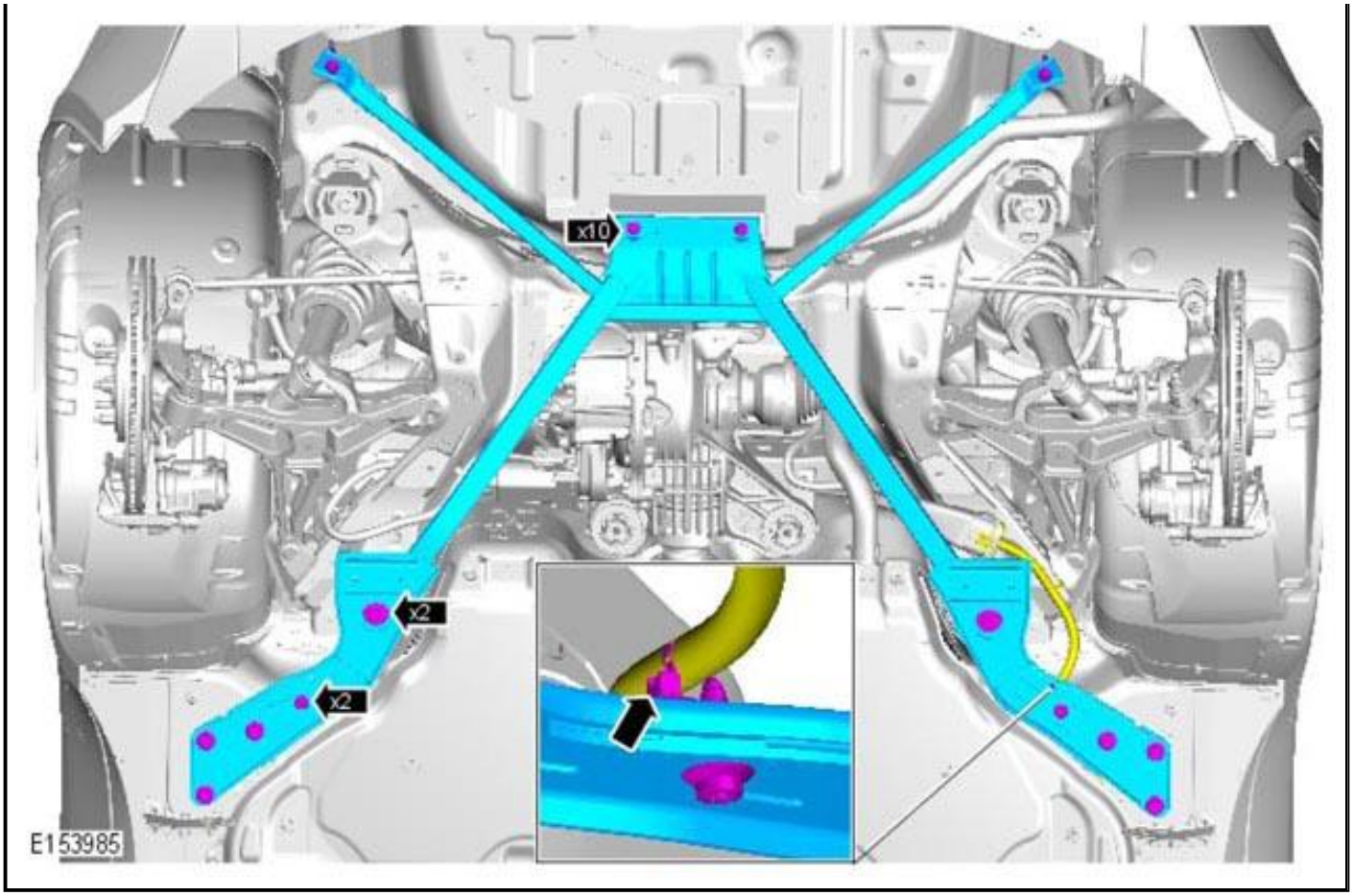
10.



Remove the rear suspension support brace.

11. **WARNING:**
    - **Make sure the axle assembly is supported.**
    - **Install the M12 subframe bolts prior to removing axle support.**

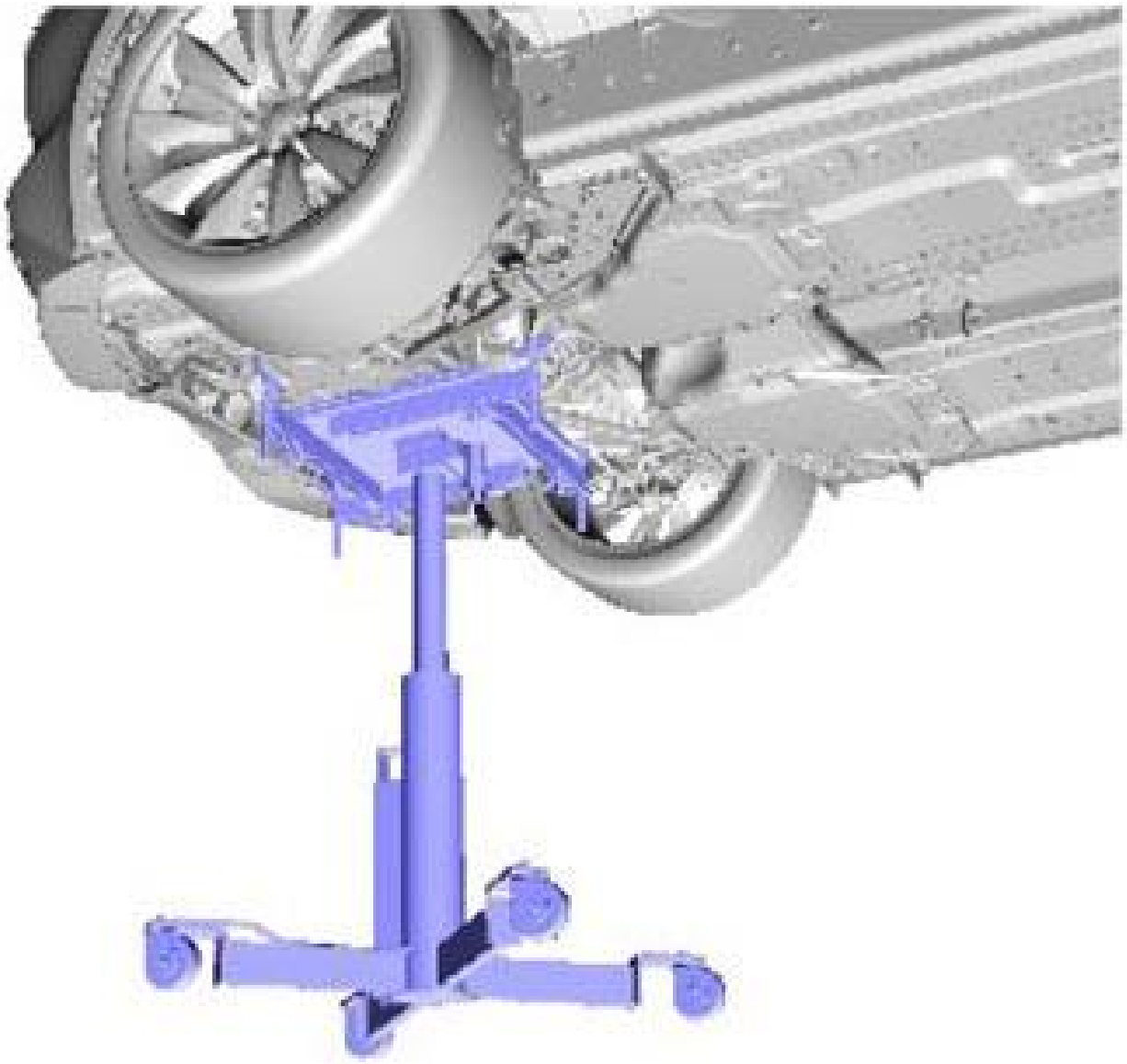
NOTE: **This step requires the aid of another technician.**



Remove the rear suspension cross brace.

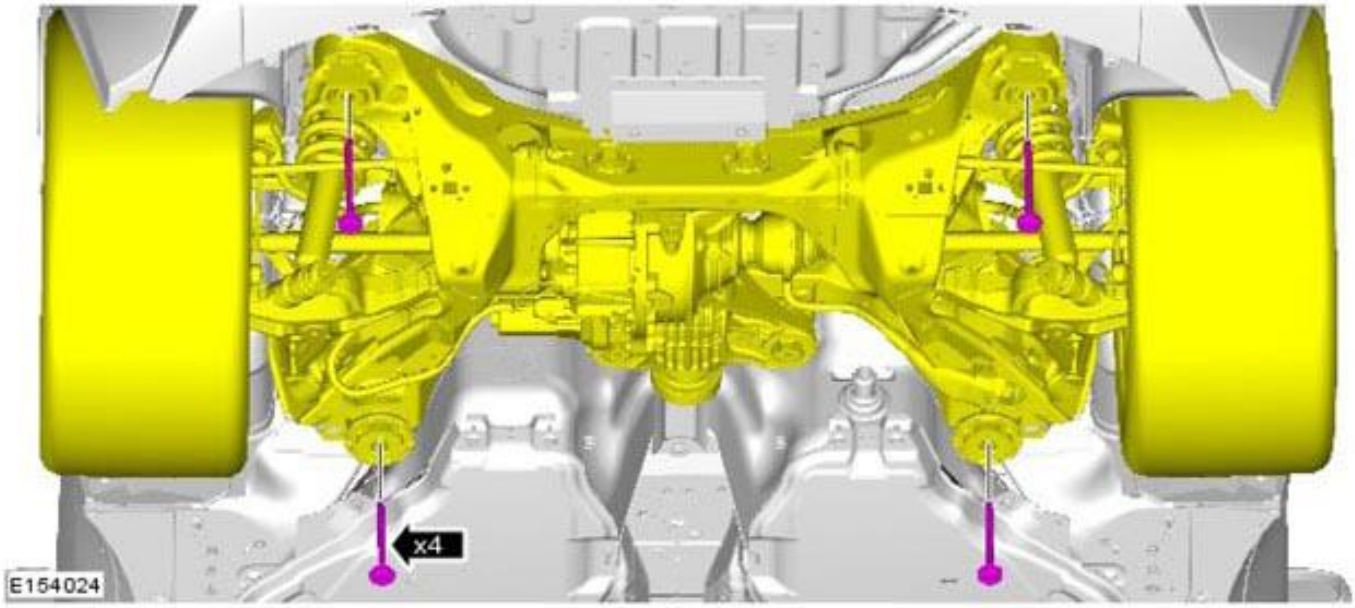
General Equipment: Transmission jack

12.



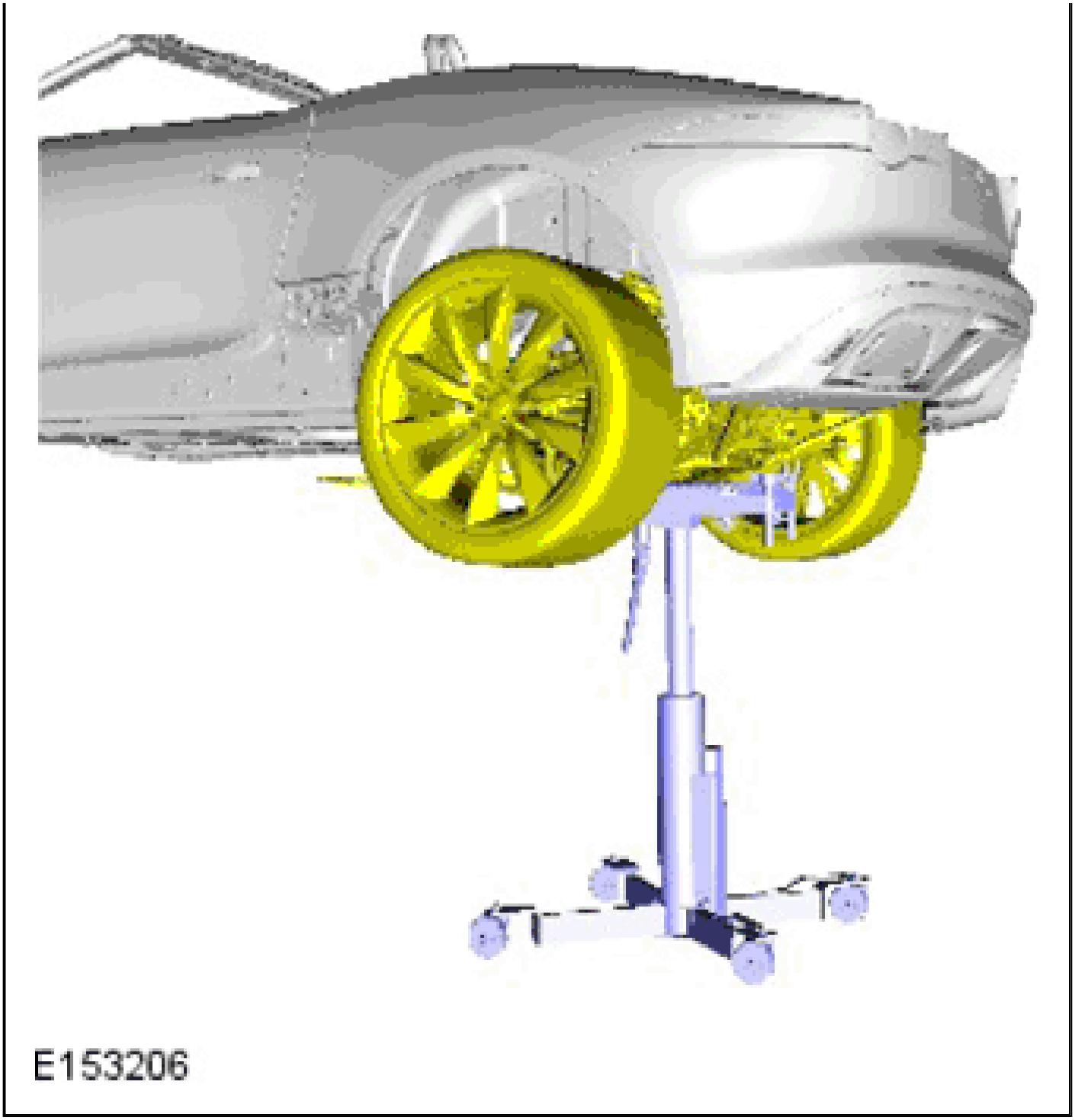
1. Position the support stand on the rear subframe.
1. Make sure the support stand has a enough clearance for the removal of the rear differential.

13.



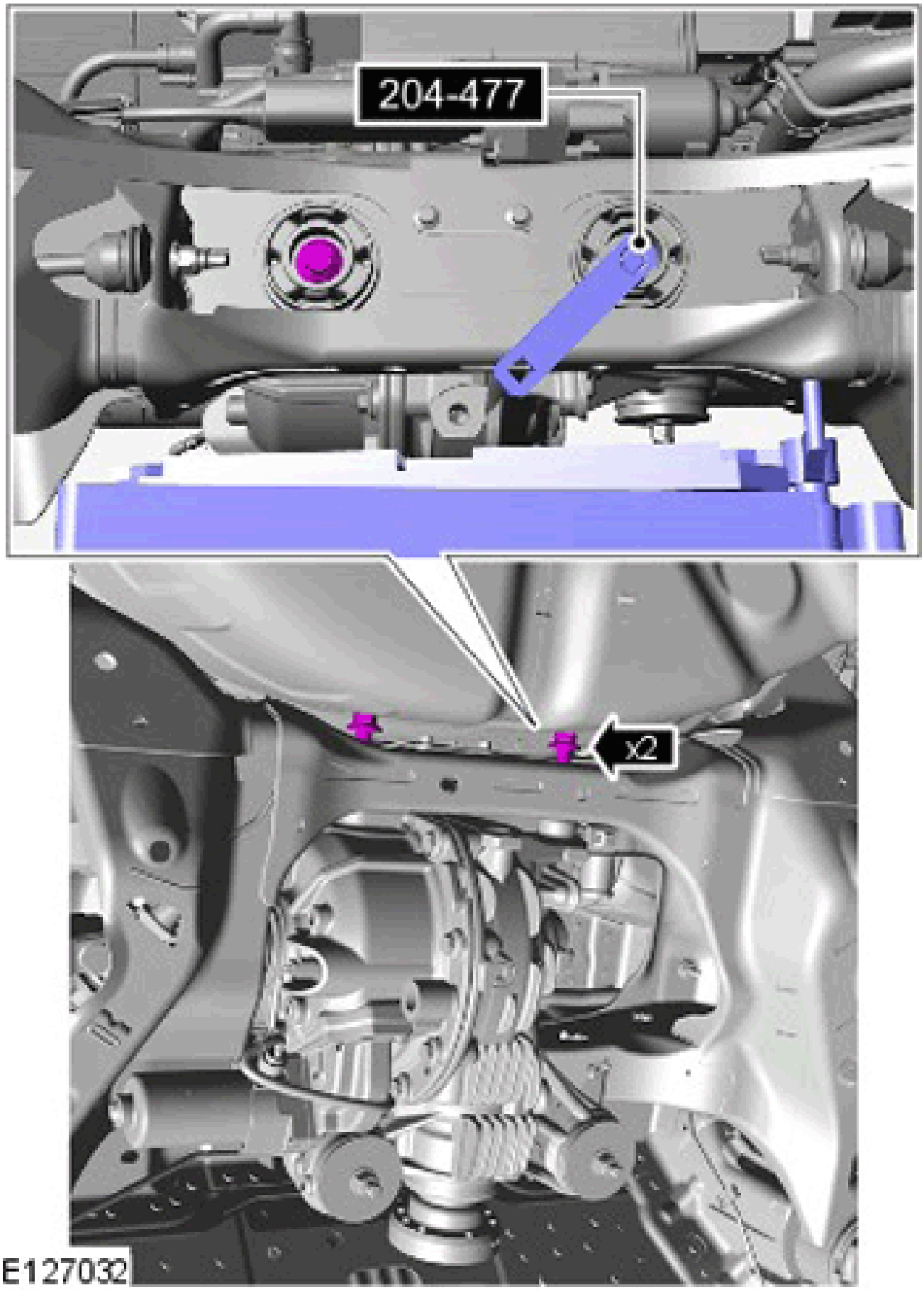
Remove the rear subframe bolts.

14. **CAUTION: Make sure when lowering the rear subframe damage does not occur to the surrounding components. Failure to follow this instruction may result in damage to the vehicle.**



Lower the subframe assembly by no more than 100 mm.

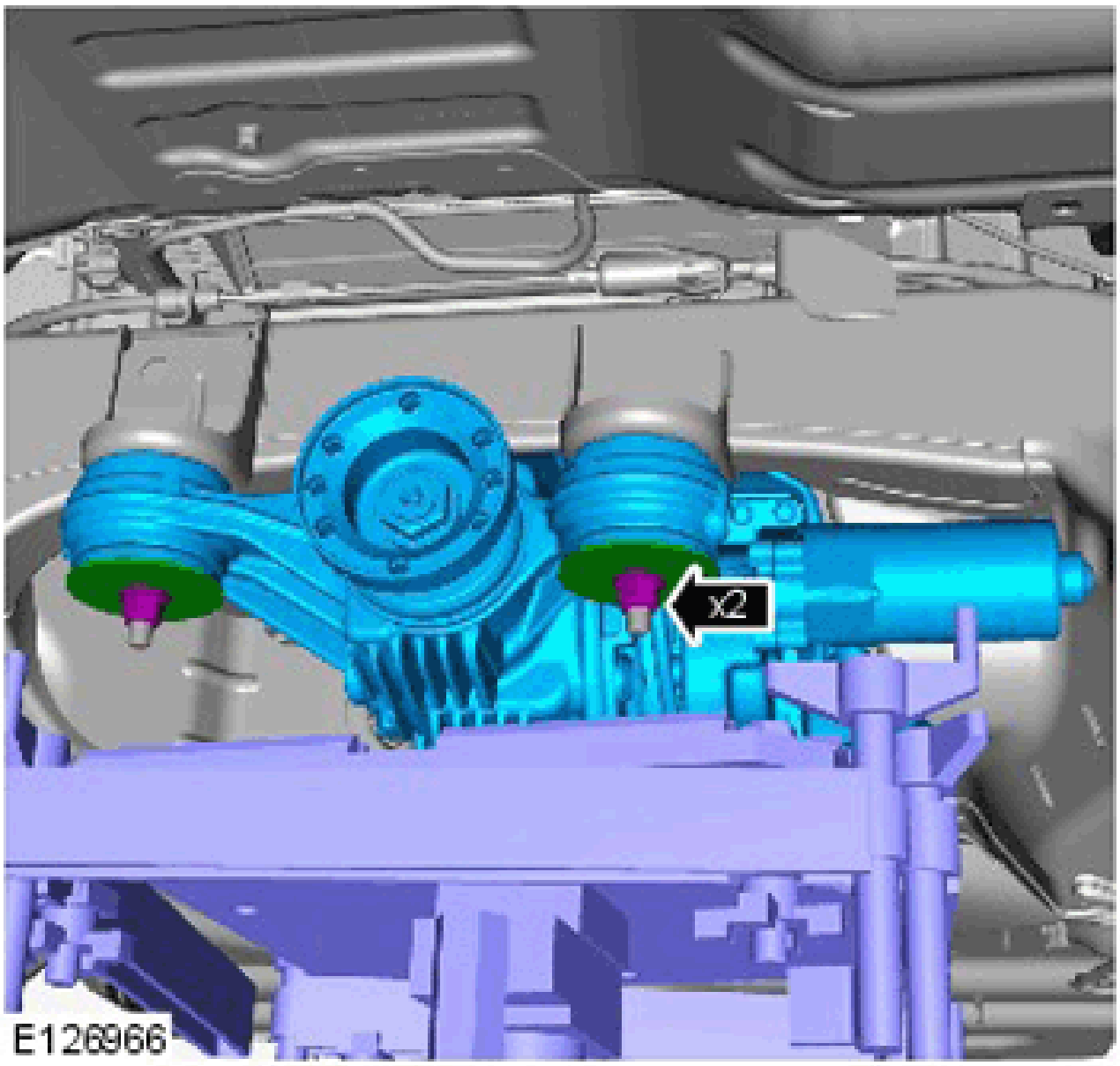
15.


204-477
x2
E127032

Remove the rear differential bolts.

Special Tool(s): 204-477

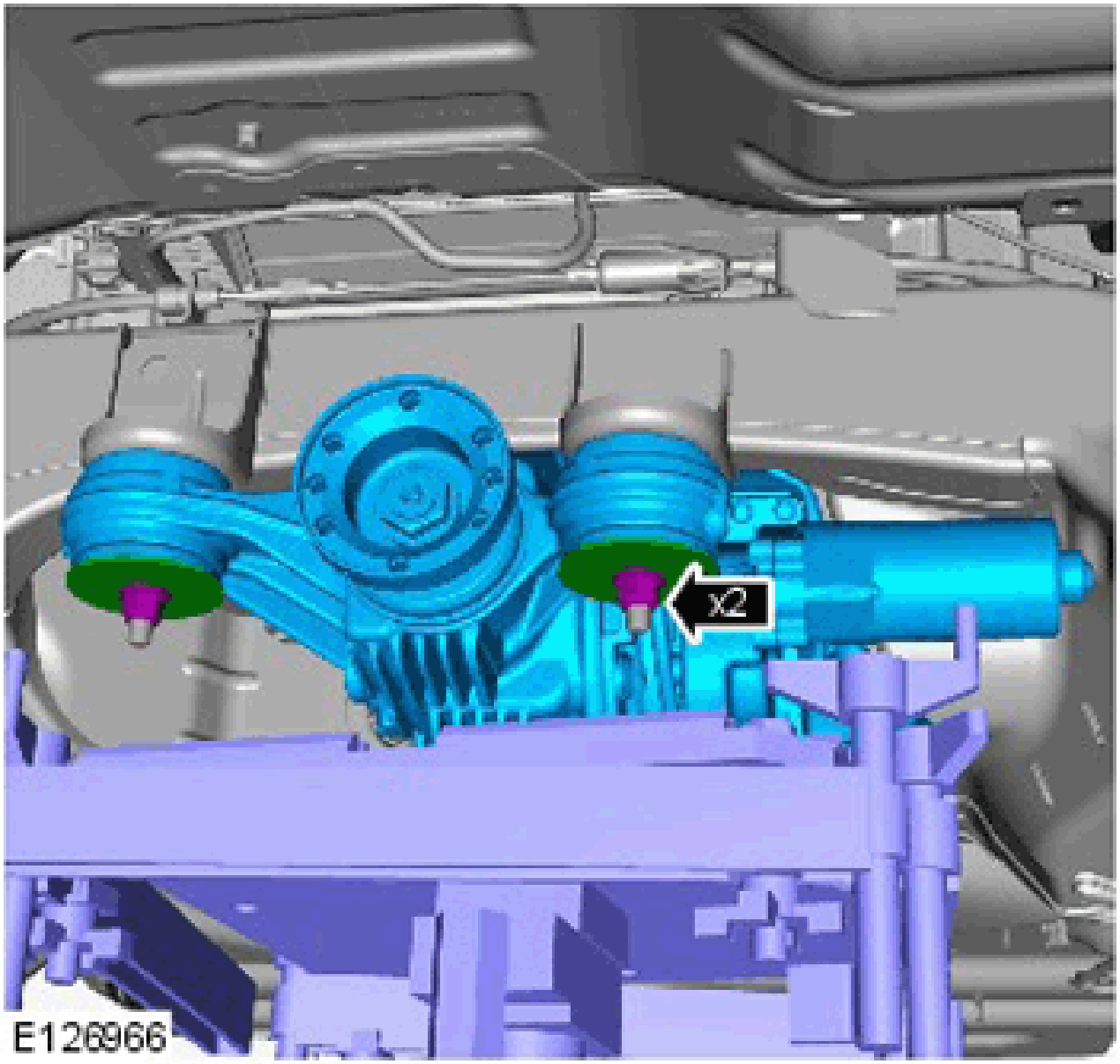
16.



Remove the rear differential bolts.

INSTALLATION

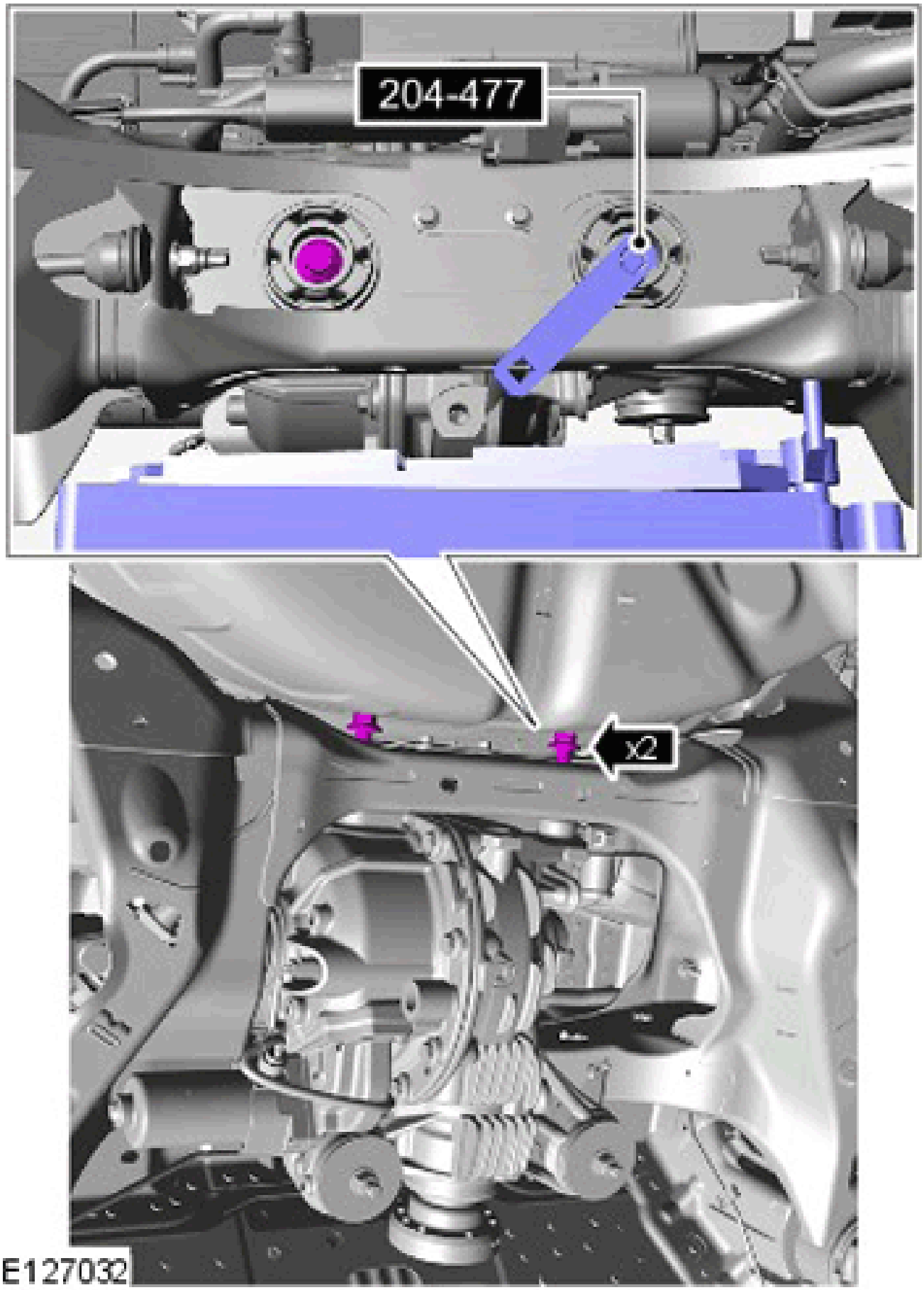
1.



Install the rear differential bolts.

Torque Specification: **90 Nm**

2.

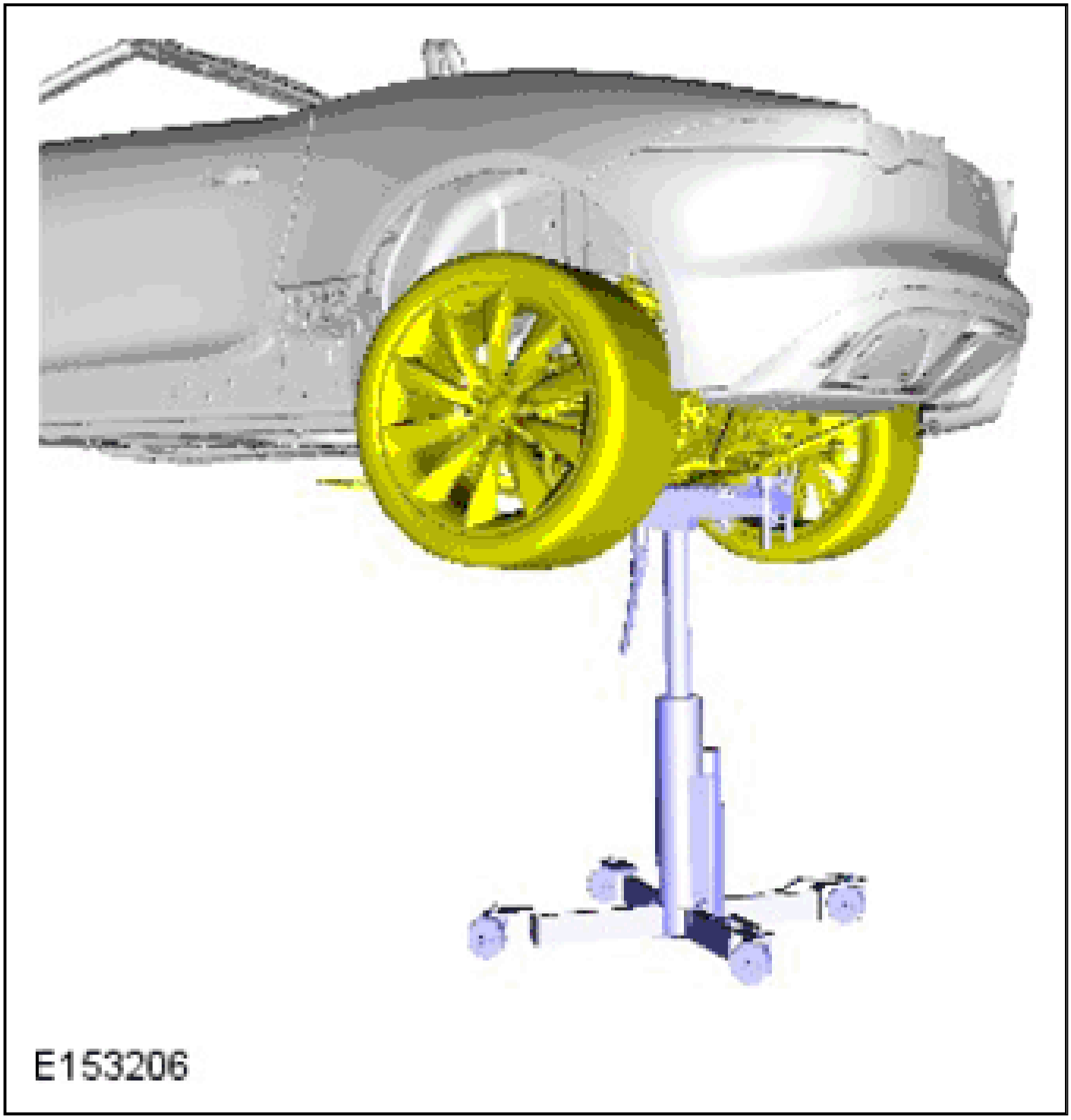

204-477
x2
E127032

Install the rear differential bolts.

Special Tool(s): 204-477

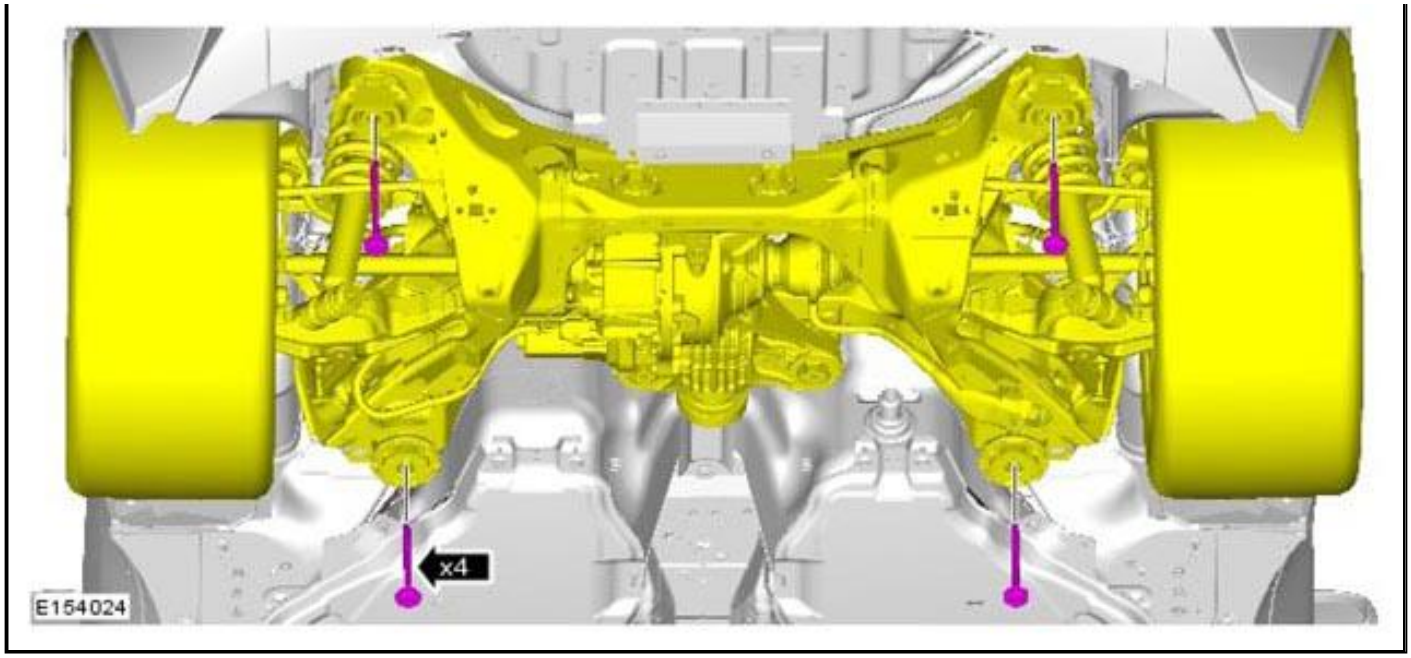
Torque Specification: **160 Nm**

3.



Raise the subframe into position.

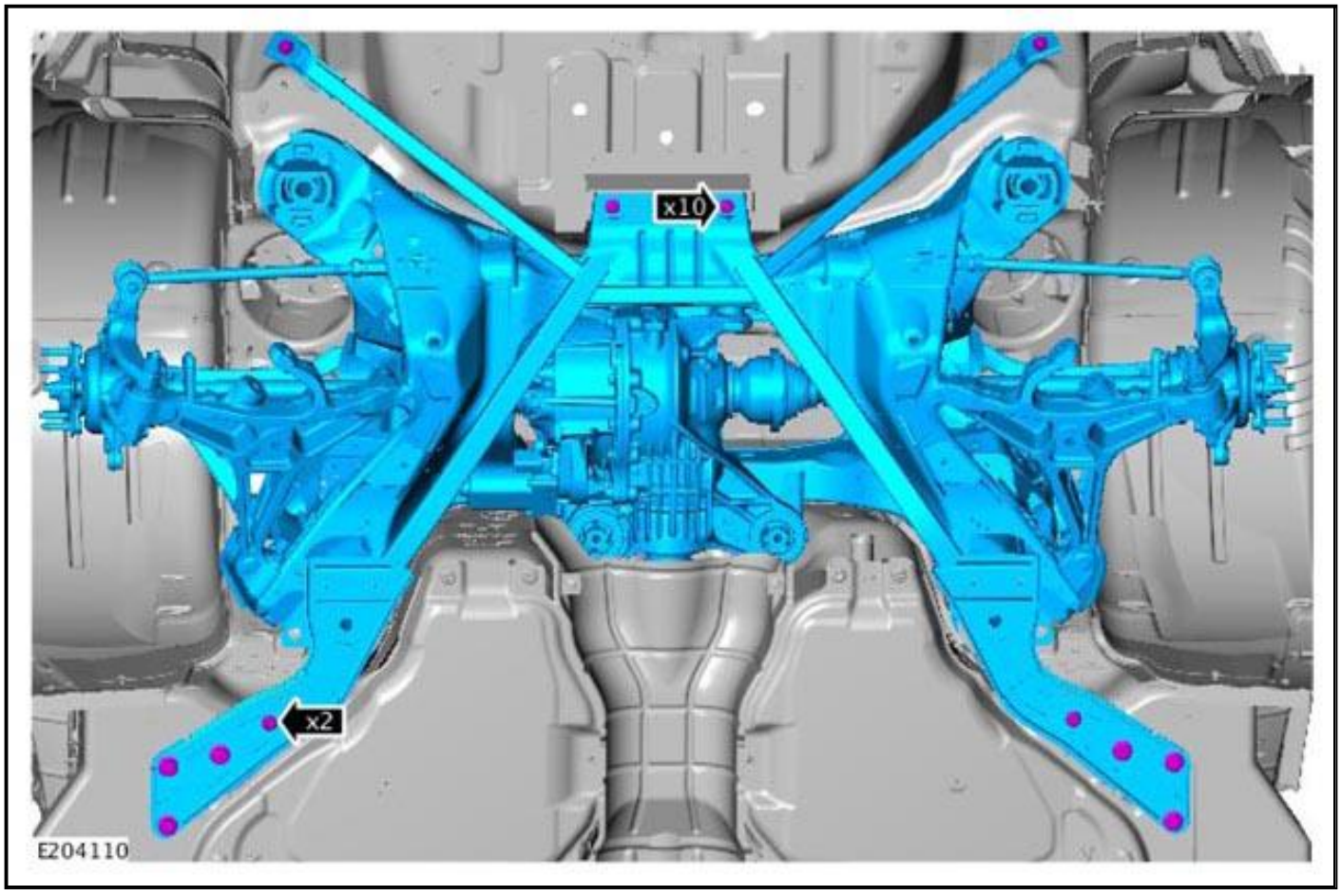
4.



Install the rear subframe bolts finger tight.

5. **WARNING:** **Make sure the axle assembly is supported.**

NOTE: **This step requires the aid of another technician.**

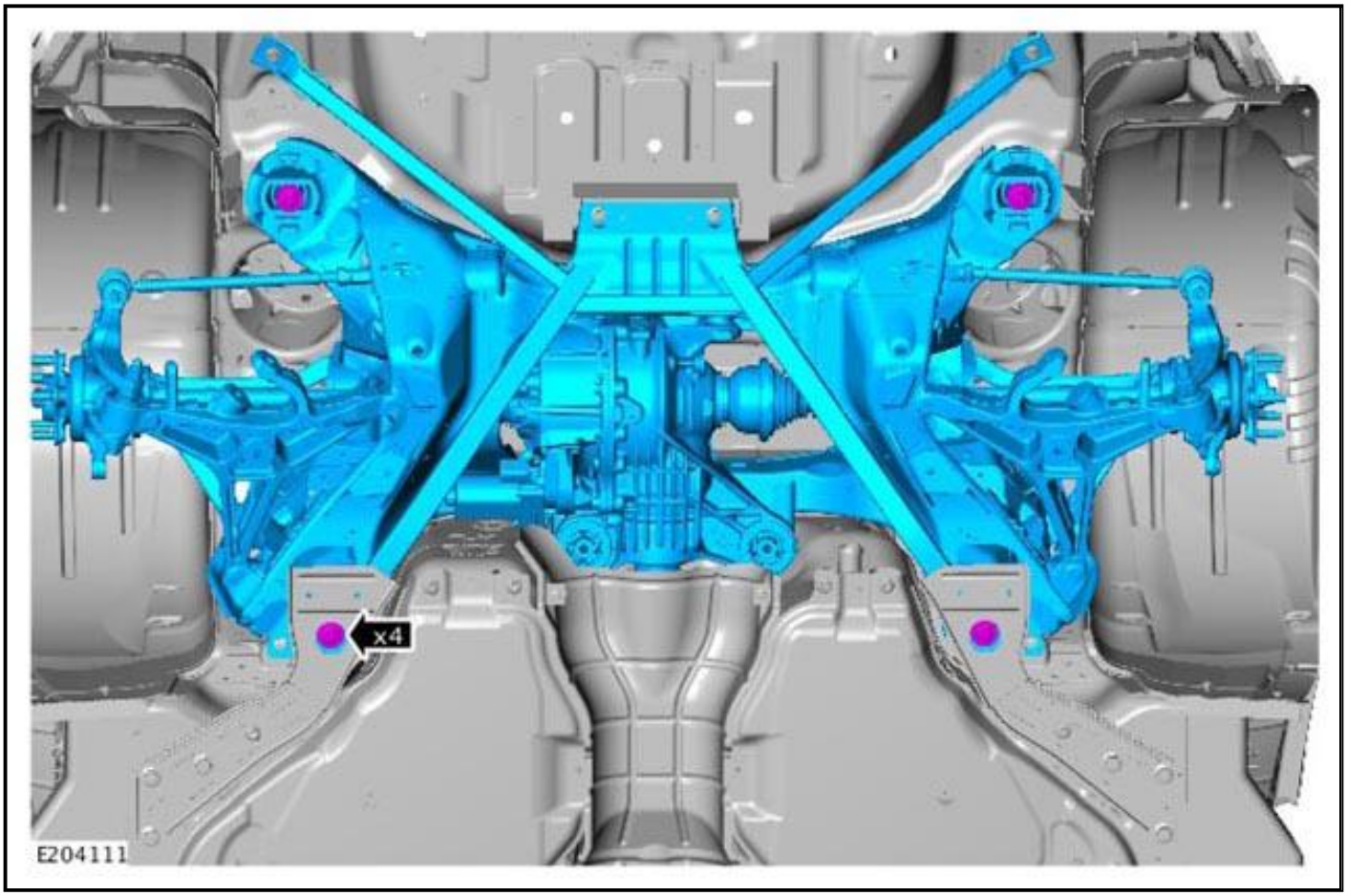


Install the rear suspension cross brace.

Torque Specification:

Torx bolts **25 Nm**

M10 bolts **45 Nm**

6. 

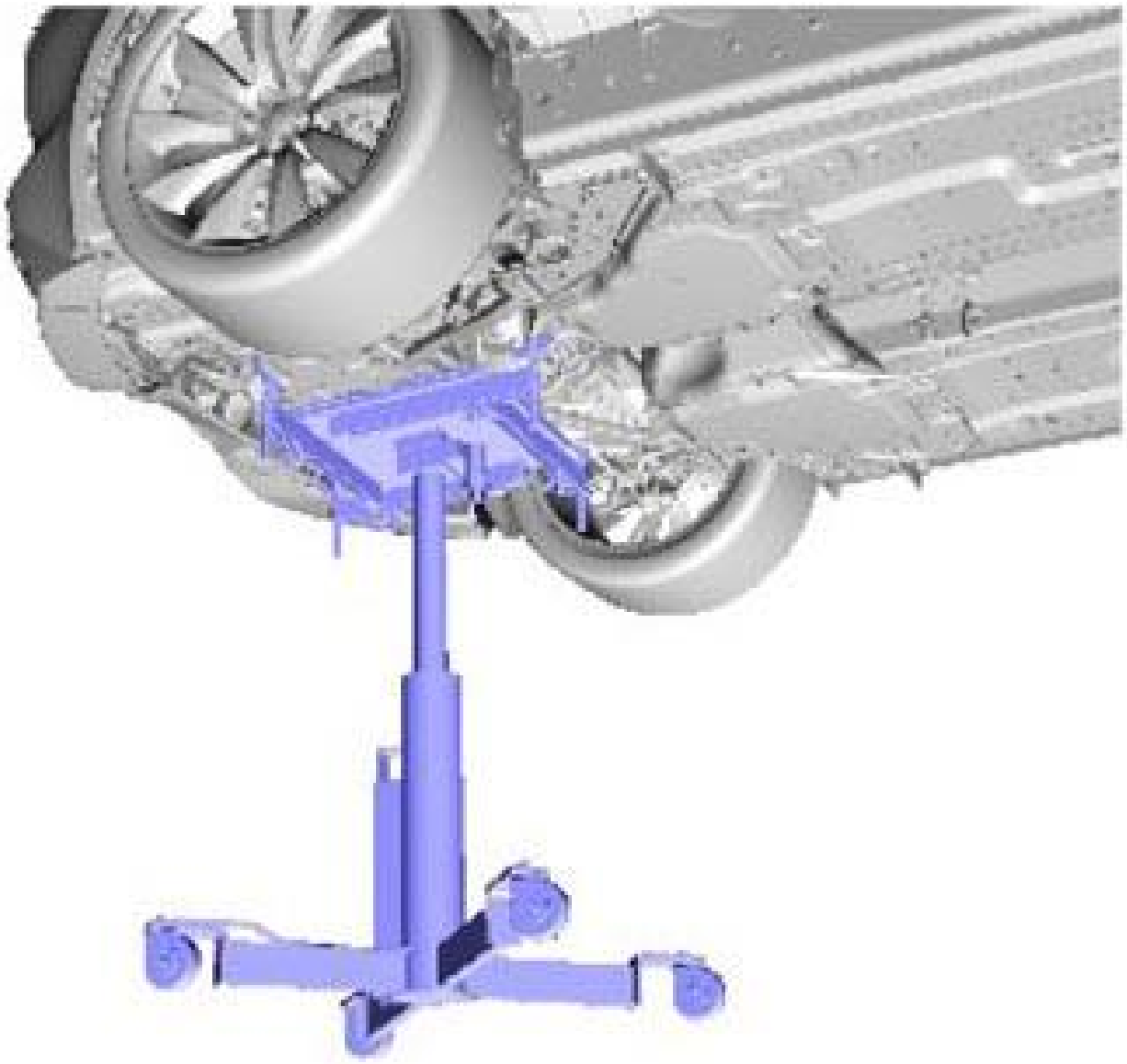
Tighten the subframe bolts.

Torque Specification:

Stage 1: **60 Nm**

Stage 2: 240Â°

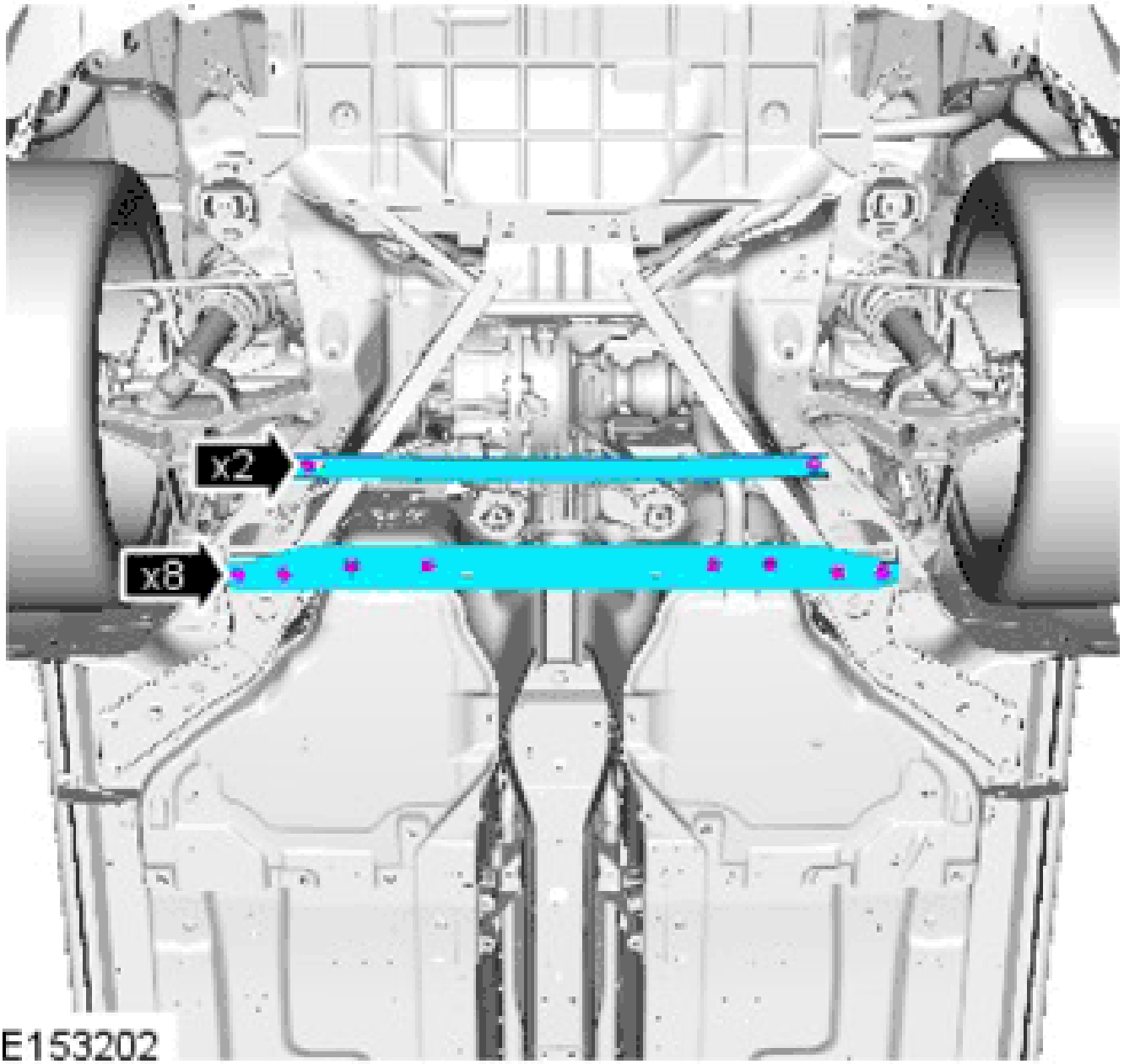
7.



Remove the support stand.

General Equipment: Transmission jack

8.



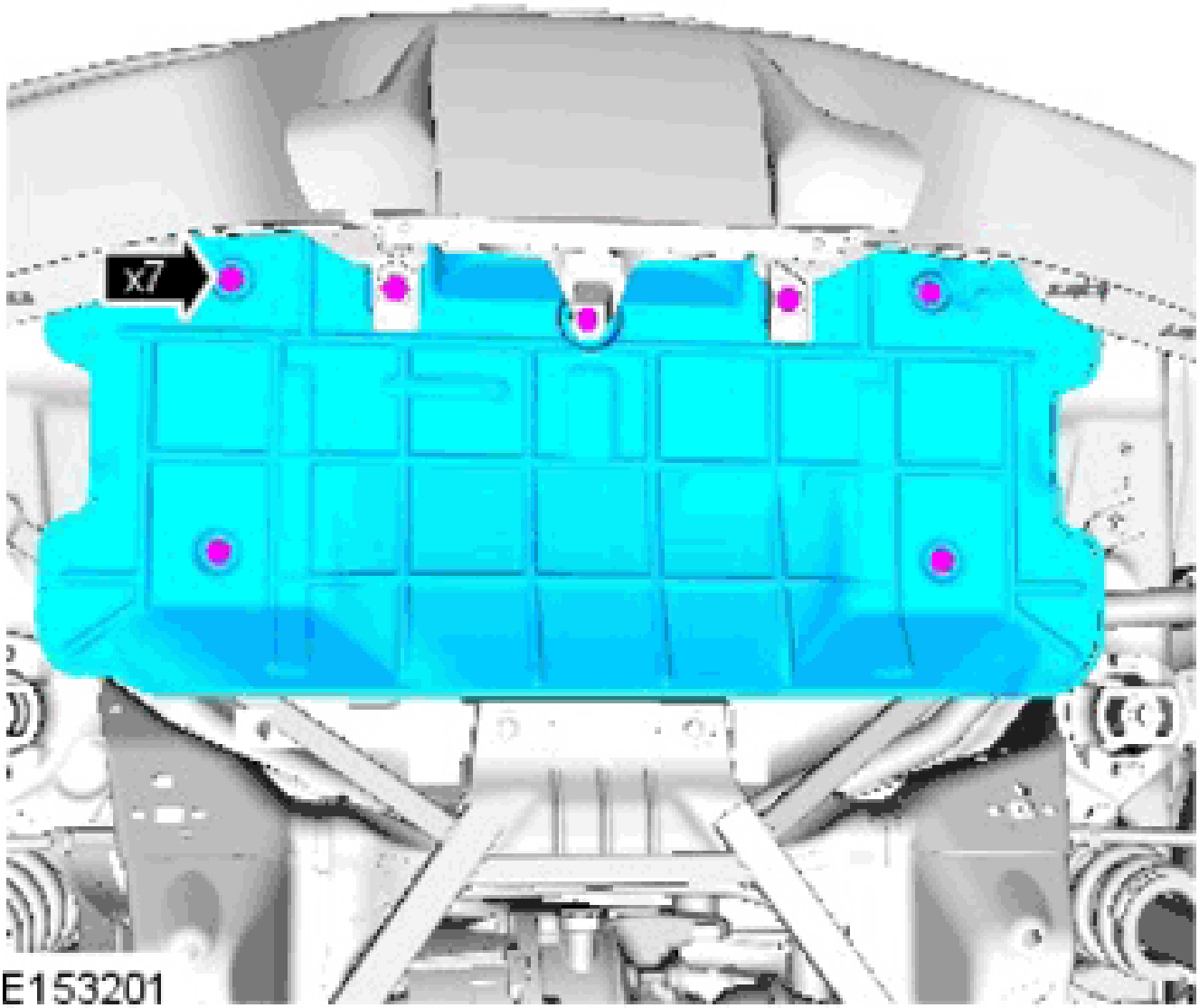
Install the rear suspension support brace.

Torque Specification:

M8 bolts **25 Nm**

M10 bolts **45 Nm**

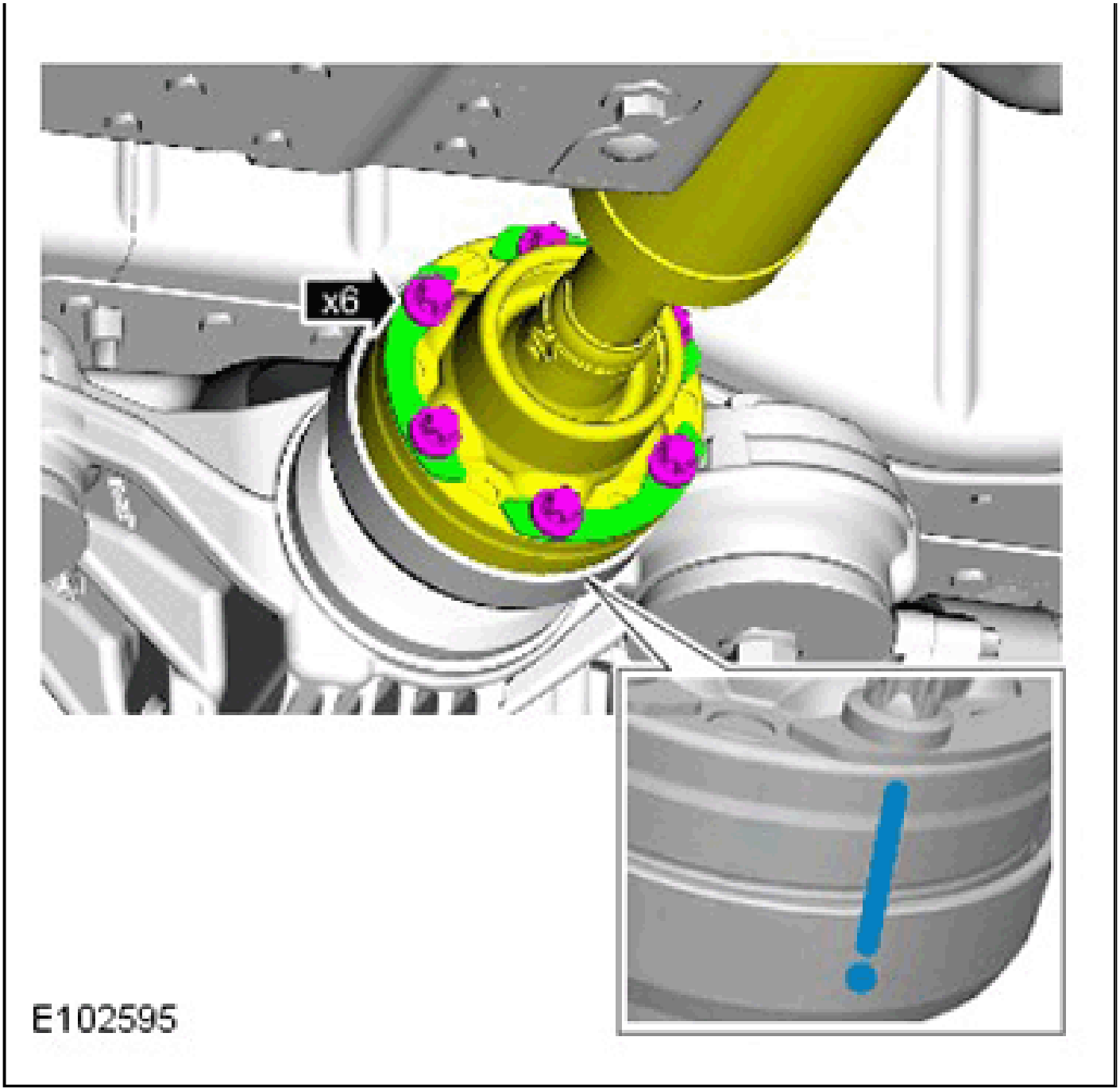
9.



Install the rear air shield.

Torque Specification: **10 Nm**

10.



Install the driveshaft bolts and washers.

Torque Specification: **75 Nm**

11. **NOTE:** **This step must be performed on both sides.**

    Install the rear half shafts.

    Refer to: **Rear Halfshaft** (Removal and Installation).

12. Fill the rear differential with the correct specification oil.

    Refer to: **Differential Draining and Filling** (General Procedures).

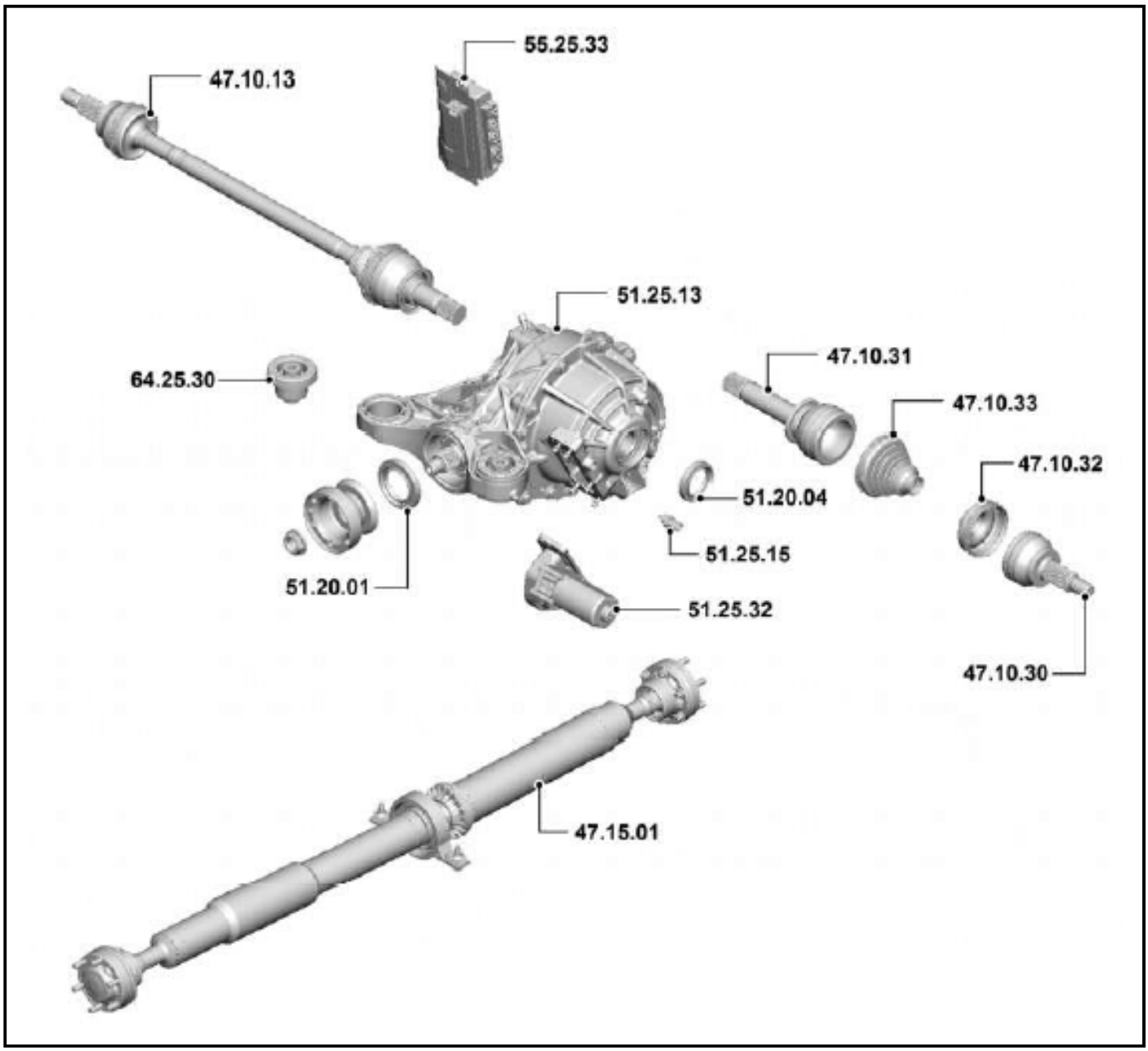
13. **NOTE:** **This step must be performed on both sides.**

Install the rocker panel mouldings.

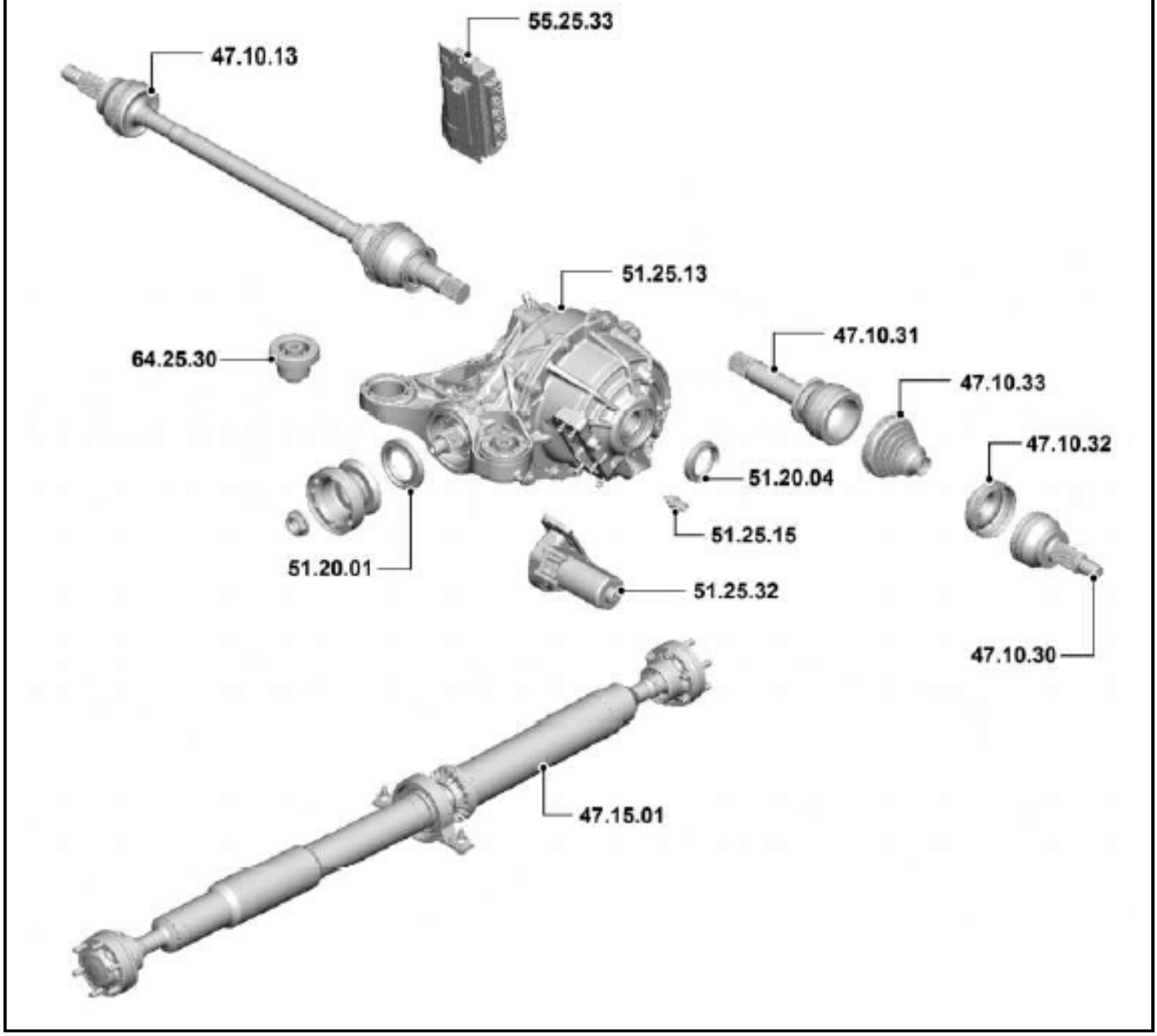
Refer to: **Rocker Panel Moulding** (Removal and Installation).

DIFFERENTIAL FRONT BUSHING (G1580094)

64.25.30	DIFFERENTIAL FRONT BUSHING - RENEW	3000 CC, AJ V6 (AJ126)	3.7



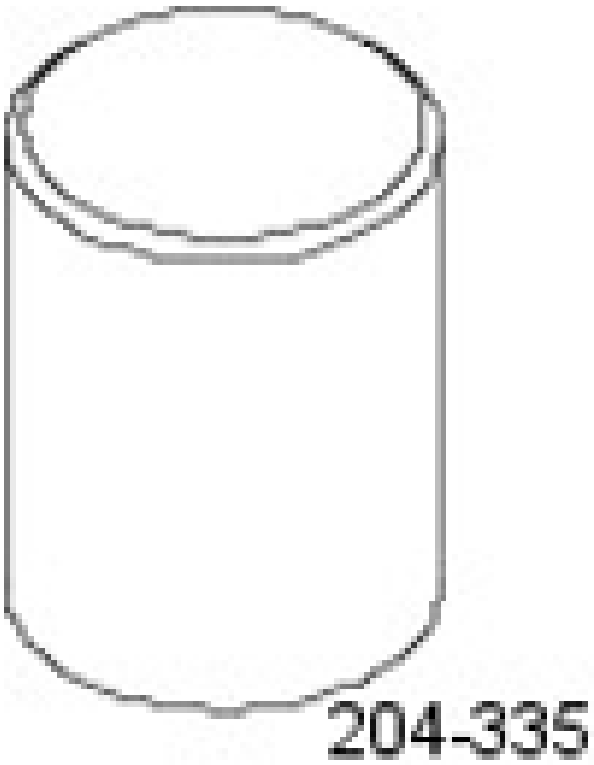
64.25.30	DIFFERENTIAL FRONT BUSHING - RENEW	5000 CC, AJ V8	3.6

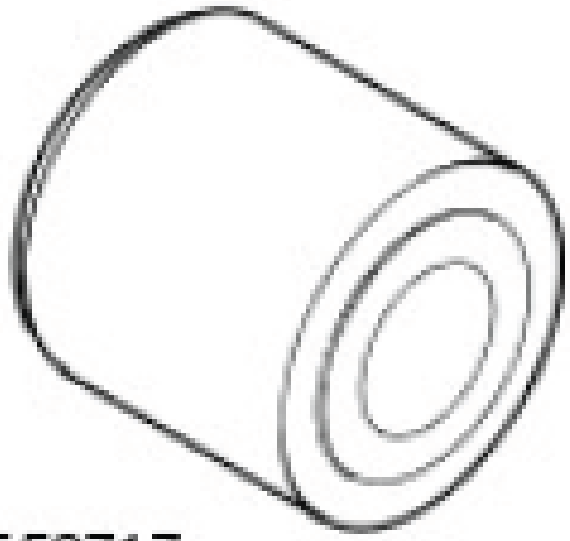


SPECIAL TOOL(S)

	204-274 Bush install and removal tool

 204-274	
 204-275	**204-275** Bush install and removal tool
	204-335 Bush install and removal tool

	
	**204-601** Bush install tool
	303-1121 Installer, Crankshaft Seal

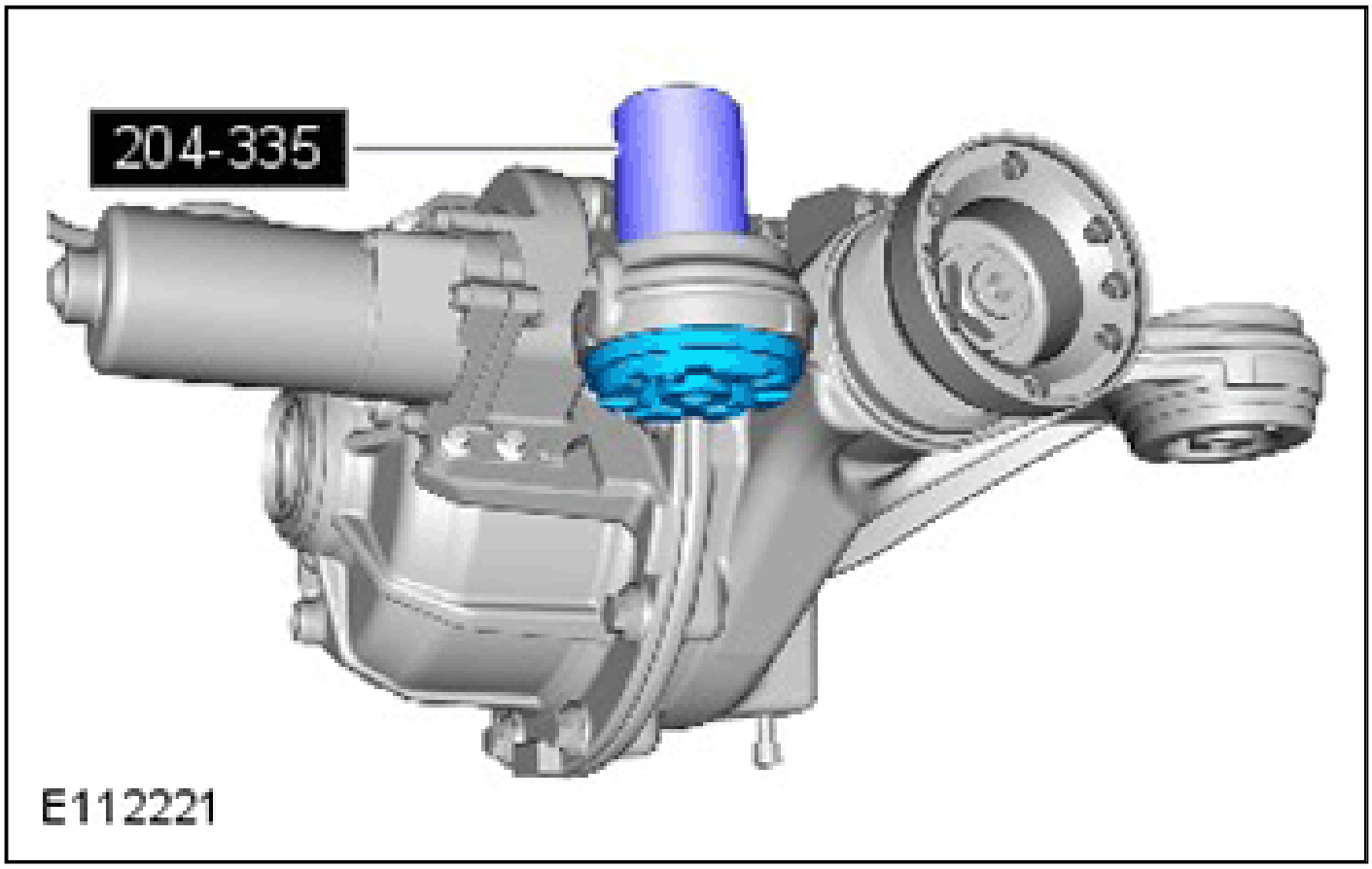


REMOVAL

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.

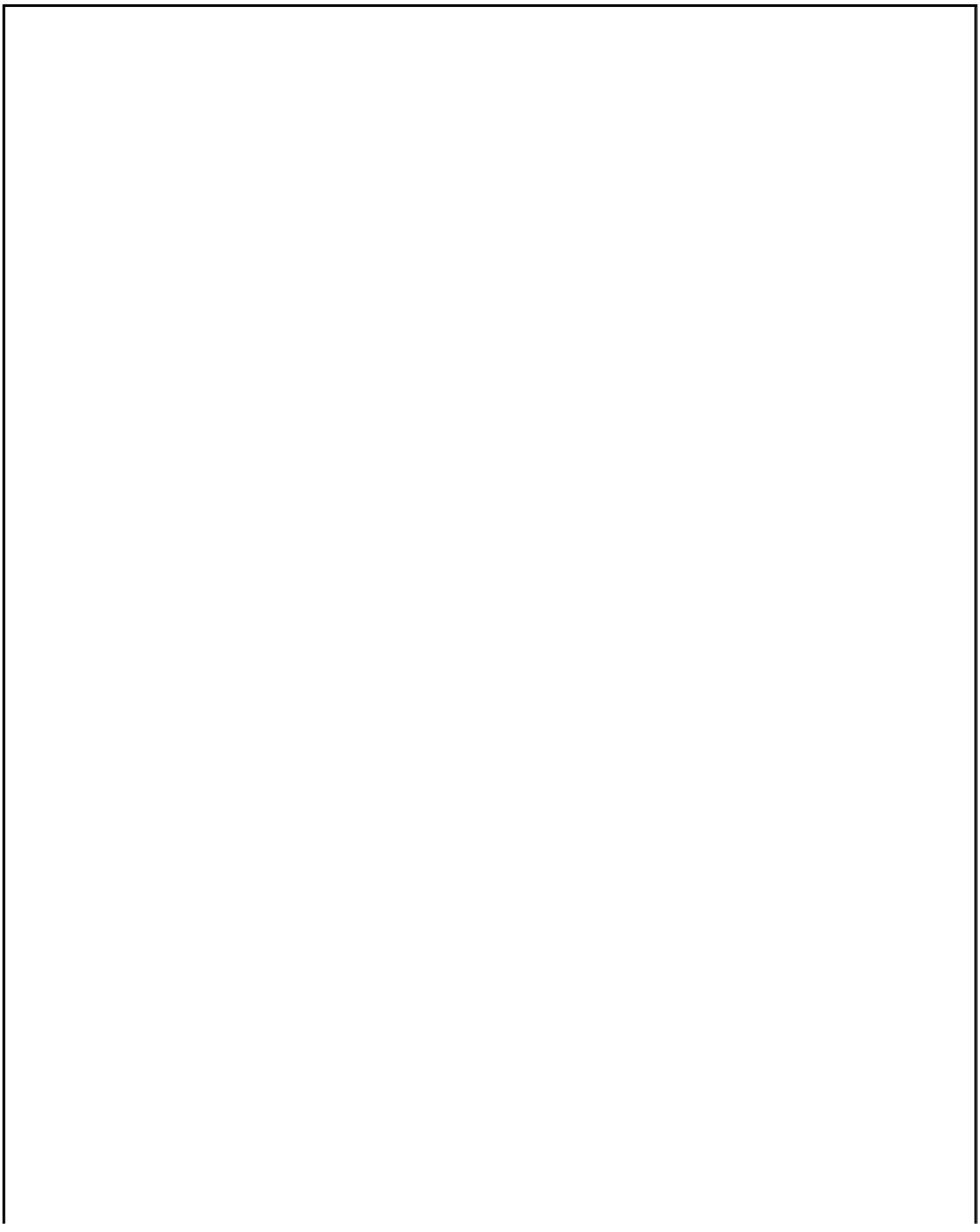
2. .: **Differential Case** (205-02, Removal and Installation).

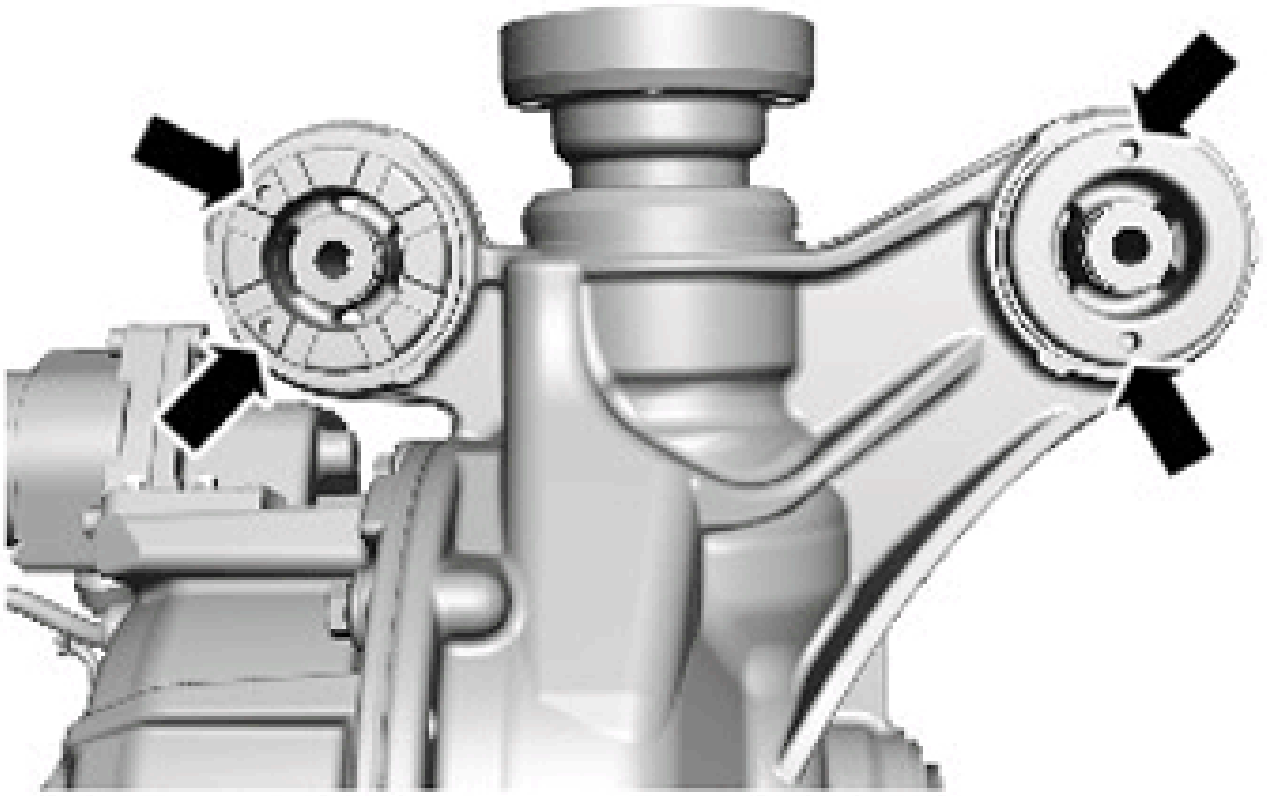
3. 

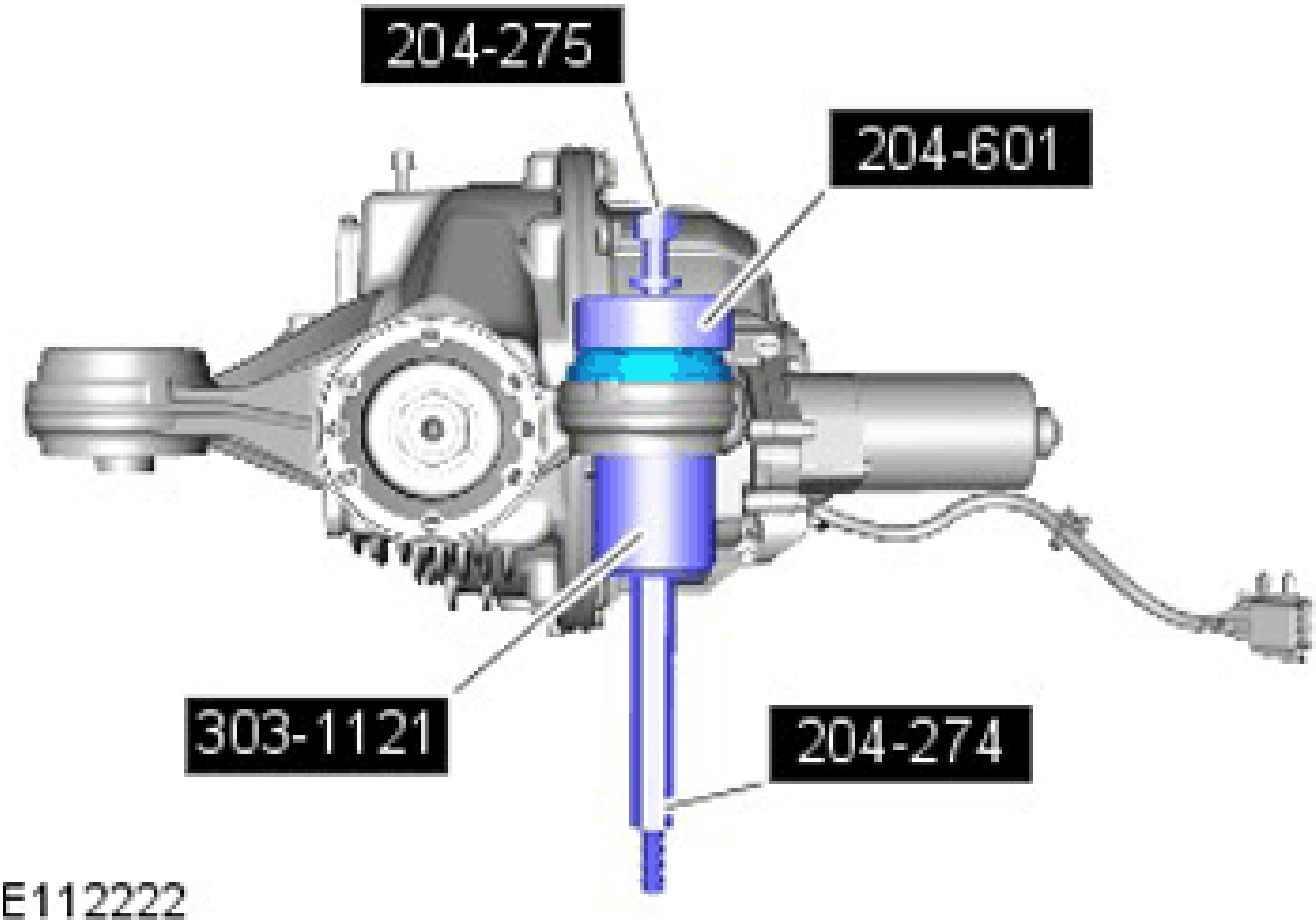
Special Tool(s): 204-335

INSTALLATION

1. **NOTE:** **Make sure the new bushes are installed in the correct orientation.**







E112222

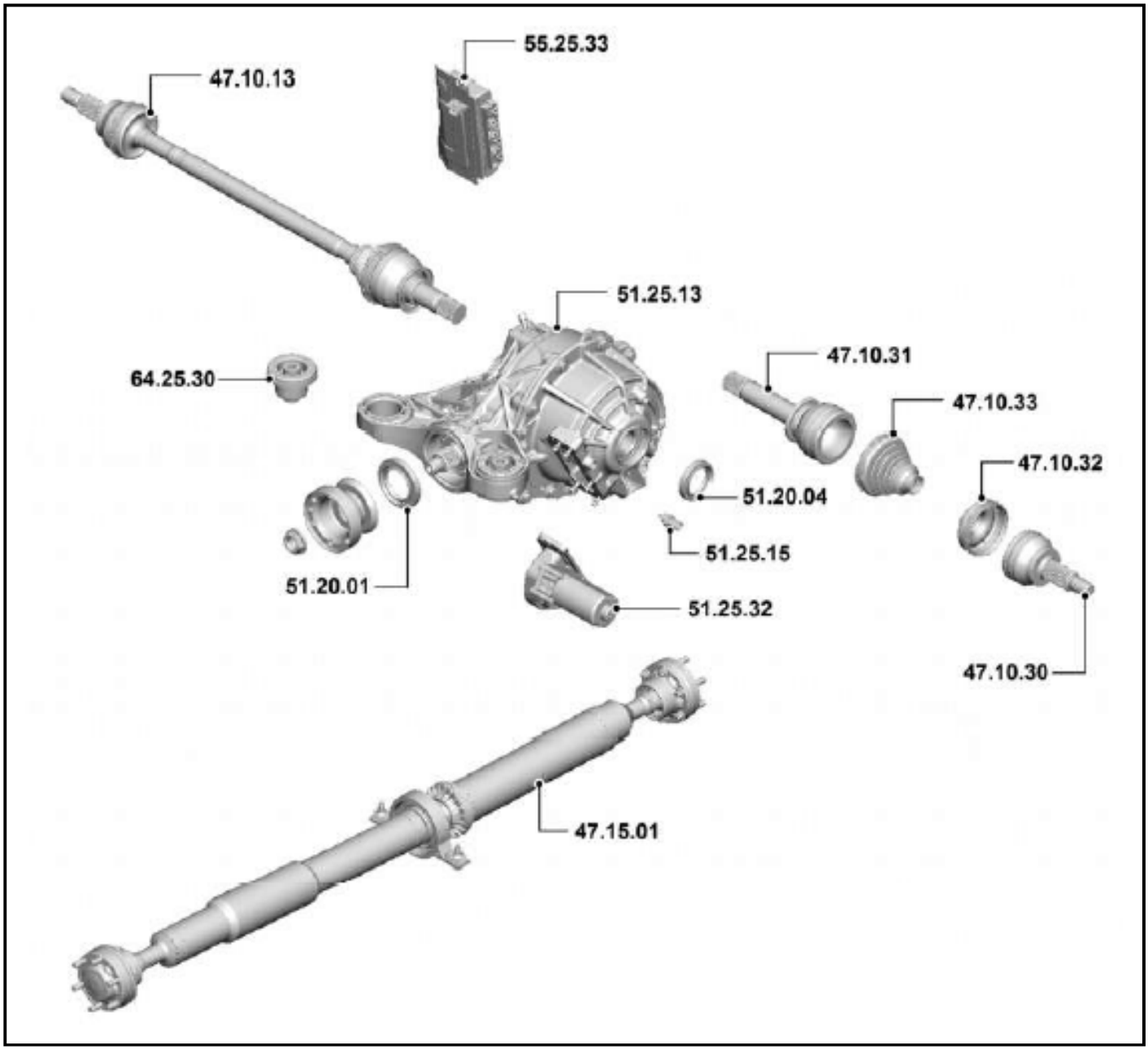
-

Special Tool(s): 204-275, 204-601, 303-1121, 204-274

2. Refer to: **Differential Case** (Removal and Installation).

DIFFERENTIAL FLUID TEMPERATURE SENSOR (G1581713)

51.25.15	FINAL DRIVE UNIT OIL TEMPERATURE SENSOR - RENEW	ALL DERIVATIVES	0.3



REMOVAL

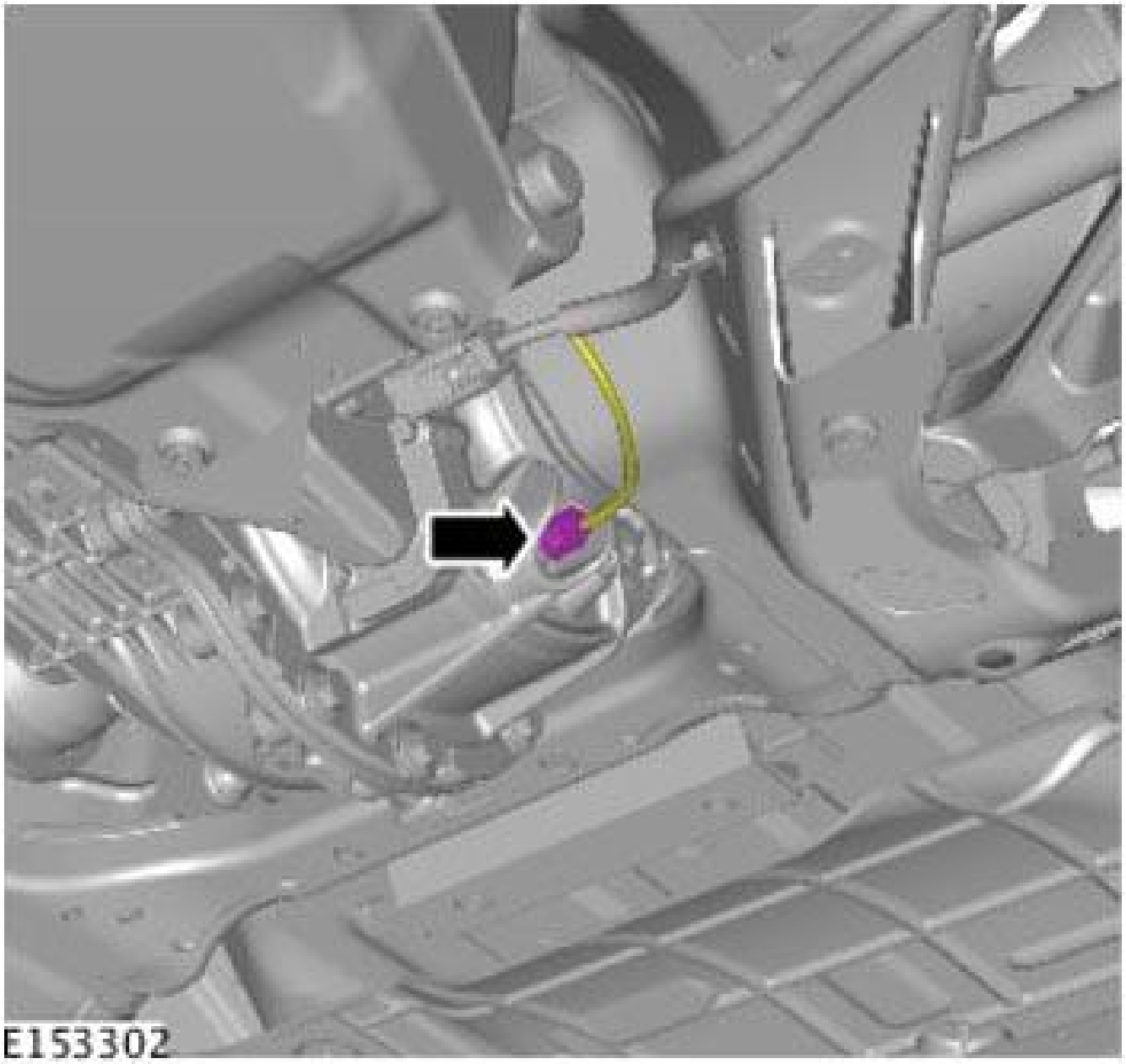
NOTE: **Removal steps in this procedure may contain installation details.**

1. Refer to: **Differential Draining and Filling** (General Procedures).

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

Raise and support the vehicle.

3.



4. **NOTE:** **Some fluid spillage is inevitable during this operation.**

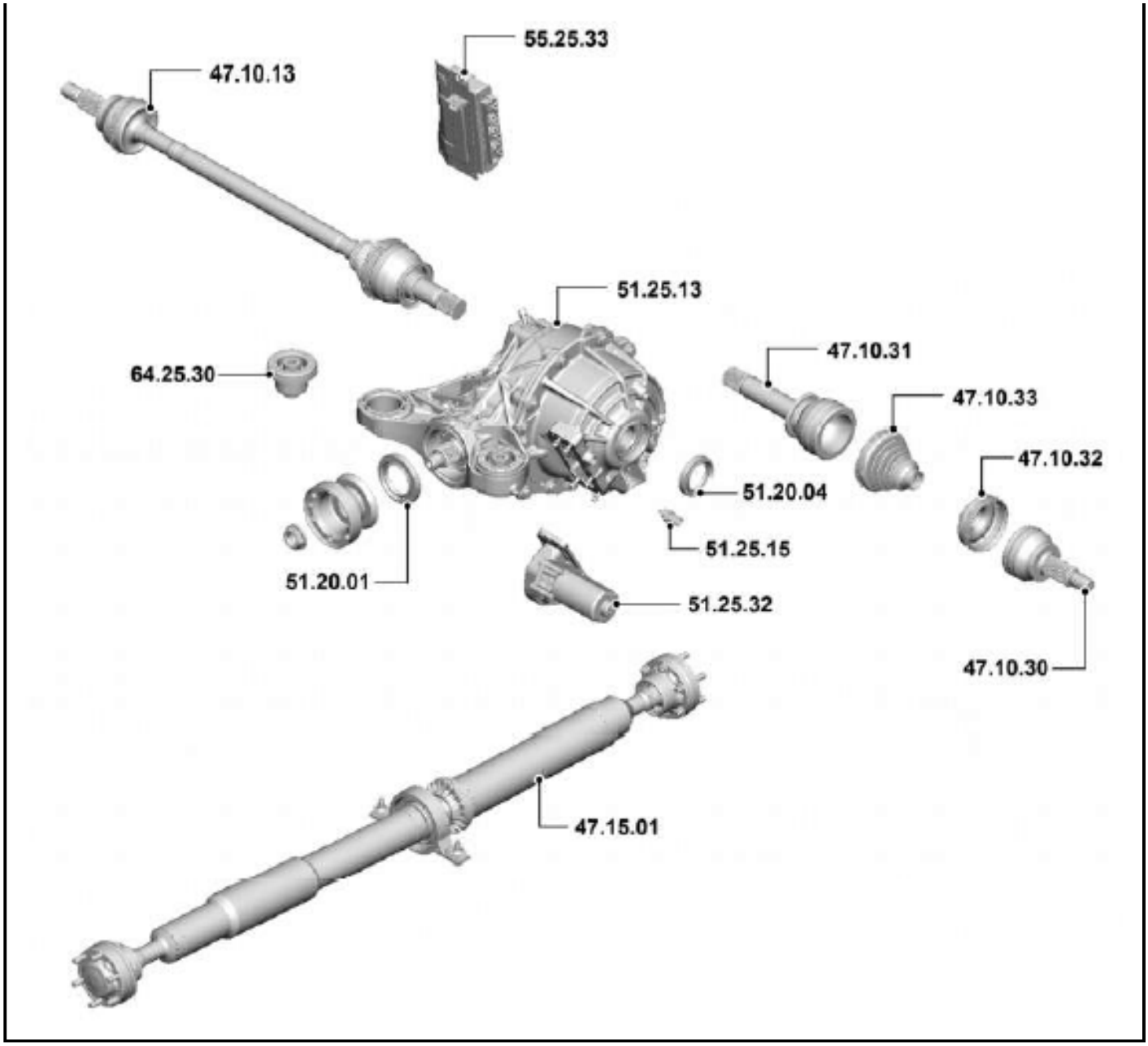
Torque Specification: **22 Nm**

INSTALLATION

1. To install, reverse the removal procedure.

DIFFERENTIAL LOCKING MODULE (G1581714)

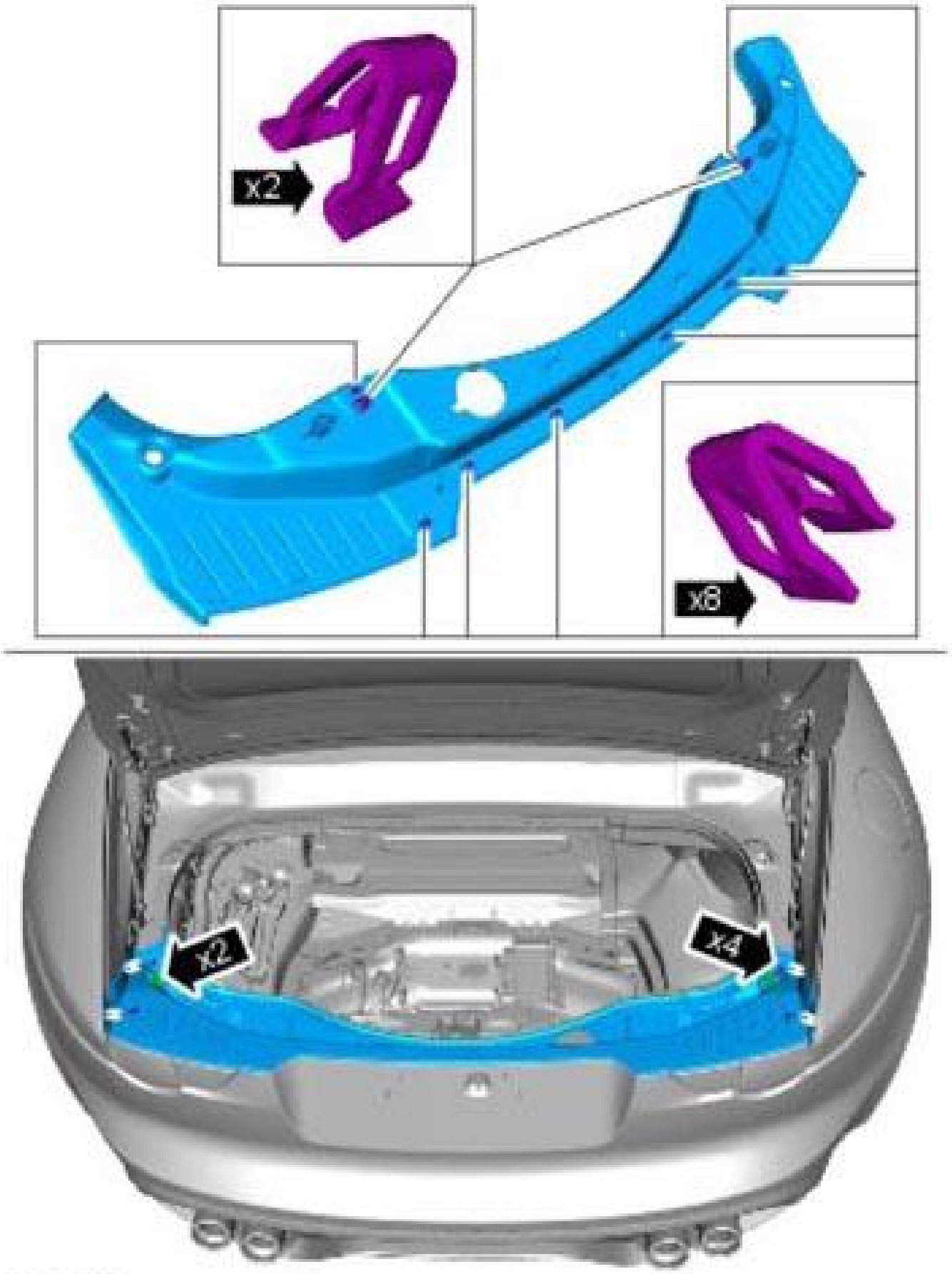
51.25.33	FINAL DRIVE UNIT - MODULE - RENEW	ALL DERIVATIVES	0.4



REMOVAL

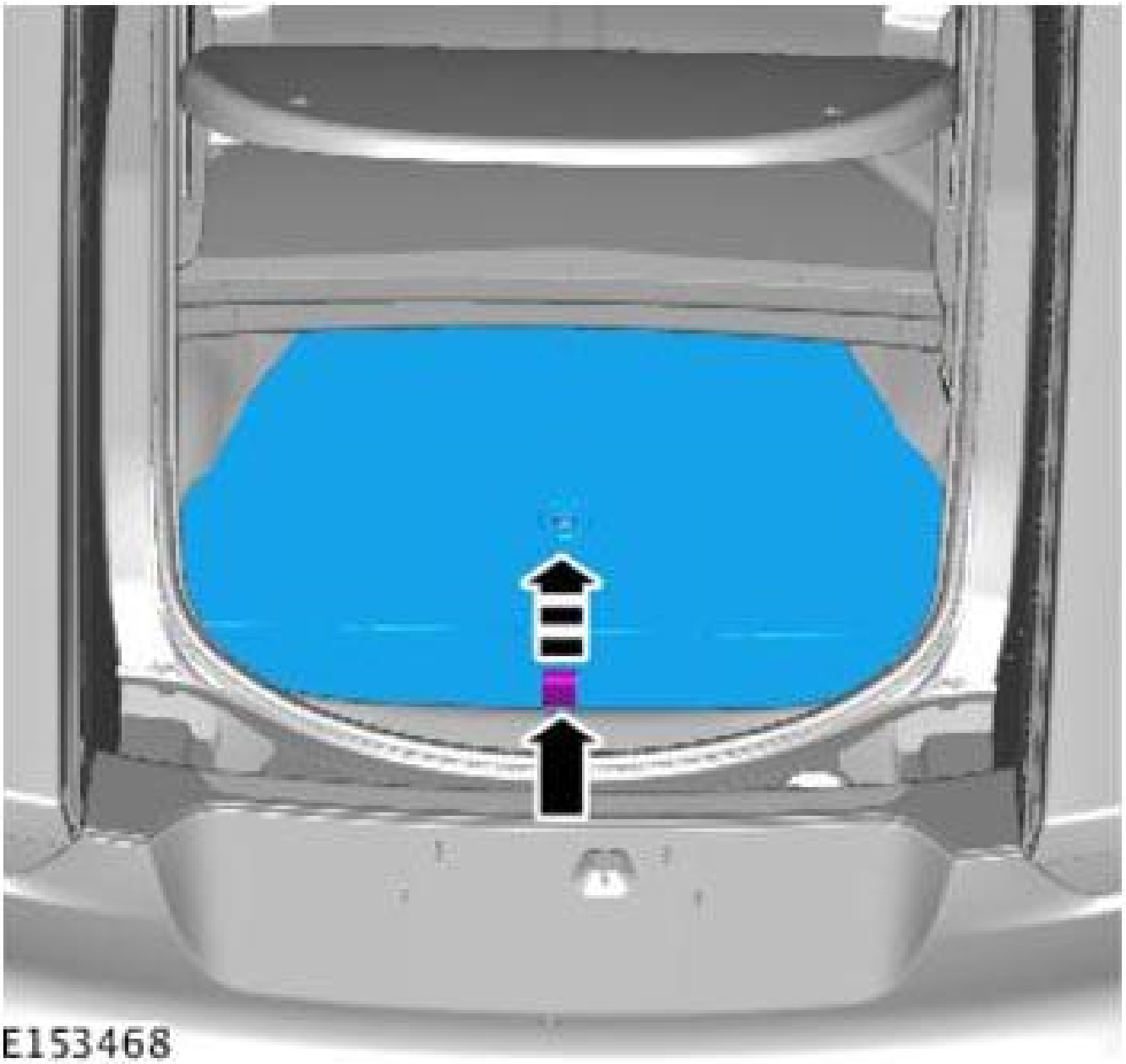
NOTE: **Removal steps in this procedure may contain installation details.**

1. Refer to: **Battery Disconnect and Connect** (General Procedures).
2.

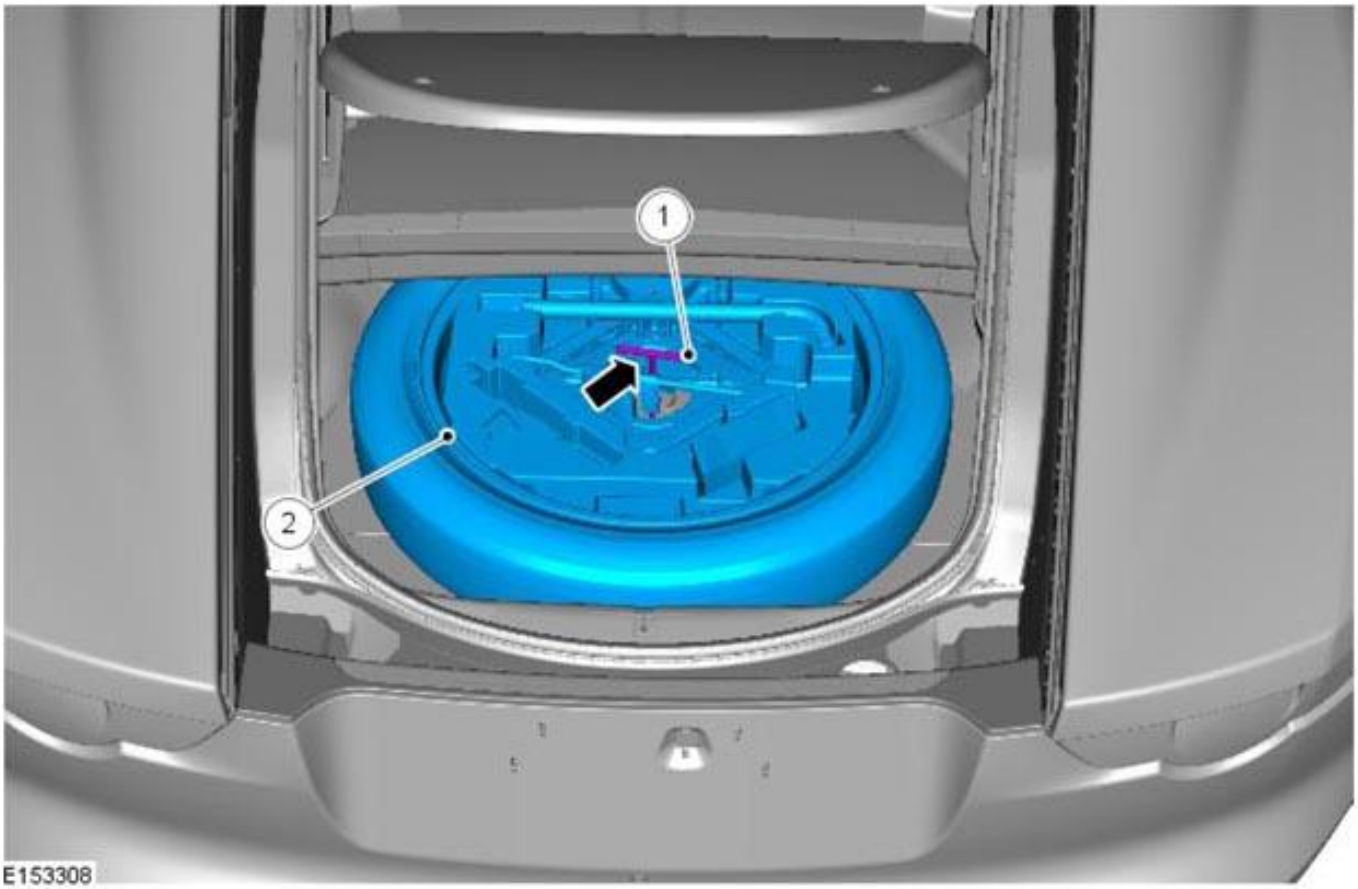


E153519

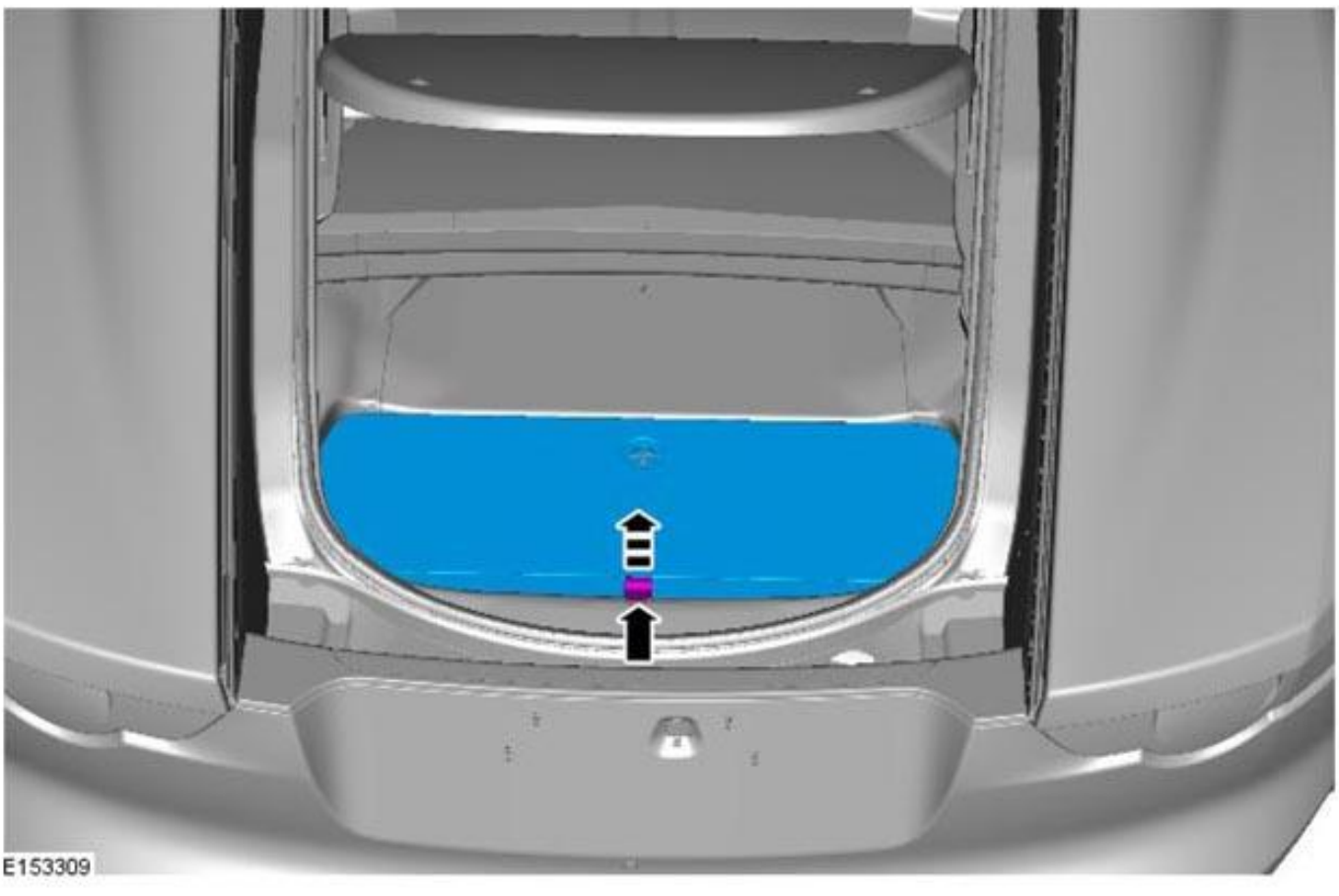
3.



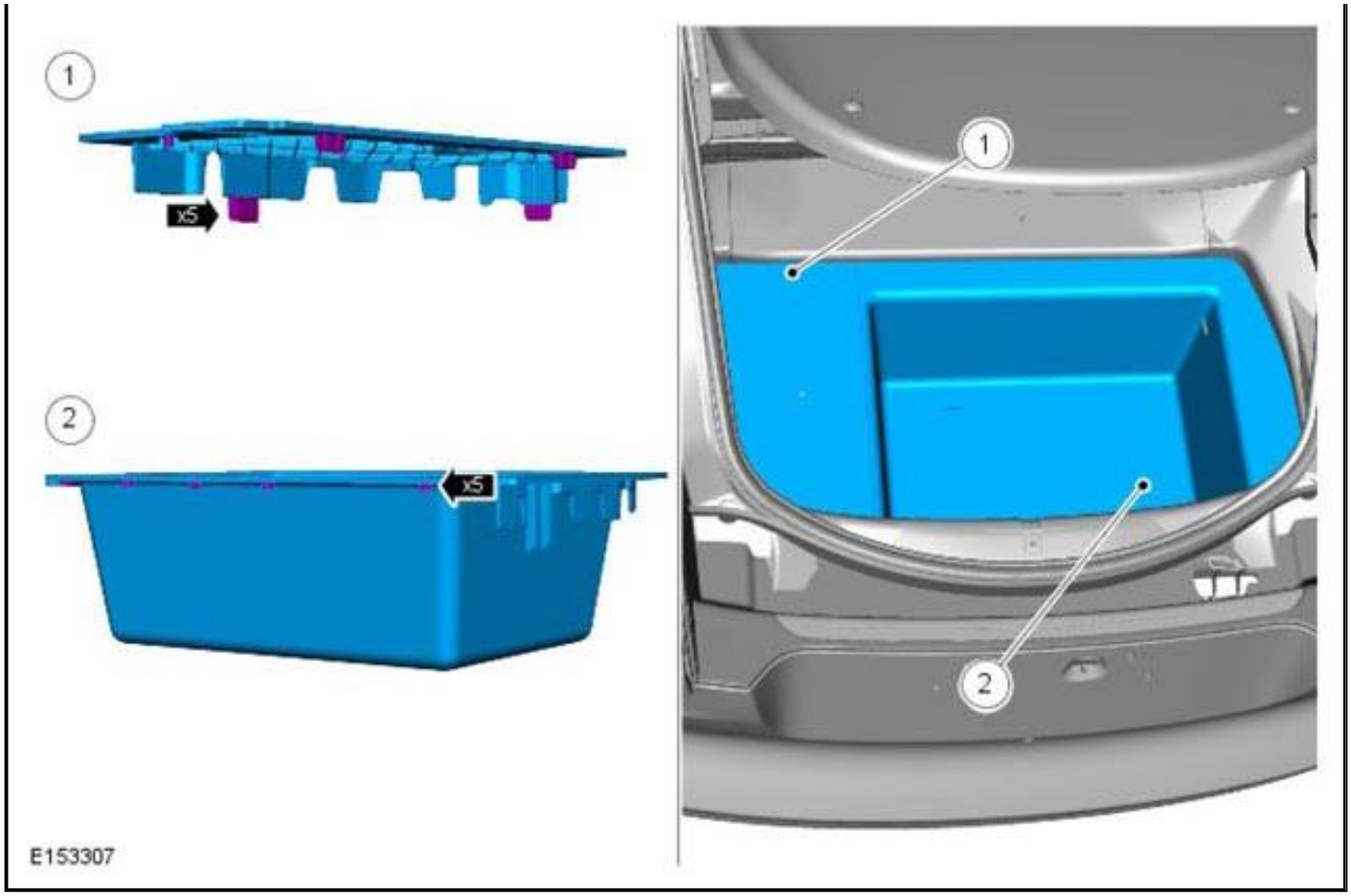
4.



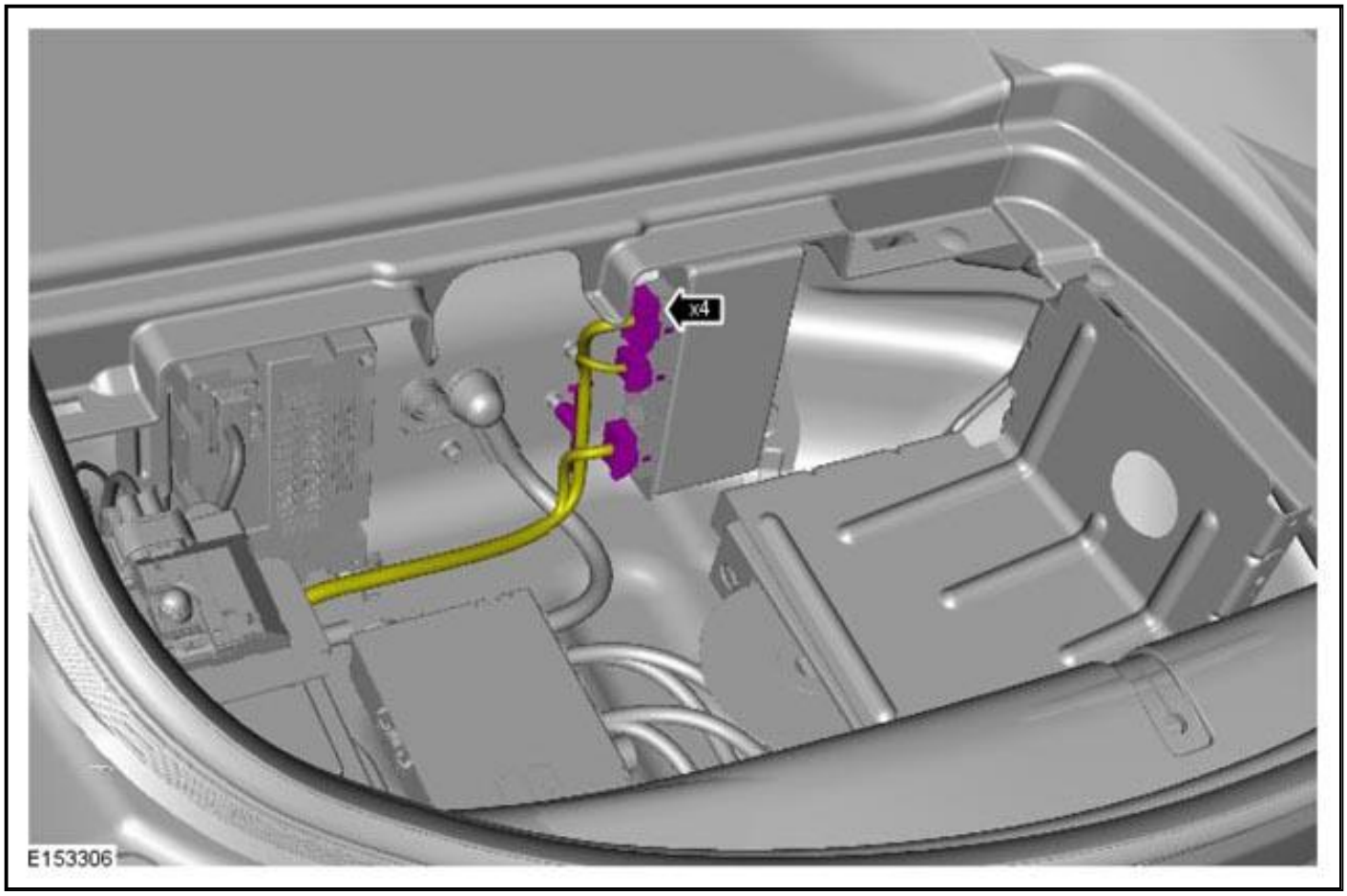
5.



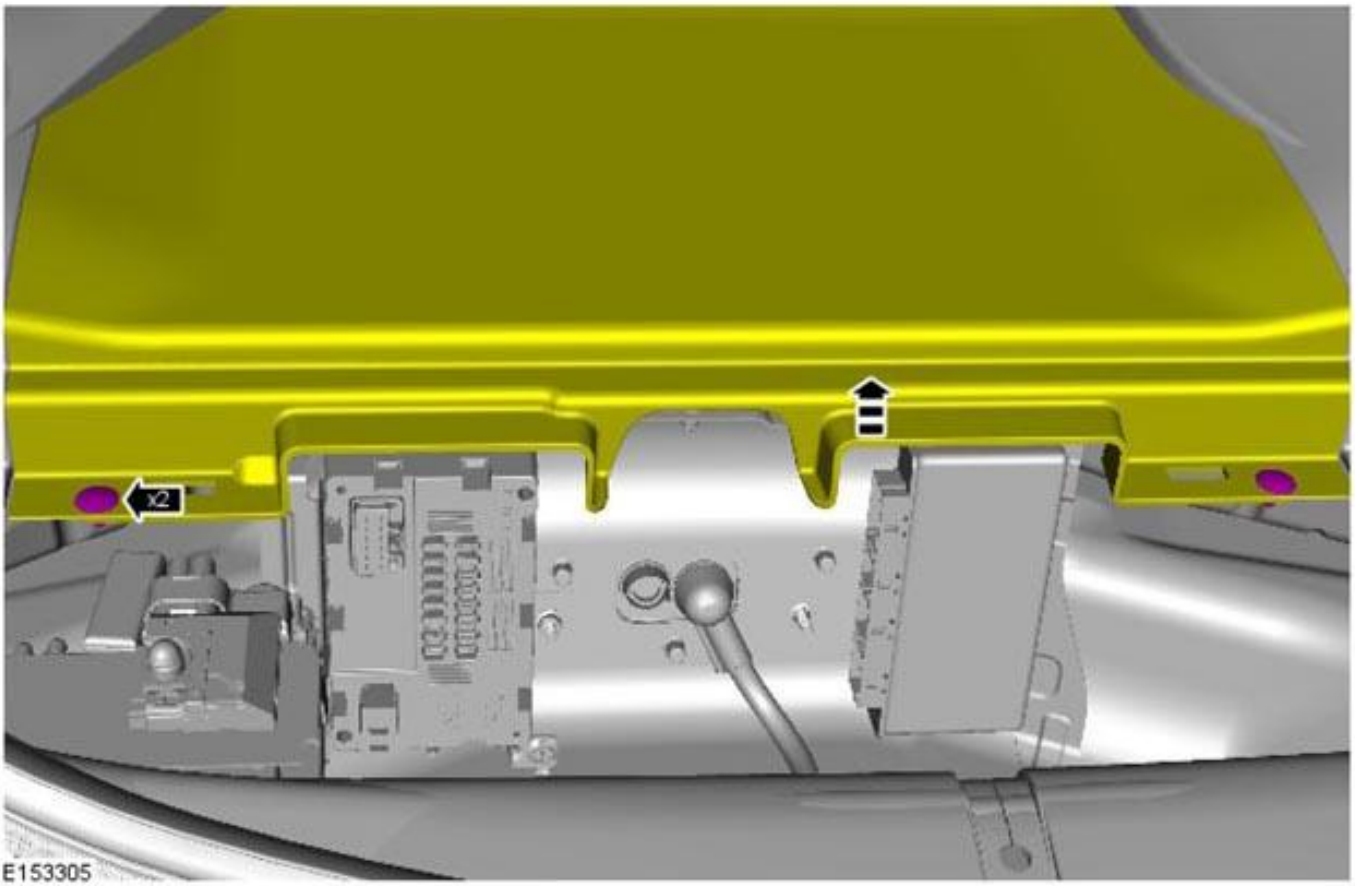
6.



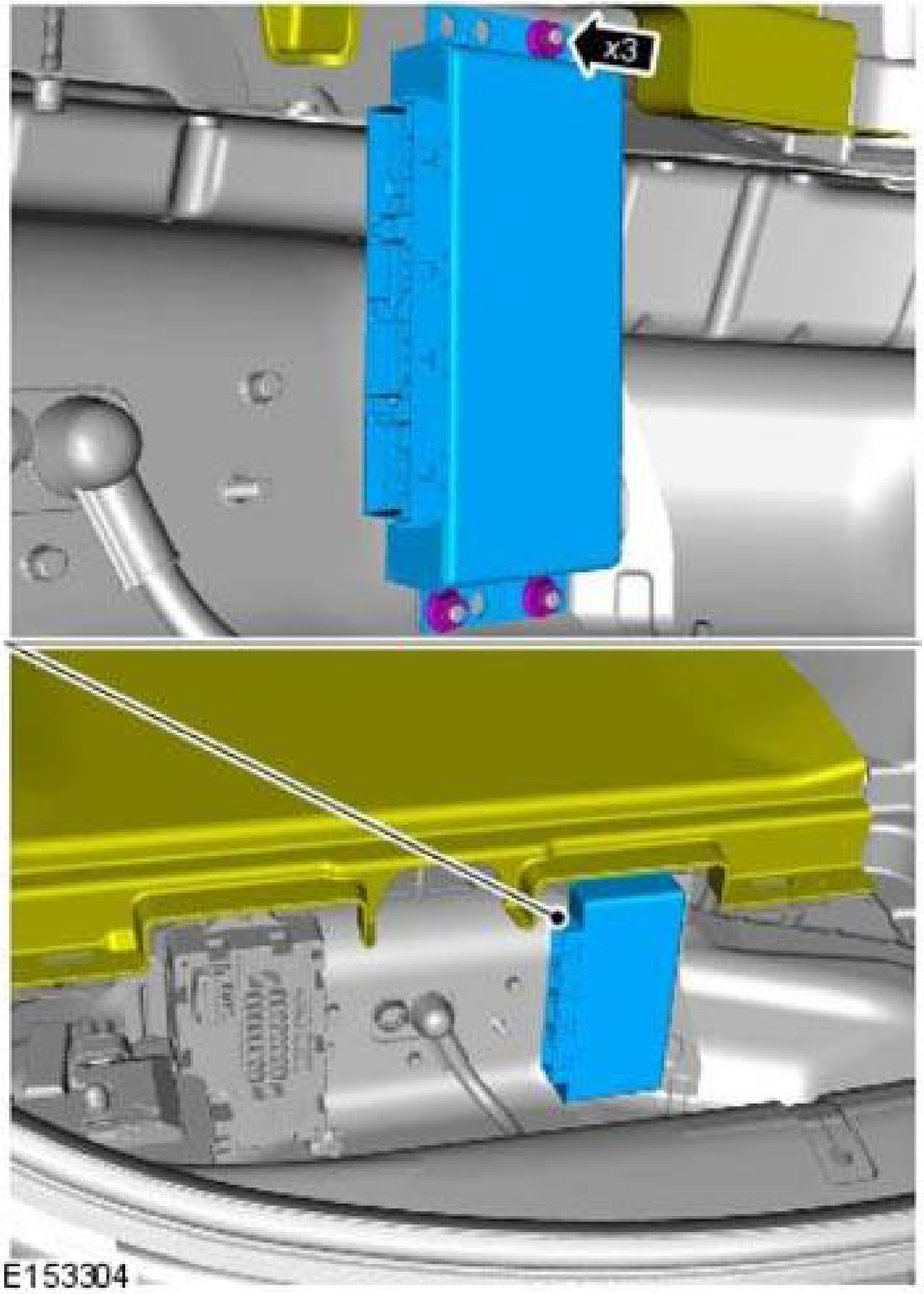
7.



8.



9.


x3
E153304

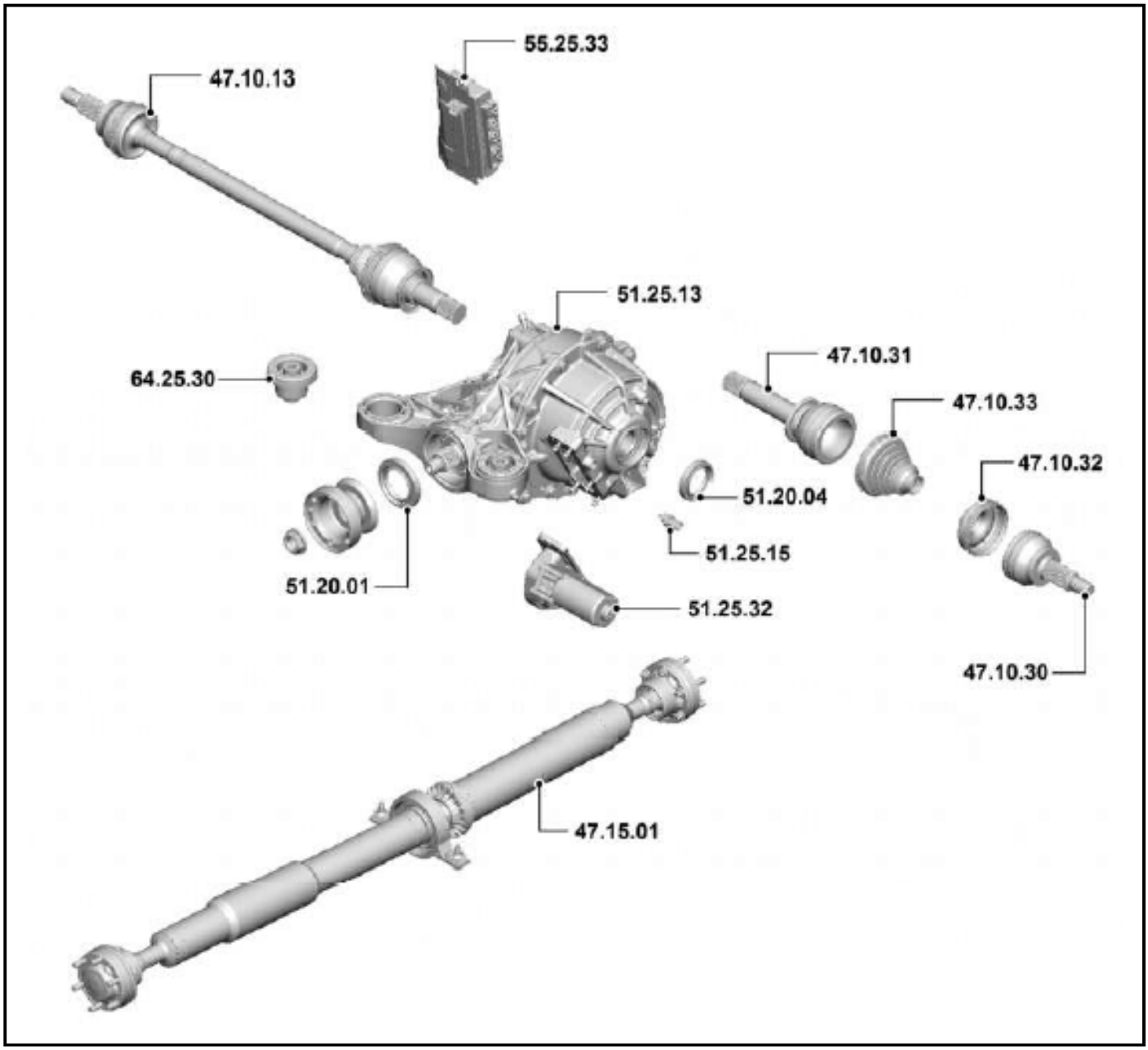
Torque Specification: **8 Nm**

INSTALLATION

1. To install, reverse the removal procedure.

DIFFERENTIAL LOCKING MOTOR (G1580097)

51.25.33	FINAL DRIVE UNIT - MODULE - RENEW	ALL DERIVATIVES	0.4



REMOVAL

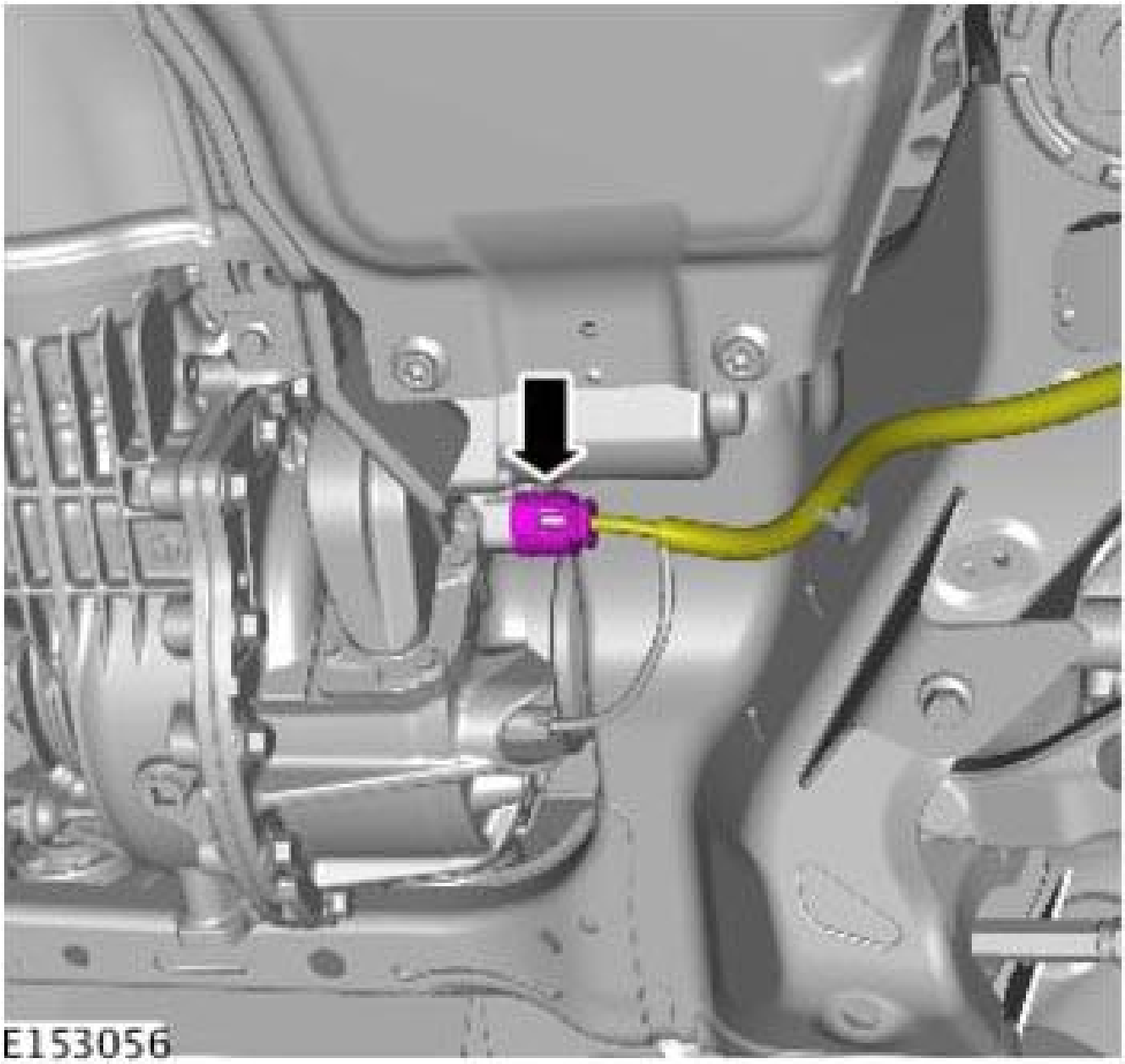
NOTE: **Removal steps in this procedure may contain installation details.**

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

   Raise and support the vehicle.

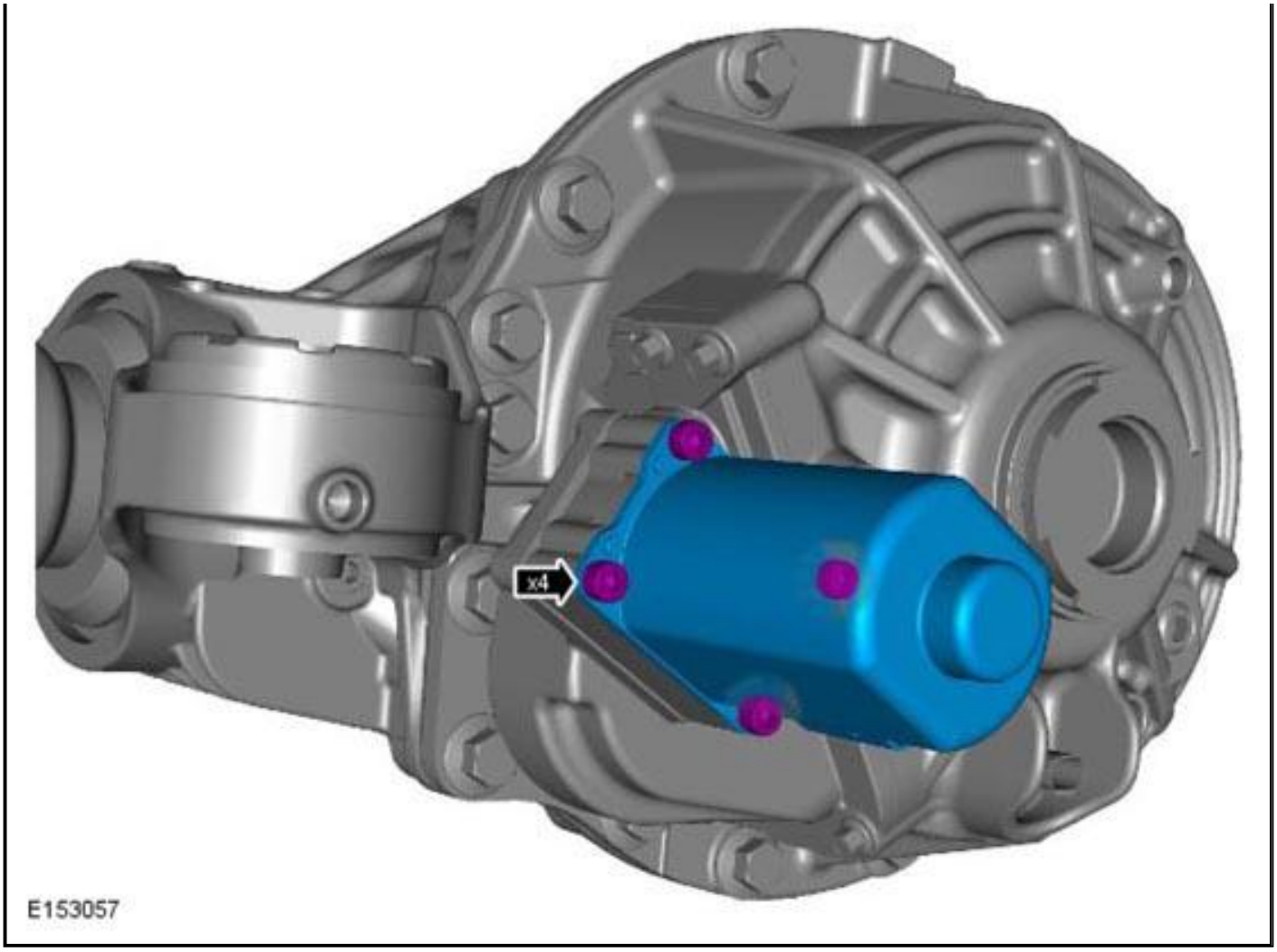
2. Refer to: **Differential Draining and Filling** (General Procedures).

3.



4. **NOTE:**

- **Position cloth to collect fluid spillage.**
- **Component illustrated, removed for clarity.**



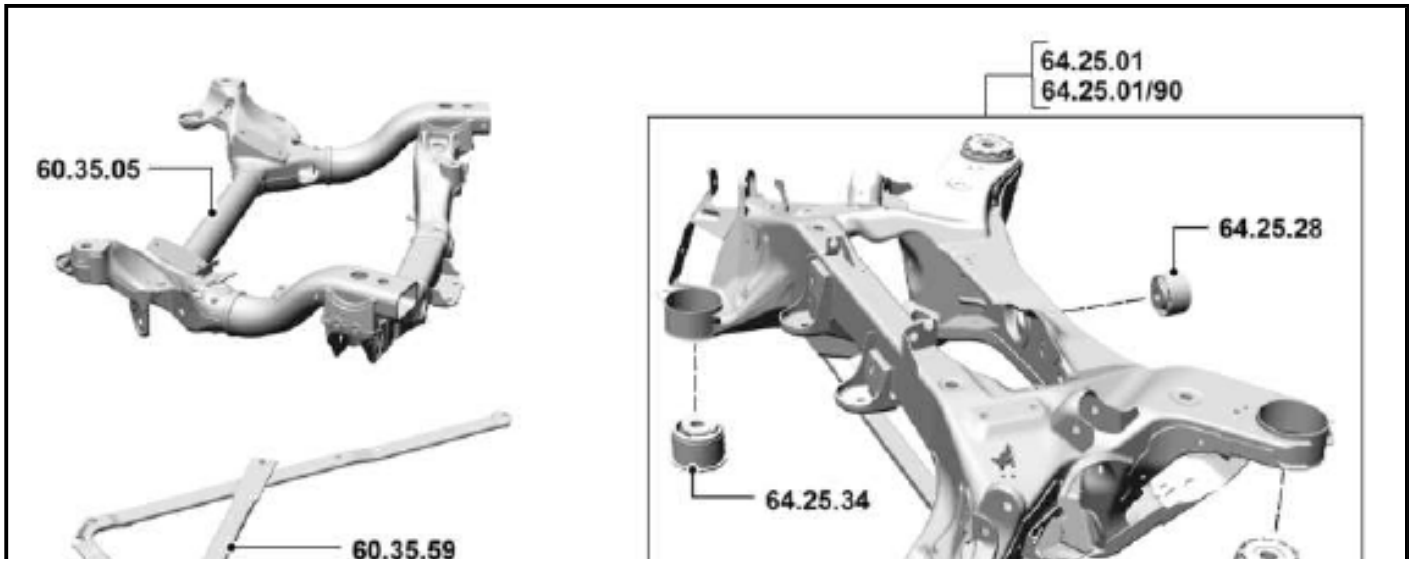
Torque Specification: **11 Nm**

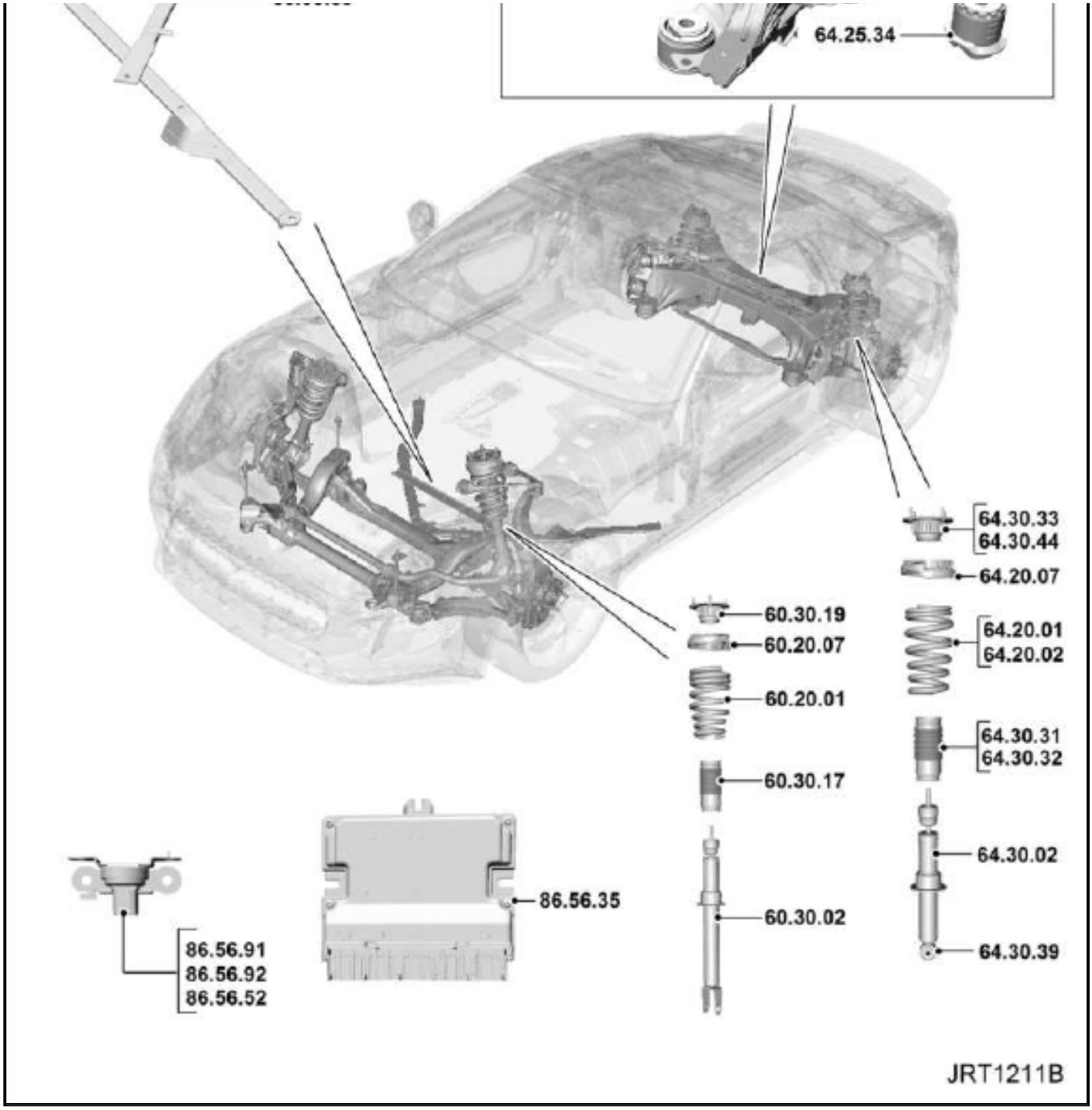
INSTALLATION

1. To install, reverse the removal procedure.

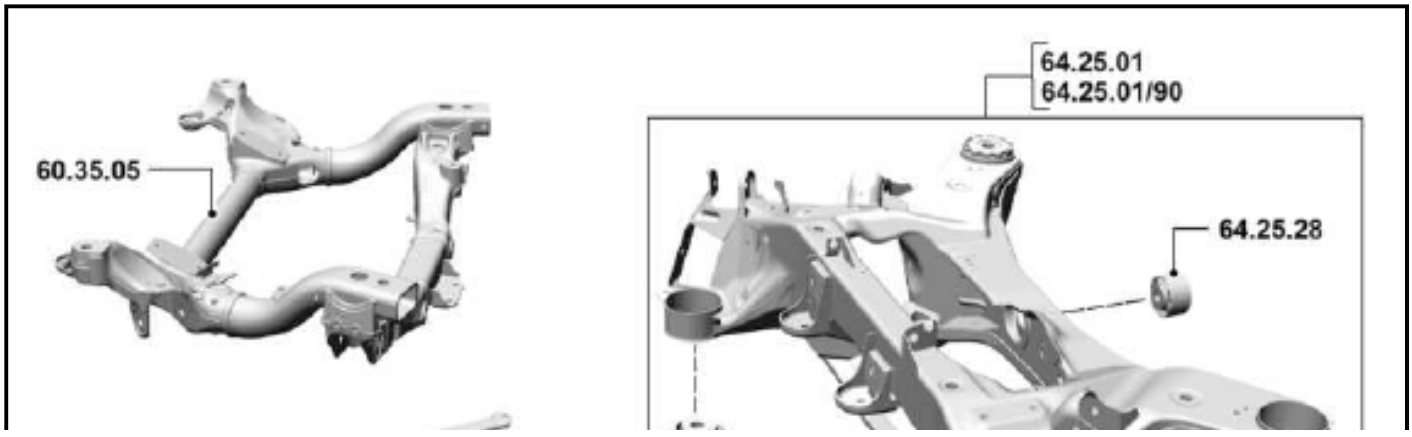
DIFFERENTIAL REAR BUSHING (G1588307)

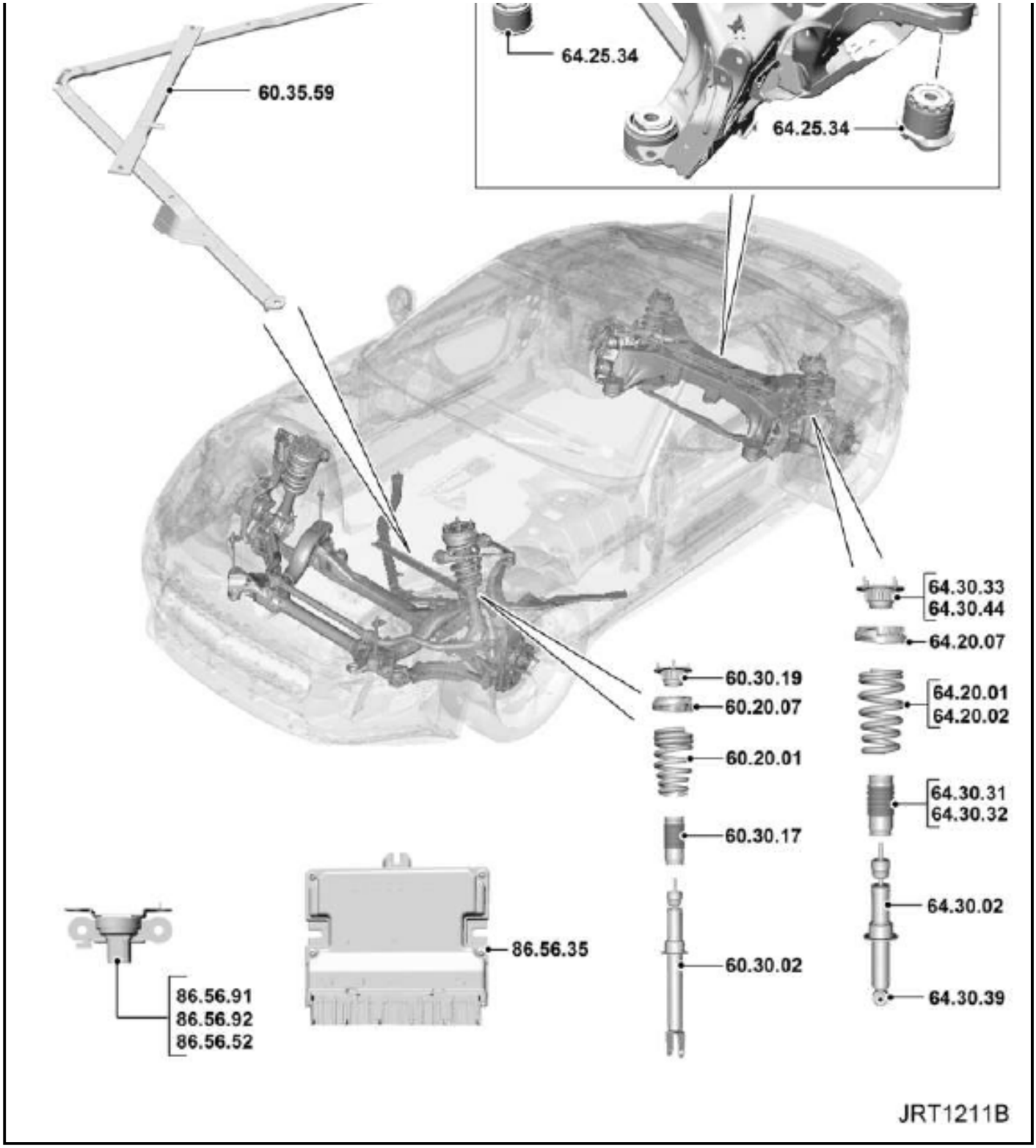
64.25.28	DIFFERENTIAL REAR BUSHING - RENEW	3000 CC, AJ V6 (AJ126)	6.4





64.25.28	DIFFERENTIAL REAR BUSHING - RENEW	5000 CC, AJ V8	6.5





SPECIAL TOOL(S)

	204-275 Bush install and removal tool

 204-275	
 E148875	**JLR-502-013** Remover, Bush
	JLR-502-020 Bush Install and Removal Tool

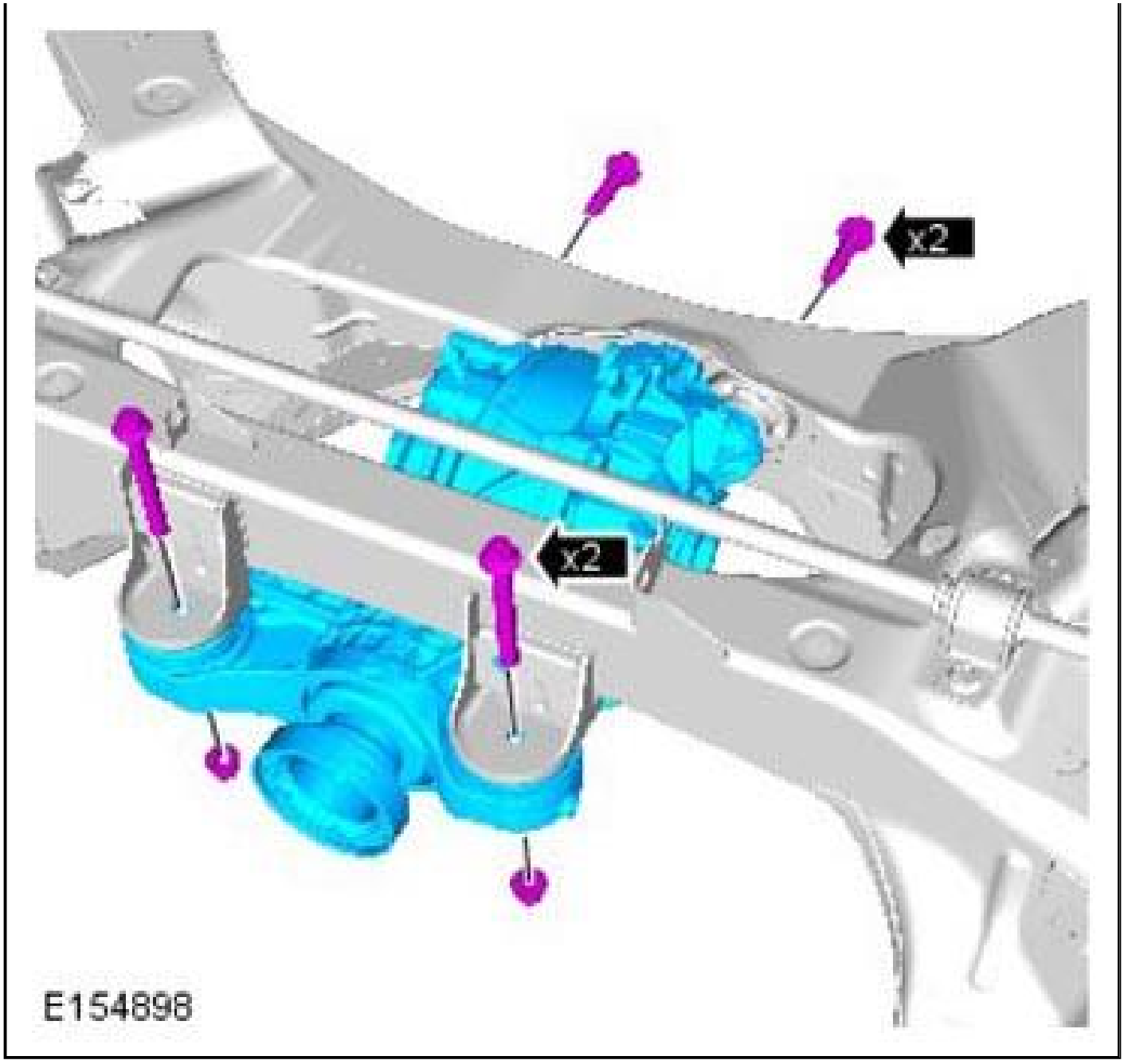
 E154889	
 E154890	**JLR-502-021** Installer, Bush

REMOVAL

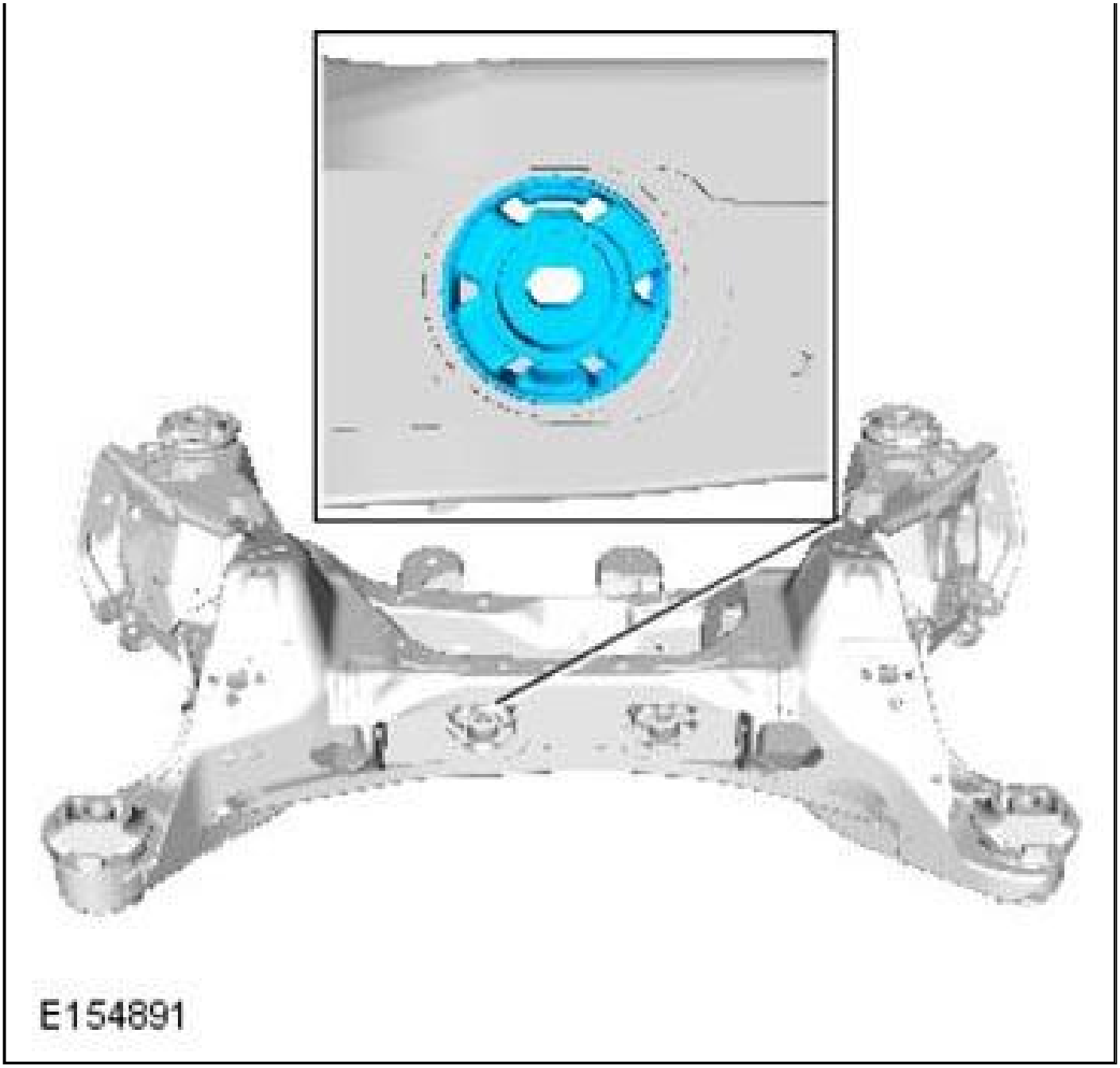
1. **WARNING:** **Make sure to support the vehicle with axle stands.**

   Raise and support the vehicle.

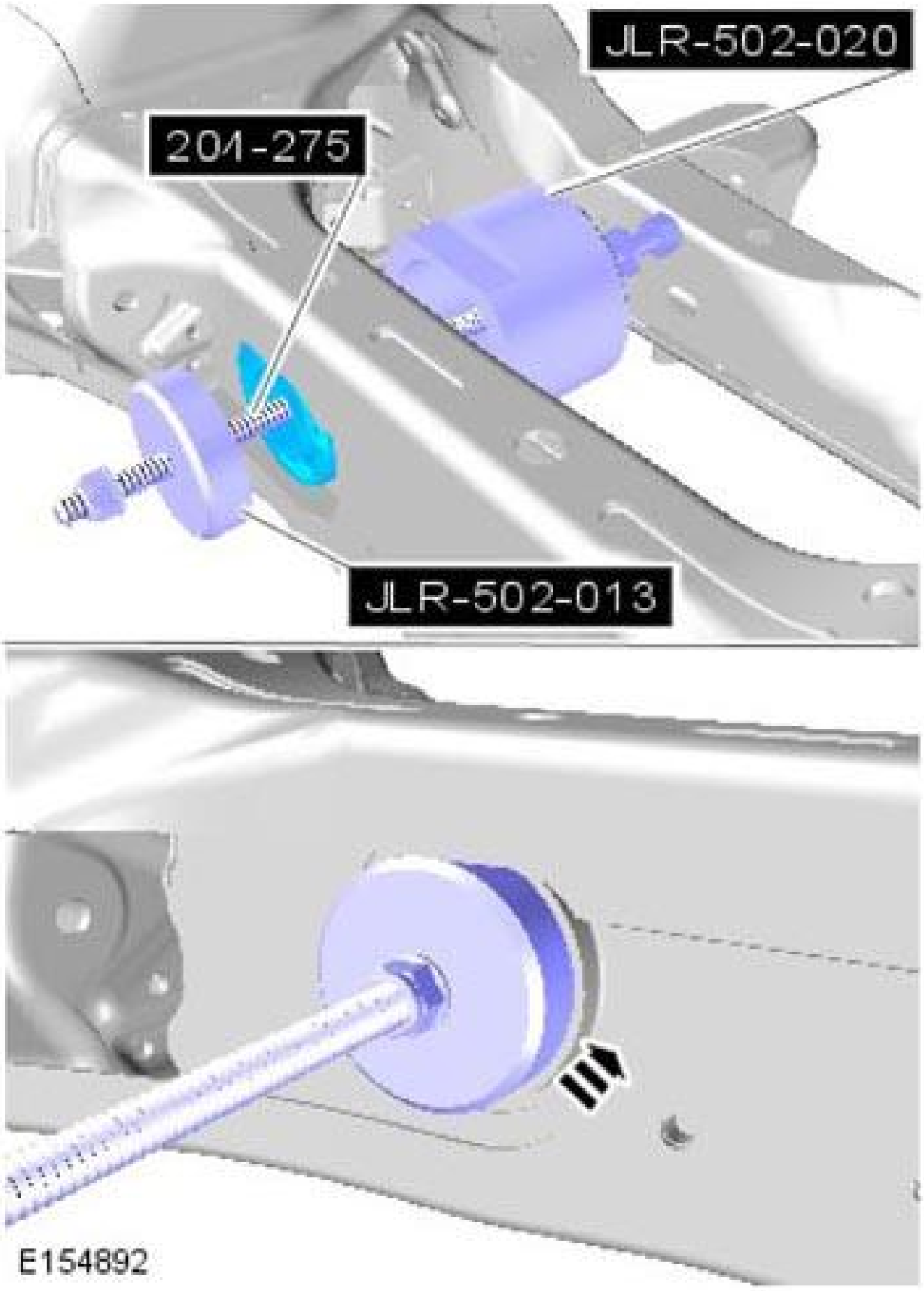
2. Refer to: **Rear Halfshaft** (Removal and Installation).
3. Refer to: **Rear Subframe** (Removal and Installation).
4. **NOTE:** **This step requires the aid of another technician.**



5. **NOTE:** **Note the orientation of the bushing before removal.**



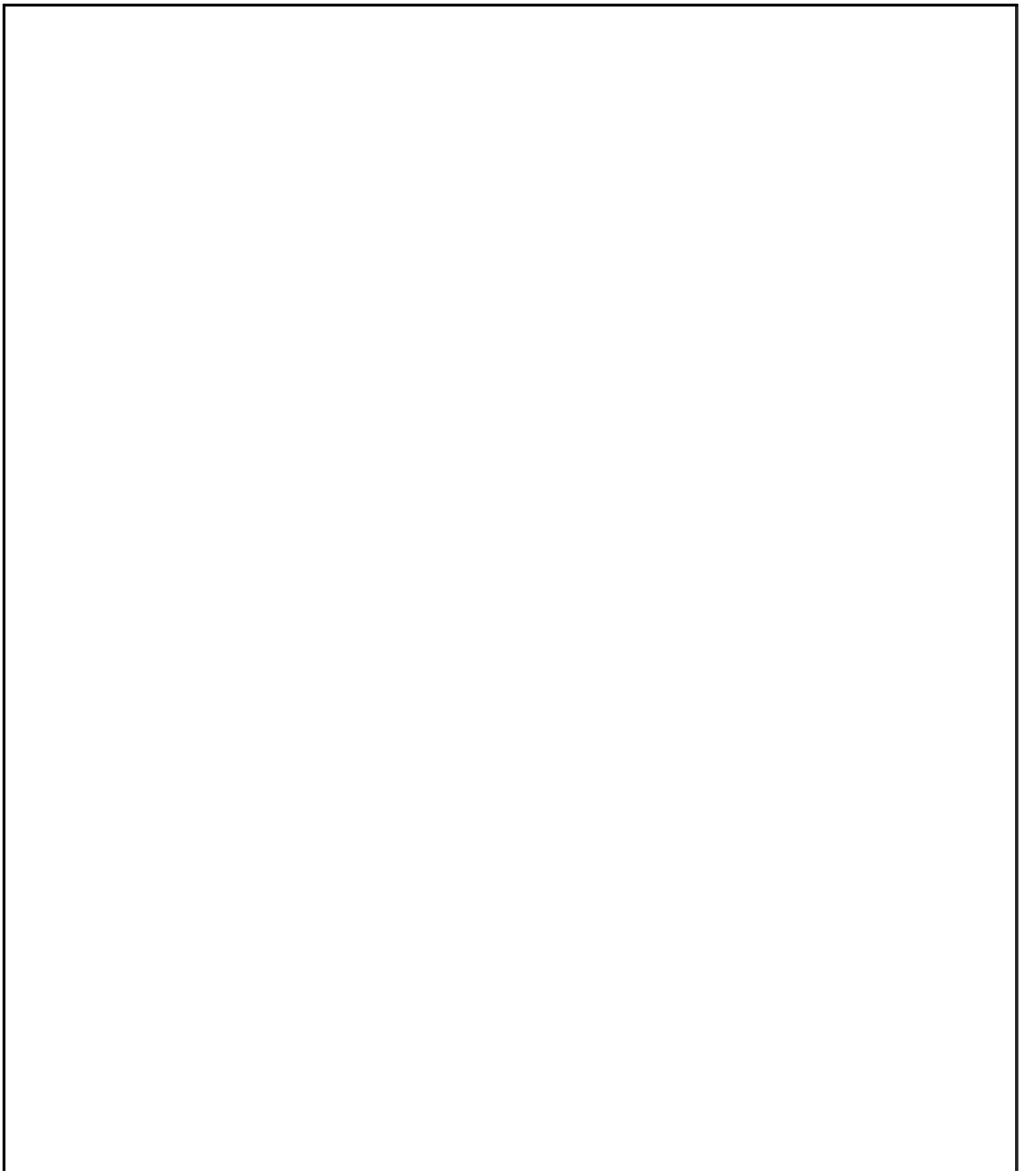
6. **CAUTION: Make sure that the special tool is correctly located.**

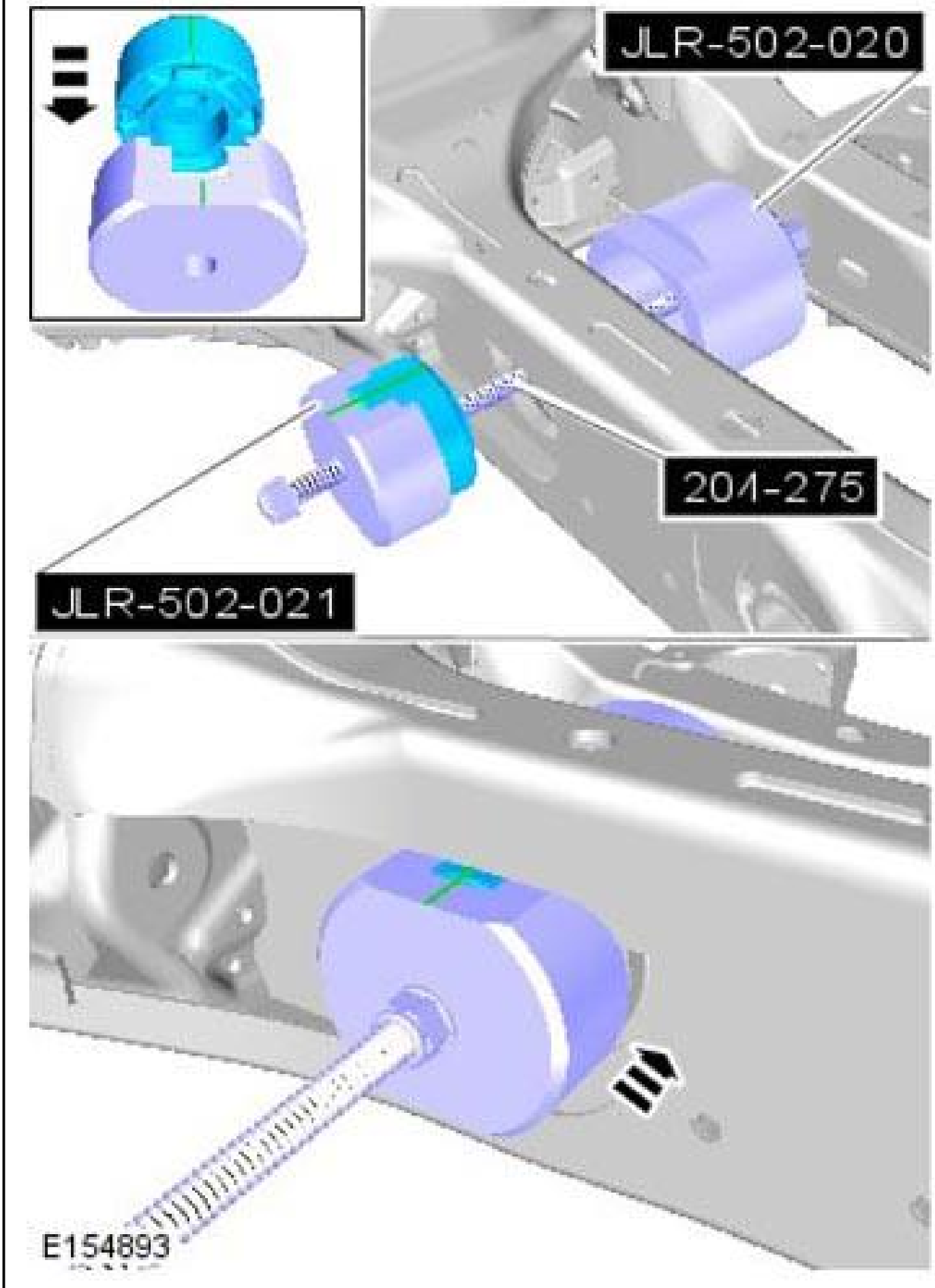

JLR-502-020
204-275
JLR-502-013
E154892

Special Tool(s): 204-275, JLR-502-013, JLR-502-020

INSTALLATION

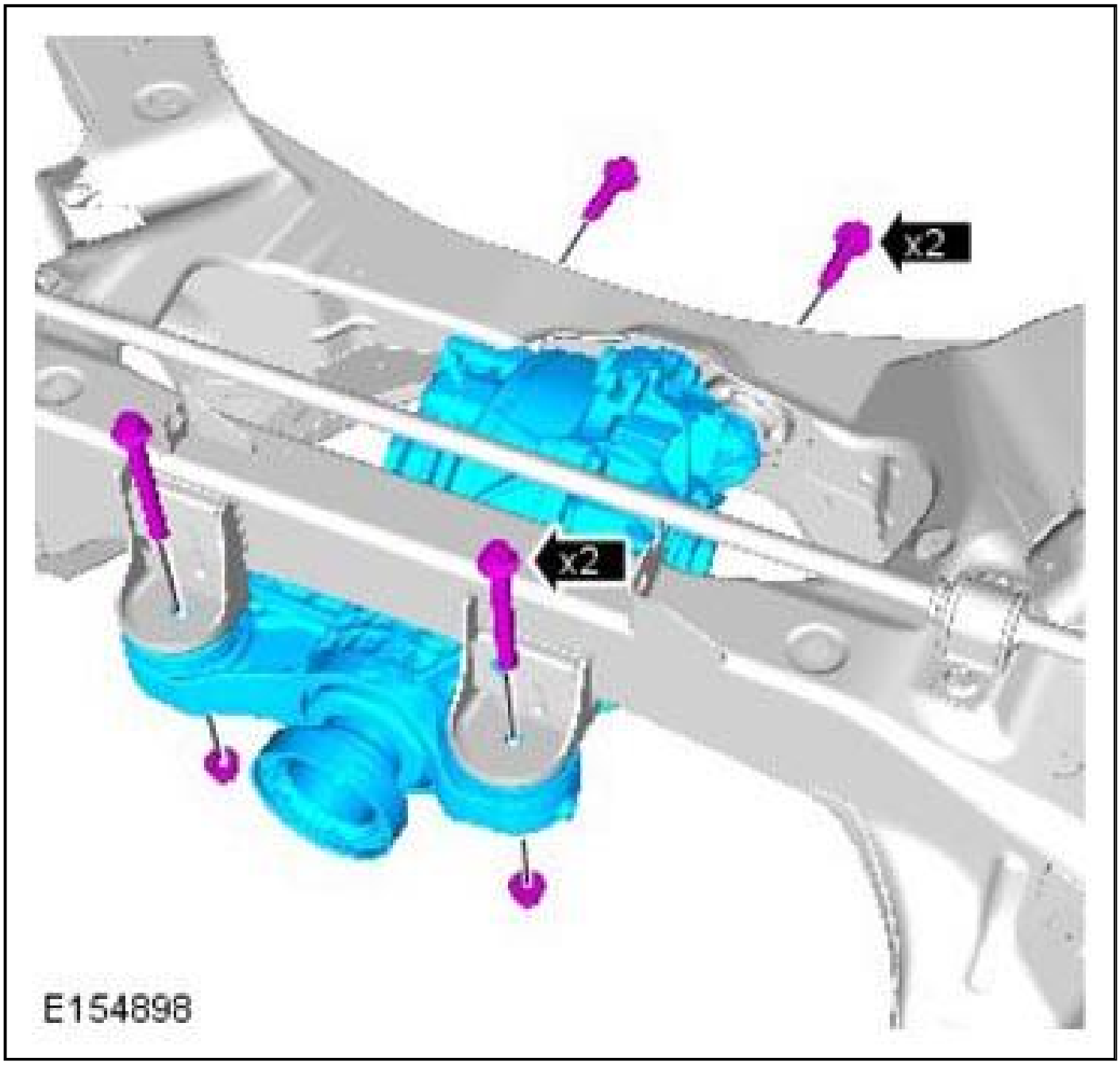
1. **CAUTION:**
   - **Mark the components to aid installation.**
   - **Make sure that the special tool is correctly located.**
   - **Make sure the correct special tool is used to install the bushings to the correct depth.**




JLR-502-020
204-275
JLR-502-021
E154893

Special Tool(s): 204-275, JLR-502-020, JLR-502-021

2. **NOTE:** **This step requires the aid of other technicians.**



Torque Specification:

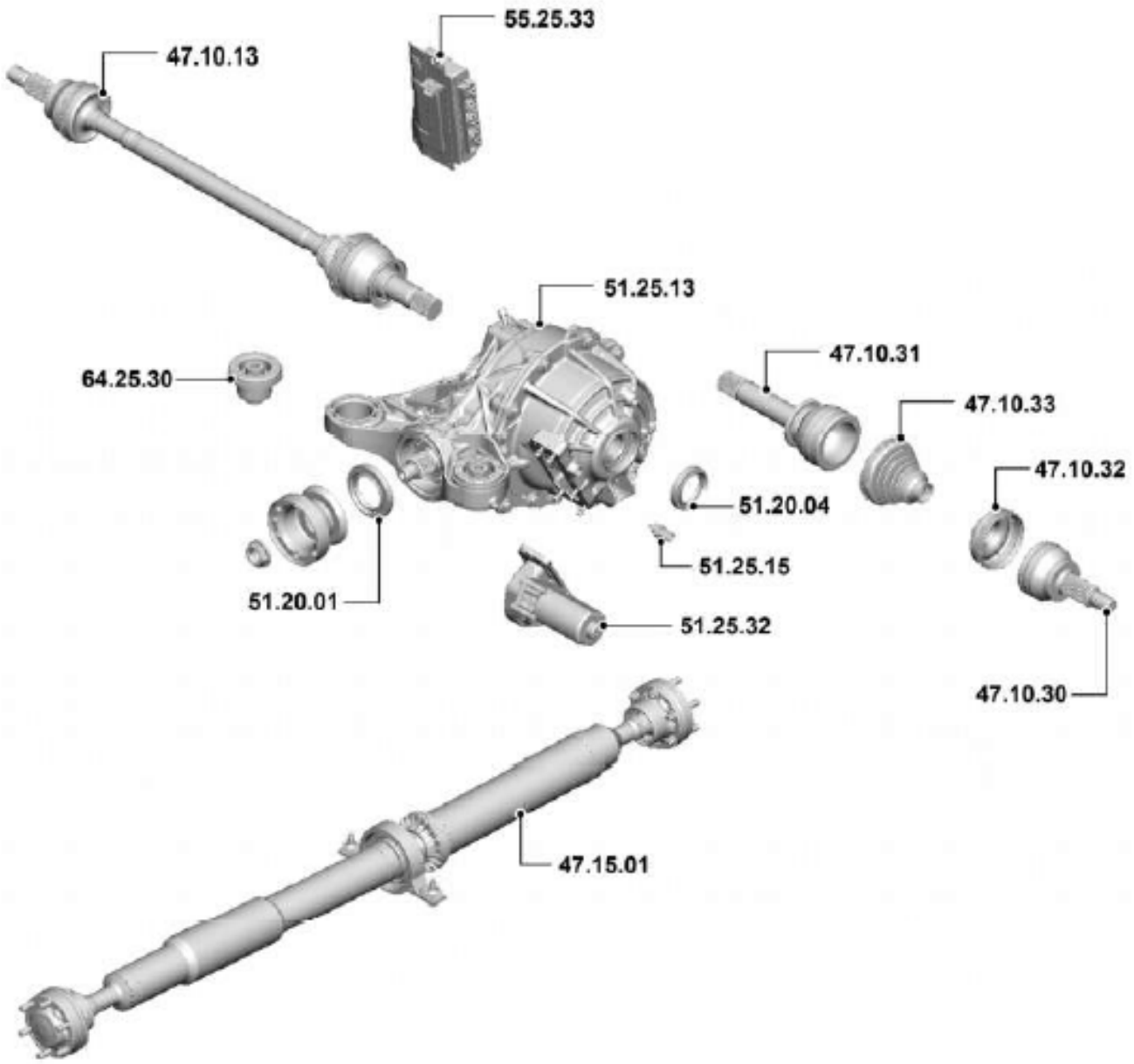
M12 **90 Nm**

M14 **163 Nm**

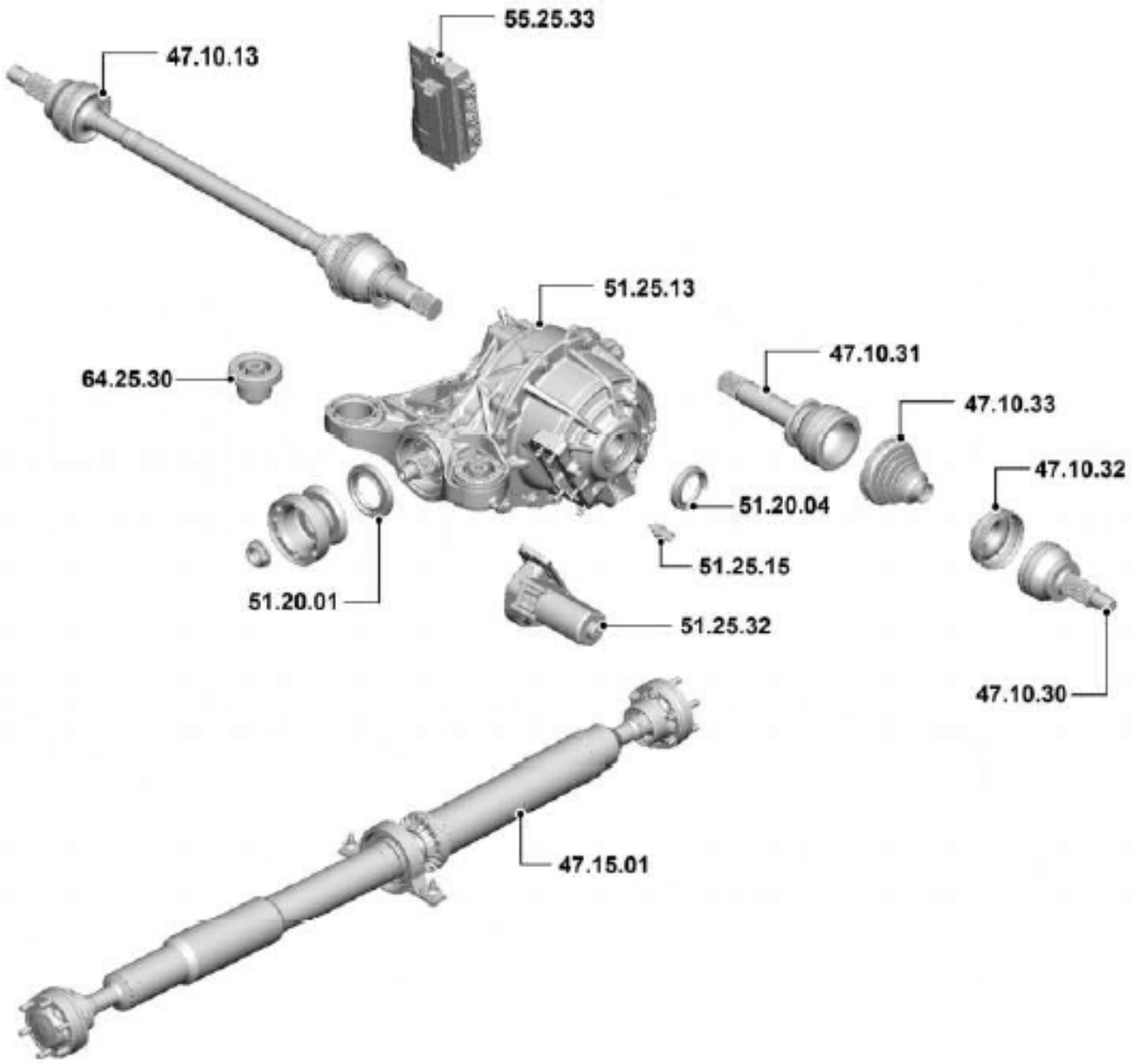
3. Refer to: **Rear Subframe** (Removal and Installation).
4. Refer to: **Rear Halfshaft** (Removal and Installation).

DRIVE PINION SEAL (G1275997)

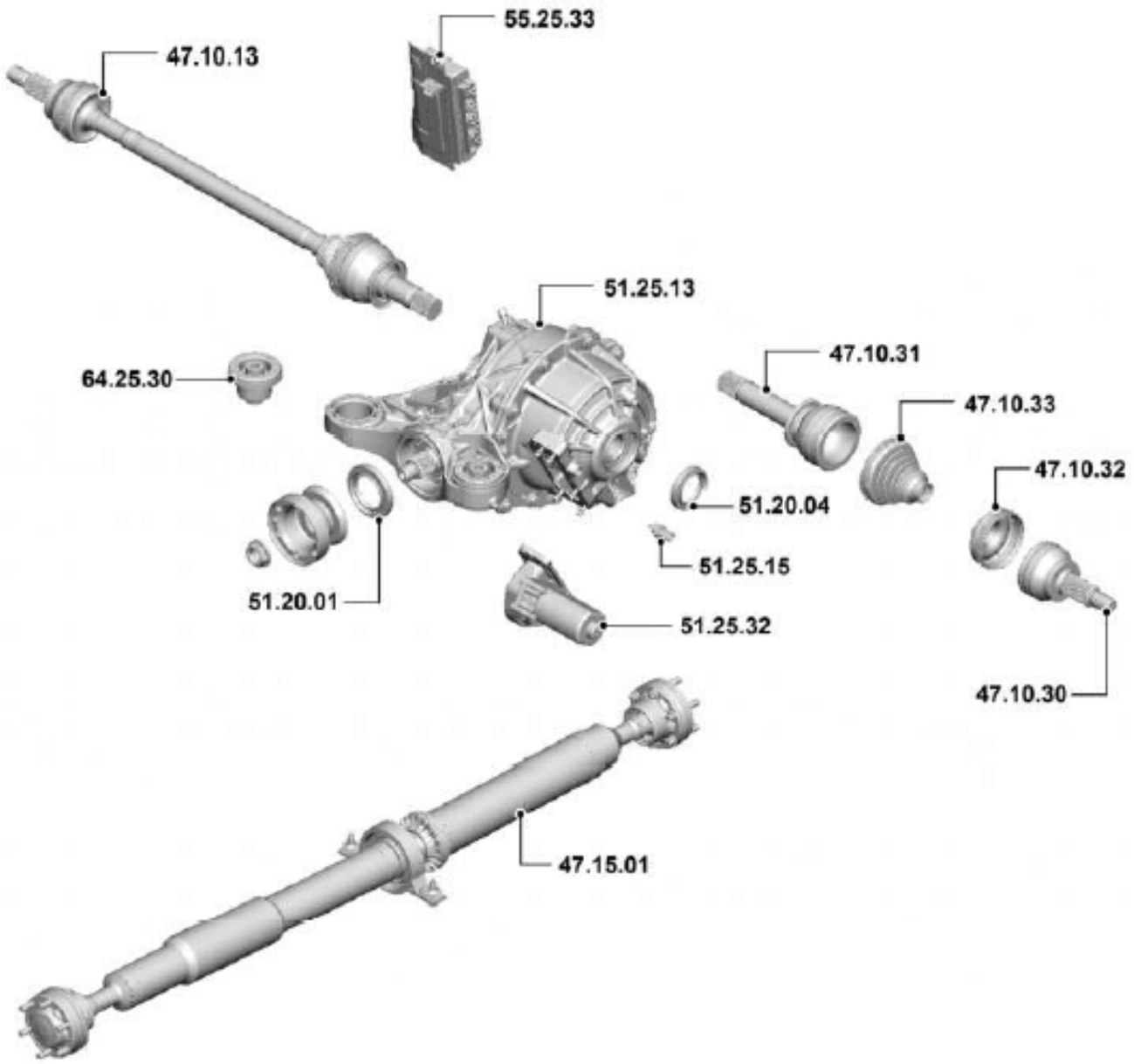
51.20.01	PINION OIL SEAL - RENEW	3000 CC, AJ V6 (AJ126)	2.2



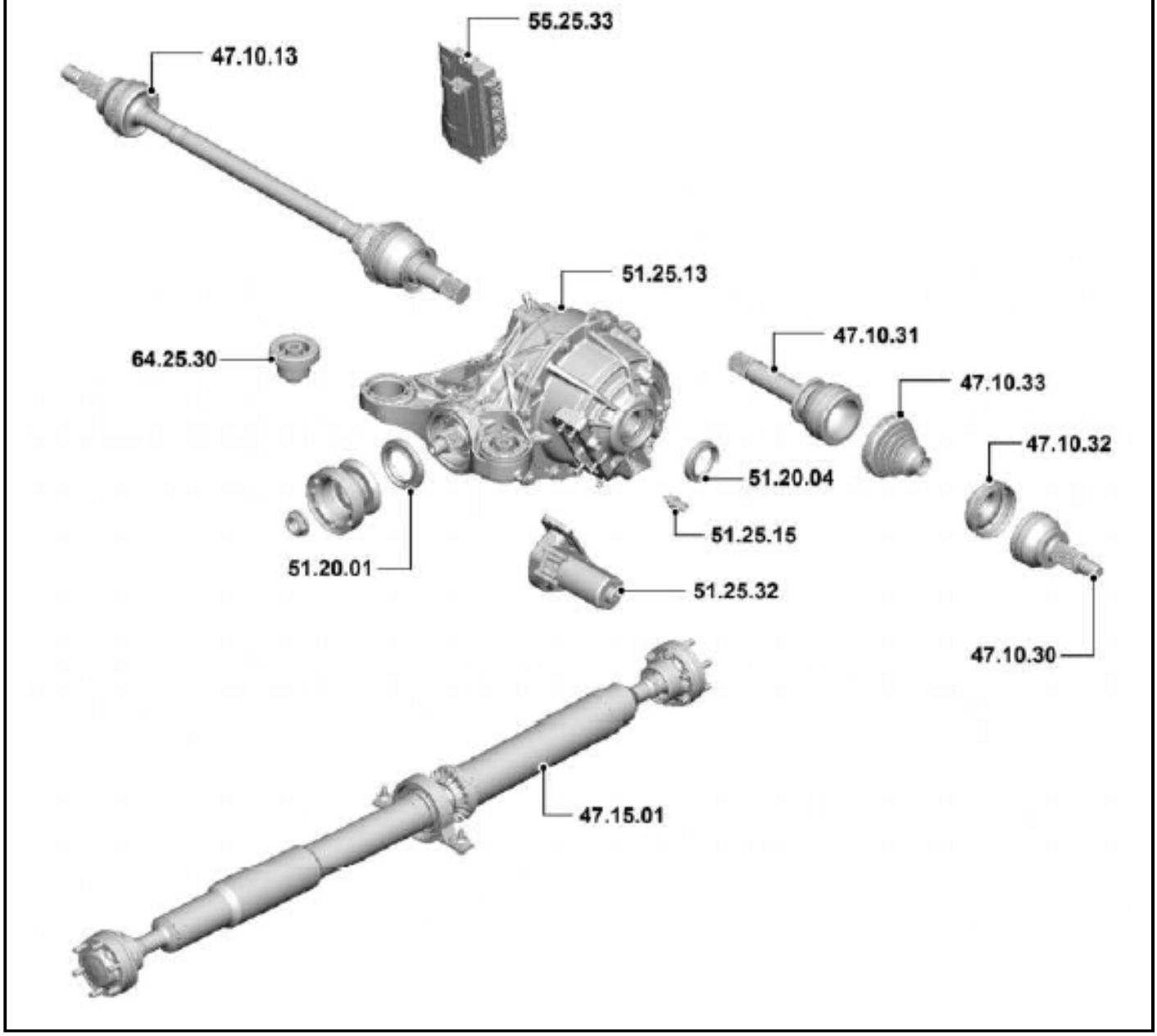
51.20.01	PINION OIL SEAL - RENEW	3000 CC, AJ V6 (AJ126), 4WD	2



51.20.01	PINION OIL SEAL - RENEW	5000 CC, AJ V8	2.2

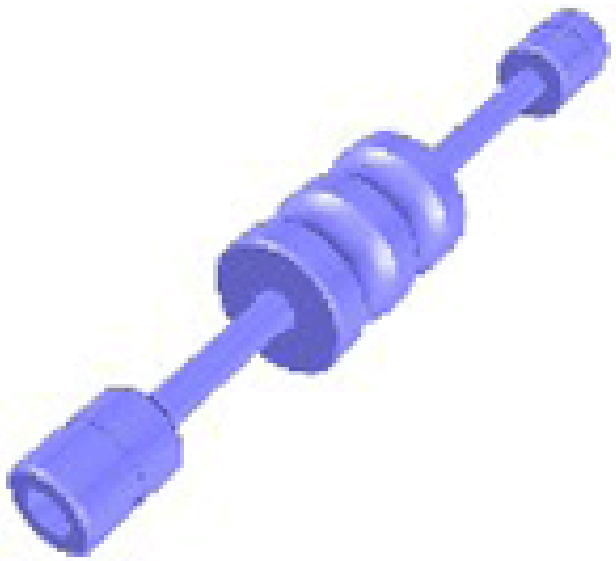


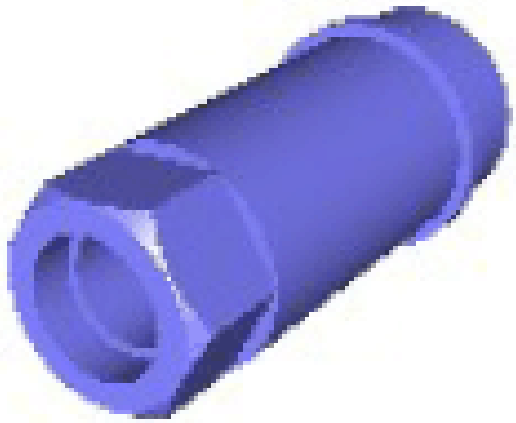
51.20.01	PINION OIL SEAL - RENEW	5000 CC, AJ V8, 4WD	2



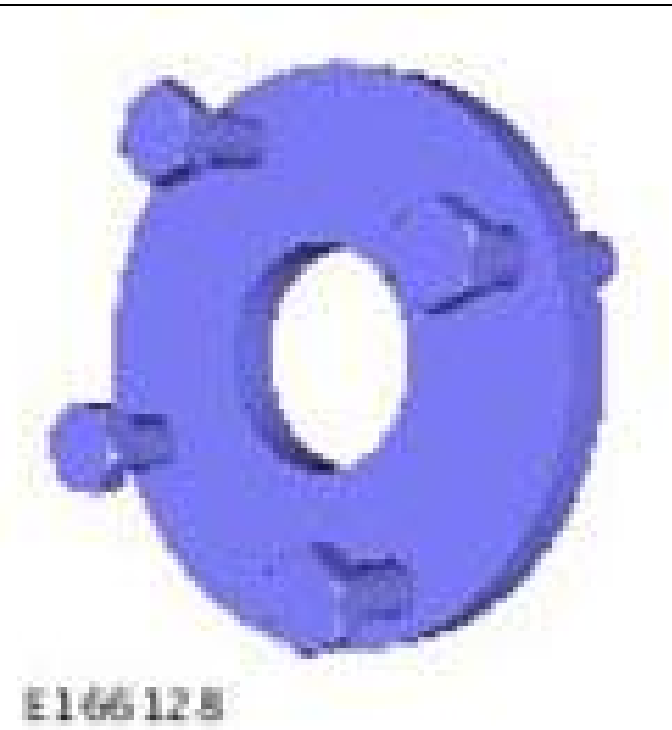
SPECIAL TOOL(S)

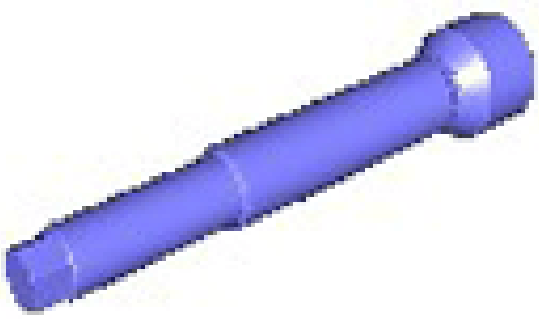
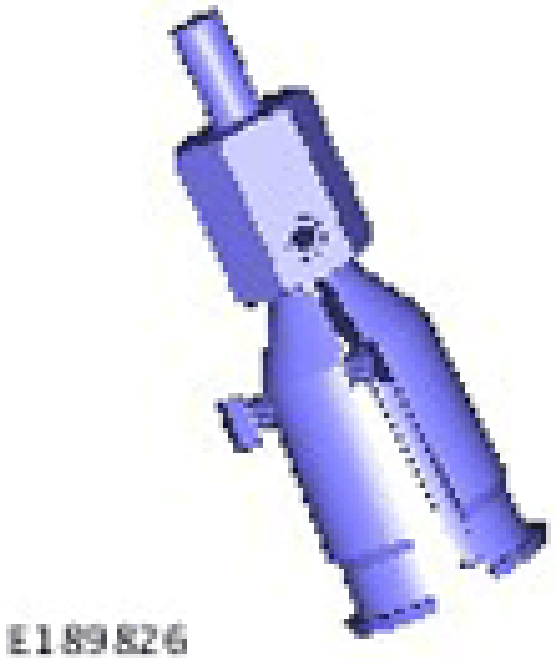
	100-012 Slide Hammer

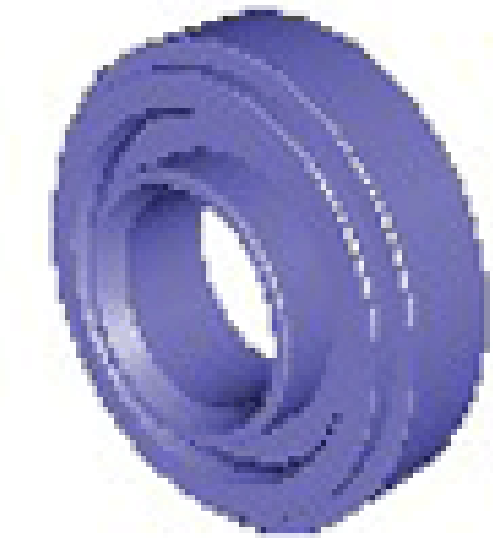
	
	**100-012-01** Slide Hammer Adapter
	204-266 Adapter for 204-265

 E117041	
 E193454	**204-269A** Flange remover forcing screw
	205-053 Retainer, Differential Pinion Flange

	
	**205-053-03** Adapter, Differential Pinion Flange
	307-520 Installer, Output Shaft Seal

	
	**JLR-205-1014** Remover/Installer, Differential Pinion Flange
	JLR-205-1015A Installer, Halfshaft

 E166129	
 E189826	**JLR-205-1031** Remover, Differential Pinion Seal
	JLR-205-998 Installer, Rear Differential Seal



E145964

REMOVAL

WARNING: **Be prepared to collect escaping oil.**

NOTE:

- **This procedure contains some variation in the illustrations depending on the vehicle specification, but the essential information is always correct.**
- **This procedure contains illustrations showing certain components removed to provide extra clarity.**

1. Raise and support the vehicle.

   Refer to: **Lifting** (Description and Operation).

2. Drain the rear differential oil.

   Refer to: **Differential Draining and Filling** (General Procedures).

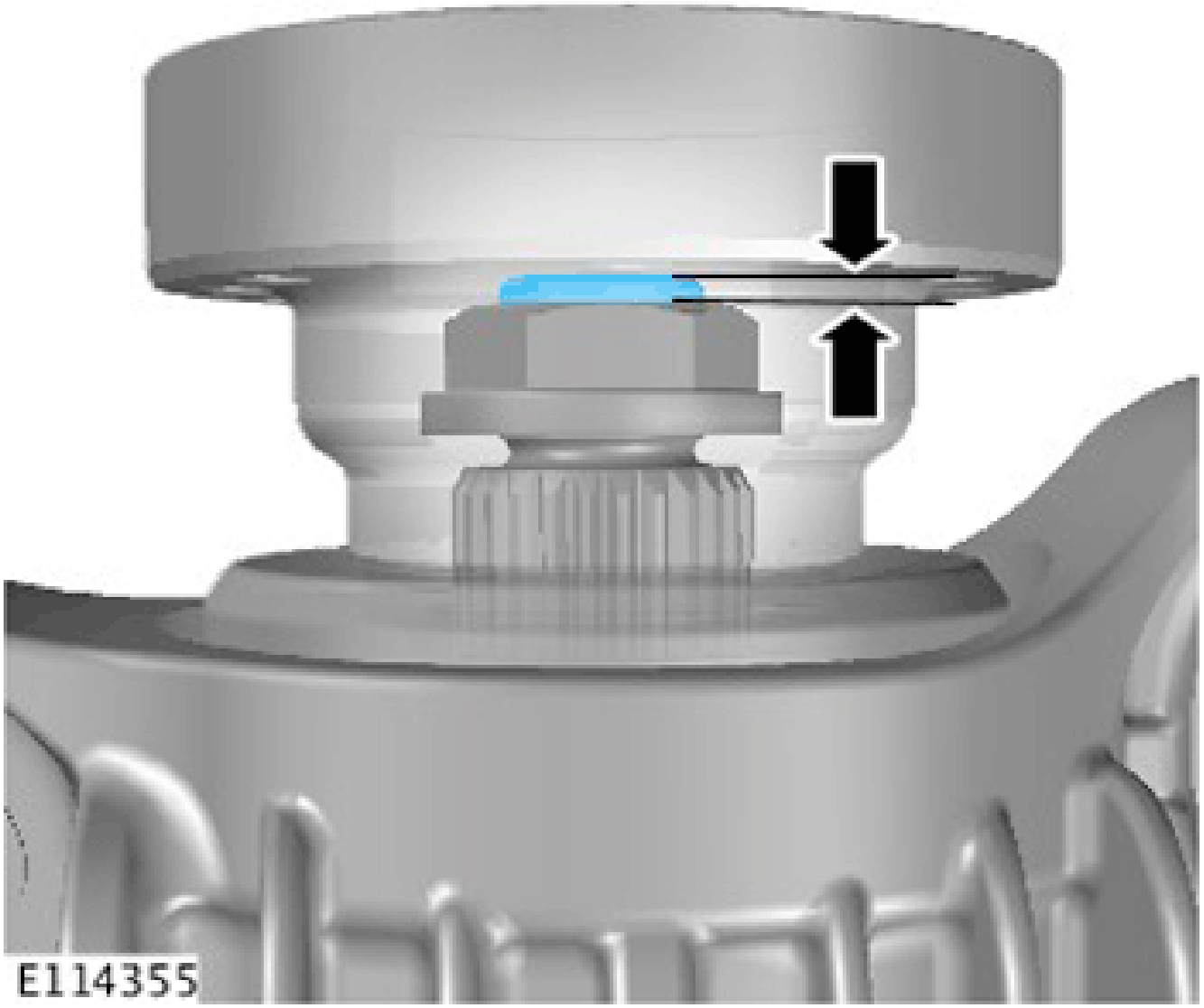
3. Remove the driveshaft.

   Refer to: **DRIVESHAFT - RWD** (Removal and Installation).

   Refer to: **Rear Driveshaft - AWD** (Removal and Installation).

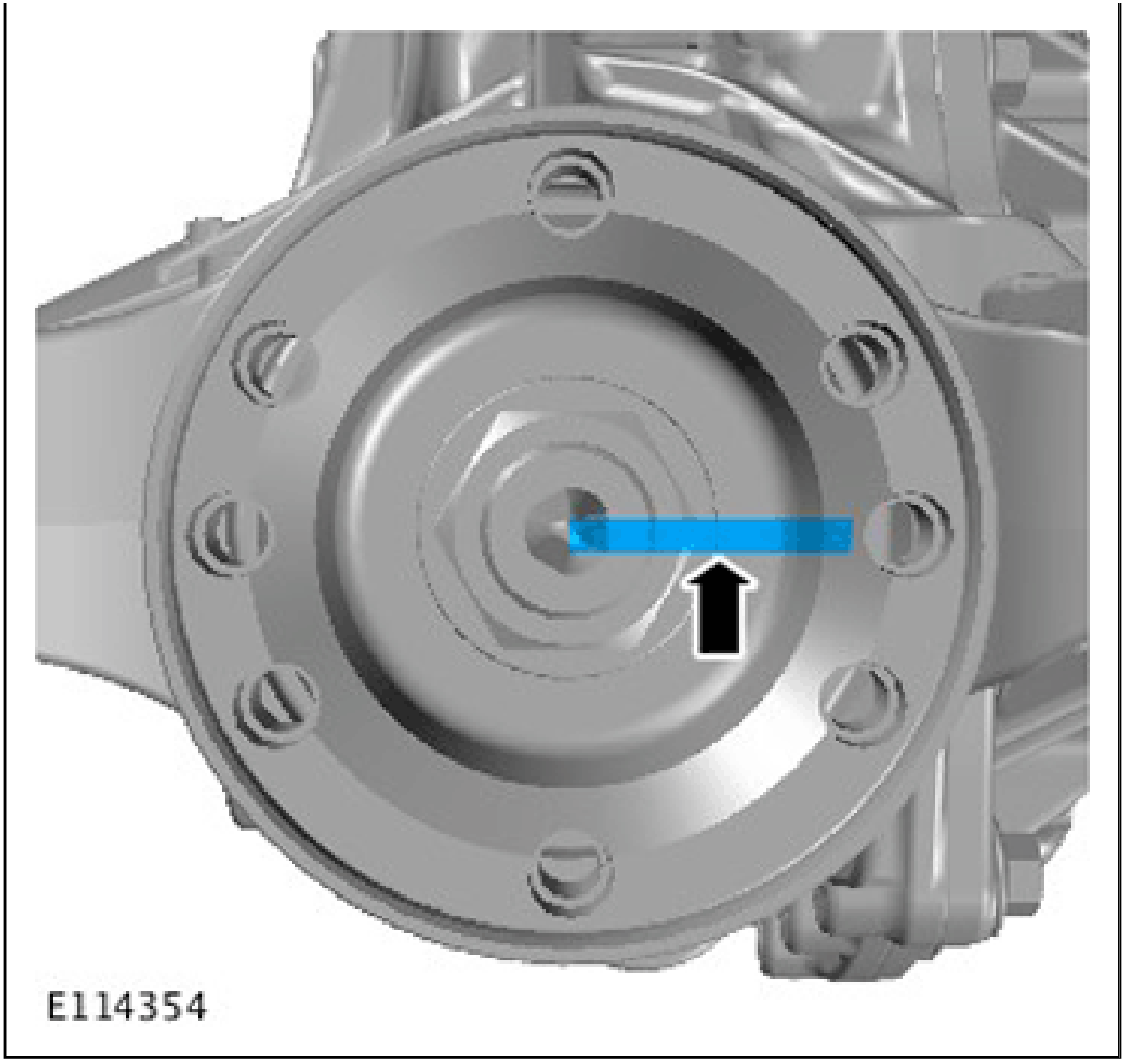
   Refer to: **DRIVESHAFT - RWD** (Removal and Installation).

4.



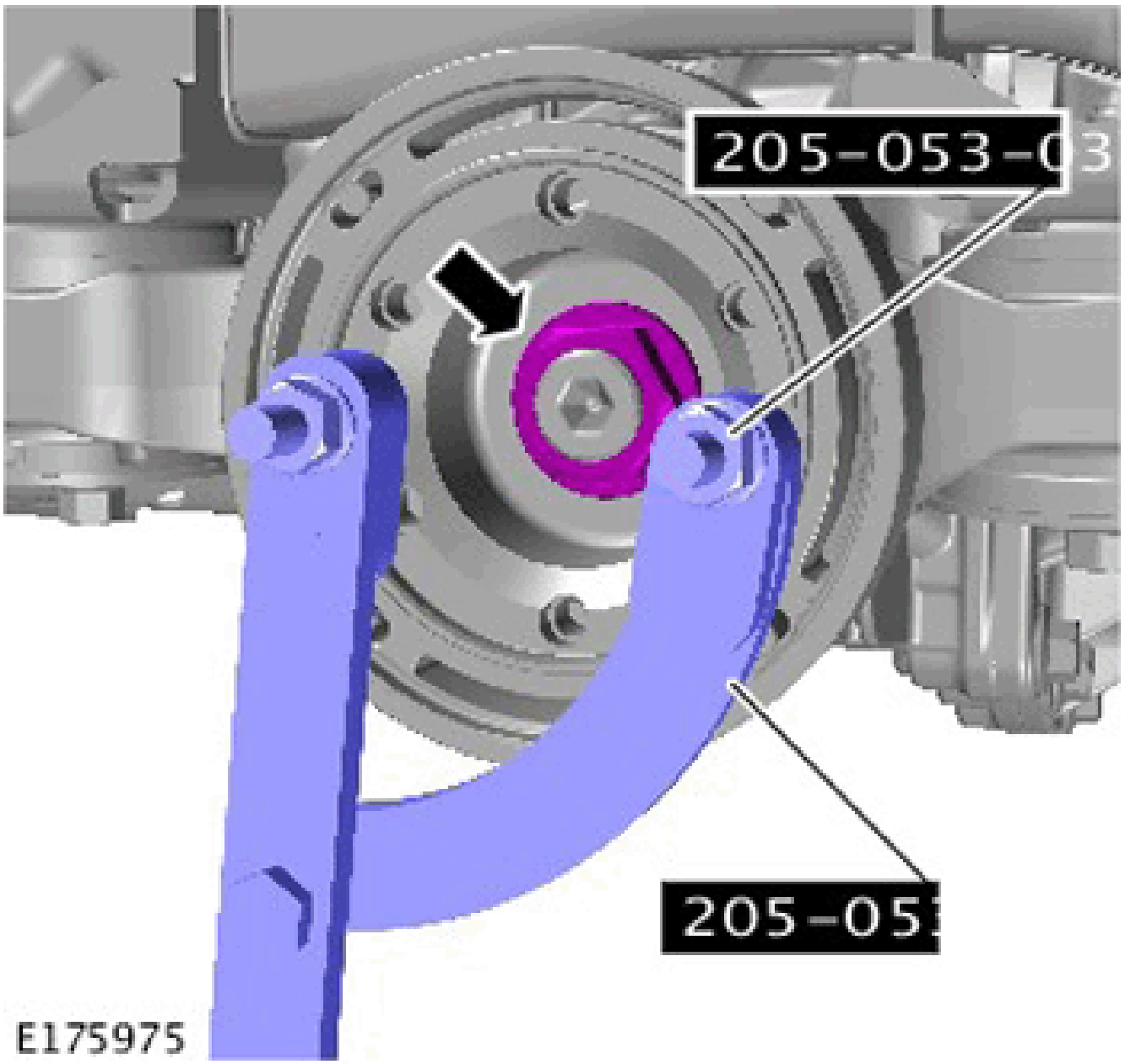
Measure the depth of the differential pinion nut on the differential pinion shaft.

5.



Scribe a line to mark the differential pinion shaft to the differential pinion flange nut and the differential pinion flange.

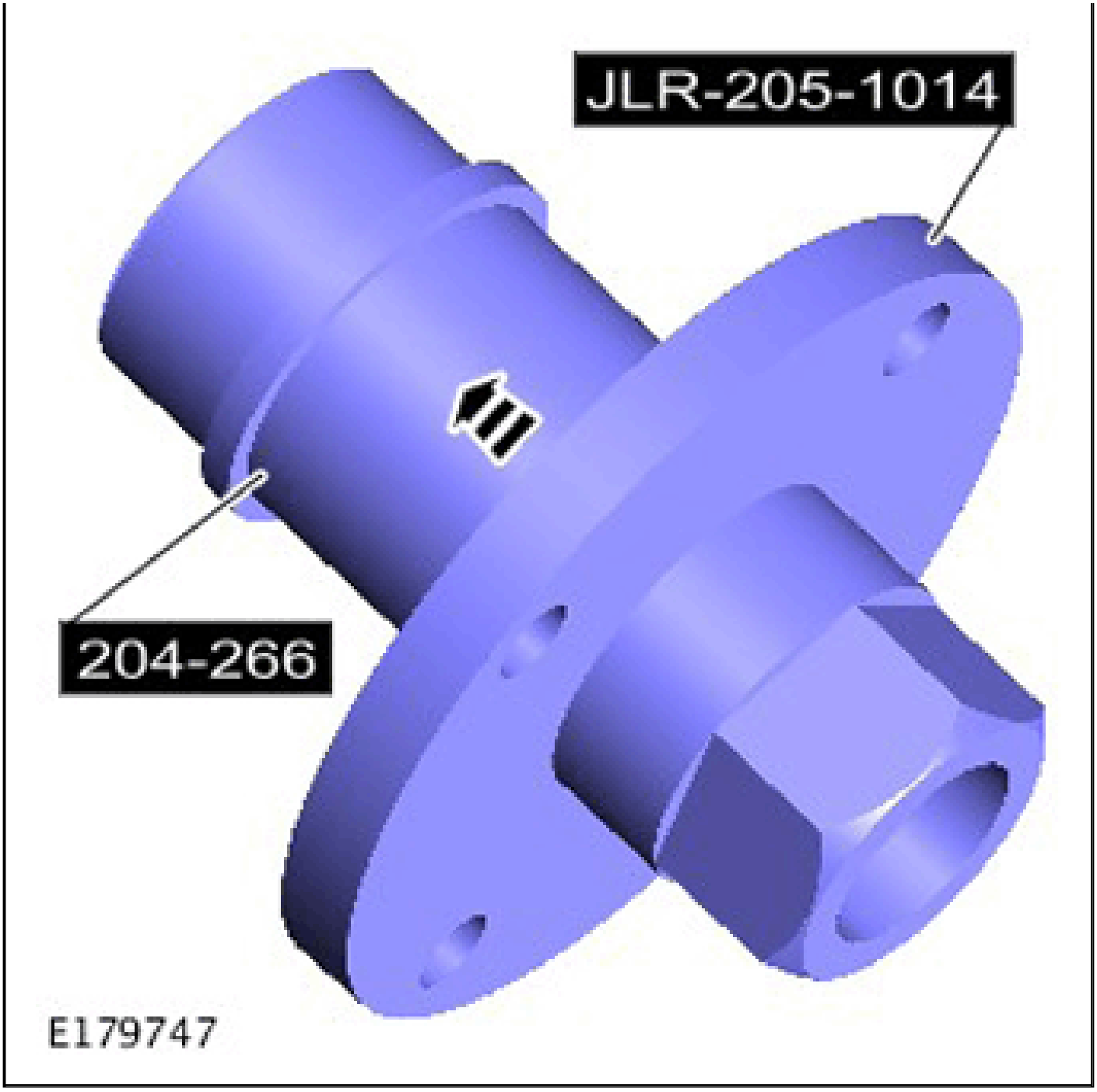
6. WARNING: **This step requires the aid of another technician.**



1. Remove the differential pinion shaft nut.

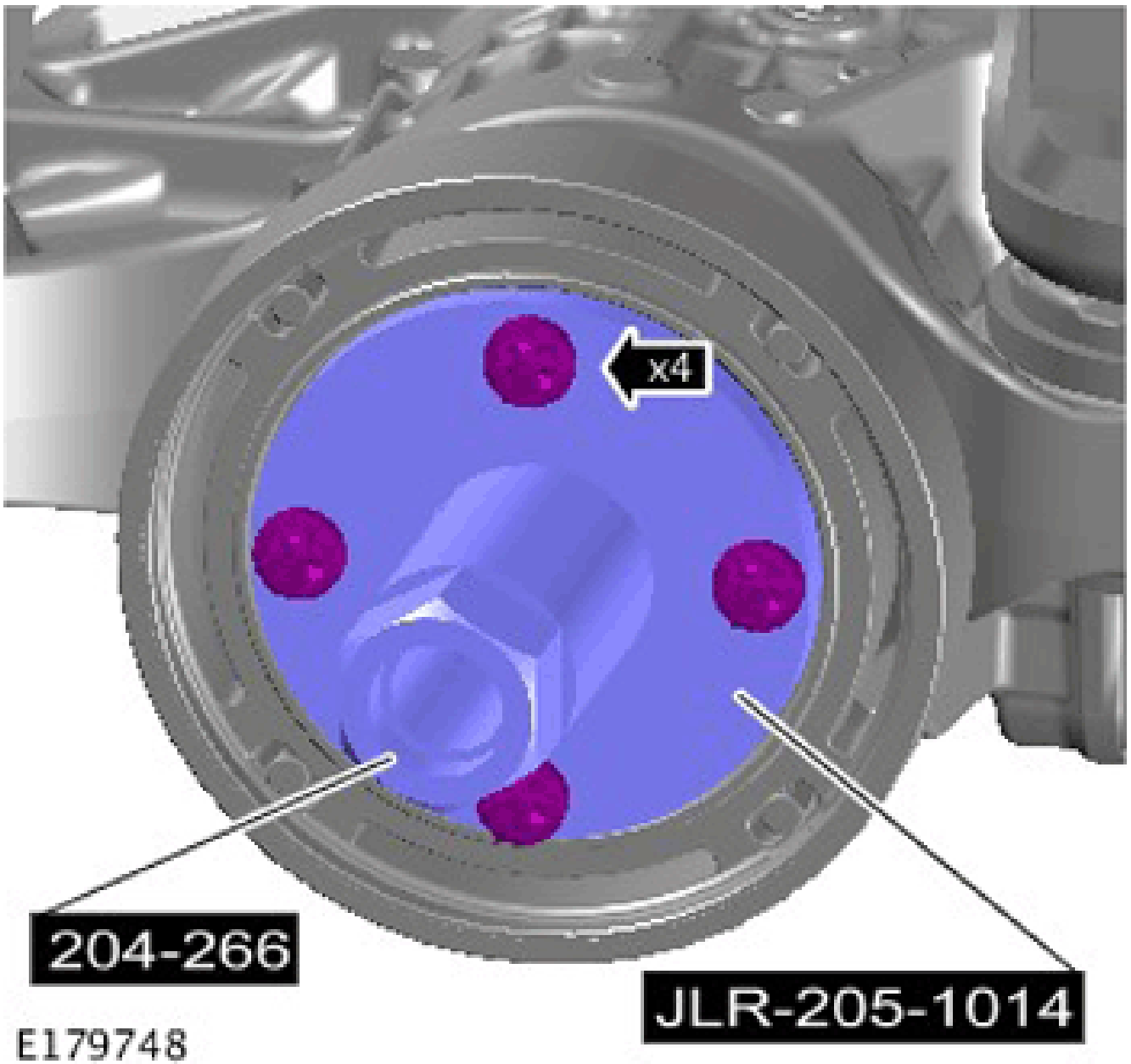
1. *Special Tool(s):* 205-053, 205-053-03

7.



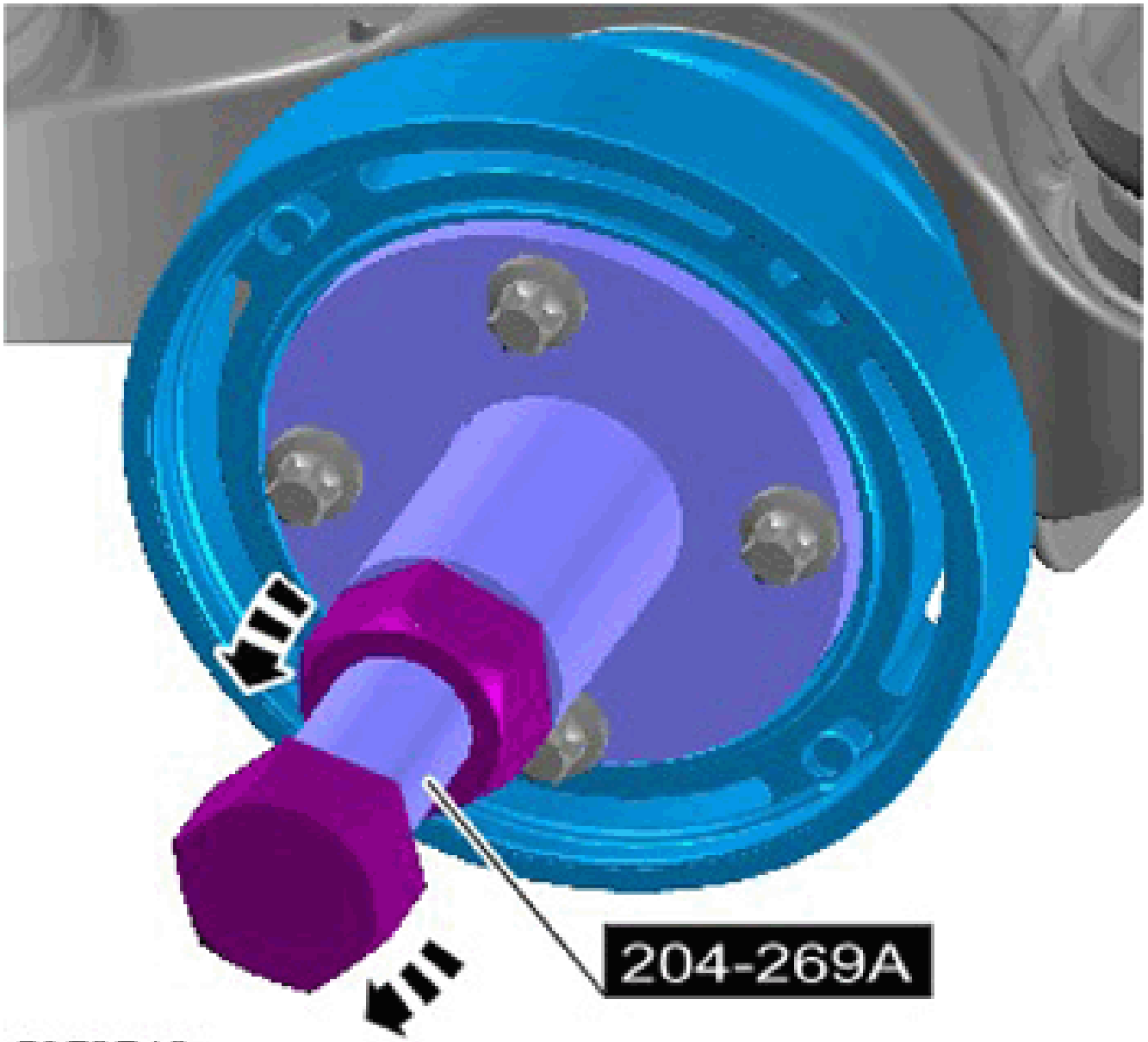
Special Tool(s): 204-266, JLR-205-1014

8.



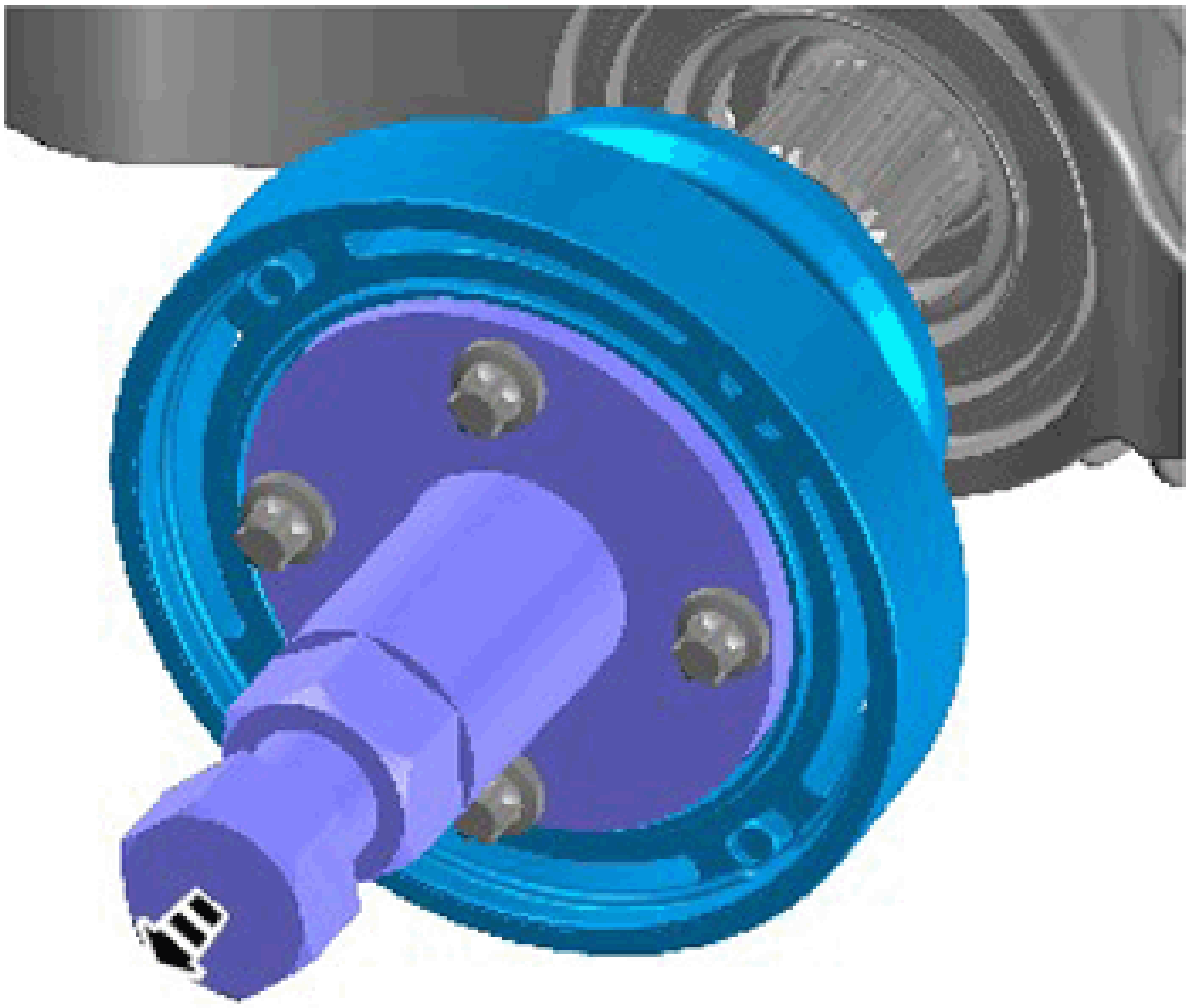
Special Tool(s): 204-266, JLR-205-1014

9. WARNING: **This step requires the aid of another technician.**



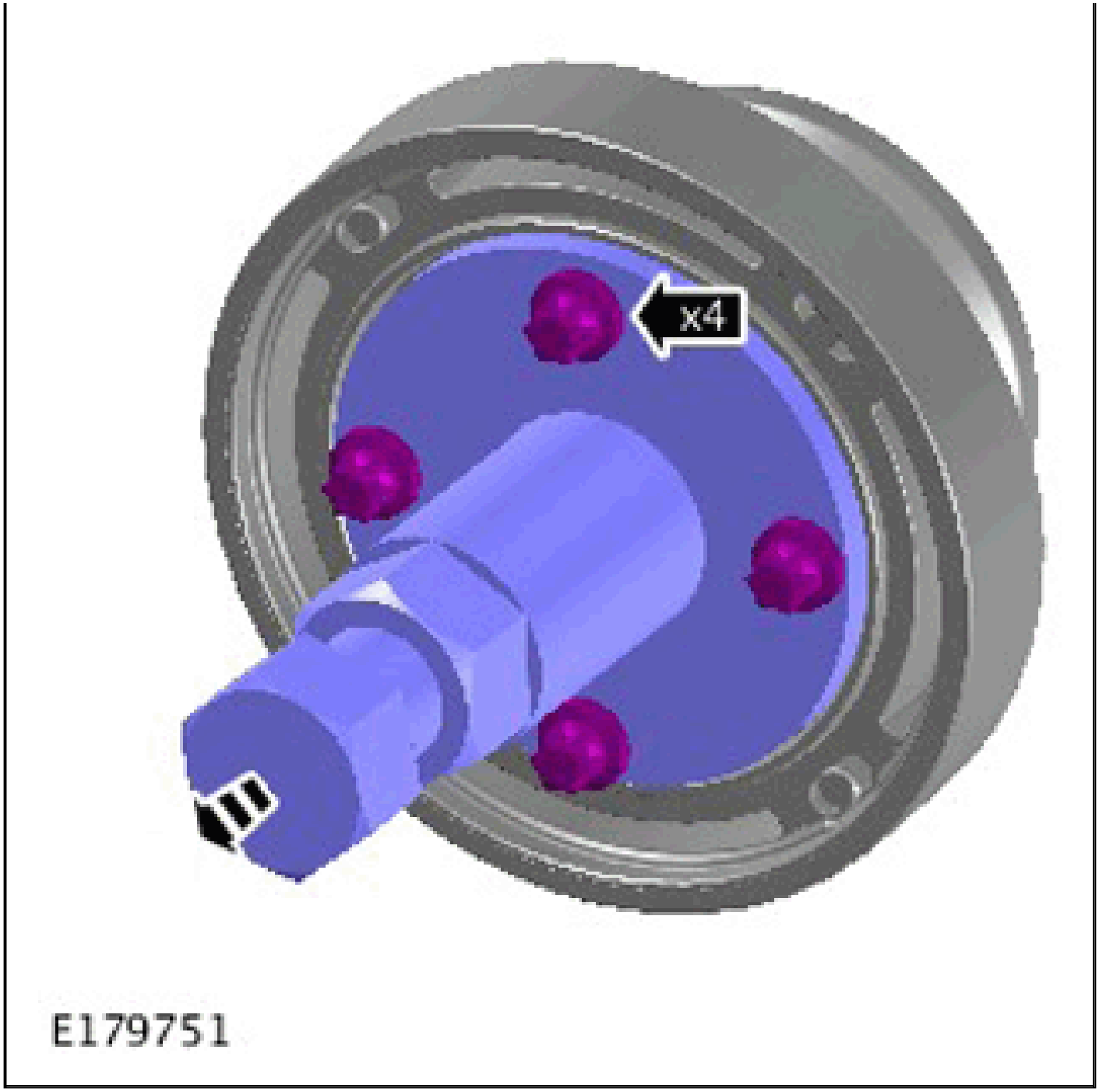
Special Tool(s): 204-269A

10.



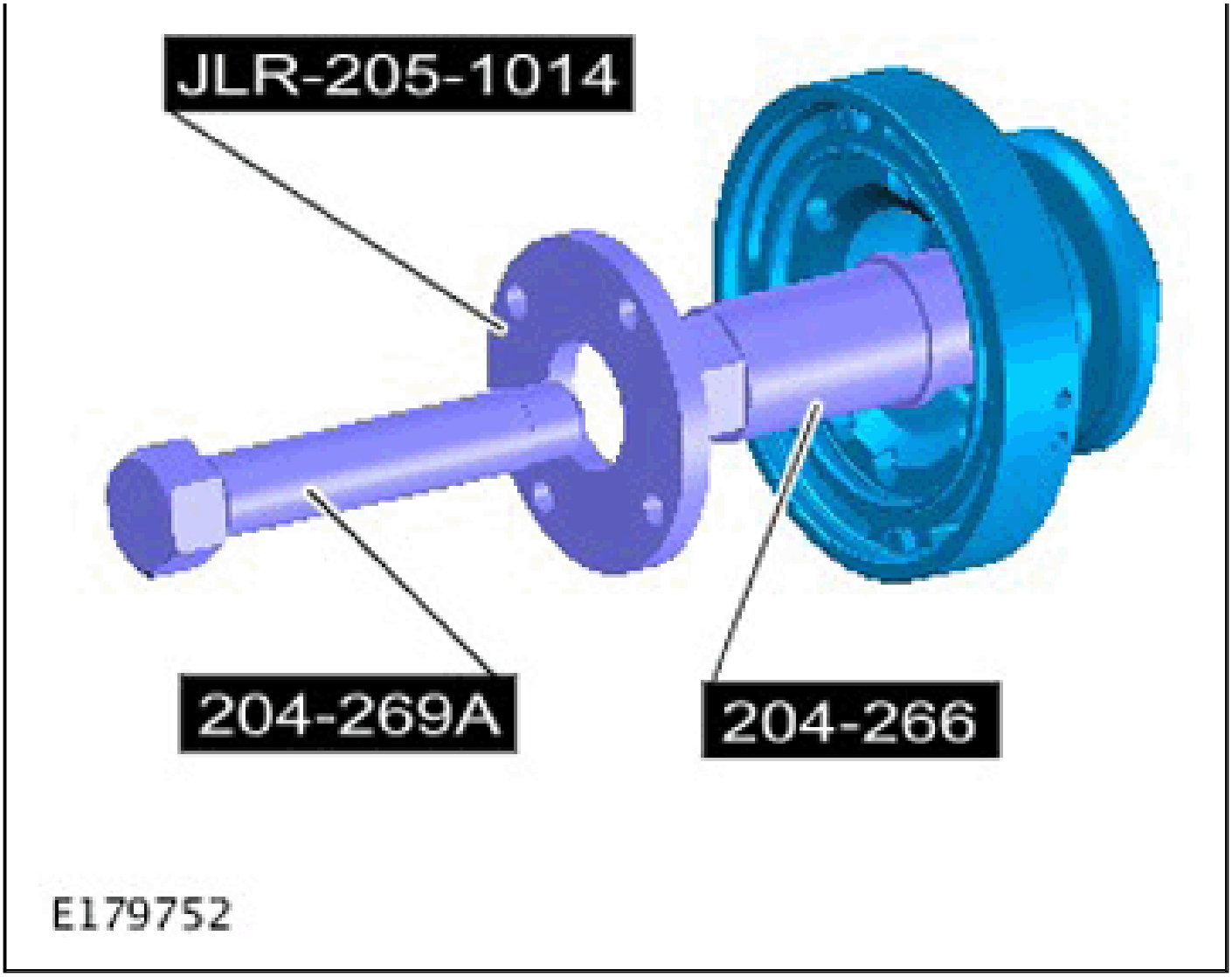
Remove the differential pinion flange assembly.

11.



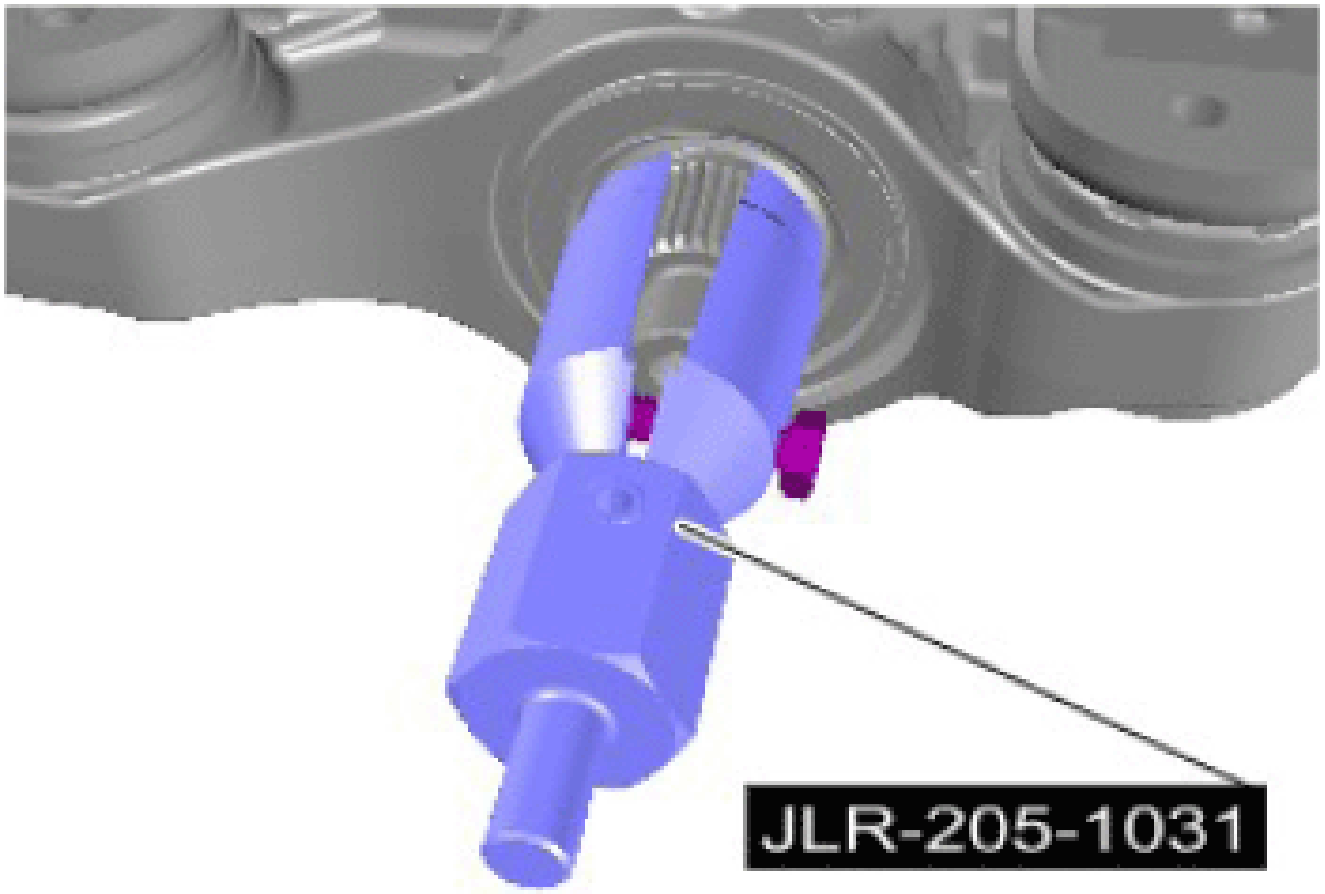
Remove the special tools from the differential pinion flange.

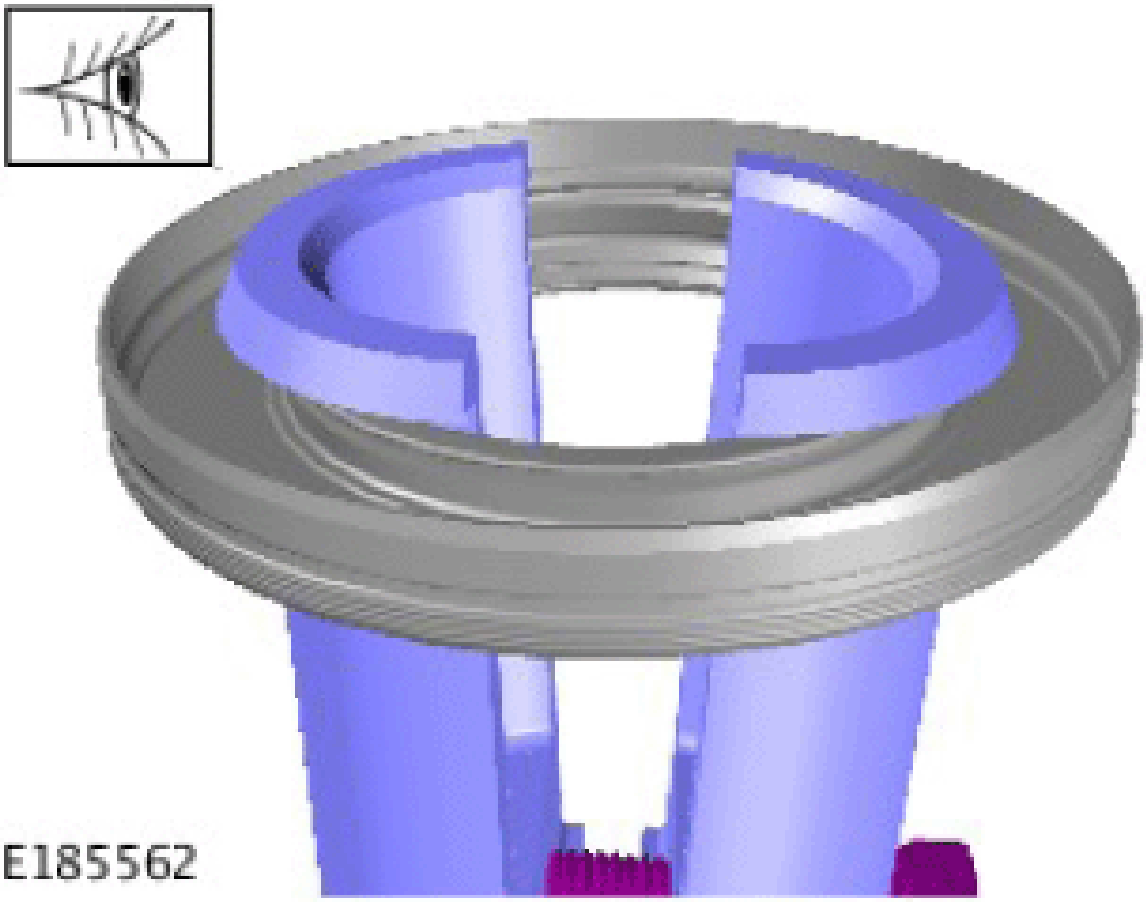
12.



Special Tool(s): 204-269A, 204-266, JLR-205-1014

13.

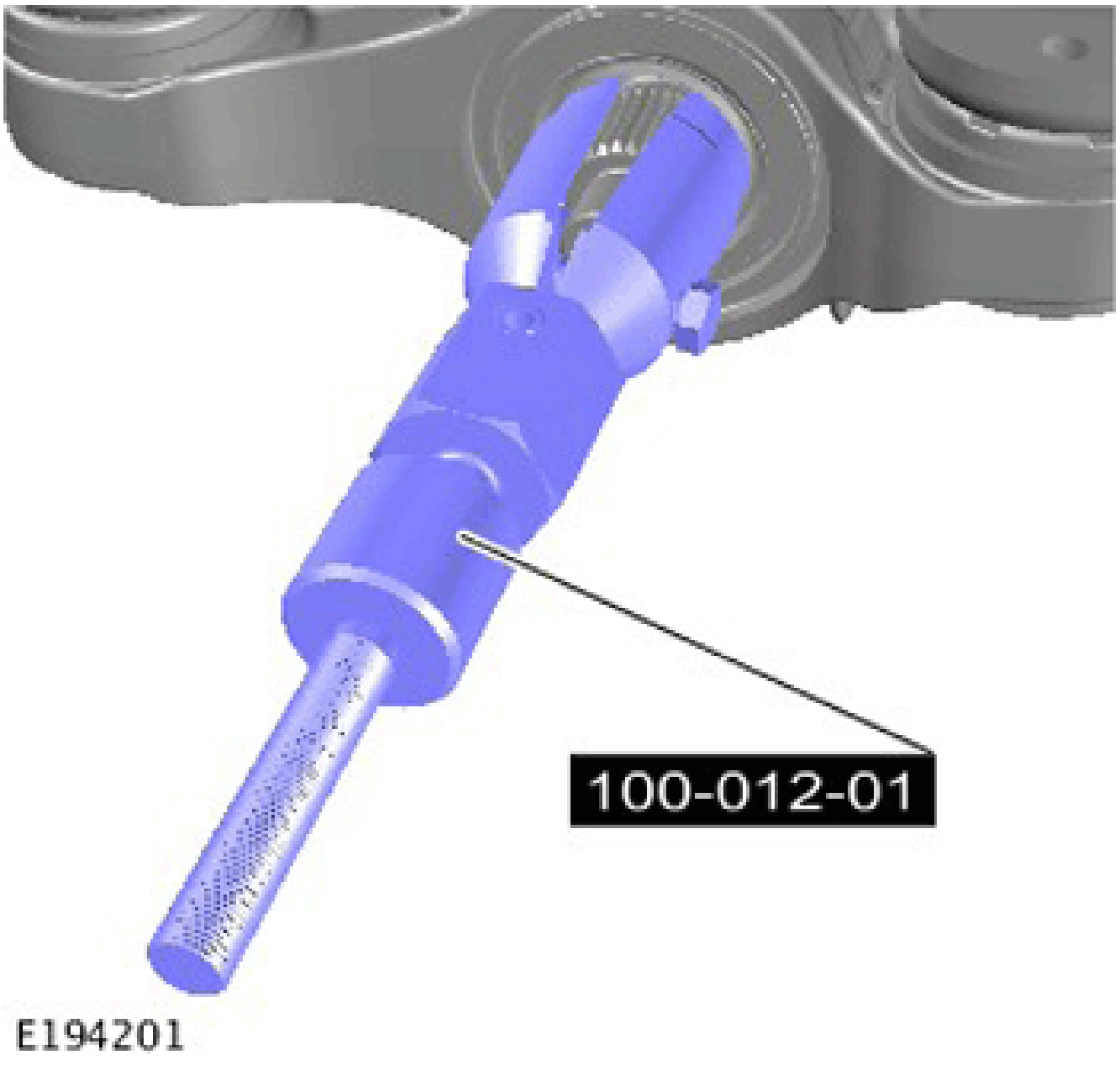

JLR-205-1031


E185562

1. Install the special tool to the differential pinion seal as shown.

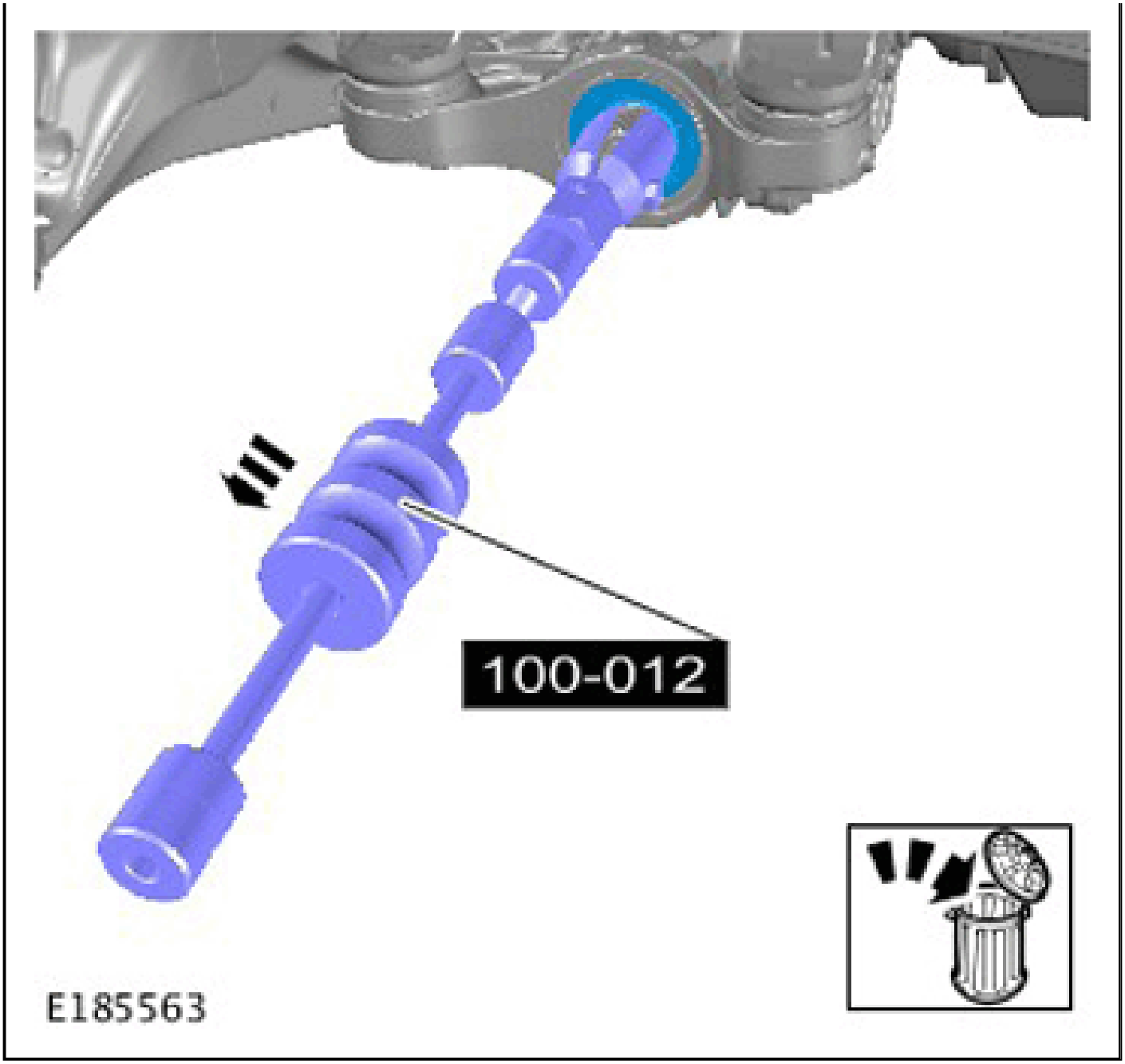
1. *Special Tool(s):* JLR-205-1031

14.



Special Tool(s): 100-012-01

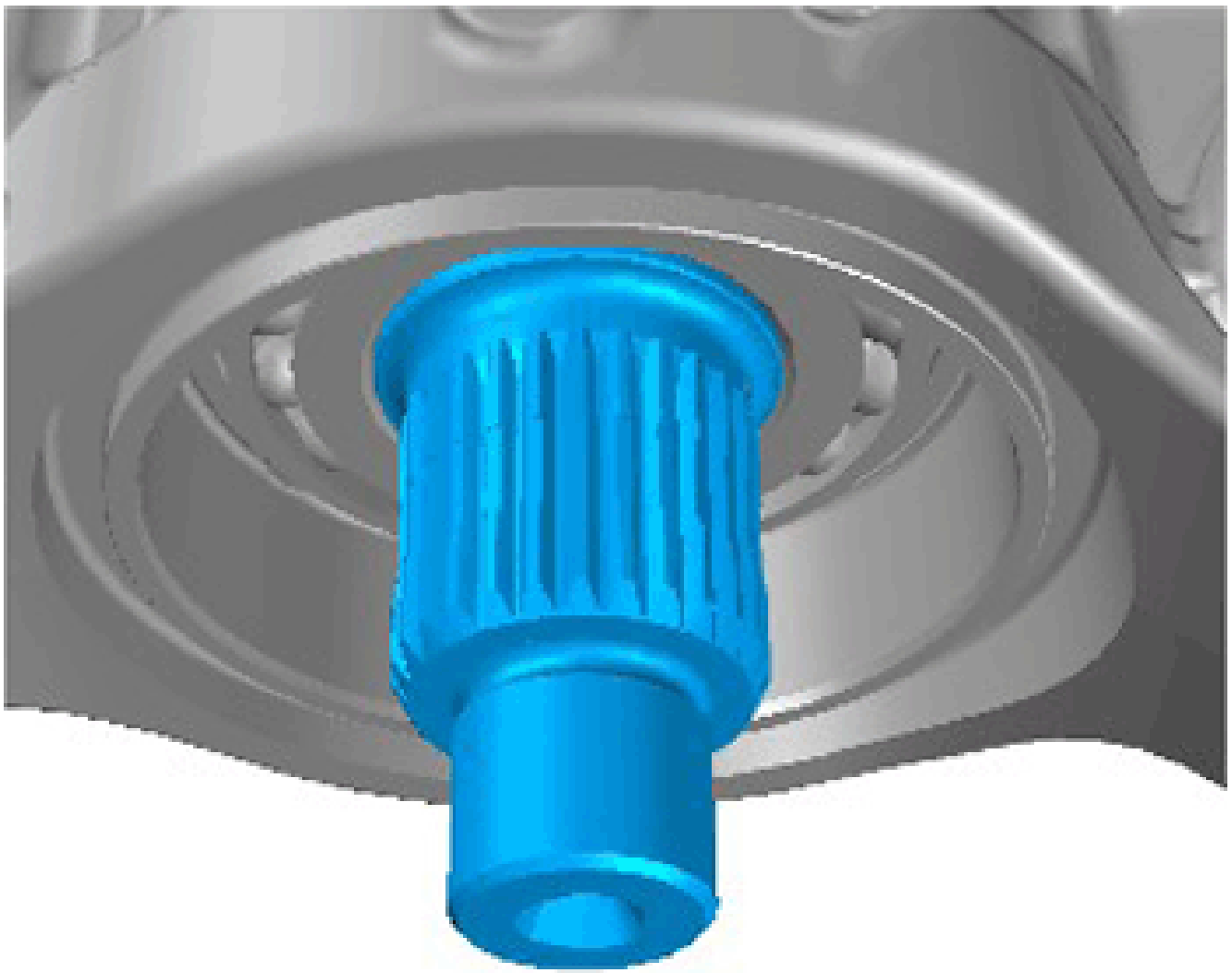
15. WARNING: **Be prepared to collect escaping oil.**



1. Remove and discard the differential pinion seal.

1. *Special Tool(s):* 100-012

16. **CAUTION: Take extra care not to contaminate the differential pinion shaft tail bearing.**



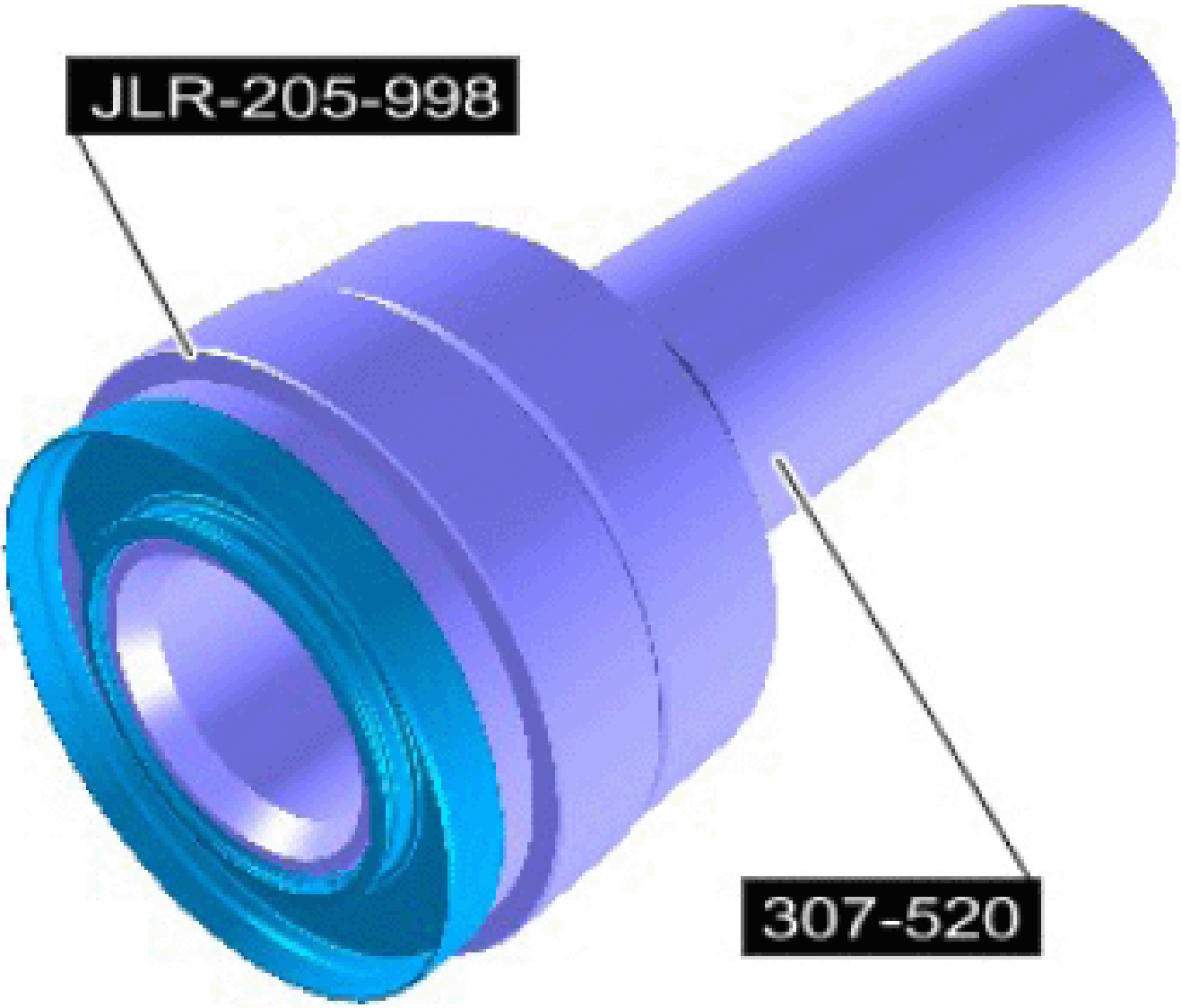
NOTE: **Make sure the differential pinion shaft splines and threads are clean and free of Loctite.**

17.

Make sure the differential pinion flange splines are clean and free of Loctite.

INSTALLATION

1.

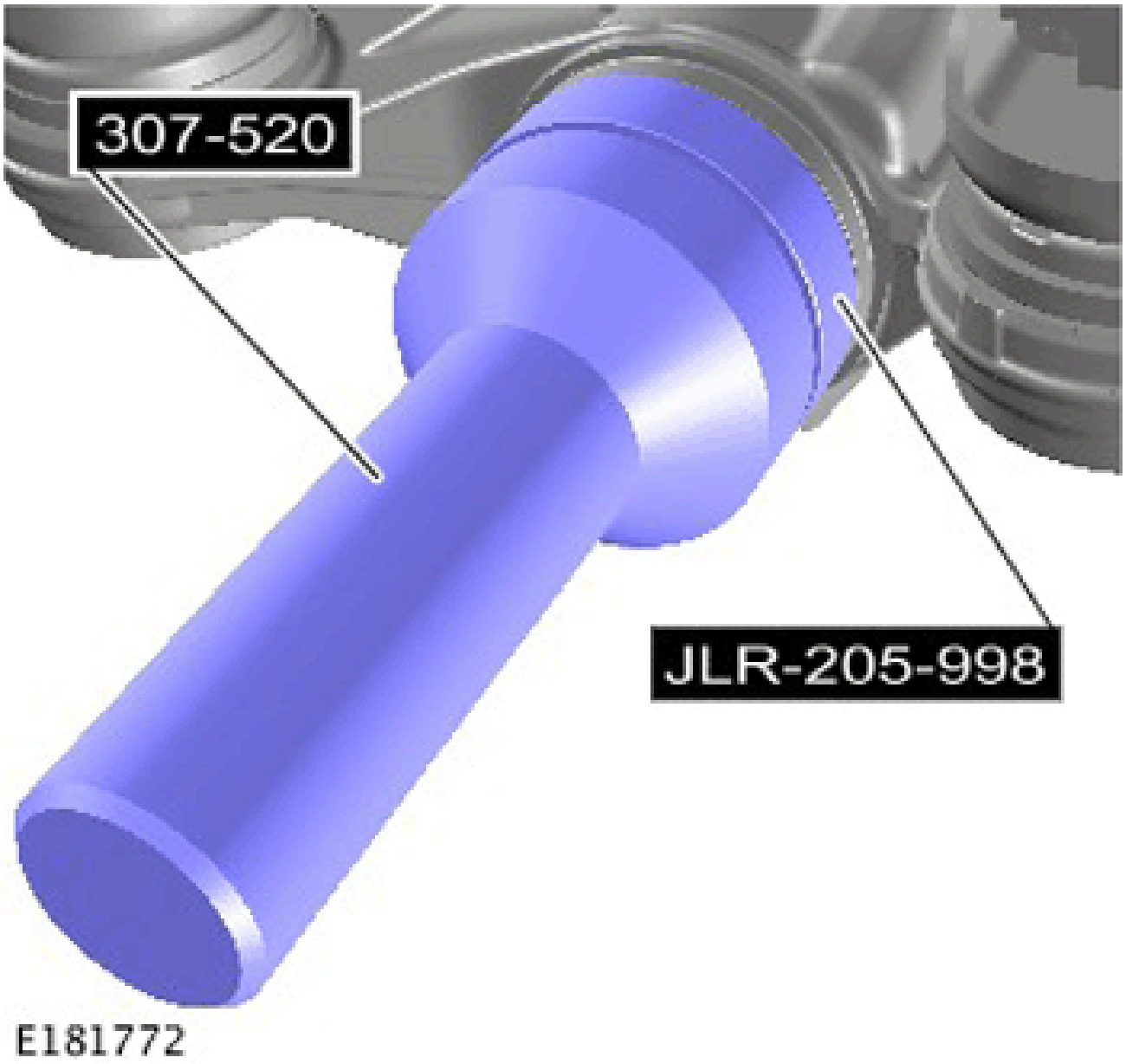


1. Install the differential pinion seal to the special tool.

1. *Special Tool(s):* JLR-205-998, 307-520

1. *Renew Part:* Differential pinion seal.

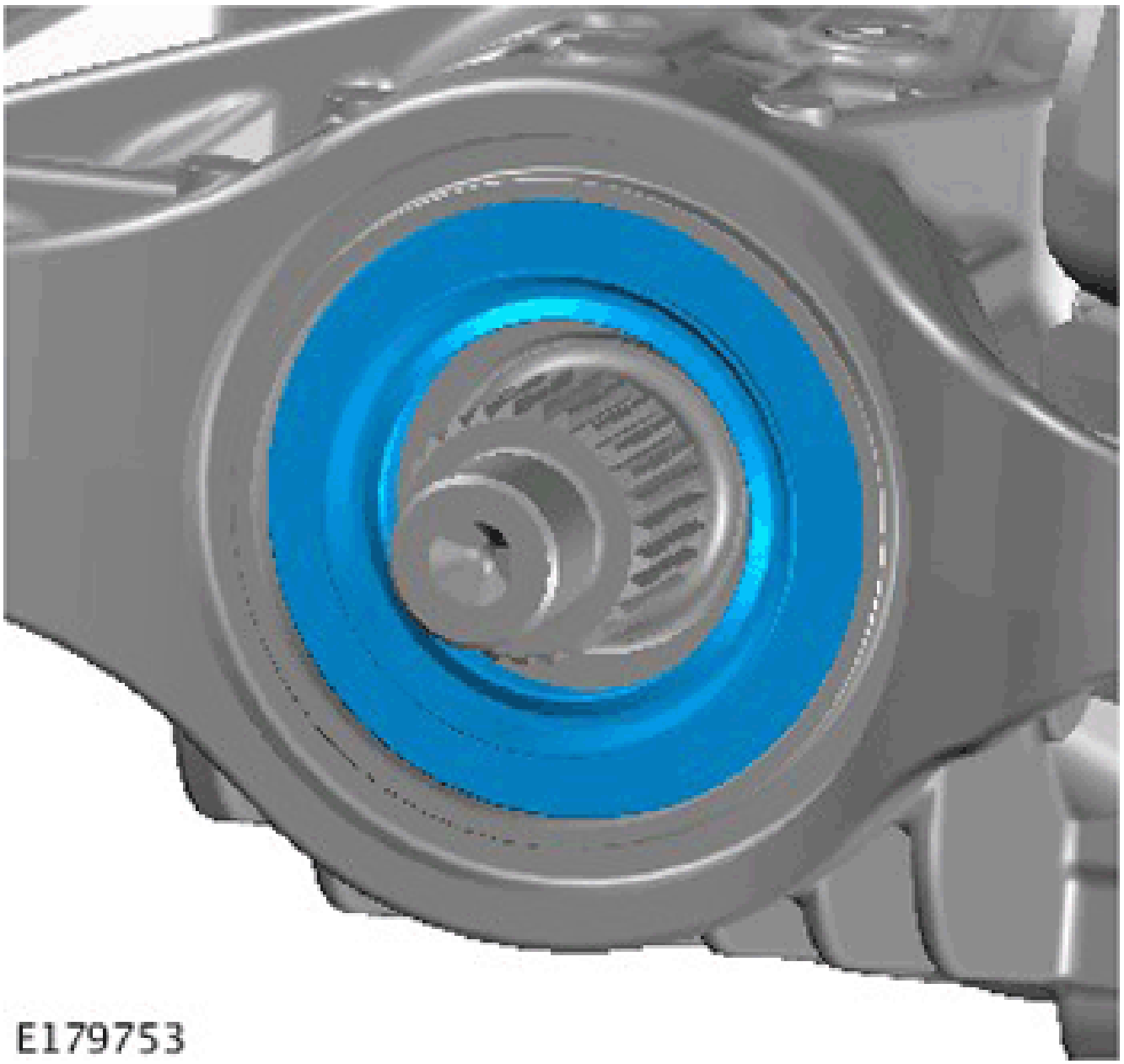
2.



1. Using the special tools, install the differential pinion seal until fully seated.

1. *Special Tool(s):* JLR-205-998, 307-520

3.

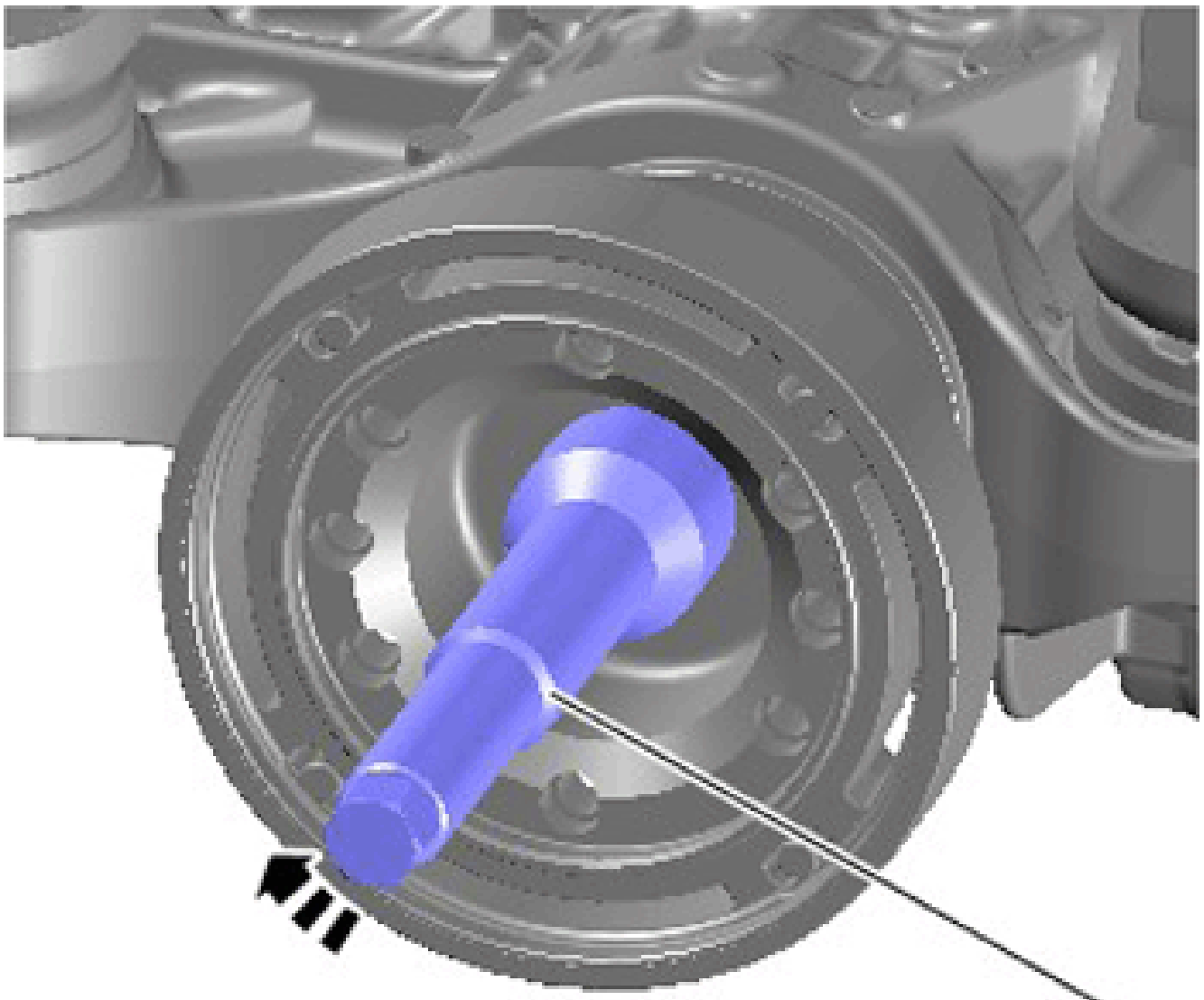


Check the differential pinion seal is fully seated.

4.

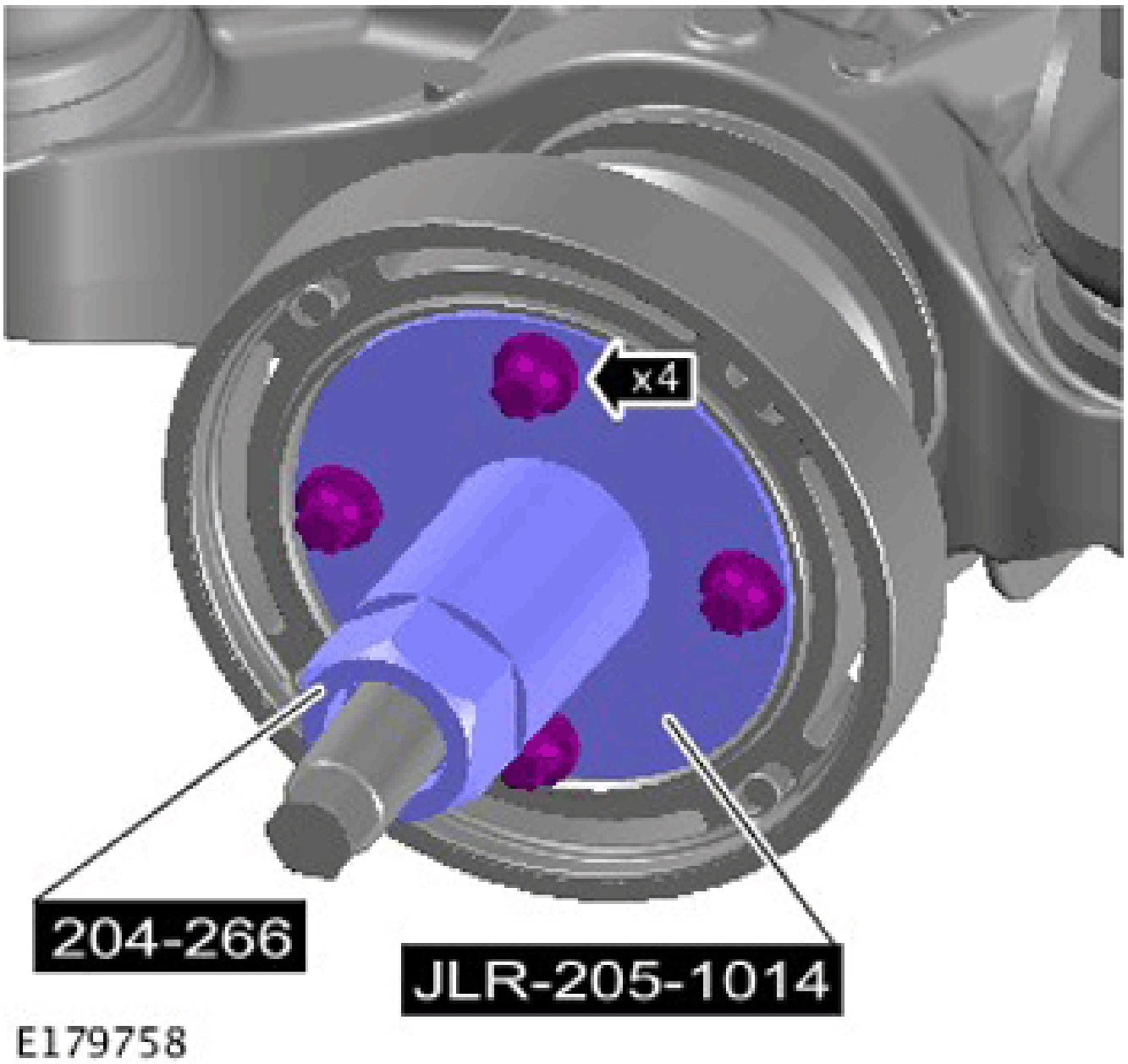
Align the scribed line on the differential pinion flange to the differential pinion shaft.

5.



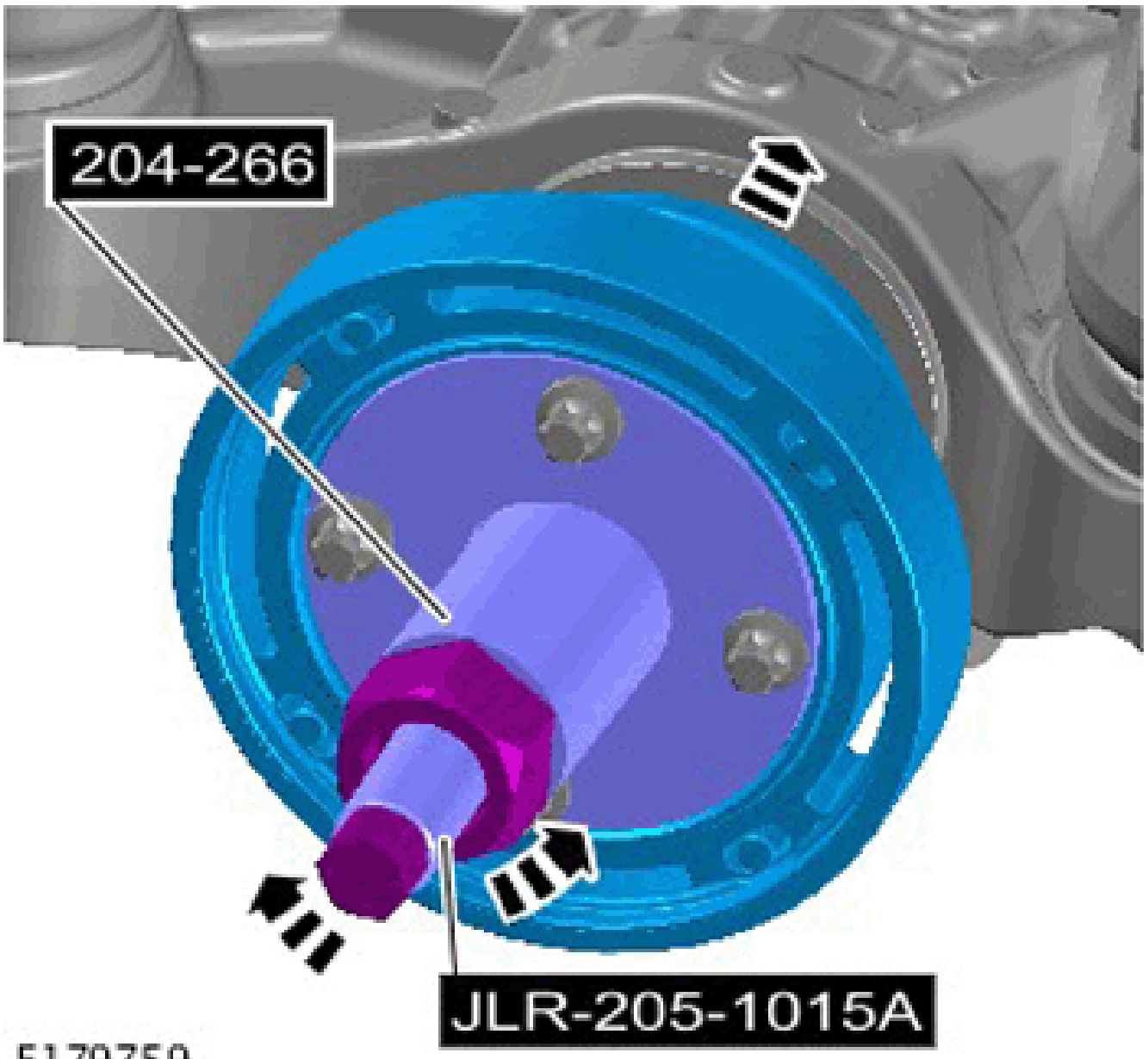
Special Tool(s): JLR-205-1015A

6.



Special Tool(s): 204-266, JLR-205-1014

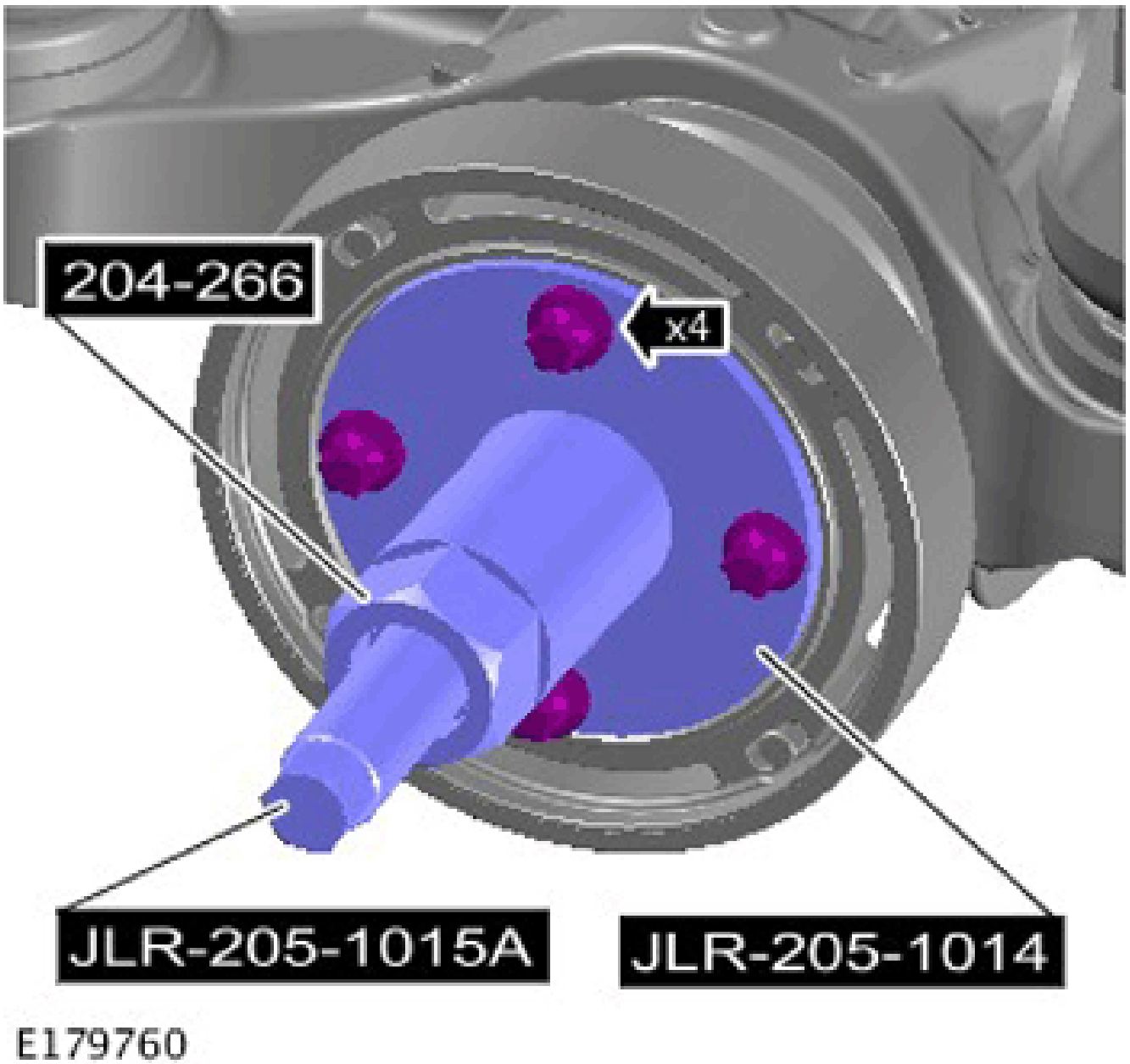
7. WARNING: **This step requires the aid of another technician.**



1. Using the special tools, install the differential pinion flange.

1. *Special Tool(s):* 204-266, JLR-205-1015A

8.

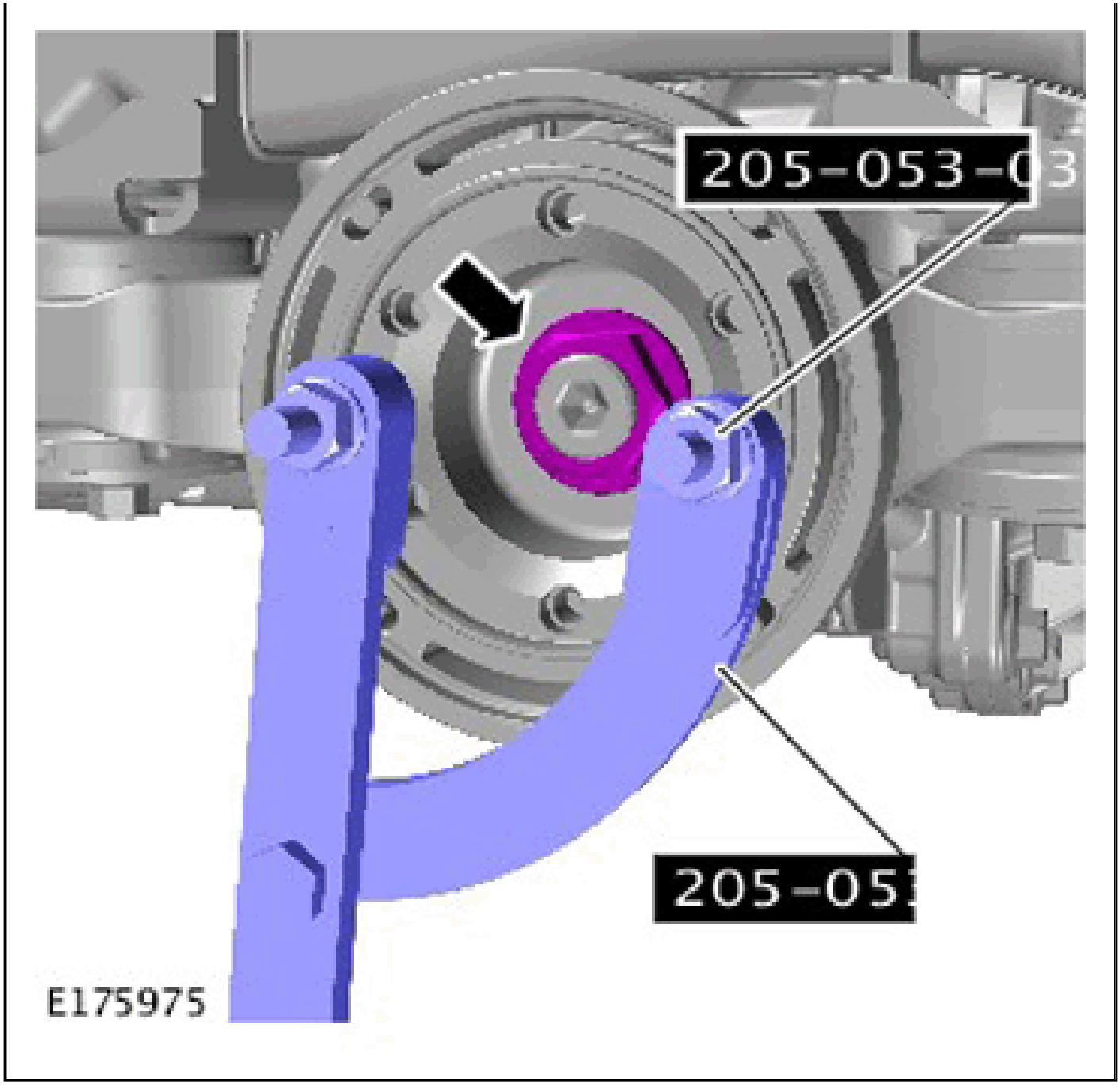


Special Tool(s): 204-266, JLR-205-1015A, JLR-205-1014

9. **WARNING:** **This step requires the aid of another technician.**

CAUTION: **Make sure the differential pinion flange has no end float and is free to rotate.**

- **Make sure that the differential pinion flange nut scribed line is aligned and is never tightened short of the scribed mark on the differential pinion shaft.**
- **Make sure that the differential pinion flange nut scribed line is aligned and tightened no more than a maximum of 5 degrees past the scribed mark on the differential pinion shaft.**



1. Apply Loctite to threads and splines.
2. Using the special tool 205-053, counter hold the differential pinion flange and install the differential pinion nut.
3. Measure the depth of the differential pinion nut on the differential pinion shaft to previous noted depth.
4. *Special Tool(s):* 205-053, 205-053-03

10. Install the driveshaft.

    Refer to: **DRIVESHAFT - RWD** (Removal and Installation).

    Refer to: **Rear Driveshaft - AWD** (Removal and Installation).

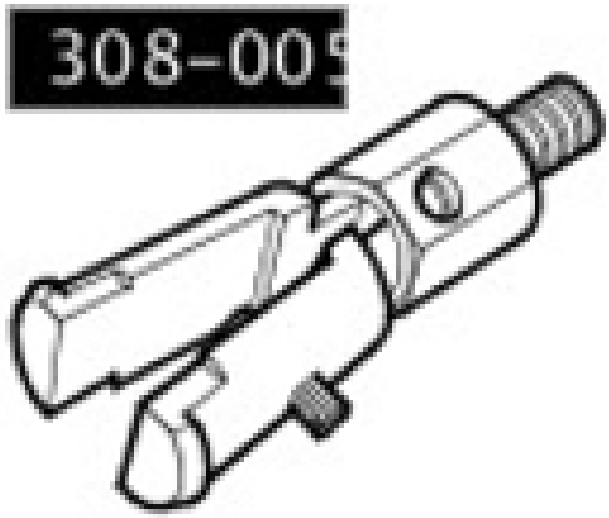
    Refer to: **DRIVESHAFT - RWD** (Removal and Installation).

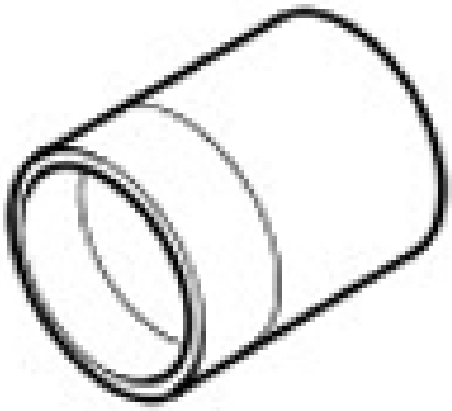
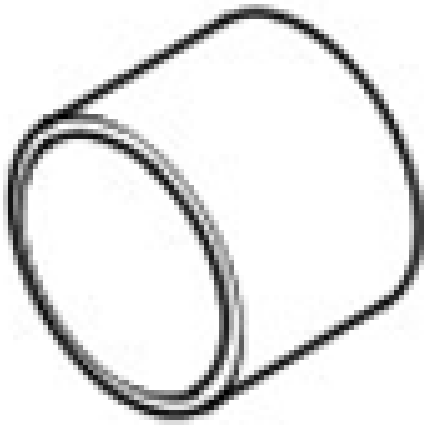
11. Carry out the rear differential filling procedure.

Refer to: **Differential Draining and Filling** (General Procedures).

REAR HALFSHAFT SEAL (G1580096)

SPECIAL TOOL(S)

 E54135	**100-012** Slide Hammer
 E54134	**308-005** Remover, Axle oil seal
	308-621-1 Installer, Halfshaft Oil Seal

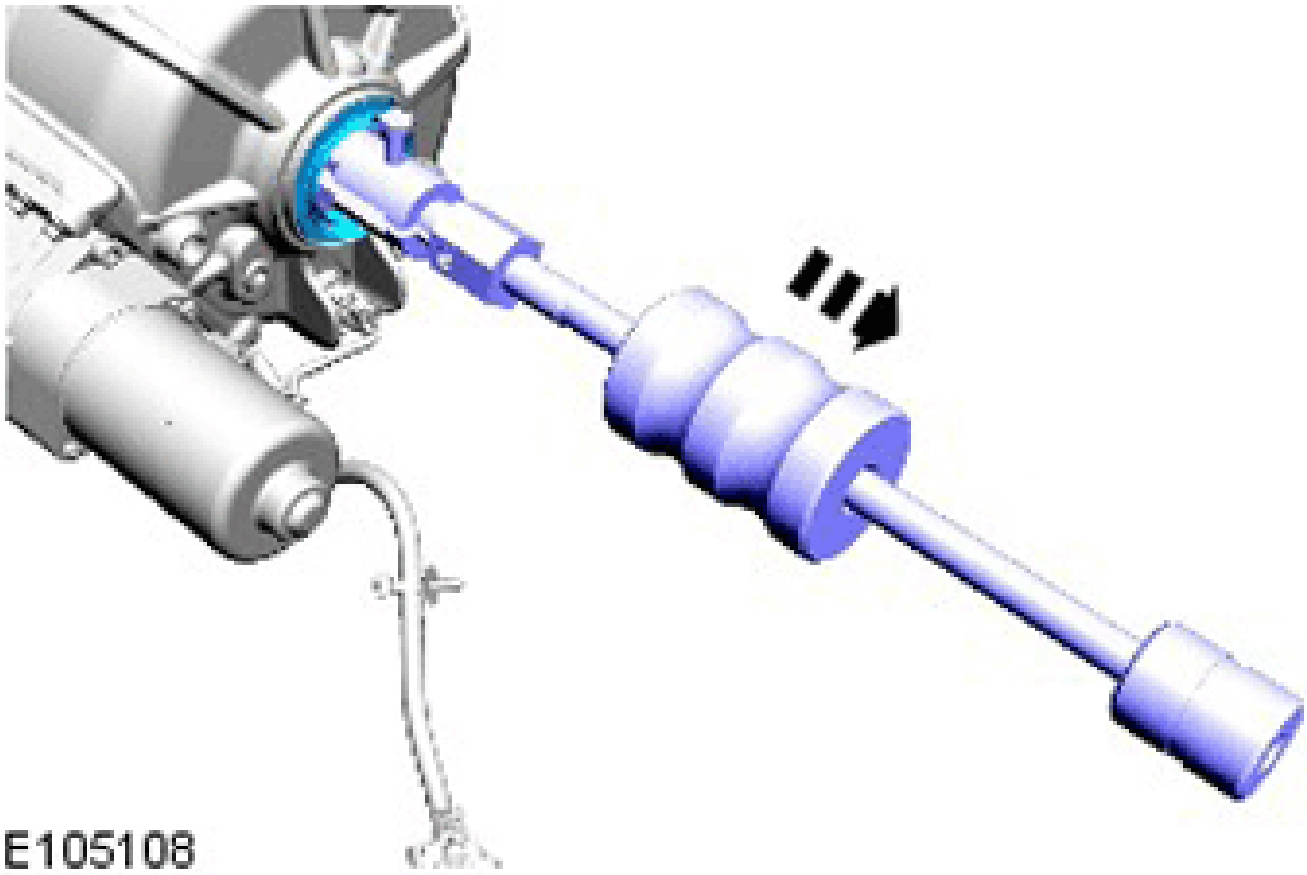
308-626/1  E54136	
308-626/2  E54137	**308-621-2** Installer/Guide, Halfshaft Oil Seal

REMOVAL

CAUTION: LH illustration shown, RH is similar.

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

1. Refer to: **Rear Halfshaft** (Removal and Installation).
2. **NOTE: Component illustrated, removed for clarity.**



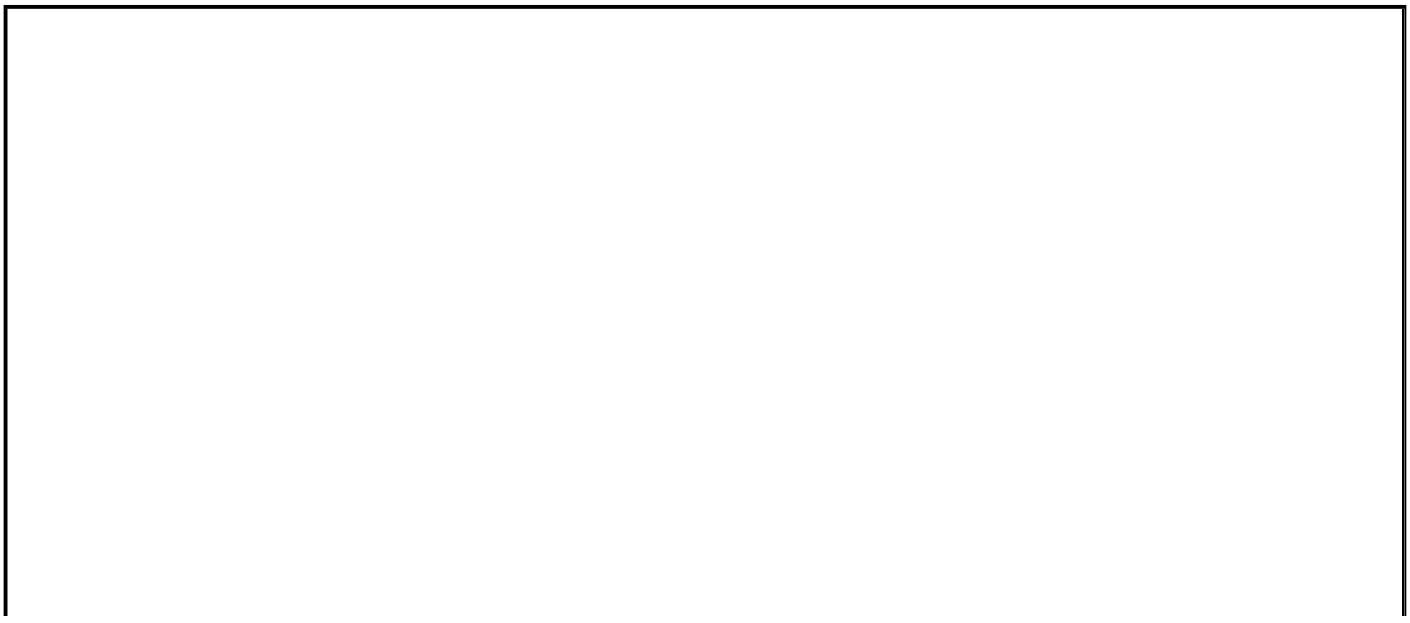
Remove and discard the halfshaft oil seal.

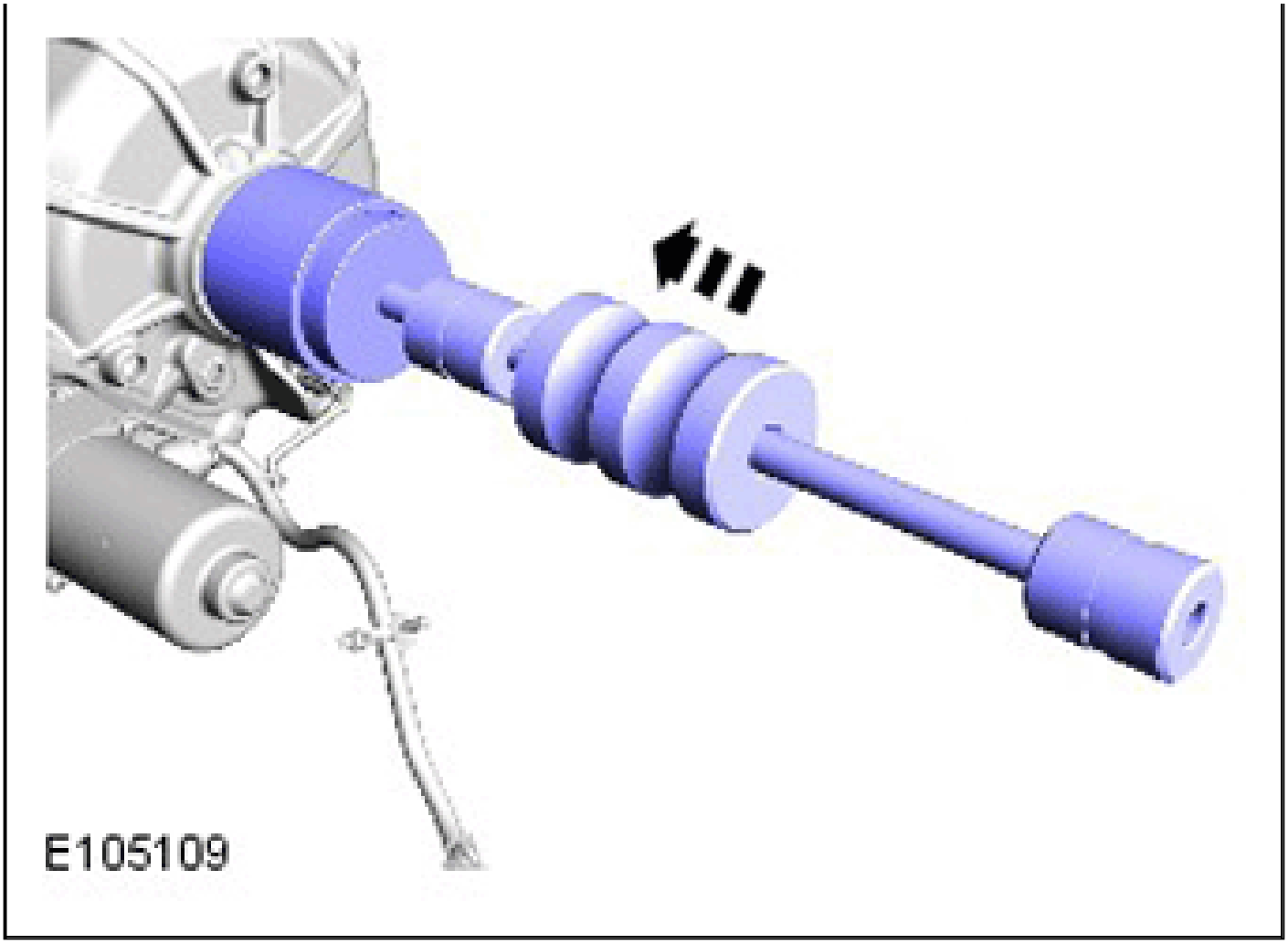
Remove the Special Tool(s): 100-012, 308-005

INSTALLATION

1. **CAUTION: Make sure the mating faces are clean, before the sealant is applied.**

   NOTE: Component illustrated, removed for clarity.

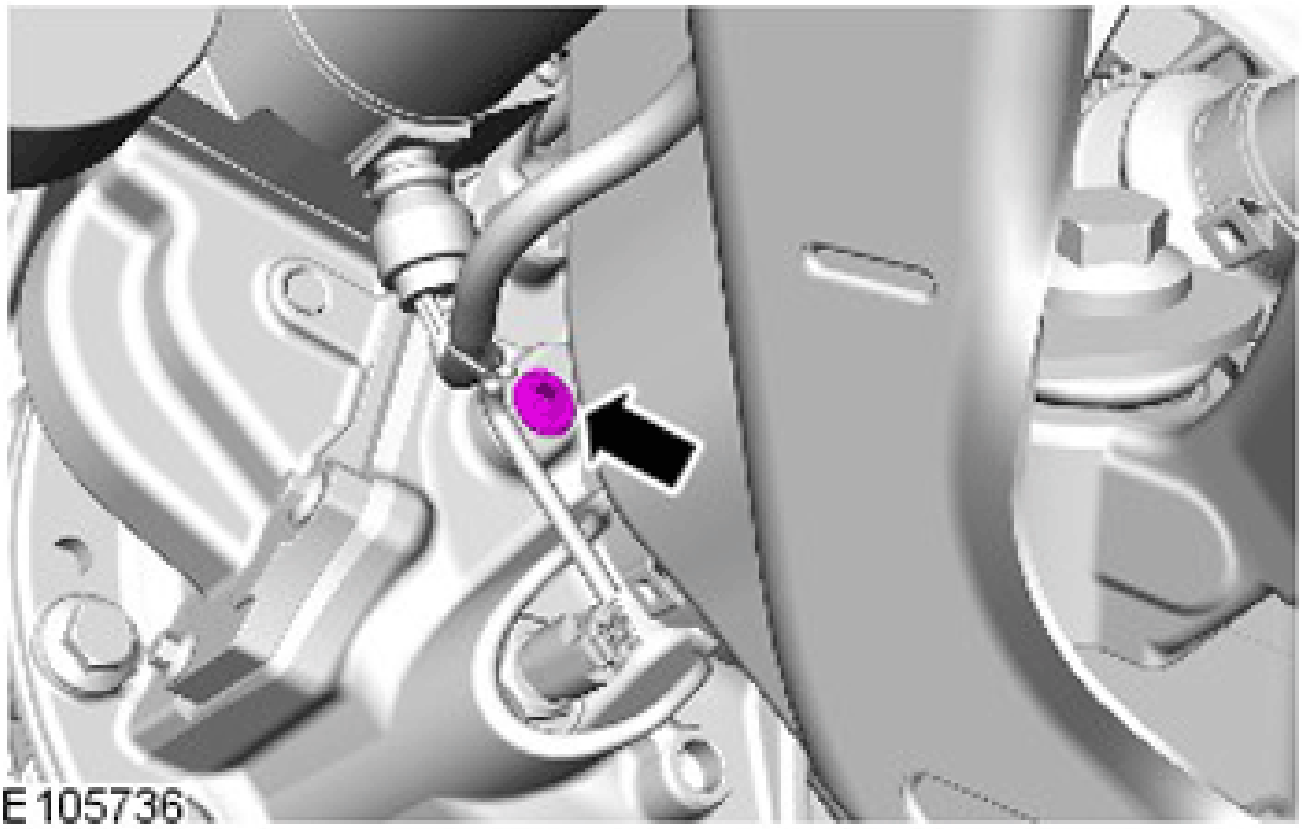




Using the special tool, install a new halfshaft oil seal.

Install the Special Tool(s): 100-012, 308-621-1, 308-621-2

2. Refer to: **Rear Halfshaft** (Removal and Installation).
3.



Check and top-up the differential case.

Article GUID: A00834143