

Power Steering -

Power Steering Fluid

Item	Specification
Recommended power steering fluid	Texaco Cold Climate Fluid 14315

Capacity

Item	Capacity
System capacity - Maximum - Fill to mark on reservoir	0.89 litre (1.5 pints) (0.9 US quarts)

General Specification

Item	Specification
Type	Power assisted rack and pinion, speed proportional with belt driven pump, remote hydraulic fluid reservoir and fluid cooler
Steering wheel diameter	395 mm (15.5 in)
Number of turns - lock to lock	3.32
Turning circle	11.45 m (37.5 ft)
System ratio	17.8:1
System operating pressure	110 bars (11000 kPa)(1595 lbf/in ²)
Pump relief valve operating pressure	114 ± 4 bar (11400 ± 400 kPa) (1653 ± 58 lbf/in ²)
Fluid flow rate - constant	8.8 ± 0.5 litre/min (15.4 ± 0.8 pints/min) (9.2 ± 0.5 US quarts/min)
Steering rack travel	166 mm (6.22 in)
Piston diameter	52 mm (1.9 in)
Rack bar diameter	30 mm (1.12 in)
Steering angle sensor make/part number	Panasonic ECS64SUKX

Torque Specifications

Description	Nm	lb-ft
Power steering pump bolts - All engines	25	18
High pressure line to power steering pump - All engines	25	18
Power steering pump bolts - All engines	25	18
High pressure line to power steering pump - All engines	25	18
Low pressure line to power steering pump - All engines	25	18
Steering angle sensor Torx screws	3	2
* Steering column intermediate shaft nut	22	16
++ Steering column intermediate shaft to the lower shaft bolt	25	18
Horn nut	10	7
Coolant expansion tank bolts	10	7
A/C condenser refrigerant line bolts	25	18
++ Power steering fluid lines bolt - 2.7 litre	25	18
+ Power steering gear to cross member bolts	175	129
High pressure line to steering gear bolt	25	18
Power steering line support bracket bolt	10	7
High pressure line union nut	30	22
* Tie rod end ball joint nuts	76	56
** Universal joint to steering gear bolt	25	18
Radiator access panel bolts	10	7
Oil filter	18	13

* New nut(s) must be fitted

+ New cage nuts must be fitted

** New 'Patchlok' bolt must be fitted

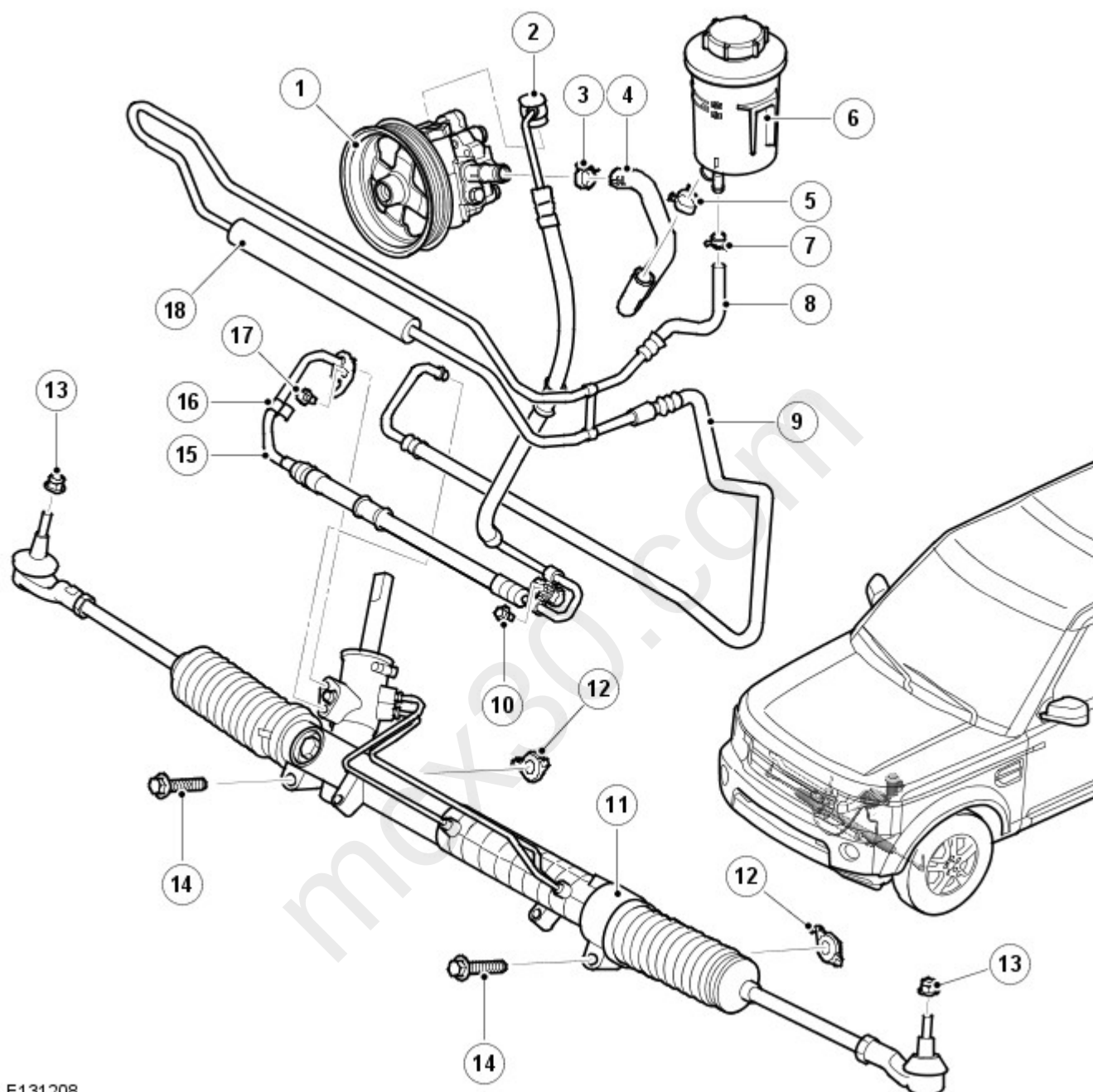
++ New bolt must be fitted

Power Steering - Power Steering

Description and Operation

COMPONENT LOCATION

• NOTE: 5.0L RHD shown.



E131208

Item	Part Number	Description
1	-	Power steering pump
2	-	Banjo bolt
3	-	Spring clip
4	-	Suction hose - reservoir to pump
5	-	Spring clip
6	-	Reservoir
7	-	Spring clip
8	-	Fluid cooler and hose assembly - fluid return
9	-	Hose assembly - Steering gear to cooler - return
10	-	Screw
11	-	Steering gear
12	-	Caged nut (2 off)
13	-	Self-locking nut (2 off)
14	-	Bolt (2 off)
15	-	Hose - pump to steering gear - pressure
16	-	Pipe clip

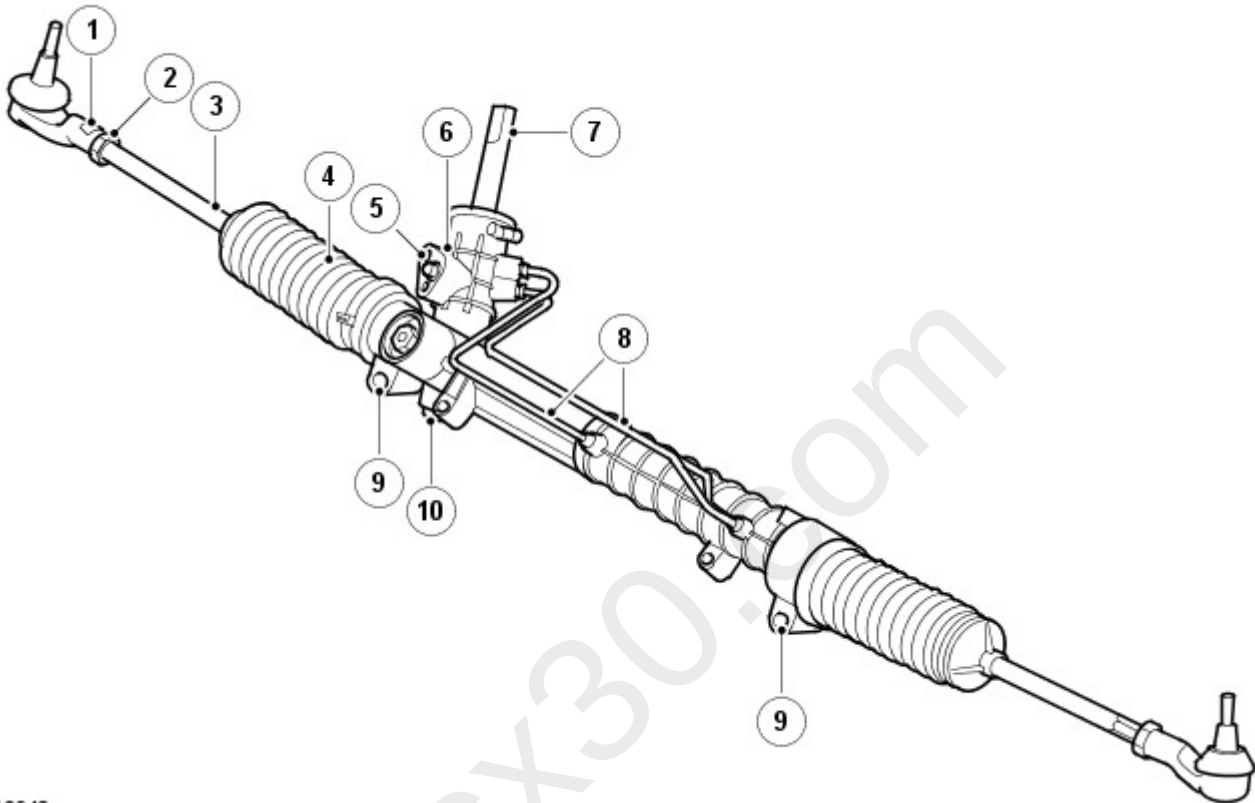
17	-	Screw
18	-	Cooler

GENERAL

The steering system comprises a TRW manufactured rack and pinion steering gear, a power steering pump, a reservoir, a fluid cooler and fluid hoses. The steering gear is a conventional end take-off rack and pinion power assisted unit.

The steering gear rack has a travel of 166 mm (6.53 in). Lock to lock requires 3.33 revolutions of the steering wheel, which gives a ratio of 45 mm (1.77 in)/revolution at the center position and 52.6 mm (2.07 in)/revolution at end of lock.

STEERING GEAR



E46942

Item	Part Number	Description
1	-	Tie-rod end
2	-	Locknut
3	-	Tie-rod
4	-	Gaitor
5	-	Pressure/return connection from/to pump
6	-	Valve unit housing
7	-	Input shaft
8	-	Pressure/return pipes
9	-	Steering gear casing attachment lugs
10	-	Pinion housing

The steering gear is located at the front of the engine, below the accessory belt drive. The gear is attached to two brackets on the chassis and is secured to the brackets with flanged bolts and caged nuts. The cage prevents the nuts from turning when the bolts are loosened or tightened. The cage nuts can only be used once and must be replaced when the gear is removed. For service, M12 Nylock nuts are available as a replacement for the cage nut.

The steering gear comprises an aluminium, cast, one piece housing which contains a mechanical steering rack, a valve unit and an integrated hydraulic power unit.

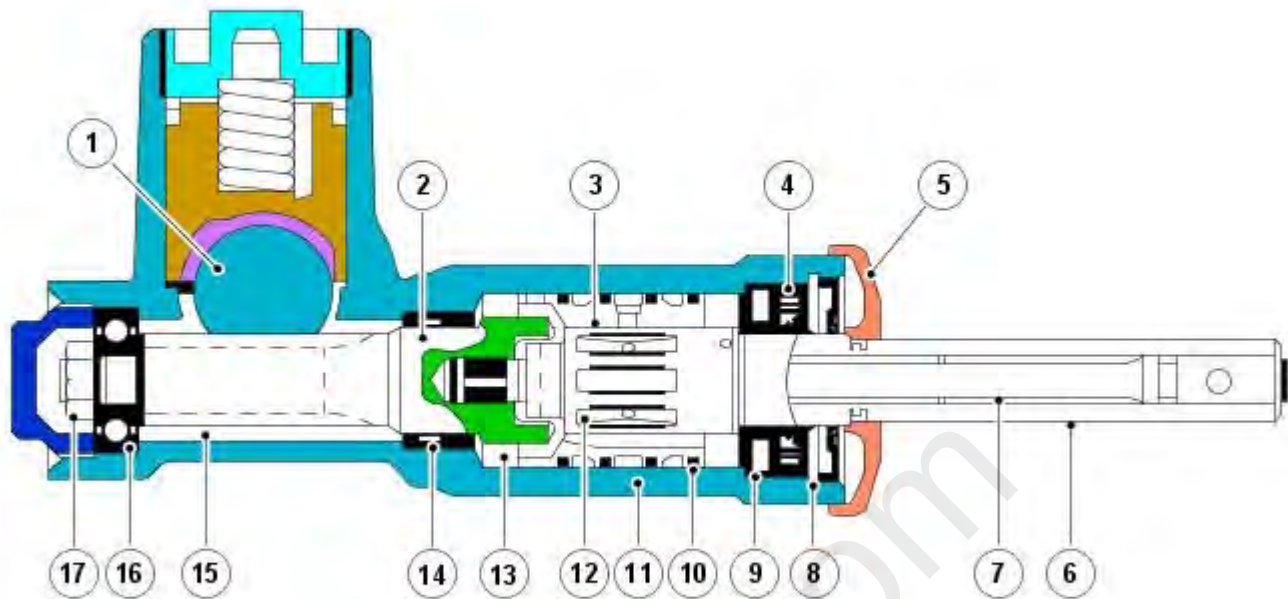
The steering gear uses a rack with an integrated piston which is guided on plain bearings within the rack housing. The pinion, which is attached to the valve unit, runs in bearings and meshes with the rack teeth. The rack is pressed against the pinion by a spring loaded yoke which ensures that the teeth mesh with the minimum of play. The pinion is connected to the valve unit via a torsion bar. The rotary motion of the steering wheel is converted into linear movement of the rack by the pinion and is initiated by the valve unit. This movement is transferred into movement of the road wheels by adjustable tie-rods.

The 49 mm (1.92 in) diameter piston of the hydraulic power unit is located at one end of the gear housing. Each side of the piston is connected to fluid pressure or fluid return via external metal pipes which are connected to the valve unit.

Each end of the gear has a threaded hole which provides for the fitment of the tie-rod. The external ends of the gear are sealed with gaitors which prevent the ingress of dirt and moisture. The tie-rod has a long threaded area which allows for the fitment of the tie-rod end. The thread allows for the adjustment of the steering toe. When the correct toe is achieved, a locknut is tightened against the tie-rod end preventing inadvertent movement.

The gear has a central hole machined along its length. The hole allows the air in the gaitors to be balanced when the steering is turned. The gaitors are serviceable items and are retained on the gear housing and the tie-rod with zip ties.

Valve Unit



E46943

Item	Part Number	Description
1	-	Rack
2	-	Pinion shaft
3	-	Outer sleeve
4	-	Oil sleeve
5	-	Dirt seal
6	-	Input shaft
7	-	Torsion bar
8	-	Circlip
9	-	Oil seal
10	-	PTFE ring
11	-	Steering gear casting
12	-	Slots
13	-	Pin - Pinion shaft to outer sleeve
14	-	Oil seal
15	-	Pinion shaft
16	-	Bearing
17	-	Pinion shaft nut

The valve unit is an integral part of the steering gear. The principle function of the valve unit is to provide maximum power assistance (i.e. when parking) with minimum effort required to turn the steering wheel.

The pinion housing of the valve is an integral part of the main steering gear casting. The pinion housing has four machined ports which provide connections for pressure feed from the power steering pump, return fluid to the reservoir and pressure feeds to each side of the cylinder piston.

The valve unit comprises an outer sleeve, an input shaft, a torsion bar and a pinion shaft. The valve unit is co-axial with the pinion shaft which is connected to the steering column via the input shaft. The valve unit components are located in the steering gear pinion housing which is sealed with a cap.

The outer sleeve is located in the main bore of the pinion housing. Three annular grooves are machined on its outer diameter. PTFE rings are located between the grooves and seal against the bore of the pinion housing. Holes are drilled radially in each annular groove through the wall of the sleeve. The bore of the outer sleeve is machined to accept the input shaft. Six equally spaced slots are machined in the bore of the sleeve. The ends of the slots are closed and do not continue to the end of the outer sleeve. The radial holes in the outer sleeve are drilled into each slot.

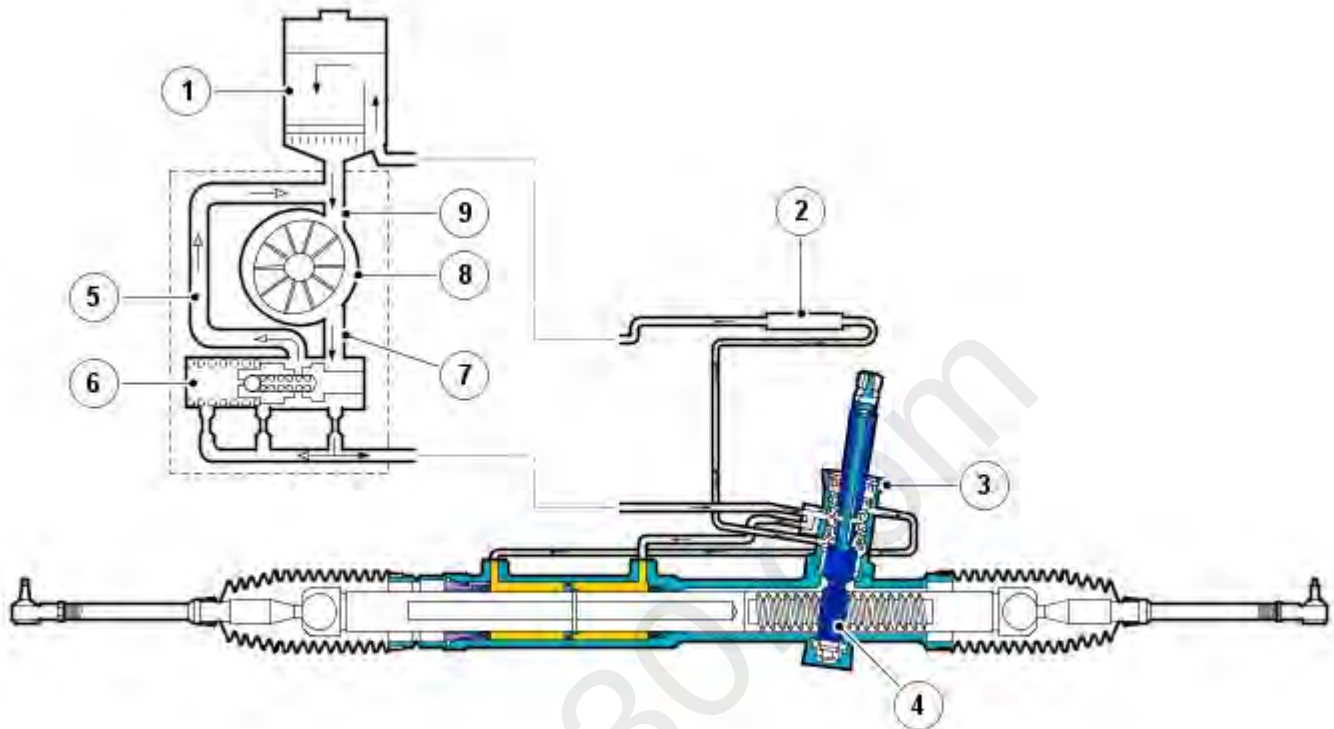
The input shaft has two machined flats at its outer end which allow for the attachment of the steering column intermediate shaft yoke. The flats ensure that the intermediate shaft is fitted in the correct position to maintain the optimum phase angle. The inner end of the input shaft forms a dog-tooth which mates with a slot in the pinion shaft. The fit of the dog-tooth in the slot allows a small amount of relative rotation between the input shaft and the pinion shaft before the dog-tooth contacts the wall of the slot. This ensures that, if the power assistance fails, the steering can be

operated manually without over stressing the torsion bar. The central portion of the input shaft has equally spaced longitudinal slots machined in its circumference. The slots are arranged alternately around the input shaft.

The torsion bar is fitted inside the input shaft and is an interference fit in the pinion shaft. The torsion bar is connected to the input shaft by a drive pin. The central diameter of the torsion bar is machined to a smaller diameter in its central section. The smaller diameter allows the torsion bar to twist in response to torque applied from the steering wheel in relation to the grip of the tyres on the road surface.

The pinion shaft has machined upper teeth on its central diameter which mate with teeth on the steering gear rack. A slot, machined in the upper end of the pinion shaft mates with the dog-tooth on the input shaft. The pinion shaft locates in the pinion housing and rotates on ball and roller bearings.

Power Steering Hydraulic Operation



E46944

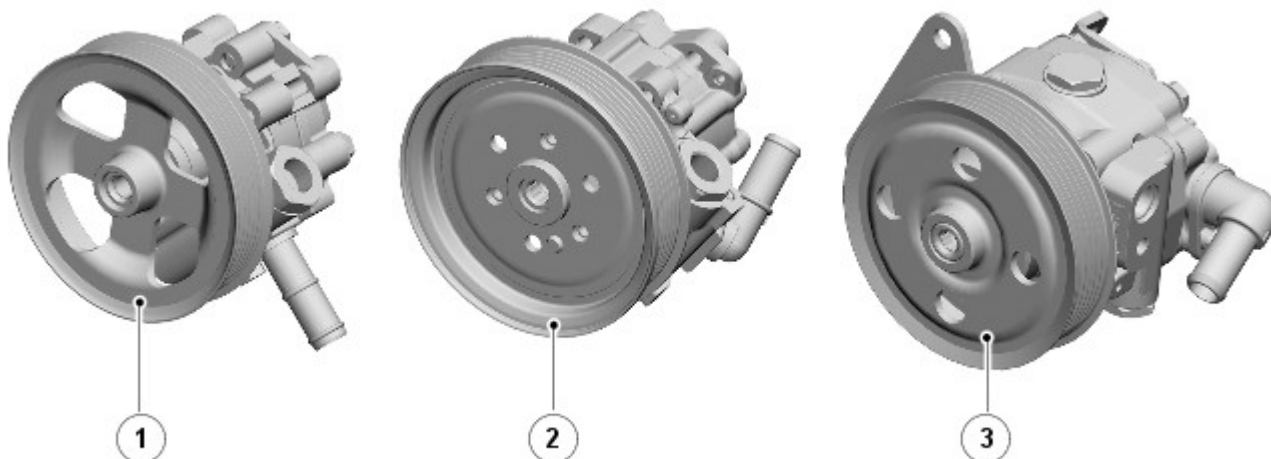
Item	Part Number	Description
1	-	Reservoir
2	-	Cooler
3	-	Valve unit
4	-	Steering rack and pinion
5	-	Flow control/pressure relief return
6	-	Flow control/Pressure relief valve
7	-	Output port
8	-	Power steering pump
9	-	Low pressure suction line

When the engine is started the power steering pump draws fluid from the reservoir into the low pressure suction line. The fluid passes through the pump and emerges as pressurised fluid at the outlet port. The attenuated high pressure hose passes the pressurised fluid to the steering gear valve unit.

If no steering effort is applied, there is minimal restriction within the system and the supply pressure from the pump is low. Minimal pressure is applied, via the valve unit, to each side of the piston in the hydraulic cylinder and the full flow from the power steering pump returns to the reservoir via the fluid cooler.

When steering effort is applied in either direction, the return flow of fluid to the reservoir is restricted, causing the supply pressure from the pump to increase. The pressurised fluid is directed to the applicable side of the piston in the hydraulic cylinder, via the valve unit, providing the power assistance required to reduce the steering effort. Fluid displaced from the low pressure side of the cylinder is returned via the valve unit and fluid cooler to the reservoir. The fluid cooler reduces the fluid temperature which prolongs the life of hoses and seals in the system.

POWER STEERING PUMP



E131159

Item	Part Number	Description
1	-	4.0L V6
2	-	5.0L V8
3	-	2.7L, 3.0L TdV6

The power steering pumps used on the four engine variants are basically the same pump with different connection fittings. The pump is a positive displacement, vane type pump which supplies hydraulic pressure to the steering gear valve unit. The pump is driven by a Poly Vee belt from the crankshaft pulley and output from the pump increases proportionally with engine speed. A self-adjusting tensioner is fitted to maintain the correct tension on the belt.

The pump has an internal flow control valve which also incorporates a pressure relief valve. The pressure relief valve limits the maximum pressure supplied to the steering gear to 114 bar (1653 lbf in²) $\pm$ 4 bar (58 lbf in²) on V6 petrol engines, and 115 bar (1667 lbf in²) $\pm$ 4 bar (58 lbf in²) for V8 petrol, and V6 diesel models. The flow control valve regulates the flow to a constant value of 8.8 l/min (1.93 gal/min) $\pm$ 0.5 l/min (0.1 gal/min) regardless of engine speed. The pump has a displacement of 9.6 cc/rev (0.58 in³/rev) on V6 petrol, and V6 diesel, but 11 cc/rev (0.67 in³/rev) for V8 petrol.

A shaft runs longitudinally through the pump. One end of the shaft is fitted with a pressed-on drive pulley, the opposite end of the shaft is closed by a cover. The shaft runs in bearings located in the body and oil seals at each end of the shaft prevent leakage of hydraulic fluid.

The pump contains ten vanes on petrol models, and eleven vanes on diesel models which rotate within a cam ring and are driven by the shaft. As the vanes rotate, the cam ring causes the space between the vanes to increase. This causes a depression between the vanes and fluid is drawn from the reservoir via the suction hose into the space between the vanes.

As the shaft rotates, the inlet port is closed to the vanes which have drawn in fluid, trapping the fluid between the vanes. The cam ring causes the space between the vanes to reduce and consequentially compresses and pressurises the hydraulic fluid trapped between them.

Further rotation of the shaft moves the vanes to the outlet port. As the vanes pass the port plate the pressurised fluid passes from the pump outlet port into the pressure hose to the steering gear.

The pressurised fluid is subject to control by the flow control and pressure relief valve. The flow control valve maintains a constant flow of fluid supplied to the steering gear irrespective of engine speed variations. The pressure relief valve limits the pressure on the output side of the pump. A metering orifice is included in the discharge port of the pump. If the pressure in the orifice reaches a predetermined level, a spring loaded ball in the center of the flow control valve is lifted from its seat and allows pressurised fluid to recirculate within the pump.

The pressure relief valve will operate if the discharge from the pump is restricted, i.e.; steering held on full lock. If the output from the pump is blocked, all output is recirculated through the pump. In this condition, as no fresh fluid is drawn into the pump from the reservoir, the fluid temperature inside the pump will increase rapidly. Consequentially, periods of operation of the steering gear on full lock should be kept to a minimum to prevent overheating of the pump and the fluid within it.

RESERVOIR



E46941

The fluid reservoir is located on a bracket in the left hand side of the engine compartment, behind the radiator. The reservoir comprises a body, cap and filter. The purpose of the reservoir is to contain a surplus of the hydraulic fluid in the system to allow for expansion and contraction of the fluid due to temperature variations. The fluid level ensures that the supply connection on the bottom of the reservoir is covered with fluid at all operating vehicle attitudes. Any air which is present in the system is exhausted from the system in the reservoir.

The body is a plastic moulding with two ports at the bottom which provide for the connection of the suction supply and return hoses. Moulded markings on the side of the reservoir denote the upper and lower fluid levels. A non-serviceable, 100 micron nylon mesh filter is fitted in the body. The filter removes particulate matter from the fluid before it is drawn into the pump supply connection.

The cap is rotated counterclockwise for one quarter turn to release from the body. The cap is fitted with an O-ring to prevent fluid leakage. The cap incorporates a breather hole to allow for changes in fluid level during operation and prevent vacuum or pressurisation of the reservoir.

HIGH PRESSURE HOSE

The high pressure hose connecting the pump to the steering gear valve unit contains two attenuators. Each attenuator comprises a bullet shaped restrictor which is secured inside the hose. The restrictors damp pressure pulses from the pump, consequently reducing noise and strain on downstream components. The attenuators are an integral part of the hose and cannot be serviced separately.

FLUID COOLER

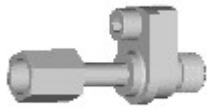
- **NOTE:** Diesel engine vehicles are not fitted with a fluid cooler.

The fluid cooler is located in the return line from the steering gear to the reservoir. The cooler comprises a flexible hose and a solid pipe which connect between the reservoir and the return pipe from the steering gear. The cooler is an integral part of the pipe and cannot be replaced as a separate component.

The cooler is a fabricated aluminium tube, through which the power steering fluid passes. The outer diameter of the cooler tube has aluminium loops attached to it which dissipate heat. Cool air entering the front of the vehicle passes over the cooler and flows through the loops. The loops act as heat exchangers, conducting heat from the fluid as it passes through the tube.

Power Steering - Power Steering Pressure Test TDV6 2.7L Diesel

General Procedures

Special Tool(s)	
 E87857	Adaptor, power steering pressure test 211-011-12
 E58730	Hose - power steering pressure test 211-011-02(LRT-57-002)
 E58730	Hose - power steering pressure test 211-011-02(LRT-57-002)
 E58732	Valve block power steering test 211-011-01(LRT-57-001)
 E58733	Hose and gauge - power steering pressure test 211-287(LRT-57-005)



CAUTION: If power steering fluid comes into contact with the paintwork, the affected area must be immediately washed down with cold water.

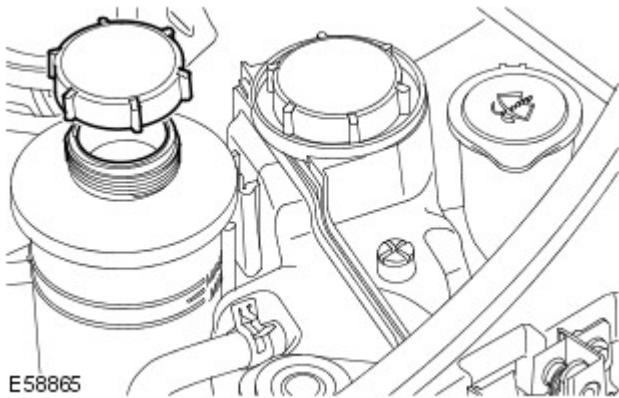
- NOTE: Some variation in the illustrations may occur, but the essential information is always correct.



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

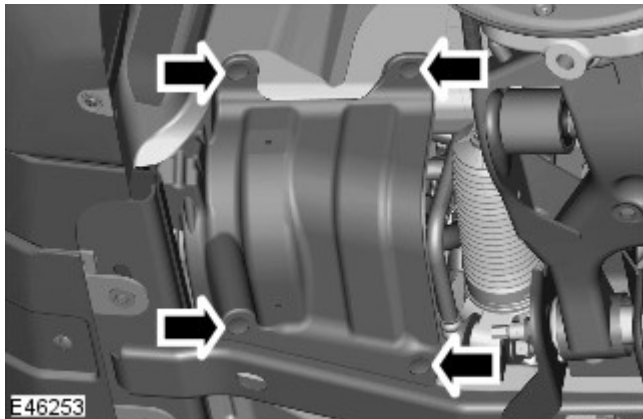
Raise and support the vehicle.

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



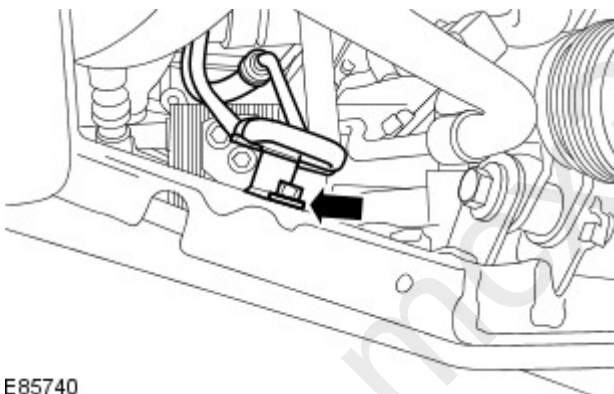
3. Siphon the fluid from the power steering reservoir.

- Remove the filler cap.



4. Remove the front LH splash shield.

- Remove the 4 clips.



5. Release the steering gear high-pressure line.

- Remove the bolt.

6. Remove the front LH fender splash shield.

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

7. CAUTIONS:



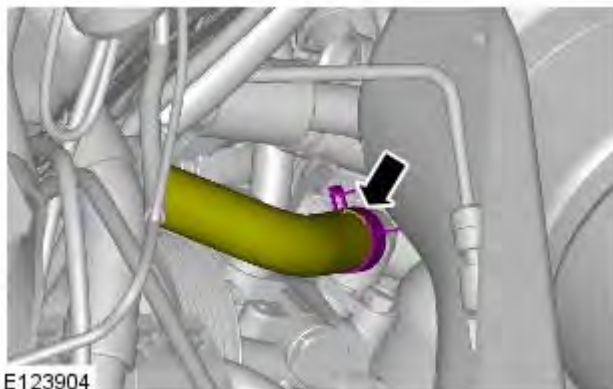
Make sure that all openings are sealed. Use new blanking caps.

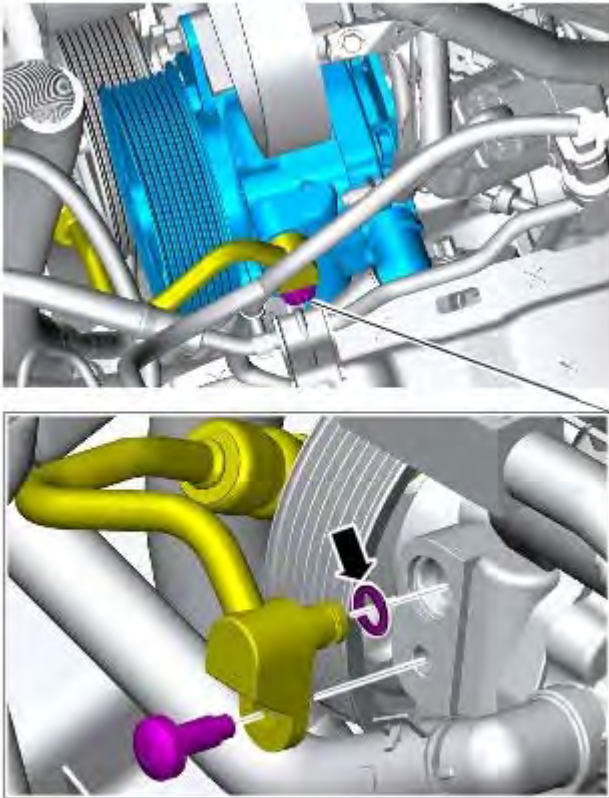


Make sure that the area around the component is clean and free of foreign material.

Disconnect the power steering pump supply hose.

- Release the clip.
- Position a container to collect the fluid.





E94170

8. ⚠ CAUTION: Make sure that the area around the component is clean and free of foreign material.

Disconnect the power steering pump high-pressure line.

- Remove the bolt.

9. Install the special tools.

- Tie the pressure gauge aside.

10. NOTE: Remove and discard the blanking caps.

Connect the power steering pump supply hose.

- Secure with the clip.

11. Fill the power steering reservoir.

12. Connect the battery ground cable.

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

13. NOTE: Make sure the steering components and test equipment are free from leaks.

- NOTE: Maintain the maximum fluid level during the test.
- NOTE: Make sure the steering is in the straight ahead position.
- NOTE: Under no circumstances must the low pressure spigot be removed from the steering pump.

With the test valve open start the engine.

- Start the engine and turn steering fully lock to lock, stop the engine.
- Top-up the power steering fluid reservoir.
- Install the reservoir filler cap.

14. For correct power steering pressures, refer to the steering specification section.

For additional information, refer to: [Specifications](#) (211-02 Power Steering, Specifications).

15. ⚠ CAUTION: Do not hold steering at full lock for longer than 10 seconds.

With the engine at idle, slowly turn the steering wheel and hold on full lock.

- Record the pressure reading.

16. Repeat the above procedure for the other side.

- Record the pressure reading.

17. With the engine at idle, release the steering wheel. The pressure should be, at or below, the pressure specified.

18. Pressure outside this tolerance, indicates a fault.

19.  **CAUTION:** Pump damage will occur if test valve is closed for longer periods.

To determine if the fault is in the steering pump or the steering rack, close the test valve for a maximum of 5 seconds.

20. If the pressures recorded fall outside the given values, replace the power steering pump.

21. If the maximum pump pressure is correct, check the hoses for correct routing and condition, if correct suspect the steering gear.

22. On completion of the test stop the engine, disconnect the battery ground cable and siphon the steering fluid from the reservoir.

23. CAUTIONS:

 Make sure that all openings are sealed. Use new blanking caps.

 Make sure that the area around the component is clean and free of foreign material.

Disconnect the power steering pump supply hose.

- Release the clip.

24. Disassemble the test equipment.

25. Connect the power steering pump high-pressure line.

- Tighten the bolt to 25 Nm (18 lb.ft).
- Install a new O-ring seal.

26. **NOTE:** Remove and discard the blanking caps.

Connect the power steering pump supply hose.

- Secure with the clip.
- Remove the container.

27. Secure the steering gear high-pressure line.

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

28. Install the front LH splash shield.

- Install the clips.

29. Install the front LH fender splash shield.

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

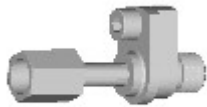
30. Connect the battery ground cable.

31. Fill and bleed the power steering system.

For additional information, refer to: [Power Steering System Filling and Bleeding](#) (211-00 Steering System - General Information, General Procedures).

Power Steering - Power Steering Pressure Test TDV6 3.0L Diesel

General Procedures

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 E58730	Hose - power steering pressure test 211-011-02(LRT-57-002)
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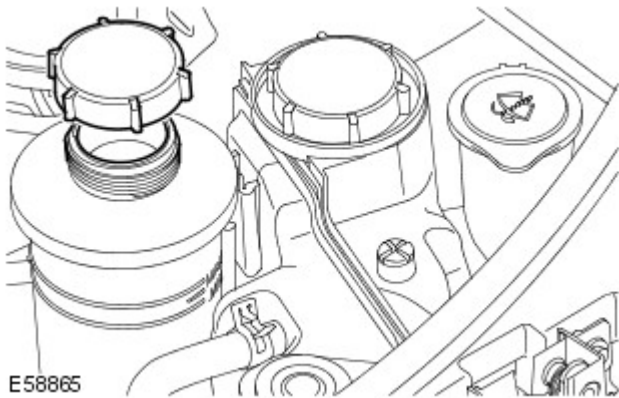
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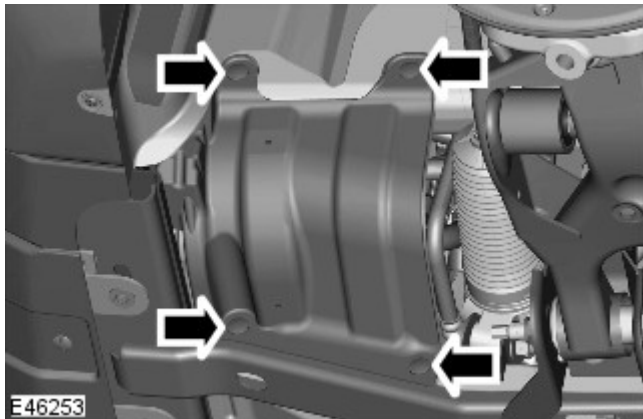
Raise and support the vehicle.

2. Disconnect the battery ground cable.
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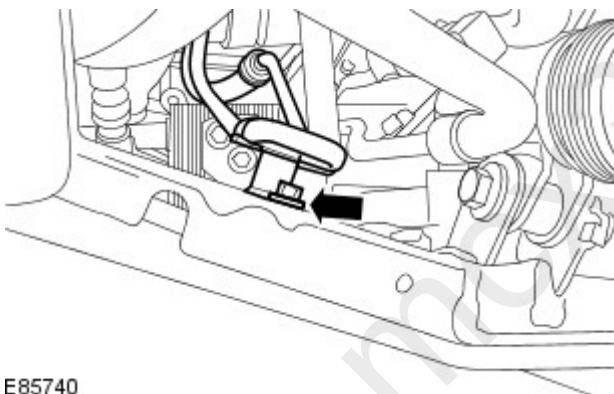
3. Siphon the fluid from the power steering reservoir.

- Remove the filler cap.



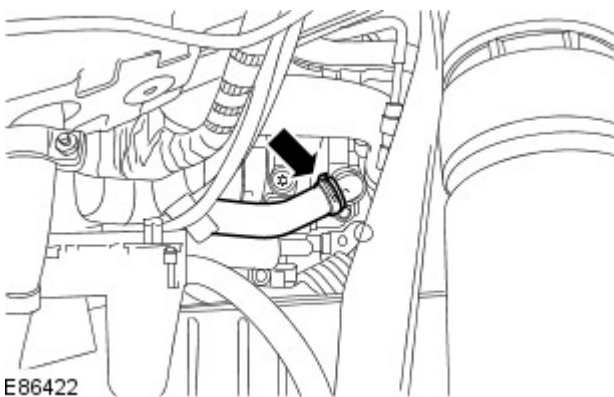
4. Remove the front LH splash shield.

- Remove the 4 clips.



5. Release the steering gear high-pressure line.

- Remove the bolt.



6. Remove the front LH fender splash shield.

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

7. CAUTIONS:



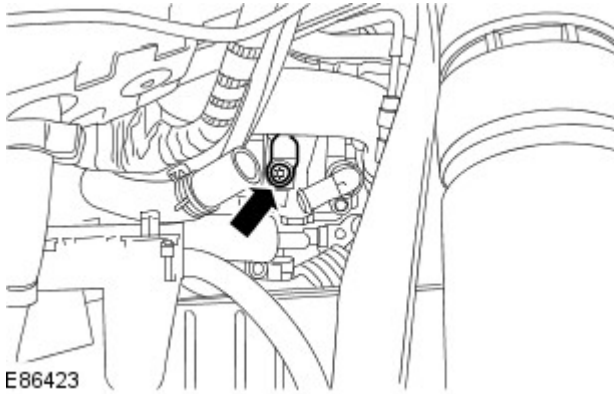
Make sure that all openings are sealed. Use new blanking caps.



Make sure that the area around the component is clean and free of foreign material.

Disconnect the power steering pump supply hose.

- Release the clip.
- Position a container to collect the fluid.



8.  **CAUTION:** Make sure that the area around the component is clean and free of foreign material.

Disconnect the power steering pump high-pressure line.

- Remove the bolt.

9. Install the special tools.

- Tie the pressure gauge aside.

10. **NOTE:** Remove and discard the blanking caps.

Connect the power steering pump supply hose.

- Secure with the clip.

11. Fill the power steering reservoir.

12. Connect the battery ground cable.

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

13. **NOTE:** Make sure the steering components and test equipment are free from leaks.

- **NOTE:** Maintain the maximum fluid level during the test.
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- **NOTE:** Under no circumstances must the low pressure spigot be removed from the steering pump.

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- Top-up the power steering fluid reservoir.
- Install the reservoir filler cap.

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21. If the maximum pump pressure is correct, check the hoses for correct routing and condition, if correct suspect the steering gear.
22. On completion of the test stop the engine, disconnect the battery ground cable and siphon the steering fluid from the reservoir.

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Make sure that all openings are sealed. Use new blanking caps.



Make sure that the area around the component is clean and free of foreign material.

Disconnect the power steering pump supply hose.

- Release the clip.

24. Disassemble the test equipment.

25. Connect the power steering pump high-pressure line.

- Tighten the bolt to 25 Nm (18 lb.ft).
- Install a new O-ring seal.

26. NOTE: Remove and discard the blanking caps.

Connect the power steering pump supply hose.

- Secure with the clip.
- Remove the container.

27. Secure the steering gear high-pressure line.

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

28. Install the front LH splash shield.

- Install the clips.

29. Install the front LH fender splash shield.

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

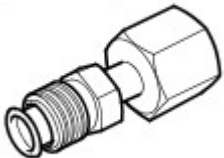
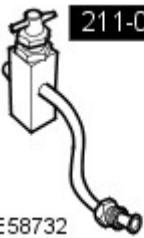
30. Connect the battery ground cable.

31. Fill and bleed the power steering system.

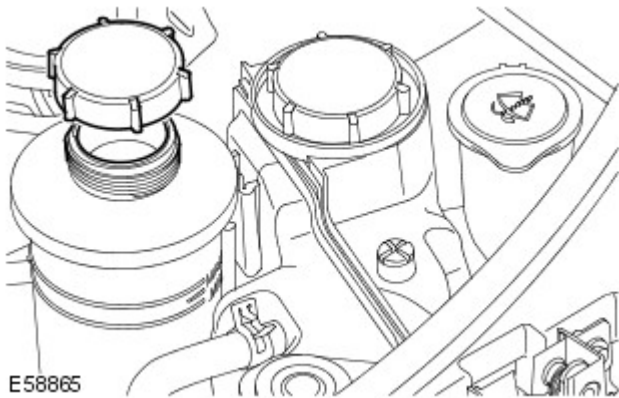
For additional information, refer to: [Power Steering System Filling and Bleeding](#) (211-00 Steering System - General Information, General Procedures).

Power Steering - Power Steering Pressure Test V6 4.0L Petrol

General Procedures

Special Tool(s)	
211-313  E58729	Adapter, power steering pressure test 211-313 (LRT-57-035A)
211-011-02  E58730	Hose, power steering pressure test 211-011-02 (LRT-57-002)
211-011-11  E58731	Hose, power steering pressure test 211-011-11
211-011-01  E58732	Valve block, power steering pressure test 211-011-01 (LRT-57-001)
211-287  E58733	Hose and gauge, power steering pressure test 211-287 (LRT-57-005)
211-325  E58734	Adapter, power steering pressure test 211-325 (LRT-57-042)

1. Disconnect the battery ground cable.
For additional information, refer to: [Specifications](#) (414-00 Battery and Charging System - General Information, Specifications).
2. Remove the engine cover.
For additional information, refer to: [Engine Cover - V6 4.0L Petrol](#) (501-05 Interior Trim and Ornamentation, Removal and Installation).



3. Siphon the fluid from the power steering reservoir.

- Remove the filler cap.
- Install the filler cap.

4. Position an absorbent cloth to collect fluid spillage.

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

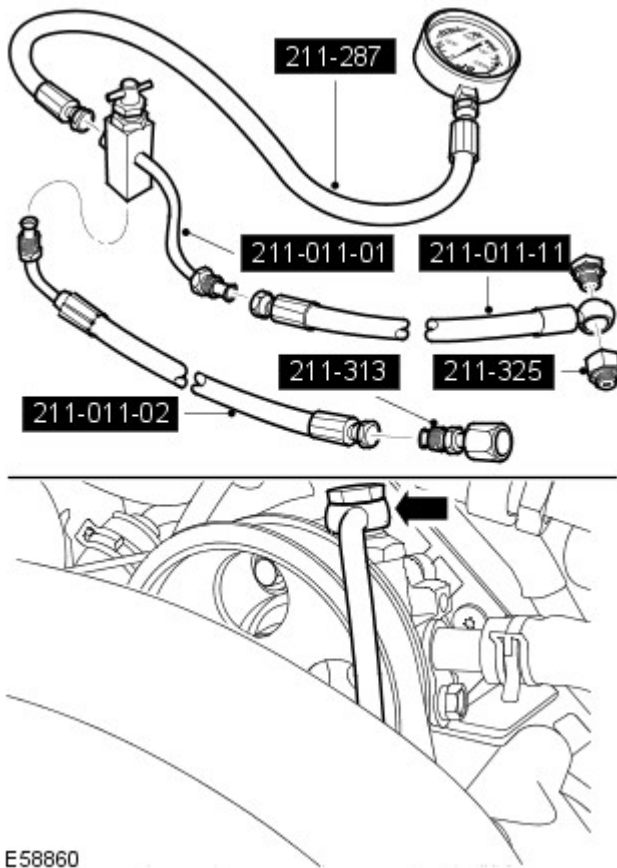
- NOTE: Some fluid spillage is inevitable during this operation.
- NOTE: Care must be taken to avoid contamination of the drive belt.

Disconnect the power steering high-pressure pipe union.

- Remove the bolt.
- Remove and discard the 2 sealing washers.
- Position a container to collect the fluid.

6. Install the special tools to the power steering high-pressure port.

- Install the O-ring seal.
- Tie the pressure gauge aside under the hood.



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7. Install the special tool to the high-pressure union.

- Install the O-ring seals.
- Connect the special tool line, to the special tool valve block assembly.

8. Refill the power steering reservoir.

- Remove the filler cap.

9. Connect the battery ground cable.

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

10. NOTE: Ensure the steering components and test equipment are free from leaks.

- NOTE: Maintain the maximum fluid level during the test.
- NOTE: Make sure the steering is in the straight ahead position.
- NOTE: Under no circumstances must the low pressure spigot be removed from the steering pump.

With the test valve open start the engine.

- Start the engine and turn steering fully lock to lock, stop the engine.
- Top-up the power steering fluid reservoir.
- Install the reservoir filler cap.

11. For correct power steering pressures, refer to the steering specification section.

For additional information, refer to: [Specifications](#) (211-02 Power Steering, Specifications).

12. With the engine at idle, slowly turn the steering wheel and hold on full lock.

- Record the pressure reading.

13. Repeat the above procedure for the other side.

- Record the pressure reading.

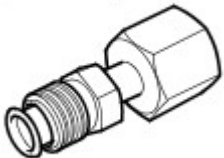
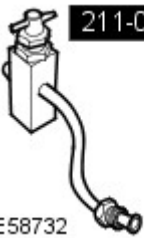
14. With the engine at idle, release the steering wheel. The pressure should be at or below the pressure specified. To determine if the fault is in the steering pump or the steering rack, close the test valve for a maximum of 5 seconds.

1. Pressure outside this tolerance, indicates a fault.

- 16.** If the pressures recorded fall outside the given values, replace the power steering pump.
- 17.** If the maximum pump pressure is correct, then suspect the power steering rack.
- 18.** On completion of the test stop the engine, disconnect the battery ground cable and siphon the steering fluid from the reservoir.
- Remove the filler cap.
 - Install the filler cap.
- 19.** Disassemble the test equipment.
- 20.** Connect the high-pressure line to the power steering pump.
- Clean the component mating faces.
 - Install the new O-ring seals.
 - Tighten the bolt to 25 Nm (18 lb.ft).
- 21.** Install the engine cover.
For additional information, refer to: [Engine Cover - V6 4.0L Petrol](#) (501-05 Interior Trim and Ornamentation, Removal and Installation).
- 22.** Connect the battery ground cable.
- 23.** Refill and bleed the power steering.
For additional information, refer to: [Power Steering System Filling and Bleeding](#) (211-00 Steering System - General Information, General Procedures).

Power Steering - Power Steering Pressure Test V8 5.0L Petrol

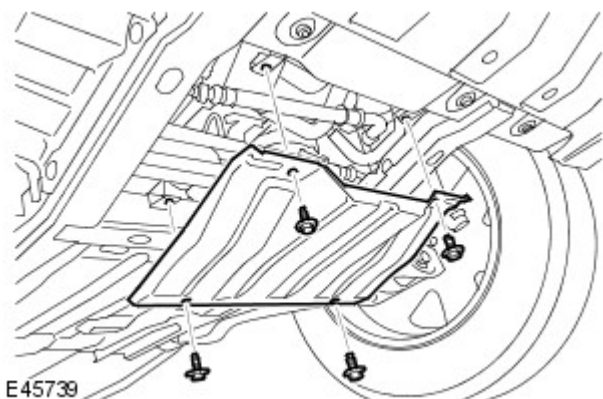
General Procedures

Special Tool(s)	
211-313  E58729	Adapter, power steering test 211-313 (LRT-57-035A)
211-011-02  E58730	Hose, power steering test 211-011-02 (LRT-57-002)
211-011-11  E58731	Hose, power steering test 211-011-11
211-011-01  E58732	Valve block, power steering test 211-011-01 (LRT-57-001)
211-287  E58733	Hose and gauge, power steering test 211-287 (LRT-57-005)
211-325  E58734	Adapter, power steering test 211-325 (LRT-57-042)

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

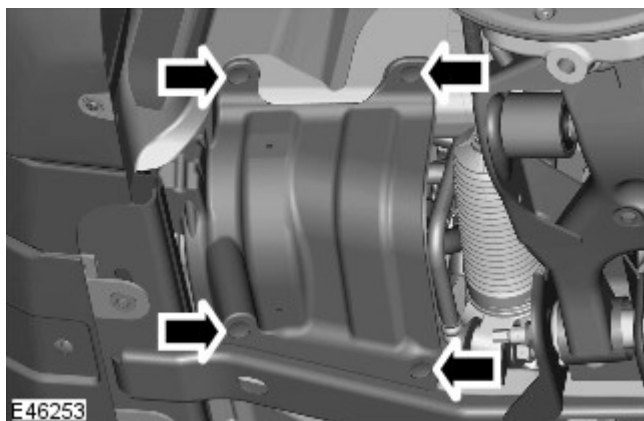
Raise and support the vehicle.

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



3. Remove the radiator access panel.

- Remove the 4 bolts.



4. Remove the front LH splash shield.

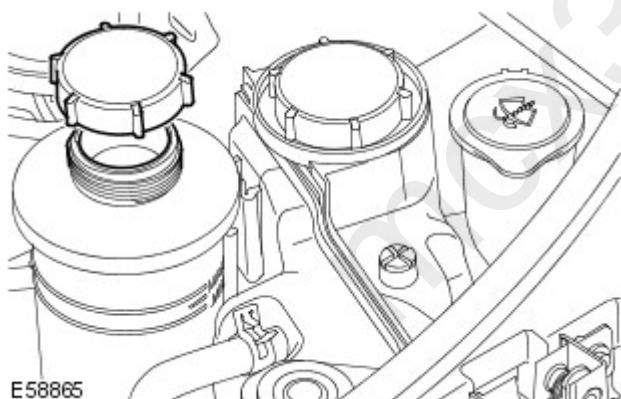
- Remove the 4 clips.

5. Remove the front LH fender splash shield.

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

6. Siphon the fluid from the power steering reservoir.

- Remove the filler cap.
- Install the filler cap.



7. Position an absorbent cloth to collect fluid spillage.

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

- NOTE: Some fluid spillage is inevitable during this operation.
- NOTE: Care must be taken to avoid contamination of the drive belt.

Disconnect the power steering high-pressure pipe union.

- Remove the bolt.
- Remove and discard the 2 sealing washers.
- Position a container to collect the fluid.

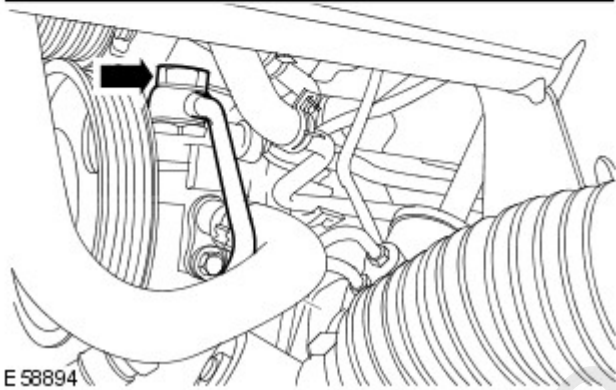
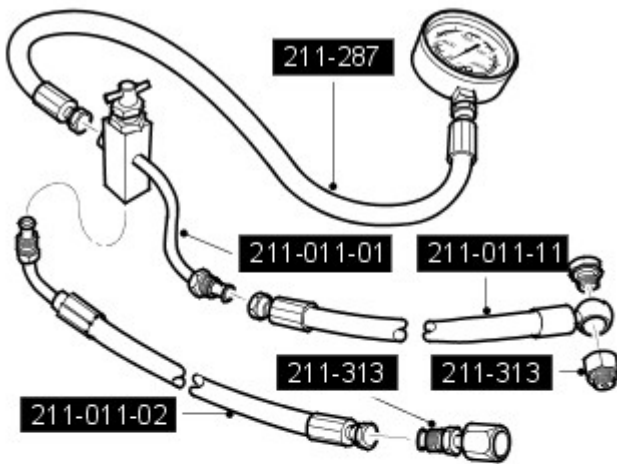
9. Install the special tools to the power steering high-pressure

port.

- Install the O-ring seal.
- Tie the pressure gauge aside under the hood.

10. Install the special tool to the high-pressure union.

- Install the O-ring seals.
- Connect the special tool line, to the special tool valve block assembly.



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11. Refill the power steering reservoir.

- Remove the filler cap.

12. Connect the battery ground cable.

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

13. NOTE: Ensure the steering components and test equipment are free from leaks.

- NOTE: Maintain the maximum fluid level during the test.
- NOTE: Make sure the steering is in the straight ahead position.
- NOTE: Under no circumstances must the low pressure spigot be removed from the steering pump.

With the test valve open start the engine.

- Start the engine and turn steering fully lock to lock, stop the engine.
- Top-up the power steering fluid reservoir.
- Install the reservoir filler cap.

14. For correct power steering pressures, refer to the steering specification section. For additional information, refer to: [Specifications](#) (211-02 Power Steering, Specifications).

15. With the engine at idle, slowly turn the steering wheel and hold on full lock.

- Record the pressure reading.

16. Repeat the above procedure for the other side. With the engine at idle, release the steering wheel. The pressure should be at or below the pressure specified.

- Record the pressure reading.

- 18.** Pressure outside this tolerance, indicates a fault.
- 19.** To determine if the fault is in the steering pump or the steering rack, close the test valve for a maximum of 5 seconds.
- 20.** If the pressures recorded fall outside the given values, replace the power steering pump.
- 21.** If the maximum pump pressure is correct, then suspect the power steering rack.
- 22.** On completion of the test stop the engine, disconnect the battery ground cable and siphon the steering fluid from the reservoir.
- Remove the filler cap.
 - Install the filler cap.
- 23.** Disassemble the test equipment.
- 24.** Connect the high-pressure line to the power steering pump.
- Clean the component mating faces.
 - Install the new O-ring seals.
 - Tighten the bolt to 25 Nm (18 lb.ft).
- 25.** Install the front LH fender splash shield.
For additional information, refer to: [Fender Splash Shield](#) (501-02 Front End Body Panels, Removal and Installation).
- 26.** Install the front LH splash shield.
- Secure with the clips.
- 27.** Install the radiator access panel.
- Tighten the M6 bolts to 10 Nm (7 lb.ft).
 - Tighten the M10 bolts to 45 Nm (33 lb.ft).
- 28.** Connect the battery ground cable.
For additional information, refer to: [Specifications](#) (414-00 Battery and Charging System - General Information, Specifications).
- 29.** Refill and bleed the power steering.
For additional information, refer to: [Power Steering System Filling and Bleeding](#) (211-00 Steering System - General Information, General Procedures).

Power Steering - Steering GearV6 4.0L Petrol

Removal and Installation

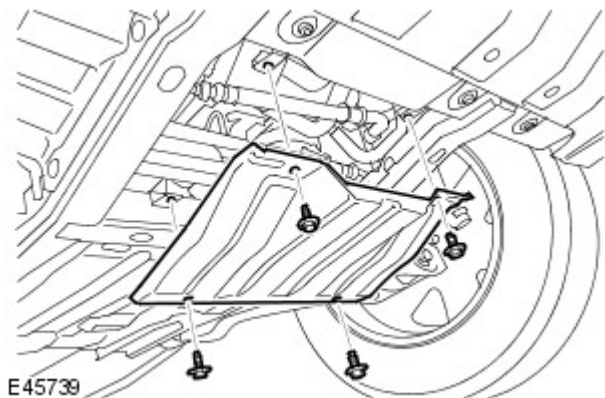
Removal

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.

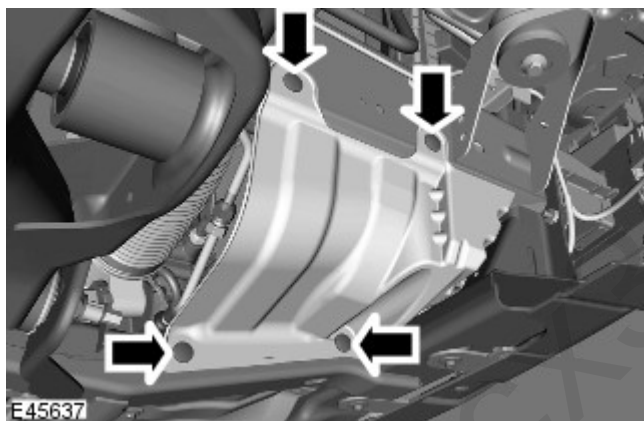
2. Remove the radiator access panel.

- Remove the 4 bolts.



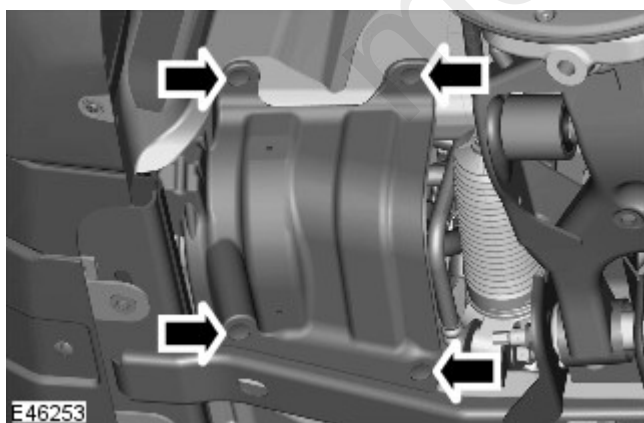
3. Remove the front RH splash shield.

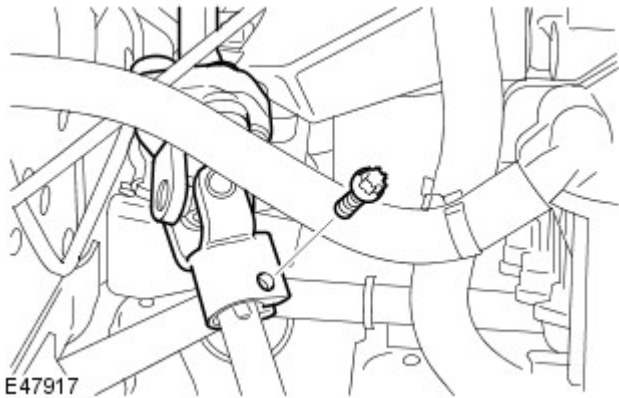
- Remove the 4 clips.



4. Remove the front LH splash shield.

- Remove the 4 clips.

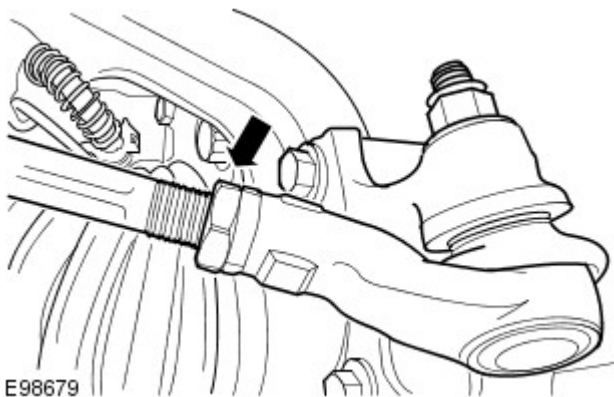




5. NOTE: Make sure the steering is in the straight ahead position.

Release the universal joint from the steering gear.

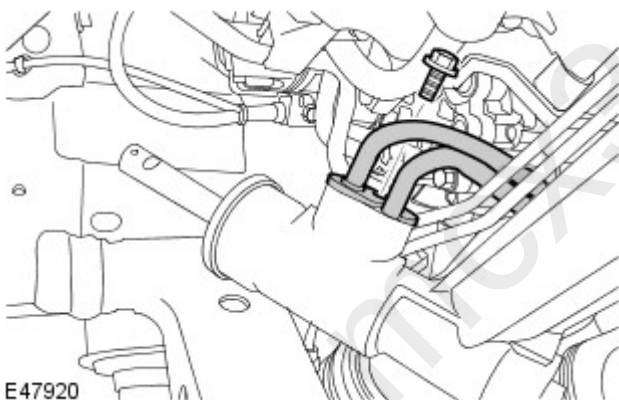
- Remove and discard the bolt.



6. NOTE: LH illustration shown, RH is similar.

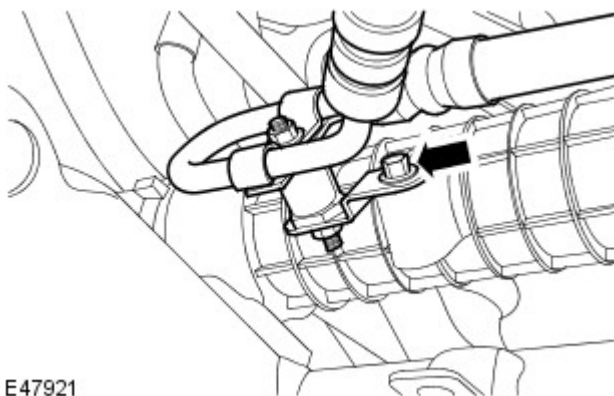
Release both tie-rod end ball joints.

- Loosen the locknut.
- Release both track rods from tie rod ends, note the number of turns for installation.



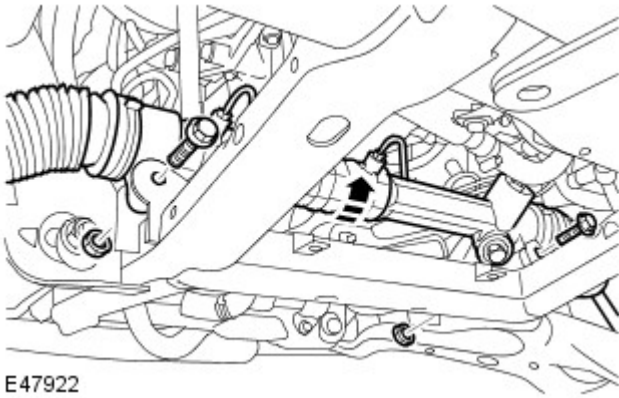
7. Disconnect the pressure lines from the power steering gear.

- Remove the bolt.
- Position an absorbent cloth to collect fluid spillage.
- Remove and discard the O-ring seals.



8. Remove the steering gear high-pressure line.

- Remove the bolt.



9. Remove the steering gear.

- Remove the 2 bolts and discard the cage nuts.
- With assistance, carefully rotate and release the steering gear.

Installation

1. With assistance, install the steering gear.

- Clean the component mating faces.
- Tighten the bolts to 175 Nm (129 lb.ft).

2. NOTE: Do not install the support bracket bolt until the steering gear connections are tightened.

Install the steering gear high pressure line.

3. NOTE: Lubricate the seals with clean power steering fluid.

Connect the steering gear pressure lines.

- Clean the component mating faces.
- Install new O-ring seals.

4. Install the power steering line support bracket.

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

5. Connect the tie-rod end ball joints.

- Attach both tie rods to previously noted positions.
- Tighten the tie-rod locking nut.

6. Connect the universal joint to the steering gear.

- Install a new patchlock bolt and tighten to 25 Nm (18 lb.ft).

7. Install the radiator access panel.

- Install the 4 bolts and tighten to 10 Nm (7 lb.ft).

8. Install the front LH splash shield.

9. Install the front RH splash shield.

10. Fill and bleed the power steering system.

For additional information, refer to: [Power Steering System Filling and Bleeding](#) (211-00 Steering System - General Information, General Procedures).

11. Adjust the front wheel alignment.

Power Steering - Steering GearTDV6 3.0L Diesel

Removal and Installation

Removal

- NOTE: LHD illustration shown, RHD is similar.
- NOTE: Some variation in the illustrations may occur, but the essential information is always correct.

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

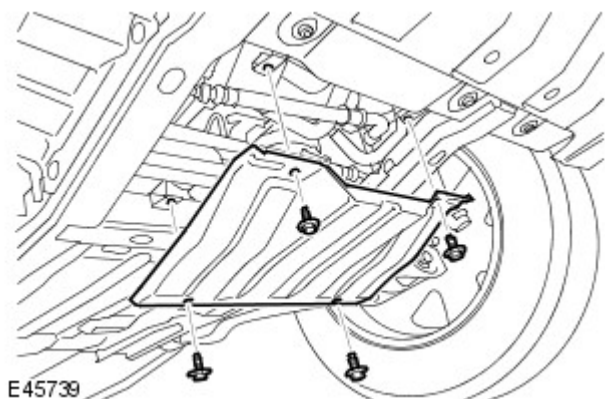
Raise and support the vehicle.

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

Center the steering wheel.

3. Remove the radiator splash shield.

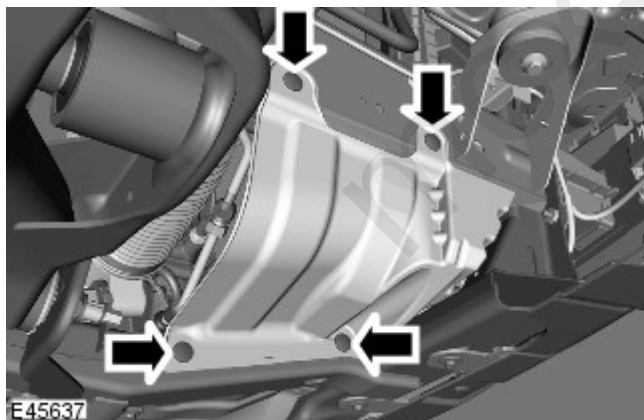
- Remove the 4 bolts.



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

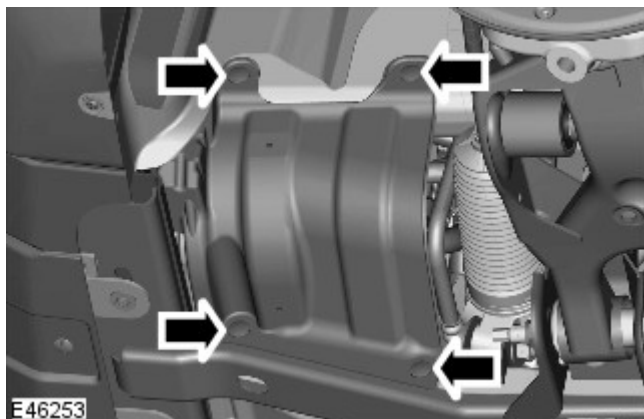
5. Remove the front RH splash shield.

- Remove the 4 clips.



6. Remove the front LH splash shield.

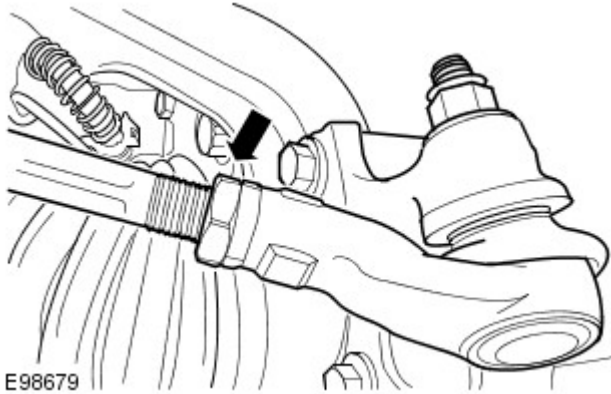
- Remove the 4 clips.



7. NOTE: LH illustration shown, RH is similar.

Release both tie-rod end ball joints.

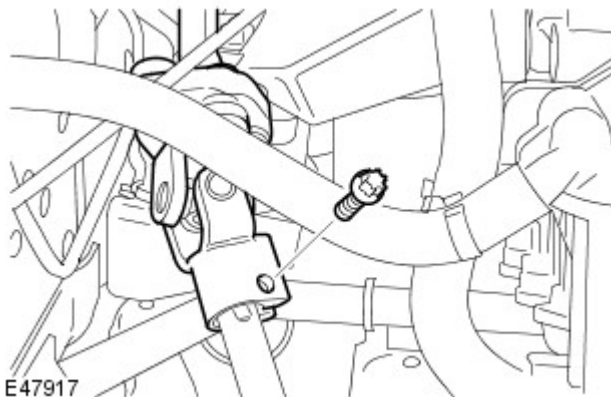
- Loosen the locknut.
- Release both track rods from tie rod ends, note the number of turns for installation.



8. NOTE: Note the fitted position.

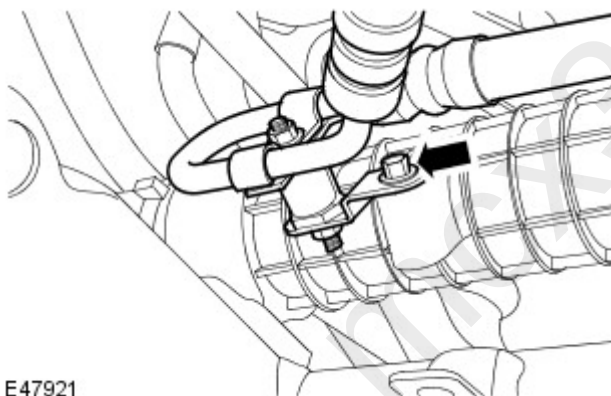
Disconnect the lower steering column from the steering gear.

- Remove and discard the bolt.



9. Remove the steering gear high-pressure line.

- Remove the bolts.

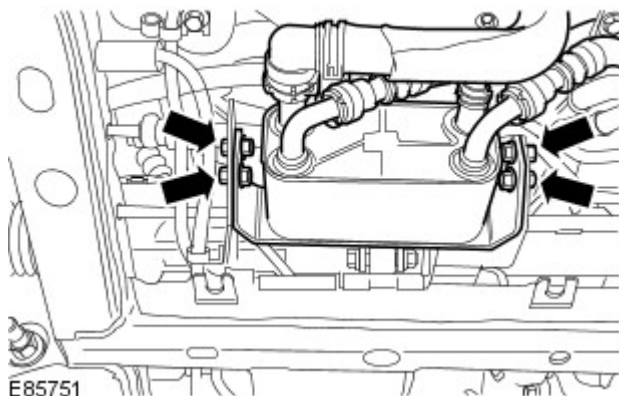


10. Disconnect the steering gear control valve actuator electrical connector.



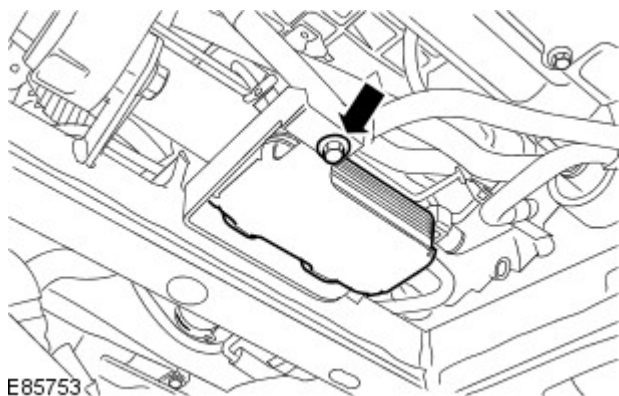
11. Release the transmission fluid cooler.

- Remove the 4 bolts.



12. Release the fuel cooler.

- Remove the bolt.



13. CAUTIONS:



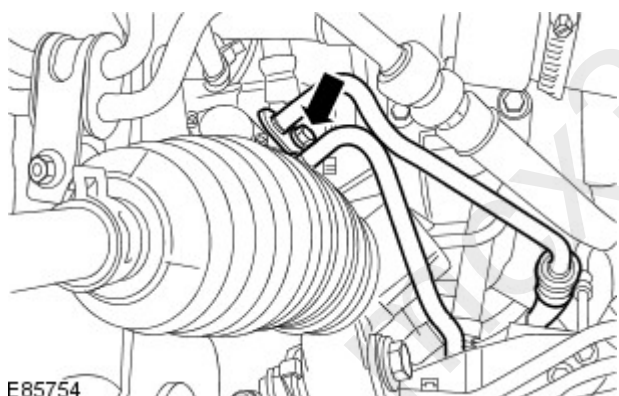
Make sure that the area around the component is clean and free of foreign material.



Make sure that all openings are sealed. Use new blanking caps.

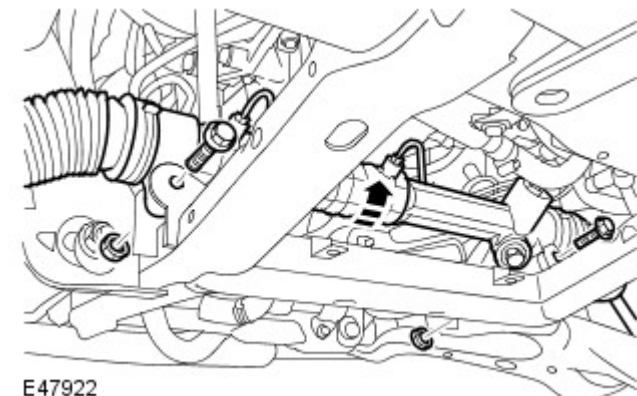
Disconnect the power steering high pressure line and return line from the steering gear.

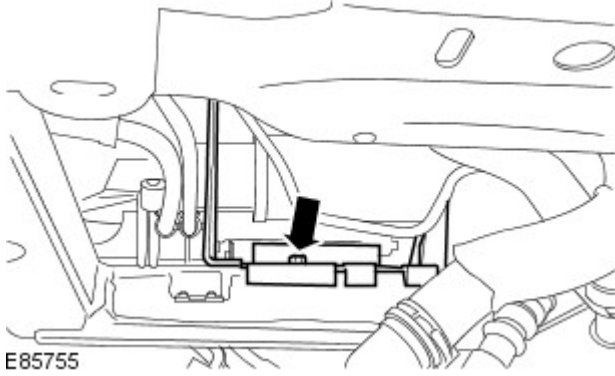
- Remove and discard the bolt.
- Remove and discard the 2 O-ring seals.



14. Release the steering gear.

- Remove the 2 bolts.





15. Remove the transmission fluid cooler and fuel cooler support bracket.

- Remove the bolt.
- Release the coolant line.

16. Remove the steering gear.

Installation

1. Install the steering gear.

2. Install the transmission fluid cooler and fuel cooler support bracket.

- Secure the coolant line.
- Tighten the bolt to 23 Nm (17 lb.ft).

3. Secure the steering gear.

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

4. NOTE: Remove and discard the blanking caps.

• **NOTE:** Lubricate the seals with clean power steering fluid.

Connect the power steering high pressure line and return line to the steering gear.

- Install new O-ring seals.
- Tighten the new bolt to 22 Nm (16 lb.ft).

5. Secure the fuel cooler.

- Tighten the bolt to 23 Nm (17 lb.ft).

6. Secure the transmission fluid cooler.

- Tighten the nuts and bolts to 25 Nm (18 lb.ft).

7. Connect the steering gear control valve actuator electrical connector.

8. Install the power steering line support bracket.

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

9. Connect the lower steering column shaft to the steering gear.

- Tighten the new bolt to 24 Nm (18 lb.ft).

10. Connect the tie-rod end ball joints.

- Attach both tie rods to previously noted positions.
- Tighten the tie-rod locking nut.

11. Install the front LH splash shield.

- Install the clips.

12. Install the front RH splash shield.

- Install the clips.

13. Install the engine undershield.

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

14. Install the radiator splash shield.

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

15. Fill and bleed the power steering system.

For additional information, refer to: [Power Steering System Filling and Bleeding](#) (211-00 Steering System - General Information, General Procedures).

16. Adjust the front wheel alignment.

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Power Steering - Steering GearV8 5.0L Petrol

Removal and Installation

Removal

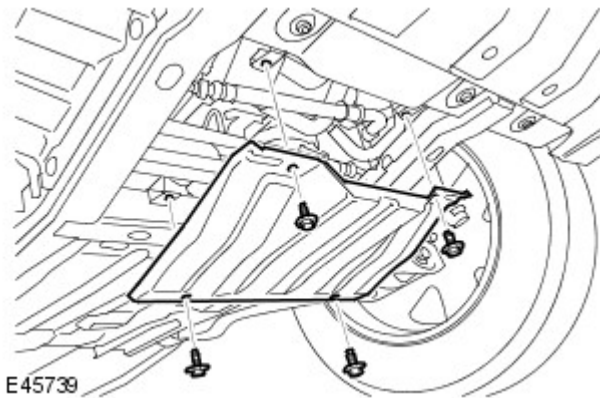
- NOTE: Some variation in the illustrations may occur, but the essential information is always correct.
- NOTE: LHD illustration shown, RHD is similar.

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

Raise and support the vehicle.

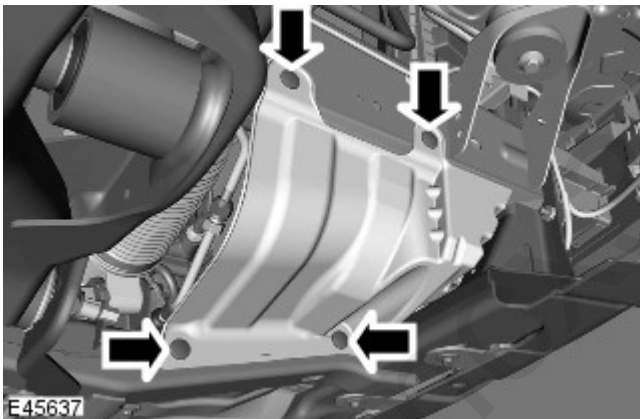
2. Remove the radiator access panel.

- Remove the 4 bolts.



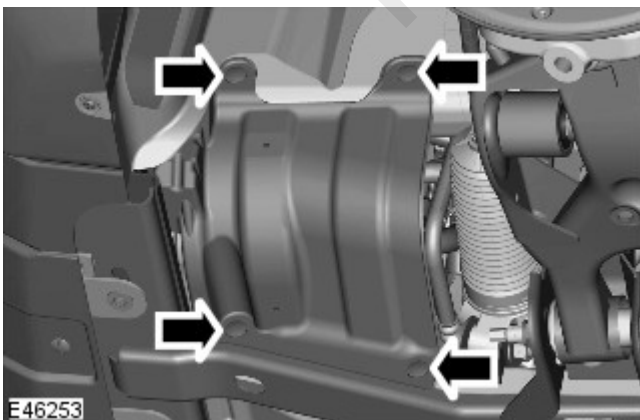
3. Remove the front RH splash shield.

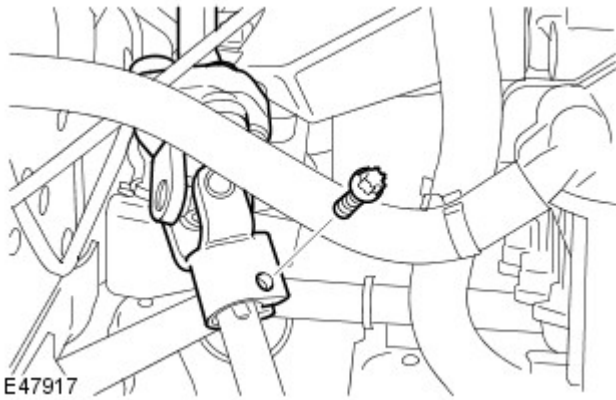
- Remove the 4 clips.



4. Remove the front LH splash shield.

- Remove the 4 clips.



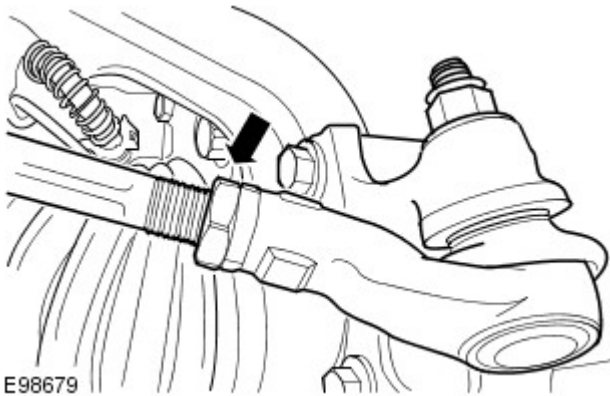


5. ⚠ CAUTION: Do not turn the steering wheel with the steering column lower shaft disconnected as damage to the clockspring and steering wheel switches may occur.

• **NOTE:** Make sure the steering is in the straight ahead position.

Release the universal joint from the steering gear.

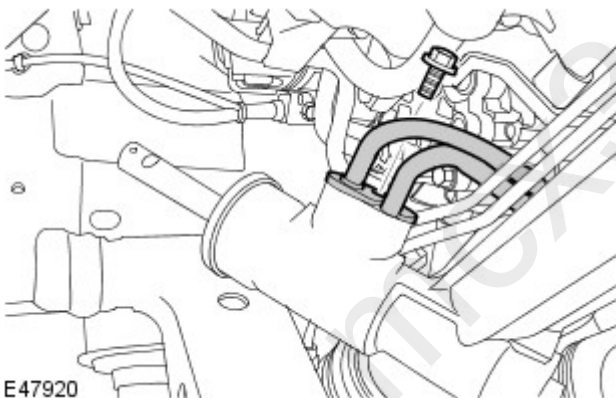
- Remove and discard the bolt.



6. NOTE: LH illustration shown, RH is similar.

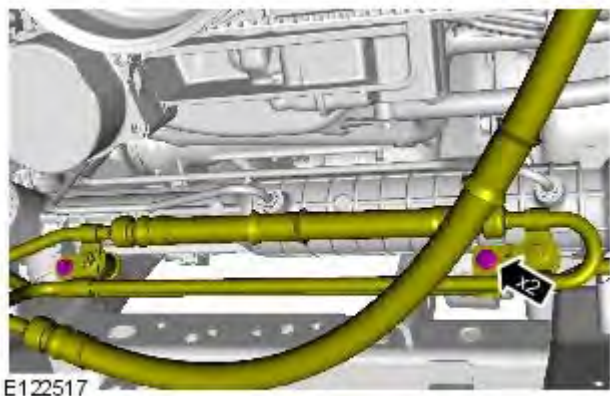
Release both tie-rod end ball joints.

- Loosen the locknut.
- Release both track rods from tie rod ends, note the number of turns for installation.



7. Disconnect the pressure lines from the power steering gear.

- Remove the bolt.
- Position an absorbent cloth to collect fluid spillage.
- Remove and discard the O-ring seals.

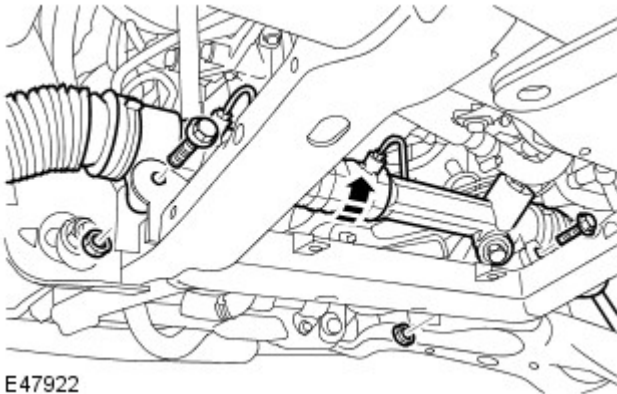


8. Remove the steering gear high-pressure line.

- Remove the bolts.



9. Disconnect the steering gear electrical connector.



10. Remove the steering gear.

- Remove the 2 bolts and discard the cage nuts.
- Release the steering gear.

Installation

1. Clean the component mating faces.
2. Install the steering gear.
 - Tighten the bolts to 175 Nm (129 lb.ft).
3. Connect the electrical connector.
4. **NOTE:** Do not install the support bracket bolt until the steering gear connections are tightened.

Install the steering gear high pressure line.

5. **NOTE:** Lubricate the seals with clean power steering fluid.

Connect the steering gear pressure lines.

- Clean the component mating faces.
 - Install new O-ring seals.
 - Tighten the bolt to 22 Nm (16 lb.ft).
6. Install the power steering line support bracket.
 - Tighten the bolt to 10 Nm (7 lb.ft).
 7. Connect the tie-rod end ball joints.
 - Attach both tie rods to previously noted positions.
 - Tighten the tie-rod locking nut.
 8. Connect the universal joint to the steering gear.
 - Install a new patchlock bolt and tighten to 25 Nm (18 lb.ft).
 9. Install the radiator access panel.
 - Install the 4 bolts and tighten to 10 Nm (7 lb.ft).
 10. Install the front LH splash shield.

11. Install the front RH splash shield.

12. Fill and bleed the power steering system.

For additional information, refer to: [Power Steering System Filling and Bleeding](#) (211-00 Steering System - General Information, General Procedures).

13. Adjust the front wheel alignment.

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Power Steering - Steering GearTDV6 2.7L Diesel

Removal and Installation

Removal

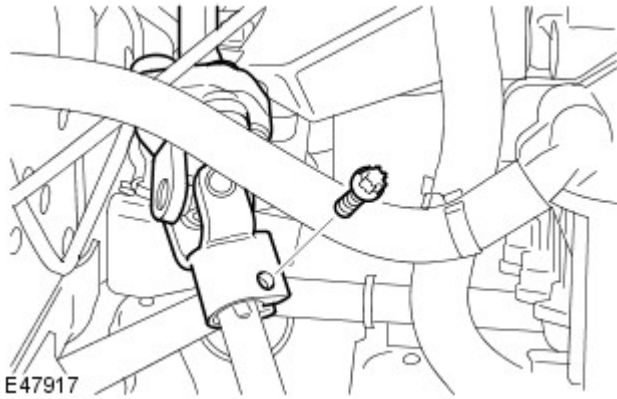
1.  **WARNING:** Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Raise and support the vehicle.

2. **NOTE:** Make sure the steering is in the straight ahead position.

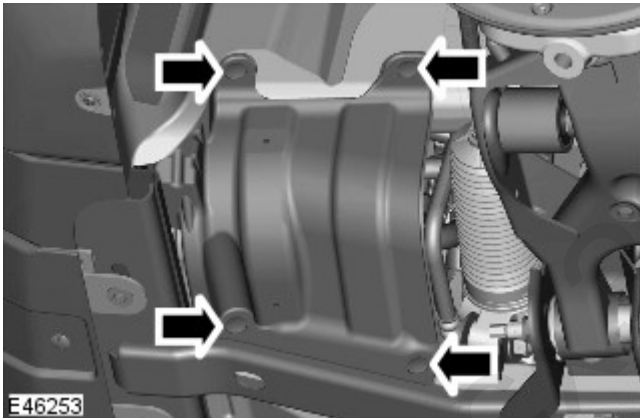
Release the universal joint from the steering gear.

- Remove and discard the bolt.



3. Remove the front RH and LH splash shields.

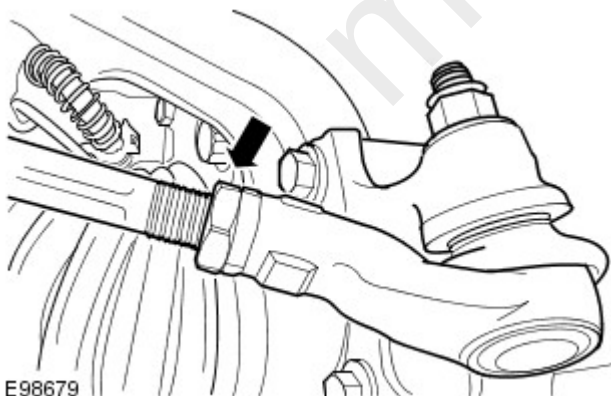
- Remove the 8 clips.

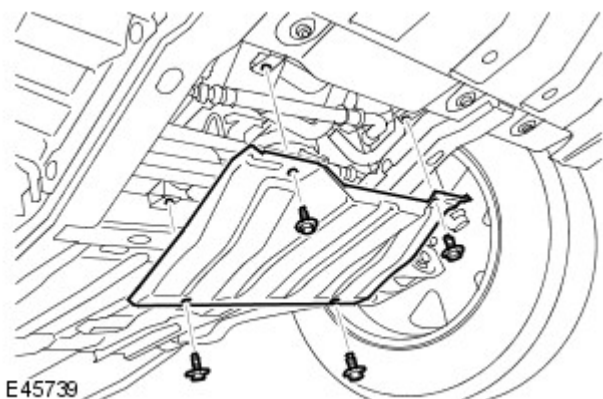


4. **NOTE:** LH illustration shown, RH is similar.

Release both tie-rod end ball joints.

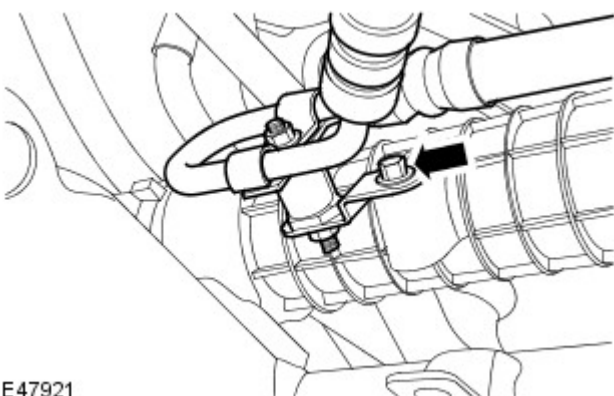
- Loosen the locknut.
- Release both track rods from tie rod ends, note the number of turns for installation.





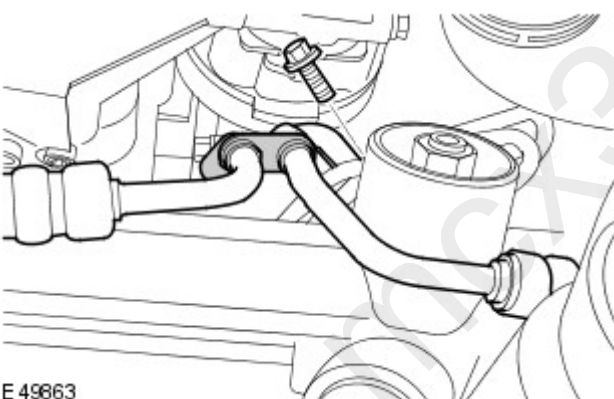
5. Remove the radiator access panel.

- Remove the 4 bolts.



6. Release the power steering line support mount.

- Remove the bolt.

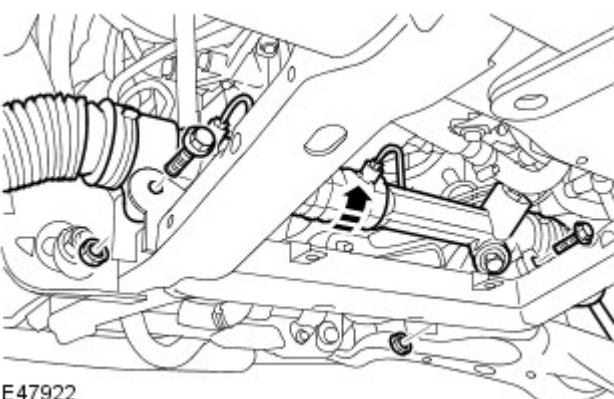


7. **CAUTION:** Before disconnecting or removing the components, make sure the area around the joint faces and connections are clean. Plug open connections to prevent contamination.

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

Disconnect the power steering fluid lines.

- Position a container to collect spillage.
- Remove the clip.
- Remove and discard the bolt.
- Discard the O-ring seals.



8. Remove the steering gear.

- Remove the 2 bolts and discard the nuts.

Installation

1. Install the steering gear.

- Clean the component mating faces.

- Use new nuts and tighten the nuts and bolts to 175 Nm (129 lb.ft).
2. Install the power steering fluid lines.
 - Clean the component mating faces.
 - Install new O-ring seals.
 - Install the clip.
 - Tighten the new bolt to 25 Nm (18 lb.ft).
 3. Secure the power steering line support mount.
 - Install the bolt.
 4. Connect the universal joint to the steering gear.
 - Install a new patchlock bolt and tighten to 25 Nm (18 lb.ft).
 5. Install the radiator access panel.
 - Tighten the bolts to 10 Nm (7 lb.ft).
 6. Install the splash shields.
 - Install the clips.
 7. Connect the tie-rod end ball joints.
 - Attach both tie rods to previously noted positions.
 - Tighten the tie-rod locking nut.
 8. Fill and bleed the power steering system.
For additional information, refer to: [Power Steering System Filling and Bleeding](#) (211-00 Steering System - General Information, General Procedures).
 9. Adjust the front wheel alignment.

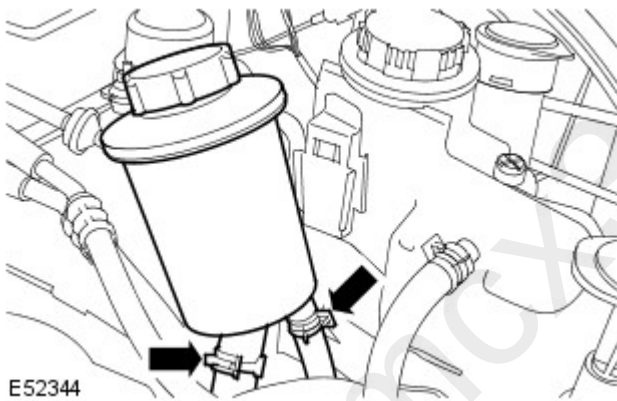
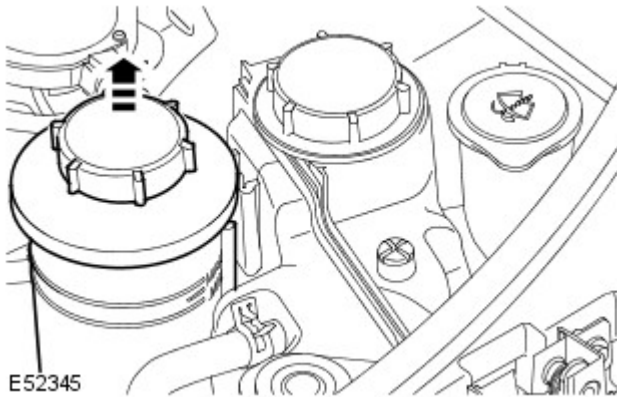
Power Steering - Power Steering Fluid Reservoir V6 4.0L Petrol/V8 5.0L Petrol/TDV6 3.0L Diesel

Removal and Installation

Removal

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

1. Disconnect the battery ground cable.
For additional information, refer to: [Specifications](#) (414-00 Battery and Charging System - General Information, Specifications).
2. Siphon the fluid from the power steering reservoir.
3. Release the power steering fluid reservoir from the bracket.



4.  **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.

- NOTE: Some fluid spillage is inevitable during this operation.

Remove the power steering fluid reservoir.

- Position an absorbent cloth to collect fluid spillage.
- Release the hose clips and disconnect the hoses.

Installation

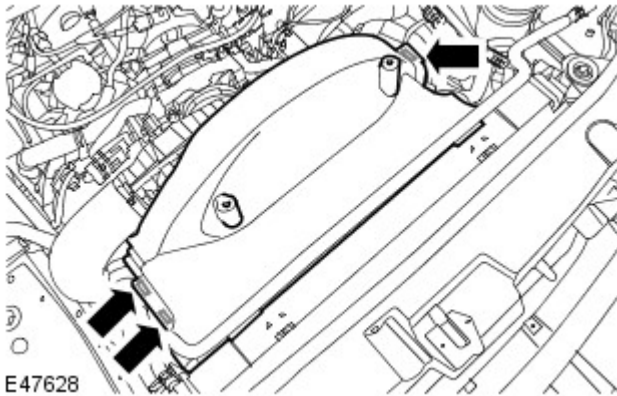
1. To install, reverse the removal procedure.
2. Fill and bleed the power steering system.
For additional information, refer to: [Power Steering System Filling and Bleeding](#) (211-00 Steering System - General Information, General Procedures).

Power Steering - Power Steering Fluid Reservoir TDV6 2.7L Diesel

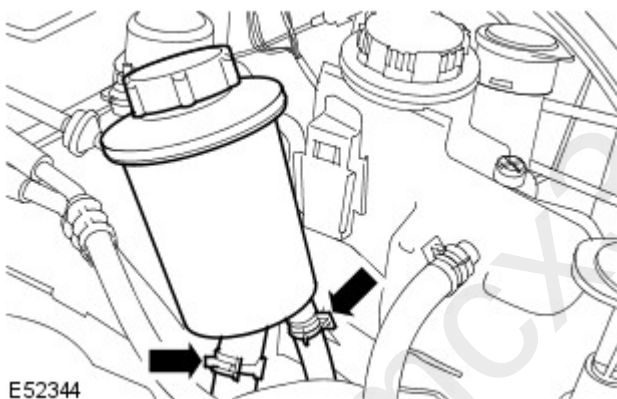
Removal and Installation

Removal

1. Disconnect the battery ground cable.
For additional information, refer to: [Specifications](#) (414-00 Battery and Charging System - General Information, Specifications).
2. Remove the air cleaner assembly.
For additional information, refer to: [Air Cleaner](#) (303-12A Intake Air Distribution and Filtering - TDV6 2.7L Diesel, Removal and Installation).
3. Remove the cooling fan shroud.



- Release the coolant hose.
- Release the 3 clips.



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

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

Remove the power steering reservoir.

- Position a container to collect spillage.
- Release the 2 clips.
- Disconnect the 2 hoses.

Installation

1. Install the power steering fluid reservoir.
 - Clean the component mating faces.
 - Connect the hoses.
 - Secure with the 2 clips.
2. Install the cooling fan shroud.
 - Secure the coolant hose.
3. Install the air cleaner assembly.
For additional information, refer to: [Air Cleaner](#) (303-12A Intake Air Distribution and Filtering - TDV6 2.7L Diesel, Removal and Installation).
4. Fill and bleed the power steering system.
For additional information, refer to: [Power Steering System Filling and Bleeding](#) (211-00 Steering System - General Information, General Procedures).

Power Steering - Power Steering Fluid Cooler V6 4.0L Petrol/ V8 5.0L Petrol

Removal and Installation

Special Tool(s)	
	Spring lock decoupler
	310-044

Removal

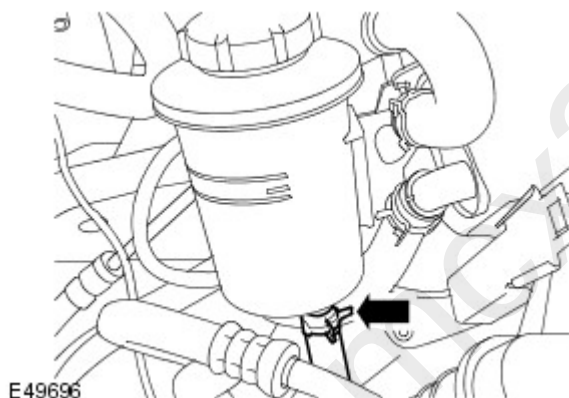
All vehicles

1. Disconnect the battery ground cable.
For additional information, refer to: [Specifications](#) (414-00 Battery and Charging System - General Information, Specifications).
2. Remove the front radiator grille.
For additional information, refer to: [Radiator Grille](#) (501-08 Exterior Trim and Ornamentation, Removal and Installation).
3. Remove the coolant expansion tank.
For additional information, refer to: [Coolant Expansion Tank](#) (303-03D Engine Cooling - V8 5.0L Petrol, Removal and Installation) / [Coolant Expansion Tank](#) (303-03C Engine Cooling - V6 4.0L Petrol, Removal and Installation).
4. Siphon the fluid from the power steering reservoir.

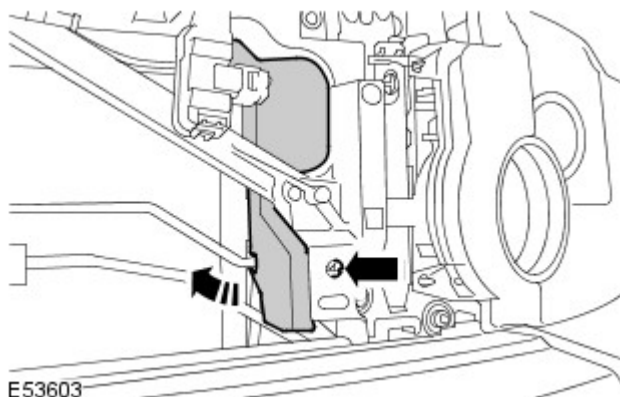
5. ⚠ CAUTION: Before disconnecting or removing the components, make sure the area around the joint faces and connections are clean. Plug open connections to prevent contamination.

Disconnect the steering reservoir return hose.

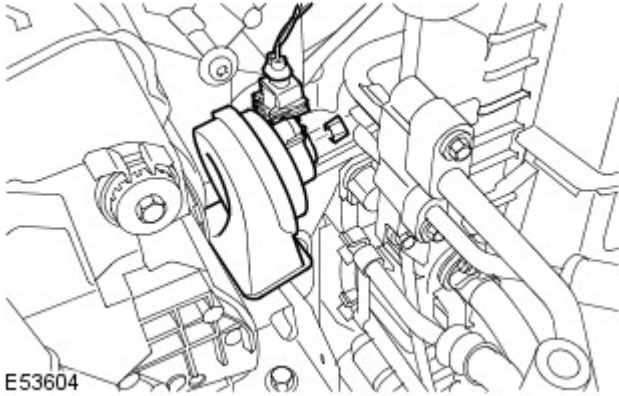
- Position an absorbent cloth to collect fluid spillage.
- Release the clip.



6. Release the LH radiator air deflector lower clip, position the deflector aside.



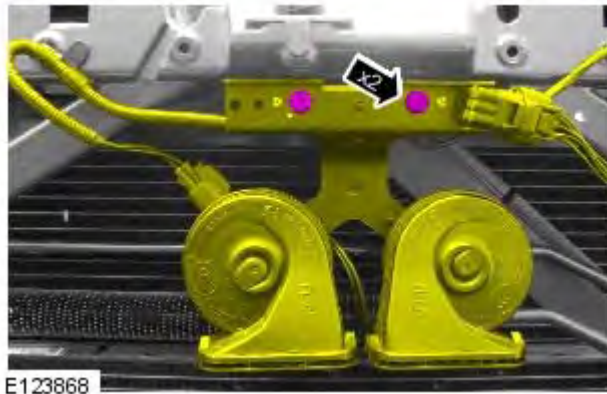
Vehicles with 4.0L engine



7. Position the LH horn aside for access.

- Remove the nut.

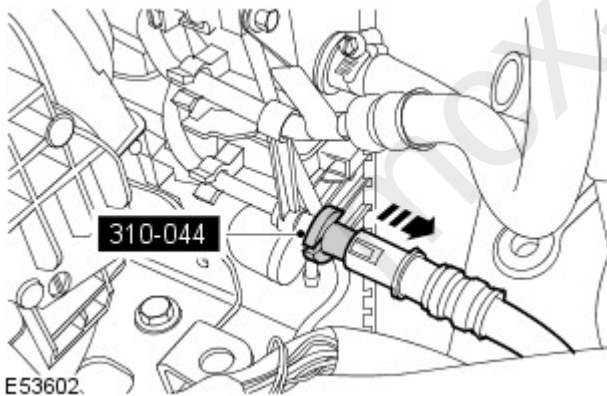
Vehicles with 5.0L engine



8. Position the horns to one side for access.

- Remove the 2 bolts.

All vehicles



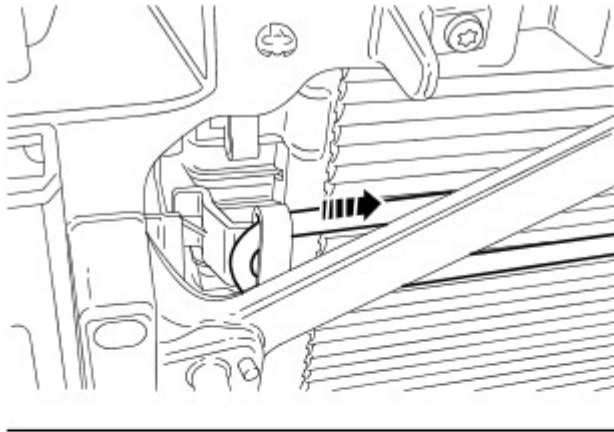
9.  **CAUTION:** Before disconnecting or removing the components, make sure the area around the joint faces and connections are clean. Plug open connections to prevent contamination.

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

Using the special tool, disconnect the cooler line.

- Position an absorbent cloth to collect fluid spillage.

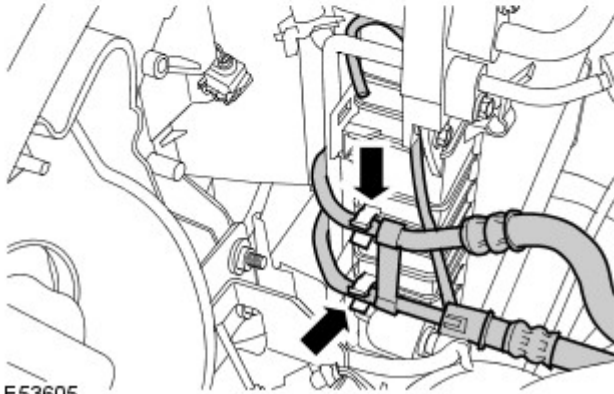
10. Remove the cooler line separating clip.



11. NOTE: Care must be taken to prevent damage to the cooler elements during removal and installation.

Remove the power steering fluid cooler.

- Release the 3 clips.



E53605

Installation

All vehicles

1. Install the power steering fluid cooler.
 - Position and secure in the clips.
2. Install the power steering fluid line and hose.
 - Clean the component mating faces.
 - Secure the hose with the clip.
3. Install the cooler line separating clip.

Vehicles with 4.0L engine

4. Install the horn assembly.
 - Tighten the nut to 10 Nm (7 lb.ft).

Vehicles with 5.0L engine

5. Install the horn assemblies.
 - Tighten the 2 bolts to 10 Nm (7 lb.ft).

All vehicles

6. Install the radiator deflector.
 - Secure with the clip.
7. Install the coolant expansion tank.
 For additional information, refer to: [Coolant Expansion Tank](#) (303-03D Engine Cooling - V8 5.0L Petrol, Removal and Installation) / [Coolant Expansion Tank](#) (303-03C Engine Cooling - V6 4.0L Petrol, Removal and Installation).
8. Install the radiator grille.
 For additional information, refer to: [Radiator Grille](#) (501-08

Exterior Trim and Ornamentation, Removal and Installation).

9. Connect the battery ground cable.

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

10. Fill and bleed the power steering system.

For additional information, refer to: [Power Steering System Filling and Bleeding](#) (211-00 Steering System - General Information, General Procedures).

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Power Steering - Power Steering Fluid CoolerTDV6 2.7L Diesel

Removal and Installation

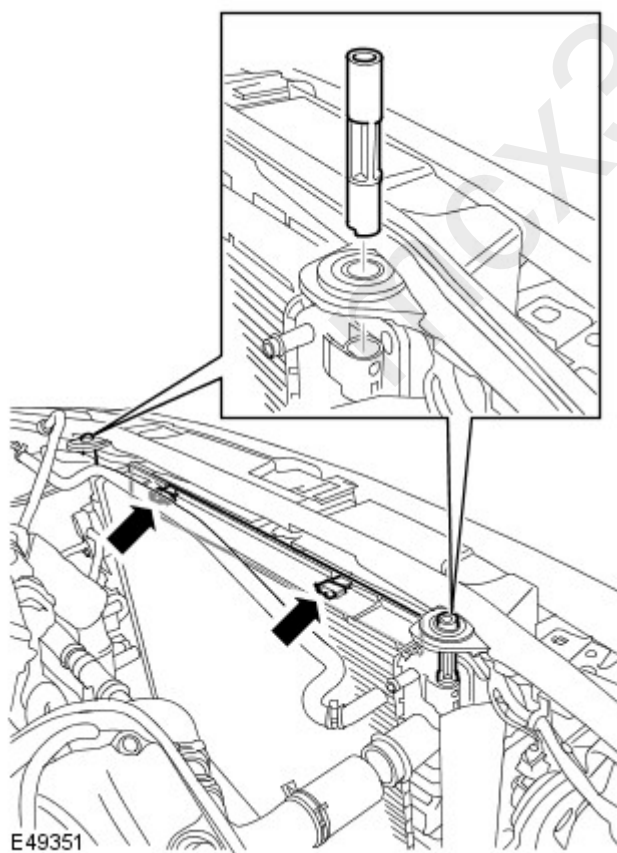
Special Tool(s)	
 E50921	Spring lock decoupler
	310-044

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.

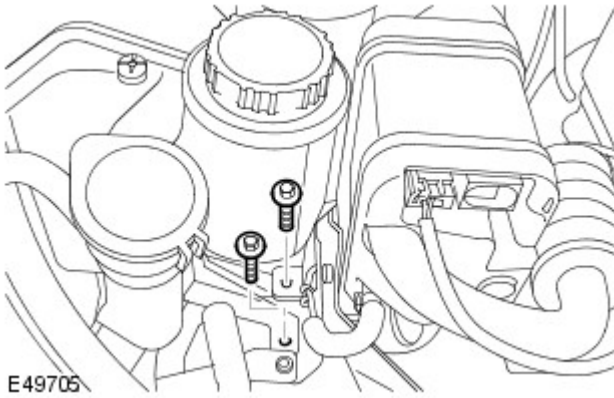
- Disconnect the battery ground cable.
For additional information, refer to: [Specifications](#) (414-00 Battery and Charging System - General Information, Specifications).
- Remove the cooling fan lower shroud.
For additional information, refer to: [Cooling Fan Shroud](#) (303-03A Engine Cooling - TDV6 2.7L Diesel, Removal and Installation).
- Remove the radiator grille.
For additional information, refer to: [Radiator Grille](#) (501-08 Exterior Trim and Ornamentation, Removal and Installation).
- Remove the radiator securing pegs.
- Remove the radiator upper deflector.
 - Release the 2 clips.



E49351

7. Release the coolant expansion tank.

- Remove the 2 bolts.



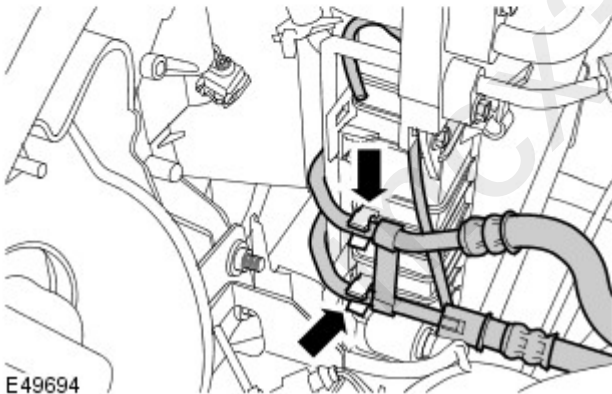
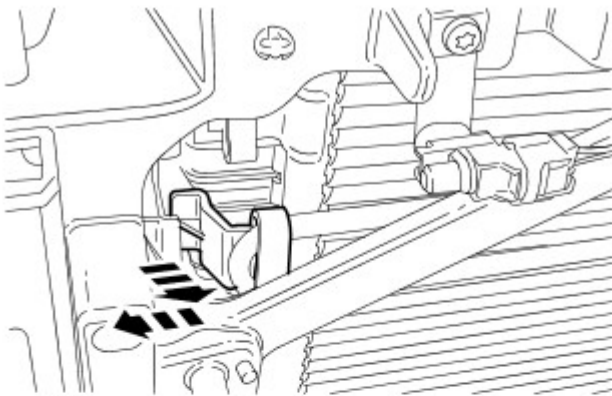
8. Tie the engine air intake duct towards the engine.

9. Tie the fuel fired booster heater coolant lines towards the engine.

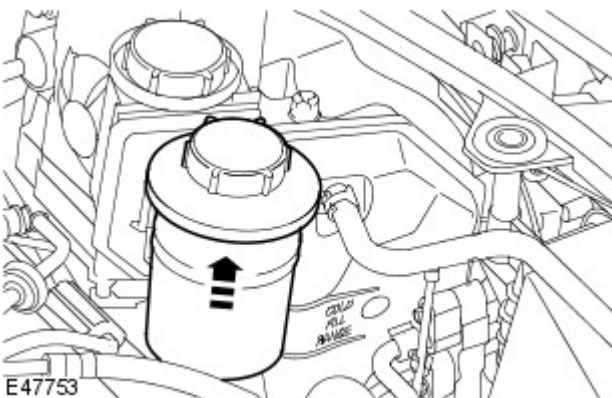
10. NOTE: Note the position of the differential breather line.

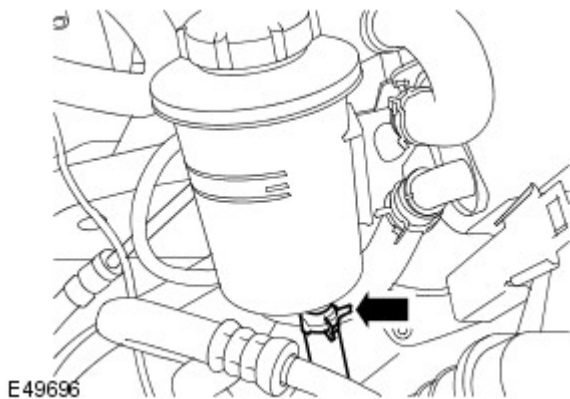
Release the power steering fluid cooler.

- Release it from 3 clips.



11. Release the power steering fluid reservoir.



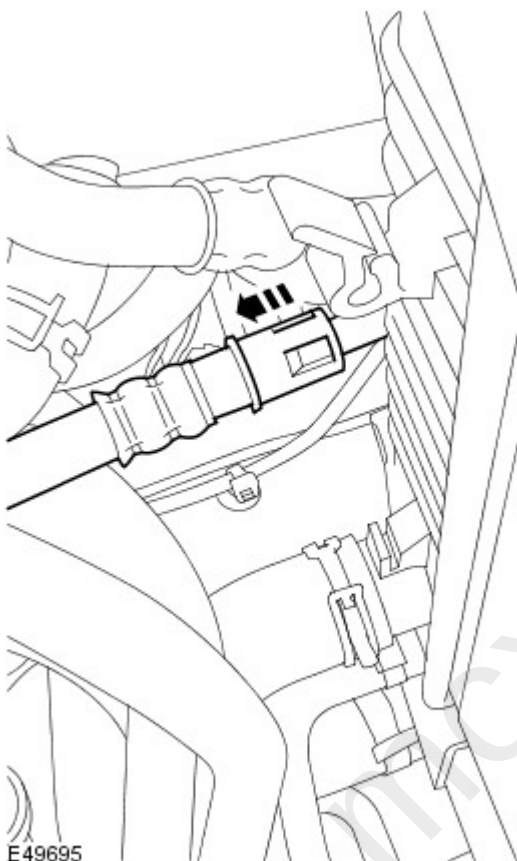


12.  **CAUTION:** Before the disconnection or removal of any components, ensure the area around joint faces and connections are clean. Plug any open connections to prevent contamination.

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

Disconnect the power steering cooler line from the fluid reservoir.

- Release the clip.
- Allow the fluid to drain into a container.



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

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

Remove the power steering fluid cooler.

- Using the special tool, release the clip.

Installation

1. Install the power steering fluid cooler.
 - Clean the component mating faces.
 - Secure the clip.
2. Connect the power steering cooler line to the fluid reservoir.
 - Clean the component mating faces.
 - Secure with the clip.
3. Install the power steering fluid reservoir.
4. Position the front differential breather line.
5. Secure the power steering fluid cooler line.
 - Secure in the 3 clips.
6. Secure the coolant expansion tank.
 - Tighten the 2 bolts to 10 Nm (7 lb.ft).

7. Install the radiator upper deflector.
8. Install the radiator securing pegs.
9. Connect the A/C condenser refrigerant lines.
 - Clean the component mating faces.
 - Install new O-ring seals.
 - Tighten the bolts to 25 Nm (18 lb.ft).
10. Install the radiator grille.

For additional information, refer to: [Radiator Grille](#) (501-08 Exterior Trim and Ornamentation, Removal and Installation).
11. Install the cooling fan lower shroud.

For additional information, refer to: [Cooling Fan Shroud](#) (303-03A Engine Cooling - TDV6 2.7L Diesel, Removal and Installation).
12. Connect the battery ground cable.

For additional information, refer to: [Specifications](#) (414-00 Battery and Charging System - General Information, Specifications).
13. Fill and bleed the power steering system.

For additional information, refer to: [Power Steering System Filling and Bleeding](#) (211-00 Steering System - General Information, General Procedures).

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Power Steering - Power Steering Pump VIN Range: 07 MODEL

YEAR->CURRENT

Removal and Installation

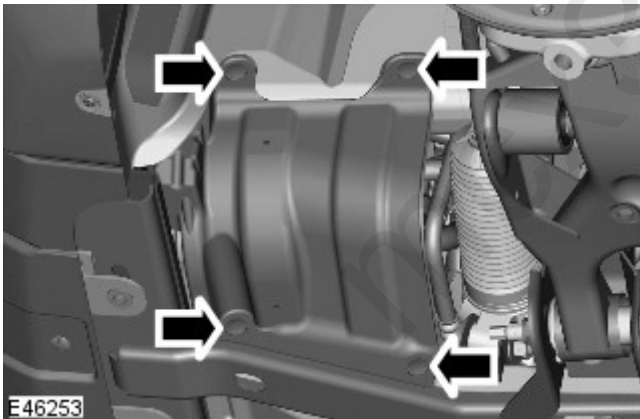
Removal

1. Disconnect the battery ground cable.
For additional information, refer to: [Specifications](#) (414-00 Battery and Charging System - General Information, Specifications).
2. Remove the engine cover.
For additional information, refer to: [Engine Cover - TDV6 3.0L Diesel](#) (501-05 Interior Trim and Ornamentation, Removal and Installation).
3. Remove the cooling fan shroud.
For additional information, refer to: [Cooling Fan Shroud](#) (303-03A Engine Cooling - TDV6 2.7L Diesel, Removal and Installation).
4. Recover the air conditioning (A/C) refrigerant.
For additional information, refer to: [Air Conditioning \(A/C\) System Recovery, Evacuation and Charging](#) (412-00 Climate Control System - General Information, General Procedures).
5. Remove the auxiliary battery tray.
For additional information, refer to: [Auxiliary Battery Tray](#) (414-01 Battery, Mounting and Cables, Removal and Installation).
6. Remove the accessory drive belt.
For additional information, refer to: [Accessory Drive Belt](#) (303-05A Accessory Drive - TDV6 2.7L Diesel, Removal and Installation).

7.  **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.

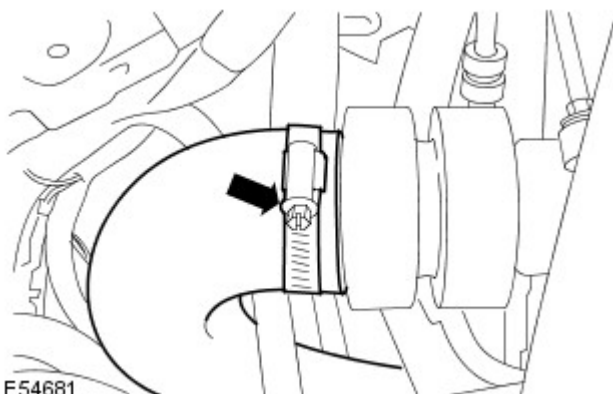
8. Remove the LH front wheel and tire.
9. Remove the fender splash shield lower trim panel.
 - Remove the 4 clips.



10. Remove the front LH fender splash shield.
For additional information, refer to: [Fender Splash Shield](#) (501-02 Front End Body Panels, Removal and Installation).

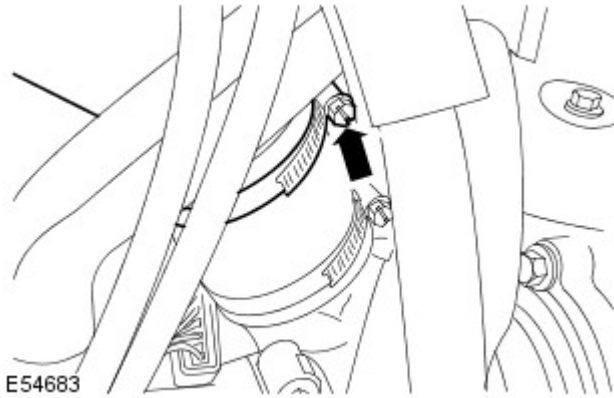
11. Remove the upper arm and brake line heat shields for access.

12. Disconnect the charge air cooler inlet hose.
 - Remove the two retaining bolts.
Remove the 3 nuts.
 - Remove the retaining nut.
 - Remove the 3 bolts.



14. Disconnect the charge air cooler inlet hose.

- Loosen the clip.



15. CAUTIONS:



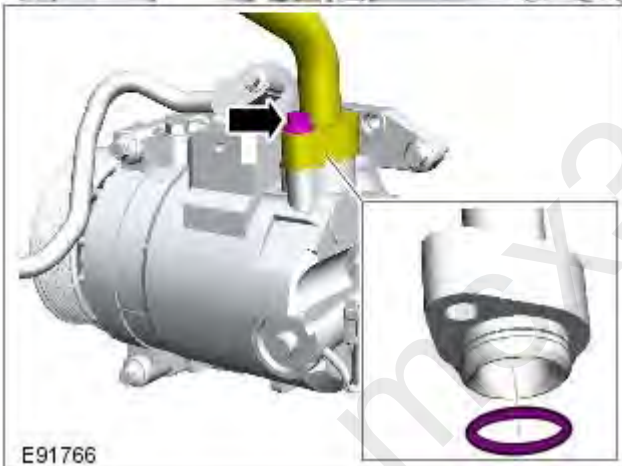
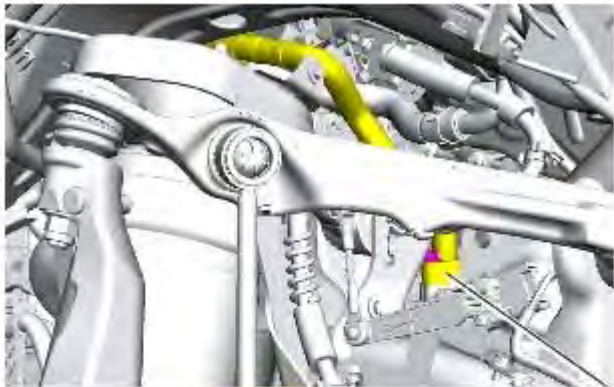
Immediately cap all refrigerant lines to prevent ingress of dirt and moisture.

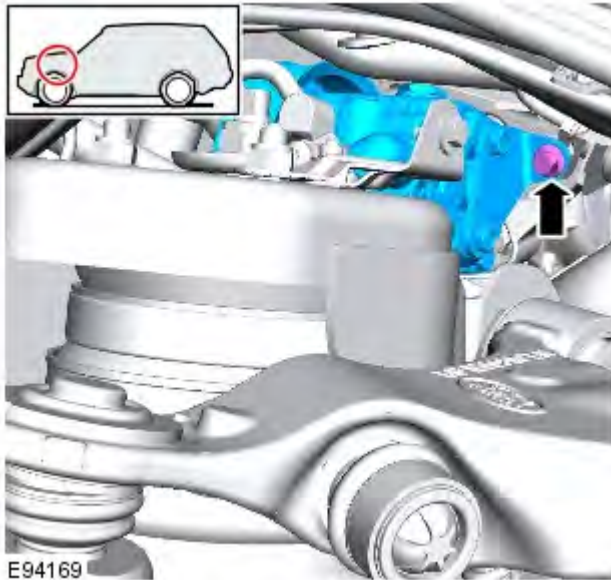


Care must be taken to avoid damage to the mating surfaces.

Release the A/C low pressure pipe from the compressor.

- Remove and discard the O-ring seal.
- Using a suitable tie strap, secure the A/C low-pressure pipe aside.





16. Remove the power steering pump rear fixing bracket retaining bolt.

- Reposition the charge air cooler inlet pipe to gain access to the power steering pump retaining bolt.

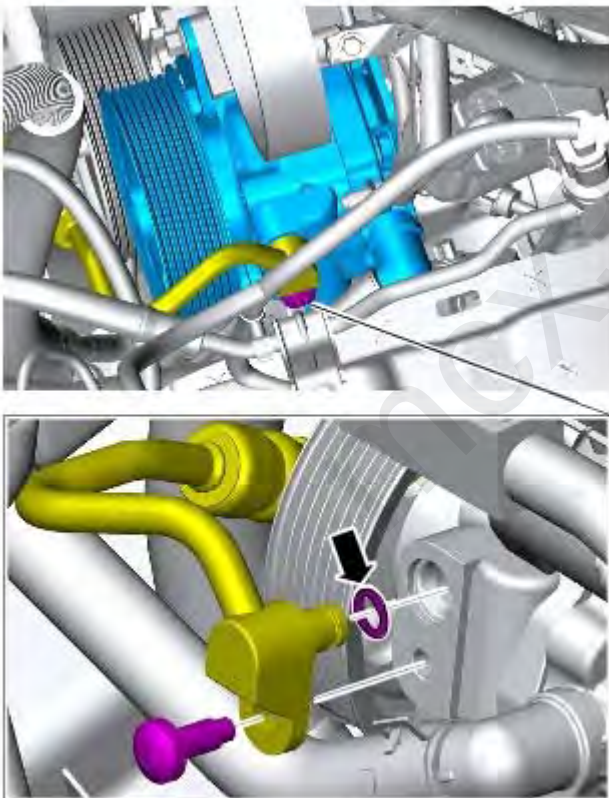
17.  **WARNING:** Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Lower the vehicle.

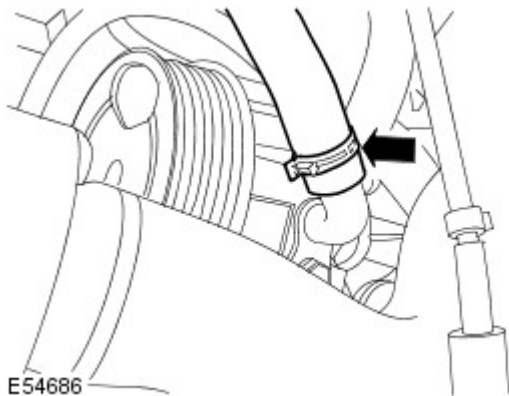
18.  **CAUTION:** If power steering fluid comes into contact with the paintwork, the affected area must be immediately washed down with cold water.

Disconnect the high pressure line from the power steering gear.

- Remove and discard the O-ring seal.
- Install blanking caps to the exposed ports.
- Allow the fluid to drain into a container.



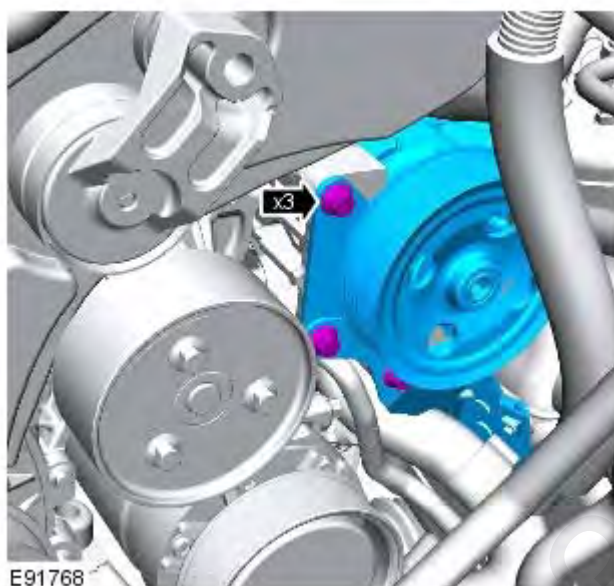
E94170



19. ⚠ CAUTION: If power steering fluid comes into contact with the paintwork, the affected area must be immediately washed down with cold water.

Disconnect the power steering pump supply hose.

- Clamp the power steering pump supply hose to minimise fluid loss.
- Install blanking caps to the exposed ports.



20. Remove the power steering pump.

- Remove the 3 power steering pump front retaining bolts.

Installation

1. Install the power steering pump and bracket.

- Install the 3 power steering pump front bolts and lightly tighten, then back off each bolt a 1/4 turn.

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

Raise the vehicle.

3. Install the power steering pump rear fixing bracket retaining bolt.

- Reposition the charge air cooler inlet pipe to gain access to the power steering pump retaining bolt.
- Tighten the bolt to 25 Nm (18 lb.ft).

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

Lower the vehicle.

5. Tighten power steering pump front retaining bolts to 24 Nm (18 lb.ft).

6. Connect the power steering supply hose.

- Remove the blanking caps from the ports.
- Remove the hose clamp.

7. NOTE: Lubricate the seals with clean power steering fluid.

Connect the power steering high-pressure pipe union.

- Remove the blanking caps from the ports.
- Install a new O-ring seal.
- Tighten the Torx bolt to 25 Nm (18 lb.ft).
- Remove the container.

8.  **CAUTION:** Lubricate the new seals with clean refrigerant oil.

Install the A/C low pressure pipe to the compressor.

- Remove the blanking caps from the ports.
- Install a new O-ring seal.
- Tighten the bolt to 9 Nm (7 lb.ft).

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

Raise the vehicle.

10. Connect the charge air cooler inlet hose.

- Tighten the clips.

11. Secure the charge air cooler inlet pipe.

- Install the two retaining bolts.
- Install the retaining nut.
- Tighten to 10 Nm (7 lb.ft).

12. Install the upper arm and brake line heat shields.

- Install the 3 bolts.
- Install the 3 nuts.

13. Install the fender splash shield lower trim panel.

- Install the 4 clips.

14. Install the front LH fender splash shield.

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

15. Install the wheel and tire.

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

Lower the vehicle.

17. Install the accessory drive belt.

For additional information, refer to: [Accessory Drive Belt](#) (303-05A Accessory Drive - TDV6 2.7L Diesel, Removal and Installation).

18. Install the auxiliary battery tray.

For additional information, refer to: [Auxiliary Battery Tray](#) (414-01 Battery, Mounting and Cables, Removal and Installation).

19. Recharge the A/C system

For additional information, refer to: [Air Conditioning \(A/C\) System Recovery, Evacuation and Charging](#) (412-00 Climate Control System - General Information, General Procedures).

20. Install the cooling fan shroud.

For additional information, refer to: [Cooling Fan Shroud](#) (303-03A Engine Cooling - TDV6 2.7L Diesel, Removal and Installation).

21. Check and top-up power steering fluid level.

For additional information, refer to: [Power Steering System Filling and Bleeding](#) (211-00 Steering System - General Information, General Procedures).

22. Install the engine cover.

For additional information, refer to: [Engine Cover - TDV6 3.0L Diesel](#) (501-05 Interior Trim and Ornamentation, Removal and Installation).

23. Connect the battery ground cable.

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

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Power Steering - Power Steering Pump TDV6 3.0L Diesel

Removal and Installation

Removal

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

1. Disconnect the battery ground cable.

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

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

Raise and support the vehicle.

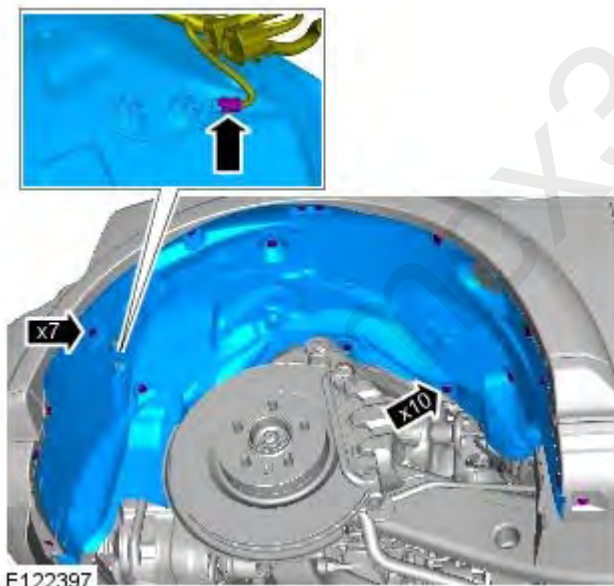
3. Refer to: [Air Conditioning \(A/C\) System Recovery, Evacuation and Charging](#) (412-00 Climate Control System - General Information, General Procedures).

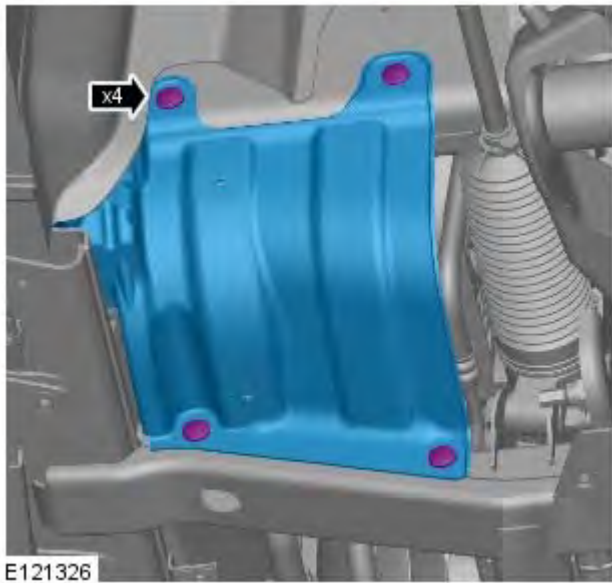
4. Refer to: [Accessory Drive Belt](#) (303-05B Accessory Drive - TDV6 3.0L Diesel, Removal and Installation).

5. Remove the LH front wheel and tire.

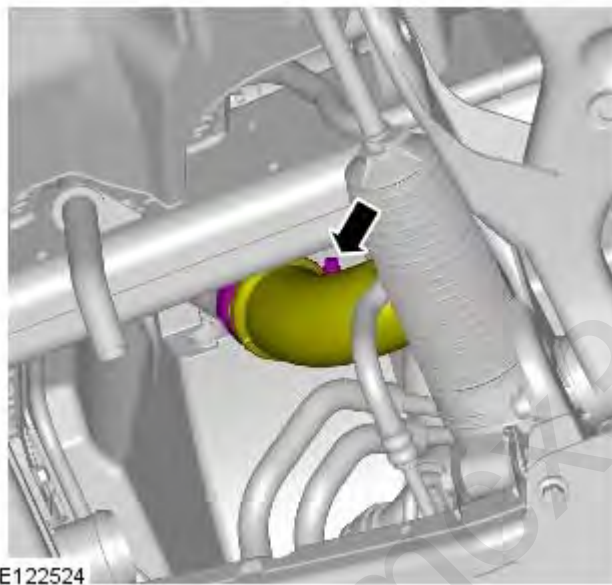
Torque: 140 Nm

6.

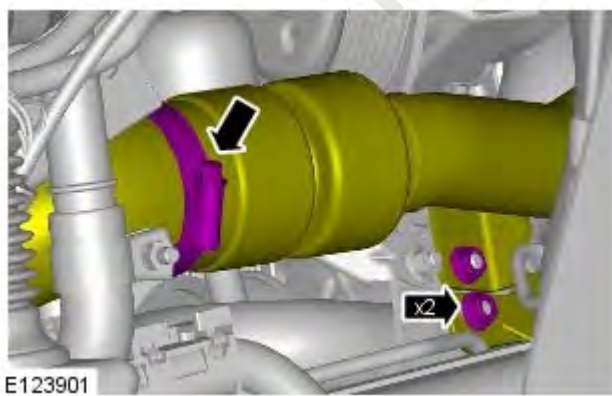




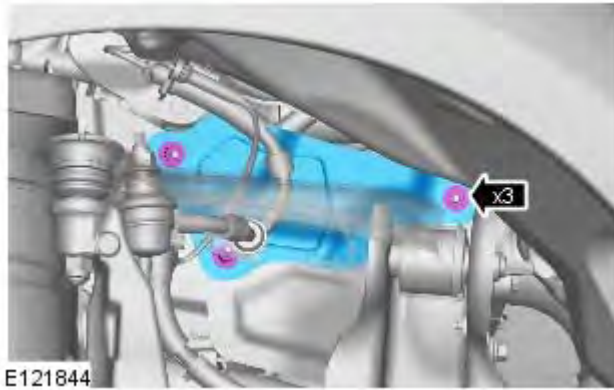
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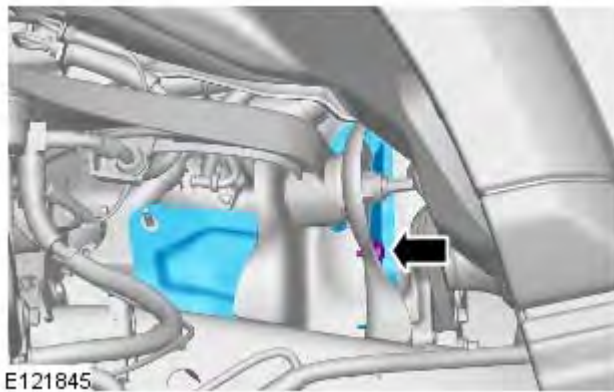
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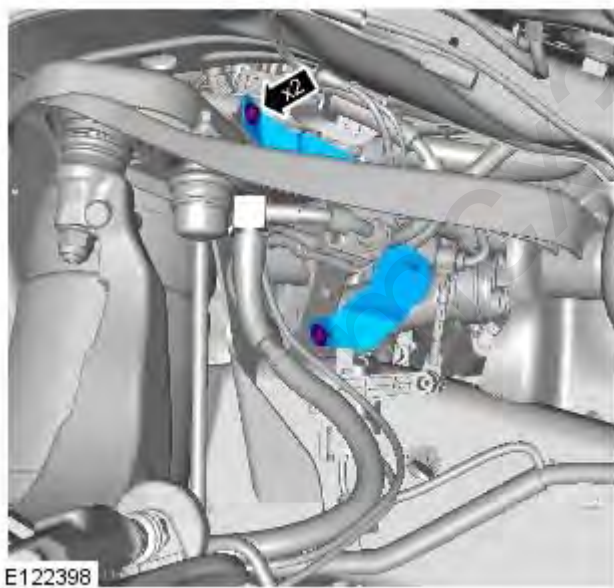
9. Torque:
Nuts 6 Nm



10. Torque: 9 Nm

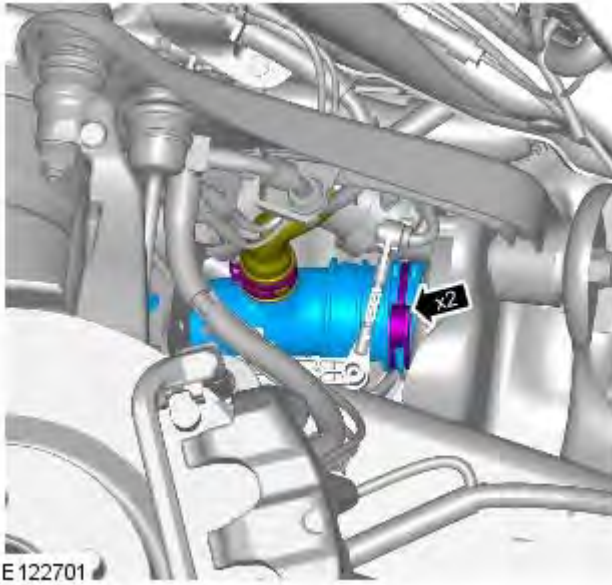


11. Torque: 9 Nm

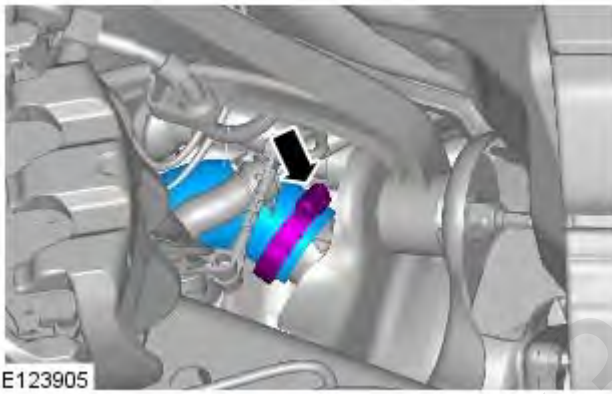


12. Torque: 9 Nm

13.

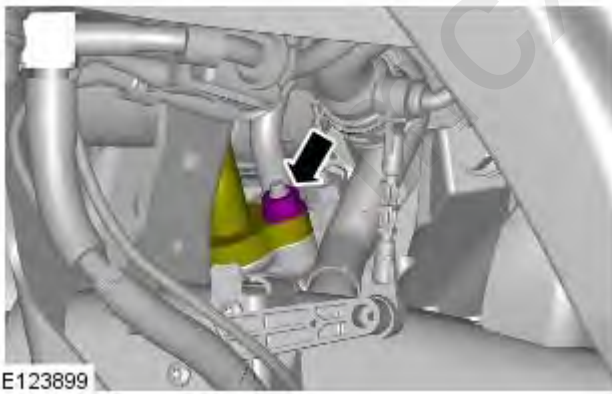


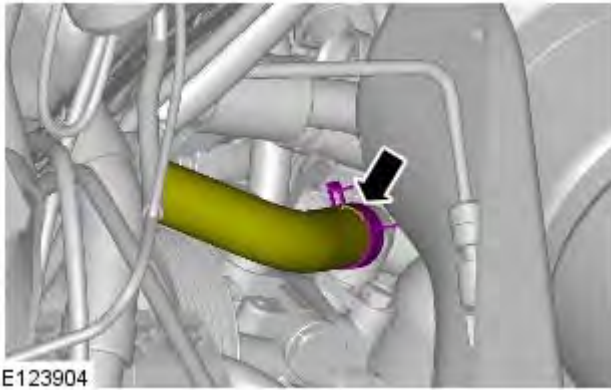
14.



15. **15.** NOTE: Make sure that all openings are sealed. Use new blanking caps.

Torque: 18 Nm



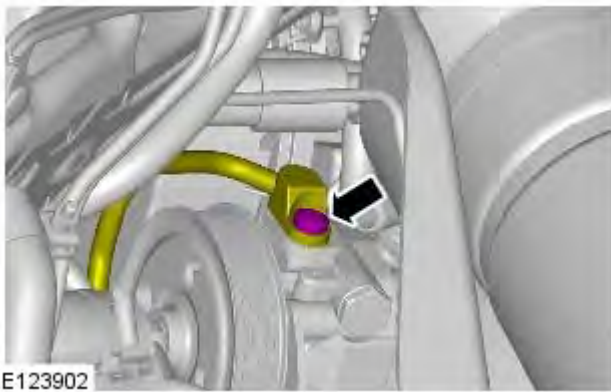


16. **16.**  **WARNING:** Fluid loss is unavoidable, use absorbent cloth or a container to collect the fluid.



CAUTION: Make sure that the mating faces are clean and free of foreign material.

- **NOTE:** Make sure that all openings are sealed. Use new blanking caps.



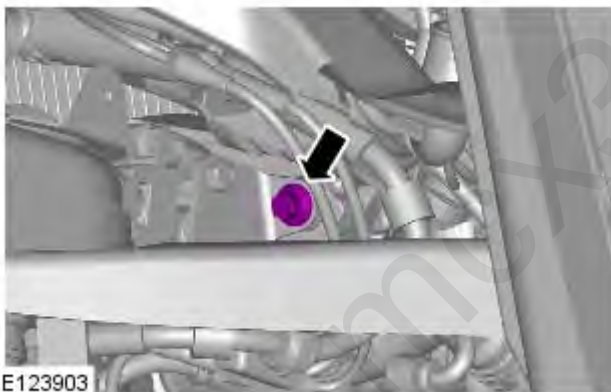
17. **17.**  **WARNING:** Fluid loss is unavoidable, use absorbent cloth or a container to collect the fluid.



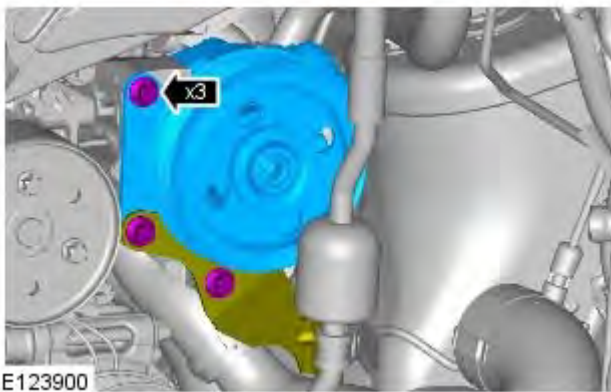
CAUTION: Make sure that the mating faces are clean and free of foreign material.

- **NOTE:** Make sure that all openings are sealed. Use new blanking caps.

Torque: 24 Nm



18. *Torque:* 25 Nm



19. *Torque:* 25 Nm

Installation

1. To install, reverse the removal procedure.

2. Refer to: [Power Steering System Filling and Bleeding](#) (211-00 Steering System - General Information, General Procedures).

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Power Steering - Power Steering PumpV6 4.0L Petrol

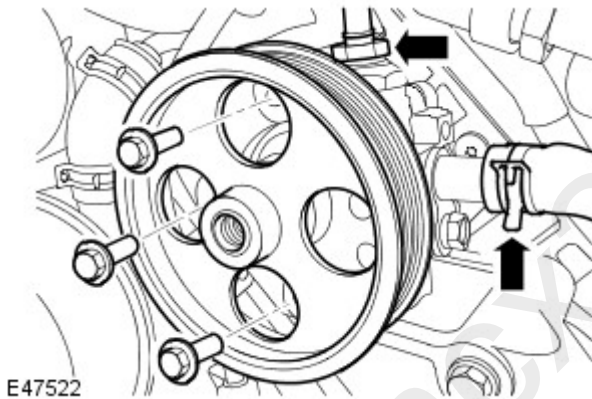
Removal and Installation

Removal

1. Disconnect the battery ground cable.
For additional information, refer to: [Specifications](#) (414-00 Battery and Charging System - General Information, Specifications).
2. Remove the accessory drive belt.
For additional information, refer to: [Accessory Drive Belt](#) (303-05C Accessory Drive - V6 4.0L Petrol, Removal and Installation).
3.  **CAUTION:** Before the disconnection or removal of any components, ensure the area around joint faces and connections are clean. Plug any open connections to prevent contamination.
- **NOTE:** Some oil spillage is inevitable during this operation.

Clamp the power steering pump supply hose to minimise fluid loss.

4. Disconnect the high pressure line at the steering pump union.
 - Position an absorbent cloth to collect fluid spillage.
5. Disconnect the power steering pump supply hose.
 - Release the clip.
6. Remove the power steering pump.
 - Remove the 3 bolts.



Installation

1. Install the power steering pump.
 - Clean the component mating faces.
 - Install and tighten the bolts to 25 Nm (18 lb.ft).
2. Connect the power steering supply hose to the steering pump.
 - Clean the component mating faces.
 - Secure with the clip.
3. Connect the high pressure line to the steering pump.
 - Clean the component mating faces.
 - Install new seals.
 - Tighten the union to 25 Nm (18 lb.ft).
4. Install the accessory drive belt.
For additional information, refer to: [Accessory Drive Belt](#) (303-05C Accessory Drive - 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).

6. Fill and bleed the power steering system.

For additional information, refer to: [Power Steering System Filling and Bleeding](#) (211-00 Steering System - General Information, General Procedures).

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Power Steering - Power Steering Pump V8 5.0L Petrol

Removal and Installation

Removal

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

1. Disconnect the battery ground cable.

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

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

Raise and support the vehicle.

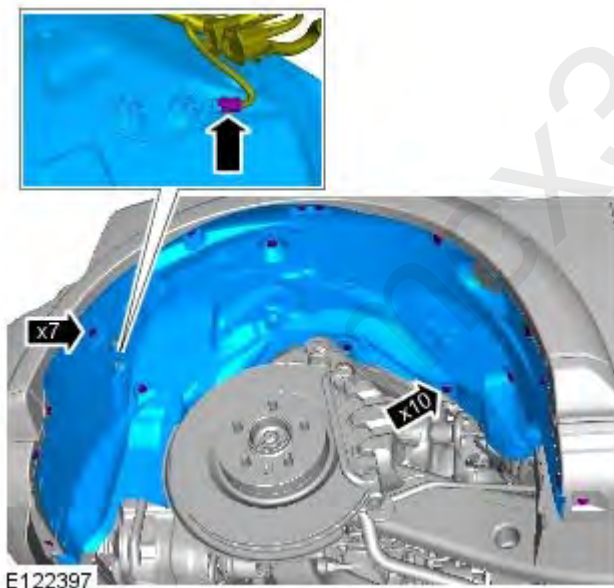
3. Refer to: [Air Conditioning \(A/C\) System Recovery, Evacuation and Charging](#) (412-00 Climate Control System - General Information, General Procedures).

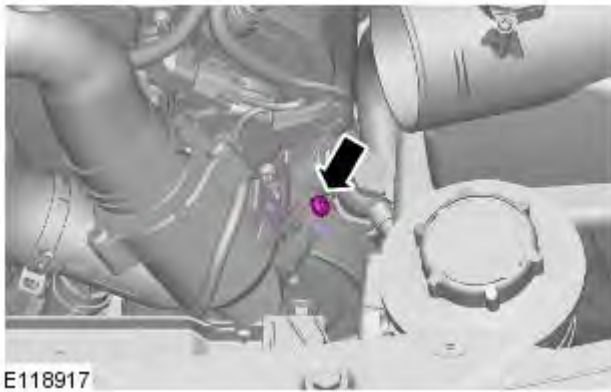
4. Refer to: [Accessory Drive Belt](#) (303-05D Accessory Drive - V8 5.0L Petrol, Removal and Installation).

5. Remove the LH front road wheel.

Torque: 140 Nm

6.



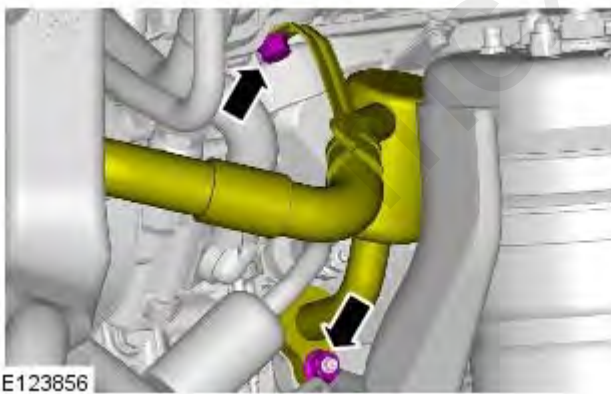


7. Torque: 10 Nm



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

Torque: 25 Nm

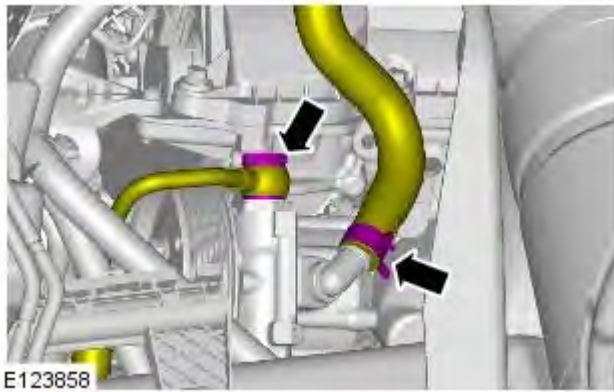


9. **9. CAUTIONS:**

 Make sure that all openings are sealed. Use new blanking caps.

 A new O-ring seal is to be installed.

Torque: 18 Nm

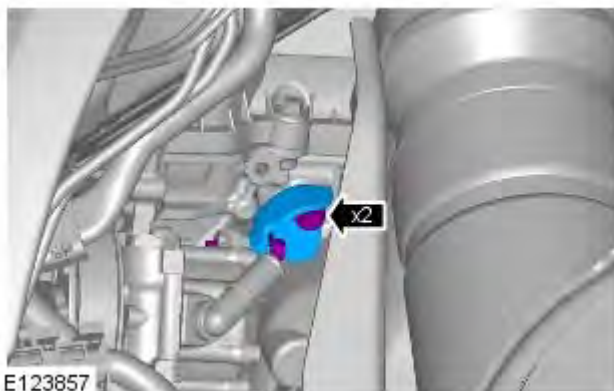


10. **10. CAUTIONS:**

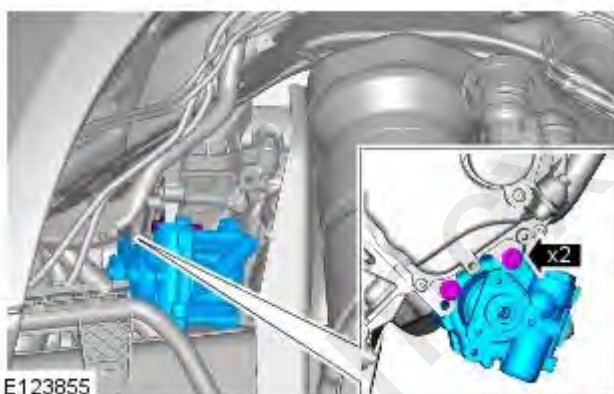
 Fluid loss is unavoidable, use absorbent cloth or a container to collect the fluid.

 Make sure that all openings are sealed. Use new blanking caps.

Torque: 25 Nm



11. *Torque:* 25 Nm



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

Torque: 25 Nm

Installation

1. To install, reverse the removal procedure.
2. Refer to: [Power Steering System Filling and Bleeding](#) (211-00 Steering System - General Information, General Procedures).

Power Steering - Steering Angle Sensor

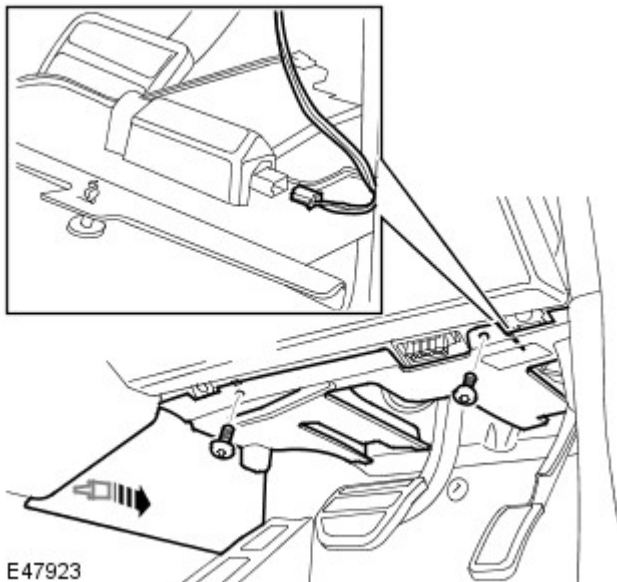
Removal and Installation

Removal

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

2. Remove the driver side closing trim panel.

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



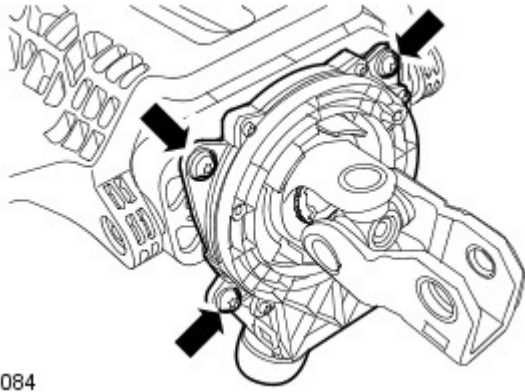
3. Disconnect the steering angle sensor electrical connector.



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

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





E47084

5. Remove the steering angle sensor.

- Remove the 3 Torx screws.

Installation

1. Install the steering angle sensor.

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

2. Connect the steering column intermediate shaft.

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

3. Connect the steering angle sensor electrical connector.

4. Install the closing trim panel.

- Connect the electrical connector.
- Secure the clip.
- Tighten the screws.

5. Connect the battery ground cable.

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

6. Initiate a new steering angle sensor using T4.

Power Steering - Power Steering Pump to Steering Gear Pressure Line

Removal and Installation

Removal

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

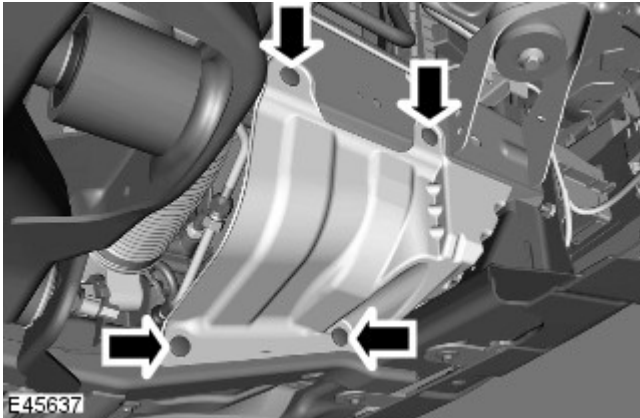
All vehicles

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

Raise and support the vehicle.

2. Remove the front RH splash shield.

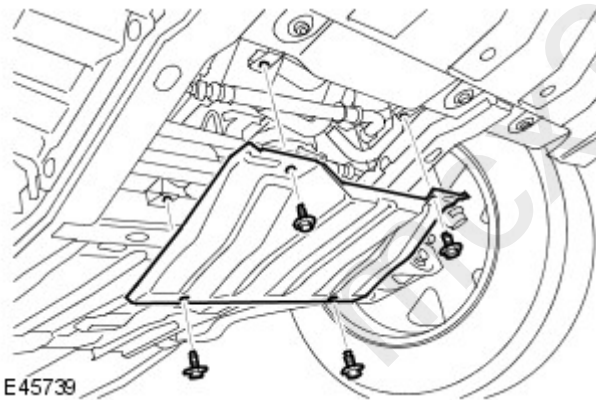
- Remove the 4 clips.

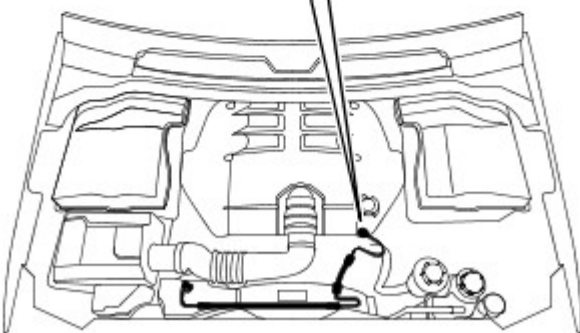
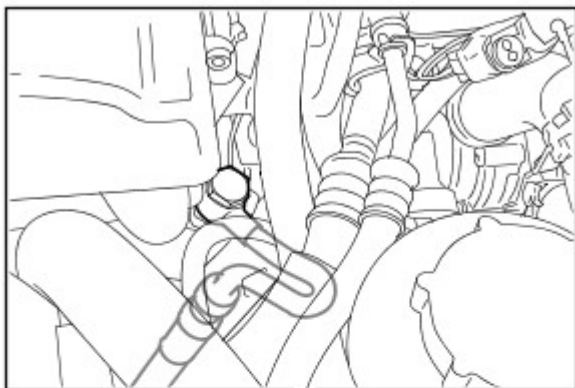


3. Remove the front LH fender splash shield.
For additional information, refer to: [Fender Splash Shield](#) (501-02 Front End Body Panels, Removal and Installation).

4. Remove the radiator access panel.

- Remove the 4 bolts.





E72350

5. ⚠ 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.

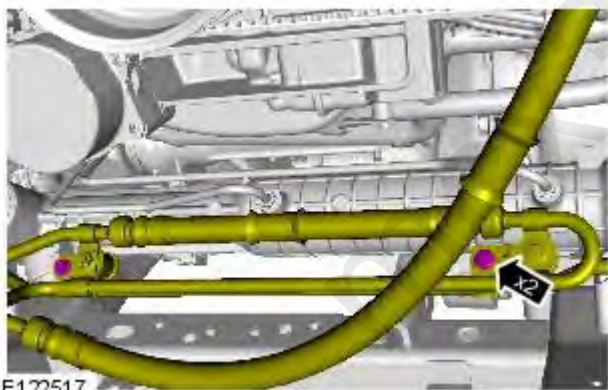
Disconnect the high pressure line from the power steering pump.

- Loosen and release the power steering pump line.
- Allow the fluid to drain into a container.
- Remove and discard the 2 sealing washers.

Vehicles with 5.0L engine

6. Release the power steering line support brackets.

- Remove the 2 nuts.
- Release the hose.

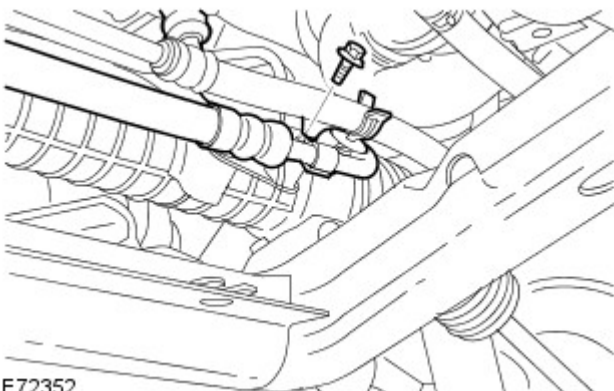


E122517

All other engine types

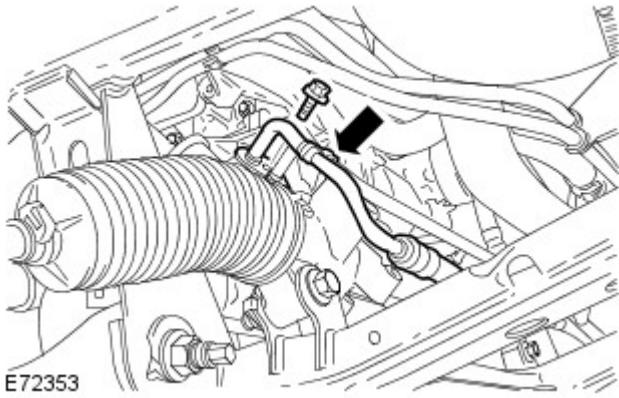
7. Release the power steering line support bracket.

- Remove the nut.
- Release the hose.



E72352

All vehicles



8.  **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.

Disconnect the high pressure line from the power steering gear.

- Remove the bolt.
- Release the power steering gear line.
- Remove and discard the O-ring seal.

9. Remove the steering gear high-pressure line.

Installation

All vehicles

1. Install the steering gear high-pressure line.
2. Connect the high-pressure line to the power steering gear.
 - Install the O-ring seal.
 - Attach the power steering gear high-pressure line.
 - Tighten the bolt to 25 Nm (18 lb.ft).

Vehicles with 5.0L engine

3. Install the power steering line support brackets.
 - Tighten the nuts to 10 Nm (7 lb.ft).
 - Secure the hose with the clip.

All other engine types

4. Install the power steering line support bracket.
 - Tighten the nut to 10 Nm (7 lb.ft).
 - Secure the hose with the clip.

All vehicles

5. Connect the high-pressure line to the power steering pump.
 - Install new sealing washers.
 - Connect the power steering pump high-pressure line.
6. Install the radiator access panel.
 - Tighten the bolts to 10 Nm (7 lb.ft).
7. Install the front LH fender splash shield.

For additional information, refer to: [Fender Splash Shield](#) (501-02 Front End Body Panels, Removal and Installation).
8. Install the front RH splash shield.
 - Secure with the clips.
9. Fill and bleed the power steering system.

For additional information, refer to: [Power Steering System Filling and Bleeding](#) (211-00 Steering System - General Information, General Procedures).