

4. ELECTRICAL

412 : Climate Control System

412-00 : Climate Control System – General Information

Specifications

Specifications

General Specification

Item	Description
Automatic temperature control, heating, ventilation and air conditioning unit	Dual zone with side to side temperature control
Compressor	Clutchless, belt driven from engine with electronically controlled outputs

Air Conditioning (A/C) System Flushing

1.



WARNING: Use extreme care and observe all safety precautions related to the use of refrigerants. Due to refrigerant hazards, always wear safety goggles and non-penetrable gloves when working on or flushing air conditioning (A/C) systems. Failure to follow this instruction may result in personal injury.



WARNING: When flushing the A/C system, refer to the manufacturers equipment instructions for additional information. Failure to do so may result in system damage or personal injury.



WARNING: The A/C refrigerant analyzer must be used before the recovery of any vehicle's A/C refrigerant. Failure to do so puts shop bulk refrigerant at risk of contamination. If the vehicle A/C refrigerant is contaminated, refer the customer to return to the repair facility that performed the last A/C repair. If the customer wishes to pay the additional cost, use the A/C recovery equipment that is designated for recovering contaminated A/C refrigerant. All contaminated A/C refrigerant must be disposed of as hazardous waste. For additional information, refer to the manufacturers equipment instructions. Failure to follow this instruction may result in personal injury.



WARNING: Prior to using the A/C flushing equipment for the first time, follow the operating instructions. Failure to follow this instruction may result in personal injury.



CAUTION: Prior to flushing, remove and discard the desiccant sack. Depending on the equipment used, other A/C components may have to be removed prior to flushing. For additional information, refer to the manufacturers equipment instructions before flushing the A/C system.

Recover the refrigerant.

2. Remove the desiccant sack. <<412-03>>

3. Flush the system. For additional information, refer to the manufacturers equipment

instructions.

4. Install new refrigerant lines if blocked with debris.
5. Install a new desiccant sack. <<412-03>>
6. Add the required amount of oil to the A/C system depending on the repair procedure.
7. Evacuate and charge the A/C system.
8. Carry out fluorescent dye leak detection test.
[Fluorescent Dye Leak Detection](#)
9. Check the A/C system for correct operation.

Air Conditioning (A/C) System Recovery, Evacuation and Charging (82.30.30)

1.



WARNING: Servicing must be carried out by personnel familiar with both vehicle system and the charging and testing equipment. All operations must be carried out in a well ventilated area away from open flame and heat sources.

NOTE:

The receiver drier need only be changed under the following circumstances: There is dirt in the refrigerant circuit (eg. compressor seizure), the system is leaking and refrigerant has been lost to atmosphere, or the refrigerant circuit has been open more than 24 hours, due to repair.

Refrigerant recovery.

2. Remove the dust covers from the high and low pressure connections.
3. Connect the high and low pressure lines to the appropriate connections.
4. Open the valves on the connections.
5. Turn the valves on the station to the correct positions.
6. Turn the process switch to the correct position.
7. Turn the main switch to 'ON'.

8.



WARNING: Refrigerant must always be recycled before re-use to ensure that the purity of the refrigerant is high enough for safe use in the air conditioning system. Recycling should always be carried out with equipment which is design certified by Underwriter Laboratory Inc. for compliance with SEA J1991. Other equipment may not recycle refrigerant to the required level of purity. R143a Refrigerant Recover Recycling Recharging station must not be used with any other type of refrigerant. Refrigerant R143a from domestic and commercial sources must not be used in motor vehicles air

conditioning systems.

Allow the system to recover the refrigerant from the system.

9. Close the valves on the refrigerant station.
10. Turn the main switch 'OFF'.
11. Close the valves on the connections.
12. Disconnect the high and low pressure connections.
13. Install the dust covers to the connectors.
14. Open the tap at the rear of the station to drain the refrigerant oil.
15. Measure and record the quantity of refrigerant oil recovered from the system.
16. Close the tap at the rear of the station.
17. Evacuation.
18. Remove the dust covers from the high and low pressure connections.
19. Connect the high and low pressure lines to the appropriate connections.
20. Open the valves on the connections.
21. Turn the valves on the station to the correct positions.
22. Turn the process switch to the correct position.
23. Turn the main switch to 'ON'.

24. Allow the station to evacuate the A/C system.

25.



CAUTION: The system must be evacuated immediately before recharging commences. Delay between evacuation and recharging is not permitted

Recharging

26. Close the valves on the refrigerant station.

27. Close the valve on the oil charger.

28. Disconnect the yellow line from the refrigerant station.

29. Remove the cover from the oil charger.

30. Pour the correct quantity of refrigerant oil into the oil charger.

31. Install the cover to the oil charger.

32. Connect the yellow line to the refrigerant station.

33. Open the valve on the oil charger.

34. Move the pointer on the refrigerant gauge to mark the position of the refrigerant drop.

35. Slowly open the correct valve on the refrigerant to allow the vacuum to pull the refrigerant into the system.

36. Close the valve on the refrigerant station when the correct amount of refrigerant has been drawn into the air conditioning system.

37. Turn the main switch 'OFF'.
38. Close the valves on the connections.
39. Disconnect the high and low pressure connections.

Contaminated Refrigerant Handling

1. If contaminated refrigerant is detected DO NOT recover the refrigerant into your R-134a OR R-12 recovery/recycling equipment. Take the follow actions:

1. Repeat the test to verify contaminated refrigerant is present.
 2. Advise the customer of the contaminated A/C system and any additional cost to repair the system. The customer may wish to return to the repair facility performing the last A/C repair.
 3. Recover the contaminated refrigerant using suitable recovery only equipment designed for capturing and storing contaminated refrigerant. This equipment must only be used to recover contaminated refrigerant to prevent the spread to other vehicles. As an alternative, contact an A/C repair facility in your area with the proper equipment to perform the repair.
- On completion of the recovery of the contaminated refrigerant, it will be necessary to carry out the A/C system flushing procedure.

[Air Conditioning \(A/C\) System Flushing](#)

Electronic Leak Detection

1.



WARNING: Good ventilation is necessary in the area where A/C leak testing is to be carried out. If the surrounding air is contaminated with refrigerant gas, the leak detector will indicate this gas all the time. Odors from other chemicals such as antifreeze, diesel fuel, disc brake cleaner, or other cleaning solvents can cause the same problem. A fan, even in a well ventilated area, is very helpful in removing small traces of contamination from the air that might affect the leak detector. Failure to follow this instruction may result in personal injury.

Attach an R-134a manifold gauge set or use a UL-approved recovery/recycling device such as an R-134a A/C refrigerant center (which meets SAE Standard J 1991). For additional information, refer to the manufacturers equipment instructions.

- Both gauges should indicate 413-551 kPa (60-80 psi) at 24°C (75°F) with the engine off.
- If little or no pressure is indicated, carry out the air conditioning (A/C) system recovery, evacuation and charging procedure.

2. Use an R134-a Automatic calibration halogen leak detector to leak test the refrigerant system. For additional information, refer to the manufacturers equipment instructions.

3. If a leak is found, carry out the air conditioning (A/C) system recovery procedure.

Refrigerant Oil Adding



CAUTION: Make sure when disconnecting air conditioning (A/C) connections, that the exposed ports are capped immediately. Make sure you do not leave the A/C system open to the atmosphere. Failure to follow this instruction may result damage to the vehicle.

NOTE:

A new replacement A/C compressor is pre-filled with ND8 oil.

1. Drain the oil from the old compressor and measure the quantity of oil drained.

2. Drain the oil from the new compressor into a clean container.

3.



CAUTION: If less than 30 cc of oil was drained from the old compressor, then 30 cc of oil must be refilled into the new compressor. Failure to follow this instruction may result in damage to the vehicle.

NOTE:

Use the new compressor oil to refill to the required quantity.

Refill the new compressor with the same amount of oil which was measured from the old compressor.

Refrigerant System Tests

1.



WARNING: Use extreme care and observe all safety precautions related to the use of refrigerants. Failure to follow this instruction may result in personal injury.



WARNING: The A/C refrigerant analyzer must be used before the recovery of any vehicle's A/C refrigerant. Failure to do so puts shop bulk refrigerant at risk of contamination. If the vehicle A/C refrigerant is contaminated, refer the customer to return to the repair facility that carried out the last A/C repair. If the customer wishes to pay the additional cost, use the A/C recovery equipment that is designated for recovering contaminated A/C refrigerant. All contaminated A/C refrigerant must be disposed of as hazardous waste. For all equipment, follow the equipment manufacturers procedures and instructions. Failure to follow this instruction may result in personal injury.

NOTE:

Jaguar Cars Ltd. supports the efficient usage, recovery and recycling of the refrigerant used in passenger car air conditioners. Jaguar Cars Ltd. recommends the use of UL-approved recovery/recycling device such as R-134a A/C refrigerant center (which meets SAE Standard J 1991) during any A/C system repair and recharge procedure which requires that the system be evacuated.

Use R-134a A/C Refrigerant Centre to evacuate and recover the A/C system.

- Follow the equipment manufactures procedures and instructions for use of equipment.

Climate Control System

Inspection and Verification

NOTE:

All Air Conditioning (A/C) related tests should be run in an ambient temperature of at least 10°C (50°F).

- 1 . Verify the customer concern by operating the system.
- 2 . Visually inspect for obvious signs of damage and system integrity.

Mechanical	Electrical
• Coolant level • Refrigerant leaks (UV lamp) • Drive belt • Compressor • Cooling fan • Control flap(s) • Duct(s) • Register(s) • Cabin air filter • Hose(s) • Coolant pump	• Fuse(s) • Circuit • Blower motor • Electrical connector(s) • Compressor • Cooling fan • Actuators • Climate control assembly

- 3 . Listen for any unusual noises during climate control system operation.
- 4 . Inspect the refrigerant system with an ultraviolet (UV) lamp for traces of UV sensitive leak trace dye.
- 5 . If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
- 6 . If the cause is not visually evident, verify the symptom and refer to the manufacturer approved diagnostic system.

412-01 : Air Distribution and Filtering

Specifications

Specifications

Torque Specifications

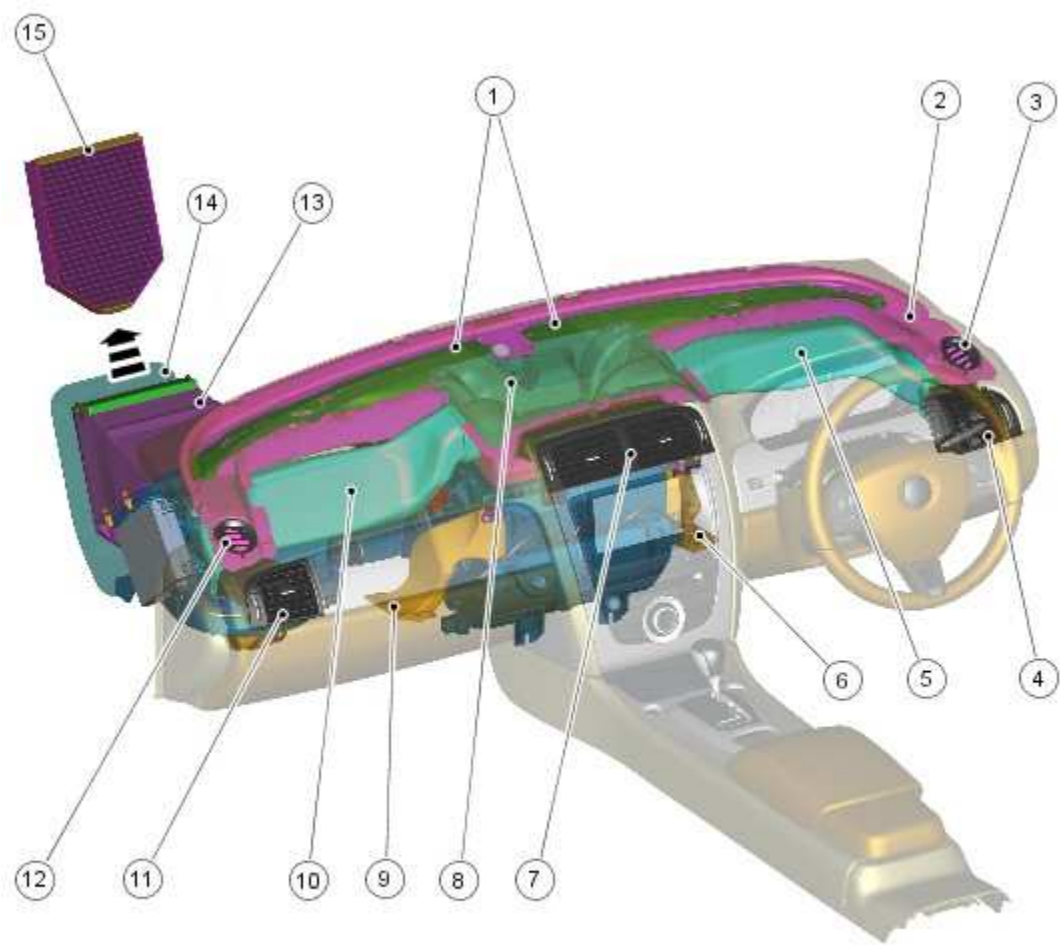
Item	Nm	lb-ft	lb-in

Air Distribution and Filtering

COMPONENT LOCATION

NOTE:

Right-Hand Drive (RHD) shown, Left-Hand Drive (LHD) similar



E62523

Item	Part Number	Description
1		Windshield vents
2		Windshield and side window air duct

3		Driver side window vent
4		Driver instrument panel register
5		Driver instrument panel air duct
6		Driver footwell air duct
7		Center instrument panel register
8		Air deflector nozzle
9		Passenger footwell air duct
10		Passenger instrument panel air duct
11		Passenger instrument panel register
12		Passenger side window vent
13		Air intake
14		Water shield
15		Cabin air filter

INTRODUCTION

The air distribution and filtering system controls the distribution and quality of air supplied to the vehicle interior. The system consists of:

- Air ducts
- Air registers and vents
- A cabin air filter

AIR DUCTS

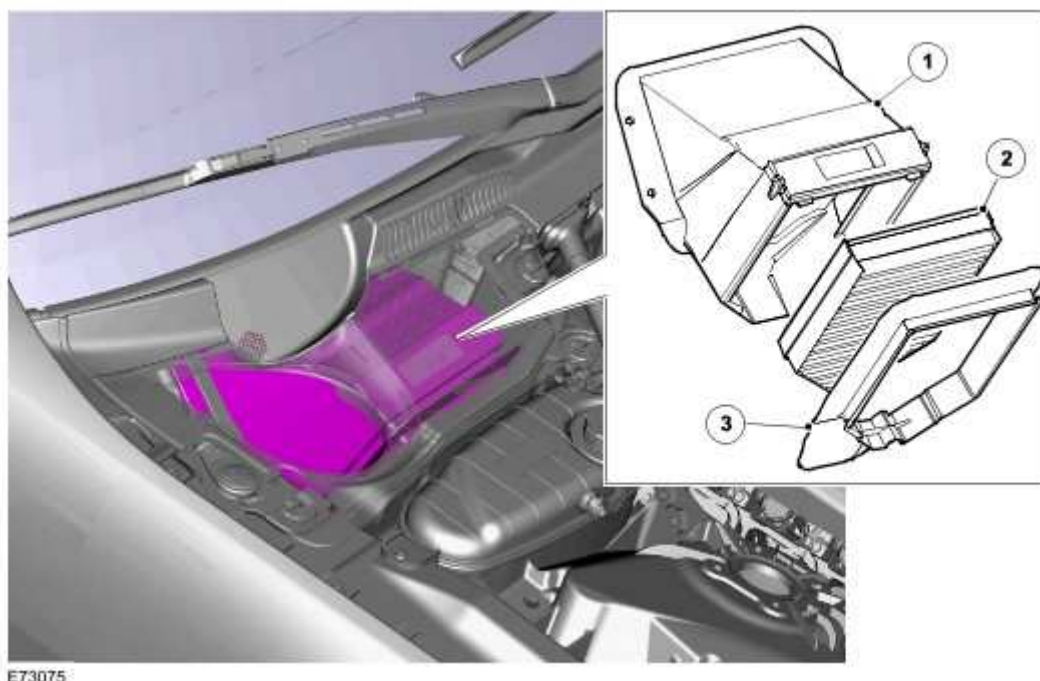
The air ducts distribute air from the heater assembly to the various registers and vents in the instrument panel. The windshield and side window air duct, the driver instrument panel air duct, and the passenger instrument panel air duct all form part of the structure of the instrument panel.

AIR REGISTERS AND VENTS

The air registers allow occupants to control the flow and direction of air from the air ducts. The instrument panel contains 4 air registers; 1 mounted at each end of the panel, and 2 mounted centrally above the Touch Screen Display (TSD).

The air vents are fixed outlets. The instrument panel contains 4 air vents; 1 mounted at each end of the panel, and 2 mounted along the top edge of the panel, below the windshield.

CABIN AIR FILTER



Item	Part Number	Description
1		Filter housing
2		Cabin air filter
3		Water shield

The cabin air filter is located in a plastic housing on the passenger side of the engine compartment. The filter removes odours and fine particles, including pollen, from air entering the blower assembly.

The filter housing also contains a shield to prevent water from contaminating the filter element and entering the heating and ventilation system.

Air Distribution and Filtering

For additional information, refer to [412-00.>](#)

Center Registers (82.20.38)

Removal

- 1 . Remove the information and entertainment module.

For additional information, refer to Information and Entertainment Module (86.53.48)

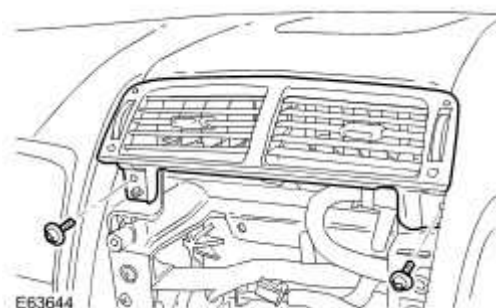
- 2 . **NOTE:**

The Torx screws may not be fitted.

Remove the center register.

➤ Remove the 2 Torx screws.

➤ Carefully release the component.



Installation

- 1 . **NOTE:**

The Torx screws may not be fitted.

Carefully install the center register.

➤ Install the Torx screws.

2 . Install the information and entertainment module.

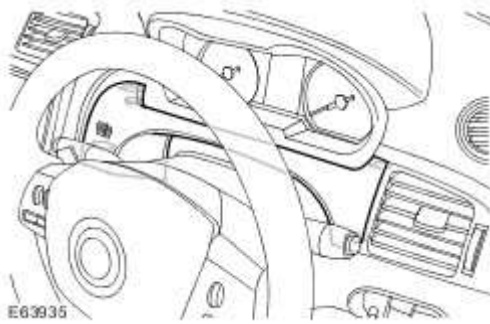
For additional information, refer to Information and Entertainment Module (86.53.48)

Driver Side Register (82.20.39)

Removal

- 1 . Remove the instrument panel driver's side reinforcement trim panel.

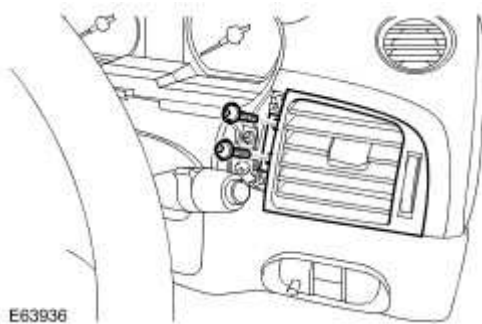
▶ Carefully release the 4 clips.



- 2 .  **CAUTION:** Care must be taken to avoid damage to the mating surfaces.

Remove the driver side register trim panel.

▶ Remove the 2 Torx screws.



Installation

- 1 . Install the driver side register trim panel.

▶ Install the Torx screws.

2 . Install the instrument panel driver's side reinforcement trim panel.

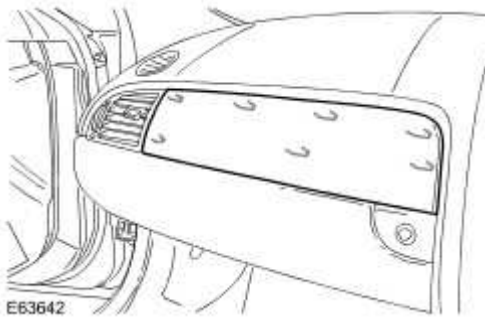
 Align the pegs and secure with the clips.

Passenger Side Register (82.20.40)

Removal

- 1 . Remove the instrument panel passenger side reinforcement trim panel.

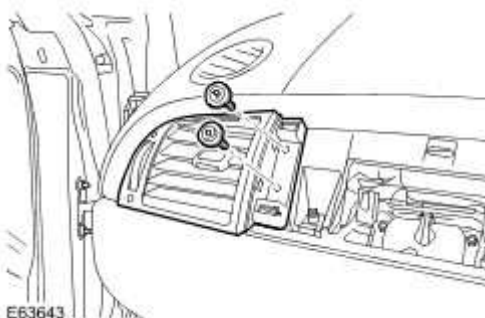
▶ Carefully release the 7 clips.



- 2 . Remove the passenger side register.

▶ Remove the 2 Torx screws.

▶ Carefully release the component.



Installation

- 1 . Install the passenger side register.

▶ Install the Torx screws.

2 . Install the instrument panel passenger side reinforcement trim panel.

 Align the pegs and secure with the clips.

Pollen Filter (76.10.09)

Removal

1 . Open the hood.

2 . Remove the air intake cover.

▶ Remove the 3 clips.



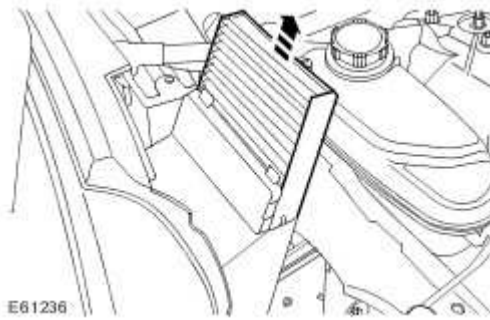
3 . Release the pollen filter housing cover.

▶ Release from the 2 clips.



4 .  **CAUTION: Remove any debris from the filter aperture.**

Remove the pollen filter.



Installation

- 1 . Install the pollen filter.
- 2 . Secure the pollen filter housing cover.
- 3 . Install the air intake cover.
 Carefully secure the clips.
- 4 . Close the hood.

412-02 : Heating and Ventilation

Specifications

Specifications

Torque Specifications

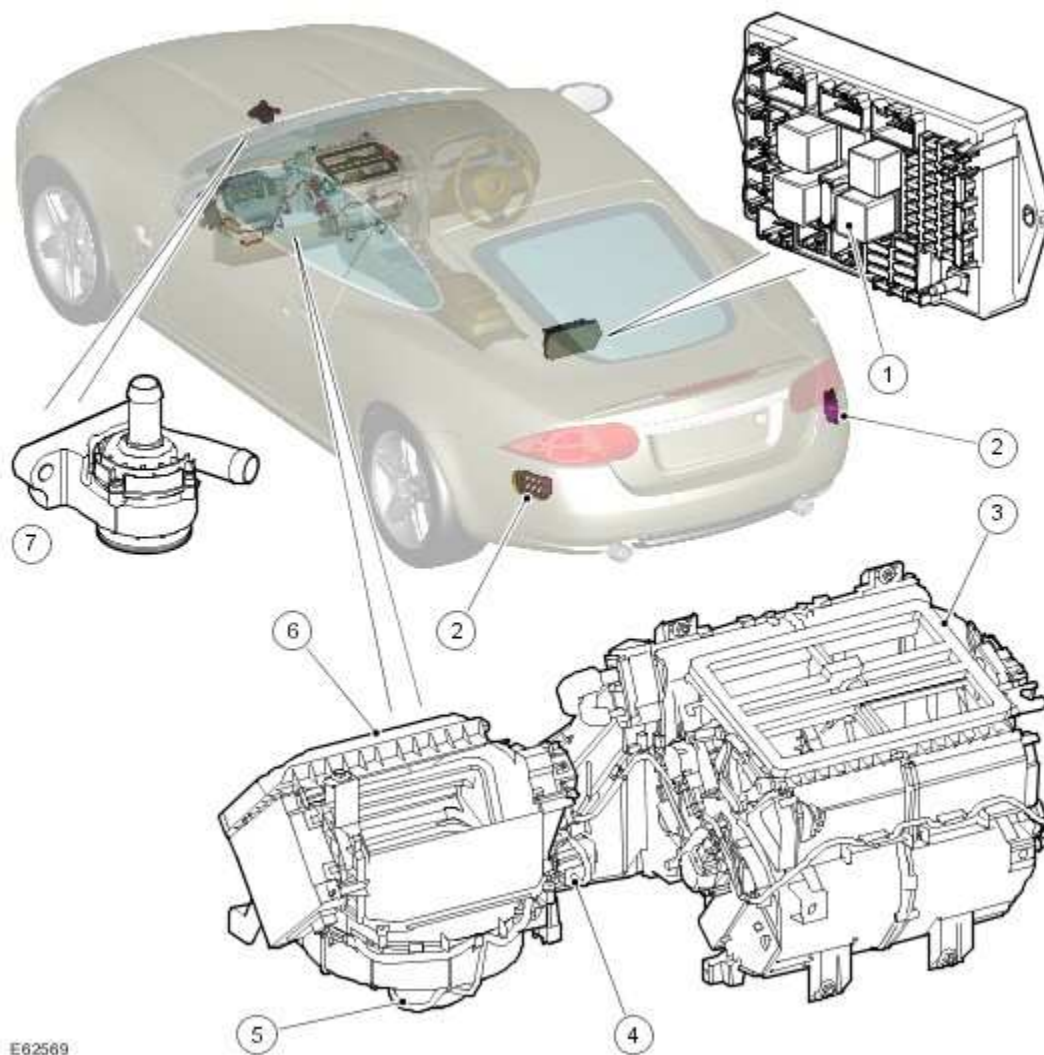
Item	Nm	lb-ft	lb-in

Heating and Ventilation

COMPONENT LOCATION

NOTE:

RHD (right-hand drive) shown, LHD (left-hand drive) similar



E62569

Item	Part Number	Description
1		Blower relay
2		Ventilation outlets (2 off)

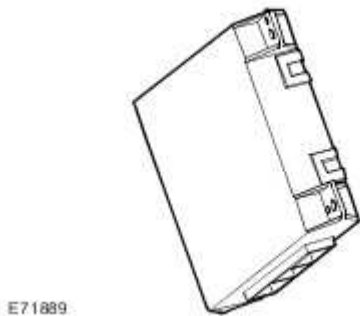
3		Heater assembly
4		Blower motor control module
5		Blower
6		Air inlet
7		Heater coolant pump

INTRODUCTION

The heating and ventilation system controls the temperature and flow of air supplied to the vehicle interior. The system is dual zone, and can provide different temperature settings for the Left Hand (LH) and Right Hand (RH) side of the cabin. The system can be operated in 'Automatic' or 'Manual' mode, with temperature settings being selected using the control switches located below the TSD.

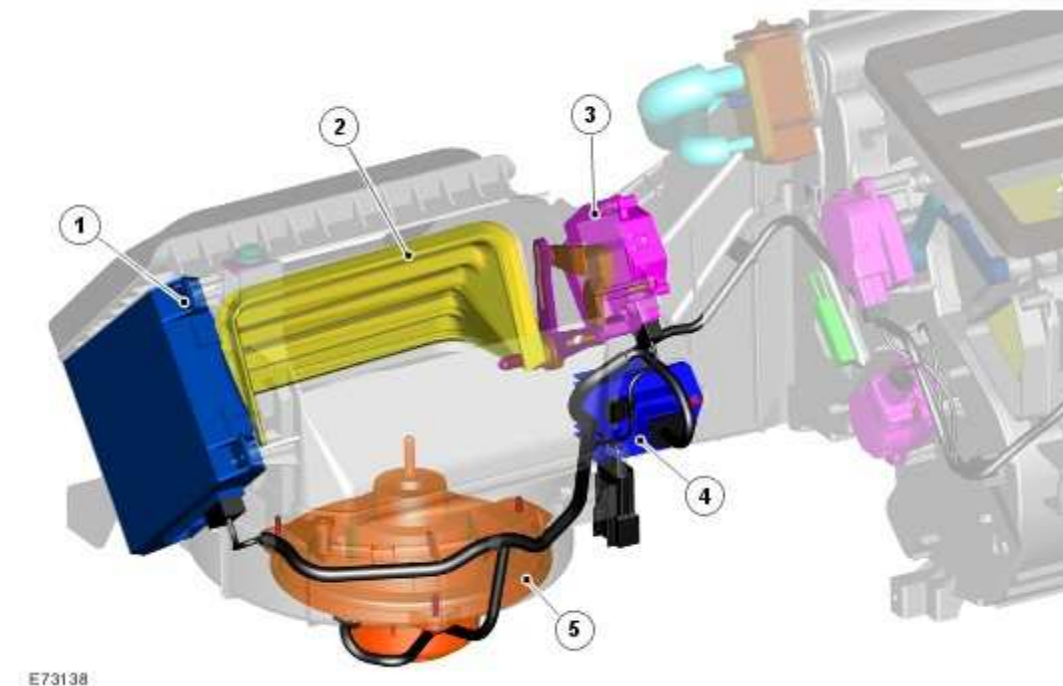
For information on how to operate the heating and ventilation system, refer to the Owner's Handbook.

AUTOMATIC TEMPERATURE CONTROL MODULE



Many of the features and operations of the heating and ventilation system are controlled by the Automatic Temperature Control (ATC) module, which is located on the end of the air inlet duct casing. For additional information, refer to Control Components (412-04)

AIR INLET DUCT



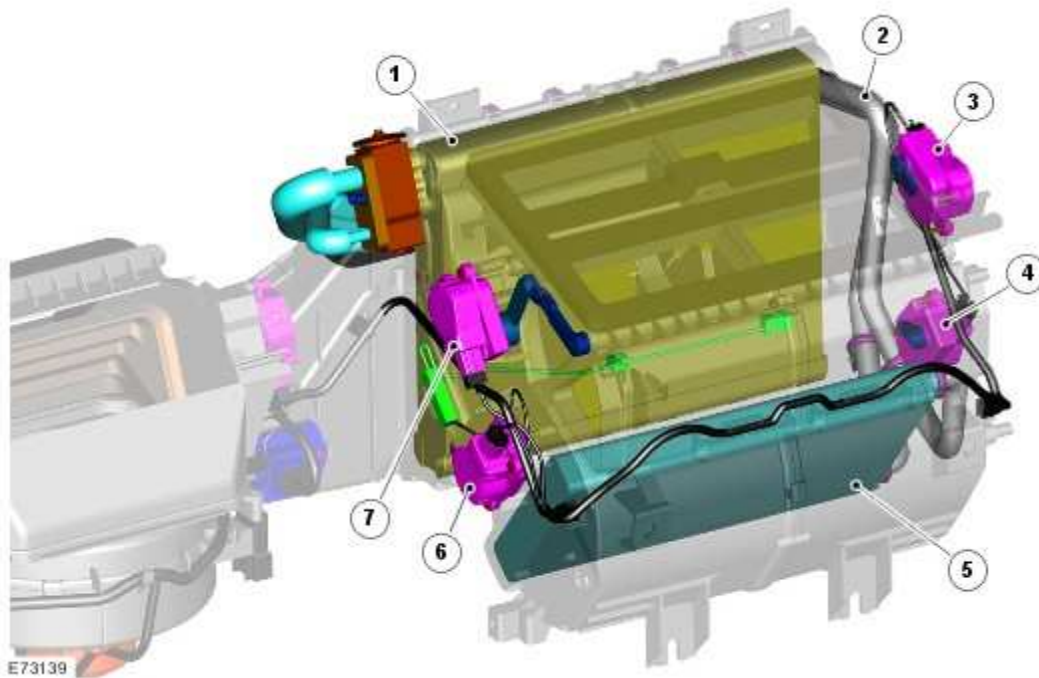
Item	Part Number	Description
1		ATC module
2		Fresh/recirculated air door
3		Fresh/recirculated air door motor
4		Blower motor control module
5		Blower motor and fan assembly

The air inlet duct is installed behind the instrument panel on the passenger side. Inlet air passes through the cabin filter and into the air inlet duct where it enters the blower. A servo motor mounted on the air inlet duct allows fresh or recirculated air to be selected. Operation of the fresh/recirculated door is controlled by the ATC module.

BLOWER

The blower is contained within the air inlet duct assembly and consists of an open hub, centrifugal fan powered by an electric motor. Operation of the blower is controlled by the ATC module using a relay located in the auxiliary junction box and the blower motor control module. The blower motor control module is installed in the air inlet duct downstream of the blower, where any heat generated during operation is dissipated by the air flow.

HEATER ASSEMBLY



Item	Part Number	Description
1		A/C evaporator
2		Heater coolant pipes
3		Windshield distribution door motor
4		RH temperature blend motor
5		Heater core
6		LH temperature blend motor
7		Face and feet distribution door motor

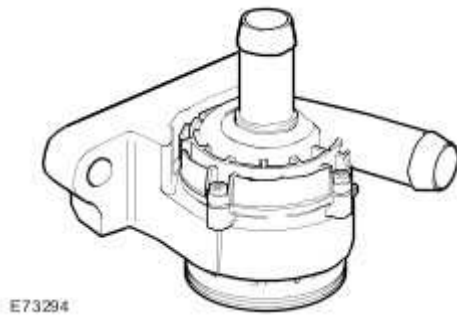
The heater assembly controls the temperature of the air supplied to the air distribution ducts, as directed by the ATC module. The heater assembly is installed on the vehicle center line, between the instrument panel and the engine bulkhead.

The heater assembly consists of a casing which contains the Air Conditioning (A/C) evaporator, the heater core, 2 air distribution control doors, and 2 temperature blend control doors.

The A/C evaporator is controlled as part of the A/C system. For additional information, refer to Air Conditioning (412-03)

The heater core provides the heat source to warm the air being supplied to the cabin. The heater core is an aluminium 2 pass, fin and tube heat exchanger, and is installed across the width of the heater housing. Two aluminium tubes attached to the heater core extend through the engine bulkhead and connect to the engine cooling system. When the engine is running, coolant is constantly circulated through the heater core by the coolant pump. For additional information, refer to Engine Cooling (303-03)

HEATER COOLANT PUMP



A heater coolant pump is mounted on the RH rear face of the radiator housing. The pump is electrically driven and provides the necessary flow rate of engine coolant to the heater core. Operation of the pump is controlled by the Central Junction Box (CJB) on receipt of medium speed Controller Area Network (CAN) bus signals from the ATC module.

The pump will run when the engine is running and operates at a single speed. The CJB broadcasts pump status over the medium speed CAN bus for use by other vehicle systems.

NOTE:

The pump can be forced to run when the engine is not running if required. For additional information, refer to Engine Cooling (303-03)

VENTILATION OUTLETS

The ventilation outlets allow the free flow of air through the passenger compartment. The outlets are installed in the LH and RH rear quarter panels, below the tail lamps.

Each ventilation outlet consists of a grille covered by a soft rubber flap, and is effectively a non-return valve. The flaps open and close automatically depending on the differential between cabin and outside air pressures.

PRINCIPLES OF OPERATION

Operation of the heating and ventilation system is controlled by the ATC module. For additional information, refer to Control Components (412-04)

Heating and Ventilation

<<412-00>>

Auxiliary Coolant Flow Pump - 4.2L NA V8 - AJV8 (82.25.59)

Removal

- 1 . Remove the cover and disconnect the battery ground cable.

For additional information, refer to

2



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

Raise and support the vehicle.

- 3 Drain the cooling system.
 - For additional information, refer to Cooling System Draining, Filling and Bleeding - 4.2L NA V8 - AJV8

- 4 . Remove the engine cover.

For additional information, refer to Engine Cover (76.11.35)

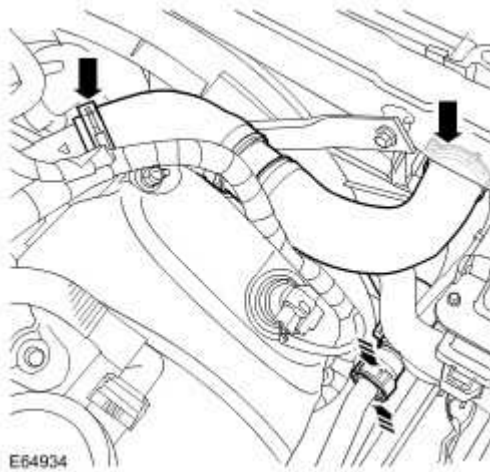
- 5 . Remove the radiator top hose.



Release the 2 clips.



Disconnect the quick release connector.



6 . Remove the auxiliary coolant flow pump.

- ▶ Release the clips and disconnect the 2 coolant hoses.
- ▶ Disconnect the electrical connector.



Installation

1 . Install the auxiliary coolant flow pump.

- ▶ Connect the electrical connector.
- ▶ Connect the coolant hoses and secure with the clips.

2 . Install the radiator top hose.

 Secure with the clips.

 Connect the quick release connector.

3 . Install the engine cover.

For additional information, refer to Engine Cover (76.11.35)

4 . Connect the battery ground cable and install the cover.

For additional information, refer to

5 Refill the cooling system.

. For additional information, refer to Cooling System Draining, Filling and Bleeding - 4.2L NA V8
- AJV8

Auxiliary Coolant Flow Pump - 4.2L SC V8 - AJV8 (82.25.59)

Removal

- 1 . Remove the cover and disconnect the battery ground cable.

For additional information, refer to Specifications

2



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

Raise and support the vehicle.

- 3 Drain the cooling system.

- For additional information, refer to Cooling System Draining, Filling and Bleeding - 4.2L SC V8 - AJV8

- 4 . Remove the intake air resonator.

For additional information, refer to Intake Air Resonator

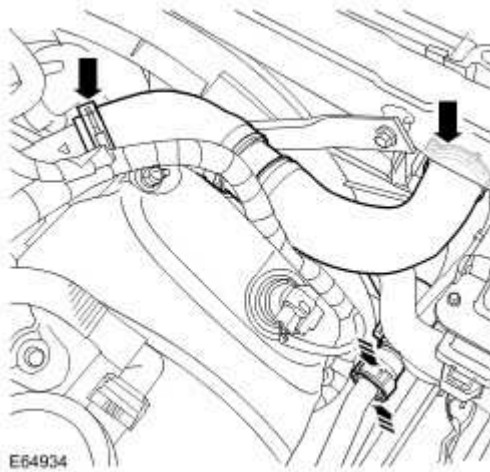
- 5 . Remove the radiator top hose.



Release the 2 clips.



Disconnect the quick release connector.



6 . Remove the auxiliary coolant flow pump.

- ▶ Release the clips and disconnect the 2 coolant hoses.
- ▶ Disconnect the electrical connector.



Installation

1 . Install the auxiliary coolant flow pump.

- ▶ Connect the electrical connector.
- ▶ Connect the coolant hoses and secure with the clips.

2 . Install the radiator top hose.

 Secure with the clips.

 Connect the quick release connector.

3 . Install the intake air resonator.

For additional information, refer to Intake Air Resonator

4 . Connect the battery ground cable and install the cover.

For additional information, refer to Specifications

5 Refill the cooling system.

. For additional information, refer to Cooling System Draining, Filling and Bleeding - 4.2L SC V8
- AJV8

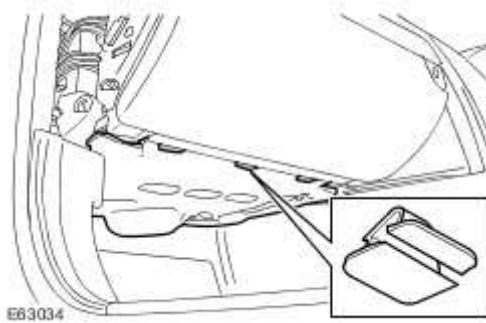
Blower Motor (82.25.66)

Removal

- 1  **CAUTION:** Removal of the clips is a delicate procedure, damage will occur if any force is used.

Remove the passenger side footwell trim panel.

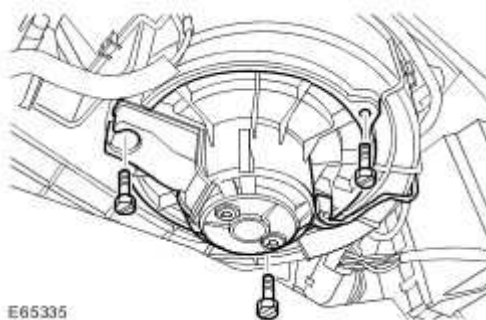
- ▶ Remove the 3 clips.



- 2 . Remove the blower motor.

- ▶ Disconnect the electrical connector.

- ▶ Remove the 3 screws.



Installation

- 1 . Install the blower motor.
- 2 . Install the passenger side footwell trim panel.

 Carefully secure the clips.

Heater Core (80.20.29)

Removal

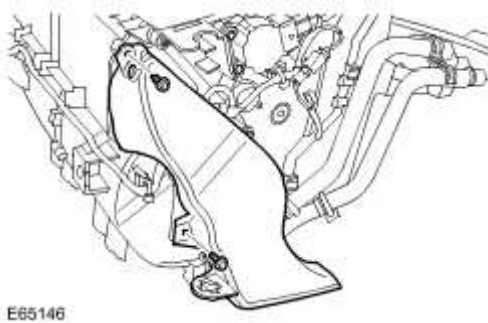
- 1  **WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.**

Raise and support the vehicle.

- 2 . Remove the cover and disconnect the battery ground cable.
For additional information, refer to
- 3 . Remove the heater and evaporator core housing.
For additional information, refer to Heater Core and Evaporator Core Housing (82.25.21)

- 4 . Remove the RH side footwell heater duct.

 Remove the 2 screws.



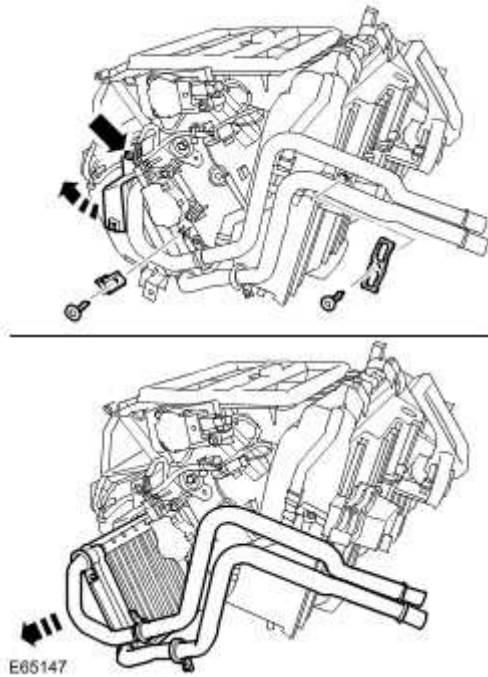
- 5 . Remove the heater core.

 Remove the coolant pipe clamp.

 Remove the screw.

 Remove the heater core retaining bracket.

- Remove the screw.
- Position the RH footwell duct mounting bracket aside for access.
- Loosen the screw.



6 . NOTE:

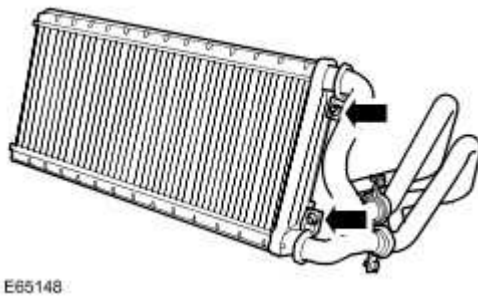
Do not disassemble further if the component is removed for access only.

NOTE:

Note the fitted position.

Remove the heater core, inlet and outlet pipes.

- Release the 2 clamps.
- Remove and discard both O-ring seals.



Installation

1 . NOTE:

Lubricate the seals with coolant.

Install the heater core, inlet and outlet pipes.

- Install new O-ring seals.
- Install the clamps and tighten the screws.

2 . Install the heater core.

- Secure the heater core retaining bracket.
- Install the screw.
- Install the coolant pipe clamp.
- Install the screw.
- Align the footwell duct mounting bracket and tighten the screw.

3 . Install the RH side footwell heater duct.

- Install the screws.

- 4 . Install the heater and evaporator core housing.

For additional information, refer to Heater Core and Evaporator Core Housing (82.25.21)

- 5 . Connect the battery ground cable and install the cover.

For additional information, refer to

Heater Core and Evaporator Core Housing (82.25.21)

Removal

All vehicles

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 cover and disconnect the battery ground cable.

For additional information, refer to Specifications

- 3 . Remove the instrument panel.

For additional information, refer to Instrument Panel (76.46.01)

- 4 . Recover the A/C refrigerant.

Vehicles without supercharger

- 5 Drain the coolant.

- For additional information, refer to Cooling System Draining, Filling and Bleeding - 4.2L NA V8 - AJV8

Vehicles with supercharger

- 6 Drain the coolant.

- For additional information, refer to Cooling System Draining, Filling and Bleeding - 4.2L SC V8 - AJV8

All vehicles

7.

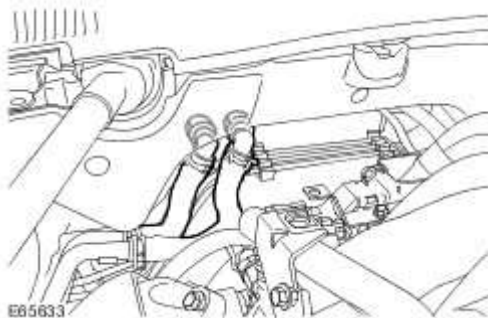


CAUTION: Always plug any open connections to prevent contamination.

Disconnect the heater supply and return hoses.

▶ Position a container to collect the fluid.

▶ Carefully release the clips.



8

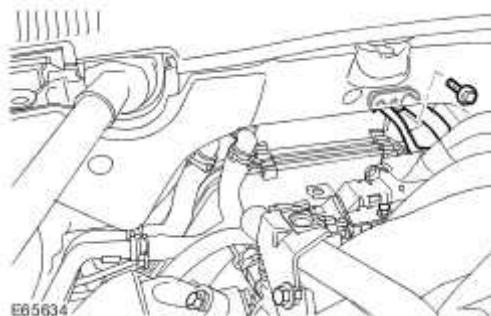


CAUTION: Before disconnecting or removing the components, ensure the area around the joint faces and connections are clean and dry. Plug open connections to prevent contamination.

Disconnect the A/C lines.

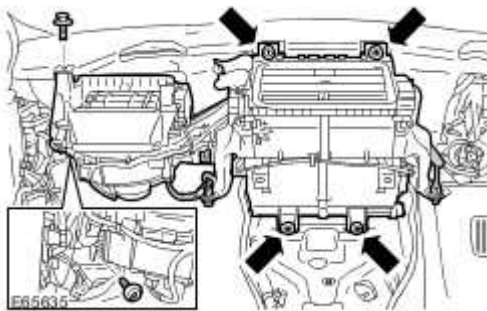
▶ Remove the bolt.

▶ Remove and discard both O-ring seals.



9 . Remove the heater and evaporator core housing.

- Position the carpet aside for access.
- Release both footwell lamp holders.
- Disconnect the 2 electrical connectors.
- Remove the 5 nuts.
- Remove the bolt.



Installation

All vehicles

1 . Install the heater and evaporator core housing.

2 . **NOTE:**

Lubricate the O-ring seals with clean refrigerant oil.

Connect the A/C lines.

- Install new O-ring seals.
- Tighten the bolt to 6 Nm (4 lb.ft).

3 . Connect the heater supply and return hoses.

 Secure the clips.

4 . Install the instrument panel.

For additional information, refer to Instrument Panel (76.46.01)

5 . Connect the battery ground cable and install the cover.

For additional information, refer to Specifications

Vehicles with supercharger

6 Refill and bleed the cooling system.

- . For additional information, refer to Cooling System Draining, Filling and Bleeding - 4.2L SC V8 - AJV8

Vehicles without supercharger

7 Refill and bleed the cooling system.

- . For additional information, refer to Cooling System Draining, Filling and Bleeding - 4.2L NA V8 - AJV8

All vehicles

8 . Fill the A/C system.

412-03 : Air conditionning

Specifications

Specifications

General Specification

Item	Specification
Compressor	Clutchless, belt driven from engine with electronically controlled outputs
make	Denso
type	7SEU17

Lubricants, Fluids, Sealers and Adhesives

	Specifications
Refrigerant	R134A
Compressor oil	JLM 12260

Capacities

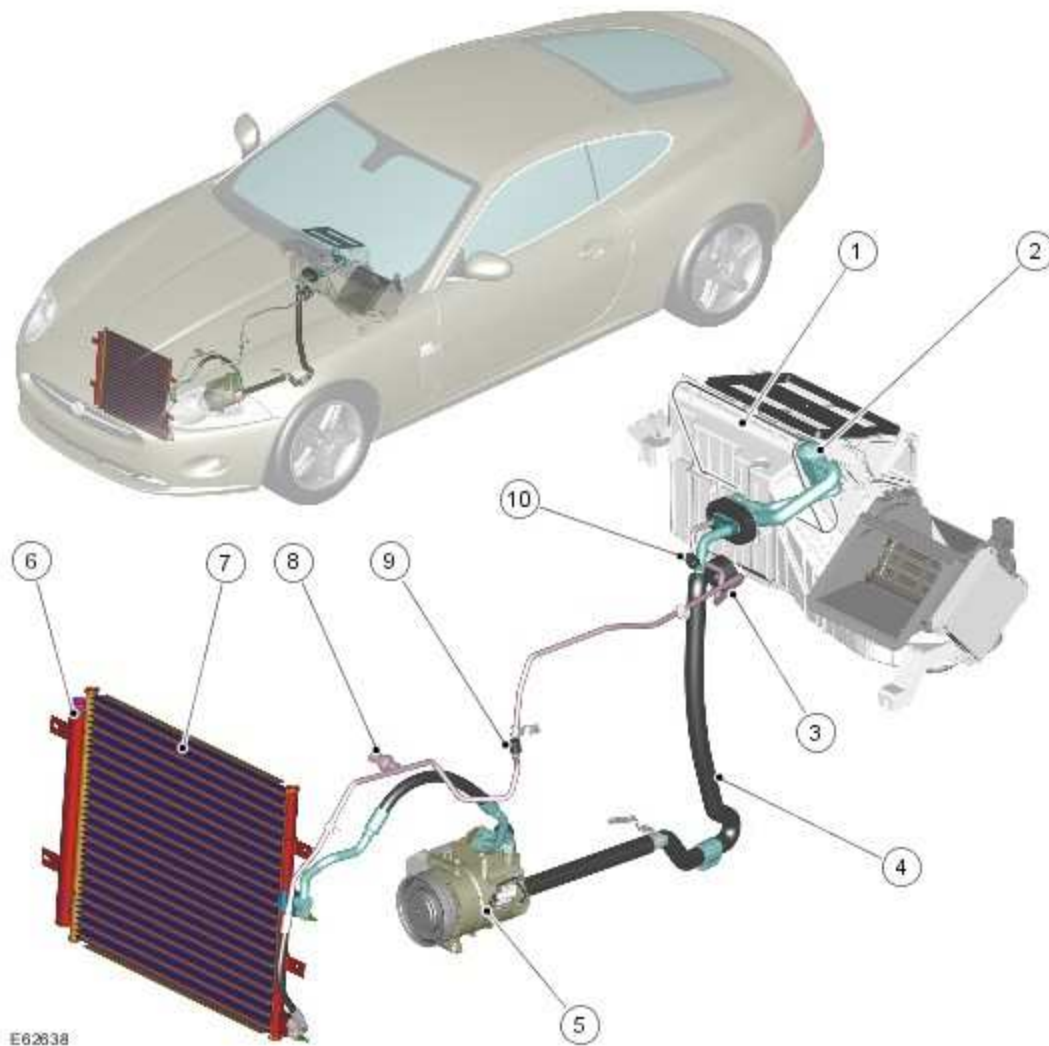
Item	Specification
Refrigerant charge weight	700g ± 25g
Compressor oil capacity	130 ml

Torque Specifications

Item	Nm	lb-ft	lb-in
Compressor to mounting bracket - bolt	25	18	-
Compressor mounting bracket to engine - bolt	25	18	-
Condenser core to bracket - bolt	10	7	88
Pressure cutoff switch to refrigerant pipe	10	7	88
Refrigerant pipes to compressor - bolt	9	7	80
Refrigerant pipes to condenser - nut	10	7	88
Thermostatic expansion valve to evaporator - bolt	6	4	53

Air Conditioning

COMPONENT LOCATION



Item	Part Number	Description
1		Evaporator
2		Thermostatic expansion valve
3		High pressure line
4		Low pressure line

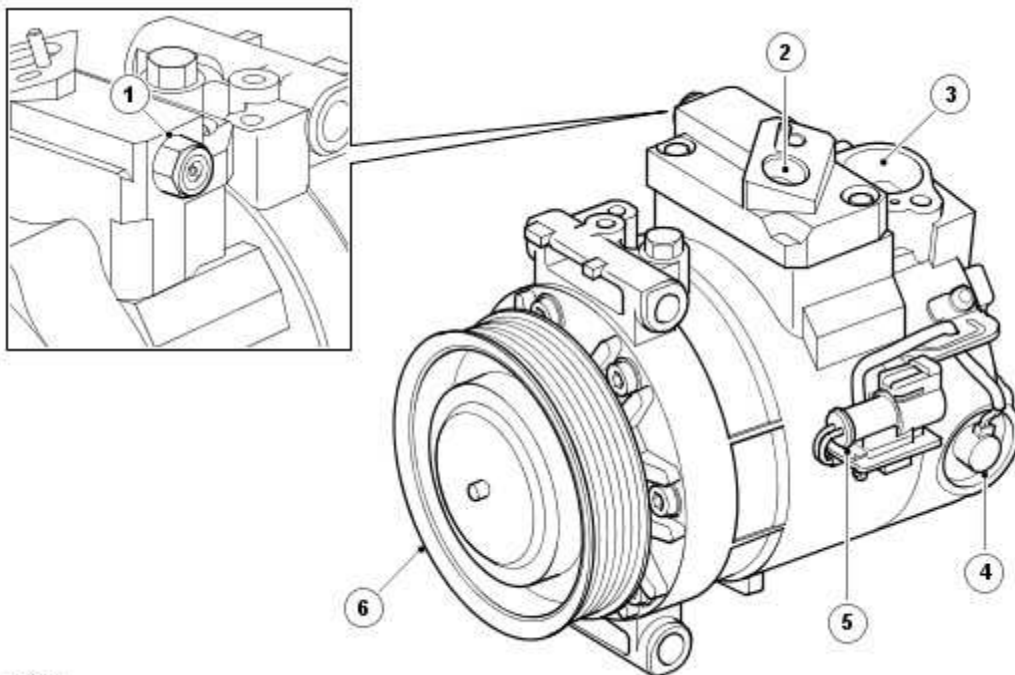
5		Air Conditioning (A/C) compressor
6		Receiver/Drier
7		Condenser
8		Refrigerant pressure sensor
9		High pressure servicing connection
10		Low pressure servicing connection

INTRODUCTION

The A/C system transfers heat from the vehicle interior to the outside atmosphere to provide the heater assembly with dehumidified cool air. The A/C system is a sealed, closed loop system, filled with a charge weight of R134a refrigerant as the heat transfer medium. Oil is added to the refrigerant to lubricate the internal components of the A/C compressor.

Operation of the A/C system is controlled by the Automatic Temperature Control (ATC) module. For additional information, refer to Control Components (412-04)

A/C COMPRESSOR



E46918

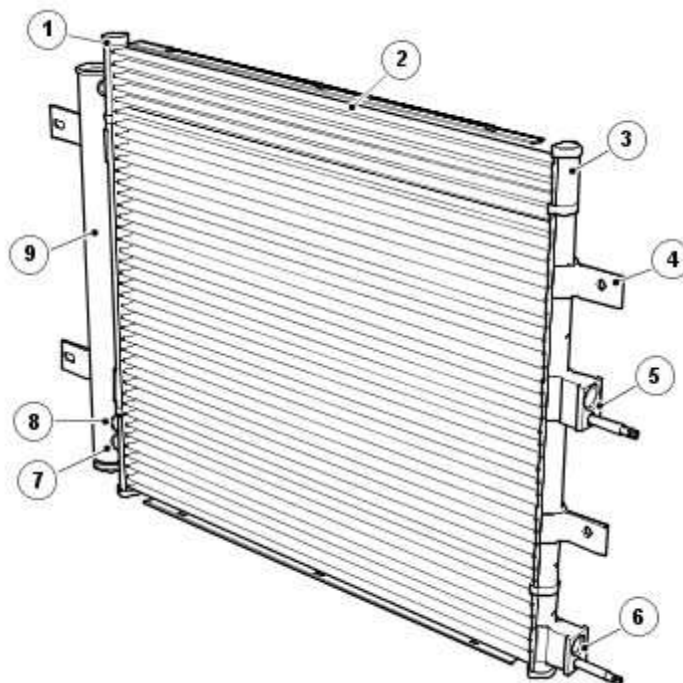
Item	Part Number	Description

1		Pressure relief valve
2		Outlet port
3		Inlet port
4		Solenoid valve
5		Electrical connector
6		Pulley

The A/C compressor circulates refrigerant around the system by compressing low pressure, low temperature vapour from the evaporator and discharging the resultant high pressure, high temperature vapour to the condenser.

The A/C compressor is a permanently engaged variable displacement unit which is driven by the engine accessory drive belt. To protect the system from excessive pressure, a pressure relief valve is installed in the outlet side of the A/C compressor. The pressure relief valve vents excess pressure into the engine compartment.

CONDENSER



E72963

Item	Part Number	Description
1		Right Hand (RH) end tank

2		Condenser core
3		Left Hand (LH) end tank
4		Mounting brackets (4 off)
5		Low pressure line connector block
6		High pressure line connector block
7		Receiver drier outlet pipe
8		Receiver drier inlet pipe
9		Receiver drier

The condenser transfers heat from the refrigerant to the surrounding air to convert the high pressure vapour from the compressor into a liquid. The condenser is installed immediately in front of the radiator. Two brackets on each end tank attach the condenser to the end tanks of the radiator.

The condenser is classified as a sub-cooling condenser and consists of a fin and tube heat exchanger core installed between 2 end tanks. Divisions in the end tanks separate the heat exchanger into a 4 pass upper (condenser) section and a 2 pass lower (sub-cooler) section.

The LH end tank provides the connections to the high pressure line from the A/C compressor and the low pressure line to the evaporator.

The RH end tank provides the connections to the receiver drier.

RECEIVER DRIER

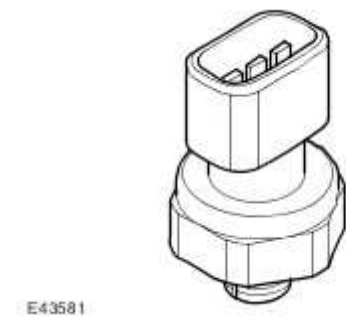
The receiver drier is mounted on the condenser RH end tank and removes solid impurities and moisture from the refrigerant. It also provides a reservoir for liquid refrigerant to accommodate changes of heat load at the evaporator.

NOTE:

The receiver drier is part of the condenser assembly and is not serviceable separately.

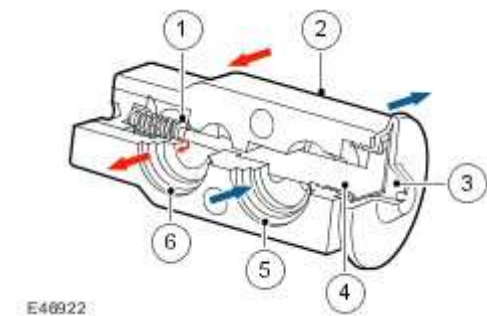
Refrigerant entering the receiver drier passes through a filter and a desiccant pack, then collects in the base of the unit before flowing through the outlet pipe back to the condenser.

REFRIGERANT PRESSURE SENSOR



The refrigerant pressure sensor is located in the high pressure/temperature refrigerant line between the condenser and the thermostatic expansion valve. For additional information, refer to Control Components (412-04)

THERMOSTATIC EXPANSION VALVE



Item	Part Number	Description
1		Metering valve
2		Housing
3		Diaphragm
4		Temperature sensor
5		Outlet passage from evaporator
6		Inlet passage to evaporator

The thermostatic expansion valve meters the flow of refrigerant into the evaporator, to match the refrigerant flow with the heat load of the air passing through the evaporator.

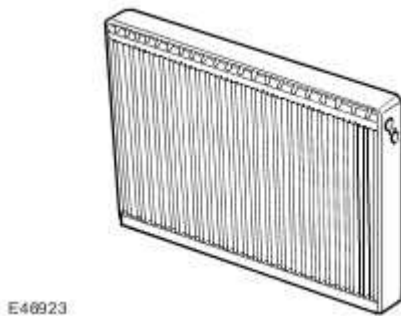
The thermostatic expansion valve is a block type valve located behind the heater assembly, and attached to the inlet and outlet ports of the evaporator. The thermostatic expansion valve consists of

an aluminium housing containing inlet and outlet passages. A ball and spring metering valve is installed in the inlet passage and a temperature sensor is installed in the outlet passage. The temperature sensor consists of a temperature sensitive tube connected to a diaphragm. The bottom end of the temperature sensitive tube acts on the ball of the metering valve. Pressure on top of the diaphragm is controlled by the evaporator outlet temperature conducted through the temperature sensitive tube. The bottom of the diaphragm senses evaporator outlet pressure.

Liquid refrigerant flows through the metering valve into the evaporator. The restriction across the metering valve reduces the pressure and temperature of the refrigerant. The restriction also changes the liquid stream of refrigerant into a fine spray, to improve the evaporation process. As the refrigerant passes through the evaporator, it absorbs heat from the air flowing through the evaporator. The increase in temperature causes the refrigerant to vaporise and increase in pressure.

The temperature and pressure of the refrigerant leaving the evaporator acts on the diaphragm and temperature sensitive tube, which regulate the metering valve opening and so control the volume of refrigerant flowing through the evaporator. The warmer the air flowing through the evaporator, the more heat available to evaporate refrigerant and thus the greater volume of refrigerant allowed through the metering valve.

EVAPORATOR



The evaporator is installed in the heater assembly, between the blower and the heater matrix, to absorb heat from the exterior or recirculated air. Low pressure, low temperature refrigerant changes from liquid to vapour in the evaporator, absorbing large quantities of heat as it changes state.

Most of the moisture in the air passing through the evaporator condenses into water, which drains out of the vehicle by passing through a drain tube to the underside of the vehicle.

REFRIGERANT LINES

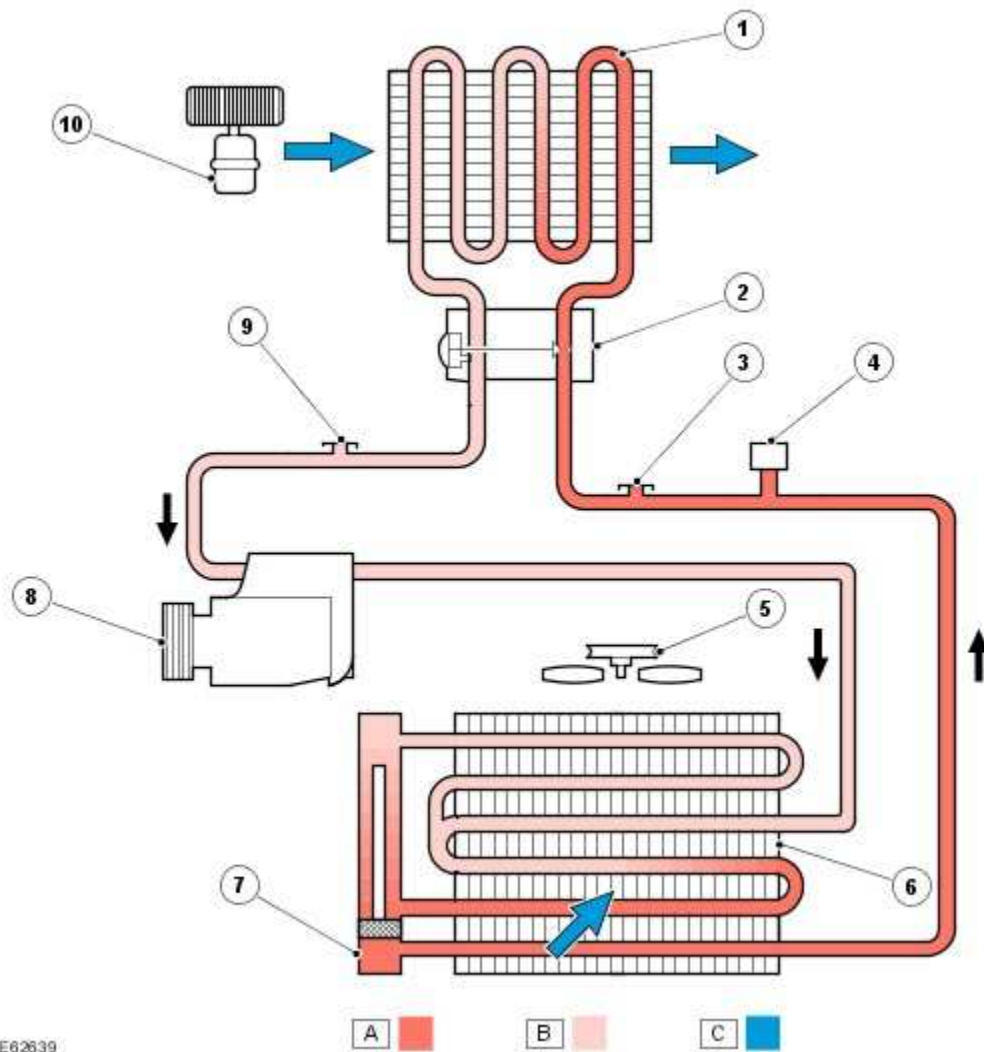
To maintain similar flow velocities around the A/C system, the diameter of the refrigerant lines varies to suit the 2 pressure/temperature regimes. Larger diameter pipes are installed in the low pressure/temperature regime and smaller diameter pipes are installed in the high pressure/temperature regime.

Low and high pressure charging connections are incorporated into the refrigerant lines for system servicing.

CONTROL DIAGRAM

NOTE:

A = Refrigerant liquid; **B** = Refrigerant vapour; **C** = Air flow



E62639

Item	Part Number	Description
1		Evaporator
2		Thermostatic expansion valve
3		High pressure servicing connection
4		Refrigerant pressure sensor
5		Engine cooling fan

6		Condenser
7		Receiver/Drier
8		Variable displacement A/C compressor
9		Low pressure servicing connection
10		Blower

PRINCIPLES OF OPERATION

To accomplish the transfer of heat, the refrigerant is circulated around the system, where it passes through 2 pressure/temperature regimes. In each of the regimes the refrigerant changes state, during which process maximum heat absorption or dissipation occurs.

The low pressure/temperature regime is from the thermostatic expansion valve, through the evaporator to the compressor. The refrigerant decreases in pressure and temperature at the thermostatic expansion valve then changes state from a liquid to a vapour in the evaporator to absorb heat.

The high pressure/temperature regime is from the compressor, through the condenser and receiver drier assembly to the thermostatic expansion valve. The refrigerant increases in pressure and temperature as it passes through the compressor, then releases heat and changes state from a vapour to a liquid in the condenser.

Operation of the A/C system is controlled by the Automatic Temperature Control (ATC) module. For additional information, refer to Control Components (412-04)

The A/C system works in conjunction with the heating and ventilation system, and the air distribution and filtering system. For additional information, refer to Heating and Ventilation (412-02)
For additional information, refer to Air Distribution and Filtering (412-01)

Air Conditioning

For additional information refer to [412-00](#)

Air Conditioning (A/C) Compressor - 4.2L NA V8 - AJV8 (82.10.20)

Special Service Tools



303-021

Engine support bracket
303-021



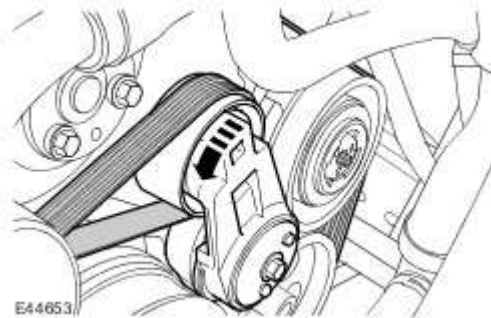
303-749

Engine lifting brackets
303-749

Removal

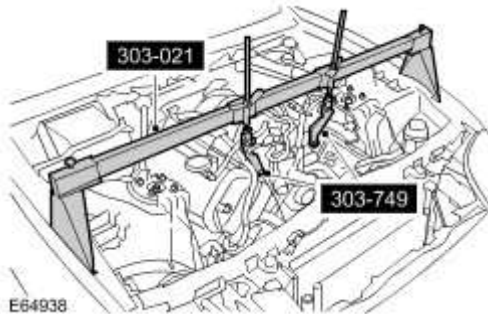
- 1 . Remove the cover and disconnect the battery ground cable.
For additional information, refer to
- 2 . Raise and support the vehicle.
- 3 . Recover the A/C refrigerant.
- 4 . Release the throttle body.
For additional information, refer to Throttle Body (19.70.04)
- 5 Release the accessory drive belt.

- ▶ Rotate the accessory drive belt tensioner counter-clockwise, using a 3/8 " drive wrench.



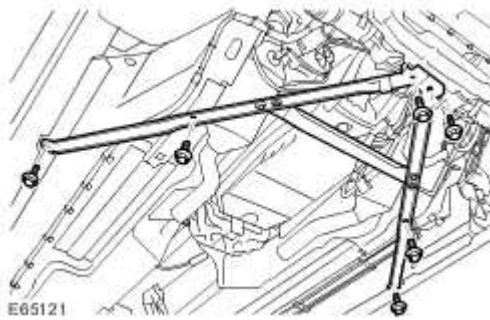
6.  **CAUTION: Protect the paintwork during this operation.**

Using the special tools, support the engine.



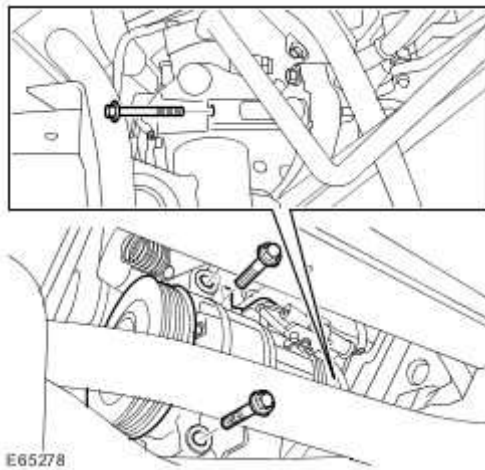
7. Remove the LH heated oxygen sensor (HO2S).
For additional information, refer to Heated Oxygen Sensor (HO2S)
8. Remove the LH engine mount.
For additional information, refer to Engine Mount LH (12.45.01)
9. With assistance, remove the A-frame.

- ▶ Remove the 6 bolts.



10 . Release the A/C compressor.

▶ Remove the 3 bolts.

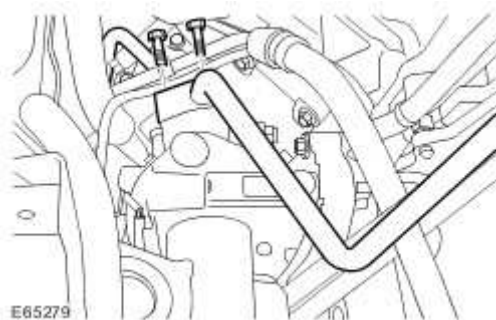


11  **CAUTION: Immediately cap all refrigerant lines to prevent ingress of dirt and moisture.**

Disconnect the refrigerant lines from the A/C compressor.

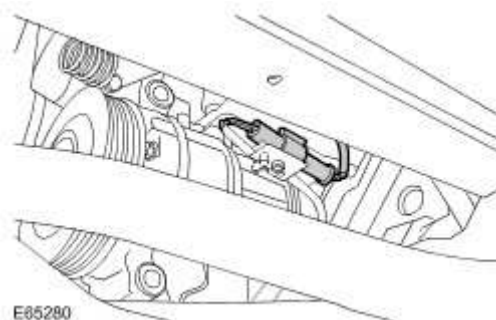
▶ Remove the 2 bolts.

▶ Remove and discard the 2 O-ring seals.



12 . Remove the A/C compressor.

▶ Disconnect the electrical connector.



Installation

1 . Install the A/C compressor.

▶ Tighten the bolts to 25 Nm (18 lb.ft).

▶ Connect the electrical connector.

2 .



CAUTION: Lubricate the new seals with clean refrigerant oil.

Connect the refrigerant lines.

▶ Clean the component mating faces.

▶ Install the new O-ring seals.

▶ Tighten the bolts to 9 Nm (7 lb.ft).

3 . With assistance, install the A-frame.

▶ Tighten the bolts to 55 Nm (40 lb.ft).

4 . Install the LH engine mount.

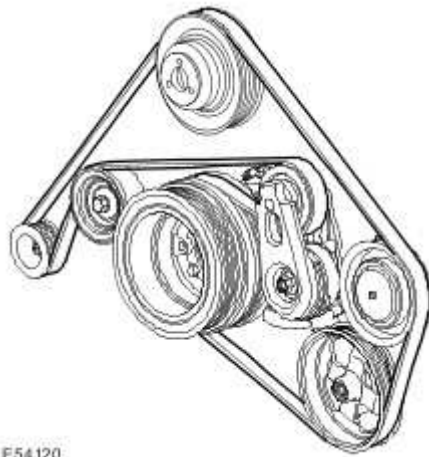
For additional information, refer to Engine Mount LH (12.45.01)

5 . Install the HO2S.

For additional information, refer to Heated Oxygen Sensor (HO2S)

6 . Remove the special tools.

7 . Install the accessory drive belt.



8 . Install the throttle body.

For additional information, refer to Throttle Body (19.70.04)

9 . Connect the battery ground cable and install the cover.
For additional information, refer to

10 . Recharge the A/C system.

Air Conditioning (A/C) Compressor - 4.2L SC V8 - AJV8 (82.10.20)

Special Service Tools



303-021

Engine support bracket

303-021



303-749

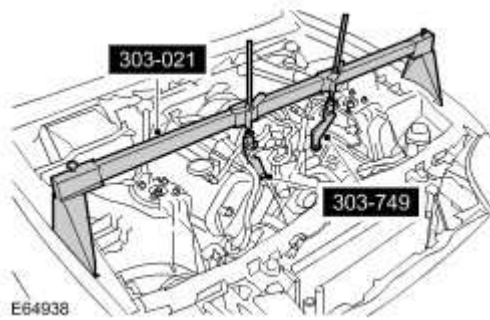
Engine lifting brackets

303-749

Removal

- 1 . Remove the cover and disconnect the battery ground cable.
For additional information, refer to Specifications
- 2 . Raise and support the vehicle.
- 3 . Remove the accessory drive belt.
For additional information, refer to Accessory Drive Belt - 4.2L SC V8 - AJV8 (12.10.40)
- 4 . Recover the A/C refrigerant.
- 5 .  **CAUTION: Protect the paintwork during this operation.**

Using the special tools, support the engine.

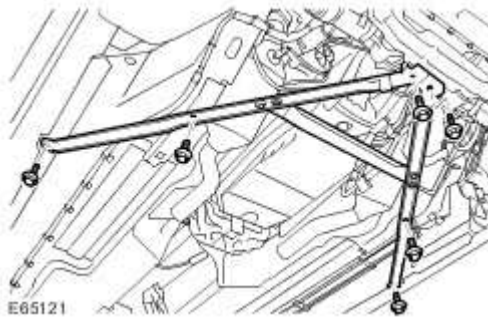


- 6 . Remove the LH heated oxygen sensor (HO2S).
For additional information, refer to Heated Oxygen Sensor (HO2S)

- 7 . Remove the LH engine mount.
For additional information, refer to Engine Mount LH (12.45.01)

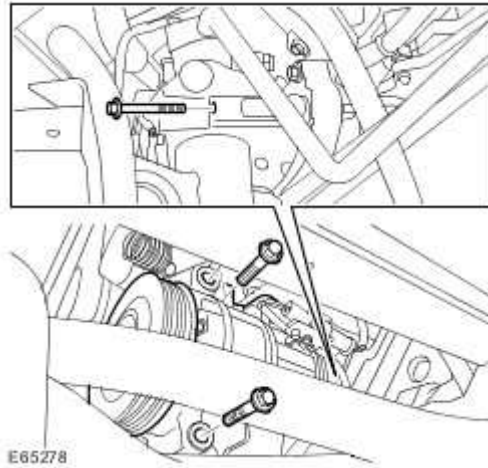
- 8 . With assistance, remove the A-frame.

➤ Remove the 6 bolts.



- 9 . Release the A/C compressor.

➤ Remove the 3 bolts.



10

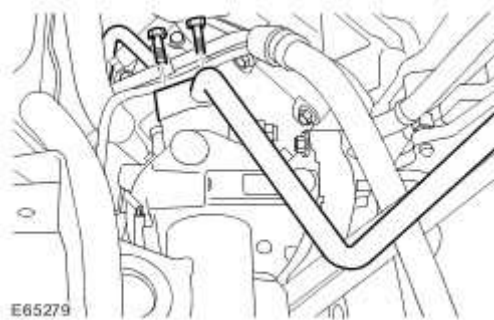


CAUTION: Immediately cap all refrigerant lines to prevent ingress of dirt and moisture.

Disconnect the refrigerant lines from the A/C compressor.

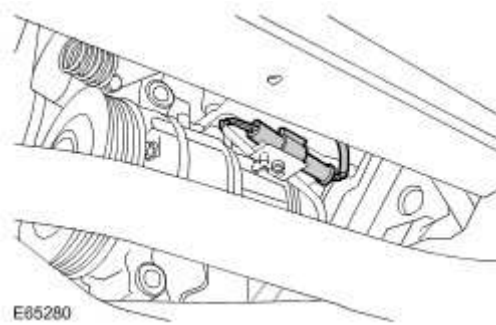
➤ Remove the 2 bolts.

➤ Remove and discard the 2 O-ring seals.



11 . Remove the A/C compressor.

➤ Disconnect the electrical connector.



Installation

1 . Install the A/C compressor.

- ▶ Tighten the bolts to 25 Nm (18 lb.ft).
- ▶ Connect the electrical connector.

2 .



CAUTION: Lubricate the new seals with clean refrigerant oil.

Connect the refrigerant lines.

- ▶ Clean the component mating faces.
- ▶ Install the new O-ring seals.
- ▶ Tighten the bolts to 9 Nm (7 lb.ft).

3 . With assistance, install the A-frame.

- ▶ Tighten the bolts to 55 Nm (40 lb.ft).

4 . Install the LH engine mount.

For additional information, refer to Engine Mount LH (12.45.01)

5 . Install the HO2S.

For additional information, refer to Heated Oxygen Sensor (HO2S)

6 . Remove the special tools.

7 . Install the accessory drive belt.

For additional information, refer to Accessory Drive Belt - 4.2L SC V8 - AJV8 (12.10.40)

8 . Connect the battery ground cable and install the cover.

For additional information, refer to Specifications

9 . Recharge the A/C system.

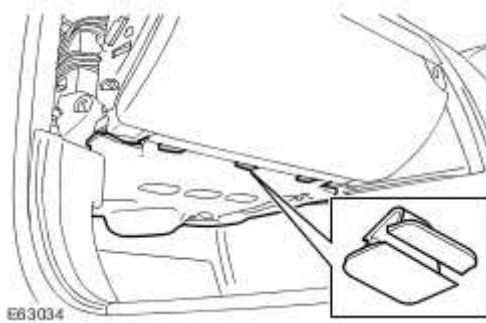
Blower Motor Resistor

Removal

- 1  **CAUTION:** Removal of the clips is a delicate procedure, damage will occur if any force is used.

Remove the passenger side footwell trim panel.

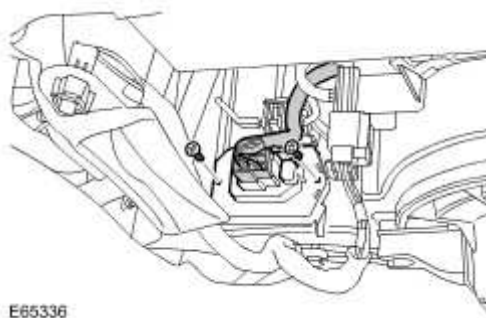
- ▶ Remove the 3 clips.



- 2 . Remove the blower motor resistor.

- ▶ Disconnect the electrical connector.

- ▶ Remove the 2 screws.



Installation

1 . Install the blower motor resistor.

 Install the screws.

 Connect the electrical connector.

2 . Install the passenger side footwell trim panel.

 Carefully secure the clips.

Condenser Core - 4.2L NA V8 - AJV8 (82.15.07)

Removal

- 1 . Disconnect the battery ground cable.
For additional information, refer to

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

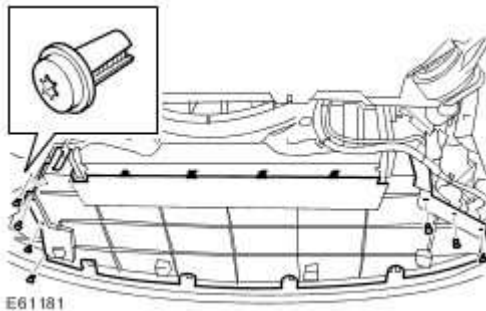
Raise and support the vehicle.

- 3 . Remove the radiator splash shield.
For additional information, refer to Radiator Splash Shield (76.22.90)

- 4 . Remove the front bumper air ducting.

➤ Remove the 7 clips.

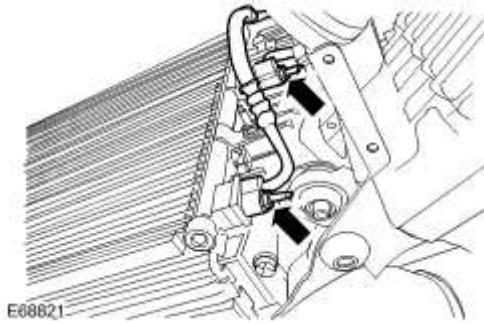
➤ Release the 4 clips.



- 5 . Recover the A/C refrigerant.

6 . Disconnect the A/C pipes.

- Remove the 2 nuts.
- Discard the O-ring seals.
- Install blanking caps to the exposed ports.



7 . Remove the condenser core.

- Remove the 2 bolts.
- Release from the 2 clips.



Installation

1 . Install the condenser core.

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

2 . Connect the A/C pipes.

- Remove the blanking caps from the ports.
- Install a new O-ring seal.
- Tighten the nuts to 10 Nm (7 lb.ft).

3 . Fill the A/C system.

4 . Install the front bumper air ducting.

- Install the clips.
- Secure the clips.

5 . Install the radiator splash shield.

For additional information, refer to Radiator Splash Shield (76.22.90)

6 . Connect the battery ground cable.

For additional information, refer to

Condenser Core - 4.2L SC V8 - AJV8 (82.15.07)

Removal

1



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

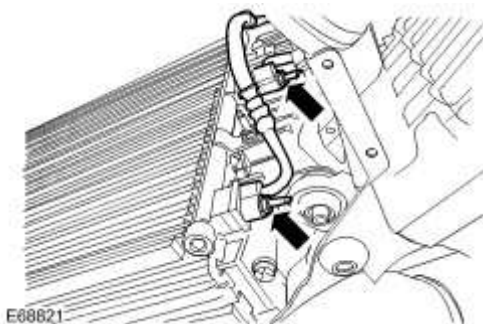
Raise and support the vehicle.

- 2 . Remove the supercharger radiator.
For additional information, refer to Radiator

- 3 . Recover the A/C refrigerant.

- 4 . Disconnect the A/C pipes.

- Remove the 2 nuts.
- Discard the O-ring seals.
- Install blanking caps to the exposed ports.



- 5 . Remove the condenser core.

Installation

1 . Install the condenser core.

2 . Connect the A/C pipes.

- ▶ Remove the blanking caps from the ports.

- ▶ Install a new O-ring seal.

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

3 . Install the supercharger radiator.

For additional information, refer to Radiator

4 . Fill the A/C system.

Evaporator Core (82.25.20)

Removal

- 1 . Remove the cover and disconnect the battery ground cable.

For additional information, refer to

2



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

Raise and support the vehicle.

- 3 . Remove the TXV assembly.

For additional information, refer to Thermostatic Expansion Valve (82.25.01)

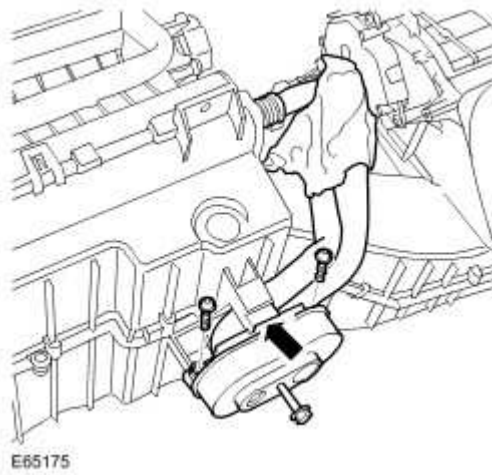
4 .



- **CAUTION: Always plug any open connections to prevent contamination.**

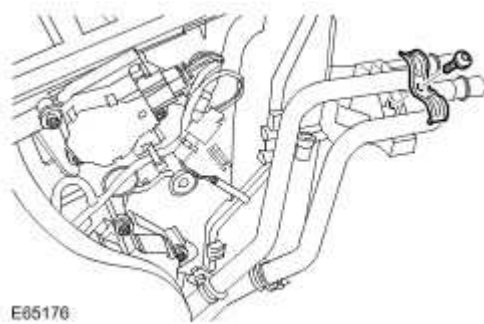
Remove the A/C pipes.

- Release the clamp.
- Remove the 2 screws.
- Release the clip.
- Release the foam pad and the upper section of the clamp.



5 . Remove the coolant pipe clamp.

➤ Remove the screw.



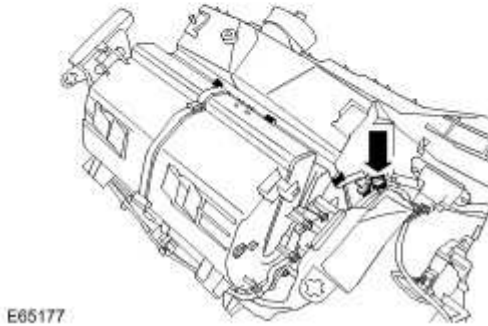
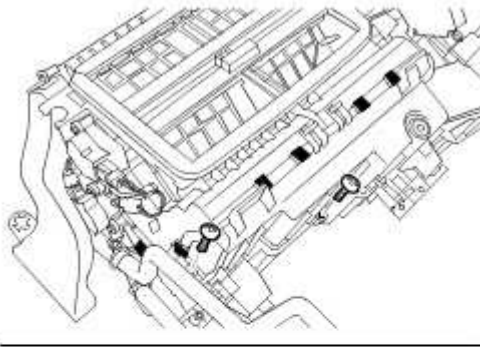
6 . Carefully separate the evaporator housing.

➤ Remove the 4 screws.

➤ Remove the 10 clips.

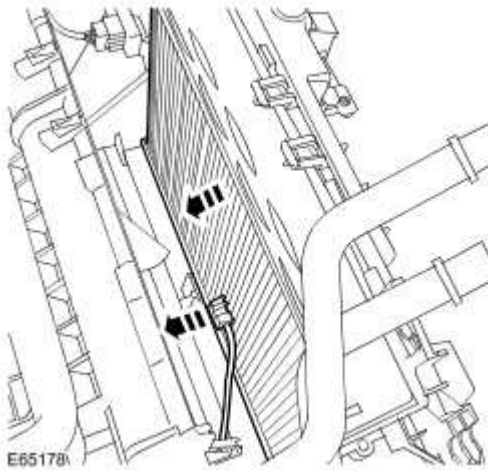
➤ Release the blower motor harness clip.

➤ Release the 2 evaporator housing clips.



7 . Remove the evaporator core.

► Carefully remove the evaporator core temperature sensor.



Installation

1 . **NOTE:**

Make sure all components are clean.

Install the evaporator core.

▶ Carefully install the evaporator core temperature sensor.

2



CAUTION: Make sure the evaporator temperature sensor harness does not become trapped.

Install the evaporator housing cover.

▶ Install the clips.

▶ Install the screws.

3 . Install the coolant pipe clamp.

▶ Install the screw.

4 . Install the A/C pipes.

▶ Install the foam pad.

▶ Install the clamp.

▶ Install the screws.

5 . Install the TXV assembly.

For additional information, refer to Thermostatic Expansion Valve (82.25.01)

6 . Connect the battery ground cable and install the cover.

For additional information, refer to

Pressure Cutoff Switch (82.10.32)

Removal

- 1 . Remove the cover and disconnect the battery ground cable.
For additional information, refer to

- 2 . Recover the A/C refrigerant.

- 3 . Remove the engine cover.
For additional information, refer to Engine Cover (76.11.35)

- 4 . Remove the air intake duct.

➤ Remove the bolt.

➤ Release the 2 clips.



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

Remove the pressure cutoff switch.

➤ Disconnect the electrical connector.

➤ Remove and discard the O-ring seal.



Installation

1 . NOTE:

Lubricate the O-ring seals with clean refrigerant oil.

Install the pressure cutoff switch.

- Clean the components.
- Install a new O-ring seal.
- Tighten the cutoff switch to 10 Nm (7 lb.ft).
- Connect the electrical connector.

2 . Install the air intake duct.

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

3 . Recharge the A/C system.

4 . Install the engine cover.

For additional information, refer to Engine Cover (76.11.35)

- 5 . Connect the battery ground cable and install the cover.
For additional information, refer to

Thermostatic Expansion Valve (82.25.01)

Removal

- 1 . Remove the cover and disconnect the battery ground cable.

For additional information, refer to

2



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

Raise and support the vehicle.

- 3 . Remove the heater and evaporator core housing.

For additional information, refer to Heater Core and Evaporator Core Housing (82.25.21)

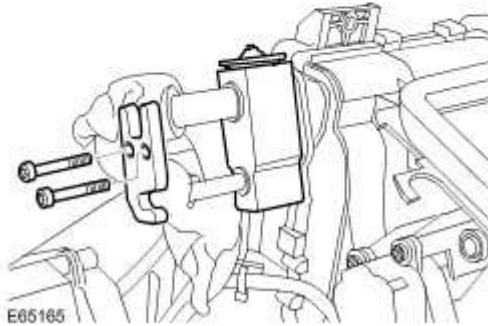
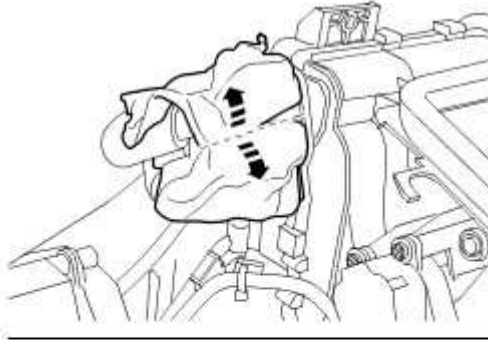
4 .



- **CAUTION: Always plug any open connections to prevent contamination.**

Remove the TXV assembly.

- Carefully cut and release the insulation for access.
- Remove the 2 Allen bolts.
- Remove and discard the 4 O-ring seals.



Installation

1 .



CAUTION: Lubricate the new seals with clean refrigerant oil.

NOTE:

Make sure all component mating faces are clean.

Install the TXV assembly.

- ▶ Install the new O-ring seals.
- ▶ Install and tighten the Allen bolts to 6 Nm (4 lb.ft).
- ▶ Replace the TXV insulation.

2 . Install the heater and evaporator core housing.

For additional information, refer to Heater Core and Evaporator Core Housing (82.25.21)

- 3 . Connect the battery ground cable and install the cover.
For additional information, refer to

412-04 : Control Componements

Specifications

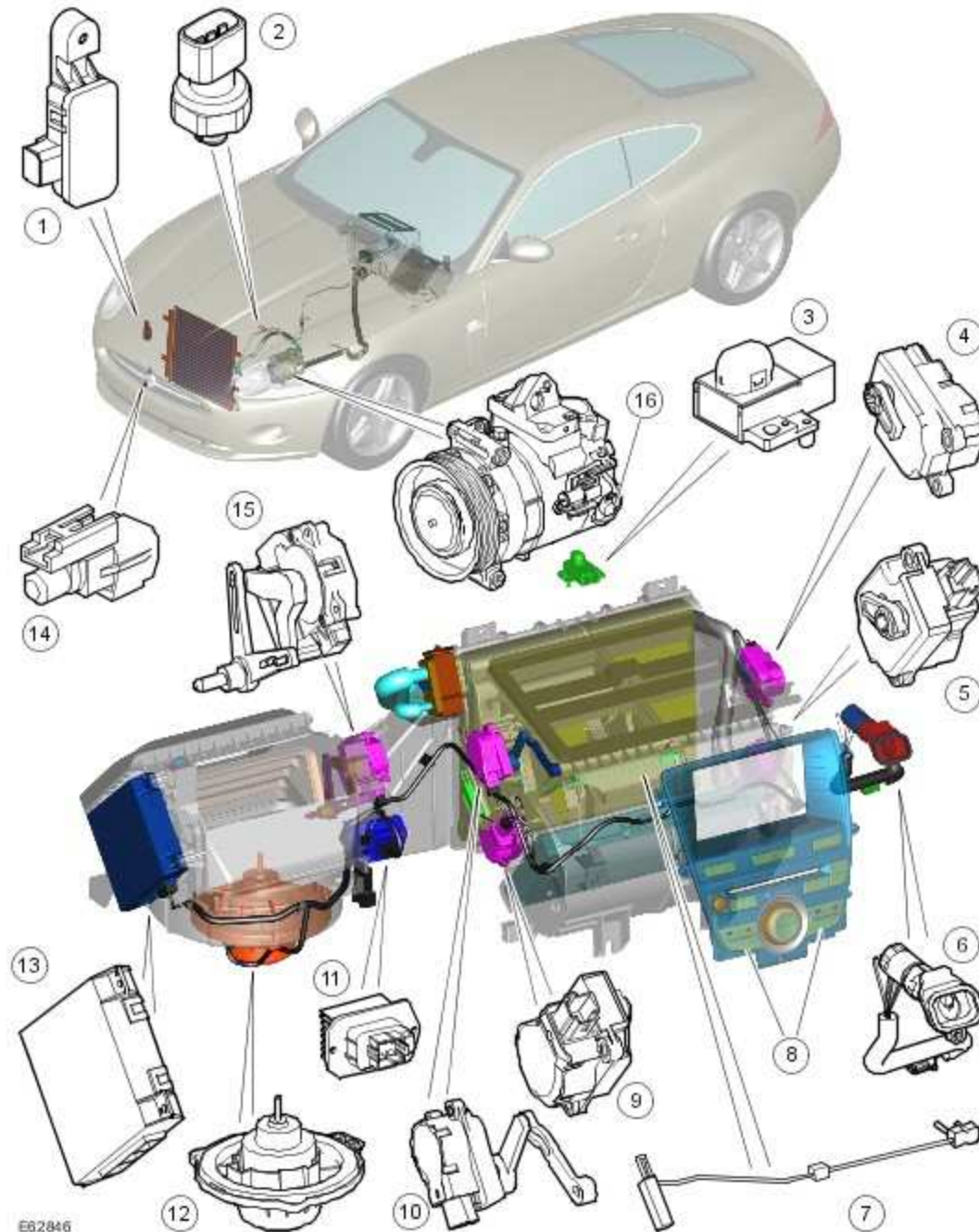
Specifications

Torque Specifications

Item	Nm	lb-ft	lb-in
Climate control module and audio/cd module assembly to instrument panel - bolt	3	-	27
Climate control and audio/cd modules to assembly bracket - bolt	3	-	27
Climate control and audio/cd modules to assembly bracket - screw	2.5	-	22

Control Components

COMPONENT LOCATION



Item	Part Number	Description
1		Pollution sensor (if fitted)

2		Refrigerant pressure sensor
3		Sunload/Light sensor
4		Windshield distribution (defrost) stepper motor
5		Right-Hand (RH) temperature blend stepper motor
6		Cabin humidity and temperature sensor
7		Evaporator temperature sensor
8		Control switches
9		Left-Hand (LH) temperature blend stepper motor
10		Face/feet distribution stepper motor
11		Blower motor control module
12		Blower motor
13		Automatic Temperature Control (ATC) module
14		Ambient air temperature sensor
15		Air intake servo motor
16		Air Conditioning (A/C) compressor solenoid valve

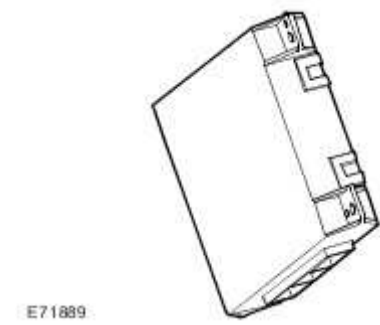
INTRODUCTION

The ATC (automatic temperature control) module controls the A/C (air conditioning) system and the heating and ventilation system to regulate the temperature, volume, and distribution of air into the cabin.

The system is a fully automatic dual zone system capable of maintaining individual temperature levels selected for the LH (left-hand) and RH (right-hand) sides of the cabin. Manual overrides for the system include intake air source, blower speed and air distribution. These selections can be made using either the Touch Screen Display (TSD) or the control switches located below the TSD.

For information on how to operate the A/C (air conditioning) system and the heating and ventilation system, refer to the Owner's Handbook.

AUTOMATIC TEMPERATURE CONTROL MODULE



The ATC (automatic temperature control) module is mounted on the end of the blower motor casing, behind the instrument panel. The ATC (automatic temperature control) module processes inputs from the TSD, the control switches located below the TSD, and the system sensors. In response to these inputs, the ATC (automatic temperature control) module outputs control signals to the A/C (air conditioning) system and the heating and ventilation system.

In addition to controlling the A/C (air conditioning) system and the heating and ventilation system, the ATC (automatic temperature control) module also controls the following:

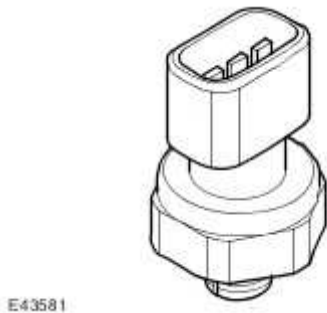
- The seat heaters. For additional information, refer to Seats (501-10 Seating)
- The rear window heater. For additional information, refer to Glass, Frames and Mechanisms (501-11 Glass, Frames and Mechanisms)
- The windshield heater. For additional information, refer to Glass, Frames and Mechanisms (501-11 Glass, Frames and Mechanisms)
- The exterior mirror heaters. For additional information, refer to Rear View Mirrors (501-09 Rear View Mirrors)
- The steering wheel heater (if fitted). For additional information, refer to Steering Column Switches (211-05 Steering Column Switches)

Two electrical connectors provide the interface between the ATC (automatic temperature control) module, and the vehicle wiring. The ATC (automatic temperature control) module uses hardwired inputs from the system sensors, the LIN (local interconnect network) bus to communicate with the stepper motors and the medium speed CAN (controller area network) bus to communicate with other control modules on the vehicle.

AIR CONDITIONING COMPRESSOR SOLENOID VALVE

The A/C (air conditioning) compressor solenoid valve is integral with the A/C (air conditioning) compressor. Operation of the solenoid valve is controlled by the ATC (automatic temperature control) module using a hardwired drive current of differing values. By controlling the flow of refrigerant through the compressor, the solenoid valve can control the A/C (air conditioning) system pressure and the evaporator operating temperature.

REFRIGERANT PRESSURE SENSOR



The refrigerant pressure sensor provides the ATC (automatic temperature control) module with a pressure input from the high pressure side of the refrigerant system. The refrigerant pressure sensor is located in the refrigerant line between the condenser and the thermostatic expansion valve.

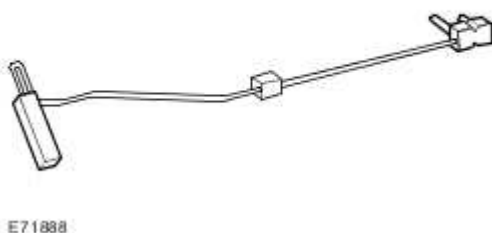
The ATC (automatic temperature control) module supplies a 5 V reference voltage to the refrigerant pressure sensor and receives a return signal voltage, between 0 V and 5 V, related to system pressure.

The ATC (automatic temperature control) module uses the signal from the pressure sensor to protect the refrigerant system from extremes of pressure. The ATC (automatic temperature control) module transmits the A/C (air conditioning) pressure, along with the compressor drive current value, to the instrument cluster on the medium speed CAN (controller area network) bus. These signals are broadcast to the ECM (engine control module) on the high speed CAN (controller area network) bus to allow it to calculate the torque being applied to the engine by the compressor.

To protect the system from extremes of pressure, the ATC (automatic temperature control) module sets the A/C (air conditioning) compressor to the minimum flow position if the pressure:

- Decreases to 2.1 ± 0.2 bar (31.5 ± 3 lbf/in²); the ATC (automatic temperature control) module loads the A/C (air conditioning) compressor again when the pressure increases to 2.3 ± 0.2 bar (33.4 ± 3 lbf/in²)
- Increases to 31 ± 1 bar (450 ± 14.5 lbf/in²); the ATC (automatic temperature control) module loads the A/C (air conditioning) compressor again when the pressure decreases to 26 ± 1 bar (377 ± 14.5 lbf/in²)

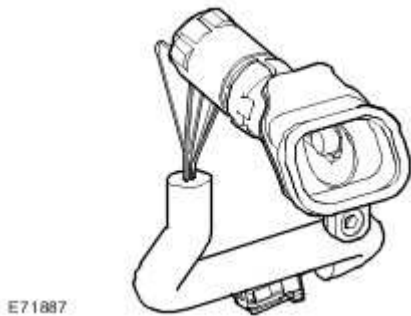
EVAPORATOR TEMPERATURE SENSOR



The evaporator temperature sensor is a NTC (negative temperature coefficient) thermistor that provides the ATC (automatic temperature control) module with a temperature signal from the downstream side of the evaporator. The evaporator temperature sensor is mounted directly onto the evaporator matrix fins.

The ATC (automatic temperature control) module uses the input from the evaporator temperature sensor to control the load of the A/C (air conditioning) compressor and thus the operating temperature of the evaporator.

CABIN HUMIDITY AND TEMPERATURE SENSOR

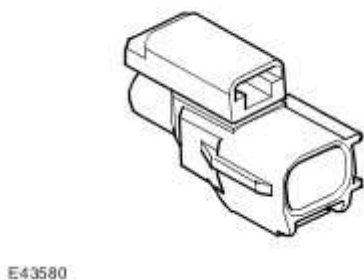


The cabin humidity and temperature sensor is installed behind a grill on the drivers side of the instrument panel. The temperature inside the cabin is measured by a NTC (negative temperature coefficient) thermistor. A motor within the sensor assembly draws cabin air in through the grill and over the thermistor. The motor is provided a battery voltage feed by a relay located within the CJB (central junction box) .

Humidity inside the cabin is measured by a sensor element made up of film capacitors on different substrates. The dielectric is a polymer which absorbs or releases water proportional to the relative humidity of the air being drawn through the sensor and thus changes the capacitance of the capacitor. For protection, the sensor element is contained in a nylon mesh cover.

Humidity within the cabin is controlled by raising and lowering the evaporator temperature. An increase in evaporator temperature increases the moisture content in the air entering the cabin. Lowering the evaporator temperature reduces the moisture content in the air entering the cabin.

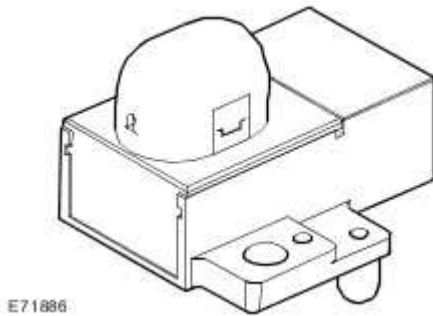
AMBIENT AIR TEMPERATURE SENSOR



The ambient air temperature sensor is a NTC (negative temperature coefficient) thermistor that

provides the ATC (automatic temperature control) module with an input of external air temperature. The sensor is hard wired to the ECM (engine control module) and its signal is transmitted to the instrument cluster on the high speed CAN (controller area network) bus. The instrument cluster acts as a gateway and transmits the ambient air temperature signal to the ATC (automatic temperature control) module on the medium speed CAN (controller area network) bus. The sensor is mounted on the vehicle center line behind the lower front grill, and can be accessed from underneath the vehicle.

SUNLOAD/LIGHT SENSOR



The sunload/light sensor consists of 2 photoelectric cells that provide the ATC (automatic temperature control) module with inputs of light intensity; one as sensed coming from the left of the vehicle and one as sensed coming from the right. The inputs are a measure of the solar heating effect on vehicle occupants, and are used by the ATC (automatic temperature control) module to adjust blower speed, temperature and distribution to improve comfort.

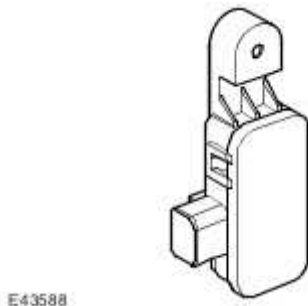
NOTE:

The solar sensor is also used as part of the Autolamp feature and also contains the active anti-theft alarm indicator LED (light emitting diode) . For additional information, refer to Exterior Lighting (417-01 Exterior Lighting)

For additional information, refer to Anti-Theft - Active (419-01 Anti-Theft - Active)

The sensor is installed in the center of the instrument panel upper surface and is powered by a 5 V feed from the instrument cluster.

POLLUTION SENSOR



Up to 2009 MY, a pollution sensor was installed only on Japanese specification vehicles. From 2009

MY, the pollution sensor is a standard fit in all markets.

The pollution sensor allows the ATC (automatic temperature control) module to monitor the ambient air for the level of hydrocarbons and oxidised gases such as nitrous oxides, sulphur oxides and carbon monoxide. The sensor is mounted in the RH (right-hand) front corner of the engine compartment.

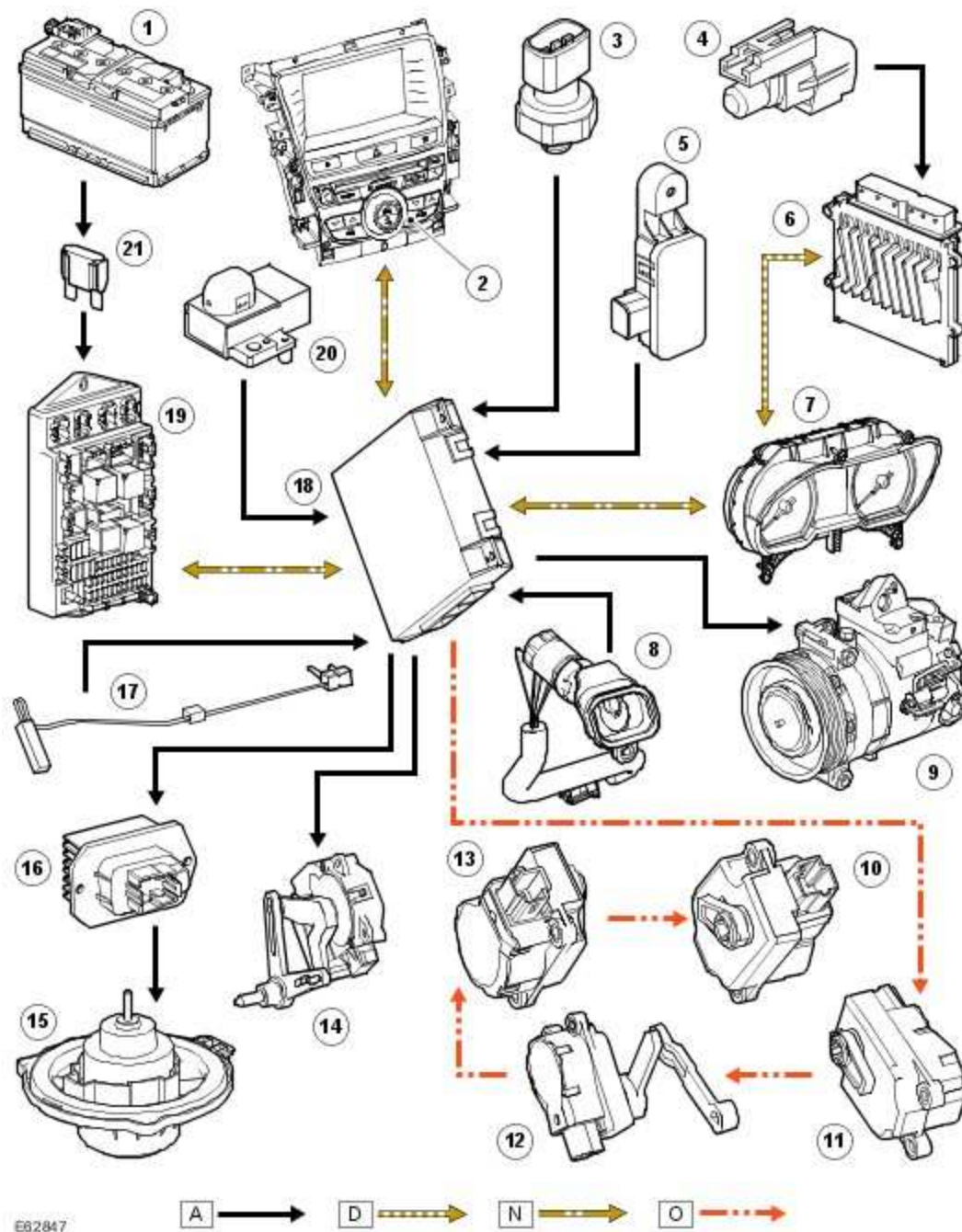
The pollution sensor is powered by an ignition controlled voltage feed from the CJB (central junction box) and provides the ATC (automatic temperature control) module with separate signals of hydrocarbon and oxidised gases. With a pollution sensor fitted, the ATC (automatic temperature control) module can control the air intake source to reduce the amount of contaminants entering the cabin. This function is fully automatic, but can be overridden by manual selection of the air source using the recirculation control switch below the TSD.

If there is a fault with the sensor, the ATC (automatic temperature control) module disables automatic operation of the recirculation door.

CONTROL DIAGRAM

NOTE:

A = Hardwired; **D** = High speed CAN (controller area network) bus; **N** = Medium speed CAN (controller area network) bus; **O** = LIN (local interconnect network) bus



E62847

Item	Part Number	Description
1		Battery
2		Control switches
3		Refrigerant pressure sensor
4		Ambient air temperature sensor

5		Pollution sensor
6		Engine Control Module (ECM)
7		Instrument cluster
8		Cabin humidity and temperature sensor
9		A/C compressor solenoid
10		RH temperature blend stepper motor
11		Windshield distribution (defrost) stepper motor
12		Face/feet distribution stepper motor
13		LH temperature blend stepper motor
14		Air intake servo motor
15		Blower motor
16		Blower motor control module
17		Evaporator temperature sensor
18		ATC module
19		CJB
20		Sunload/Light sensor
21		Megafuse (175A)

PRINCIPLES OF OPERATION

Air Intake Control

The source of intake air is automatically controlled unless overridden by pressing the air recirculation switch located below the TSD. Under automatic control, the ATC (automatic temperature control) module determines the required position of the recirculation door from its 'comfort' algorithm and, if fitted, the pollution sensor.

The recirculation door is operated by an electric motor. The ATC (automatic temperature control) module provides analogue signals to the motor along a hardwired connection. A potentiometer in

the motor supplies the ATC (automatic temperature control) module with a position feedback signal for closed loop control.

Air Temperature Control

Cooled air from the evaporator enters the heater assembly, where temperature blend doors direct a proportion of the air through the heater core to produce the required output air temperature.

The 2 temperature blend doors operate independently to enable individual temperature settings for the left and right sides of the cabin. The temperature blend doors are operated by stepper motors, which are controlled by the ATC (automatic temperature control) module using LIN (local interconnect network) bus messages.

The ATC (automatic temperature control) module calculates the temperature blend stepper motor positions required to achieve the selected temperature and compares it against the current position. If there is any difference, the ATC (automatic temperature control) module signals the stepper motors to adopt the new position.

Air temperature is controlled automatically unless maximum heating (HI) or maximum cooling (LO) is selected. When maximum heating or cooling is selected, a 'comfort' algorithm in the ATC (automatic temperature control) module adopts an appropriate strategy for air distribution, blower speed, and air source.

Temperature control of one side of the cabin can be compromised by the other side of the cabin being set to a high level of heating or cooling. True maximum heating or cooling (displayed as 'HI' or 'LO' on the TSD) can only be selected from the driver's side temperature control button. If 'HI' or 'LO' is selected from the driver's side, the passenger side temperature will be automatically set to match the driver's side.

When economy mode is selected by pressing the 'Econ' TSD soft button, no cooling of the intake air will take place. The minimum output air temperature from the system will be ambient air temperature plus any heat pick up in the air intake path.

Blower Motor Control

Operation of the blower motor is controlled by the ATC (automatic temperature control) module. The ATC (automatic temperature control) module monitors a feedback voltage from the blower motor control module. In response to the feedback voltage, the ATC (automatic temperature control) module provides a drive signal back to the blower motor control module which is used to regulate the voltage flow across the blower motor and hence regulate blower speed. The blower motor is provided with a battery voltage feed from the blower motor relay, which is located within the auxiliary junction box.

When the A/C (air conditioning) system is in automatic mode, the ATC (automatic temperature control) module determines the blower speed required from its 'comfort' algorithm. When the A/C (air conditioning) system is in manual mode, the ATC (automatic temperature control) module operates the blower at the speed selected using either the rotary control switch or the '+/-' soft

buttons on the TSD.

The ATC (automatic temperature control) module also controls blower motor speed to compensate for the ram effect on intake air produced by forward movement of the vehicle. As vehicle speed, and consequently the ram effect increases, blower motor speed is reduced.

Air Distribution Control

Two air distribution doors are used to direct air into the cabin. The doors are operated by stepper motors, which are controlled by the ATC (automatic temperature control) module using LIN (local interconnect network) bus messages.

When the A/C (air conditioning) system is in automatic mode, the ATC (automatic temperature control) module automatically controls air distribution into the cabin in line with its 'comfort' algorithm. Automatic control is overridden if any of the TSD air distribution soft buttons are selected. Air distribution in the cabin will remain as selected until the 'Auto' switch is pressed or a different manual selection is made.

Programmed Defrost

When the 'DEF' button is pressed, the ATC (automatic temperature control) module instigates the programmed defrost function. When selected, the ATC (automatic temperature control) module configures the system as follows:

- Automatic mode off
- Selected temperature unchanged
- Air inlet set to fresh air
- Air distribution set to windshield
- Blower speed set to level 6
- Windshield and rear screen heaters on.

The programmed defrost function can be cancelled by one of the following:

- Selecting any air distribution switch on the TSD
- Pressing the 'AUTO' switch below the TSD
- A second press of the 'DEF' button
- Switching the ignition OFF

NOTE:

The blower speed can be adjusted without terminating the programmed defrost function.

A/C Compressor Control

When A/C (air conditioning) is selected ('Econ' off) the ATC (automatic temperature control) module maintains the evaporator at an operating temperature that varies with the cabin cooling requirements. If the requirement for cooled air decreases, the ATC (automatic temperature control) module raises the evaporator operating temperature by reducing the flow of refrigerant provided by

the A/C (air conditioning) compressor.

NOTE:

The ATC (automatic temperature control) module closely controls the rate of temperature increase to avoid introducing moisture into the cabin.

If the requirement for cooled air increases, the ATC (automatic temperature control) module lowers the evaporator operating temperature by increasing the flow of refrigerant provided by the A/C (air conditioning) compressor.

When economy mode is selected by pressing the 'Econ' TSD soft button, the compressor current signal supplied by the ATC (automatic temperature control) module holds the A/C (air conditioning) compressor solenoid valve in the minimum flow position, effectively switching off the A/C (air conditioning) function.

The ATC (automatic temperature control) module incorporates limits for the operating pressure of the refrigerant system. When the system approaches the high pressure limit the compressor current signal is progressively reduced until the system pressure decreases. When the system pressure falls below the low pressure limit the compressor current signal is held at its lowest setting so that the A/C (air conditioning) compressor is maintained at its minimum stroke. This avoids depletion of the lubricant from the A/C (air conditioning) compressor.

A/C Compressor Torque

The ATC (automatic temperature control) module transmits refrigerant pressure and A/C (air conditioning) compressor current values to the ECM (engine control module) over the medium speed then high speed CAN (controller area network) bus, using the instrument cluster as a gateway. The ECM (engine control module) uses these values to calculate the torque being used to drive the A/C (air conditioning) compressor. The ECM (engine control module) compares the calculated value with its allowable value and if necessary forces the ATC (automatic temperature control) module to inhibit the A/C (air conditioning) compressor by transmitting the 'ACClutchInhibit' CAN (controller area network) message. This forces the ATC (automatic temperature control) module to reduce the drive current to the A/C (air conditioning) compressor solenoid valve, which reduces refrigerant flow. This in turn reduces the torque required to drive the A/C (air conditioning) compressor.

By reducing the maximum A/C (air conditioning) compressor torque, the ECM (engine control module) is able to reduce the load on the engine when it needs to maintain vehicle performance or cooling system integrity.

Cooling Fan Control

The ATC (automatic temperature control) module determines the amount of condenser cooling required from the refrigerant pressure sensor, since there is a direct relationship between the temperature and pressure of the refrigerant. The cooling requirement is broadcast to the ECM (engine control module) on the medium speed CAN (controller area network) bus. The ECM (engine control module) then controls the temperature of the condenser using the cooling fan. For additional

information, refer to Electronic Engine Controls (303-14 Electronic Engine Controls - Vehicles Without: Supercharger)

Windshield Heater

The ATC (automatic temperature control) module controls operation of the windshield heater using 2 relays in the power distribution box. When a request is made for windshield heater operation, the ATC (automatic temperature control) module broadcasts a message to the CJB (central junction box) on the medium speed CAN (controller area network) bus. On receipt of this message, the CJB (central junction box) energises the relays by providing a ground path for both relay coils. This allows a battery feed to flow across the relays to power the left and right heater elements.

NOTE:

Windshield heater operation is only enabled when the engine is running.

There are 2 modes of windshield heater operation; manual and automatic.

Manual operation is activated by pressing the windshield heater control switch. When the switch is pressed, the ATC (automatic temperature control) module illuminates a LED (light emitting diode) in the switch and powers the heater elements for 6.5 minutes.

The switch LED (light emitting diode) remains illuminated until the windshield heater switch is pressed a second time (to switch the system off), the heating phase is completed, or the engine stops. If the engine is re-started within 30 seconds the windshield heater resumes the previous heating phase.

There are 2 variants of automatic operation; automatic operation at the start of a journey and automatic operation during a journey.

Automatic operation at the start of a journey is initiated if the ambient air temperature is below 5 °C (41 °F) at the start of a journey. In this instance, the ATC (automatic temperature control) module will automatically power the windshield heater elements and illuminate the switch LED (light emitting diode) for 6.5 minutes. The windshield heater can be switched off during this period by pressing the control switch or stopping the engine.

Automatic operation during a journey is initiated when low ambient air temperatures are experienced and the vehicle has been travelling for a set period of time above a threshold speed. In this instance, no feedback is given to the driver to inform him the windshield heater is operational (the switch LED (light emitting diode) is not illuminated) and the duration of operation is variable depending upon the ambient air temperature, vehicle speed and the amount of time the vehicle has been travelling.

Rear Window Heater

The ATC (automatic temperature control) module controls operation of the rear window heater using a relay in the auxiliary junction box. When a request is made for rear window heater operation, the ATC (automatic temperature control) module broadcasts a message to the auxiliary junction box on the medium speed CAN (controller area network) bus. On receipt of this message, the auxiliary junction box energises the relay by providing a ground path for the relay coil. This allows a battery feed to flow across the relay to power the rear window heater element.

NOTE:

Rear window heater operation is only enabled when the engine is running.

There are 2 modes of rear window heater operation; manual and automatic.

Manual operation is activated by pressing the rear window heater control switch. When the switch is pressed, the ATC (automatic temperature control) module illuminates a LED (light emitting diode) in the switch and powers the heater element for 21 minutes.

The switch LED (light emitting diode) remains illuminated until the rear window heater switch is pressed a second time (to switch the system off), the heating phase is completed, or the engine stops. If the engine is re-started within 30 seconds the rear window heater resumes the previous heating phase.

There are 2 variants of automatic operation; automatic operation at the start of a journey and automatic operation during a journey.

Automatic operation at the start of a journey is initiated if the ambient air temperature is below 5 °C (41 °F) at the start of a journey. In this instance, the ATC (automatic temperature control) module will automatically power the rear window heater element and illuminate the switch LED (light emitting diode) for 21 minutes. The rear window heater can be switched off during this period by pressing the control switch or stopping the engine.

Automatic operation during a journey is initiated when low ambient air temperatures are experienced and the vehicle has been travelling for a set period of time above a threshold speed. In this instance, no feedback is given to the driver to inform him the rear window heater is operational (the switch LED (light emitting diode) is not illuminated) and the duration of operation is variable depending upon the ambient air temperature, vehicle speed and the amount of time the vehicle has been travelling.

Exterior Mirror Heaters

Exterior mirror heater operation is determined by ambient air temperature and windshield wiper status. When ambient air temperature reaches a pre-determined level, the ATC (automatic temperature control) module broadcasts an exterior mirror heating request to the door modules over the medium speed CAN (controller area network) bus. On receipt of this message, the door

modules provide feed and ground connections to both exterior mirror heater elements.

NOTE:

Operation of the exterior mirror heaters is fully automatic and not controllable by the driver.

The amount of time the exterior mirror heaters are operational increases if the windshield wipers are switched on. This ensures the mirrors remain mist free in damp and wet conditions, where there is an increased risk of misting.

Seat Heaters

There are 4 seat heater settings available; Off, 1, 2 or 3, which can be set through the TSD. The heat setting is relayed to the vehicle occupants through a graduated display on the TSD.

Operation of the heated seats is controlled by the ATC (automatic temperature control) module. When the ATC (automatic temperature control) module receives a heating request from the TSD, it broadcasts a message to the CJB (central junction box) over the medium speed CAN (controller area network) bus. The CJB (central junction box) then provides a hardwired 12 V supply to the 3 heater elements contained within each seat. The 3 heater elements, 2 in the seat cushion and 1 in the seat squab, are wired in series.

The ATC (automatic temperature control) module monitors seat temperature using a temperature sensor located in each seat cushion. The CJB (central junction box) provides the temperature sensors with a 5 V supply. The level of the returned voltage back to the CJB (central junction box) is proportional to the seat temperature. The value of the return signal is broadcast to the ATC (automatic temperature control) module over the medium speed CAN (controller area network) bus which it then converts into a temperature value to allow it to control seat temperature to the required level.

The ATC (automatic temperature control) module will suspend or disable operation of the seat heaters if any of the following occur:

- Battery voltage exceeds 16.5 ± 0.3 V for more than 5 seconds. Seat heating is re-enabled when battery voltage decreases to 16.2 ± 0.3 V
- If a short or open circuit is detected
- If the seat heat temperature rises significantly above the target temperature setting.

The graduated display on the TSD remains illuminated until the seat heaters are turned off or the engine stops. If the engine is restarted within 30 seconds the seat heater resumes the previous heating level.

Steering Wheel Heater

The steering wheel heater has 1 heat setting and can be turned on and off by pressing the soft button located on the seat heater TSD screen. The on/off status of the steering wheel heater is relayed to the vehicle occupants through the TSD. When the ignition is switched off, the heater will

reset to off.

Power for the heater element is supplied by the CJB (central junction box) on receipt of a request from the ATC (automatic temperature control) module over the medium speed CAN (controller area network) bus. Temperature control for the heater element is provided by the steering wheel heater control module which receives a temperature feedback signal from a NTC (negative temperature coefficient) thermistor located within the steering wheel.

Control Components

Principle of Operation

For a detailed description of the climate control system, refer to the relevant Description and Operation section in the workshop manual.

Inspection and Verification

- 1 . Verify the customer concern.
- 2 . Visually inspect for obvious signs of damage and system integrity.

Mechanical	Electrical
• Refrigerant • Heater control flaps • Ducting	• Fuse(s) • Harness • Electrical connectors • Switch(s)

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

DTC Index



CAUTION: When probing connectors to take measurements in the course of the pinpoint tests, use the adaptor kit, part number 3548-1358-00

NOTE:

If the control module is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module.

NOTE:

Generic scan tools may not read the codes listed, or may read only five digit codes. Match the five digits from the scan tool to the first five digits of the seven digit code listed to identify the fault (the last two digits give extra information read by the manufacturer-approved diagnostic system).

NOTE:

When performing voltage or resistance tests, always use a digital multimeter (DMM) accurate to three decimal places and with a current calibration certificate. When testing resistance, always take the resistance of the DMM leads into account.

NOTE:

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

NOTE:

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

DTC	Description	Possible Cause	Action
B105A01	Aspirator fan fault	- Aspirator fan circuit - short to ground, open circuit - Aspirator fan component fault	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1A5911	Recirculation servo motor actuator - sensor 5 volt supply	Sensor 5 volt supply - short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1A5913	Air conditioning pressure sensor - sensor 5 volt supply	Air conditioning pressure sensor 5 volt supply - open circuit	Refer to electrical circuit diagrams and test air conditioning pressure sensor circuit for open circuit
B1A6111	In car temperature sensor circuit - short to ground	In car temperature sensor circuit - short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved

			diagnostic system
B1A6115	In car temperature sensor circuit - short to power, open circuit	In car temperature sensor circuit - short to power, open circuit	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1A6211	Air conditioning pressure sensor - short to ground	Air conditioning pressure sensor circuit - short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1A6215	Air conditioning pressure sensor - short to power, open circuit	Air conditioning pressure sensor circuit - short to power, open circuit	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1A6311	Right hand sun load sensor - short to ground	Right hand sun load sensor circuit - short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1A6411	Left hand sun load sensor - short to ground	Left hand sun load sensor circuit - short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1A6713	Vehicle sensor ground - open circuit	Vehicle sensor ground - open circuit	Refer to electrical circuit diagrams and test vehicle sensor ground circuit for open circuit
B1A6901	Humidity sensor fault	- Humidity sensor circuit - short to power, ground, open circuit - Sensor component fault	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1A7001	Compressor fault	Over current detection	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1A9815	Stepper motor actuator LIN Bus fault, or power	No response from ALL steppers for 20 seconds - LIN	Refer to electrical circuit diagrams and test stepper motor actuator LIN Bus for

	supply - open circuit	network fault	open circuit
B1B6013	Recirculation servo motor actuator - sensor 5 volt supply	Sensor 5 volt supply - open circuit	Refer to electrical circuit diagrams and test sensor 5 volt supply for open circuit
B1B6111	Pollution sensor HC input - short to ground	Pollution sensor HC input - short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1B6211	Pollution sensor Nox input - short to ground	Pollution sensor Nox input - short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1B6313	Recirculation servo motor actuator - ground circuit	Recirculation servo motor actuator ground - open circuit	Refer to electrical circuit diagrams and test recirculation servo motor actuator ground for open circuit
B1B6711	Recirculation servo potentiometer - short to ground	Recirculation servo potentiometer circuit - short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1B6715	Recirculation servo potentiometer - short to power, open circuit	Recirculation servo potentiometer circuit - short to power, open circuit	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1B6801	Recirculation servo motor fault	- Recirculation servo potentiometer circuit - short to power, ground, open circuit - Recirculation door/linkage broken	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1B7111	Evaporator temperature sensor - short to ground	Evaporator temperature sensor circuit - short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system

B1B7115	Evaporator temperature sensor - short to power, open circuit	Evaporator temperature sensor circuit - short to power, open circuit	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1B7211	Stepper motor actuator LIN Bus power supply - short to ground	Stepper motor actuator LIN Bus power supply - short to ground	Refer to electrical circuit diagrams and test stepper motor actuator LIN Bus power supply for short to ground
B1B7400	Defrost stepper motor actuator fault	Internal or external fault - under/over voltage	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1B7449	Defrost stepper motor actuator fault	Internal electronic fault - motor over temperature	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1B7500	Panel/foot stepper motor actuator fault	Internal or external fault - under/over voltage	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1B7549	Panel/foot stepper motor actuator fault	Internal electronic fault - motor over temperature	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1B7600	Front left air blend stepper motor actuator fault	Internal or external fault - under/over voltage	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1B7649	Front left air blend stepper motor actuator fault	Internal electronic fault - motor over temperature	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1B7700	Front right air blend stepper motor actuator fault	Internal or external fault - under/over voltage	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system

B1B7749	Front right air blend stepper motor actuator fault	Internal electronic fault - motor over temperature	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1B7884	Air conditioning system under pressure	- Signal below allowable range - System leak - Incorrect refrigerant charge weight	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check system for leaks. Charge system with correct weight of refrigerant
B1B7885	Air conditioning system over pressure	Signal above allowable range	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U001088	Medium speed CAN communication	Bus off	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U030000	Internal control module software incompatibility	Invalid configuration message is received	Re-configure the RJB using the manufacturer approved diagnostic system. Clear the DTC and retest. If the DTC is still logged suspect the climate control module, refer to the new module installation note at the top of the DTC Index
U1A1449	Failed to initialise CAN	Internal electronic failure	Install a new climate control module, refer to the new module installation note at the top of the DTC Index
U300055	Stored vehicle configuration data does not match	Incorrect car configuration data received	Re-configure the RJB using the manufacturer approved diagnostic system. Clear DTC and re-test. If the DTC remains suspect the climate control module, refer to the new module installation note

			at the top of the DTC Index
U300087	Control Module	Missing message	Re-configure the RJB using the manufacturer approved diagnostic system. Check climate control module for DTCs and refer to the DTC Index. Check CAN network integrity using the manufacturer approved diagnostic system
U300281	Vehicle Identification Number (VIN)	Vehicle/component mismatch. Corrupt VIN data being transmitted, module previously installed to other vehicle	Install original module, check for DTCs and refer to relevant DTC Index

Ambient Air Temperature Sensor (82.20.02)

Removal

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

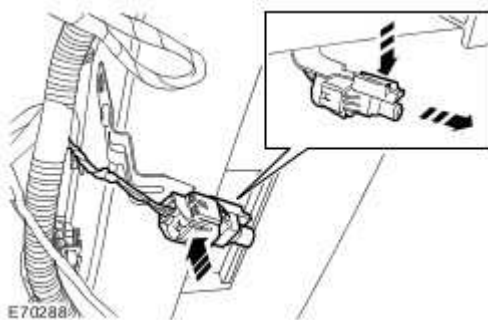
Raise and support the vehicle.

- 2 . Remove the radiator splash shield.
For additional information, refer to Radiator Splash Shield (76.22.90)

- 3 . Remove the ambient air temperature sensor.

➤ Disconnect the electrical connector.

➤ Carefully release the clip.



Installation

- 1 . Install the ambient air temperature sensor.

 Secure the clip.

 Connect the electrical connector.

2 . Install the radiator splash shield.

For additional information, refer to Radiator Splash Shield (76.22.90)

Removal

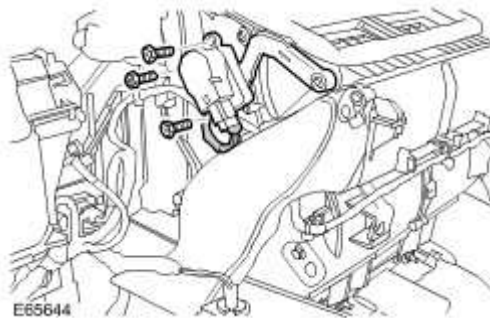
- 1 . Remove the cover and disconnect the battery ground cable.
For additional information, refer to
- 2 . Remove the instrument panel.
For additional information, refer to Instrument Panel (76.46.01)

3 . NOTE:

Note the relationship between the servo motor drive and the vent flap.

Remove the servo motor assembly.

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



Installation

- 1 . Install the servo motor assembly.
 - ▶ Align the servo motor drive.
 - ▶ Install the screws.
 - ▶ Connect the electrical connector.

2 . Install the instrument panel.

For additional information, refer to Instrument Panel (76.46.01)

3 . Connect the battery ground cable and install the cover.

For additional information, refer to

Defrost Vent/Register Blend Door Actuator RH

Removal

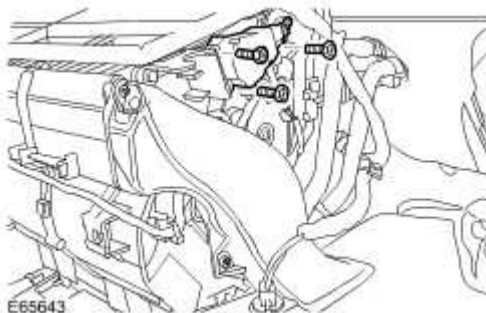
- 1 . Remove the cover and disconnect the battery ground cable.
For additional information, refer to
- 2 . Remove the instrument panel.
For additional information, refer to Instrument Panel (76.46.01)
- 3 . **NOTE:**

Note the relationship between the servo motor drive and the vent flap.

Remove the servo motor assembly.

➤ Disconnect the electrical connector.

➤ Remove the 3 screws.



Installation

- 1 . Install the servo motor assembly.
➤ Align the servo motor drive.
➤ Install the screws.

 Connect the electrical connector.

2 . Install the instrument panel.

For additional information, refer to Instrument Panel (76.46.01)

3 . Connect the battery ground cable and install the cover.

For additional information, refer to

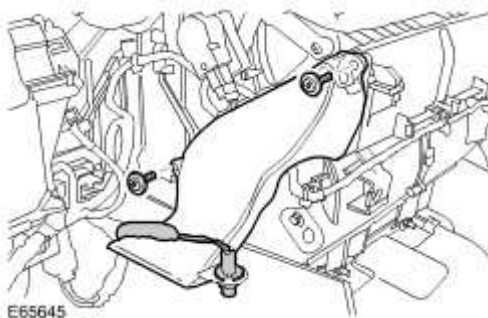
Footwell Vent/Duct Blend Door Actuator LH

Removal

- 1 . Remove the cover and disconnect the battery ground cable.
For additional information, refer to
- 2 . Remove the instrument panel.
For additional information, refer to Instrument Panel (76.46.01)
- 3 . Remove the LH side footwell heater duct.

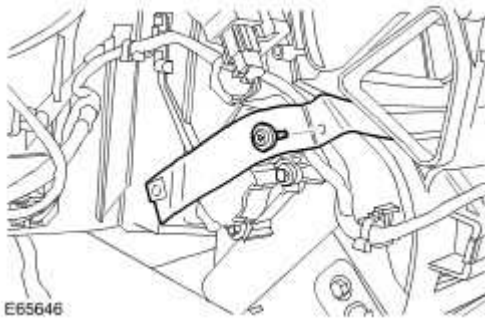
▶ Release the lampholder.

▶ Remove the 2 screws.



- 4 . Remove the support bracket.

▶ Remove the screw.



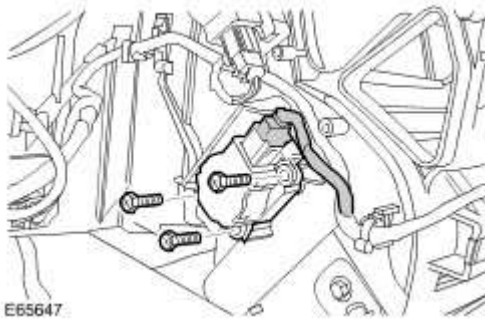
5 . NOTE:

Note the relationship between the servo motor drive and the vent flap.

Remove the servo motor assembly.

➤ Disconnect the electrical connector.

➤ Remove the 3 screws.



Installation

1 . Install the servo motor assembly.

➤ Align the servo motor drive.

➤ Install the screws.

➤ Connect the electrical connector.

2 . Install the support bracket.

 Install the screw.

3 . Install the LH side footwell heater duct.

 Install the screws.

4 . Install the instrument panel.

For additional information, refer to Instrument Panel (76.46.01)

5 . Connect the battery ground cable and install the cover.

For additional information, refer to

In-Vehicle Temperature Sensor (82.20.03)

Removal

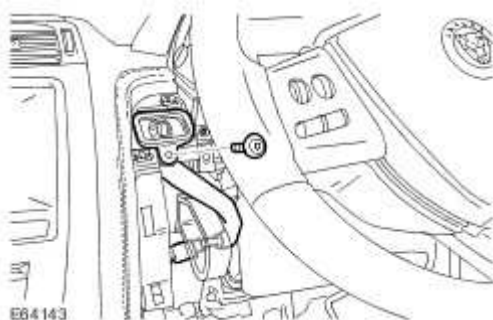
- 1 . Remove the instrument panel, lower trim panel.

For additional information, refer to Instrument Panel Lower Trim Panel (76.46.11)

- 2 . Remove the in-vehicle temperature sensor.

▶ Remove the Torx screw.

▶ Disconnect the electrical connector.



Installation

- 1 . Install the in-vehicle temperature sensor.

▶ Position the electrical harness.

▶ Connect and secure the electrical connector.

▶ Install the Torx screw.

- 2 . Install the instrument panel, lower trim panel.

For additional information, refer to Instrument Panel Lower Trim Panel (76.46.11)

Recirculation Blend Door Actuator (82.20.67)

Removal

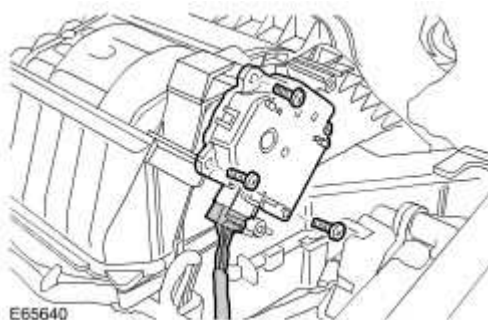
- 1 . Remove the cover and disconnect the battery ground cable.
For additional information, refer to
- 2 . Remove the instrument panel.
For additional information, refer to Instrument Panel (76.46.01)
- 3 . **NOTE:**

Note the relationship between the servo motor drive and the vent flap.

Remove the servo motor assembly.

▶ Disconnect the electrical connector.

▶ Remove the 3 screws.



Installation

- 1 . Install the servo motor assembly.
▶ Align the servo motor drive.
▶ Install the screws.

 Connect the electrical connector.

2 . Install the instrument panel.

For additional information, refer to Instrument Panel (76.46.01)

3 . Connect the battery ground cable and install the cover.

For additional information, refer to

Sunload Sensor (82.20.70)

Removal

1

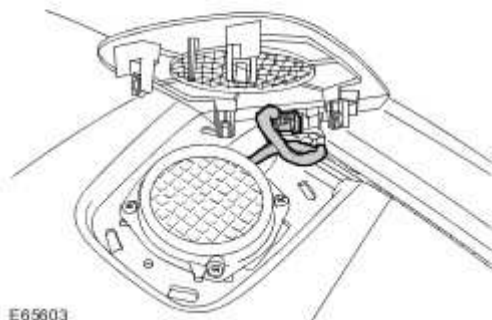
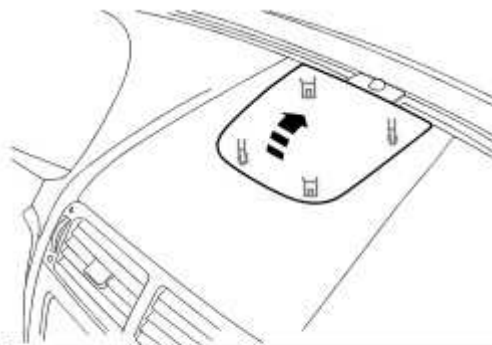


CAUTION: Protect the surrounding trim from damage when changing the component.

Remove the center speaker grille.

▶ Carefully release the 4 clips.

▶ Disconnect the electrical connector.



2 . Remove the sunload sensor.

▶ Remove the 2 screws.



Installation

1 . Install the sunload sensor.

▶ Install the screws.

2 . Install the center speaker grille.

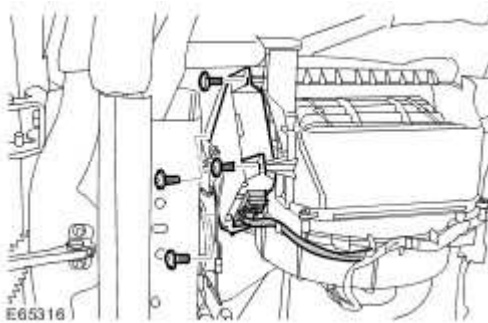
▶ Connect the electrical connector.

▶ Secure the clips.

Climate Control Module

Removal

- 1 . Remove the cover and disconnect the battery ground cable.
For additional information, refer to
- 2 . Remove the instrument panel.
For additional information, refer to Instrument Panel (76.46.01)
- 3 . Remove the A/C control module.
 - ▶ Remove the 4 Torx screws.
 - ▶ Disconnect the electrical connector.



Installation

- 1 . Install the A/C control module.
 - ▶ Install the Torx screws.
 - ▶ Connect the electrical connector.
- 2 . Install the instrument panel.
For additional information, refer to Instrument Panel (76.46.01)

3 . Connect the battery ground cable and install the cover.

For additional information, refer to

4 . Connect WDS to the vehicle and configure a new module.

Climate Control Assembly (82.20.07)

Removal

NOTE:

Removal of this component is part of the audio removal procedure.

- 1 . Disconnect the battery ground cable.
- 2 . Remove the audio unit.
For additional information, refer to Audio Unit (86.50.03)

Installation

- 1 . Install the audio unit.
For additional information, refer to Audio Unit (86.50.03)
- 2 . Connect the battery ground cable.

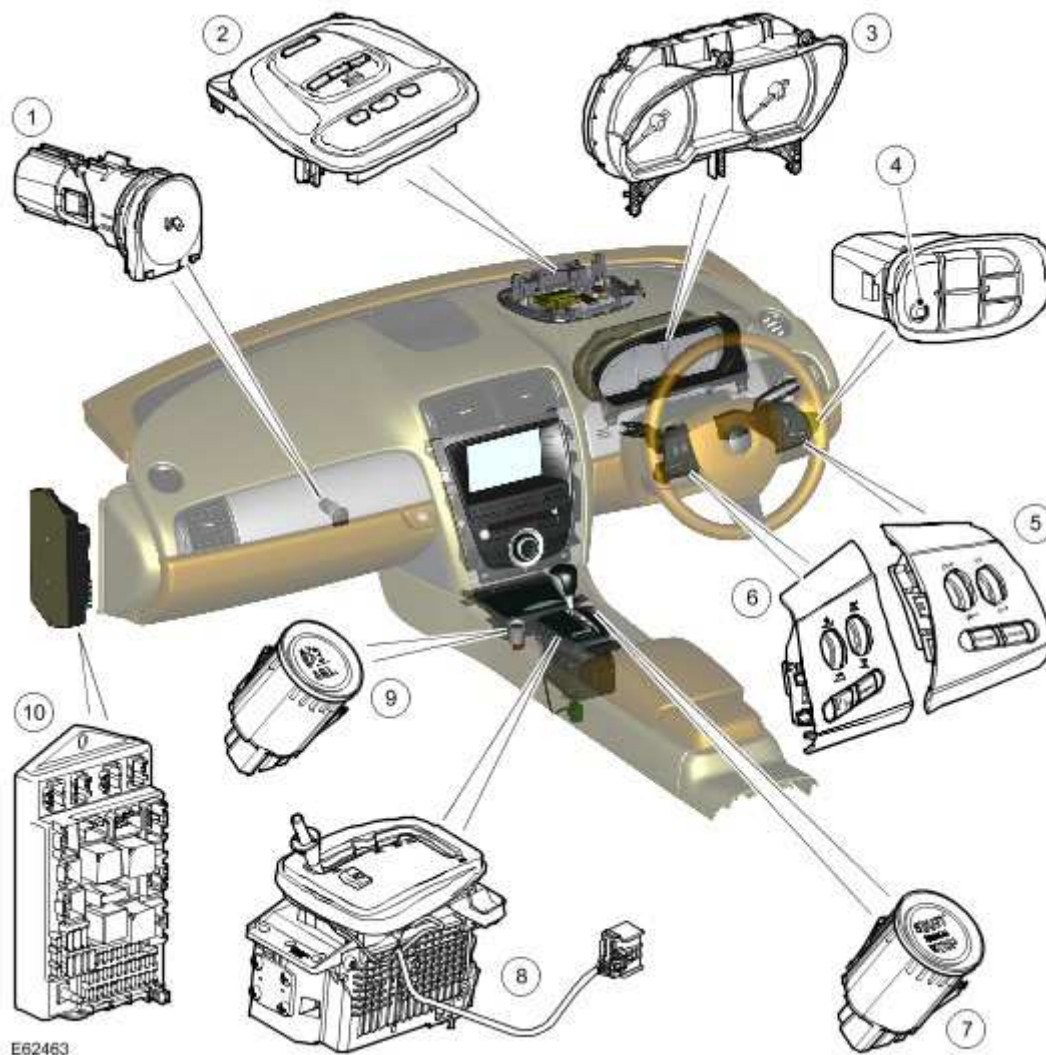
413 : Instrumentation and Warning Systems

413-00 : Instrumentation Cluster and Panel Illumination

Description and operation

Instrument Cluster and Panel Illumination

COMPONENT LOCATION



E62463

Item	Part Number	Description
------	-------------	-------------

1		Accessory power socket
2		Overhead console
3		Instrument cluster
4		Illumination switch
5		Right-Hand (RH) steering column multifunction switch
6		Left-Hand (LH) steering column multifunction switch
7		Start/stop switch
8		Gear shift module
9		Automatic speed limiter switch
10		Central Junction Box (CJB)

INTRODUCTION

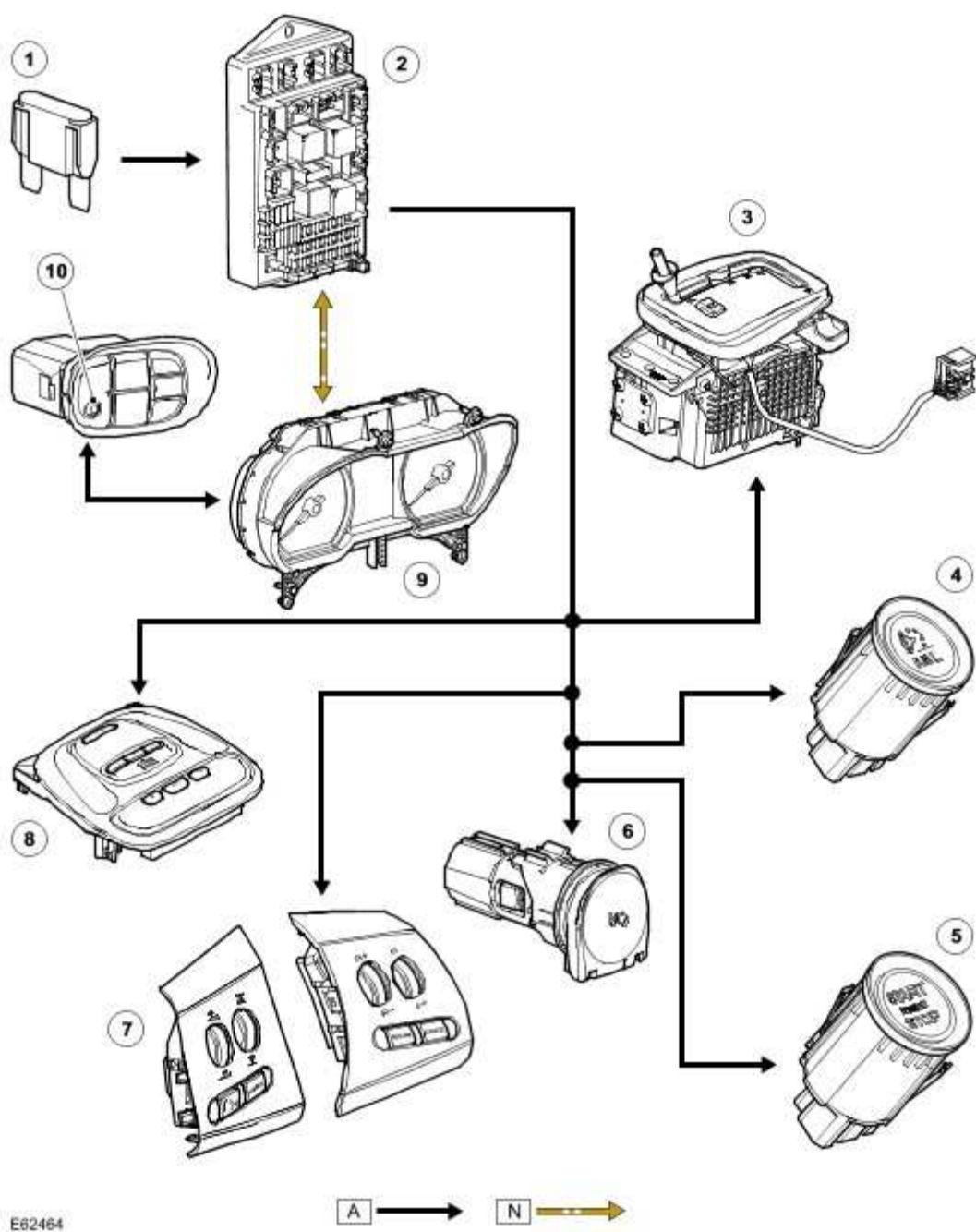
Instrument cluster and panel illumination is achieved through a series of Light Emitting Diodes (LED's) located throughout the interior of the vehicle. The intensity of illumination can be controlled by the driver through a rotary control located on the lower drivers side of the instrument panel. The rotary control is integral with the auxiliary lighting switch.

The rotary control is a variable resistor which is used as a potential divider to provide a high or low voltage according to its set position. The voltage returned to the instrument cluster is converted into a dimmer control positional message and transmitted to the CJB over the medium speed Controller Area Network (CAN) bus. The CJB converts the illumination intensity message into a Pulse Width Modulation (PWM) signal which it supplies to the instrument panel and switch illumination LED.

CONTROL DIAGRAM

NOTE:

A = Hardwired; **N** = Medium speed CAN bus



E62464

Item	Part Number	Description
1		Megafuse (175A)
2		CJB
3		Gear shift module
4		Automatic speed limiter switch

5		Start/stop switch
6		Accessory power socket
7		Steering column multifunction switches
8		Overhead console
9		Instrument cluster
10		Illumination switch

Instrument Cluster and Panel Illumination

Principle of Operation

For a detailed description of the Instrument Cluster and Panel Illumination, refer to the relevant Description and Operation section in the workshop manual.

Instrument Cluster and Panel Illumination

Inspection and Verification

1 . Verify the customer concern.

2 . Visually inspect for obvious signs of mechanical or electrical damage.

Mechanical	Electrical
- Fluid level(s) - Accessory installations	- Bulbs(s) - Fuse(s) - Wiring harness - Electrical connector(s) - Engine compartment components - Underbody components - Instrument cluster - Dimmer switch - Headlamp switch - Autolamp sensor

3 . If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.

4 . If the cause is not visually evident, verify the symptom and refer to the manufacturer approved diagnostic system.

413-01 Instrumenation Cluster

Specifications

Specifications

Torque Specifications

Item	Nm	lb-ft	lb-in
Instrument cluster surround - screw	1	-	9
Instrument cluster - screw	1.5	-	13

Instrument Cluster

COMPONENT LOCATION



E63299

Item	Part Number	Description
1		Speedometer
2		Message center
3		Tachometer

INTRODUCTION

The instrument cluster is located in the instrument panel, above the steering column. The instrument cluster comprises analogue gauges, an Liquid Crystal Display (LCD) message center to provide vehicle operation details to the driver and a number of indicator lamps to display system status.

The message center is a LCD located in a central position in the cluster. The message center displays system status information including fuel quantity remaining.

The instrument cluster also functions as an intelligent controller for a number of other vehicle systems, for example column adjust positions, steering column multifunction switch inputs, steering Servotronic control.

The instrument cluster is the gateway for the high speed and medium speed Controller Area Network (CAN) and is also connected to the Local Interconnect Network (LIN) bus to the start control unit and the steering wheel module.

ANALOGUE GAGES

Speedometer

The speedometer is located on the Left Hand (LH) side of the cluster and is available in three market variants:

- major scale Miles Per Hour (MPH), minor scale kilometers per hour (km/h)
- major scale km/h, minor scale MPH
- major scale km/h only.

The speedometer is driven by high speed CAN signals transmitted by the Anti-lock Brake System (ABS) module. The wheel speeds are measured by sensors reading the rotational speed of the rear wheels from toothed targets on the hubs. An average of the two wheel speeds are passed from the sensors to the ABS module in the form of pulsed signals. The ABS module converts these signals into a speed output on the high speed CAN to the instrument cluster.

The same speed outputs from the wheel speed sensors are also used to calculate the distance the vehicle has travelled.

Tachometer

The tachometer is located on the Right Hand (RH) side of the instrument cluster and displays engine speeds up to 8000 Revolutions Per Minute (RPM) on naturally aspirated models and 7000 RPM on supercharged models.

The tachometer is driven by an engine speed signal transmitted on the high speed CAN from the Engine Control Module (ECM). The signal is derived from the Crankshaft Position (CKP) sensor. The signal is received by the instrument cluster microprocessor and the output from the microprocessor drives the tachometer.

LCD DISPLAY

In the area above and below the message center is a LCD display. The area below the message center displays a linear fuel gage, odometer, trip distance and trip computer readouts. The area above the message center displays the transmission gear position information and speed control related information.

NOTE:

There is no engine coolant temperature gage displayed. If the engine coolant temperature increases to above a predetermined threshold, a warning message is displayed in the message center. The message is sent from the ECM in a high speed CAN message to the instrument cluster.

Fuel Gage

The linear fuel gage has a colored bar which moves left or right depending on the tank contents. As the bar moves to the left the fuel tank contents displayed is decreasing. A warning message is displayed in the message center when the fuel tank contents fall to below the reserve level.

The fuel gage is controlled by CAN messages from the Auxiliary Junction Box (AJB). The AJB reads the values output by the fuel level sensors every 131 ms and transmits a fuel tank contents value, corrected for battery voltage, in a CAN message to the instrument cluster.

A fuel pump symbol is displayed to the left of the linear gage. An arrow above the symbol shows the driver on which side of the vehicle the fuel filler cap is located.

Above the linear fuel gage, is a LCD area which displays odometer and trip readouts. When a trip computer function is selected, these are replaced by a trip computer display for the trip function selected.

Transmission Gear Position Display

The gear position display shows selector lever position or selected gear when using the 'Jaguar Sequential Shift'.

The gear selector module transmits a CAN message to the instrument cluster for gear selector lever position. The module also outputs a 'not in park' signal to the instrument cluster.

The Transmission Control Module (TCM) transmits a high speed CAN message to the instrument cluster with data containing the selected gear when in Jaguar Sequential Shift mode.

Message Center

The message center displays system status and warning messages to the driver. For additional information, refer to Information and Message Center (413-08 Information and Message Center)

WARNING INDICATORS



Item	Part Number	Description
1		Anti-lock Braking System (ABS) indicator (USA only)
2		ABS indicator - (Canada/Mexico)
3		ABS indicator - (Rest of World (ROW))
4		Adaptive speed control indicator
5		Adaptive Front lighting System (AFS) indicator
6		Malfunction Indicator Lamp (MIL)
7		Tire Pressure Monitoring System (TPMS) indicator
8		Airbag indicator
9		Front fog lamp indicator
10		RH turn signal indicator
11		Rear fog lamp indicator
12		Dynamic Stability Control (DSC) indicator
13		High beam indicator
14		Side lamp indicator
15		Seat belt indicator

16		Message center
17		Automatic speed limiter
18		Forward alert indicator
19		Brake indicator (USA only)
20		Brake indicator (ROW)
21		LH turn signal indicator

The warning indicators are located in various positions in the instrument cluster. The indicators can be split into two groups; instrument cluster controlled and externally controlled.

Instrument cluster controlled warning indicators are dependant on software logic within the instrument cluster for activation. The cluster software controls the indicator illumination check at ignition on.

Externally controlled indicators are supplied with current from another vehicle system control module or illuminated by the instrument cluster software on receipt of a bus message from another vehicle sub-system. The indicator illumination check at ignition on is also controlled by the sub-system module on these indicators.

CONTROL DIAGRAM

NOTE:

A = Hardwired; **D** = High speed CAN bus; **N** = Medium speed CAN bus; **O** = LIN bus

5		Power distribution box
6		High speed CAN bus to other vehicle systems
7		Medium speed CAN bus to other vehicle systems
8		LIN bus to start control module and steering wheel module
9		Gear selector module
10		Column adjustment switch
11		Column reach and rake adjustment motors
12		Column position potentiometer
13		Oil pressure sensor
14		Steering gear Servotronic valve
15		Steering column RH multifunction switch
16		Steering column LH multifunction switch
17		Auxiliary lighting switch
18		Instrument cluster
19		Light sensor (with integral alarm Light Emitting Diode (LED))

PRINCIPLES OF OPERATION

Warning Indicator Functionality



E74038

Item	Part Number	Description
1		LH turn signal
2		RH turn signal
3		Brake warning
4		Forward alert
5		Automatic speed limiter
6		Adaptive speed control
7		ABS warning
8		AFS warning
9		MIL
10		TPMS warning
11		Airbag warning
12		Front fog lamps
13		DSC warning
14		Seat belt warning

15		Side lamp warning
16		High beam
17		Rear fog lamps

The functionality for each of the above warning indicators is described in the following section.

1 and 2. Turn Signal Indicators

The turn signal indicators are controlled by the Central Junction Box (CJB) on receipt of medium speed CAN signals from the instrument cluster.

The instrument cluster outputs a voltage to the turn signal indicator switch. The switch contains resistors of different values. When the switch is operated in either the LH or RH direction, the voltage is passed to a ground connection in the instrument cluster which detects the reduced voltage supplied via the resistors. When the turn signal indicator switch is operated in the LH or RH direction, the instrument cluster detects the ground voltage and determines whether a LH or RH selection is made.

The instrument cluster transmits a medium speed CAN message to the CJB for operation of the applicable turn signal indicators. The message can contain a number of states for each possible switch position and also an out of range low and high state for circuit faults and an initial value for the switch neutral position. The turn signal indicators are not subject to the 3 second indicator check when the ignition is switched on.

The AJB software controls the flash rate of the warning indicator which sends 'ON' and 'OFF' signals to the instrument cluster which flashes the indicators in a green color. During normal operation, the warning indicator flashes slowly, accompanied simultaneously by a sound from the instrument cluster sounder. If a fault exists, the CJB transmits a message to the instrument cluster which responds by flashing the warning indicator and operating the sounder at double speed to indicate a bulb failure and also displays an appropriate message and vehicle graphic in the message center.

The hazard warning indicators are controlled by the CJB on receipt of a completed ground path from the hazard warning indicator switch. The CJB outputs a medium speed CAN message to the instrument cluster which operates both the LH and RH turn signal indicators simultaneously. The hazard warning indicators can operate with the ignition switched off, therefore the CAN message from the CJB will also carry a 'wake-up' message for the instrument cluster.

3. Brake Warning Indicator

This warning indicator is displayed in a red or amber color (dependant on market) as a brake symbol in all markets except USA which have the word 'BRAKE' in addition to the symbol. The indicator is controlled by high speed CAN messages from the ABS module and the parking brake control module. The indicator is illuminated in a red color for a 3 second indicator check when the ignition is switched on.

The ABS module monitors the fluid level in the brake fluid reservoir using a level switch. If the fluid level falls to below a determined level, the switch contact is broken and the ABS module detects the low fluid level condition. The ABS module issues a CAN message which is received by the instrument cluster which illuminates the warning indicator and displays the message 'BRAKE FLUID LOW' in the message center. The warning indicator can also be illuminated by the ABS module if an Electronic Brake Distribution (EBD) fault is detected.

NOTE:

If both the brake warning indicator and the ABS warning indicator illuminate simultaneously, a major fault in the brake system will have occurred.

The warning indicator also displays parking brake status. When the parking brake is applied, the warning indicator will be illuminated by the instrument cluster and, if the vehicle is moving, the message 'PARK BRAKE APPLIED' will be also displayed in the message center in response to a CAN message from the parking brake control module.

If a condition exists where the parking brake cannot be applied, the parking brake control module issues a CAN message to the instrument cluster which illuminates or flashes (dependant on market) the warning lamp on and off and is accompanied with a message 'CANNOT APPLY PARK BRAKE'. If a fault occurs in the parking brake system, the parking brake control module issues a CAN message to the instrument cluster which illuminates the warning indicator and displays the message 'PARK BRAKE FAULT' in the message center.

4. Forward Alert Indicator

The forward alert system uses the components of the adaptive speed control system to alert the driver of the presence of a vehicle ahead. The system can be turned on and off using a switch located in the auxiliary lighting switch when the adaptive speed control system is off. The indicator is illuminated in an amber color for a 3 second indicator check when the ignition is switched on.

The forward alert system is controlled by the adaptive speed control module. When the switch is pressed, the forward alert system is activated and the adaptive speed control module issues a forward alert active message on the high speed CAN bus to the instrument cluster. The forward alert icon in the instrument cluster will illuminate in an amber color and a 'FORWARD ALERT' message will be displayed in the message center. When the button is pressed a second time, the module issues a forward alert off CAN message. The forward alert system will be deactivated, the forward alert icon will go off and a message 'FORWARD ALERT OFF' will be displayed in the message center.

5. Automatic Speed Limiter (ASL) Indicator

The ASL is controlled by the ECM. An ASL switch is located in the floor console, adjacent to the gear selector lever. When the ASL switch is pressed, this is sensed by the ECM which issues a high speed CAN message to the instrument cluster. The instrument cluster illuminates the ASL warning indicator in an amber color to show the driver that ASL is active. The driver sets the required speed using the speed control SET +/- switches on the steering wheel. The selected speed is shown by the message '

LIMITER SET XXX MPH / K/MH' in the message center. The indicator is illuminated in an amber color for a 3 second indicator check when the ignition is switched on.

ASL can be deselected by pressing the ASL switch, by depressing the throttle pedal initiating kick-down or by pressing the 'cancel' switch on the steering wheel. The ASL indicator will go off and the message center will display the message 'limiter cancelled' for 4 seconds.

If a fault occurs in the ASL system, the ECM will send a message to the instrument cluster to illuminate the ASL indicator and display the message 'LIMITER NOT AVAILABLE'.

6. Adaptive Speed Control Indicator

The adaptive speed control system is controlled by the adaptive speed control module. Operation of the SET +/- switches on the steering wheel will activate the system. Operation of the switches is detected by the adaptive speed control module. The module issues a high speed CAN message to the instrument cluster which illuminates the adaptive speed control indicator, when the system is in 'follow mode', in an amber color and displays a 'SETSPEED XXX MPH / KM/H' message in the message center. The indicator is illuminated in an amber color for a 3 second indicator check when the ignition is switched on.

7. Anti-lock Braking system (ABS) Warning Indicator

The ABS warning indicator is controlled by the ABS module. If a fault in the ABS system is detected by the ABS module, the module issues a high speed CAN message to the instrument cluster to illuminate the ABS warning indicator in an amber color and display the message 'ABS FAULT' in the instrument cluster. The indicator is illuminated in an amber color for a 3 second indicator check when the ignition is switched on. If a fault is present when the ignition is on the bulb will remain illuminated after the 3 second indicator check period.

NOTE:

The 'ABS FAULT' message is not displayed in NAS markets.

NOTE:

If both the ABS warning indicator and the brake warning indicator illuminate simultaneously, a major fault in the brake system will have occurred.

On all vehicles except NAS, the ABS warning indicator is also used for parking brake faults. The indicator in these markets illuminates in an amber color and displays a brake symbol without the text 'ABS' in the icon.

On NAS vehicles, the ABS warning indicator is only used for ABS. The warning indicator has 'ABS' on the icon and will illuminate in a amber color for ABS faults only.

8. Adaptive Front light System (AFS) Warning Indicator

The AFS warning indicator is controlled by the AFS control module. The AFS warning indicator illuminates in an amber color if a fault in the AFS system is detected by the control module. If a fault in another system occurs which prevents AFS operation, the warning indicator will flash. The indicator is illuminated by the instrument cluster on receipt of a high speed CAN message from the AFS control module. The indicator is illuminated in an amber color for a 3 second indicator check when the ignition is switched on.

9. Engine Malfunction Indicator Lamp (MIL)

The MIL warning indicator is controlled by the ECM and illuminated by the instrument cluster on receipt of a message on the high speed CAN bus from the Engine Control Module (ECM). The indicator is illuminated in an amber color for a 3 second indicator check when the ignition is switched on.

If the MIL remains illuminated after the engine is started or illuminates when driving, a fault is present and must be investigated at the earliest opportunity. Illumination of the MIL warning indicator alerts the driver to an On-Board Diagnostic (OBD) fault which will cause excessive emissions output. This may relate to either an engine management system fault or a transmission fault.

10. Tire Pressure Monitoring System (TPMS) Warning Indicator

The TPMS warning indicator is illuminated by the instrument cluster on receipt of a medium speed CAN message from the TPMS module. The indicator is illuminated in an amber color for a 3 second indicator check when the ignition is switched on.

If the indicator illuminates and is accompanied by the message 'TYRE PRESSURE SYSTEM FAULT' in the message center, then a TPMS fault has occurred. If the indicator illuminates and accompanied by a different message, then a low tire pressure has been detected, a spare wheel has been fitted or a TPMS sensor has failed.

11. Airbag Warning Indicator

The airbag warning indicator is controlled by the instrument cluster. The indicator is illuminated in an amber color for the 3 second indicator check when the ignition is switched on. The indicator remains illuminated after the 3 second period has expired until the instrument cluster receives a turn off message on the high speed CAN bus from the Restraints Control Module (RCM).

12. Front Fog Lamp Indicator

The green colored front fog lamp indicator is controlled by the CJB and illuminated by the instrument cluster on receipt of a front fog lamp on message on the medium speed CAN bus from the CJB. The indicator is illuminated for as long as the front fog lamps are active. The front fog lamp indicator is not subject to the 3 second indicator check when the ignition is switched on.

13. Dynamic Stability Control (DSC) Indicator

The DSC warning lamp is controlled by the ABS module and illuminated by the instrument cluster in response to messages received on the high speed CAN bus. The indicator is illuminated in an amber color for the 3 second indicator check when the ignition is switched on.

The DSC warning indicator, are permanently illuminated in an amber color if the instrument cluster receives a high speed CAN message from the ABS module relating to one of the following faults:

- Traction control fault
- Yaw control fault
- Engine drag torque control fault
- Panic Brake Assist (PBA) fault
- Signal missing relating to either traction control active, yaw control active or DSC switch input.

The above faults will also generate an applicable DSC and ABS warning message in the message center.

The DSC warning indicator will flash at 2 Hz for if the traction control or yaw control is active when the DSC system is enabled.

If the DSC system is switched off, the warning indicator will be permanently illuminated until the DSC system is subsequently re-activated.

14. Safety Belt Warning Indicator

The safety belt warning indicator operates for both the driver and passenger safety belts. The warning indicator is controlled by the RCM and illuminated by the instrument cluster on receipt of high speed CAN bus messages. The safety belt warning indicator is not subject to the 3 second indicator check when the ignition is switched on.

The operation of the passenger seat buckle switch is as described below with the exception that the instrument cluster must receive a hardwired signal from the belt minder control module to indicate that a passenger is occupying the seat.

The safety belt warning indicator is subject to a timer. The warning indicator is activated when the following conditions exist:

- Ignition is switched on
- One of the front seat belts is unbuckled
- USA market only - 75 seconds has elapsed after ignition on mode is selected
- Vehicle is not in reverse gear
- Vehicle speed is more than 8 km/h (5 mph).

Once the above parameters are met, the instrument cluster flashes the warning indicator at 2 Hz for 10 seconds accompanied by a simultaneous chime. After 10 seconds the chime ceases and the warning indicator is permanently illuminated for 20 seconds. This sequence is repeated every 30 seconds until one of the following events occurs:

- 300 seconds has elapsed
- The safety belt of the occupied front seats is fastened
- The ignition is switched to off mode

- The vehicle speed decreases to below 5 km/h (3 mph).

NOTE:

On USA market vehicles, the warning indicator is not permanently illuminated.

In certain markets the belt minder function can be enabled and disabled using the driver safety belt switch. For additional information, refer to [Safety Belt System \(501-20A Safety Belt System\)](#)

15. Side Lamp Indicator

The instrument cluster controls the green colored side lamp indicator on receipt of a side lamp status message on the medium speed CAN bus from the CJB and the AJB. The lighting switch on the Left Hand (LH) steering column multifunction switch is connected to the instrument cluster. Selections using this switch are detected by the cluster which requests the side or headlamp operation via a CAN message to the CJB and the AJB. The CJB and the AJB responds with a side lamp active message and the cluster illuminates the side lamp indicator. The side lamp indicator is not subject to the 3 second indicator check when the ignition is switched on.

16. High Beam Indicator

The instrument cluster controls the blue colored high beam indicator on receipt of a high beam status message on the medium speed CAN bus from the CJB. The lighting switch on the Left Hand (LH) steering column multifunction switch is connected to the instrument cluster. High beam or flash selections using this switch are detected by the cluster which requests the light operation via a CAN message to the CJB. The CJB responds with a high beam active message and the cluster illuminates the high beam indicator. The high beam indicator is not subject to the 3 second indicator check when the ignition is switched on.

17. Rear Fog Lamp Indicator

The amber colored rear fog lamp indicator is controlled by the AJB and illuminated by the instrument cluster on receipt of a rear fog lamp on message on the medium speed CAN bus from the AJB. The indicator is illuminated for as long as the rear fog lamps are active. The rear fog lamp indicator is not subject to the 3 second indicator check when the ignition is switched on.

Instrument Cluster

Principle of Operation

For a detailed description of the instrument cluster, refer to the relevant Description and Operation section in the workshop manual.

Instrument Cluster

Inspection and Verification

- 1 . Verify the customer concern.
- 2 . Visually inspect for obvious signs of damage and system integrity.

Mechanical	Electrical
- Fluid level(s) - Accessory installations	- Fuse(s) - Wiring harness - Electrical connector(s) - Instrument cluster - Central Junction Box (CJB) - Engine Junction Box (EJB) - Driver Door Module (DDM) - Engine Control Module (ECM)

3 . If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.

4 . If the cause is not visually evident, check for DTCs and refer to the DTC Index.

DTC Index



CAUTION: When probing connectors to take measurements in the course of the pinpoint tests, use the adaptor kit, part number 3548-1358-00

NOTE:

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

NOTE:

Generic scan tools may not read the codes listed, or may read only five digit codes. Match the five digits from the scan tool to the first five digits of the seven digit code listed to identify the fault (the last two digits give extra information read by the manufacturer-approved diagnostic system).

NOTE:

When performing voltage or resistance tests, always use a digital multimeter (DMM) accurate to three decimal places and with a current calibration certificate. When testing resistance, always take the resistance of the DMM leads into account.

NOTE:

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

NOTE:

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

DTC	Description	Possible Cause	Action
B100811	Wiper mode switch	• Circuit short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B100815	Wiper mode switch	• Circuit short to battery or open	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B100951	Ignition authorisation	• Faulty instrument cluster • Target SID re-synchronisation error following programming • CAN fault	Check ignition, power and ground supplies to CJB and instrument cluster. Re-synchronize ID by re-configuring the instrument cluster as a new module. Check CAN

			communications between instrument cluster and tester
B100962	Ignition authorisation signal compare failure	• Low speed CAN fault • CJB fault • Instrument cluster fault • Incorrect module installed (CJB/Instrument cluster) • Target SID synchronisation error following re-programming • Noise/EMC related error	Check CAN communications between CJB and instrument cluster. Check ignition, power and ground supplies to CJB and instrument cluster. Confirm correct module is installed. Re-synchronise ID by re-configuring the instrument cluster as a new module. Check CAN network for interference/EMC related issues
B100987	Ignition authorisation	• CJB fault • Low speed CAN fault • Instrument cluster fault • Low battery voltage <9V	Check power and ground supplies to CJB and instrument cluster. Check CAN network between CJB and instrument cluster. Check battery is fully charged and in serviceable condition, refer to the battery care manual
B104611	Front fog lamp control switch	• Circuit short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B104615	Front fog lamp control switch	• Circuit short to battery or open	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B100A62	Fuel pump authorisation signal compare failure	• Low speed CAN fault • RJB fault • Instrument cluster fault • Incorrect module installed (RJB/Instrument cluster) • Write target SID synchronisation error following re-programming • Noise/EMC related error	Check CAN communications between RJB and instrument cluster. Check power and ground supplies to RJB and instrument cluster. Confirm correct module installed. Re-synchronise ID by re-configuring the RJB as a new module. Check CAN network for interference/EMC related issues

B100A64	Fuel Pump authorisation	• Write target SID synchronisation error following re-programming • RJB fault • Low speed CAN fault	Re-synchronise ID by re-configuring the RJB as a new module. Check ignition, power and ground supplies to RJB and instrument cluster. Check CAN network between RJB and instrument cluster
B100A87	Fuel pump authorisation	• RJB fault • Low speed CAN fault • Instrument cluster fault • Low battery voltage < 9 volts	Check power and ground supplies to RJB and instrument cluster. Check CAN network between RJB and instrument cluster. Check battery is fully charged and in serviceable condition, refer to the battery care manual
B100B67	Column lock ground authorisation	• Instrument cluster fault • Low speed CAN fault • RJB fault • Vehicle speed present when attempting to power steering column lock • Engine speed present when attempting to power steering column lock • Power mode status > four when attempting to perform lock action	Check power and ground supplies to RJB and instrument cluster. Check CAN network between RJB and instrument cluster. Check ABS, ECM and CJB for DTCs and refer to the relevant DTC Index
B100B87	Column lock ground authorisation	• Instrument cluster fault • Low speed CAN fault • RJB fault	Check power and ground supplies to RJB and instrument cluster. Check CAN network between RJB and instrument cluster
B100C67	Column lock supply authorisation	• Instrument cluster fault • Low speed CAN fault • CJB fault • Vehicle speed present when attempting to power steering column lock • Engine speed present when attempting to power steering column lock • Power mode status > four when attempting to perform	Check power and ground supplies to CJB and instrument cluster. Check CAN network between CJB and instrument cluster. Check ABS, ECM and CJB for DTCs and refer to the relevant DTC Index

		lock action	
B100C87	Column lock supply authorisation	- Instrument cluster fault - Low speed CAN fault - CJB fault	Check power and ground supplies to CJB and instrument cluster. Check CAN network between CJB and instrument cluster
B100D62	Column lock authorisation - signal compare failure	- CAN fault - Steering column lock fault - Instrument cluster fault - Incorrect module installed (Steering column lock/Instrument cluster) - Target ID synchronisation error following re-programming - Noise/EMC related error	Check CAN network between steering column lock and instrument cluster. Check power and ground supplies to steering column lock and instrument cluster. Confirm the correct modules are installed. Re-synchronize ID by re-configuring the steering column lock as new. Check CAN network for interference/EMC related issues
B100D64	Column lock authorisation - signal plausibility failure	- CAN fault - Steering column lock fault - Instrument cluster fault	Check CAN network to steering column lock. Check power and ground supplies to steering column lock and instrument cluster
B100D87	Column lock authorisation - missing message	- CAN fault - Steering column lock fault - Instrument cluster fault - Low voltage at steering column lock < 8V	Check CAN network between steering column lock and instrument cluster. Check power and ground supplies to steering column lock and instrument cluster
B100D96	Column lock authorisation	- CAN fault - Steering column lock fault - Instrument cluster fault - Low temperature < -30 ° - Low voltage at steering column lock < 8 volts - Restricted bolt movement	Check CAN network between steering column lock and instrument cluster. Check power and ground supplies to steering column lock and instrument cluster. Check there is no torque applied to the steering column/wheel
B10A011	Wiper/washer switch	Circuit short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved

			diagnostic system
B10A015	Wiper/washer switch	• Circuit short to battery or open	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B10A611	Main light switch	• Circuit short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B10A615	Main light switch	• Circuit short to battery or open	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B115C7A	Transfer fuel pump	• Fluid leak or seal failure	For fuel system tests. Fuel Tank and Lines
B1A8511	Ambient light sensor	• Circuit short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1A8515	Ambient light sensor	• Circuit short to battery or open	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1B0100	Key transponder - number of keys stored below minimum number required	• Operator only cycles one key during programming • Instrument cluster, start control unit or key loses power or circuit failure during programming • Faulty key • Unable to programme key due to noise/EMC related issues	Ensure all keys to be programmed are available. Check power and ground supplies to all relevant modules. Replace faulty key. Check CAN network for noise/EMC related issues
B1B0105	Key transponder - start control unit already programmed	• Error following start control unit replacement • Start control unit fault • LIN fault • Instrument cluster fault	Re-synchronize ID by re-configuring the start control unit as new module. Check power and ground supplies to start control unit and

			instrument cluster. Check LIN circuit between start control unit and instrument cluster
B1B0151	Key transponder - start control unit programming error	• LIN fault • Instrument cluster fault • Faulty key • Start control unit fault • Attempted to programme a non-default key	Check LIN circuit between start control unit and instrument cluster. Check power and ground supplies to start control unit and instrument cluster. Ensure new keys are from a known good source
B1B0155	Key transponder - transponder not programmed	• Un-programmed key inserted in start control unit • Non-default key inserted during key programming	Confirm correct keys are being used
B1B0162	Key transponder - start control unit challenge response error	• Instrument cluster fault • Start control unit fault • Incorrect module installed (instrument cluster/start control unit) • Error during or following the write target SID routine • Noise/EMC related issues	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check power and ground supplies to start control unit and instrument cluster. Check correct modules are installed. Re-synchronize ID by re-configuring the start control unit as a new module. Check CAN network for interference/EMC related issues
B1B0164	Key transponder - transponder challenge response error	• LIN fault • Instrument cluster fault • Key fault • Start control unit fault • Error occurred during key programming	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check LIN circuit between start control unit and instrument cluster. Check power and ground supplies to start control unit and instrument cluster. Confirm correct key operation. Re-run key programming
B1B0167	Key transponder - start control unit	• LIN fault • Instrument cluster fault • Key fault • Start control unit fault	Carry out any pinpoint tests associated with this DTC using the manufacturer approved

	invalid response	• Another key in close proximity • Attempted to programme a non default key • IPK Cold initialisation whilst in Ignition On state, without key being present in the SCU • Race condition caused by closing driver door and pressing start button within a small time window • Passive Key search function from last door closed and key inserted in the SCU	diagnostic system. Check LIN circuit between start control unit and instrument cluster. Check ignition, power and ground supplies to start control unit and instrument cluster. Confirm correct key operation. Confirm single key operation. Ensure new keys are from a known good source. Check for intermittent power and ground at instrument cluster. Design condition - advise customer of correct starting sequence. Design condition - determine customer transponder key usage
B1B0187	Key transponder - timer expired	• LIN fault • Instrument cluster fault • Start control unit fault	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check LIN circuit between start control unit and instrument cluster. Check power and ground supplies to start control unit and instrument cluster
B1B3305	Target I.D. transfer - system programming failures	• CAN fault • ECM fault • Instrument cluster fault • ECM or instrument cluster incorrectly configured	Check CAN network between ECM and instrument cluster. Check ignition, power and grounds to ECM and instrument cluster. Re-synchronise ID by re-configuring the instrument cluster as a new module
B1B3362	Target I.D. transfer - signal compare failure	• CAN fault • ECM fault • Instrument cluster fault • Incorrect module installed (ECM/instrument cluster) • Synchronisation error following re-programming • Noise/EMC related error	Check CAN network between ECM and instrument cluster. Check ignition, power and grounds to ECM and instrument cluster. Check correct ECM and instrument cluster installed. Re-synchronise ID by re-configuring the instrument cluster as a new module. Check CAN network for

			interference/EMC related issues
B1B3364	Target I.D. transfer - signal plausibility failure	• CAN fault • ECM fault • Instrument cluster fault • Steering column lock status incomplete • Race condition caused by closing driver door and pressing start button within a small time window	Check CAN network between ECM and instrument cluster. Check ignition, power and grounds to ECM and instrument cluster. Check steering column lock operation. Design condition - advise customer of correct start sequence
B1B3387	Target I.D. transfer - missing message	• CAN fault • ECM fault • Instrument cluster fault • Low battery voltage	Check CAN network between ECM and instrument cluster. Check ignition, power and grounds to ECM and instrument cluster. Check battery is in fully charged and serviceable condition, refer to the battery care manual
B1C3277	Steering column tilt solenoid	• Commanded position not reachable	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1C3294	Steering column tilt solenoid	• Unexpected operation	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1C3312	Steering column tilt feedback signal	• Circuit shorted to battery	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1C3314	Steering column tilt feedback signal	• Circuit short to ground or open	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1C3477	Steering column telescope solenoid	• Commanded position not reachable	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system

B1C3494	Steering column telescope solenoid	Unexpected operation	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1C3512	Steering column telescope feedback signal	Circuit shorted to battery	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1C3514	Steering column telescope feedback signal	Circuit short to ground or open	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1C3611	Steering column tilt/telescope switch	Circuit short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1C4811	Flash to pass switch	Circuit short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1C4815	Flash to pass switch	Circuit short to power or open	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1C5311	Front wiper intermittent data	Circuit short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1C5315	Front wiper intermittent data	Circuit short to power or open	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1D3611	Turn indicator switch	Circuit short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system

B1D3615	Turn indicator switch	• Circuit short to power or open	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1D3711	Wiper switch connection circuit	• Circuit short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1D3715	Wiper switch connection circuit	• Circuit short to power or open	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
C111064	Power steering calibration data	• Signal plausibility failure	Using the manufacturer approved diagnostic system, re-configure the instrument cluster as new
P063511	Power steering control circuit	• Circuit short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
P063512	Power steering control circuit	• Circuit short to power	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
P063513	Power steering control circuit	• Circuit open	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
P063522	Power steering control circuit	• First received speed value above threshold	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
P063544	Power steering control circuit	• Internal Fault - Wrong reply from VAPS driver or NVM checksum error (after ~500ms)	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system

U000188	High speed CAN communication Bus	Bus off, break in connection to bus	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U001088	Medium speed CAN communication Bus	Bus off, break in connection to bus	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U010000	Lost communication with ECM	Missing message	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U010100	Lost communication with TCM	Missing message	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U010300	Lost communication with 'L' gate	Missing message	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U010400	Lost communication with speed control module	Missing message	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U012100	Lost communication with Anti-lock Brake System (ABS) control module	Missing message	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U012600	Lost communication with Passenger Seat Module (PSM)	Missing message	Check PSM for DTCs and refer to DTC Index. Seats
U012700	Lost communication	Missing message	Carry out any pinpoint tests associated with this DTC using

	with Tire Pressure Monitor System (TPMS) module		the manufacturer approved diagnostic system
U012800	Lost communication with Parking Brake control module	Missing message	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U013900	Lost communication with adaptive damping control module	Missing message	Check adaptive damping module for DTCs and refer to DTC Index. Vehicle Dynamic Suspension
U014000	Lost communication with CJB	Missing message	Check CJB for DTCs and refer to DTC Index. Communications Network
U014200	Lost communication with RJB	Missing message	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U015100	Lost communication with Supplemental Restraints System (SRS) module	Missing message	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U015600	Lost communication with Information and Entertainment Module	Missing message	Check information and entertainment module for DTCs and refer to DTC Index
U016400	Lost communication with climate control module	Missing message	Check climate control module for DTCs and refer to DTC Index

U019900	Lost communication with Driver Door Module (DDM)	Missing message	Check DDM for DTCs and refer to DTC Index
U020000	Lost communication with Passengers Door Module (PDM)	Missing message	Check PDM for DTCs and refer to DTC Index
U020600	Lost communication with Convertible Top control module	Missing message	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U020800	Lost communication With Driver Seat Module (DSM)	Missing message	Check DSM for DTCs and refer to DTC Index
U021400	Lost communication with Remote Keyless Entry Module	Missing message	Check Remote Keyless Entry module for DTCs and refer to DTC Index
U024100	Lost communication with Active Front Lighting system	Missing message	Check lighting control module for DTCs and refer to DTC Index
U025000	Lost communication with Pedestrian Protection system module	Missing message	Check Pedestrian Protection system module for DTCs and refer to DTC Index
U025600	Lost communication with Integrated Control Panel	Missing message	Check Integrated Control Panel for DTCs and refer to DTC Index

U030000	Internal control module software incompatibility	RJB car configuration data is not compatible with the instrument cluster	Re-configure the RJB using the manufacturer approved diagnostic system. Clear DTCs and re-test. If DTC still logged, suspect the instrument cluster. Refer to the new module installation note at the top of the DTC Index
U200411	Auxiliary switch pack	Circuit short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U200415	Auxiliary switch pack	Circuit short to power or open	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U300046	Control module	Calibration/parameter memory failure	Install a new instrument cluster. Refer to the new module installation note at the top of the DTC Index
U300049	Control module	Internal electronic failure	Install a new instrument cluster, refer to the new module installation note at the top of the DTC Index
U300055	Stored vehicle configuration data does not match	Incorrect car configuration data received	Re-configure the RJB using the manufacturer approved diagnostic system. Clear DTC and re-test. If the DTC remains suspect the instrument cluster, refer to the new module installation note at the top of the DTC Index
U300087	Control Module	Missing message	Re-configure the RJB using the manufacturer approved diagnostic system. Check instrument cluster for DTCs and refer to the DTC Index. Check CAN network integrity using the manufacturer approved

			diagnostic system
U300281	Vehicle Identification Number (VIN)	Vehicle/component mismatch. Corrupt VIN data being transmitted, module previously installed to other vehicle	Install original module, check for DTCs and refer to relevant DTC Index
U300316	Battery voltage	Circuit voltage below threshold	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U300317	Battery voltage	Circuit voltage above threshold	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U300362	Battery voltage	Signal compare failure	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system

Instrument Cluster (88.20.01)

Removal

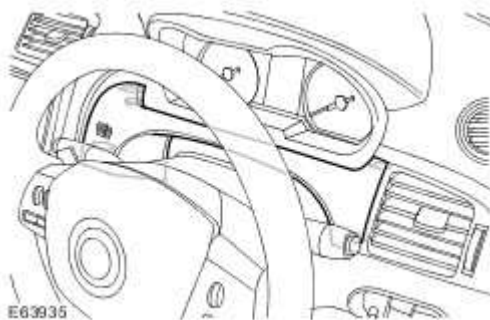
1 NOTE:

Make sure all smart keys are available before a new instrument cluster is installed.

If a new instrument cluster is being installed, all smart keys must be cleared from the passive anti-theft system (PATS), using the Jaguar approved diagnostic equipment prior to the instrument cluster removal.

2 . Remove the instrument panel driver's side reinforcement trim panel.

▶ Carefully release the 4 clips.



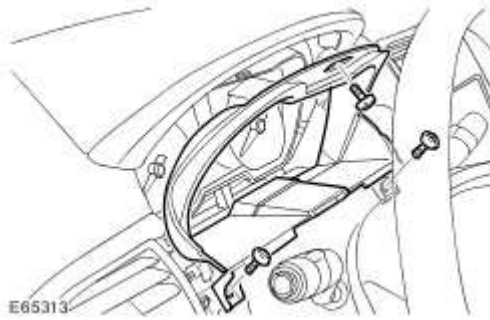
3



CAUTION: Protect the surrounding trim from damage when changing the component.

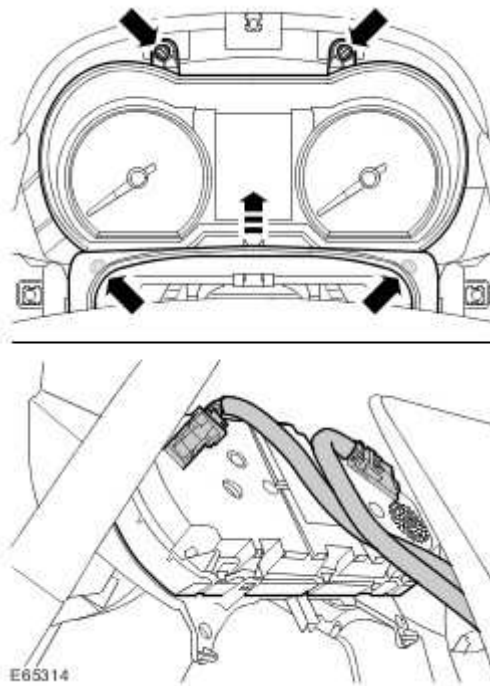
Remove the instrument cluster surround.

▶ Remove the 3 screws.



4 . Remove the instrument cluster.

- ▶ Raise the steering column finisher for access to the lower screws.
- ▶ Remove the 4 screws.
- ▶ Disconnect the 2 electrical connectors.



Installation

1 . Install the instrument cluster.

 Connect and secure the electrical connectors.

 Install the screws.

2 . Install the instrument cluster surround.

 Install the screws.

3 . Install the instrument panel driver's side reinforcement trim panel.

 Align the pegs and secure with the clips.

4 **NOTE:**

Make sure all smart keys are available before the new instrument cluster is installed.

Using the Jaguar approved diagnostic equipment, programme the new instrument cluster and reprogram all of the smart keys to the vehicle.

413-06 : Horn

Specifications

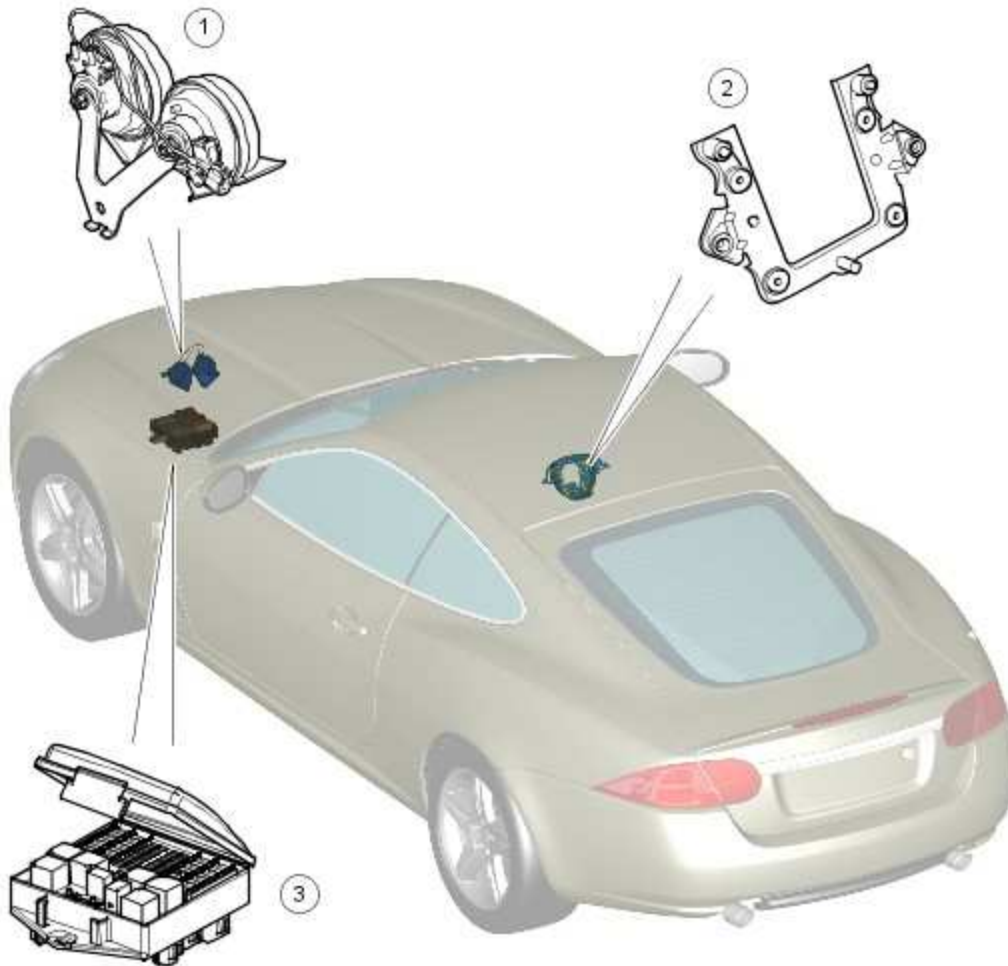
Specifications

Torque Specifications

Item	Nm	lb-ft	lb-in
Horn - stud	25	18	-

Horn

COMPONENT LOCATION



E62425

Item	Part Number	Description
1		Horns
2		Horn switch
3		Horn relay and fuse (15A)

INTRODUCTION

The vehicle horns are operated by pressing the center of the steering wheel. Two horns are fitted to the vehicle; a high tone horn and a low tone horn. Voltage supply to the horns is controlled by the horn relay, which is energised when the horn switch is pressed.

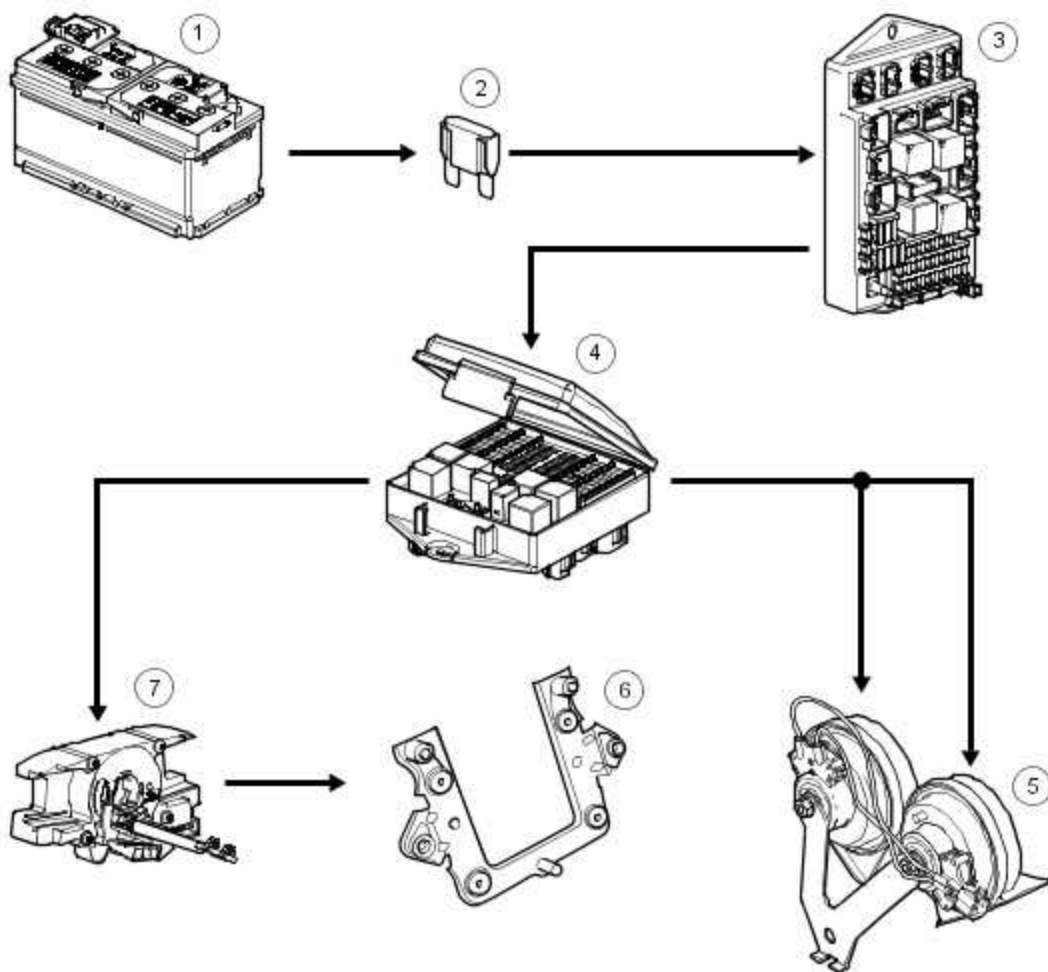
The horn relay is incorporated within the Battery Junction Box (BJB) and when energised provides a supply to both horns simultaneously. Circuit protection is provided by fuse 10 (15A), which is located in the BJB.

The horns are mounted on a bracket, which is secured to the center of the front bumper beam, and form part of the anti-theft system. For additional information, refer to Anti-Theft - Active (419-01A Anti-Theft - Active)

CONTROL DIAGRAM

NOTE:

A = Hardwired



E62426

A →

Item	Part Number	Description
1		Battery
2		Megafuse (175A)
3		Central Junction Box (CJB)
4		Horn relay
5		Horns
6		Horn switch
7		Clock spring

Horn

- 1 . Verify the customer concern.
- 2 . Visually inspect for obvious signs of electrical damage.

Visual Inspection Chart

Electrical
• Fuse(s) • Wiring Harness • Electrical connector(s) • Horn(s) • Relay • Horn switch • Clockspring

- 1 . If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
- 2 . If the cause is not visually evident, verify the symptom and refer to the Jaguar Approved Diagnostic System.

Horn (86.30.02)

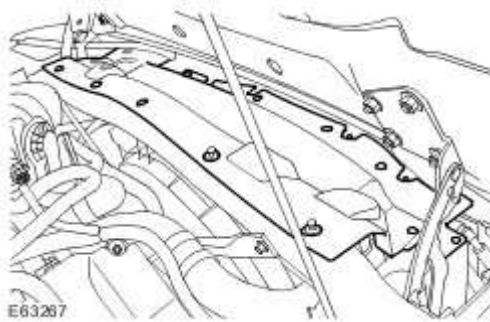
Removal

Vehicles without supercharger

1 . Open the hood.

2 . Remove the fan cowl.

▶ Remove the 15 clips.



Vehicles with supercharger

3



· **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.

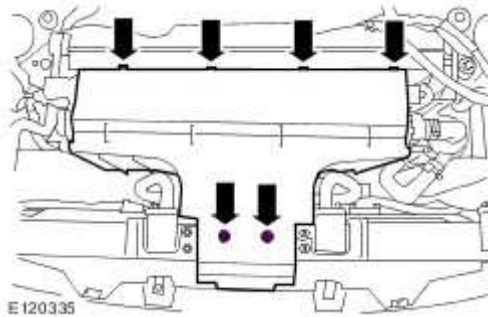
4 . Remove the radiator splash shield.

For additional information, refer to Radiator Splash Shield (76.22.90)

5 . Remove the radiator air deflector.

➤ Remove the 2 scrivets.

➤ Release the 4 clips.



All vehicles

6 . NOTE:

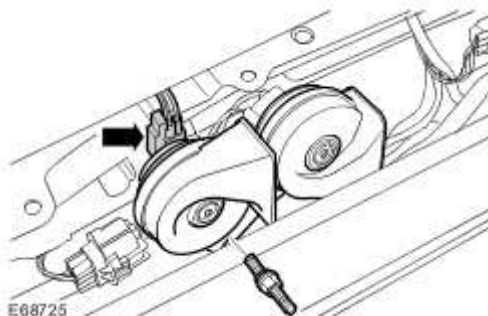
Note the fitted position.

Remove the horn assembly.

➤ Release the clip and position the wiring harness aside for access.

➤ Disconnect the electrical connector.

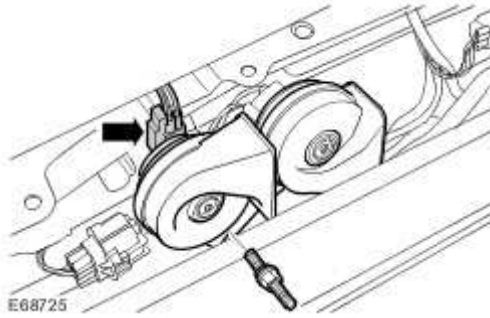
➤ Remove the stud.



Installation

1 . To install, reverse the removal procedure.

- ▶ Connect the electrical connector.
- ▶ Tighten the stud to 25 Nm (18 lb.ft).
- ▶ Secure the electrical harness with the clip.



413-08 : Information and Message Center

Description and operation

Information and Message Center

COMPONENT LOCATION



Item	Part Number	Description
1		Message center

INTRODUCTION

The message center is a Liquid Crystal Display (LCD) located in a central position in the instrument cluster.

The message center displays system information, vehicle status and trip computer information to the driver. The message center is controlled by the instrument cluster and displays system information using CAN and hard wired signals received from other vehicle system control modules.

MESSAGE CENTER

The message center LCD display has a viewable area of 240 pixels horizontal and 315 pixels vertical. It is divided into five information display zones as follows, starting from the top:

- Transmission position
- Set speed
- Warning /message display
- Odometer/Trip computer information
- Fuel level.

The message center is active at all times when the ignition is on and can also be active when the ignition is off, dependant on the information to be displayed.

The message center LCD is displayed at its full brightness when the ignition is on and the exterior lights are off. If the exterior lights have been activated by the AUTO windshield wipers feature, the illumination will remain at full brightness. If the exterior lights are on in any position other than AUTO, then the LCD will be illuminated at a brightness controlled by the illumination dimmer which is located in the auxiliary lighting switch.

If more than one message is active, each message is displayed in turn in the order of priority. Once all messages have been displayed, they are again displayed in turn for 2 seconds each. Warning messages can be displayed when the ignition is in convenience mode which is the initial ignition state when a door is opened.

Message Priority

Messages are assigned priorities which are defined by the effect on driving safety and functional ability of the vehicle. When new messages are displayed they may be accompanied by a chime from the instrument cluster sounder.

A new message will be displayed immediately, providing the currently displayed message (if there is one) has been displayed for at least 4 seconds. A warning indicator will be activated simultaneously with the message being displayed. If more than one fault warning message is being displayed, the messages will cycle, in priority order, with each message being displayed for 2 seconds.

INFORMATION DISPLAY

Transmission Display

The transmission display is located in the upper section of the LCD. The transmission position information is sent from the Transmission Control Module (TCM) in a high speed CAN message to the instrument cluster.

The transmission has three modes of operation:

- Conventional automatic operation (selector in 'D' position)
- Sport automatic operation (selector lever in 'S' position)
- Manual gear operation - Jaguar Sequential Shift

The following table shows the selector lever position and the highlighted indication displayed in the transmission display.

The following table shows the Jaguar Sequential Shift display. Selections are made using the steering wheel mounted paddle switches.

Selector Lever Position	Transmission Display
(P) Park	P
(R) Reverse	R
(N) Neutral	N
(D) Drive	D
(S) Sport	DS

Jaguar Sequential Shift Gear Selection	Transmission Display
First	1
Second	2
Third	3
Fourth	4
Fifth	5
Sixth	6

The transmission may inhibit a requested up or down shift if the requested gear is outside the normal engine speed operating range. If this occurs, the transmission display will briefly display the gear requested by the driver but will then change to display the actual gear selection.

Set Speed Display

The following table shows the possible messages which can be displayed, other visual or audible warnings and a description of the message.

Message	Other Warnings	Reason	Action
LIMITER SET XXX MPH (km/h)	None	Displays new speed setting for the ASL	None
LIMITER STANDBY	None	Displayed when ASL is activated and speed control is selected	None
LIMITER CANCELLED	None	Displayed for 4 seconds when driver deselects ASL	None
OVERLIMIT XXX MPH (km/h)	- Amber ASL warning indicator illuminated at +4.8 km/h (+3 mph) above limit - Amber ASL warning indicator flashing at +24 km/h (+15 mph) above limit - Amber ASL warning indicator flashing and chime emitted at +24 km/h (+15 mph) for a certain time period	Displayed when vehicle speed exceeds the ASL set speed	Reduce vehicle speed to ASL set limit
LIMITER NOT AVAILABLE	None	Displayed when ECM has detected a fault	Use the Integrated Diagnostic System to diagnose fault
SETSPEED XXX MPH (km/h)	None	Displays the new speed input for the speed control	None

DRIVER INTERVENE	None	Immediate action required by the driver to apply the brakes if required	• Apply brakes if required. • May also be displayed if speed control system loses CAN messages when active.
CRUISE NOT AVAILABLE	None	Speed control cannot be engaged	A fault has occurred in the speed control system. Diagnose fault using IDS.
GAP	None	Displays the current set or default adaptive speed control distance. Displayed along with a vehicle graphic in the LCD.	If required, adjust distance using the steering wheel switches.
RADAR SENSOR BLOCKED	None	The adaptive speed control radar sensor has become dirty or obstructed.	Remove obstruction or clean the radar sensor.
FORWARD ALERT OFF	None	Forward alert has been switched off. No warning will be given for objects in the vehicles forward direction.	None
FORWARD ALERT	None	Forward alert has been switched on or the gap settings have changed.	None
CRUISE OVERRIDE	None	Driver has pressed the accelerator pedal, overriding the speed control system. Message will go off when accelerator pedal is released and speed control is active.	WARNING: Adaptive cruise braking will be disabled when this message is displayed.
CRUISE CANCELLED	None	Driver has cancelled speed control or the brake pedal has been pressed.	Re-activate the speed control system or press the 'Resume' switch on the steering wheel.

CRUISE STANDBY	None	Displayed when speed control is activated and ASL is selected	None
CRUISE ENGAGED	None	Displayed when speed control is active	None
TOO FAST TO RESUME	None	Displayed when 'Resume' switch is pressed but vehicle speed is 30 km/h (18 mph) above the set speed.	Reduce vehicle speed to set speed then press 'Resume' switch.

Warning/Message Display

Warning and information messages are displayed in the central area of the LCD. When no messages are required, an analogue clock is present on the display.

The message display language can be changed by the driver using a selection menu on the Touch Screen Display (TSD).

The following table shows the possible messages which can be displayed, other visual or audible warnings and a description of the message.

Message	Other Warnings	Reason	Action
FUEL LEVEL LOW	Amber warning triangle illuminated in LCD.	Fuel level has reached 1/16 of tank capacity - Fuel range approximately 48 -64 km/h (30 to 40 miles).	Refuel vehicle at earliest opportunity.
FUEL PUMP SYSTEM FAULT	Amber warning triangle illuminated in LCD.	Fuel system fault detected by the instrument cluster checking the signals from the auxiliary junction box. Only detected if the left hand fuel level sensor shows nearly full and the right hand fuel level sensor shows nearly empty.	A fault has occurred in the fuel system. Check fuel pump operation.
WASHER FLUID LOW	Amber warning triangle illuminated in LCD.	Washer fluid level has become low and activated low level switch.	Refill washer fluid reservoir.

DOOR OPEN	Red warning triangle illuminated in LCD. Vehicle graphic displayed showing open door(s).	Door(s) open.	Close door(s).
BOOT OPEN	Red warning triangle illuminated in LCD. Vehicle graphic displaying open liftgate.	Liftgate open.	Close liftgate.
BONNET OPEN	Red warning triangle illuminated in LCD. Vehicle graphic showing open hood.	Hood open.	Close hood.
COLUMN ADJUST	None	Column adjust switch has been moved to the column position.	None
COLUMN ADJUST AUTO	None	Column is operating in auto adjust memory mode.	None
MEMORY 1 RECALLED	None	Memory 1 button pressed or Smart Key assigned to memory 1 sensed in vehicle by Keyless Vehicle Module.	None
MEMORY 2 RECALLED	None	Memory 2 button pressed or Smart Key assigned to memory 1 sensed in vehicle by Keyless Vehicle Module.	None
MEMORY 3 RECALLED	None	Memory 3 button pressed or Smart Key assigned to memory 1 sensed in vehicle by Keyless Vehicle Module.	None
MEMORY 1 SETTINGS SAVED	None	New memory settings assigned to memory 1.	None
MEMORY 2 SETTINGS SAVED	None	New memory settings assigned to memory 2.	None

MEMORY 3 SETTINGS SAVED	None	New memory settings assigned to memory 3.	None
CHECK PEDESTRIAN SYSTEM	Red warning triangle illuminated in LCD.	A fault is present in the pedestrian protection system when no accident or deployment has occurred.	A fault has occurred in the pedestrian protection system. Interrogate pedestrian protection system control module for faults and diagnose fault using IDS.
INERTIA SWITCH TRIPPED	Amber warning triangle illuminated in LCD.	Vehicle may have been involved in an impact which has caused the Restraints Control Module to activate the inertia switch.	Check for fuel system leaks. Perform the inertia switch reset procedure. For additional information, refer to Electronic Engine Controls (303-14B Electronic Engine Controls - Vehicles Without: Supercharger)
VALET MODE	None	Valet Mode has been selected by the driver to secure the luggage compartment and the glovebox.	Use TSD to exit the valet mode.
VEHICLE ARMED	None	Displayed when the vehicle is locked and is displayed simultaneously with the visual and audible locking confirmation.	None
SMART KEY NOT FOUND. PLEASE INSERT IN SLOT	None	The Smart Key has not been detected by the Keyless Vehicle Module.	Insert Smart Key into the slot in the start control module. This may caused by Smart Key low battery voltage or local RF interference.
CHECK SMART KEY	None	Keyless Vehicle Module has not detected a Smart Key in the vehicle.	Ensure that the Smart Key in range of the vehicle LF antennae.
REMOVE SMART KEY	None	Smart Key has been detected by the start control module.	Remove Smart Key from slot.

PRESS BRAKE WHEN STARTING	None	Driver has pressed the Start/Stop button for a second time without pressing on the brake pedal.	Press brake pedal to start engine.
GEAR SELECTOR NOT IN PARK	None	Transmission selector lever is not the 'PARK' position when a request to start or stop the engine is made.	Move transmission selector lever to the 'PARK' position.
SMART KEY BATTERY LOW	None	The Keyless Vehicle Module has detected that the Smart Key battery is low on power.	Replace Smart Key battery.
STEERING COLUMN LOCKED	None	The Electric steering column lock has failed to unlock the steering and the engine is prevented from starting.	Turn off the ignition, move the steering wheel gently from side to side and try again to start the engine. If this fails a fault has occurred which must be rectified.
LIGHTS ON	Chime from the instrument cluster.	The vehicle side lamps are switched on and the driver's door has been opened.	Turn off side lamps or close driver's door.
TAIL LAMP FAILURE	Amber warning triangle illuminated in LCD. Vehicle graphic displaying failed tail lamp displayed.	A LH or RH tail lamp bulb has failed.	Replace defective bulb.
BRAKE LAMP FAILURE	Amber warning triangle illuminated in LCD. Vehicle graphic displaying failed brake lamp displayed.	A LH or RH brake lamp bulb has failed.	Replace defective bulb.
INDICATOR LAMP FAILURE	Amber warning triangle illuminated in LCD. Vehicle graphic displaying failed turn signal indicator	A LH or RH, front or rear turn signal indicator bulb has failed.	Replace defective bulb.

	displayed.		
DSC ON	DSC warning indicator flashes for a short time.	Displayed for a short time when the DSC switch is operated to activate the DSC system.	None
DSC OFF	DSC warning indicator illuminated.	Displayed for a short time when the DSC switch is operated to de-activate the DSC system.	None
TRAC DSC	DSC warning indicator illuminated.	Displayed for a short time when TRAC DSC has been selected by the driver using the DSC switch.	None
DSC NOT AVAILABLE	DSC warning indicator illuminated.	A fault is present in the DSC system.	A fault has occurred in the DSC system. Interrogate ABS module for faults and diagnose fault using IDS.
BRAKE FLUID LOW	• Brake warning indicator illuminated. • Red warning triangle illuminated in LCD.	Brake fluid level has become low and activated low level switch.	Investigate fluid loss and check brake system for leaks. Repair system as required and replenish brake fluid reservoir.
ABS FAULT	• ABS warning indicator illuminated. • Amber warning triangle illuminated in LCD.	A fault is present in the ABS system. Braking system will operate but ABS will not be available.	A fault has occurred in the ABS system. Interrogate ABS module for faults and diagnose fault using IDS.
BRAKE ASSIST FAULT	Amber warning triangle illuminated in LCD.	A fault is present in the braking system preventing brake assist operation. Braking system will operate but brake assist will not be available and increased effort on the brake pedal	A fault has occurred in the brake assist system. Interrogate ABS module for faults and diagnose fault using IDS.

		may be required.	
CATS SYSTEM FAULT	Amber warning triangle illuminated in LCD.	A fault is present in the Computer Active Technology Suspension (CATS). Suspension will default to the 'hard' setting.	A fault has occurred in the CATS system. Interrogate the CATS module for faults and diagnose using IDS.
PARK BRAKE APPLIED	None	Parking brake has been applied when the vehicle moving at a speed 5 km/h (3 mph) or above.	None
PARK BRAKE FAULT	• Brake warning indicator illuminated. • Red warning triangle illuminated in LCD.	A fault is present in the parking brake system.	A fault has occurred in the parking brake system. Interrogate the parking brake module for faults and diagnose using IDS.
APPLY FOOT AND PARK BRAKE	Amber warning triangle illuminated in LCD.	The battery has been disconnected or power supply interrupted to the parking brake module.	Apply foot brake and parking brake to reset the parking brake module.
CANNOT APPLY PARK BRAKE	• Brake warning indicator flashing. • Red warning triangle illuminated in LCD. • NOTE: In certain markets the brake warning indicator does not flash.	A fault is present in the parking brake system and the parking brake cannot be applied.	A fault has occurred in the parking brake system. Interrogate the parking brake module for faults and diagnose using IDS.
CHECK TYRE PRESSURE	• Tire Pressure Monitoring System (TPMS) warning indicator illuminated. • Vehicle	A tire pressure has decreased to below the warning threshold.	Check tires for punctures and re-inflate to correct pressures.

	graphic displaying tire location.		
CHECK ALL TYRE PRESSURES	• Tire Pressure Monitoring System (TPMS) warning indicator illuminated. • Amber warning triangle illuminated in LCD. • Vehicle graphic displaying tire location.	One or more tire pressures have decreased to below the warning threshold.	• Check tires for punctures and re-inflate to correct pressures. • Message may be displayed when TPMS is learning position of a new sensor.
TYRE NOT MONITORED	• Tire Pressure Monitoring System (TPMS) warning indicator illuminated. • Vehicle graphic displaying tire location.	• One or more tire pressure sensors have developed a fault. • A temporary spare wheel or a wheel without a sensor has been fitted at the displayed position. • An unapproved accessory may be interfering with the TPMS.	• Check for local RF interference. • A wheel has been fitted without a TPMS sensor fitted (space saver spare wheel). • TPMS sensor has developed a fault or the battery voltage is low. • A fault has occurred in the TPMS. Interrogate the TPMS module for faults and diagnose using IDS.
TYRE PRESSURE SYSTEM FAULT	• Tire Pressure Monitoring System (TPMS) warning indicator illuminated. • Amber warning triangle illuminated in LCD.	• Wheels and tires without sensors have been fitted to the vehicle. • TPMS sensors have become defective. • An unapproved accessory may be interfering with the TPMS. • A fault is present in the TPMS system and the tire pressures cannot	A fault has occurred in the TPMS. Interrogate the TPMS module for faults and diagnose using IDS.

		be monitored.	
ENGINE TEMPERATURE HIGH	Amber warning triangle illuminated in LCD at temperatures of between 118.0°C (244.4°F) and 119.3°C (246.8°F).	Engine coolant temperature has exceeded threshold for normal operation.	- Stop vehicle and allow engine to idle for 5 minutes. Switch off engine and allow to stand for not less than 10 minutes. Check coolant level. - If message re-appears, investigate coolant system for leakage.
ENGINE OVERHEATING	Red warning triangle illuminated in LCD at temperatures of 119.4°C (247°F) or above.	Engine coolant temperature has exceeded threshold for normal engine operation.	- Stop vehicle and allow engine to idle for 5 minutes. Switch off engine and allow to stand for not less than 10 minutes. Check coolant level. - If message re-appears, investigate coolant system for leakage.
ENGINE OIL PRESSURE LOW	Red warning triangle illuminated in LCD.	Engine oil pressure has fallen below the threshold for normal operation.	Stop the engine immediately. Check engine oil level. If oil level correct, do not restart engine until oil pressure loss has been identified and corrected.
RESTRICTED PERFORMANCE	Red or Amber warning triangle illuminated in LCD depending on nature of power loss.	A fault has occurred which has reduced engine power output.	Investigate cause of engine power loss. Interrogate control modules for faults and diagnose using IDS.
ENGINE SYSTEMS FAULT	- MIL illuminated for certain faults. - Red or Amber warning triangle illuminated in LCD.	A fault has occurred in the engine management system or, if the MIL is illuminated, an emissions related fault is present which has been detected by	- Investigate cause of fault. Interrogate ECM and TCM for faults and diagnose using IDS. - Check start/stop switch for correct operation or short circuits.

		the On-Board Diagnostic systems in the ECM and TCM. A fault has occurred with the start/stop switch.	
CHECK FUEL FILLER CAP	(NAS Only) - Red warning triangle illuminated in LCD.	Diagnostic Monitoring of Tank Leakage (DMTL) system has detected fuel filler cap has not been correctly installed.	Check fuel filler cap to ensure is it correctly installed and secure.
ENGINE TEMPERATURE INDICATION FAULT	Red warning triangle illuminated LCD.	A fault has occurred in the engine management system and the engine temperature signal is no longer being received.	Investigate cause of engine temperature failure. Interrogate ECM for faults and diagnose using IDS.
GEARBOX FAULT	Red warning triangle illuminated in LCD.	TCM has detected a fault in the transmission. Transmission may default to 'limp home' mode and only allow operation of one forward gear and reverse.	Investigate transmission fault. Interrogate TCM and diagnose fault using IDS.
BATTERY NOT CHARGING	Red warning triangle illuminated in LCD.	Charge output from generator not detected by ECM.	Investigate cause of generator failure.
OVER 120 km/h	(GULF States Only) - Amber warning triangle illuminated in LCD.	Vehicle has exceeded the preset 120 km/h speed value.	Reduce vehicle speed.
HOOD NOT LATCHED	Red warning triangle illuminated in LCD.	The convertible top is not correctly latched.	Ensure convertible top is correctly latched and secured.
HOOD OUT OF POSITION	Amber warning triangle illuminated in LCD.	The convertible top is incorrectly positioned.	Open or close the convertible top again and ensure it is correctly positioned.

LUGGAGE COVER OUT OF POSITION	Amber warning triangle illuminated in LCD.	The luggage separator is incorrectly positioned.	Check the positioning of the luggage separator and it is correctly engaged.
LISTENING	None	Telephone voice system is active.	None.

Odometer Display

The odometer displays the total distance which the vehicle has travelled. This is calculated by the instrument cluster using wheel speed signals from the ABS module.

The odometer can show 6 characters and distances up to 999,999 miles or kilometers. The total distance travelled is stored in a Electronically Erasable Programmable Read Only Memory (EEPROM) and the Random Access Memory (RAM). This ensures that the total distance is not lost if the battery is disconnected.

The odometer value is passed to other vehicle system modules on the medium speed and high speed CAN bus. This is used to record the total vehicle mileage for diagnostic purposes and when storing Diagnostic Trouble Codes (DTC).

Trip computer Information Display

The instrument cluster contains software which controls the trip computer. The computer allows the driver to access information for current fuel usage, current journey length, average speed and estimated vehicle range of fuel remaining.

The information is calculated from CAN messages from other vehicle systems, for example wheel speed signals from the ABS module and fuel injector operating data from the ECM.

A 'Trip' button is located on the end of the LH multifunction switch and allows the driver to access, in sequence, the available trip information by repeatedly pressing the button. The trip information is displayed in the following order:

- Trip distance The trip distance since the last reset is displayed.
- Average speed The average speed since the last reset is displayed.
- Average fuel consumption The average fuel consumption since the last reset is displayed.
- Range The range is displayed showing the distance which can be travelled until the fuel gage reads empty. If the range display shows dashes (-), this indicates a failure with one or both of the fuel level sensors.

The trip computer has three independent memories; A, B and Auto. Memories A and B can be set independently. The Auto memory is reset after each ignition cycle and therefore only contains information relating the current journey.

The trip information can also be accessed from the TSD located in the center console. The TSD allows

the same information available with the trip button on the multifunction switch to be displayed on the TSD, with the addition of the option to reset the values in the A and B memories.

If the battery is disconnected, all trip data in memories A, B and Auto are erased.

Fuel Level Display

The fuel level display is a linear LCD display to show the usable fuel tank contents. The level display is active at all times when the ignition is on. Low fuel level is displayed as a LOW FUEL LEVEL message and an amber warning triangle in the message center.

The fuel level is obtained by fuel level sensors in the fuel tank. These are monitored by the auxiliary junction box software and their output resistance values, corresponding fuel quantity, are transmitted to the instrument cluster on the medium speed CAN bus. The instrument cluster uses the two level sensor signals to calculate the fuel tank contents. This calculation takes into account fuel movement in the tank to display a steady fuel quantity in the LCD.

The fuel level information is transmitted on the medium speed and high speed CAN bus for use by other vehicle system modules.

AUDIBLE WARNINGS

The instrument cluster can generate audible warnings to alert the driver to a displayed message and change of vehicle operating condition. The audible warning is generated by a sounder located within the instrument cluster.

The audible warnings can be generated for the warnings and are listed in order of priority, with the first being the highest priority.

- Seatbelt reminder
- EPB (High Pitch)
- ACC Driver Intervene 1
- Airbag fault
- Key in ignition switch
- ASL overspeed
- ACC Driver Intervene 2
- EPB (Low Pitch)
- Vehicle armed (entry delay)
- Gear selector not in park
- Valet mode
- Lights on reminder
- Hood operation
- Passive Entry / Passive Start (PEPS)
- Memory set
- Turn signal indicators
- Seat Belt Minder.

The audible warnings can take the form of a single chime, a number of chimes or a continuous chime. The audible warnings are initiated by a CAN message request from the requesting sub-system control module or by the instrument cluster software.

Information and Message Center

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

Visual Inspection Chart

Mechanical	Electrical
• Fluid level(s) • Accessory installations	• Fuse(s) • Wiring harness • Electrical connector(s) • Engine compartment components • Underbody components • Instrument cluster • Door switches • Electronic modules • Boot/bonnet switch

- 1 . If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
- 2 . If the cause is not visually evident, verify the symptom and refer to the Jaguar approved diagnostic system.

413-09 : Warning Devices

Diagnosis and testing

Warning Devices

Inspection and Verification

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

Visual Inspection Chart

Mechanical	Electrical
• Door ajar switch(es) • Safety belt buckle and pretensioner • Headlamp switch • Fuel gauge • Inertia switch	• Fuse(s) • Wiring harness • Electrical connector(s) • Switch(es) • Sensor(s)

- 1 . If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
- 2 . If the cause is not visually evident, verify the symptom and refer to the Jaguar approved diagnostic system.

Low Washer Fluid Warning Indicator Switch (84.10.17)

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 RH fender splash shield.
For additional information, refer to Fender Splash Shield (76.10.90)

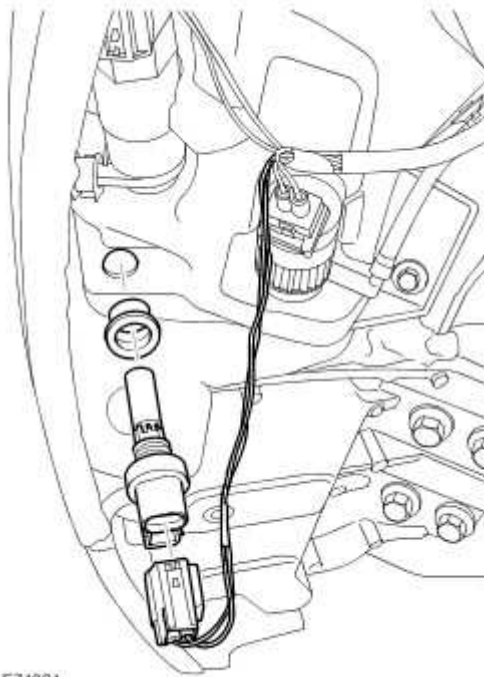
- 3 . Drain the washer reservoir fluid.

 Position a container to collect the fluid.

- 4 . Remove the low washer fluid warning indicator switch.

 Disconnect the electrical connector.

- 5 . Remove and discard the seal.



Installation

- 1 . Install a new seal.
- 2 . Install the low washer fluid warning indicator switch.
 - ▶ Connect and secure the electrical connector.
- 3 . Install the fender splash shield.

For additional information, refer to Fender Splash Shield (76.10.90)
- 4 . Refill the washer reservoir.

413-13 : Parking Aid

Specifications

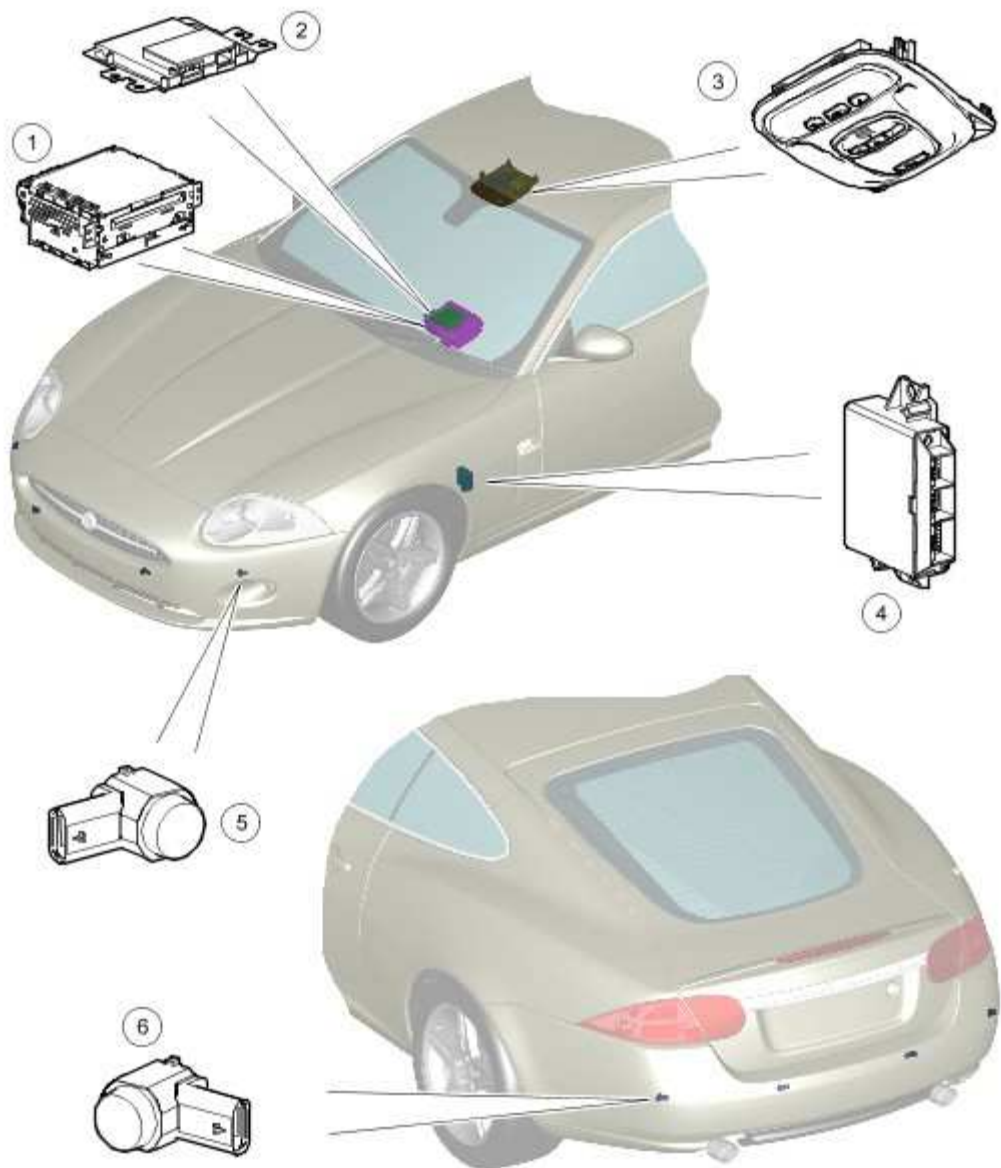
Specifications

Torque Specifications

Item	Nm	lb-ft	lb-in
Parking aid module - nut	2	-	18

Parking Aid

COMPONENT LOCATION



E62362

Item	Part Number	Description
1		Audio head unit

2		Gateway module
3		Control switch
4		Control module
5		Front parking aid sensors (4 off)
6		Rear parking aid sensors (4 off)

INTRODUCTION

The parking aid system provides an audible warning to the driver when any obstacles are in the path of the vehicle during a forward (if front sensors fitted) or reversing manoeuvre. The purpose of the system is to assist the driver when parking or manoeuvring in restricted space. It is not designed as a crash avoidance system or a replacement for visual interpretation by the driver.

All vehicles are fitted with rear parking aid sensors. Higher specification vehicles may be fitted with both front and rear sensors.

Audible warnings to the driver are given by the entertainment system speakers. A visual representation is shown on the Touch Screen Display (TSD).

The control module controls operation of the speakers via the audio head unit. A gateway module is incorporated into the system to convert medium speed Controller Area Network (CAN) bus messages from the control module into Media Orientated System Transport (MOST) messages for use by the audio head unit. For additional information, refer to Audio System (415-01 Audio Unit)

If an obstacle is sensed by the rear parking aid sensors, the rear audio system speakers will sound. If an obstacle is sensed by the front parking aid sensors (if fitted), the front audio system speakers will sound.

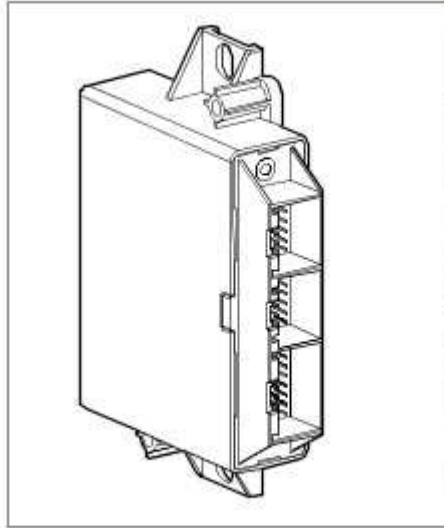
The parking aid system operates using ultrasonic signals which are transmitted by the sensors. The reflected echo from this output is received by the sensors and used by the control module to calculate the distance from an object.

The roof console mounted control switch allows the driver to deactivate the parking aid system if operation is not required.

NOTE:

The control switch is only fitted to vehicles with front parking aid sensors.

CONTROL MODULE



E67781



The parking aid control module is located in the passenger footwell, behind a protective panel. The control module uses a single microprocessor to perform the following tasks:

- Control of the ultrasonic sensors
- Monitoring of the sensors
- Evaluation of received echo signals from the sensors
- Noise and disturbance suppression
- Control of the audio system speakers
- Control and monitoring of the switch status Light Emitting Diode (LED) and associated wiring
- Evaluation and monitoring of the control inputs
- Management of diagnostic and test functions
- Monitoring of power supply
- Communication via diagnostic link.

The control module is connected to the vehicle electrical system by either 3 (vehicles fitted with front and rear sensors) or 2 (vehicles fitted with rear sensors only) multiplug connectors.

Inputs and Outputs

The table below shows control module inputs and outputs

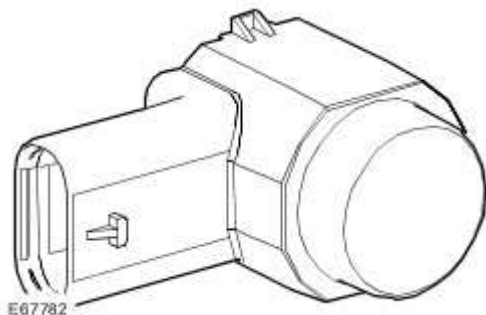
Component	Description	Input/Output
Transmission Control Module (TCM)	Medium speed CAN bus message - reverse gear selected	Input

TCM	Medium speed CAN bus message - forward gear selected	Input
Control switch	Status - On/Off	Input
Parking brake module	Medium speed CAN bus message via the gateway module - parking brake applied	Input
Auxiliary junction box	Electrical power supply	Input
Parking aid sensors	Electrical power and ground	Output
Parking aid sensors	Digital transmit and receive signals	Output
Audio system speakers	Varying frequency outputs	Output
Control switch	LED illumination	Output

Diagnostics

The control module has a diagnostic connection via the medium speed CAN bus to enable faults to be retrieved using the Integrated Diagnostic System (IDS). Additionally an on-board diagnostic routine within the control module constantly monitors the system and alerts the driver to a system fault by emitting a 5 second continuous tone through the audio system speakers when the ignition is switched on and a gear is selected. If front parking aid sensors are fitted, the control switch LED will also illuminate.

PARKING AID SENSORS



Four sensors are positioned in the rear bumper and four in the front bumper (if fitted). The front sensor housings are glued into position; the rear sensor housings are welded into position. The sensor bodies are then clipped into the housings from the rear.

Each sensor has a 3 pin connector which connects into a common harness linking all 4 sensors. The 3 pins of each connector provide the sensor a negative feed, a positive feed and a signal line. The rear parking aid harness connects to the main vehicle body harness. The front parking aid harness connects to the Left-Hand (LH) engine compartment harness.

Each sensor comprises a plastic housing which contains a piezoelectric disc. The disc resonates at a frequency of approximately 50 kHz, producing an ultrasonic signal output. The disc also receives the reflected echo signal.

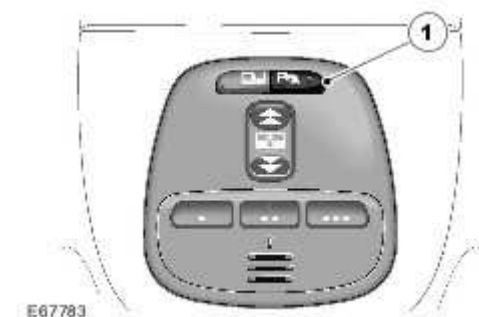
Each sensor has 2 modes of operation; combined transmitter and receiver mode or receiver mode only. The control module controls the operating mode of each sensor by the output of a digital signal on the signal line.

In the combined mode, the sensor emits a series of ultrasonic impulses and then switches to receiver mode to receive the echo reflected by an obstacle in the detection range. These echo signals are amplified and converted from an analogue signal to a digital signal by the sensor. The digital signal is then transmitted to the control module and compared with preprogrammed data stored in an Electrically Erasable Programmable Read Only Memory (EEPROM) within the module.

The module receives this data via the signal line from the sensor and calculates the distance to the obstacle according to the elapses time between the transmitted and received impulse. The duration of the impulse transmission is determined by the control module. The frequency of the impulse is determined by the sensor.

In the receiver mode, the sensor will receive impulses that were emitted by adjacent sensors. The control module uses this information to precisely determine position and distance of the obstacle.

CONTROL SWITCH



Item	Part Number	Description
1		Control switch

The control switch is located in the roof console. The switch is non-latching with an integral LED. The switch receives a 12 V output from the control module, and is also connected to ground. When the switch is operated, a momentary ground is completed. This is interpreted by the control module as a signal to enable or disable the parking aid system.

The switch also receives a 12 V output from the control module to drive the LED when the parking aid system is on.

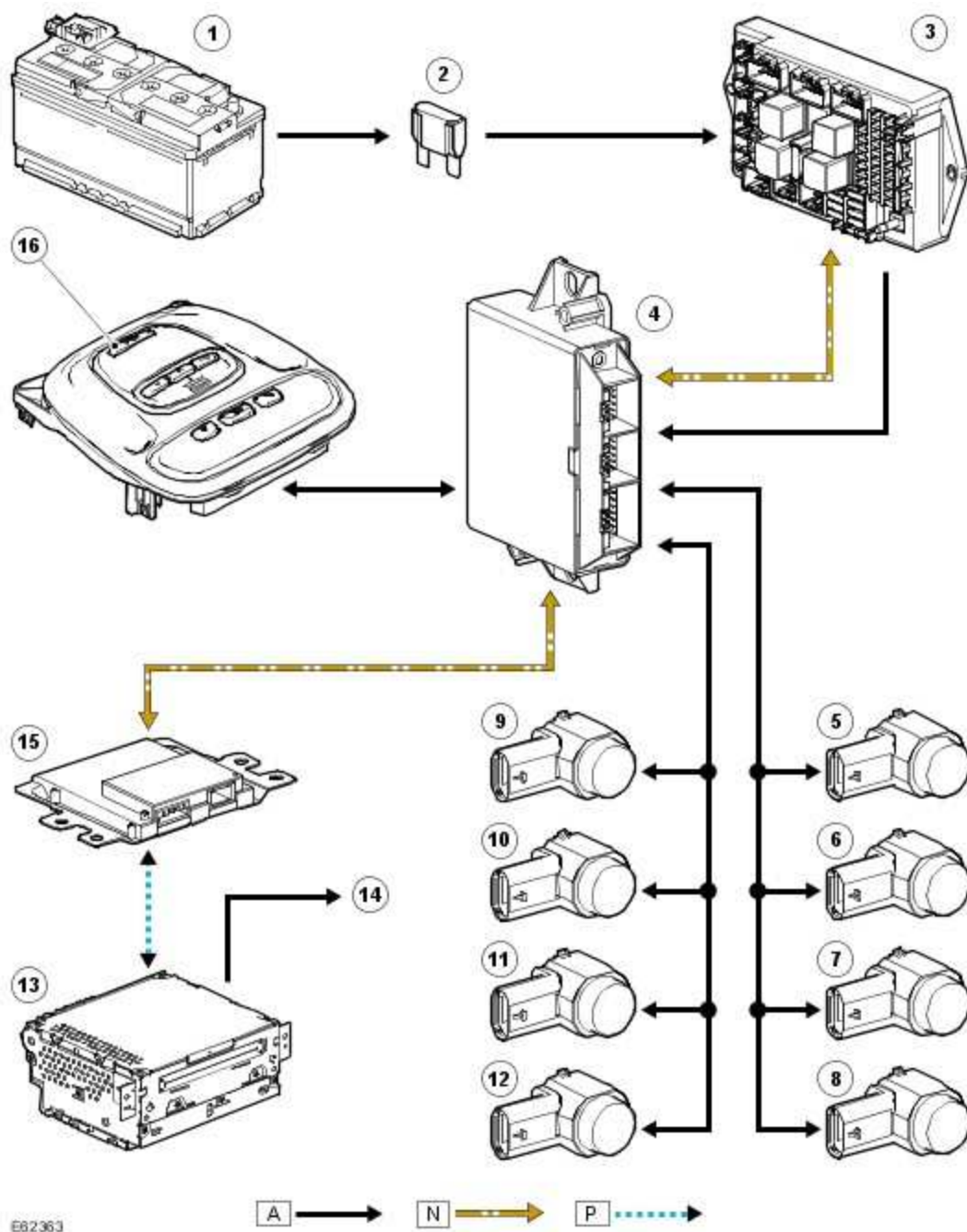
NOTE:

The control switch will only switch off the front parking aid sensors. The rear parking aid sensors will remain operational.

CONTROL DIAGRAM

NOTE:

A = Hardwired; **N** = Medium Speed CAN bus; **P** = MOST



E62363

Item	Part Number	Description
1		Battery
2		Megafuse (175A)
3		Auxiliary junction box
4		Control module

5		Right outer front sensor
6		Right inner front sensor
7		Left inner front sensor
8		Left outer front sensor
9		Right outer rear sensor
10		Right inner rear sensor
11		Left inner rear sensor
12		Left outer rear sensor
13		Audio head unit
14		To audio system speakers
15		Gateway module
16		Control switch

PRINCIPLES OF OPERATION

If a forward drive gear is selected when the vehicle ignition is first switched on, the front parking aid sensors (if fitted) will not be operational. If reverse (R) is the first gear selected after the ignition is switched on, both the front and rear parking aid sensors will become operational. If a forward drive gear is subsequently selected, the rear parking aid sensors be switched off by the control module but the front parking aid sensors will remain operational until vehicle speed increases above 16 km/h (10 mph).

Parking aid will only become active if the following conditions exist:

Front and rear sensors fitted

- Ignition on
- 'Park' is not selected
- Parking brake is released
- Vehicle speed drops below 7 km/h (4.5 mph) - rear sensors only
- Vehicle speed drops below 7 km/h (4.5 mph) and control switch pressed - front sensors only.

Rear sensors only

- Ignition on

- Reverse gear selected for more than 1 second.

Audible and Visual Warnings

The control module processes the distance readings from the ultrasonic parking aid sensors to determine if there are any objects within the detection areas. If there are no objects no audible warning is produced. If an object is detected, repeated audible warnings are produced via the audio system speakers. The time delay between the audible warnings decreases as the distance between the detected object and the vehicle decreases until eventually a continuous tone is emitted from the speakers.



A visual interpretation of the detection areas is given in the TSD.

The detection ranges of the sensors are shown in the table below.

Sensors	Maximum Detection Range	Continuous Tone
Front	800 mm (31 inches)	250 mm (10 inches)
Rear	1600 mm (63 inches)	300 mm (12 inches)

After the initial detection of an object, if there is no decrease in the distance between an object and the central sensors, the time delay between the audible warnings remains constant. If an object is detected by one of the corner sensors only, the audible warnings stop after approximately 5 seconds if there is no change in the distance between an object and the corner sensor.

Detection Calculation

When operating in the combined transmitter and receiver mode, the sensor outputs a number of ultrasonic pulses and receives the reflected echo signal. The control module amplifies the received echo signals and compares them with a preprogrammed threshold to calculate the distance to the object. This is achieved by determining the elapsed time between the transmission and reception of the ultrasonic signal.

When operating in receiver mode, the sensor receives echo signals transmitted by an adjacent sensor. This mode is used to improve the accuracy of the system.

The detection cycle consists of the control module operating 1 sensor in the combined transmitter and receiver mode and transmitting a number of pulses. The control module then switches the transmitting sensor and the adjacent sensor(s) to receiver mode. After a short time delay this sequence is repeated using a different sensor to transmit the ultrasonic signal. This sequence is completed in 100 ms. The control module uses several measurements of the same sensors to remove errors from the calculation.

If the detected object is directly behind a sensor, the distance is calculated using the time between the transmission and reception of the ultrasonic signal. If the object is positioned between 2 sensors, the control module uses both signals to determine the correct distance using triangulation.

To perform the triangulation calculation, the control module must know the distance between the individual sensors in the bumper. This information is stored in the control module memory. From the received distance signal from each sensor and using the known distance between adjacent sensors, the control module can calculate the minimum distance from the vehicle to the detected object.

When approaching several objects, the control module recognises the distance from the vehicle to the nearest object.

Parking Aid

Principle of Operation

For a detailed description of the parking aid system, refer to the relevant Description and Operation section in the workshop manual.

Parking Aid

Inspection and Verification



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

- 1 . Verify the customer concern.
- 2 . Visually inspect for obvious signs of damage and system integrity.

NOTE:

Particular attention should be paid to the following items where DTCs may not be logged:

- Check for contamination (e.g. dirt, grime, frosting, ice) around the parking aid sensors, if so refer to the parking aid section in the vehicle handbook.
- Check for the correct installation and alignment of the sensors to the bumper
- Spurious detection of the ground may occur during front system operation on an up-slope

Electrical
• Fuse(s) • Relay(s) • Wiring Harness • Electrical connector(s) • Front parking aid sensor(s) and holders • Rear parking aid sensor(s) and holders • Audio system • Touch screen display unit • Parking aid switch and LED • Reversing lamp switch

- Parking aid module

3 . If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.

4 . If the cause is not visually evident, check for Diagnostic Trouble Codes (DTCs) and refer to the DTC Index.

DTC Index



CAUTION: When probing connectors to take measurements in the course of the pinpoint tests, use the adaptor kit, part number 3548-1358-00.

NOTE:

If the control module is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module.

NOTE:

Generic scan tools may not read the codes listed, or may read only five digit codes. Match the five digits from the scan tool to the first five digits of the seven digit code listed to identify the fault (the last two digits give additional information read by the manufacturer approved diagnostic system).

NOTE:

When performing voltage or resistance tests, always use a digital multimeter (DMM) accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance always take the resistance of the DMM leads into account.

NOTE:

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

NOTE:

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

NOTE:

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

DTC	Description	Possible Cause	Action
B1B3601	Front right outer sensor	• Front right outer sensor signal circuit - short to ground, high resistance • Front right outer sensor power supply circuit - high resistance	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1B3612	Front right outer sensor	• Front right outer sensor signal circuit - short to power	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1B3696	Front right outer sensor	• Front right outer sensor ground circuit - open circuit • Front right outer sensor internal failure	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Install new sensor as necessary. Front Outer Parking Aid Sensor (86.54.22)
B1B3801	Front right inner sensor	• Front right inner sensor signal circuit - short to ground, high resistance • Front right inner sensor power supply circuit - high resistance	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1B3812	Front right inner sensor	• Front right inner sensor signal circuit - short to power	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1B3896	Front right inner sensor	• Front right inner sensor ground circuit - open circuit • Front right inner sensor internal failure	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Install new sensor as necessary.

			Front Inner Parking Aid Sensor (86.54.21)
B1B4001	Front left outer sensor	• Front left outer sensor signal circuit - short to ground, high resistance • Front left outer sensor power supply circuit - high resistance	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1B4012	Front left outer sensor	• Front left outer sensor signal circuit - short to power	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1B4096	Front left outer sensor	• Front left outer sensor ground circuit - open circuit • Front left outer sensor internal failure	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Install new sensor as necessary. Front Outer Parking Aid Sensor (86.54.22)
B1B4201	Front left inner sensor	• Front left inner sensor signal circuit - short to ground, high resistance • Front left inner sensor power supply circuit - high resistance	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1B4212	Front left inner sensor	• Front left inner sensor signal circuit - short to power	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1B4296	Front left inner sensor	• Front left inner sensor ground circuit - open circuit • Front left inner sensor internal failure	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Install new sensor as necessary. Front Inner Parking Aid Sensor (86.54.21)
B1B4401	Rear right outer sensor	• Rear right outer sensor signal circuit - short to ground, high resistance • Rear right outer sensor power	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system

		supply circuit - high resistance	
B1B4412	Rear right outer sensor	Rear right outer sensor signal circuit - short to power	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1B4496	Rear right outer sensor	- Rear right outer sensor ground circuit - open circuit - Rear right outer sensor internal failure	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Install new sensor as necessary. Rear Parking Aid Sensor (86.54.14)
B1B4601	Rear right inner sensor	- Rear right inner sensor signal circuit - short to ground, high resistance - Rear right inner sensor power supply circuit - high resistance	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1B4612	Rear right inner sensor	Rear right inner sensor signal circuit - short to power	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1B4696	Rear right inner sensor	- Rear right inner sensor ground circuit - open circuit - Rear right inner sensor internal failure	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Install new sensor as necessary. Rear Parking Aid Sensor (86.54.14)
B1B4801	Rear left outer sensor	- Rear left outer sensor signal circuit - short to ground, high resistance - Rear left outer sensor power supply circuit - high resistance	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1B4812	Rear left outer sensor	Rear left outer sensor signal circuit - short to power	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system

B1B4896	Rear left outer sensor	• Rear left outer sensor ground circuit - open circuit • Rear left outer sensor internal failure	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1B5001	Rear left inner sensor	• Rear left inner sensor signal circuit - short to ground, high resistance • Rear left inner sensor power supply circuit - high resistance	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1B5012	Rear left inner sensor	• Rear left inner sensor signal circuit - short to power	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1B5096	Rear left inner sensor	• Rear left inner sensor ground circuit - open circuit • Rear left inner sensor internal failure	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Install new sensor as necessary. Rear Parking Aid Sensor (86.54.14)
B1B5411	Parking aid status LED	• Parking aid status LED - short to ground (detected if driven only)	Refer to the electrical circuit diagrams and test status LED circuit for short to ground
B1B5412	Parking aid status LED	• Parking aid status LED - short to power (detected if not driven only)	Refer to the electrical circuit diagrams and test status LED circuit for short to power
B1B5711	Front sensors power supply circuit	• Front sensors power supply circuit - short to ground	Refer to the electrical circuit diagrams and test front sensor power supply circuit for short to ground
B1B5811	Rear sensors power supply circuit	• Rear sensors power supply circuit - short to ground	Refer to the electrical circuit diagrams and test rear sensor power supply circuit for short to ground
B1C3073	Disable switch	• Disable switch stuck closed • Disable switch circuit - short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved

			diagnostic system
U001000	Medium speed CAN communication Bus	Medium speed CAN communication Bus	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U007300	Control module communication Bus "A" Off	Control module communication Bus "A" Off	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U014000	Lost communication with CJB	Logged when subscribed CAN message missing from CJB	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U014200	Lost communication with RJB	Logged when subscribed CAN message missing from RJB	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U015500	Lost communication with instrument cluster	Logged when subscribed CAN message missing from instrument cluster	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U030000	Internal control module software incompatibility	RJB car configuration data is not compatible with the parking aid module	Re-configure the RJB using the manufacturer approved diagnostic system. Clear DTCs and re-test. If DTC still logged, install a new parking aid module. Refer to the new module installation note at the top of the DTC Index
U042200	Invalid data received from CJB	Logged when subscribed CAN message invalid data from CJB	Check CJB for DTCs and refer to DTC Index. Communications Network
U042300	Invalid data received from instrument cluster	Logged when subscribed CAN message invalid data from Instrument Cluster	Check instrument cluster for DTCs and refer to DTC Index. Instrument Cluster

U044300	Invalid data received from RJB	Logged when subscribed CAN message invalid data from RJB	Check RJB for DTCs and refer to DTC Index. Communications Network
U210000	Initial configuration not complete	No configuration has been previously set	Re-configure RJB using manufacturer approved diagnostic tool, clear DTC and re-test. If DTC remains check CAN network. Communications Network
U210100	Control module configuration incompatible	Data sent from RJB is invalid	Re-configure RJB using manufacturer approved diagnostic tool, clear DTC and re-test. If DTC remains check Check RJB for DTCs and refer to DTC Index. Communications Network
U300049	Control module	Internal control module failure	Install a new parking aid control module, refer to the new module installation note at the top of the DTC Index
U300281	Vehicle Identification Number (VIN)	Vehicle/component mismatch. Corrupt VIN data being transmitted, module previously installed to other vehicle	Install original module, check for parking aid related DTCs and refer to DTC Index. If DTC remains suspect parking aid module, refer to new module installation note at top of DTC Index
U300316	Battery voltage	Circuit voltage below threshold	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U300317	Battery voltage	Circuit voltage above threshold	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U300362	Battery voltage	Mis-match of battery voltage, of 2 volts or lower, between	Carry out any pinpoint tests associated with this DTC using the manufacturer approved

		parking aid module and RJB	diagnostic system
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Parking Aid Module (86.80.39)

Removal

NOTE:

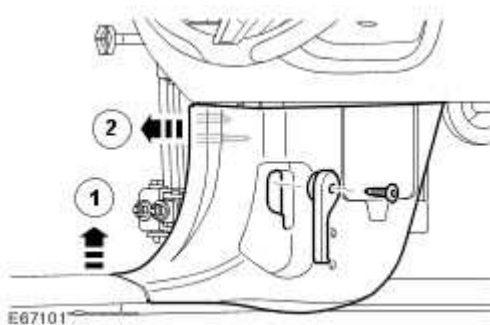
The park control module is situated in the LH footwell and does not change position with the hand of drive.

- 1 . Remove the cover and disconnect the battery ground cable.

For additional information, refer to

- 2 . LH side: Remove the cowl side trim panel.

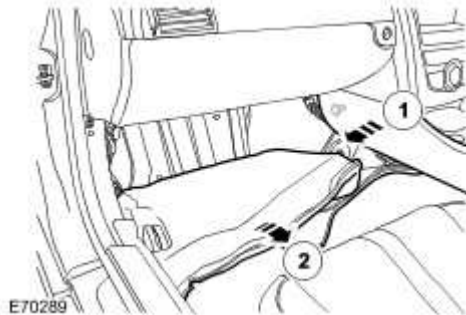
- Remove the Torx screw.
- Remove the hood release lever.
- Release the forward edge of the scuff plate trim panel.
- Carefully release the clips.



- 3  **CAUTION:** Make sure the wiring harness and electrical connectors are not damaged during the carpet release.

Carefully release the carpet for access.

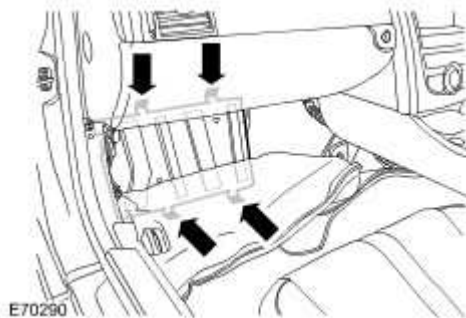
- ▶ Carefully release the forward edge of the floor console side trim panel.



4 . Release the subwoofer cover.

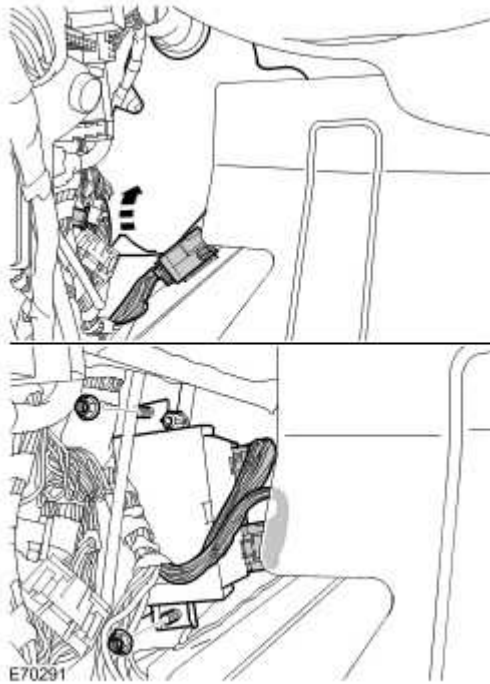
- ▶ Remove the 4 bolts.

- ▶ Position aside.



5 . Remove the parking aid module.

- ▶ Position the acoustic pad aside.
- ▶ Release 2 electrical harness clips from the body and position aside.
- ▶ Remove the 2 nuts.
- ▶ Disconnect the 2 electrical connectors.



Installation

1 . Install the parking aid module.

- ▶ Connect the electrical connectors.
- ▶ Tighten the nuts to 3 Nm (2 lb.ft).
- ▶ Secure the electrical harness.
- ▶ Align the acoustic pad.

2 . Install the subwoofer cover.

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

3



- **CAUTION:** Make sure the carpet is correctly installed and that no foul-condition exists when the accelerator pedal is depressed.

Install the carpet.

 Install the floor console side panel trim.

4 . Install the cowl side trim panel.

 Carefully align and secure the clips.

 Secure the scuff plate trim panel.

5 . Connect the battery ground cable and install the cover.

For additional information, refer to

Rear Parking Aid Sensor (86.54.14)

Removal

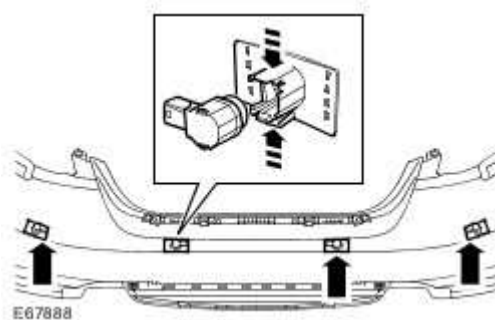
- 1  **WARNING:** Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Raise and support the vehicle.

- 2 . Remove the rear bumper cover.
For additional information, refer to Rear Bumper Cover (76.22.74)

- 3 . Remove the parking aid sensor.

- ▶ Disconnect the electrical connector.
- ▶ Release the 2 clips.
- ▶ Repeat the above for the other 3 sensors.



Installation

- 1  **CAUTION:** If a new sensor is installed, only the front face must be painted. Failure to follow this instruction may result in the component malfunctioning.

Install the parking aid sensor.

- ▶ Carefully secure the clips.
- ▶ Connect the electrical connector.
- ▶ Repeat the above procedure for the remaining 3 sensors.

2 . Install the rear bumper cover.

For additional information, refer to Rear Bumper Cover (76.22.74)

Front Inner Parking Aid Sensor (86.54.21)

Removal

All vehicles

- 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.

Vehicles with 4.2L engine

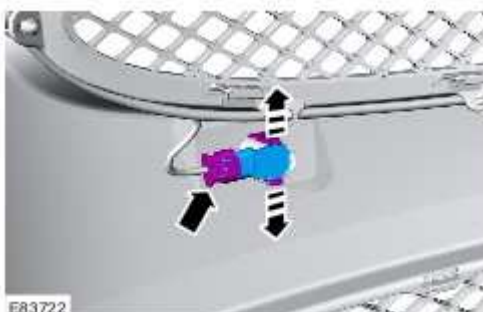
- 2 . Remove the front bumper cover.
For additional information, refer to Front Bumper Cover (76.22.78)

Vehicles with 5.0L engine

- 3 . Remove the front bumper cover.
For additional information, refer to

All vehicles

- 4 . Remove the parking aid sensor.
 -  Disconnect the electrical connector.
 -  Release the 2 clips.



Installation

1



- **CAUTION: If a new sensor is installed, only the front face must be painted. Failure to follow this instruction may result in the component malfunctioning.**

To install, reverse the removal procedure.

Front Outer Parking Aid Sensor (86.54.22)

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 headlamp assembly.
For additional information, refer to Headlamp Assembly (86.41.33)

- 3 . Remove the parking aid sensor.

▶ Disconnect the electrical connector.

▶ Release the 2 clips.



Installation

- 1  **CAUTION: If a new sensor is installed, only the front face must be painted. Failure to follow this instruction may result in the component malfunctioning.**

To install, reverse the removal procedure.

414 : Battery and Charging System

414-00 : Charging System – General Information

General procedure

Battery Charging

1. Before charging a discharged battery inspect and repair the following conditions, if necessary:

- Loose accessory drive belt.
- Pinched or grounded wiring harness to the generator or voltage regulator.
- Loose wiring harness connections at the generator or voltage regulator.
- Loose or corroded connections at battery, headlamp panel junction wire or engine ground.
- Carry out generator charging checks.
- Excessive battery quiescent drain due to:
engine compartment, load space, glove compartment and courtesy lamps remaining on (switch damaged or out of adjustment, glove compartment left open).

Battery Charging - Maintenance-Free Batteries



WARNING: KEEP BATTERIES OUT OF REACH OF CHILDREN. BATTERIES CONTAIN SULPHURIC ACID, AVOID CONTACT WITH SKIN, EYES OR CLOTHING. SHIELD YOUR EYES WHEN WORKING NEAR THE BATTERY TO PROTECT AGAINST POSSIBLE SPLASHING OF THE ACID SOLUTION. IN CASE OF ACID CONTACT WITH SKIN OR EYES, FLUSH IMMEDIATELY WITH WATER FOR A MINIMUM OF 15 MINUTES AND SEEK PROMPT MEDICAL ATTENTION. IF ACID IS SWALLOWED, CALL A PHYSICIAN IMMEDIATELY. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN PERSONAL INJURY.



WARNING: BATTERIES NORMALLY PRODUCE EXPLOSIVE GASES WHICH CAN CAUSE PERSONAL INJURY, THEREFORE DO NOT ALLOW FLAMES, SPARKS, OR LIGHTED SUBSTANCES TO COME NEAR THE

BATTERY. WHEN CHARGING OR WORKING NEAR A BATTERY ALWAYS SHIELD YOUR FACE AND PROTECT YOUR EYES . ALWAYS PROVIDE ADEQUATE VENTILATION. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN PERSONAL INJURY.

1. Cold batteries will not readily accept a charge. Therefore, batteries should be allowed to warm up approximately to 15 degrees centigrade (59 degrees Fahrenheit) before charging. This may require 12 hours at room temperature depending on the initial temperature and battery size.
2. A battery which has been completely discharged may be slow to accept a charge initially, and in some cases may not accept a charge at the normal charger setting. When batteries are in this condition, charging can be started by use of the 'dead battery' switch which is fitted to certain types of battery chargers. Follow the manufacturer's instructions when carrying out this procedure.
3. To determine whether a battery is accepting a charge, follow the manufacturer's instructions for the charger.
4. After releasing dead battery switch and with the charger still operating, measure battery voltage. If the voltage is 12 volts or higher, the battery may be accepting a charge and may be capable of being recharged. If the temperature of the battery is below 15 degrees centigrade (59 degrees Fahrenheit) the battery may require charging for up to two hours before the charge rate is high enough to show on the charger ammeter. It has been found that all undamaged batteries can be charged by this procedure. If a battery cannot be charged by this procedure, it should be replaced.
5. A rapid recharge procedure has been developed for recharging batteries that have passed the 'No-Load Test' and only need a recharge. This can be due to non start battery failures or battery discharged in vehicle due to key-off loads.
6. The battery can be rapidly recharged by using either of the following methods:
 - Perform a two hour charge using a constant current of 20 amps (manual setting on the charger).
 - Perform a two hour charge using a constant voltage (automatic setting on the charger).

Quiescent Current Measurement

1. NOTE:

The following quiescent current measurement does not apply to vehicles with the Tracker system installed. If the vehicle is installed with the tracker system the quiescent current may be up to 14 milliamps higher. If non-jaguar approved accessories are installed the

following measurements may not apply.

Disconnect the battery ground cable.

2. Check the vehicle off-load battery voltage. If below 12.5 volts, install a fully charged slave battery for the tests and recharge the vehicle battery.

3. Connect a 'shorting' link lead between the negative battery terminal and the negative battery lead, before connecting a suitable ammeter to the battery (with the negative test lead clip to the negative battery terminal, and the positive test lead clip to the battery negative lead).

4. NOTE:

Make sure that all electrical accessories are switched off.

Operate the key fob unlock button to disarm the vehicle security system.

- Select ignition mode (without starting the engine) for around 10 seconds.
- Deselect ignition mode, close doors, hood & luggage compartment lid latch.
- Lock vehicle.
- After 15 minutes on vehicles with TPMS installed or 4 minutes on vehicles without TPMS installed, remove shorting link & note ammeter reading.
- The quiescent current should be less than 35mA.
- Replace Shorting link.
- Unlock the vehicle.
- Superlock the vehicle.
- After 15 minutes, on vehicles with TPMS installed, or 4 minutes, on vehicles without TPMS installed, remove shorting link & note ammeter reading.
- The quiescent current should be less than 35mA.

5. NOTE:

In the unlocked state, the vehicle will take 30mins to shut down to its min quiescent current.

If intermittent wake-ups are suspected, monitor battery current continuously

6. Disconnect the ammeter. Reconnect the battery ground cable.

Charging System

Principle of Operation

For a detailed description of the charging system, refer to the relevant Description and Operation section in the workshop manual.

Battery and Cables

Generator

Inspection and Verification

1 . Verify the customer concern.

2 . Visually inspect for obvious signs of damage and system integrity.

NOTE:

Check the vehicle battery condition and state of charge before condemning any of the charging system components. For additional information, refer to the battery care manual.

Mechanical	Electrical
- Generator - Drive belt - Drive belt tensioner - Generator pulley - Check the security of the generator fixings	- Generator - Battery - Fuse 5 Rear Junction Box (RJB) - Engine/generator ground connection - Circuit(s) - Electrical connector(s) - Engine Control Module (ECM)

3 . If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.

4 . If the cause is not visually evident verify the symptom and refer to the Symptom Chart. Alternatively, check for Diagnostic Trouble Codes (DTCs) and refer to the DTC Index.

Symptom Chart

Symptom	Possible Cause	Action
Battery Not Charging warning displayed	- Fuse 5 RJB - Front End	Check Fuse 5 RJB. Check the battery condition and state of charge. Refer to the battery care

on message center	Accessory Drive (FEAD) belt tension • Generator fault • ECM • Instrument cluster fault • Controller Area Network (CAN) fault	manual. Check the FEAD belt tension. Accessory Drive Check ECM and instrument cluster for DTCs and refer to relevant DTC Index. Electronic Engine Controls Instrument Cluster Communications Network
Battery keeps discharging, no warning message displayed on message center	• No ignition power from CJB • Battery quiescent drain • Battery fault • FEAD belt tension • Generator pulley fault • Generator failure	For ignition power circuit tests. GO to Pinpoint Test G834532p1. Check the quiescent drain. Check the battery condition and state of charge, refer to the battery care manual. Battery Charging Check the FEAD belt tension. Accessory Drive Check RJB for DTCs B2A9016, B2A9116, Note: if battery requires replacing and these DTCs were logged, complete and return the battery report form listing the DTCs, see battery care manual. Check ECM for DTCs and refer to relevant DTC Index. Electronic Engine Controls Check the generator pulley does not turn independently of the generator
Generator noisy	• FEAD belt tension • FEAD belt • FEAD belt tensioner • FEAD belt idler pulleys • Generator failure	For noisy generator tests. GO to Pinpoint Test G834532p7.
Radio interference	• Generator • Wiring harness	For radio interference tests. GO to Pinpoint Test G834532p8.

DTC Index



CAUTION: When probing connectors to take measurements in the course of the pinpoint tests, use the adaptor kit, part number 3548-1358-00.

NOTE:

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

NOTE:

Generic scan tools may not read the codes listed, or may read only five digit codes. Match the five digits from the scan tool to the first five digits of the seven digit code listed to identify the fault (the last two digits give extra information read by the manufacturer-approved diagnostic system).

NOTE:

When performing electrical voltage or resistance tests, always use a digital multimeter (DMM) accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance, always take the resistance of the DMM leads into account.

NOTE:

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

NOTE:

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

DTC	Description	Possible Cause	Action
P163200	Generator faults sensor/circuit	Charging system fault	GO to Pinpoint Test G834532p4.
B2A9016	Battery low	Circuit voltage below threshold	Check battery is in fully charged and serviceable condition (if battery requires replacing and this DTC is logged, complete and return battery report form listing this DTC), refer to the battery care manual
B2A9116	Battery	Circuit voltage	Check battery is in fully charged and serviceable condition (if battery requires

	discharged	below threshold	replacing and this DTC is logged, complete and return battery report form listing this DTC), refer to the battery care manual
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Pinpoint Tests

PINPOINT TEST G834532p4 : P163200 CHARGING SYSTEM FAULT

G834532t9 : CHECK THE BATTERY VOLTAGE WITH THE ENGINE RUNNING

1. Connect a suitable voltmeter across the battery terminals. 2. Start the engine and allow to idle with no electrical loads applied. 3. Measure the maximum voltage achieved at the battery after start.

- **Is the voltage greater than 13 volts?**

-> **Yes**

GO to Pinpoint Test G834532t10.

-> **No**

INSTALL a fully charged battery. GO to Pinpoint Test G834532t13.

G834532t10 : CHECK THE GENERATOR 'S' TERMINAL FOR BATTERY VOLTAGE

1. Set ignition status to OFF. 2. DISCONNECT generator electrical connector PI048. 3. MEASURE the voltage at generator electrical connector PI048 pin 3.

- **Is the voltage greater than 10 volts?**

-> **Yes**

GO to Pinpoint Test G834532t13.

-> **No**

GO to Pinpoint Test G834532t11.

G834532t11 : CHECK FUSE 5 IN REAR JUNCTION BOX (RJB)

1. Check fuse 5 in the RJB.

- **Is the fuse OK?**

-> **Yes**

REPAIR the circuit between the generator electrical connector PI048 pin 3 and fuse 5 in the RJB.
CLEAR the DTC, test the system for normal operation.

-> **No**

GO to Pinpoint Test G834532t12.

G834532t12 : CHECK THE GENERATOR 'S' TERMINAL FOR SHORT TO GROUND

1. MEASURE the resistance between generator electrical connector PI048 pin 3 and ground.

- **Is the resistance less than 10,000 ohms?**

-> **Yes**

REPAIR the circuit between the generator electrical connector PI048 pin 3 and fuse 5 of the RJB.
INSTALL a new fuse, CLEAR the DTC, test the system for normal operation.

-> **No**

INSTALL a new fuse, CLEAR the DTC, test the system for normal operation.

G834532t13 : CHECK FOR BATTERY VOLTAGE AT THE GENERATOR 'L' TERMINAL

1. Set ignition status to OFF. 2. Disconnect generator electrical connector PI048. 3. Set ignition status to ON. 4. Measure the voltage at generator electrical connector PI048 pin 1.

- **Is the voltage greater than 10 volts?**

-> **Yes**

INSTALL a new generator.

Generator - 4.2L NA V8 - AJV8 (86.10.02) CLEAR the DTC, test the system for normal operation.

-> **No**

GO to Pinpoint Test G834532t14.

G834532t14 : CHECK THE GENERATOR 'L' LINE FOR SHORT TO GROUND

1. Set ignition status to OFF. 2. Disconnect battery. 3. MEASURE the resistance between the generator electrical connector PI048 pin 1 and ground.

- **Is the resistance less than 1,000 ohms?**

-> **Yes**

REPAIR the circuit between the generator electrical connector PI048 pin 1 and the Engine Control Module (ECM). CLEAR the DTC, test the system for normal operation.

-> **No**

GO to Pinpoint Test G834532t15.

G834532t15 : CHECK THE GENERATOR 'L' LINE FOR SHORT TO POWER

1. MEASURE the resistance between the generator electrical connector PI048 pin 1 and battery positive.

- **Is the resistance less than 10,000 ohms?**

-> **Yes**

REPAIR the circuit between the generator electrical connector PI048 pin 1 and the Engine Control Module (ECM). CLEAR the DTC, test the system for normal operation.

-> **No**

GO to Pinpoint Test G834532t16.

G834532t16 : CHECK THE GENERATOR 'L' LINE FOR OPEN CIRCUIT

1. Disconnect the ECM electrical connector PI300. 2. MEASURE the resistance between the generator electrical connector PI048 pin 1 and ECM electrical connector PI300 pin 16.

- **Is the resistance less than 5 ohms?**

-> **Yes**

Install a new generator.

Generator - 4.2L NA V8 - AJV8 (86.10.02) CLEAR the DTC, test the system for normal operation.

-> **No**

REPAIR the circuit between the generator electrical connector PI048 pin 1 and the ECM electrical connector PI300 pin 16. CLEAR the DTC, test the system for normal operation.

PINPOINT TEST G834532p1 : IGNITION POWER CIRCUIT TESTS

G834532t1 : CHECK FOR IGNITION POWER AT GENERATOR

1. Set ignition status to OFF. 2. Disconnect generator electrical connector PI048. 3. Set ignition status to ON. 4. Measure the voltage at generator electrical connector PI048 pin 2.

- **Is the voltage greater than 10 volts?**

-> **Yes**

Check for quiescent current fault, check battery condition. Refer to the Battery Care Manual.

-> **No**

GO to Pinpoint Test G834532t2.

G834532t2 : CHECK THE IGNITION POWER CIRCUIT FOR SHORT TO GROUND

1. Set the ignition status to OFF. 2. Disconnect the battery. 3. Check the resistance between generator electrical connector PI048 pin 2 and GROUND.

- **Is the resistance less than 400 ohms?**

-> **Yes**

REPAIR the circuit between the generator electrical connector PI048 pin 2 and the CJB. CLEAR the DTC, test the system for normal operation.

-> **No**

GO to Pinpoint Test G834532t3.

G834532t3 : CHECK THE IGNITION POWER CIRCUIT FOR SHORT TO POWER

1. Check the resistance between generator electrical connector PI048 pin 2 and battery positive.

- **Is the resistance less than 10,000 ohms?**

-> **Yes**

REPAIR the circuit between the generator electrical connector PI048 pin 2 and the CJB. CLEAR the DTC, test the system for normal operation.

-> **No**

GO to Pinpoint Test G834532t4.

G834532t4 : CHECK THE IGNITION POWER CIRCUIT FOR OPEN CIRCUIT

1. Disconnect CJB electrical connector FL048. 2. Check the resistance between CJB electrical connector FL048 pin 12 and generator electrical connector PI048 pin 2.

- **Is the resistance greater than 5 ohms?**

-> **Yes**

REPAIR the circuit between CJB electrical connector FL048 pin 12 and generator electrical connector PI048 pin 2. CLEAR the DTC, test the system for normal operation.

-> **No**

GO to Pinpoint Test G834532t5.

G834532t5 : CHECK CJB IGNITION POWER OUTPUT DRIVE

1. Connect the battery. 2. Set ignition status to ON. 3. Check the voltage at CJB electrical connector FL048, component side, pin 12.

- **Is the voltage greater than 10 volts?**

-> **Yes**

Check no other modules connected to this circuit are pulling to GROUND. Clear the DTC, test the system for normal operation.

-> **No**

Install a new generator.

Generator - 4.2L NA V8 - AJV8 (86.10.02)

PINPOINT TEST G834532p7 : GENERATOR NOISY

G834532t23 : CHECK THE GENERATOR FOR SECURITY

1. Inspect the generator fixings.

- **Is the generator secure?**

-> **Yes**

GO to Pinpoint Test G834532t24.

-> **No**

SECURE the generator. TEST the system for normal operation.

G834532t24 : CHECK THE FEAD BELT

1. Remove and inspect the FEAD belt.

Accessory Drive Belt - 4.2L NA V8 - AJV8 (12.10.40)

- **Is the FEAD belt in good condition?**

-> **Yes**

GO to Pinpoint Test G834532t25.

-> **No**

INSTALL a new FEAD belt. TEST the system for normal operation.

G834532t25 : CHECK THE FEAD BELT TENSIONER

1. Remove and inspect the FEAD belt tensioner.

Accessory Drive Belt Tensioner - 4.2L NA V8 - AJV8 (12.10.41)

- **Is the FEAD belt tensioner in good condition?**

-> **Yes**

GO to Pinpoint Test G834532t26.

-> **No**

INSTALL a new FEAD belt tensioner. TEST the system for normal operation.

G834532t26 : CHECK THE GENERATOR FOR MECHANICAL NOISE

1. Rotate the generator pulley by hand.

- **Does the generator rotor shaft rotate smoothly and quietly?**

-> **Yes**

GO to Pinpoint Test G834532t27.

-> **No**

INSTALL a new generator.

Generator - 4.2L NA V8 - AJV8 (86.10.02) TEST the system for normal operation.

G834532t27 : CHECK THE FEAD BELT IDLER PULLEYS

1. Rotate the FEAD belt idler pulleys by hand.

- **Do the FEAD belt idler pulleys rotate smoothly and quietly?**

-> **Yes**

GO to Pinpoint Test G834532t28.

-> **No**

INSTALL new FEAD belt idler pulleys as necessary.

Accessory Drive Belt Idler Pulley - 4.2L NA V8 - AJV8 (12.10.43) TEST the system for normal operation.

G834532t28 : CHECK THE GENERATOR FOR ELECTRICAL NOISE

1. Install the FEAD belt pulleys and belt. 2. Start and run the engine at 1500 rpm. Apply a high electrical load to the battery.

- **Is the noise only heard with the high electrical load applied?**

-> **Yes**

GO to Pinpoint Test G834532t29.

-> **No**

CHECK the air conditioning compressor.

Air Conditioning (A/C) Compressor - 4.2L NA V8 - AJV8 (82.10.20) CHECK the power steering pump.

Power Steering Pump - 4.2L NA V8 - AJV8 (57.20.14) TEST the system for normal operation.

G834532t29 : ELIMINATE THE GENERATOR AS THE CAUSE OF ELECTRICAL NOISE

1. Disconnect generator electrical connector PI048. 2. Start and run the engine at 1500 rpm.

- **Is the noise still present?**

-> **Yes**

CHECK the air conditioning compressor.

Air Conditioning (A/C) Compressor - 4.2L NA V8 - AJV8 (82.10.20) CHECK the power steering pump.

Power Steering Pump - 4.2L NA V8 - AJV8 (57.20.14) TEST the system for normal operation.

-> **No**

INSTALL a new generator.

Generator - 4.2L NA V8 - AJV8 (86.10.02) TEST the system for normal operation.

PINPOINT TEST G834532p8 : RADIO INTERFERENCE

G834532t30 : CHECK IF THE GENERATOR IS THE CAUSE OF THE RADIO INTERFERENCE

1. Start and run the engine at 1500 rpm. 2. Turn the radio to the **ON** position, and select the affected station.

- **Is the radio interference present?**

-> **Yes**

GO to Pinpoint Test G834532t32.

-> **No**

GO to Pinpoint Test G834532t31.

G834532t31 : CHECK IF THE GENERATOR IS THE CAUSE OF THE RADIO INTERFERENCE WITH A HIGH ELECTRICAL LOAD APPLIED TO THE BATTERY

1. Start and run the engine at 1500 rpm. 2. Apply a high electrical load to the battery. 3. Turn the radio to the **ON** position, and select the affected station.

- **Is the radio interference present?**

-> **Yes**

GO to Pinpoint Test G834532t32.

GO to Pinpoint Test G834532t32.

-> **No**

DIAGNOSE the entertainment system.

Audio System

G834532t32 : ELIMINATE THE GENERATOR AS THE CAUSE OF RADIO INTERFERENCE

1. Disconnect generator electrical connector PI048. 2. Start and run the engine at 1500 rpm. 3. Turn the radio to the **ON** position, and select the affected station.

- **Is the radio interference present?**

-> **Yes**

DIAGNOSE the entertainment system.

Audio System

-> **No**

CLEAN and tighten all mounting points, positive and negative cable connections (including the hood, luggage compartment lid and engine GROUND straps). INSTALL fuse 5 to the RJB. TEST the system for normal operation. If interference is still present, INSTALL a new generator.

Generator - 4.2L NA V8 - AJV8 (86.10.02)

414-01 : Battery, Mounting and Cables

Specifications

Specifications

Battery Specification



WARNING: Batteries produce explosive gases which may cause personal injury. Do not expose the battery to a naked flame. When charging or working near a battery wear protective clothing and eye protectors. Always provide adequate ventilation. Failure to follow these instructions may result in personal injury.



WARNING: Batteries contain sulphuric acid, avoid contact with skin, eyes and clothing. Shield your eyes when working near the battery to protect against possible contact of the acid solution. In case of contact with the skin or eyes, flush immediately for a minimum of 15 minutes and seek prompt medical attention. If swallowed call a physician immediately. Failure to follow these instructions may result in personal injury.



CAUTION: Make sure all electrical systems are off before connecting the battery ground cable. Failure to follow these instructions may result in damage to the electrical system.

Engine Specification	Battery		
	Battery Information		
	Battery type	Specification	
Vehicles fitted with 4.2L NA and SC engine	Varta T8	90 Ah	

Battery Cold Cranking Specification

Item	Specification
90 Ah Battery Cold Cranking	800 Amps

Battery Disconnect/Connect Procedures



WARNING: The backup power supply energy must be depleted before any supplementary restraint system repairs are carried out. To deplete the backup supply energy, first disconnect the battery ground cable, then disconnect the battery positive cable and wait ten minutes to avoid accidental deployment and personal injury. Failure to follow this instruction may result in personal injury.



CAUTION: Disconnecting the battery cables will cause all of the electronic control modules to lose all stored data/fault codes.

NOTE:

Following reconnecting of the battery, the engine should be allowed to idle as the stored idle and drive values contained within the engine control module (ECM) will have been lost. This may cause driveability concern if the following procedure is not carried out.

Battery disconnect procedure	Battery connect procedure
1. If possible, apply parking brake or alternatively, chock wheels.	1. Connect the battery cables and tighten to 5 Nm. Ground cable must be connected last
2. If required, record any customer audio and climate control settings. This also applies to all electronic control module stored information.	2. Install the battery cover and close the luggage compartment lid.
3. Switch off ignition.	3. Start the engine and allow to idle until the engine reaches normal operating temperature.
4. Open the luggage compartment lid.	4. Switch the engine off.
5. Release the cover and disconnect the battery ground cable.	5. Restart the engine and allow to idle for approximately two minutes (this will allow the ECM to learn the idle values).
6. If required, disconnect the battery positive cable.	6. Apply and hold the brake pedal, select drive and allow the engine to idle for a further two minutes.
	7. Drive the vehicle for approximately five miles/eight kilometers of varied driving to enable the ECM to complete it's learning strategy.
	8. Reset the audio unit and climate control assembly to original customer settings.
	9. Reset the door window motors.

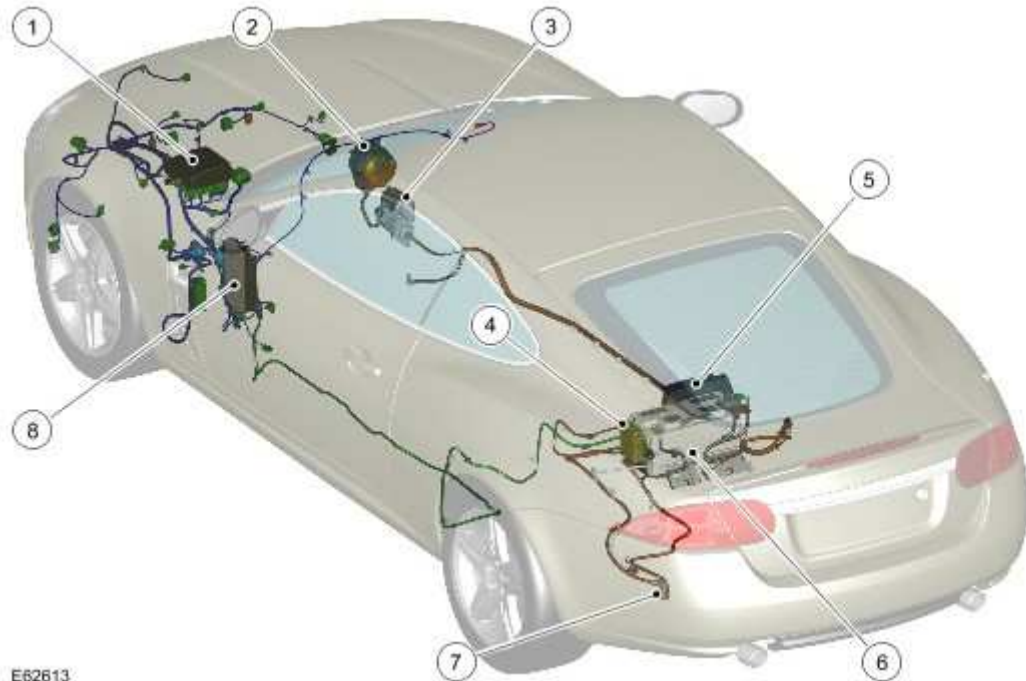
Torque Specifications

Description	Nm	lb-ft	lb-in
Battery positive cable terminal retaining nut	5	4	-

Battery negative cable terminal retaining nut	5	4	-
Battery clamp nuts	9	7	-

Battery and Cables

COMPONENT LOCATION



Item	Part Number	Description
1		Power distribution box
2		Generator
3		Starter motor
4		Battery Junction Box (BJB)
5		Auxiliary junction box
6		Battery
7		Remote jump start terminal
8		Central Junction Box (CJB)

INTRODUCTION

Electrical power from the battery and generator is distributed throughout the vehicle through a series of junction boxes.

IGNITION MODES

The vehicle has a possible 4 ignition modes. The modes and systems that are active in each mode are detailed in the following table.

Ignition Mode	Off	Accessory (convenience)	On	Crank
Exterior lamps headlamps – Dip only approach lamps	Memory functions seat, column etc	Exterior lamps fog lamps directional Indicators	Stability controls	
Interior lighting	Manual adjust seat column etc	Convertible hood	Heated/cooled Seat	
Preheat - timed in	Interior lighting	Wash/wipe	Adaptive speed control	
Electric park brake - On	Brake lights	HVAC	Adaptive damping	
Instrument cluster - stand by, clock, odometer	Exterior lighting auto headlamps, reversing lamps, side lamps, tail lamps	EMS	TPMS	
Hazard warning lamps	Auto infotainment previous condition (preset volume), radio standby, phone standby, steering wheel switches	Instrument cluster – dials and warnings fuel gauge temperature gauge lamp check	Pedestrian Protection system	
Locking and unlocking	Instrument cluster –message center, trip computer	Windows	Gearshift control & TCM	
Security	Horn	EPB – power to disengage (foot on break)	EPB – power to disengage	
	Cigar lighter/power socket	Restraints check		

BATTERY



The battery is located behind a cover at the front of the luggage compartment. The cover is held in place by 4 retainers. The battery sits in a tray and is secured with a clamp plate and 2 nuts.

The positive and negative battery cables are fitted with Service loops. The Service loops add extra length to the cables and allow the battery to be slid rearward in the luggage compartment without disconnection.

Remote Jump Start Terminal

The positive battery cable is also connected to a remote jump start terminal. The remote jump start terminal is located in the Left-Hand (LH) rear corner of the luggage compartment and can be accessed by removing the air vent trim. Although also fitted to coupe vehicles, the terminal has been specifically designed to allow a convertible vehicle to be jump started if a drained battery is experienced when the top is in the stowed condition.

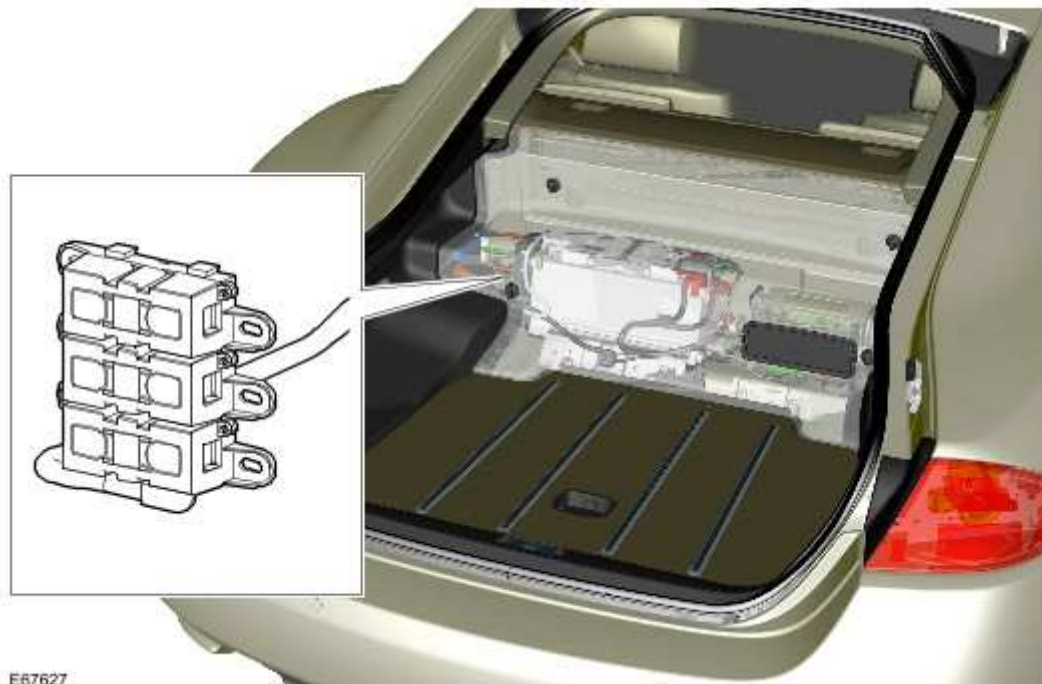
The starter motor power lead is also connected to the remote jump start terminal and is insulated from the battery jump start cable and the vehicle body by a nylon washer.

The negative jump start connection is a stud located in the spare wheel well. For more information on jump start procedure, refer to the Owners Handbook.

Transit Relay

The vehicle is also fitted with a transit relay. This is a disposable device and not for use by the customer. This relay is fitted in series with the battery and ground. It disconnects the battery from the vehicles ground and thus eliminates quiescent current drain during delivery. The relay must be removed before delivery to the customer. For more information, refer to the Pre-Delivery Inspection (PDI) manual.

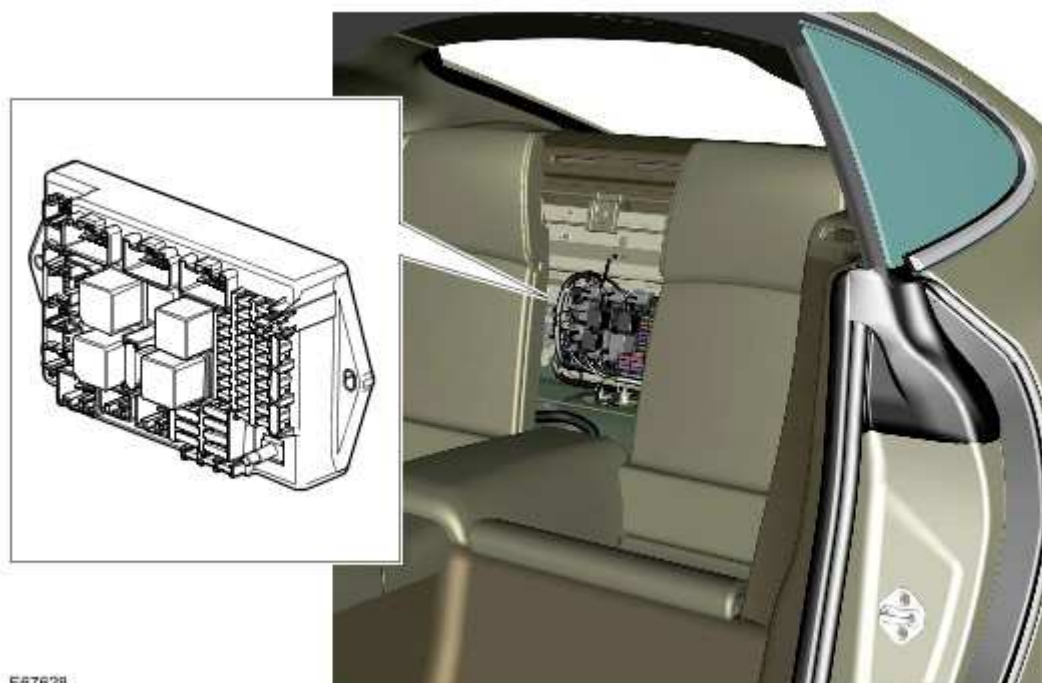
BATTERY JUNCTION BOX (BJB)



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Mounted on the LH side of the battery is the BJB. The BJB contains 3 megafuses delivering battery power to; the starter motor (400A); the auxiliary junction box (175A) and the CJB (175A). For more information, refer to the Electrical Guide.

AUXILIARY JUNCTION BOX

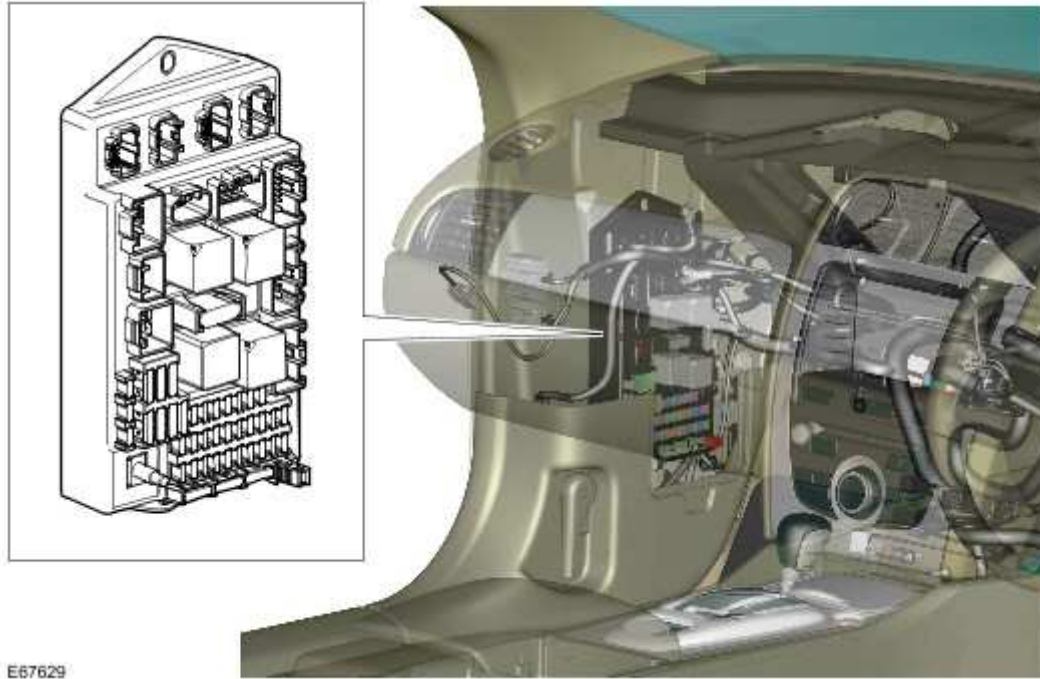


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The auxiliary junction box is mounted on the passenger compartment rear bulkhead and secured by 2 nuts/studs. The junction box can be accessed by opening the center panel of the rear seat back. The center panel is secured in position by a single stud at the top, and hinged at the bottom.

The auxiliary junction box receives electrical power from the BJB via a 175A megafuse. For more information on the circuits and systems served by the auxiliary junction box, refer to the Electrical Guide.

CENTRAL JUNCTION BOX (CJB)



The CJB is mounted at the base of the LH A pillar and secured by 2 nuts/studs. Access to the CJB can be gained through a removable panel located below the LH side of the instrument panel.

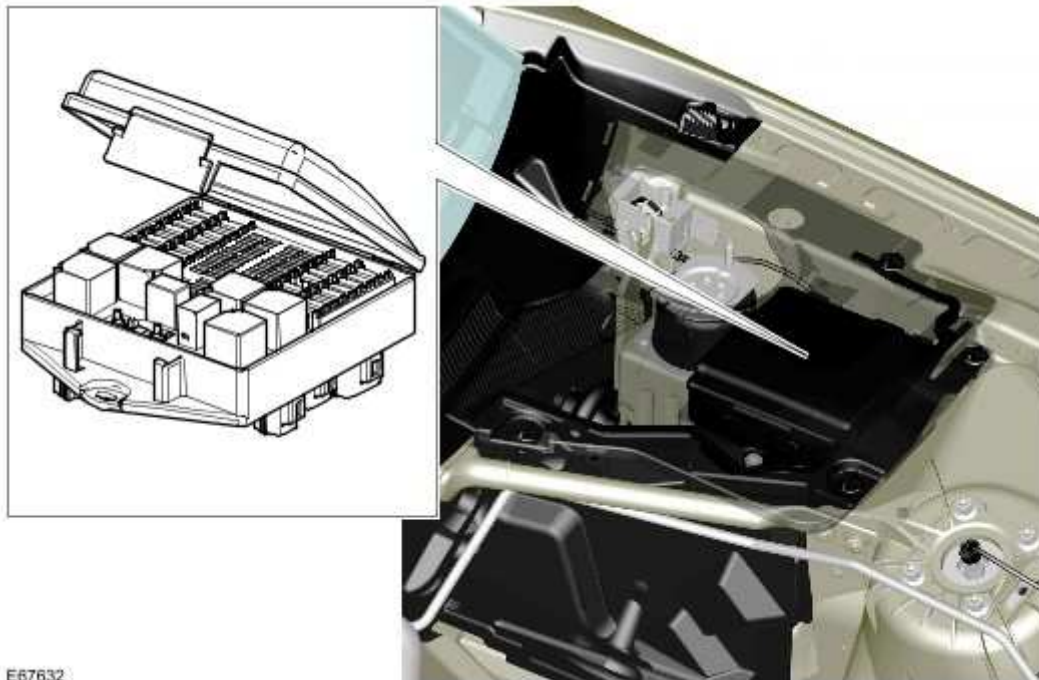
The CJB receives electrical power from the BJB via a 175A megafuse. A second power supply lead 'daisy chains' off the CJB, providing electrical power to the power distribution box. For more information on the circuits and systems served by the CJB, refer to the Electrical Guide.

The CJB also controls the functionality of a number of vehicle systems. These include:

- Electric steering column lock. For additional information, refer to Steering Column (211-04 Steering Column)
- Instrument cluster and panel illumination. For additional information, refer to Instrument Cluster and Panel Illumination (413-00 Instrument Cluster and Panel Illumination)
- Exterior lighting systems. For additional information, refer to Exterior Lighting (417-01 Exterior Lighting)
For additional information, refer to Daytime Running Lamps (DRL) (417-04 Daytime Running Lamps (DRL))
- Interior lighting systems. For additional information, refer to Interior Lighting (417-02 Interior Lighting)
- Active anti-theft alarm system. For additional information, refer to Anti-Theft - Active (419-01 Anti-Theft - Active)
- Passive anti-theft alarm system. For additional information, refer to Anti-Theft - Passive (419-01 Anti-Theft - Passive)

- Passive start. For additional information, refer to Handles, Locks, Latches and Entry Systems (501-14 Handles, Locks, Latches and Entry Systems)
- Electric seats. For additional information, refer to Seats (501-10 Seating)
- Electric windows. For additional information, refer to Glass, Frames and Mechanisms (501-11 Glass, Frames and Mechanisms)
- Wipers and washers. For additional information, refer to Wipers and Washers (501-16 Wipers and Washers)

POWER DISTRIBUTION BOX



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The power distribution box is located in the LH rear of the engine compartment, beneath a closing panel. The power distribution box is supplied electrical power from the BJB, via the CJB. For more information on the circuits and systems served by the power distribution box, refer to the Electrical Guide.

Battery

For additional information, <<414-00>>

Battery (86.15.01)

Removal



CAUTION: It is imperative that the battery ground cable is disconnected from the battery terminal and not the body.

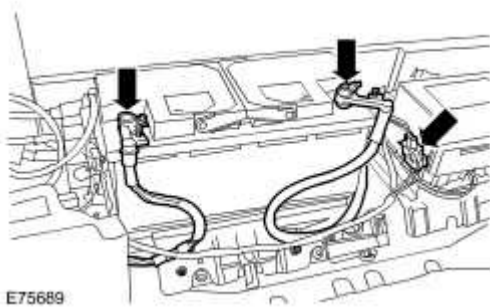
1 . Remove the cover and disconnect the battery ground cable.

2 . Disconnect the battery positive cable.

► Loosen the nut.

3 . Release the harness.

► Release the electrical connector from the clip.

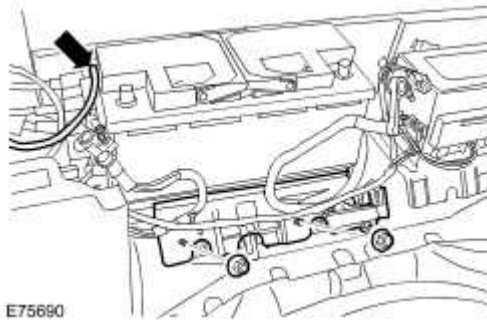


4 . Release the battery clamp.

► Remove the 2 nuts.

5 . Remove the battery.

- ▶ Disconnect the vent tube.



Installation

- 1 . Install the battery.

- ▶ Connect the vent tube.

- 2 . Install the battery clamp.

- ▶ Tighten the nuts to 6 Nm (4 lb.ft).

- 3 . Secure the wiring harness.

- ▶ Attach the electrical connector to the clip.

- 4 . Connect the battery positive cable.

- ▶ Tighten the nut to 5 Nm (4 lb.ft).

- 5 . Connect the battery ground cable and install the cover.

414-02 : Generator and Regulator – 4.2L NA V8 – AJV8/4.2L SC V8 – AJV8

Specifications

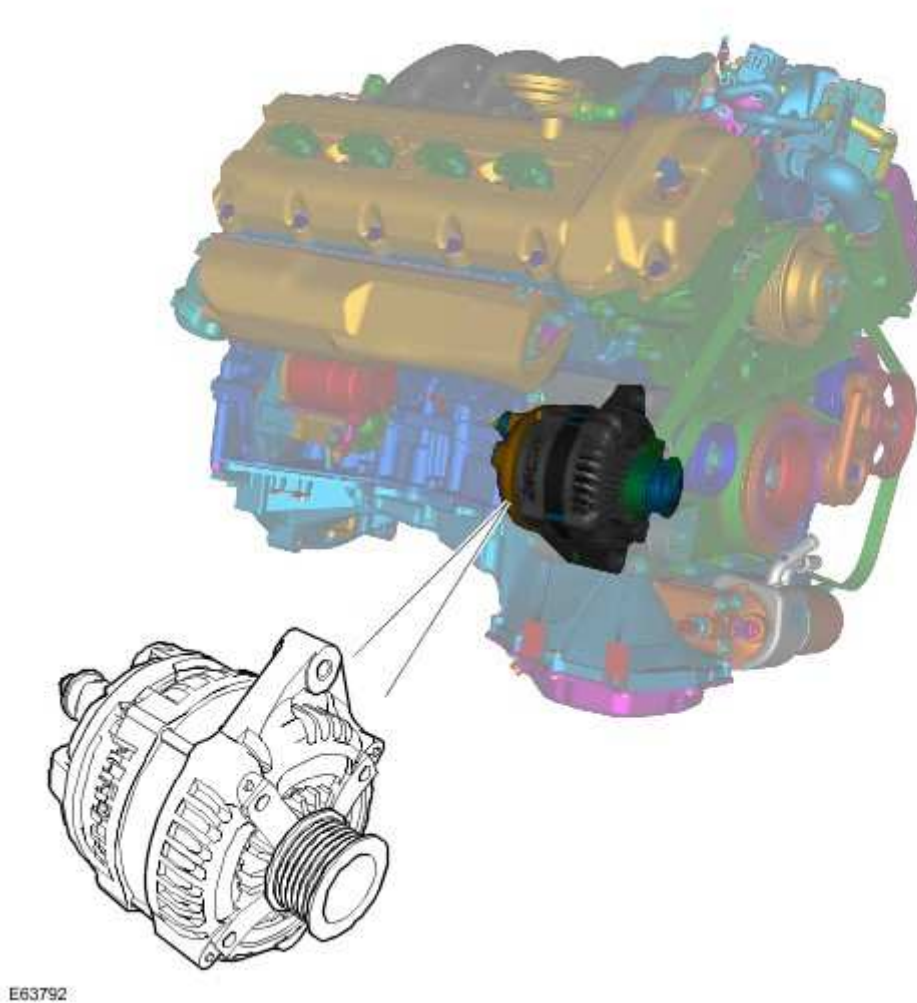
Specifications

Torque Specifications

Item	Nm	lb-ft	lb-in
Electrical connector to generator - nut	12	9	-
Generator to mounting bracket - upper nut	25	18	-
Generator to mounting bracket - lower nut/bolt	40	30	-
Generator mounting bracket to engine - bolt	40	30	-

Generator

COMPONENT LOCATION



E63792

INTRODUCTION

The generator is located at the front Right-Hand (RH) side of the engine, on the cylinder block. The generator has an output of 85/130 Amps and is manufactured by Denso. A six-ribbed polyvee belt drives the generator pulley, which in turn is driven from the engine crankshaft pulley. The generator comprises a stator, a rotor, a rectifier pack and a regulator.

The rotor comprises a field winding, wound around an iron core and mounted on a shaft. The iron core has extensions at each end, which form North and South poles as current flows through the field winding. The rotor is located inside the stator and is mounted on bearings for smooth running and to support the rotor due to the high side loading applied by the drive belt tension.

The stator has three sets of coils made from copper wire. The three coil windings are connected in a 'dual star' connection, where one end of the winding is connected to the other two windings. The output current is supplied from the opposite end of each winding. Rotation of the rotor causes ac current to be produced in the coils.

The rectifier converts the ac current produced in the stator coils into dc (rectified) current required by the vehicle electrical system. The rectifier comprises 12 semi-conductor diodes mounted on a heatsink to dissipate heat. An equal number of the diodes are on the negative and positive side. An additional diode in the regulator controls feedback through the battery voltage signal line. The rectifier also prevents current flow from the battery to the generator when the output voltage is less than the battery voltage.

Initially, the ignition supply provides an excitation current to the rotor at low generator speeds via brushes, which contact slip rings at the end of the rotor shaft. As the generator speed increases the generator becomes self-exciting.

The charge warning lamp function is transmitted to the engine management system and then on to the high speed Controller Area Network (CAN) bus to the instrument cluster.

Generator

For additional information, refer to section [414-00](#)

Generator - 4.2L NA V8 - AJV8 (86.10.02)

Removal

All vehicles

- 1 . Remove the cover and disconnect the battery ground cable.

2



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

Raise and support the vehicle.

- 3 . Remove the accessory drive belt.

- 4 . Remove the RH HO2S.

- 5 . Remove the RH engine mount.

Right-hand drive vehicles

- 6 . Disconnect the steering gear electrical connector.



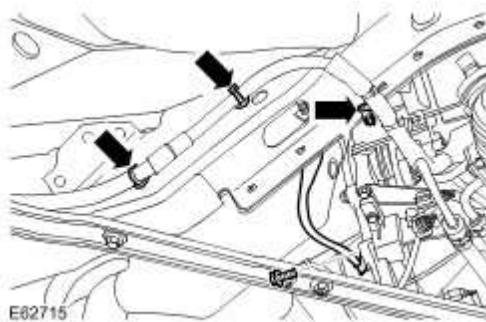
All vehicles

7 . Release the battery positive cable from the body.

▶ Release the 3 clips.

8 . Disconnect the ground cable from the transmission.

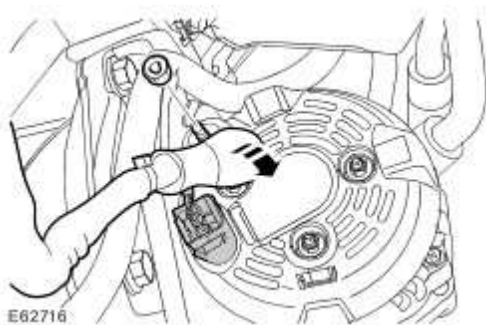
▶ Remove the bolt.



9 . Disconnect the generator electrical connectors.

▶ Release the cover.

▶ Remove the nut.

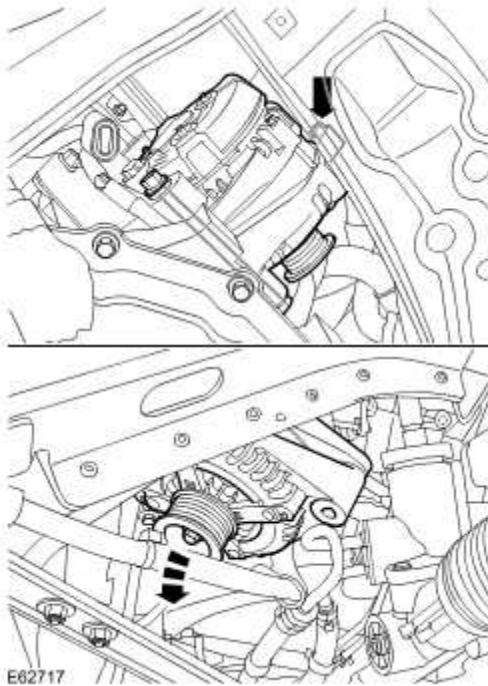


10 . Remove the generator.

▶ Remove the nut.

▶ Remove the nut and bolt.

- ▶ Rotate the generator.



Installation

All vehicles

- 1 . Install the generator.

- ▶ Tighten the nut to 25 Nm (18 lb.ft).
- ▶ Tighten the nut and bolt to 40 Nm (30 lb.ft).

- 2 . Connect the generator electrical connectors.

- ▶ Tighten the nut to 12 Nm (9 lb.ft).
- ▶ Secure the cover.

- 3 . Connect the ground cable.

 Tighten the bolt to 48 Nm (35 lb.ft).

4 . Secure the battery positive cable.

 Attach the clips.

Right-hand drive vehicles

5 . Connect the steering gear electrical connector.

All vehicles

6 . Install the RH engine mount.

7 . Install the RH HO2S.

8 . Install the accessory drive belt.

9 . Connect the battery ground cable and install the cover.

Generator - 4.2L SC V8 - AJV8 (86.10.02)

Removal

All vehicles

- 1 . Remove the cover and disconnect the battery ground cable.
For additional information, refer to Specifications

2



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

Raise and support the vehicle.

- 3 . Remove the accessory drive belt.
For additional information, refer to Accessory Drive Belt - 4.2L SC V8 - AJV8 (12.10.40)
- 4 . Remove the RH HO2S.
For additional information, refer to Heated Oxygen Sensor (HO2S)
- 5 . Remove the RH engine mount.
For additional information, refer to Engine Mount RH (12.45.03)

Right-hand drive vehicles

- 6 . Disconnect the steering gear electrical connector.



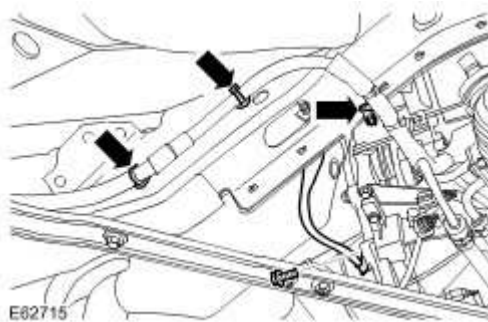
All vehicles

7 . Release the battery positive cable from the body.

▶ Release the 3 clips.

8 . Disconnect the ground cable from the transmission.

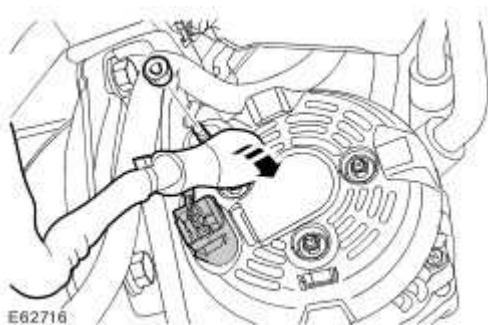
▶ Remove the bolt.



9 . Disconnect the generator electrical connectors.

▶ Release the cover.

▶ Remove the nut.

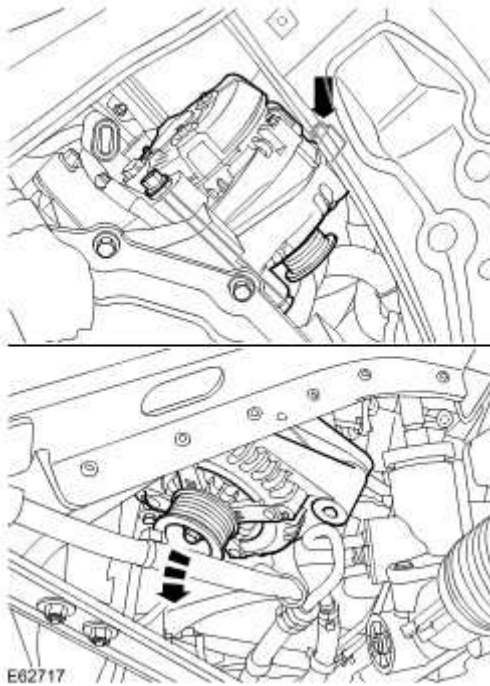


10 . Remove the generator.

▶ Remove the nut.

▶ Remove the nut and bolt.

- ▶ Rotate the generator.



Installation

All vehicles

- 1 . Install the generator.

- ▶ Tighten the nut to 25 Nm (18 lb.ft).
- ▶ Tighten the nut and bolt to 40 Nm (30 lb.ft).

- 2 . Connect the generator electrical connectors.

- ▶ Tighten the nut to 12 Nm (9 lb.ft).
- ▶ Secure the cover.

- 3 . Connect the ground cable.

 Tighten the bolt to 48 Nm (35 lb.ft).

4 . Secure the battery positive cable.

 Attach the clips.

Right-hand drive vehicles

5 . Connect the steering gear electrical connector.

All vehicles

6 . Install the RH engine mount.

For additional information, refer to Engine Mount RH (12.45.03)

7 . Install the RH HO2S.

For additional information, refer to Heated Oxygen Sensor (HO2S)

8 . Install the accessory drive belt.

For additional information, refer to Accessory Drive Belt - 4.2L SC V8 - AJV8 (12.10.40)

9 . Connect the battery ground cable and install the cover.

For additional information, refer to Specifications

415 : Information and Entertainment Systems

415-00 : Information and Entertainment – General Information

Diagnosis and testing

Audio System

Principle of Operation

For a detailed description of the Information and Entertainment System, refer to the relevant Description and Operation section in the workshop manual.

Audio System

Antenna

Speakers

Inspection and Verification

- 1 . Verify the customer concern.
- 2 . Visually inspect for obvious signs of damage and system integrity.

Mechanical	Electrical
• Integrated audio module • Information and entertainment module • Audio amplifier • Compact disc player jammed, not loading • Scratched/dirty compact discs • Speakers	• Fuses • Loose or corroded connector(s) • Integrated audio module • Information and entertainment module • Audio amplifier • Speakers

3 . If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.

4 . If the cause is not visually evident, check for Diagnostic Trouble Codes (DTCs) and refer to the DTC Index.

DTC Index

Information and Entertainment Module



CAUTION: When probing connectors to take measurements in the course of the pinpoint tests, use the adaptor kit, part number 3548-1358-00

NOTE:

If the control module is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module.

NOTE:

Generic scan tools may not read the codes listed, or may read only five digit codes. Match the five digits from the scan tool to the first five digits of the seven digit code listed to identify the fault (the last two digits give extra information read by the manufacturer-approved diagnostic system).

NOTE:

When performing voltage or resistance tests, always use a digital multimeter (DMM) accurate to three decimal places and with a current calibration certificate. When testing resistance, always take the resistance of the DMM leads into account.

NOTE:

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

NOTE:

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

DTC	Description	Possible Cause	Action
B1A59-	Sensor 5 Volt supply	Internal electronic failure	Install a new information and entertainment control module,

49			refer to the new module installation note at the top of the DTC Index
B1D21-15	Remote control switch	Steering wheel audio switch circuit - short to power, high resistance	For steering wheel audio control switch tests. GO to Pinpoint Test G834560p1.
U0010-00	Medium speed CAN communication Bus	General failure No sub type information	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
U0127-00	Lost communication with Tire Pressure Monitor System (TPMS) module	General failure No sub type information	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
U0140-00	Lost communication with CJB	General failure No sub type information	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
U0142-00	Lost communication with RJB	General failure No sub type information	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
U0155-00	Lost communication with instrument cluster	General failure No sub type information	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
U0159-00	Lost communication with parking aid module	General failure No sub type information	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
U0164-00	Lost communication with climate control module	General failure No sub type information	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
U0184-	Lost communication	General failure No sub type	Carry out the pinpoint test associated with this DTC using

00	with audio module	information	the manufacturer approved diagnostic system
U0186-00	Lost communication with audio amplifier	General failure No sub type information	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
U0193-00	Lost communication with satellite radio tuner	General failure No sub type information	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
U0197-00	Lost communication with telephone module	General failure No sub type information	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
U0199-00	Lost communication with driver door module	General failure No sub type information	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
U0200-00	Lost communication with passenger door module	General failure No sub type information	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
U0206-00	Lost communication with convertible top module	General failure No sub type information	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
U0214-00	Lost communication with remote function actuation	General failure No sub type information	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
U0256-00	Lost communication with integrated control panel	General failure No sub type information	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
U0245-	Lost communication with multimedia	General failure No sub type	Carry out the pinpoint test associated with this DTC using

00	module	information	the manufacturer approved diagnostic system
U0257-00	Lost communication with touch screen display	General failure No sub type information	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
U0300-00	Internal control module software incompatibility	RJB car configuration data is not compatible with the information and entertainment control module	Re-configure the RJB using the manufacturer approved diagnostic system, clear DTCs and re-test. If DTC still logged, suspect the information and entertainment control module and refer to the new module installation note at top of DTC Index
U0300-51	Internal control module software incompatibility	System program failure	Re-configure the information and entertainment control module using the manufacturer approved diagnostic system
U1A15-87	Incomplete MOST ring reported by Information and Entertainment control module	Missing message	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
U3000-55	Stored vehicle configuration data does not match	Incorrect car configuration data received	Re-configure the RJB using the manufacturer approved diagnostic system. Clear DTC and re-test. If the DTC remains suspect the information and entertainment module, refer to the new module installation note at the top of the DTC Index
U3000-87	Control module	Missing message	Re-configure the RJB using the manufacturer approved diagnostic system. Check information and entertainment module for DTCs and refer to

			the DTC Index. Check CAN network integrity using the manufacturer approved diagnostic system
U3002-81	Vehicle Identification Number (VIN)	Vehicle/component mismatch. Corrupt VIN data being transmitted, module previously installed to other vehicle	Install original module, check for DTCs and refer to relevant DTC Index
U3003-62	Battery voltage	Mis-match of battery voltage, of 2 volts or lower, between information and entertainment module and RJB	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system

Audio Amplifier (vehicles with premium audio)



CAUTION: When probing connectors to take measurements in the course of the pinpoint tests, use the adaptor kit, part number 3548-1358-00

NOTE:

If the control module is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module.

NOTE:

Generic scan tools may not read the codes listed, or may read only five digit codes. Match the five digits from the scan tool to the first five digits of the seven digit code listed to identify the fault (the last two digits give extra information read by the manufacturer-approved diagnostic system).

NOTE:

When performing voltage or resistance tests, always use a digital multimeter (DMM) accurate to three decimal places and with a current calibration certificate. When testing resistance, always take the resistance of the DMM leads into account.

NOTE:

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

NOTE:

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

DTC	Description	Possible Cause	Action
B1A01-13	Speaker #1 - circuit open	Front passenger speaker circuits - high resistance	Refer to the electrical circuit diagrams and test front passenger speaker circuits for high resistance
B1A02-13	Speaker #2 - circuit open	Front driver speaker circuits - high resistance	Refer to the electrical circuit diagrams and test front driver speaker circuits for high resistance
B1A03-13	Speaker #3 - circuit open	Rear left speaker circuit - high resistance	Refer to the electrical circuit diagrams and test rear left speaker circuit for high resistance
B1A04-13	Speaker #4 - circuit open	Rear right speaker circuit - high resistance	Refer to the electrical circuit diagrams and test rear right speaker circuit for high resistance
B1A05-13	Speaker #5 - circuit open	Front center speaker circuit - high resistance	Refer to the electrical circuit diagrams and test front center speaker circuit for high resistance
B1A06-13	Speaker #6 - circuit open	Sub-woofer speaker circuit - high resistance	Refer to the electrical circuit diagrams and test sub-woofer speaker circuit for high resistance
B1A01-01	Speaker#1 - general electrical failure	General electrical failure	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
B1A02-	Speaker #2 - general	General electrical	Carry out the pinpoint test associated with this DTC using the manufacturer

01	electrical failure	failure	approved diagnostic system
B1A03-01	Speaker #3 - general electrical failure	General electrical failure	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
B1A04-01	Speaker #4 - general electrical failure	General electrical failure	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
B1A05-01	Speaker #5 - general electrical failure	General electrical failure	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
B1A06-01	Speaker #6 - general electrical failure	General electrical failure	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
B1A09-11	Short circuit of one or both front speaker output - circuit short to ground	Short to ground	Check for additional front speaker DTCs and refer to DTC Index
B1A10-11	Short circuit of one or both rear speaker output - circuit short to ground	Short to ground	Check for additional rear speaker DTCs and refer to DTC Index
B1A11-12	Speaker#11 - circuit short to battery	Short to power	Refer to the electrical circuit diagrams and check all speaker circuits for short to power
U2003-98	Fibre optic communication Bus - component or system over temperature	Component or system over temperature	Check for additional DTCs and refer to DTC Index. Clear DTC and re-test/monitor condition
U3000-05	Control module - system programming failures	- Software incompatibility - The version of the Local Configuration file does not match that expected	Re-configure the audio amplifier as an existing control module, using the manufacturer approved diagnostic system

U3000-42	Control module - general memory failure	General memory failure	Re-configure the audio amplifier as an existing control module, using the manufacturer approved diagnostic system. Clear DTC, cycle ignition and read DTCs. If DTC returns, suspect audio amplifier module and install a new module. Refer to the new module installation note at the top of the DTC Index
U3000-44	Control module - data memory failure	Data memory failure	Re-configure the audio amplifier as an existing control module, using the manufacturer approved diagnostic system. Clear DTC, cycle ignition and read DTCs. If DTC returns, suspect audio amplifier module and install a new module. Refer to the new module installation note at the top of the DTC Index
U3000-55	Stored vehicle configuration data does not match - not configured	Incorrect car configuration data received	Re-configure the RJB using the manufacturer approved diagnostic system. Clear DTC and re-test. If the DTC remains suspect the audio amplifier, refer to the new module installation note at the top of the DTC Index
U3000-87	Control module - missing message	Missing message	Re-configure the RJB using the manufacturer approved diagnostic system. Check audio amplifier for DTCs and refer to the DTC Index. Check CAN network integrity using the manufacturer approved diagnostic system
U3000-98	Control module - component or system over temperature	Component or system over temperature	Check for additional DTCs and refer to DTC Index. Clear DTC and re-test/monitor condition
U3003-16	Battery voltage - circuit voltage below threshold	Circuit voltage below threshold	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system

U3003-17	Battery voltage - circuit voltage above threshold	Circuit voltage above threshold	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
U3006-12	Control module - circuit short to battery	Short to power	Install a new audio amplifier module, refer to the new module installation note at the top of the DTC Index
U3006-16	Control module - circuit voltage below threshold	Circuit voltage below threshold	Install a new audio amplifier module, refer to the new module installation note at the top of the DTC Index

Integrated Audio Module



CAUTION: When probing connectors to take measurements in the course of the pinpoint tests, use the adaptor kit, part number 3548-1358-00

NOTE:

If the control module is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module.

NOTE:

Generic scan tools may not read the codes listed, or may read only five digit codes. Match the five digits from the scan tool to the first five digits of the seven digit code listed to identify the fault (the last two digits give extra information read by the manufacturer-approved diagnostic system).

NOTE:

When performing voltage or resistance tests, always use a digital multimeter (DMM) accurate to three decimal places and with a current calibration certificate. When testing resistance, always take the resistance of the DMM leads into account.

NOTE:

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

NOTE:

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

DTC	Description	Possible Cause	Action
B1B69-15	12 Volt supply circuit	Antenna power supply circuit - short to battery, high resistance	Refer to the electrical circuit diagrams and test the antenna power supply circuit for short to battery and high resistance
B1B69-11	12 Volt supply circuit	Antenna power supply circuit - short to ground	Refer to the electrical circuit diagrams and test the antenna power supply circuit for short to ground
B1D19-16	Compact disc unit	Circuit voltage below threshold	Install a new integrated audio module, refer to the new module installation note at the top of the DTC Index
B1D19-77	Compact disc unit	Commanded position not reachable	Install a new integrated audio module, refer to the new module installation note at the top of the DTC Index
B1D19-93	Compact disc unit	No operation	Install a new integrated audio module, refer to the new module installation note at the top of the DTC Index
B1A01-11	Speaker #1	Front driver speaker circuits - short to ground	Refer to the electrical circuit diagrams and test front driver speaker circuits for short to ground
B1A01-12	Speaker #1	Front driver speaker circuits - short to power	Refer to the electrical circuit diagrams and test front driver speaker circuits for short to power
B1A01-1A	Speaker #1	Front driver speaker circuits - resistance below threshold	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
B1A01-	Speaker #1	Front driver speaker circuits - resistance above	Carry out the pinpoint test associated with this DTC using the manufacturer

1B		threshold	approved diagnostic system
B1A01-1C	Speaker #1	Front driver speaker circuits - voltage out of range	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
B1A02-11	Speaker #2	Front passenger speaker circuits - short to ground	Refer to the electrical circuit diagrams and test front passenger speaker circuits for short to ground
B1A02-12	Speaker #2	Front passenger speaker circuits - short to power	Refer to the electrical circuit diagrams and test front passenger speaker circuits for short to power
B1A02-1A	Speaker #2	Front passenger speaker circuits - resistance below threshold	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
B1A02-1B	Speaker #2	Front passenger speaker circuits - resistance above threshold	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
B1A02-1C	Speaker #2	Front passenger speaker circuits - voltage out of range	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
B1A03-11	Speaker #3	Rear left speaker circuits - short to ground	Refer to the electrical circuit diagrams and test rear left speaker circuits for short to ground
B1A03-12	Speaker #3	Rear left speaker circuits - short to power	Refer to the electrical circuit diagrams and test rear left speaker circuits for short to power
B1A03-1A	Speaker #3	Rear left speaker circuits - resistance below threshold	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
B1A03-1B	Speaker #3	Rear left speaker circuits - resistance above threshold	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
B1A03-1C	Speaker #3	Rear left speaker circuits - voltage out of range	Carry out the pinpoint test associated with this DTC using the manufacturer

			approved diagnostic system
B1A04-11	Speaker #4	Rear right speaker circuits - short to ground	Refer to the electrical circuit diagrams and test rear right speaker circuits for short to ground
B1A04-12	Speaker #4	Rear right speaker circuits - short to power	Refer to the electrical circuit diagrams and test rear right speaker circuits for short to power
B1A04-1A	Speaker #4	Rear right speaker circuits - resistance below threshold	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
B1A04-13	Speaker #4	Rear right speaker circuits - resistance above threshold	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
B1A04-1C	Speaker #4	Rear right speaker circuits - voltage out of range	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system
B1D78-11	Auxiliary input	Auxiliary input circuit - short to ground	Refer to the electrical circuit diagrams and test Auxiliary input circuits for short to ground
B1D78-12	Auxiliary input	Auxiliary input circuit - short to power	Refer to the electrical circuit diagrams and test Auxiliary input circuits for short to power
B1D78-13	Auxiliary input	Auxiliary input circuit - high resistance	Refer to the electrical circuit diagrams and test Auxiliary input circuits for high resistance
B1D79-11	Microphone input	Microphone input circuit - short to ground	Refer to the electrical circuit diagrams and test microphone input circuits for short to ground
B1D79-12	Microphone input	Microphone input circuit - short to power	Refer to the electrical circuit diagrams and test microphone input circuits for short to power
B1D79-13	Microphone input	Microphone input circuit - high resistance	Refer to the electrical circuit diagrams and test microphone input circuits for

			high resistance
B1134-11	Phone input	Phone input circuit - short to ground	Refer to the electrical circuit diagrams and test phone input circuits for short to ground
B1134-12	Phone input	Phone input circuit - short to power	Refer to the electrical circuit diagrams and test phone input circuits for short to power
B1134-13	Phone input	Phone input circuit - high resistance	Refer to the electrical circuit diagrams and test phone input circuits for high resistance
U3000-49	Control module	Internal electronic failure	Suspect the integrated audio module, refer to the new module installation note at the top of the DTC Index
U3000-55	Stored vehicle configuration data does not match	Incorrect car configuration data received	Re-configure the RJB using the manufacturer approved diagnostic system. Clear DTC and re-test. If the DTC remains suspect the integrated audio module, refer to the new module installation note at the top of the DTC Index
U3000-87	Control module	Missing message	Re-configure the RJB using the manufacturer approved diagnostic system. Check integrated audio module for DTCs and refer to the DTC Index. Check CAN network integrity using the manufacturer approved diagnostic system
U3000-98	Control module	Component or system over temperature	Check for additional DTCs and refer to DTC Index. Clear DTC and re-test/monitor condition
U3003-62	Battery voltage	Mis-match of battery voltage, of 2 volts or lower, between integrated audio module and RJB	Carry out the pinpoint test associated with this DTC using the manufacturer approved diagnostic system

Pinpoint Tests

PINPOINT TEST G834560p1 : STEERING WHEEL AUDIO CONTROL SWITCH CIRCUIT TESTS

G834560t1 : CHECK THE STEERING WHEEL AUDIO CONTROL SWITCH CIRCUIT

1. Disconnect the battery negative terminal.

Battery (86.15.01) 2. Wait one minute for the supplemental restraints system back-up power to dissipate. 3. Disconnect the information and entertainment module connector, IP087. 4. Measure the resistance between:

Information and entertainment module connector, IP087 pin 07, harness side

GROUND

- Is the resistance 5036.71 ohms?

-> **Yes**

GO to Pinpoint Test G834560t2.

-> **No**

GO to Pinpoint Test G834560t8.

G834560t2 : CHECK THE STEERING WHEEL AUDIO CONTROL MUTE SWITCH CIRCUIT

1. PRESS and HOLD the MUTE switch 2. Measure the resistance between:

Information and entertainment module connector, IP087 pin 07, harness side

GROUND

- Is the resistance 2036.7 ohms?

-> **Yes**

GO to Pinpoint Test G834560t3.

-> **No**

Install a new steering wheel audio control switch assembly.

Steering Wheel Audio Controls (86.50.42)

G834560t3 : CHECK THE STEERING WHEEL AUDIO CONTROL SOURCE SWITCH CIRCUIT

1. PRESS and HOLD the SOURCE switch 2. Measure the resistance between:

Information and entertainment module connector, IP087 pin 07, harness side

GROUND

- **Is the resistance 1036.7 ohms?**

-> **Yes**

GO to Pinpoint Test G834560t4.

-> **No**

Install a new steering wheel audio control switch assembly.

Steering Wheel Audio Controls (86.50.42)

G834560t4 : CHECK THE STEERING WHEEL AUDIO CONTROL SEEK DOWN SWITCH CIRCUIT

1. OPERATE and HOLD the SEEK DOWN switch 2. Measure the resistance between:

Information and entertainment module connector, IP087 pin 07, harness side

GROUND

- **Is the resistance 561.7 ohms?**

-> **Yes**

GO to Pinpoint Test G834560t5.

-> **No**

Install a new steering wheel audio control switch assembly.

Steering Wheel Audio Controls (86.50.42)

G834560t5 : CHECK THE STEERING WHEEL AUDIO CONTROL SEEK UP SWITCH CIRCUIT

1. OPERATE and HOLD the SEEK UP switch 2. Measure the resistance between:

Information and entertainment module connector, IP087 pin 07, harness side

GROUND

- **Is the resistance 300.7 ohms?**

-> **Yes**

GO to Pinpoint Test G834560t6.

-> **No**

Install a new steering wheel audio control switch assembly.

Steering Wheel Audio Controls (86.50.42)

G834560t6 : CHECK THE STEERING WHEEL AUDIO CONTROL VOLUME + SWITCH CIRCUIT

1. OPERATE and HOLD the VOLUME + switch 2. Measure the resistance between:

Information and entertainment module connector, IP087 pin 07, harness side

GROUND

- **Is the resistance 146.7 ohms?**

-> **Yes**

GO to Pinpoint Test G834560t7.

-> **No**

Install a new steering wheel audio control switch assembly.

Steering Wheel Audio Controls (86.50.42)

G834560t7 : CHECK THE STEERING WHEEL AUDIO CONTROL VOLUME - SWITCH CIRCUIT

1. OPERATE and HOLD the VOLUME - switch 2. Measure the resistance between:

Information and entertainment module connector, IP087 pin 07, harness side

GROUND

- **Is the resistance 53.6 ohms?**

-> **Yes**

No fault is indicated with the steering wheel audio control switches or circuit. Check the integrity of all connections, TEST the system for normal operation.

-> **No**

Install a new steering wheel audio control switch assembly.

Steering Wheel Audio Controls (86.50.42)

G834560t8 : CHECK THE STEERING WHEEL AUDIO CONTROL SWITCH CIRCUIT

1. Disconnect the clockspring connector IP042. 2. Measure the resistance between:

Clockspring connector IP042, pin 03, component side

Clockspring connector IP042, pin 06, component side

- **Is the resistance 5036.71 ohms?**

-> **Yes**

GO to Pinpoint Test G834560t13.

-> **No**

GO to Pinpoint Test G834560t9.

G834560t9 : CHECK THE STEERING WHEEL AUDIO CONTROL SWITCH CIRCUIT

1. Disconnect the clockspring connector SW001. 2. Measure the resistance between:

Clockspring connector SW001, pin 04, harness side

Clockspring connector SW001, pin 01, harness side

- **Is the resistance 5036.71 ohms?**

-> **Yes**

INSTALL a new clockspring.

Clockspring TEST the system for normal operation.

-> **No**

GO to Pinpoint Test G834560t10.

G834560t10 : CHECK THE STEERING WHEEL AUDIO CONTROL SWITCH CIRCUIT

1. Disconnect the steering wheel audio control switch connector SW003. 2. Measure the resistance between:

Audio control switch connector SW003, pin 04, component side

Audio control switch connector SW003, pin 01, component side

- **Is the resistance 5036.71 ohms?**

-> **Yes**

GO to Pinpoint Test G834560t11.

-> **No**

Install a new steering wheel audio control switch.

Steering Wheel Audio Controls (86.50.42)

G834560t11 : CHECK THE STEERING WHEEL AUDIO CONTROL SWITCH CIRCUIT

1. Measure the resistance between:

Clockspring connector SW001, pin 01, harness side

Audio control switch connector SW003, pin 01, harness side

- **Is the resistance greater than 5 ohms?**

-> **Yes**

REPAIR the circuit - audio control switch connector SW003, pin 01 to clockspring connector SW001, pin 01. For additional information, refer to the wiring diagrams. TEST the system for normal operation.

-> **No**

GO to Pinpoint Test G834560t12.

G834560t12 : CHECK THE STEERING WHEEL AUDIO CONTROL SWITCH CIRCUIT

1. Measure the resistance between:

Clockspring connector SW001, pin 04, harness side

Audio control switch connector SW003, pin 04, harness side

- **Is the resistance greater than 5 ohms?**

-> **Yes**

REPAIR the circuit - audio control switch connector SW003, pin 04 to clockspring connector SW001, pin 04. For additional information, refer to the wiring diagrams. TEST the system for normal operation.

-> **No**

No fault is indicated with the steering wheel audio control switches or circuit. Check integrity of all connections and TEST system for normal operation.

G834560t13 : CHECK THE STEERING WHEEL AUDIO CONTROL SWITCH CIRCUIT

1. Measure the resistance between:

Clockspring connector IP042, pin 03, harness side

Information and entertainment module connector IP087, pin 07, harness side

- **Is the resistance greater than 5 ohms?**

-> **Yes**

REPAIR the circuit - clockspring connector IP042, pin 03 to information and entertainment module connector IP087, pin 07. For additional information, refer to the wiring diagrams. TEST the system for normal operation.

-> **No**

GO to Pinpoint Test G834560t14.

G834560t14 : CHECK THE STEERING WHEEL AUDIO CONTROL SWITCH CIRCUIT

1. Measure the resistance between:

Clockspring connector IP042, pin 06, harness side

GROUND point G40AR/1

- **Is the resistance greater than 5 ohms?**

-> **Yes**

REPAIR the circuit - clockspring connector IP042, pin 06 to GROUND point G40AR/1. For additional information, refer to the wiring diagrams. TEST the system for normal operation.

-> **No**

No fault is indicated with the steering wheel audio control switches or circuit. Check integrity of all connections and TEST system for normal operation.

PINPOINT TEST G834560p2 : MOST NETWORK TESTS

G834560t15 : CHECK HLDF DISPLAY

1. Check HLDF display

- **Is the HLDF showing a flashing Jaguar leaper, or a blank screen?**

-> **Yes**

GO to Pinpoint Test G834560t16.

-> **No**

No ring break fault has occurred. Suspect invalid Car Configuration File parameter faults, check modules on MOST Network for related DTCs and refer to the relevant DTC Index.

G834560t16 : CHECK INTEGRITY OF MOST RING TEST CONNECTOR OPTICAL LOOP AND FUSE RL2

1. Check the MOST ring test connector optical loop IP090 is not disconnected or open circuit and free from damage, and fuse RL2 in the RJB is not disconnected or open circuit.

- **Is the MOST ring test connector optical loop IP090 disconnected, open circuit or damaged, or fuse RL2 in the RJB disconnected or open circuit.**

-> **Yes**

Rectify the fault condition and re-test.

-> **No**

GO to Pinpoint Test G834560t17.

G834560t17 : INITIATE RING BREAK DIAGNOSTIC (RBD) & READ DTCs

1. Ensure fuse RL2 is installed in RJB and is in serviceable condition. 2. Set ignition status from 'OFF' to 'ON'. 3. Clear all DTCs. 4. Remove fuse RL2 from RJB and wait for at least 10 seconds, then replace fuse RL2 in RJB and wait for at least 30 seconds for RBD to initiate and complete. 5. Read DTCs

- **Is DTC U1A1587 logged?**

-> **Yes**

GO to Pinpoint Test G834560t18.

-> **No**

Check HLDF for additional DTCs and refer to relevant DTC Index.

G834560t18 : CHECK FOR FAILURE AT INTERMEDIATE CONNECTOR TM071 PIN 1 FROM INFORMATION AND ENTERTAINMENT MODULE

1. Disconnect the MOST network intermediate connector TM071.

- **Is the bright red light visible at the connector TM071, pin 1 female?**

-> **Yes**

GO to Pinpoint Test G834560t19.

-> **No**

GO to Pinpoint Test G834560t20.

G834560t19 : CHECK FOR FAILURE AT FIRST HALF OF MOST NETWORK

1. Connect the Optical Bus Tester (OBT) to intermediate connector TM071, from information and entertainment module. 2. Switch OBT 'ON' and set to 2+0 option. 3. Select the visible LED option.

- **Is the Rx lamp/LED permanently 'ON' and the HLDF screen permanently displaying 'Home menu screen' or Jaguar leaper?**

-> **Yes**

On Low Line vehicles, check integrity of optical loop installed at intermediate connector TM071. On High Line vehicles, fault is in second half of MOST Network. Disconnect OBT and re-connect intermediate connector TM071. GO to Pinpoint Test G834560t21.

-> **No**

GO to Pinpoint Test G834560t23.

G834560t20 : CHECK FOR FAILURE OF OPTICAL FIBRE FROM INFORMATION AND ENTERTAINMENT MODULE

1. Disconnect MOST connector IP088 from information and entertainment module.

- **Is the bright red light visible at the connector IP088 pin 2, module side?**

-> **Yes**

Fault is in optical fibre harness between intermediate connector TM071, pin 1 female and information and entertainment module connector IP088, pin 2.

-> **No**

Install a new information and entertainment module and re-test.

G834560t21 : CHECK FOR FAILURE OF OPTICAL FIBRE BETWEEN INTERMEDIATE CONNECTORS TM071 AND TM075

1. Disconnect intermediate connector TM075.

- **Is the bright red light visible at the intermediate connector TM075, pin 2 female.**

-> **Yes**

GO to Pinpoint Test G834560t22.

-> **No**

Fault is in optical fibre harness between intermediate connectors TM071 pin 1 and TM075 pin 2, rectify the fault and re-test the vehicle.

G834560t22 : CHECK FOR FAILURE OF OPTICAL FIBRE BETWEEN INTERMEDIATE CONNECTORS TM071 AND TM075

1. Connect the Optical Bus Tester (OBT) to intermediate connector TM075. 2. Switch OBT 'ON' and set to 2+0 option. 3. Select the visible LED option.

- **Is the Rx lamp/LED permanently 'ON' and the HLDF screen permanently displaying 'Home menu screen' or Jaguar leaper?**

-> **Yes**

Fault is in second half of MOST network. GO to Pinpoint Test G834560t48.

-> **No**

Fault is in optical fibre harness between intermediate connectors TM071 pin 2 and TM075 pin 1, rectify the fault and re-test the vehicle.

G834560t23 : CHECK FOR FAILURE OF OPTICAL FIBRE TO HLDF

1. Disconnect MOST connector IP065 from HLDF.

- **Is the bright red light visible at connector IP065 pin 1, harness side?**

-> **Yes**

GO to Pinpoint Test G834560t24.

-> **No**

Fault is in optical fibre harness between intermediate connector TM071 pin 2 and HLDF connector IP065 pin 1, rectify the fault and re-test the vehicle.

G834560t24 : CHECK FOR FAILURE AT HLDF

1. Connect the Optical Bus Tester (OBT) to HLDF connector IP065. 2. Switch OBT 'ON' and set to 2+0 option. 3. Select the visible LED option.

- **Is the Rx lamp/LED permanently 'ON' and the HLDF screen permanently displaying blank screen?**

-> **Yes**

Check/repair power feed and ground lines to HLDF. If power feed and ground lines ok, install a new

HLDF.

-> **No**

GO to Pinpoint Test G834560t25.

G834560t25 : CHECK FOR INSTALLATION OF AUDIO AMPLIFIER

1. Check for installation of audio amplifier.

- **Is there an audio amplifier installed to the vehicle?**

-> **Yes**

GO to Pinpoint Test G834560t26.

-> **No**

GO to Pinpoint Test G834560t29.

G834560t26 : CHECK FOR FAILURE OF OPTICAL FIBRE TO AUDIO AMPLIFIER

1. Disconnect MOST connector CA117 from audio amplifier.

- **Is the bright red light visible at the connector CA117 pin 1, harness side?**

-> **Yes**

GO to Pinpoint Test G834560t28.

-> **No**

GO to Pinpoint Test G834560t27.

G834560t27 : CHECK FOR FAILURE AT INTERMEDIATE CONNECTOR CA119

1. Disconnect intermediate connector CA119.

- **Is the bright red light visible at the intermediate connector CA119, pin 1 female?**

-> **Yes**

Fault is in optical fibre harness between intermediate connector CA119 pin 1 and audio amplifier connector CA117 pin 1, rectify the fault and re-test the vehicle.

-> **No**

Fault is in optical fibre harness between intermediate connector CA119 pin 1 and HLDF connector IP065 pin 2, rectify the fault and re-test vehicle.

G834560t28 : CHECK FOR FAILURE AT AUDIO AMPLIFIER

1. Connect the Optical Bus Tester (OBT) to audio amplifier connector CA117. 2. Switch OBT 'ON' and set to 2+0 option. 3. Select the visible LED option.

- **Is the Rx lamp/LED permanently 'ON' and the HLDF screen permanently displaying 'Home menu screen' or Jaguar leaper?**

-> **Yes**

Check/repair power feed and ground lines to audio amplifier. If power feed and ground lines ok, install a new audio amplifier.

-> **No**

GO to Pinpoint Test G834560t29.

G834560t29 : CHECK FOR FAILURE OF OPTICAL FIBRE TO INTEGRATED AUDIO MODULE

1. Disconnect MOST connector IP059 at integrated audio module.

- **Is the bright red light visible at the connector IP059 pin 1 harness side?**

-> **Yes**

GO to Pinpoint Test G834560t31.

-> **No**

If no audio amplifier is installed, the fault is in the optical fibre harness between HLDF connector IP065 pin 2 and integrated audio module connector IP059 pin 1, rectify the fault and re-test the vehicle. If audio module is installed. GO to Pinpoint Test G834560t30.

G834560t30 : CHECK FOR FAILURE AT INTERMEDIATE CONNECTOR CA119 PIN 2

1. Disconnect intermediate connector CA119.

- **Is the bright red light visible at the intermediate connector CA119 pin 2 male?**

-> **Yes**

Fault is in the optical fibre harness between intermediate connector CA119 pin 2 and integrated audio module connector IP059 pin 1, rectify the fault and re-test the vehicle.

-> **No**

Fault is in the optical fibre harness between intermediate connector CA119 pin 2 and audio amplifier connector CA117 pin 2, rectify the fault and re-test the vehicle.

G834560t31 : CHECK FOR FAILURE AT INTEGRATED AUDIO MODULE

1. Connect the Optical Bus Tester (OBT) to integrated audio module connector IP059. 2. Switch OBT 'ON' and set to 2+0 option. 3. Select the visible LED option.

- **Is the Rx lamp/LED permanently 'ON' and the HLDF screen permanently displaying 'Home menu screen' or Jaguar leaper?**

-> **Yes**

Check/repair power feed and ground lines to integrated audio module. If power feed and ground lines ok, install a new integrated audio module.

-> **No**

GO to Pinpoint Test G834560t32.

G834560t32 : CHECK FOR FAILURE OF OPTICAL FIBRE TO MOST TEST CONNECTOR

1. Disconnect MOST test connector IP090.

- **Is the bright red light visible at the connector IP090 pin 1 harness side?**

-> **Yes**

GO to Pinpoint Test G834560t33.

-> **No**

Fault is in the optical fibre harness between integrated audio module connector IP059 pin 2 and MOST test connector IP090 pin 1, rectify the fault and re-test the vehicle.

G834560t33 : CHECK FOR FAILURE AT MOST TEST CONNECTOR OPTICAL LOOP

1. Connect the Optical Bus Tester (OBT) to MOST test connector IP090. 2. Switch OBT 'ON' and set to 2+0 option. 3. Select the visible LED option.

- **Is the Rx lamp/LED permanently 'ON' and the HLDF screen permanently displaying 'Home menu screen' or Jaguar leaper?**

-> **Yes**

Install a new MOST test connector optical loop.

-> **No**

GO to Pinpoint Test G834560t34.

G834560t34 : CHECK FOR FAILURE OF OPTICAL FIBRE TO INFORMATION AND ENTERTAINMENT CONTROL MODULE

1. Disconnect MOST connector IP088 from information and entertainment control module.

- **Is the bright red light visible at connector IP088 pin 1, harness side?**

-> **Yes**

No fault identified with the MOST network. Check integrity of all MOST network connections, and re-test vehicle.

-> **No**

Fault is in the optical fibre harness between MOST test connector IP090 pin 2 and information and entertainment module connector IP088 pin 1, rectify the fault and re-test the vehicle.

G834560t48 : CHECK FOR INSTALLATION OF NAVIGATION MODULE

1. Check for installation of navigation control module.

- **Is a navigation control module installed to the vehicle?**

-> **Yes**

GO to Pinpoint Test G834560t35.

-> **No**

GO to Pinpoint Test G834560t36.

G834560t35 : CHECK FOR FAILURE OF OPTICAL FIBRE TO NAVIGATION MODULE

1. Disconnect MOST connector TM084 from navigation module.

- **Is the bright red light visible at connector TM084 pin 1, harness side?**

-> **Yes**

GO to Pinpoint Test G834560t35.

-> **No**

Fault is in the optical fibre harness between MOST intermediate connector TM075 pin 2 and navigation module connector TM084 pin 1, rectify the fault and re-test the vehicle.

G834560t45 : CHECK FOR FAILURE AT NAVIGATION MODULE

1. Connect the Optical Bus Tester (OBT) to navigation module connector TM084. 2. Switch OBT 'ON' and set to 2+0 option. 3. Select the visible LED option.

- **Is the Rx lamp/LED permanently 'ON' and the HLDF screen permanently displaying 'Home menu screen' or Jaguar leaper?**

-> **Yes**

Check/repair power feed and ground lines to navigation module. If power feed and ground lines ok, install a new navigation module.

-> **No**

GO to Pinpoint Test G834560t36.

G834560t36 : CHECK FOR INSTALLATION OF SATELLITE RADIO MODULE

1. Check for installation of satellite radio module.

- **Is a satellite radio module installed to the vehicle?**

-> **Yes**

GO to Pinpoint Test G834560t37.

-> **No**

GO to Pinpoint Test G834560t39.

G834560t37 : CHECK FOR FAILURE OF OPTICAL FIBRE TO SATELLITE RADIO MODULE

1. Disconnect MOST connector TM100 from satellite radio module.

- **Is the bright red light visible at connector TM100 pin 1 , harness side?**

-> **Yes**

GO to Pinpoint Test G834560t38.

-> **No**

If navigation module is installed to the vehicle - the fault is in the optical fibre harness between navigation module connector TM084 pin 2 and satellite radio module connector TM100 pin 1. If navigation module is not installed to the vehicle - the fault is in the optical fibre harness between intermediate connector TM075 pin 2 and satellite radio module connector TM100 pin 1.

G834560t38 : CHECK FOR FAILURE AT SATELLITE RADIO MODULE

1. Connect the Optical Bus Tester (OBT) to satellite radio module connector TM100. 2. Switch OBT 'ON' and set to 2+0 option. 3. Select the visible LED option.

- **Is the Rx lamp/LED permanently 'ON' and the HLDF screen permanently displaying 'Home menu screen' or Jaguar leaper?**

-> **Yes**

Check/repair power feed and ground lines to satellite radio module. If power feed and ground lines ok, install a new satellite radio module.

-> **No**

GO to Pinpoint Test G834560t39.

G834560t39 : CHECK FOR INSTALLATION OF BLUETOOTH MODULE

1. Check for installation of bluetooth module.

- **Is a bluetooth module installed to the vehicle?**

-> **Yes**

GO to Pinpoint Test G834560t40.

-> **No**

If satellite radio module is not installed. GO to Pinpoint Test G834560t43.

If satellite radio module is installed. GO to Pinpoint Test G834560t44.

G834560t40 : CHECK FOR FAILURE OF OPTICAL FIBRE TO BLUETOOTH MODULE

1. Disconnect MOST connector TM023 from bluetooth module.

- **Is the bright red light visible at connector TM023 pin 1, harness side?**

-> **Yes**

GO to Pinpoint Test G834560t41.

-> **No**

If satellite radio module is installed to vehicle - fault is in optical fibre harness between bluetooth module connector TM023 pin 1 and satellite radio module connector TM100 pin 2, rectify the fault and re-test the vehicle. If satellite radio module is not installed - fault is in optical fibre harness between bluetooth module connector TM023 pin 1 and navigation module TM084 pin 2, rectify the fault and re-test vehicle.

G834560t41 : CHECK FOR FAILURE AT BLUETOOTH MODULE

1. Connect the Optical Bus Tester (OBT) to satellite bluetooth module connector TM023. 2. Switch OBT 'ON' and set to 2+0 option. 3. Select the visible LED option.

- **Is the Rx lamp/LED permanently 'ON' and the HLDF screen permanently displaying 'Home menu screen' or Jaguar leaper?**

-> **Yes**

Check/repair power feed and ground lines to bluetooth module. If power feed and ground lines ok, install a new bluetooth module.

-> **No**

GO to Pinpoint Test G834560t42.

G834560t42 : CHECK FOR FAILURE OF OPTICAL FIBRE FROM BLUETOOTH MODULE

1. Disconnect MOST intermediate connector TM075.

- **Is the bright red light visible at connector TM075 pin 1 male?**

-> **Yes**

No fault is identified with the MOST network. Check integrity of all MOST connectors and re-test the vehicle.

-> **No**

Fault is in the optical fibre harness between bluetooth module connector TM023 pin 2 and intermediate connector TM075 pin 1, rectify the fault and re-test the vehicle.

G834560t43 : CHECK FOR FAILURE OF OPTICAL FIBRE FROM NAVIGATION MODULE

1. Disconnect MOST intermediate connector TM075.

- **Is the bright red light visible at the intermediate connector TM075 pin 1 male?**

-> **Yes**

No fault is identified with the MOST network. Check integrity of all MOST connectors and re-test the vehicle.

-> **No**

Fault is in optical fibre harness between intermediate connector TM075 pin 1 and navigation module connector TM084 pin 2, rectify the fault and re-test the vehicle.

G834560t44 : CHECK FOR FAILURE OF OPTICAL FIBRE FROM SATELLITE RADIO MODULE

1. Disconnect MOST intermediate connector TM075.

- **Is the bright red light visible at the intermediate connector TM075 pin 1 male?**

-> **Yes**

No fault is identified with the MOST network. Check integrity of all MOST connectors and re-test the vehicle.

-> **No**

Fault is in optical fibre harness between intermediate connector TM075 pin 1 and satellite radio module connector TM100 pin 2, rectify the fault and re-test the vehicle.

Cellular Phone

Principle of Operation

For a detailed description of the telephone system, refer to the relevant Description and Operation section in the workshop manual.

Cellular Phone

Inspection and Verification

NOTE:

Prior to starting any diagnostics, ensure that the customer handset is on the Jaguar Approved Phone List (as found in the vehicle technology information on the external Jaguar website). If the customer handset is not on the approved phone list it should NOT be used when carrying out these diagnostics, the technician should test using an approved handset only.

- 1 . Verify the customer concern by operating the telephone.
- 2 . Visually inspect for obvious signs of damage and system integrity.

Mechanical	Electrical
• Microphone • Bluetooth antenna	• Electrical connectors • Wiring harness for damage or corrosion • Fuses

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

System/Carrier Concerns - All Systems

Dropped calls, bad connections, noisy audio and other intermittent symptoms usually indicate a system or cellular carrier concern, and are not the fault of the phone itself. Such symptoms may occur in situations such as the following:

- In certain geographic areas (for example: areas of excessive foliage or hills) or at the edge of coverage areas
- At the same place each day
- At the same time each day
- Under bridges, tunnels, in lower freeways, or in congested downtown areas

If the customer phone exhibits any of the above symptoms or symptoms occur under the above conditions, the customer or the dealer should contact customer assistance at their particular cellular provider/carrier.

Symptom Chart

Symptom	Action
Unable to pair	GO to Pinpoint Test G1296535p1.
Not Auto Connecting	GO to Pinpoint Test G1296535p2.
Poor Quality Audio	GO to Pinpoint Test G1296535p3.
No Audio to 3rd Party	GO to Pinpoint Test G1296535p4.
No Audio from 3rd Party	GO to Pinpoint Test G1296535p5.
No Audio	GO to Pinpoint Test G1296535p6.

DTC Index



CAUTION: When probing connectors to take measurements in the course of the pinpoint tests, use the adaptor kit, part number 3548-1358-00.

NOTE:

If the control module is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module.

NOTE:

Generic scan tools may not read the codes listed, or may read only five digit codes. Match the five digits from the scan tool to the first five digits of the seven digit code listed to identify the fault (the last two digits give additional information read by the manufacturer approved diagnostic system).

NOTE:

When performing electrical voltage or resistance tests, always use a digital multimeter (DMM) accurate to three decimal places, and with an up-to-date calibration certificate. When testing

resistance, always take the resistance of the DMM leads into account.

NOTE:

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

NOTE:

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

NOTE:

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

DTC	Description	Possible Cause	Action
B1A5613	Bluetooth antenna	Open circuit	Refer to the electrical circuit diagrams and test blue tooth antenna circuit for open circuit
B1D7984	Microphone input	Signal amplitude < minimum	Refer to the electrical circuit diagrams and test microphone input circuit for short/open circuit. Check integrated audio module for DTCs and refer to DTC Index
U1A0088	Private Bus circuit	BT chipset communications failure	Install a new telephone module, refer to the new module installation note at the top of the DTC Index
U210000	Control module	Initial configuration not complete	Re-configure the RJB using the manufacturer approved diagnostic system. If DTC remains, carry out CAN network tests
U210100	Control module	Configuration incompatible	Re-configure the RJB using the manufacturer approved diagnostic system. If DTC remains, suspect the telephone module, refer to the new

			module installation note at the top of the DTC Index
U300044	Control module	Data memory failure	Re-configure the telephone module. If the DTC remains install a new telephone module, refer to the new module installation note at the top of the DTC Index
U300045	Control module	Program memory failure	Re-configure the telephone module. If the DTC remains install a new telephone module, refer to the new module installation note at the top of the DTC Index
U300055	Stored vehicle configuration data does not match	Incorrect car configuration data received	Re-configure the RJB using the manufacturer approved diagnostic system. Clear DTC and re-test. If the DTC remains suspect the telephone module, refer to the new module installation note at the top of the DTC Index
U300087	Control module	Missing message	Re-configure the RJB using the manufacturer approved diagnostic system. Check telephone module for DTCs and refer to the DTC Index. Check CAN network integrity using the manufacturer approved diagnostic system
U300098	Control module	Component or system over temperature	Check for additional DTCs and refer to DTC Index. Clear DTC and re-test/monitor condition for re-occurrence
U300362	Battery voltage	Mis-match of battery voltage, of 2 volts or lower, between telephone module and RJB	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system

Pinpoint Tests

PINPOINT TEST G1296535p1 : Unable to Pair

G1296535t1 : 'No Phone Fitted' Display

1. Carry out checks to determine if 'No Phone Fitted' is shown on vehicle display.

- **Is 'No Phone Fitted' displayed?**

-> **Yes**

GO to Pinpoint Test G1296535t2.

-> **No**

Locate the connected telephone and if not Customer telephone, disconnect from the system.

G1296535t2 : Telephone Bluetooth Device Search

1. Carry out Bluetooth device search using Customer handset.

- **Is 'Jaguar' identified in Bluetooth device list?**

-> **Yes**

Select device from list, then continue with diagnosis. GO to Pinpoint Test G1296535t3.

-> **No**

Carry out further Bluetooth device search, to a maximum of 4 times, waiting approximately 20 seconds between searches. If 'Jaguar' still not identified in Bluetooth device list, set ignition status to OFF, wait approximately 30 seconds and set ignition status to ON. Carry out further Bluetooth device search, to a maximum of 4 times, waiting approximately 20 seconds between searches. If 'Jaguar' still not identified in Bluetooth device list, contact your local in market support for further assistance.

G1296535t3 : Telephone Handset Error

1. Check for any error shown on the telephone handset when 'Jaguar' is selected from the Bluetooth device list.

- **Was an error immediately shown on the telephone handset?**

-> **Yes**

Wait approximately 10 seconds then re-attempt selection, to a maximum of 4 times, waiting approximately 10 seconds between each attempt. If error still being displayed, contact your local in market support for assistance.

-> **No**

Enter PIN '1313' then continue with diagnosis. GO to Pinpoint Test G1296535t4.

G1296535t4 : PIN Entry Status

1. Check for successful PIN entry.

- **Was PIN entry successful?**

-> **Yes**

GO to Pinpoint Test G1296535t5.

-> **No**

Wait approximately 10 seconds then re-attempt PIN entry, to a maximum of 4 times, waiting approximately 10 seconds between each attempt. If PIN entry is still un-successful, contact your local in market support for assistance.

G1296535t5 : 'No Phone Fitted' Display

1. Carry out checks to determine if 'No Phone Fitted' is still shown on vehicle display.

- **Is 'No Phone Fitted' still displayed?**

-> **Yes**

From the telephone handset, select the connect option for the 'Land Rover' device identified in the Bluetooth device list. If 'No Phone Fitted' is still displayed, suspect a telephone handset fault. Carry out Pinpoint test again using known good telephone handset.

-> **No**

The telephone is paired and connected to the system. No further action is required for this symptom.

PINPOINT TEST G1296535p2 : Not Automatically Connecting

G1296535t6 : Bluetooth Module Paired Device List

1. Carry out checks to determine if the Customer telephone is shown in the Bluetooth Module paired device list.

- **Is the Customer telephone in the Bluetooth Module paired device list?**

-> **Yes**

GO to Pinpoint Test G1296535t7.

-> **No**

Carry out Unable to Pair Pinpoint Test. GO to Pinpoint Test G1296535p1.

G1296535t7 : Customer Handset Paired Device List

1. Carry out checks to determine if the Bluetooth Module is shown in the Customer telephone paired device list.

- **Is the Bluetooth Module in the Customer telephone paired device list?**

-> **Yes**

GO to Pinpoint Test G1296535t8.

-> **No**

Carry out Unable to Pair Pinpoint Test. GO to Pinpoint Test G1296535p1.

G1296535t8 : Customer Telephone in Position 1

1. Carry out checks to determine if the Customer telephone is in position 1 in the Bluetooth Module paired device list.

- **Is the Customer telephone in position 1?**

-> **Yes**

GO to Pinpoint Test G1296535t9.

-> **No**

Advise Customer that auto connection will only be attempted with the device that is shown in position 1 in Bluetooth Module paired device list.

G1296535t9 : Check for DTC B1A56-13

1. Using Manufacturer approved diagnostic system, check for DTC B1A56-13.

- **Is DTC B1A56-13 logged?**

-> **Yes**

Carry out remedial actions as outlined in DTC Index. If symptom remains, contact your local in market support for assistance.

-> **No**

GO to Pinpoint Test G1296535t10.

G1296535t10 : Bluetooth Connection

1. Carry out checks to determine if Bluetooth connection icon is shown on Customer Bluetooth telephone screen but shows 'No Phone Fitted' on vehicle screen.

- **Is Bluetooth connection icon shown on the Customer handset but 'No Phone Fitted' displayed on vehicle screen?**

-> **Yes**

GO to Pinpoint Test G1296535t14.

-> **No**

GO to Pinpoint Test G1296535t11.

G1296535t11 : 'Land Rover' Authorisation

1. Carry out checks to determine if 'Land Rover' is authorised in the Customer Bluetooth telephone device list menu.

- **Is 'Land Rover' authorised in the Customer Bluetooth telephone device list menu?**

-> **Yes**

GO to Pinpoint Test G1296535t12.

-> **No**

Advise customer that 'Land Rover' needs to be authorised in the Customer Bluetooth telephone device list menu, or operator intervention may be required to manually authorise connection.

G1296535t12 : Search for Devices Screen

1. Select the search for devices button on the vehicle display.

- **Does pressing the search for devices button bring up the searching screen on the vehicle display?**

-> **Yes**

Contact your local in market support for assistance.

-> **No**

GO to Pinpoint Test G1296535t13.

G1296535t13 : Cycle Ignition and Check Search for Devices Screen

1. Lock vehicle (wait 60s) before unlocking and turning Ignition status back to ON.

- **Does pressing the search for devices button bring up the searching screen on the vehicle display?**

-> **Yes**

No further action required for this Symptom. Possible intermittent fault.

-> **No**

Contact your local in market support for assistance.

G1296535t14 : Paired Device

1. Check Customer telephone paired device list to establish which device the Customer telephone is connected to.

- **Is the Customer telephone connected to the vehicle?**

-> **Yes**

Lock vehicle (wait 60s) before unlocking and turning Ignition status back to ON. If Not Automatically Connecting, contact you local in market support for assistance.

-> **No**

Using the Customer telephone controls, disconnect from the currently connected device and delete from paired device list. Lock vehicle (wait for 60s) before unlocking and turning Ignition status to ON. If Not Automatically Connecting, contact your local in market support for assistance.

PINPOINT TEST G1296535p3 : Poor Quality Audio

G1296535t15 : Microphone Installation

1. Check that the microphone is installed in the correct location/orientation.

- **Is the microphone installed in the correct location/orientation?**

-> **Yes**

GO to Pinpoint Test G1296535t16.

-> **No**

Install microphone to correct location/orientation.

G1296535t16 : Signal Strength

1. Check the signal strength displayed on the telephone handset.

- **Are at least two signal strength bars shown on the telephone handset display?**

-> **Yes**

GO to Pinpoint Test G1296535t17.

-> **No**

Suspect GSM Network issue. This can explain intermittent audio and dropped calls, and the inability to initiate calls.

G1296535t17 : Poor Audio From Third Party Only

1. Establish from Customer feedback/symptom if there is poor audio from the Third Party only.

- **Is the poor audio from the Third Party only?**

-> **Yes**

Suspect GSM Network issue. This can explain intermittent audio and dropped calls, and the inability to initiate calls.

-> **No**

GO to Pinpoint Test G1296535t18.

G1296535t18 : Poor Audio To Third Party Only

1. Establish from Customer feedback/symptom if there is poor audio to the Third Party only.

- **Is the poor audio to the Third Party only?**

-> **Yes**

Check and install a new microphone as necessary.

-> **No**

GO to Pinpoint Test G1296535t19.

G1296535t19 : Poor Audio with Vehicle Stationary

1. Establish from Customer feedback/symptom if there is poor audio when the vehicle is stationary only.

- **Is the poor audio when the vehicle is stationary only?**

-> **Yes**

Check and install a new microphone as necessary.

-> **No**

GO to Pinpoint Test G1296535t20.

G1296535t20 : Third Party Moving Vehicle

1. Establish from Customer feedback/symptom if the Third Party is in a moving vehicle.

- **Is the Third Party in a moving vehicle?**

-> **Yes**

There are limitations to the way the system can improve audio, and in this situation it is not possible to determine the source of the audio degradation.

-> **No**

GO to Pinpoint Test G1296535t21.

G1296535t21 : Customer Hearing Echo

1. Establish from Customer feedback/symptom if the Customer is hearing an echo.

- **Is the Customer hearing an echo?**

-> **Yes**

Echo from the Third Party is not vehicle failure, it is the Third Party set-up. No further action is required for this symptom.

-> **No**

Contact your local in market support for assistance.

PINPOINT TEST G1296535p4 : No Audio To Third Party

G1296535t22 : Microphone Diagnostic Trouble Codes (DTCs)

1. Using the Manufacturer approved diagnostic system, check for any logged microphone DTCs in Audio Front Control module.

- **Is DTC B1D79-01 logged?**

-> **Yes**

Carry out diagnosis of electrical failure as advised in Action column of DTC Index.

-> **No**

Contact your local in market support for assistance.

PINPOINT TEST G1296535p5 : No Audio From Third Party

G1296535t23 : 'In Call' Display

1. Carry out checks to determine if 'In Call' is shown on the vehicle display.

- **Is vehicle display showing 'In Call'?**

-> **Yes**

Contact your local in market support for assistance.

-> **No**

Call has ended. No further action is required for this symptom.

PINPOINT TEST G1296535p6 : No Audio

G1296535t24 : Audio From Third Party

1. Establish from Customer feedback/symptom if there is Audio from the Third Party.

- **Is there Audio from the Third Party?**

-> **Yes**

GO to Pinpoint Test G1296535t25.

-> **No**

Refer to the 'No Audio From Third Party' Pinpoint test. GO to Pinpoint Test G1296535p5.

G1296535t25 : Audio To Third Party

1. Establish from Customer feedback/symptom if there is Audio to the Third Party.

- **Is there Audio to the Third Party?**

-> **Yes**

GO to Pinpoint Test G1296535t26.

-> **No**

Refer to the 'No Audio To Third Party' Pinpoint test. GO to Pinpoint Test G1296535p4.

G1296535t26 : CD or Radio Audio

1. Establish from Customer feedback/symptom if there is Audio from the CD or Radio.

- **Is there Audio from the CD or Radio?**

-> **Yes**

GO to Pinpoint Test G1296535t27.

-> **No**

Suspect MOST ring fault, refer to electrical circuit diagrams and check/rectify MOST ring as necessary.

G1296535t27 : Telephone Handset Audio

1. Establish from Customer feedback/symptom if there is Audio from the telephone handset.

- **Is there Audio from the telephone handset?**

-> **Yes**

Ensure vehicle is parked. Disconnect and reconnect handset. If issue not resolved, contact your local in market support for assistance.

-> **No**

Contact you local in market support for assistance.

415-01 : Audio Unit

Specifications

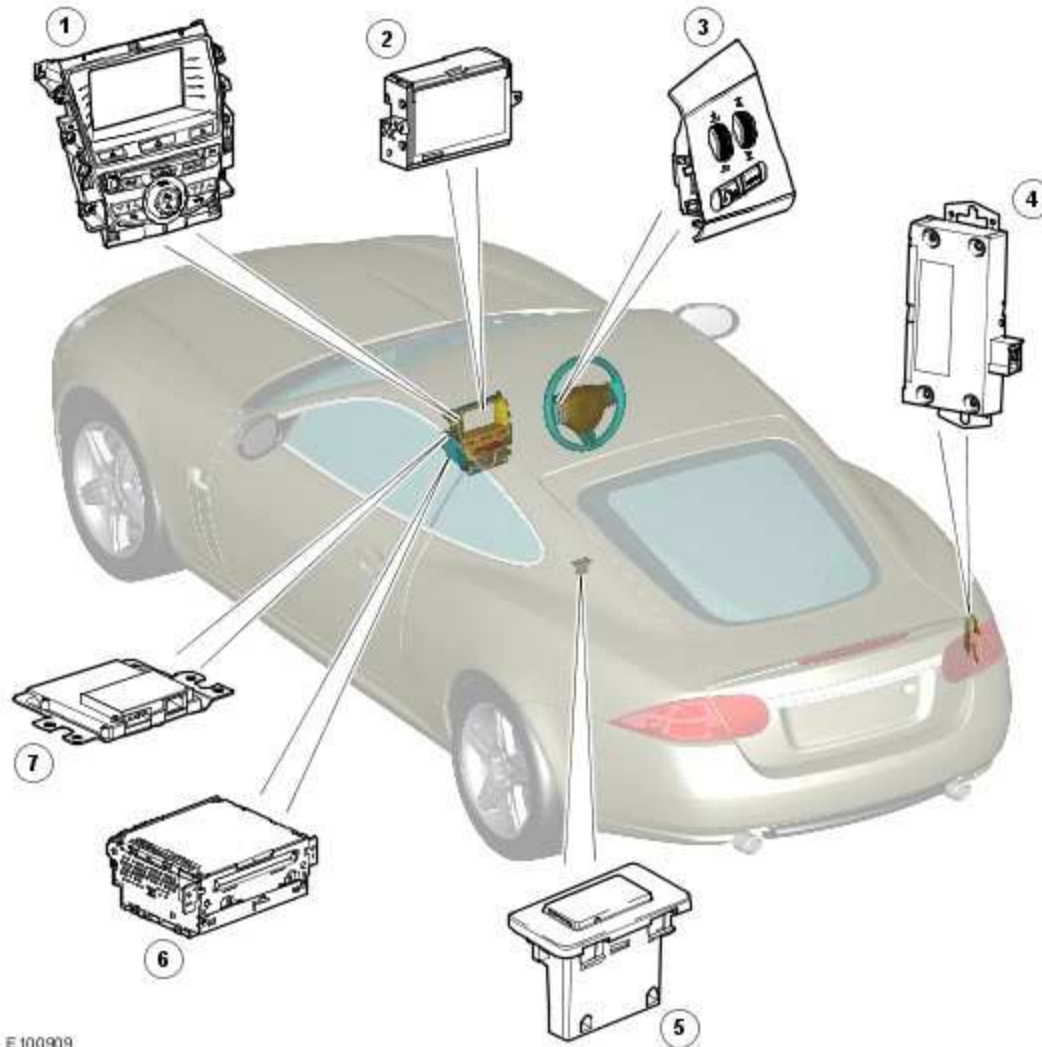
Specifications

Torque Specifications

Item	Nm	lb-ft	lb-in
Amplifier to bracket - screw	2.5	-	22
Audio/CD module and climate control module assembly to instrument panel - bolt	3	-	27
Audio/CD and climate control modules to assembly bracket - bolt	3	-	27
Audio/CD and climate control modules to assembly bracket - screw	2.5	-	22
Radio frequency interference suppressor to engine cover bracket - bolt	10	7	88
Steering wheel audio controls - bolt	3.5	2.5	31

Audio System

COMPONENT LOCATION



E 100909

Item	Part Number	Description
1		Integrated control panel
2		Touch Screen Display (TSD)
3		Remote audio switches
4		Auxiliary Universal Serial Bus (USB) unit (from 2009 Model Year (MY))

5		Auxiliary input panel (from 2009 MY)
6		Integrated audio module
7		Information and entertainment Module

INTRODUCTION

The audio system contains the following functions:

- Six disc CD autochanger.
- AM/FM tuner.
- Interface Protocol Option Devices (iPod) and USB connectivity (from 2009 MY).

The audio system is available in two versions, standard and premium. The standard audio system uses an internal amplifier to drive the system speakers. The premium system uses an external amplifier and subwoofer assembly to drive the speakers. For additional information, refer to Speakers (415-03 Speakers)

Control of the audio system is via the integrated control panel and the TSD, located in the center of the instrument panel, and the remote audio switches on the steering wheel.

Control signals from the integrated control panel are relayed on the medium speed CAN (controller area network) bus to the information and entertainment module. The information and entertainment module relays the control signals to the rest of the audio system on the Media Orientated System Transport (MOST) ring. The information and entertainment module is the timing master for the MOST ring and also hosts a gateway function between the medium speed CAN (controller area network) bus and the MOST ring. On premium audio systems the audio signals are sent on the MOST ring from the integrated audio module to the amplifier. The control signal from the remote audio switches to the information and entertainment module consists of an analogue voltage from a resistive ladder.

The iPod and USB connectivity allows audio files on portable media players and mass storage devices (i.e. portable audio devices) to be played through the speakers of the audio system. The audio system supports portable audio devices with a storage capacity up to 256 GB (approximately 65,000 music tracks).

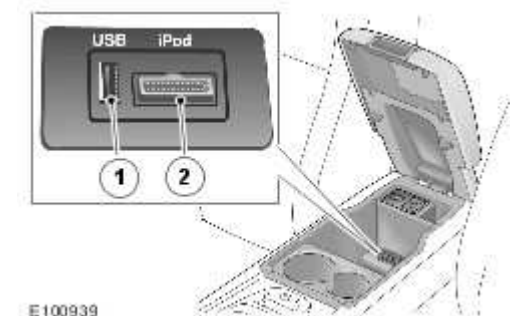
The iPod and USB connectivity is provided by:

- An auxiliary input panel, installed in the cubby box of the floor console.
- An auxiliary USB unit, attached to the RH rear quarter panel, behind the trim of the luggage compartment.

The auxiliary input panel provides the interface between the portable audio device and the vehicle's audio system. An iPod port and a USB port are located in the top of the auxiliary input panel, underneath a protective rubber cover. An iPod connector lead is supplied with the vehicle. Portable audio devices can be connected to both ports at the same time.

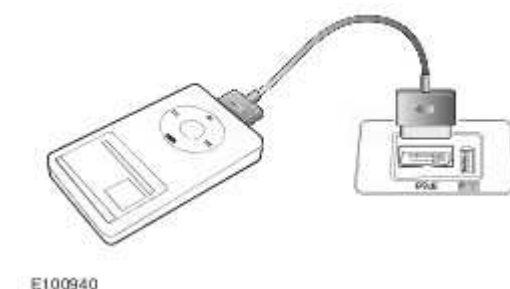
The iPod and USB ports both incorporate a charging function. The maximum charging current supplied is 500 ma.

Auxiliary Input Panel



Item	Part Number	Description
1		USB port
2		iPod port

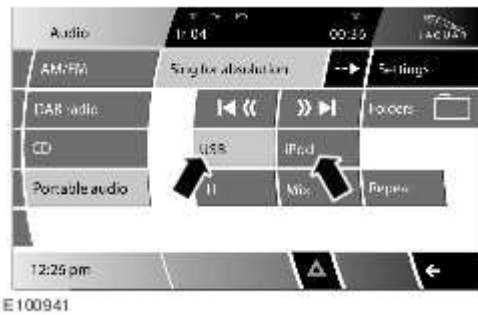
iPod Connector Lead



The auxiliary USB unit translates the electronic signals from the auxiliary input panel into optical signals and transmits them on the MOST ring.

Operation of the portable audio device is controlled from the TSD via the integrated audio module. For road safety reasons, the normal control interface of the portable device is disabled when it is plugged into the auxiliary input panel, and it can only be controlled from the TSD.

Portable Audio Device Selection on TSD



Some MP3 players have a file system that is not supported by the audio system. To use one of these MP3 players with the audio system, the MP3 player must be set to USB Removable Device mode or Mass Storage Device mode (see the MP3 player manufacturer's information for further details). Only files that have been added to the MP3 player in these modes can be played on the audio system.

A number of other vehicle systems are operated from the TSD and the integrated control panel, or have inputs into the audio system. These include:

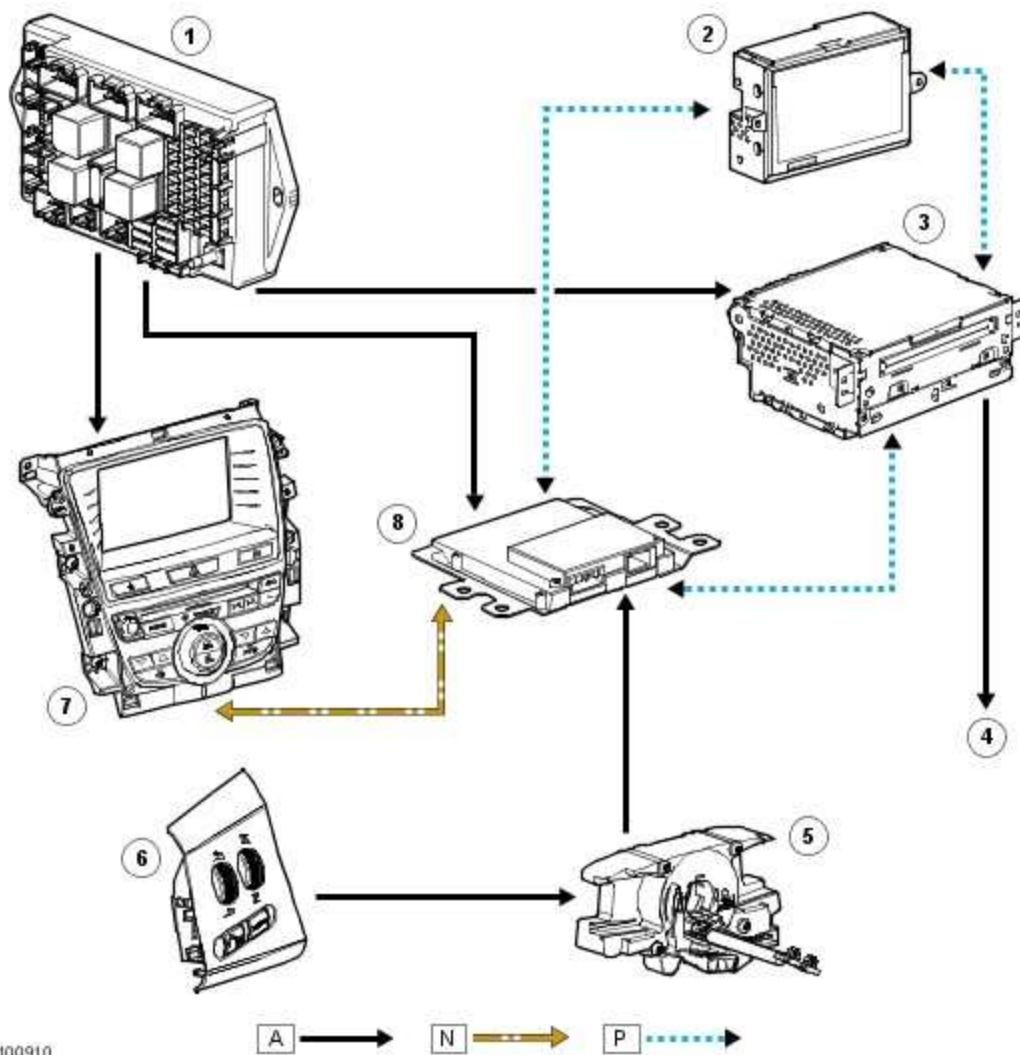
- Air conditioning system. For additional information, refer to Air Conditioning (412-03 Air Conditioning)
- Navigation. For additional information, refer to Navigation System (419-07 Navigation System)
- Parking aid. For additional information, refer to Parking Aid (413-13 Parking Aid)
- Telephone. For additional information, refer to Cellular Phone (419-08 Cellular Phone)

Software in the information and entertainment module generates the graphics for the TSD.

CONTROL DIAGRAM - STANDARD AUDIO SYSTEM (UP TO 2009 MY)

NOTE:

A = Hardwired; N = Medium speed CAN (controller area network) bus; P = MOST ring



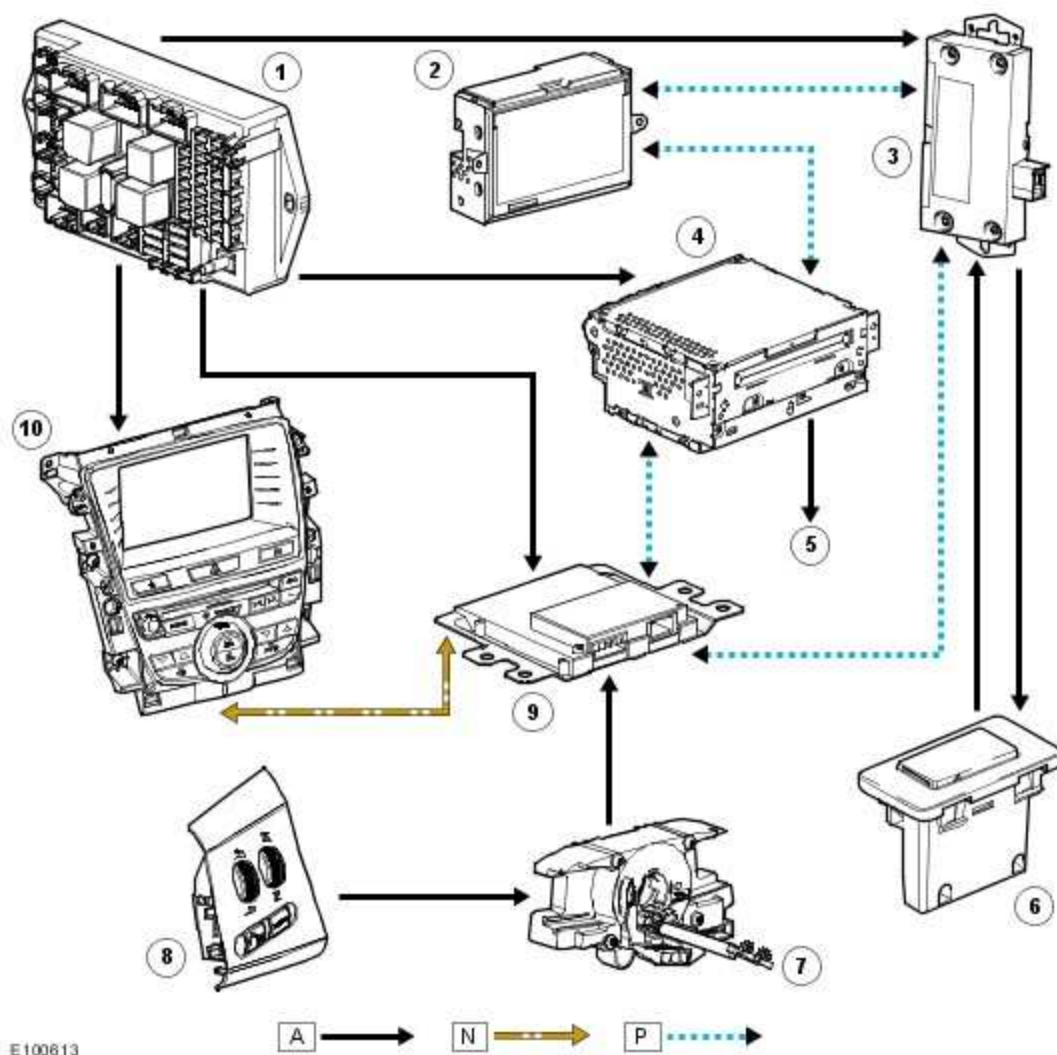
Item	Part Number	Description
1		Auxiliary Junction Box (AJB)
2		TSD
3		Integrated audio module
4		To speakers
5		Clock spring
6		Remote audio switches
7		Integrated control panel

8		Information and entertainment module
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CONTROL DIAGRAM - STANDARD AUDIO SYSTEM (FROM 2009 MY)

NOTE:

A = Hardwired; N = Medium speed CAN (controller area network) bus; P = MOST ring



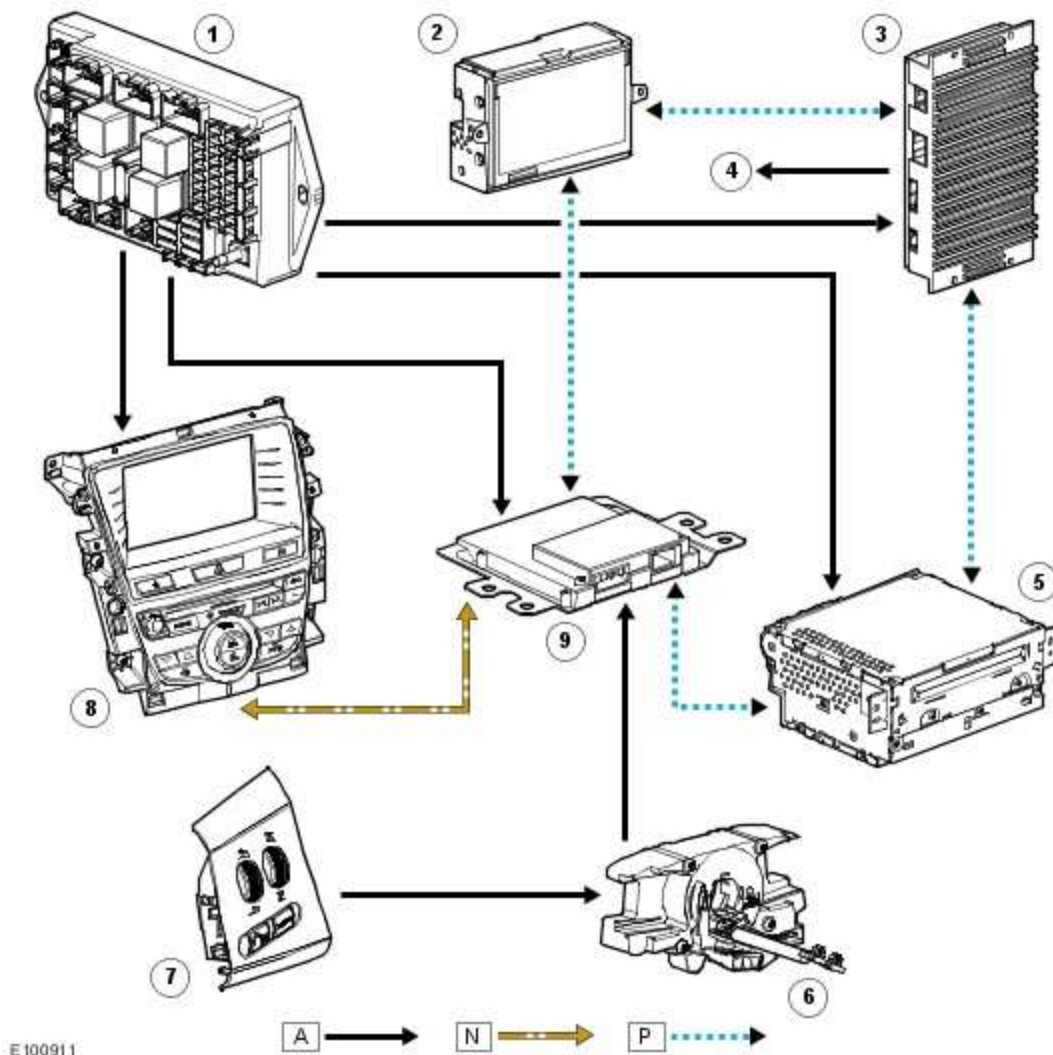
Item	Part Number	Description
1		AJB
2		TSD
3		Auxiliary USB unit

4		Integrated audio module
5		To speakers
6		Auxiliary input panel
7		Clock spring
8		Remote audio switches
9		Information and entertainment module
10		Integrated control panel

CONTROL DIAGRAM - PREMIUM AUDIO SYSTEM (UP TO 2009 MY)

NOTE:

A = Hardwired; N = Medium speed CAN (controller area network) bus; P = MOST ring



E 100911

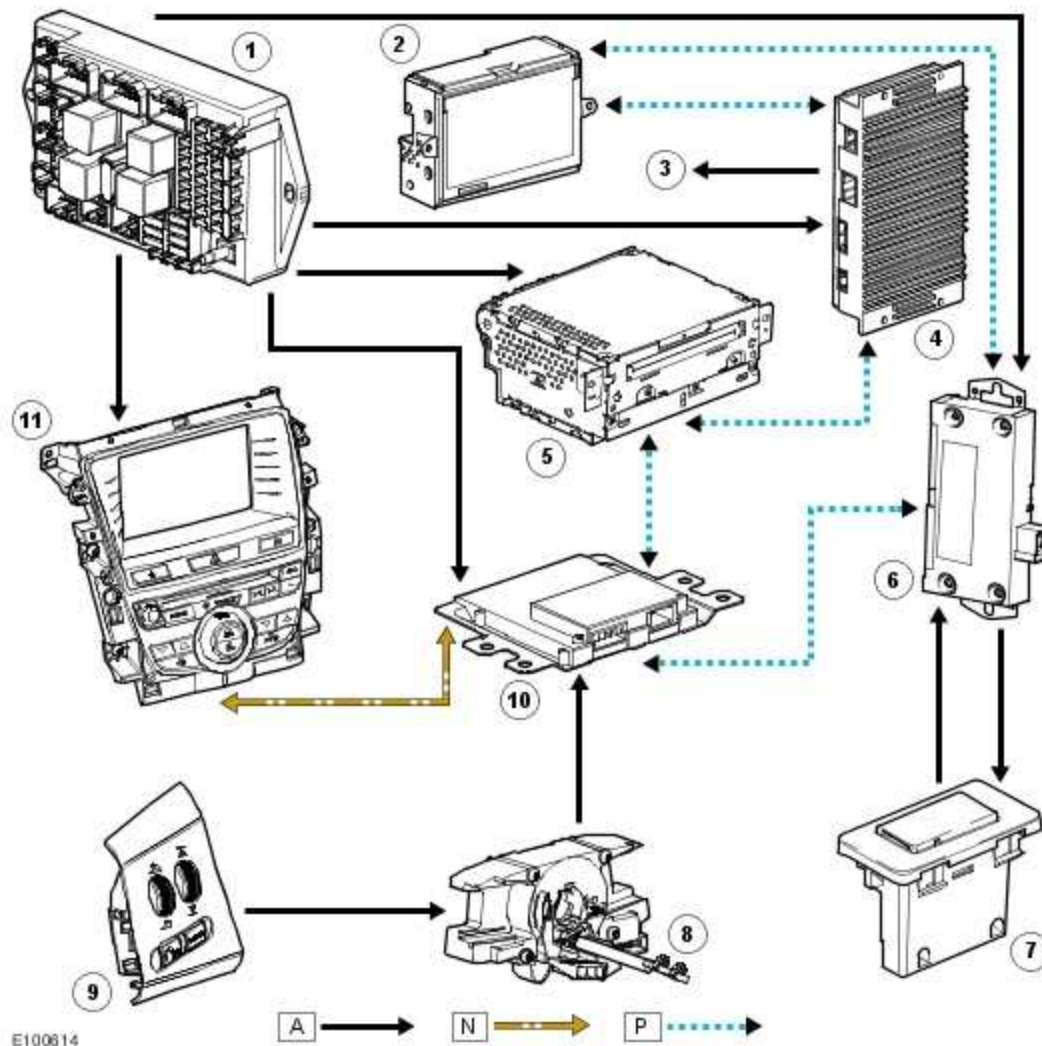
Item	Part Number	Description
1		AJB
2		TSD
3		Audio amplifier
4		To speakers
5		Integrated audio module
6		Remote audio switches
7		Clock spring

8		Integrated control panel
9		Information and entertainment module

CONTROL DIAGRAM - PREMIUM AUDIO SYSTEM (FROM 2009 MY)

NOTE:

A = Hardwired; N = Medium speed CAN (controller area network) bus; P = MOST ring



Item	Part Number	Description
1		AJB
2		TSD

3		To speakers
4		Audio amplifier
5		Integrated audio module
6		Auxiliary USB unit
7		Auxiliary input panel
8		Clock spring
9		Remote audio switches
10		Information and entertainment module
11		Integrated control panel

Audio System

For additional information, refer to [415-00](#)

Amplifier (86.50.10)

Removal

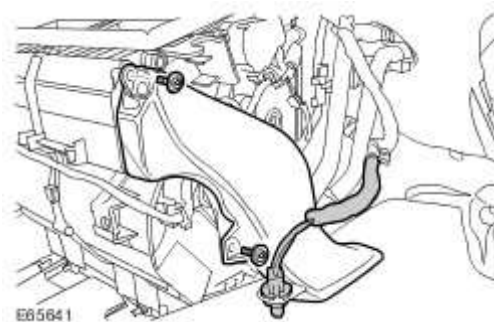
NOTE:

The component is situated in the passenger footwell. LHD is illustrated the procedure to remove the component on a RHD vehicle is similar.

- 1 . Remove the instrument panel assembly.
For additional information, refer to Instrument Panel (76.46.01)
- 2 . Remove the heater duct.

➤ Remove the 2 Torx screws.

➤ Release the lampholder.

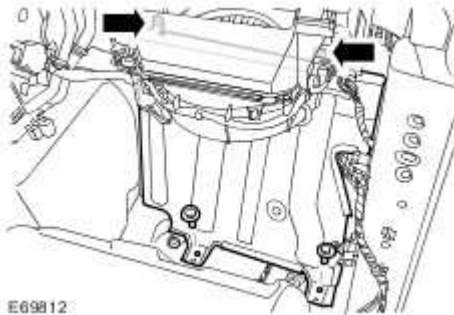


- 3  **CAUTION:** Make sure the wiring harness and electrical connectors are not damaged during the carpet release.

Carefully release the carpet for access.

4 . Remove the subwoofer cover.

➤ Remove the 4 bolts.



5



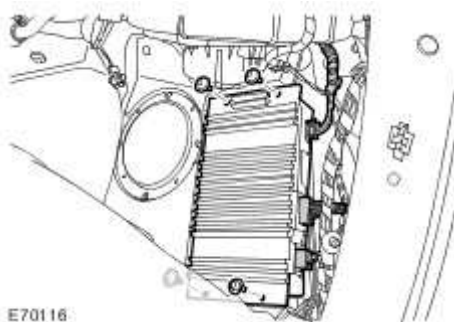
CAUTION: Cover fibre optic cable connectors to minimise dust ingress and avoid bending the cables in a radius of less than 30 mm.

Disconnect the 2 electrical connectors.

➤ Carefully disconnect the MOST connector.

6 . Remove the amplifier.

➤ Remove the 4 Torx screws.



Installation

1 . Install the amplifier.

2 . Connect the electrical connectors.

▶ Connect the MOST connector.

3 . Install the subwoofer cover.

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

4 .  **CAUTION: Make sure the carpet is correctly installed and that no foul-condition exists when the accelerator pedal is depressed.**

Install the carpet.

5 . Install the heater duct.

▶ Install the Torx screws.

▶ Install the lampholder.

6 . Install the instrument panel assembly.

For additional information, refer to Instrument Panel (76.46.01)

Audio Unit (86.50.03)

Removal

NOTE:

This component is easily recognised as a CD multichanger, it is however an audio module and links to the MOST.

- 1 . Disconnect the battery ground cable.

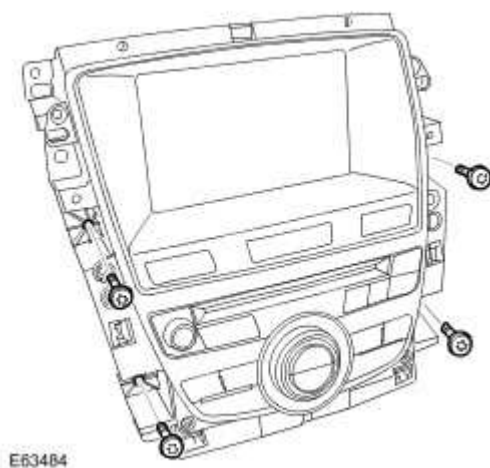
For additional information, refer to

- 2 . Remove the navigation screen module.

For additional information, refer to Navigation System Display Module (86.62.07)

- 3 . Release the audio/CD module and climatic control assembly.

➤ Remove the 4 module bracket Torx bolts.

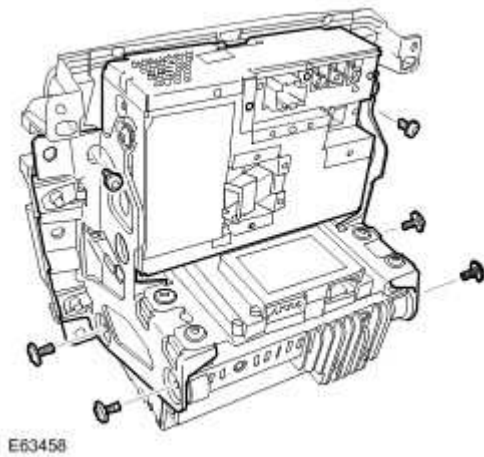


- 4 .  **CAUTION: Care must be taken to avoid damage to the mating surfaces.**

Separate the climatic control and audio/CD module from the module bracket.

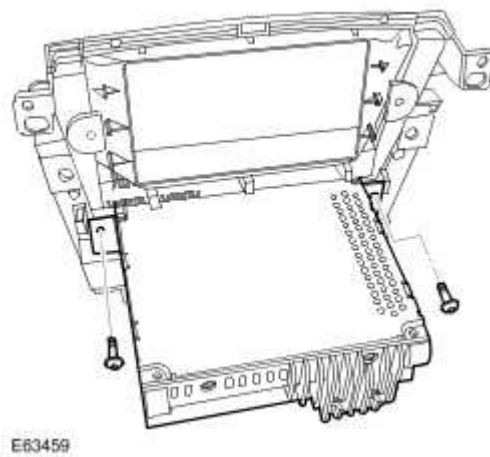
▶ Remove 2 Torx screws securing the navigation screen to the climatic control assembly.

▶ Remove the 4 Torx bolts.



5 . Remove the CD unit.

▶ Remove the 2 Torx screws.



Installation

1 NOTE:

Carefully check the CD access slot in the climatic control assembly is aligned to the CD unit after tightening the screws. This is a visual check only, do not attempt to probe the CD unit with a sharp object or load a CD .

Carefully install the audio/CD module to the climatic control assembly.

 Tighten the Torx screws.

2 . Install the climatic control assembly and audio/CD module to the module bracket.

 Install and tighten the navigation screen Torx screws.

 Install the CD module bracket Torx bolts and tighten to 6 Nm (4 lb.ft).

 Install the climatic control assembly Torx bolts and tighten to 6 Nm (4 lb.ft).

3 . Install the navigation screen module.

For additional information, refer to Navigation System Display Module (86.62.07)

4 . Connect the battery ground cable.

For additional information, refer to

5 . Connect WDS to the vehicle and configure a new module.

Steering Wheel Audio Controls (86.50.42)

Removal

NOTE:

This procedure is identical to the removal of the steering wheel speed control switch.

- 1 . Remove the steering wheel switch assembly.
For additional information, refer to Speed Control Switch (19.75.25)

Installation

- 1 . To install, reverse the removal procedure.
For additional information, refer to Speed Control Switch (19.75.25)

415-02 : Antenna

Specifications

Specifications

Torque Specifications

Item	Nm	lb-ft	lb-in
Body earth point - nut	9	7	80
Electric AM/FM antenna	9	7	80
FM ariel splitter module - nut	7	5	62

Antenna

COMPONENT LOCATION



E62784

Item	Part Number	Description
1		VICS beacon antenna (Japan only)
2		Amplitude Modulation (AM)/Frequency Modulation (FM) electric antenna
3		FM antenna signal splitter
4		GPS antenna

5		Bluetooth antenna
---	--	-------------------

INTRODUCTION

The antenna systems on the vehicle cover the following functions:

- AM/FM radio reception
- Bluetooth connection with the Telephone Control Module
- FM reception for the VICS/TMC function of the navigation system
- Global Positioning System (GPS) signals.

GPS ANTENNA

The GPS antenna is located in the rear liftgate spoiler.

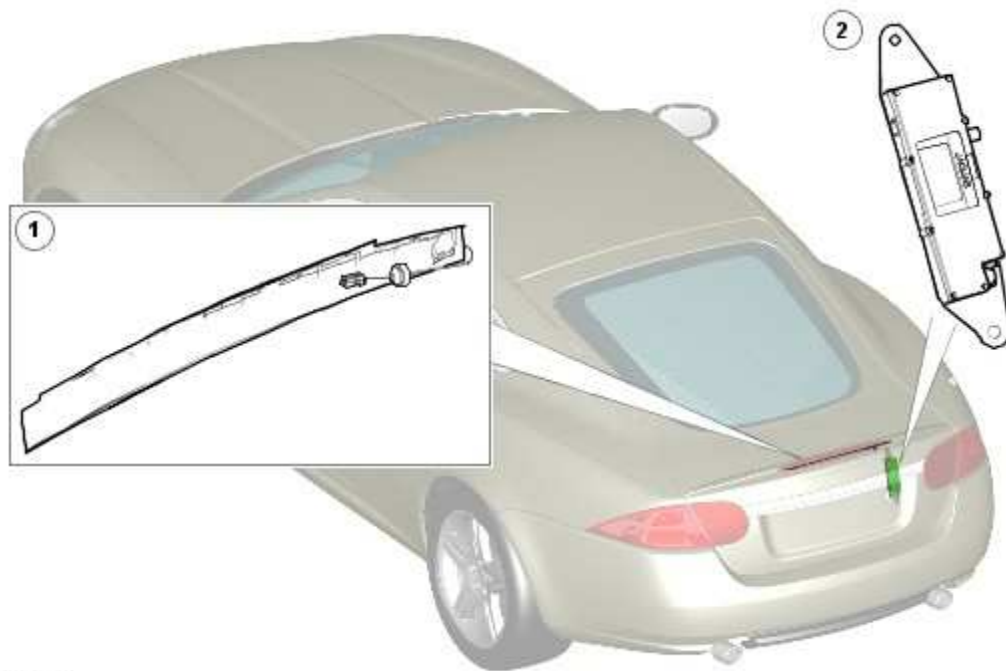
BLUETOOTH ANTENNA

The Bluetooth Antenna is located centrally behind the rear seat. The antenna is used to connect the telephone control module to a Bluetooth compatible phone. The vehicle audio system can then be used for making and receiving telephone calls hands free. For additional information, refer to Cellular Phone (419-08 Cellular Phone)

ELECTRIC AM/FM ANTENNA

The electric AM/FM antenna is located on the rear RH quarter of the vehicle. The antenna is controlled by the Integrated Audio Module, which supplies power to the antenna motor. The antenna is extended when the radio is switched on and retracted when the system is switched off or the ignition is switched off.

AM/FM ANTENNA AND AMPLIFIER - 08 MODEL YEAR ONWARDS



E94652

Item	Part Number	Description
1		Antenna
2		FM amplifier

On all vehicles from 08MY, the AM/FM antenna is located in the rear spoiler. The antenna has a hardwire connection to the amplifier which is mounted on the inner Left-Hand (LH) side of the lift gate, behind the trim panel. The amplifier is held in place by a steel strap. The amplifier is connected to the integrated audio module, via the FM antenna signal splitter, by a coaxial cable.

On coupe models, ground for the antenna amplifier is provided by a strap connected to the lift gate hinge. On convertible models a block connected directly to the amplifier provides the ground through the vehicle body.

FM ANTENNA SIGNAL SPLITTER

The FM antenna signal splitter is located in the luggage compartment just below the RH rear lamp cluster. The splitter divides the received FM signal between the Integrated Audio Module and the navigation computer. The navigation computer uses the FM signal for TMC information. For additional information, refer to Navigation System (419-07 Navigation System).

VICS BEACON ANTENNA (Japan only)

The VICS beacon antenna is located on the passenger side of the instrument panel adjacent to the windshield. The antenna receives infra red and microwave data transmissions from roadside transmitters.

SDARS ANTENNA

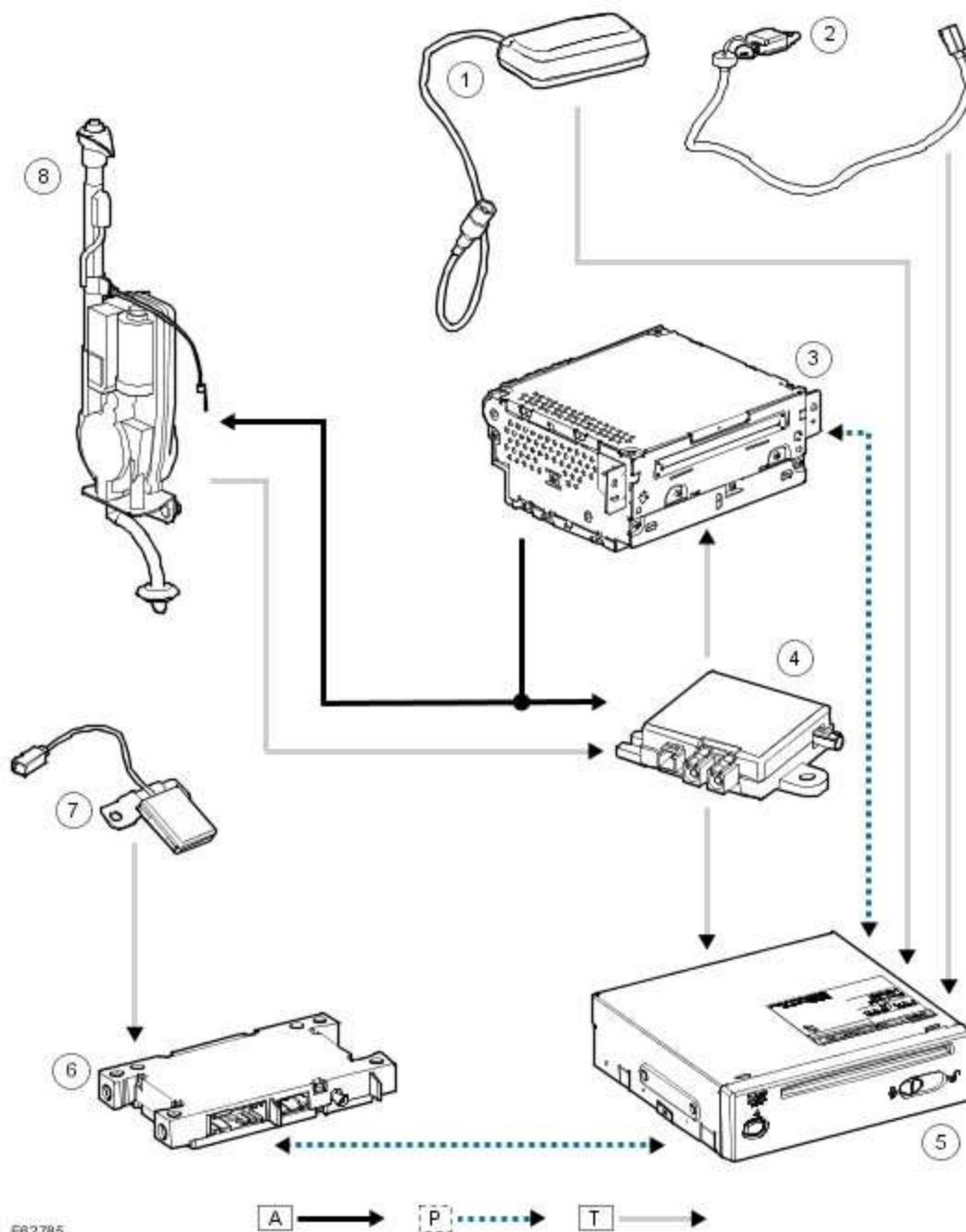
Where fitted the SDARS antenna is located in the center of the liftgate just in front of the spoiler. The antenna receives satellite radio transmissions.

CONTROL DIAGRAM

Upto 08 Model Year

NOTE:

A=Hardwired; P=MOST; T=Coaxial



E62785

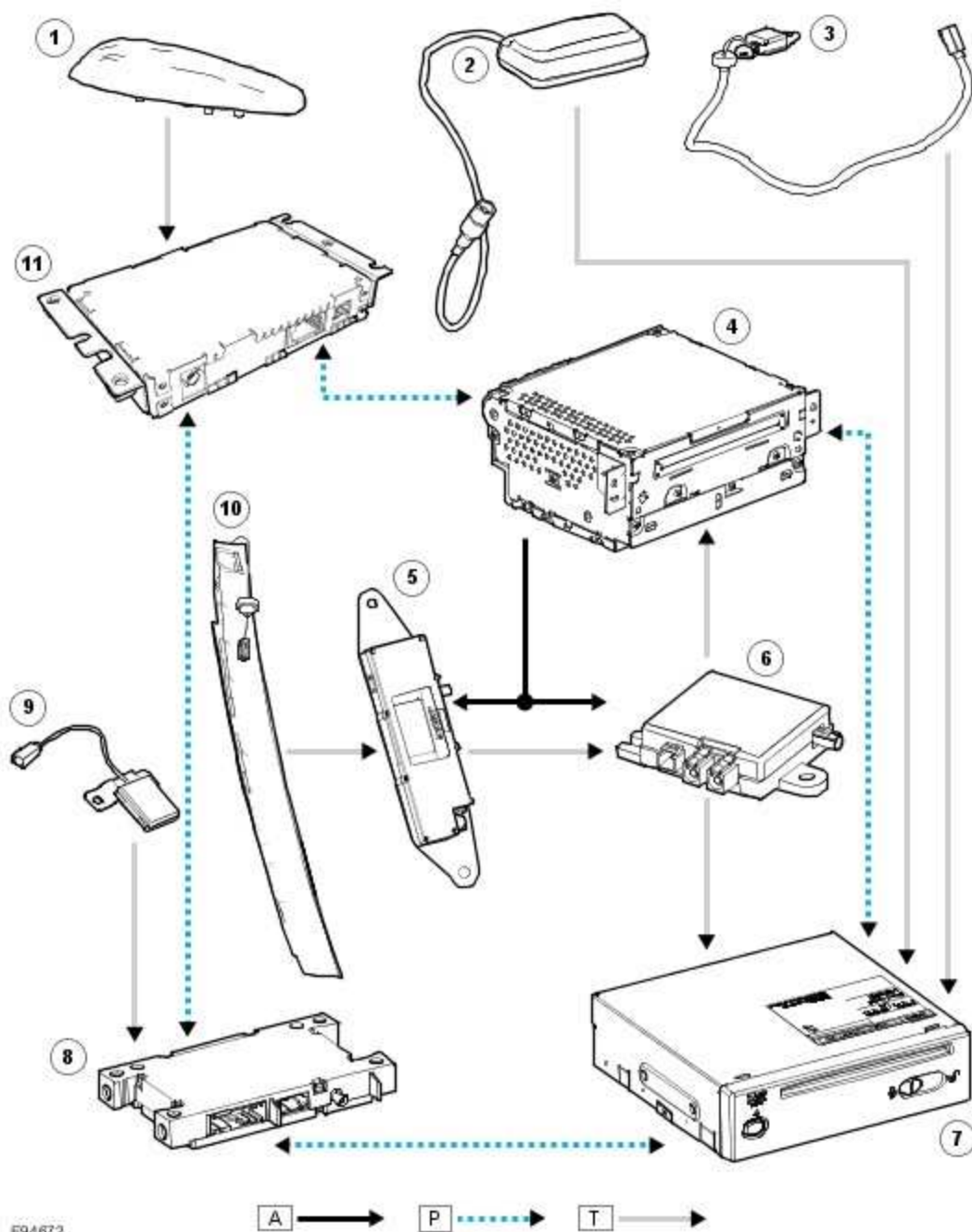
Item	Part Number	Description
1		SDARS Antenna (where fitted)
2		VICS beacon antenna (Japan)
3		GPS antenna
4		Integrated audio module

5		AM/FM electric antenna
6		FM antenna signal splitter
7		Navigation computer
8		Telephone control module
9		Bluetooth antenna
10		SDARS module

From 08 Model Year

NOTE:

A=Hardwired; P=MOST; T=Coaxial



E94672

Item	Part Number	Description
1		SDARS Antenna (where fitted)
2		VICS beacon antenna (Japan)
3		GPS antenna
4		Integrated audio module

5		AM/FM antenna amplifier
6		FM antenna signal splitter
7		Navigation computer
8		Telephone control module
9		Bluetooth antenna
10		AM/FM antenna
11		SDARS module

Antenna

For diagnosis and testing information.

[Audio System](#)

Antenna (86.51.17.60)

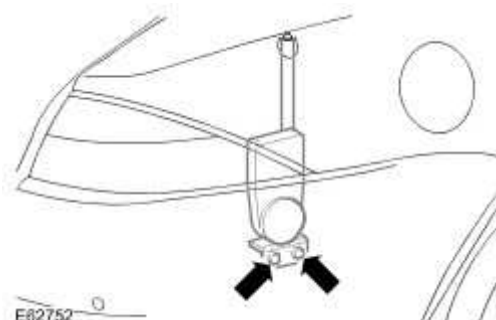
Removal

1 . Remove the RH rear quarter trim panel.

2 . Raise the vehicle on the lift.

3 . Release the antenna.

▶ Remove the 2 nuts.



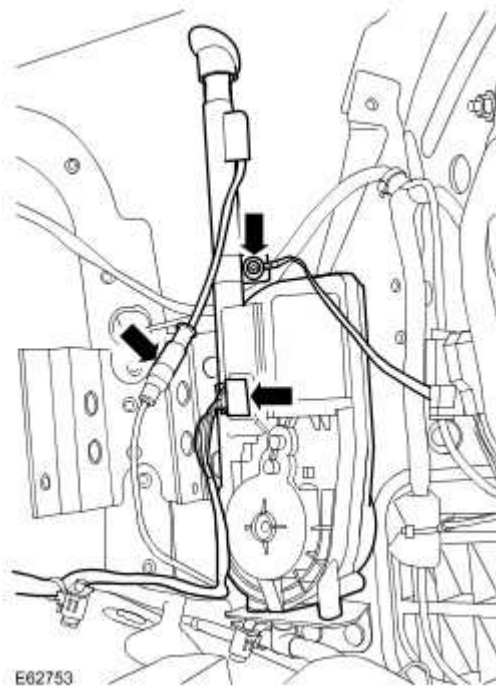
4 . Lower the vehicle.

5 . Remove the antenna.

▶ Disconnect the antenna cable.

▶ Disconnect the electrical connector.

▶ Disconnect the antenna earth strap.



Installation

1 . Install the antenna.

- Connect the antenna cable.
- Connect the electrical connector.
- Connect the antenna earth strap.

2 . Raise the vehicle on the lift.

3 . Secure the antenna.

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

4 . Lower the vehicle.

5 . Install the RH rear quarter trim panel.

415-03 : Speakers

Specifications

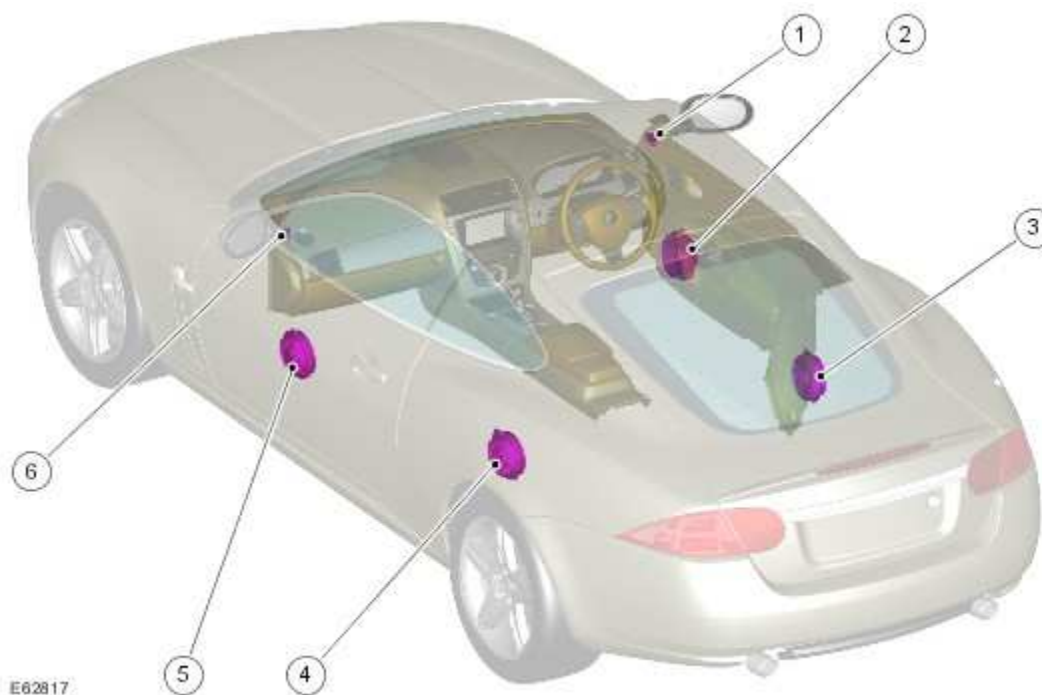
Specifications

Torque Specifications

Item	Nm	lb-ft	lb-in
Front door speaker - screw	2	-	18
Subwoofer speaker - screw	5	4	44
Subwoofer speaker cover - bolt	5	4	44
Subwoofer speaker housing - bolt	5	4	44
Subwoofer speaker housing - nut	5	4	44
Subwoofer speaker housing - screw	5	4	44
Quarter panel speaker - screw	2	-	18

Speakers

COMPONENT LOCATION-STANDARD AUDIO SYSTEM



Item	Part Number	Description
1		Front RH high range speaker
2		Front RH mid/low range speaker
3		Rear RH mid/low range speaker
4		Rear LH mid/low range speaker
5		Front LH mid/low range speaker
6		Front LH high range speaker

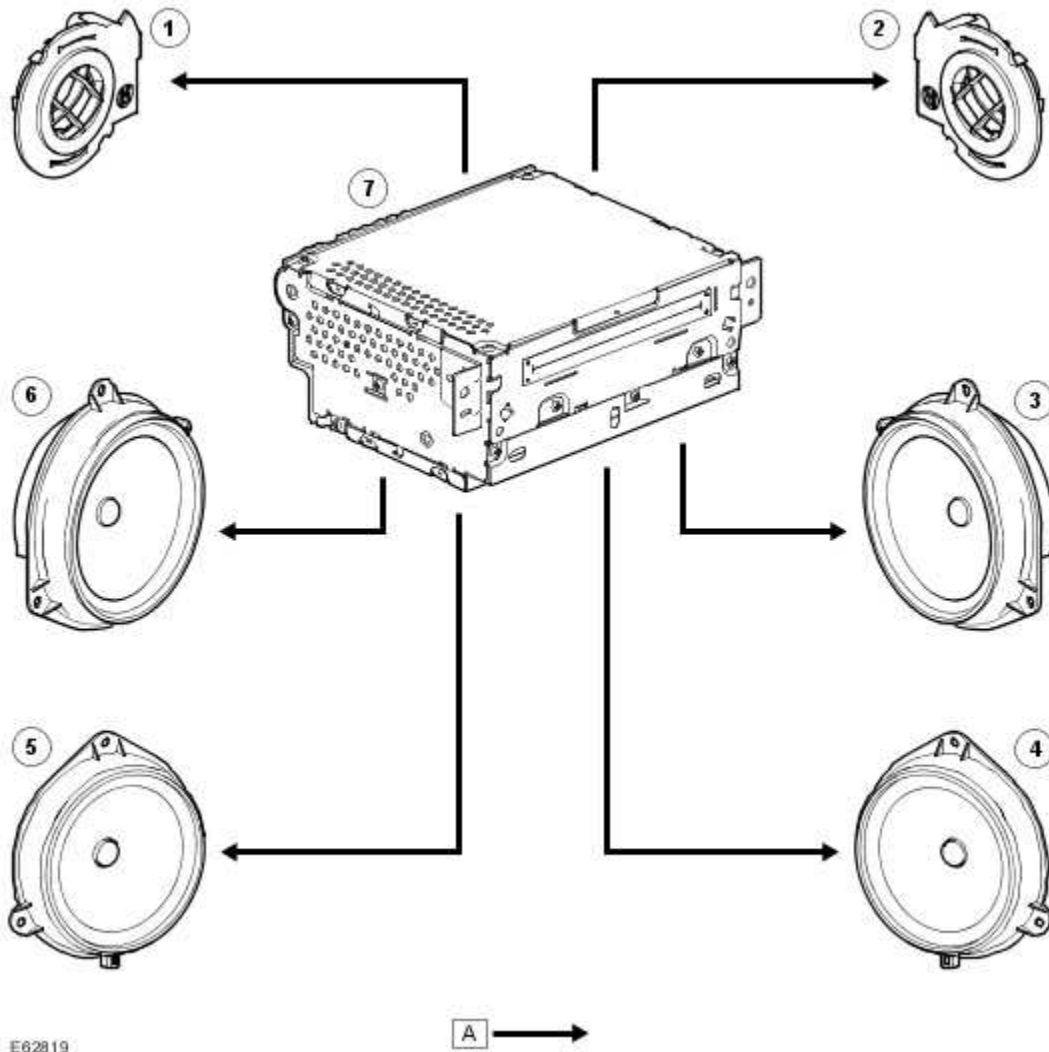
INTRODUCTION

The standard speaker system comprises 6 speakers that are driven by the Integrated Audio Modules internal amplifier.

CONTROL DIAGRAM-STANDARD AUDIO SYSTEM

NOTE:

A=Hardwired

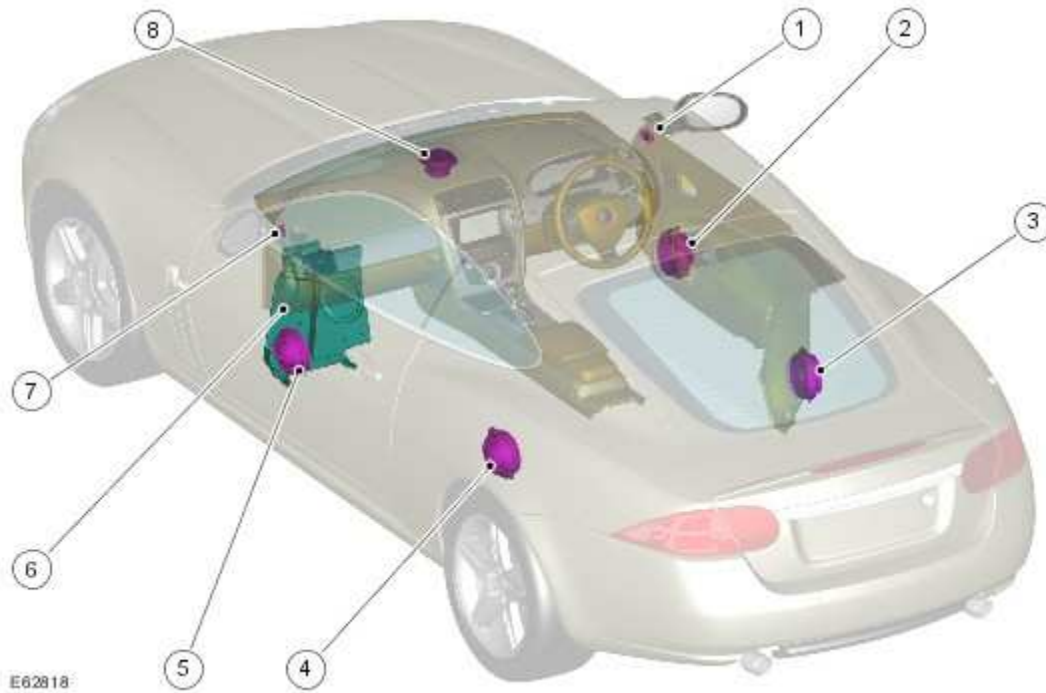


E62819

Item	Part Number	Description
1		Front LH high range speaker
2		Front RH high range speaker
3		Front RH mid/low range speaker
4		Rear RH mid/low range speaker
5		Rear LH mid/low range speaker

6		Front LH mid/low range speaker
7		Integrated Audio Module

COMPONENT LOCATION-PREMIUM AUDIO SYSTEM



Item	Part Number	Description
1		Front RH high range speaker
2		Front RH mid/low range speaker
3		Rear RH mid/low range speaker
4		Rear LH mid/low range speaker
5		Front LH mid/low range speaker
6		Subwoofer and power amplifier assembly
7		Front LH high range speaker
8		Center speaker

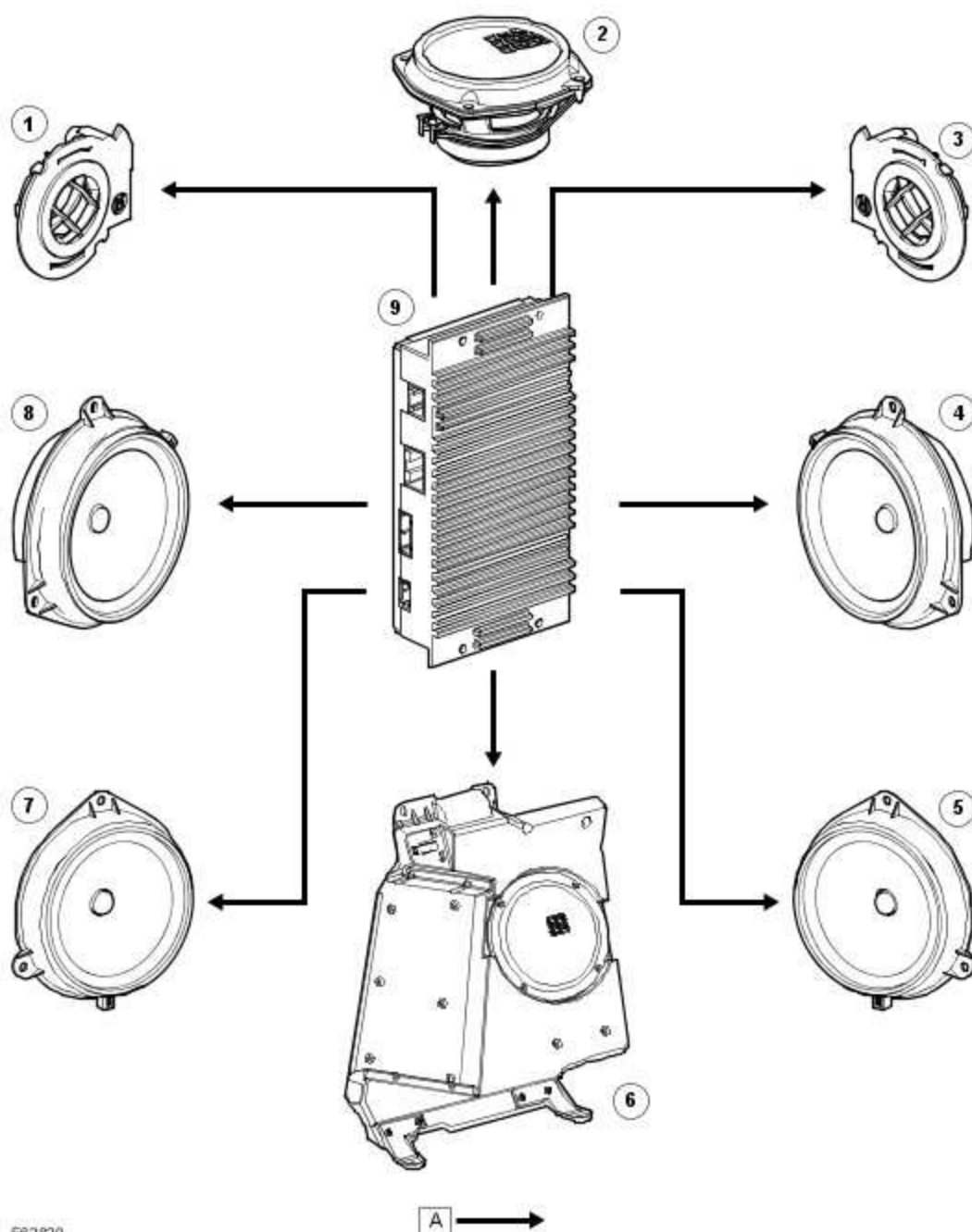
INTRODUCTION

Premium audio system is a 7 speaker system which is driven by a Dolby Prologic II Audio amplifier. The subwoofer is located in the passenger footwell behind a false panel inside its own enclosure. The Dolby Prologic II amplifier is attached to the front of the subwoofer enclosure.

CONTROL DIAGRAM-PREMIUM AUDIO SYSTEM

NOTE:

A=Hardwired



Item	Part Number	Description
1		Front LH high range speaker
2		Center speaker
3		Front RH high range speaker
4		Front RH mid/low range speaker
5		Rear RH mid/low range speaker
6		Subwoofer
7		Rear LH mid/low range speaker
8		Front LH mid/low range speaker
9		Power amplifier

Speakers

For diagnosis and testing information.

[Audio System](#)

Front Door Speaker (86.50.13)

Removal

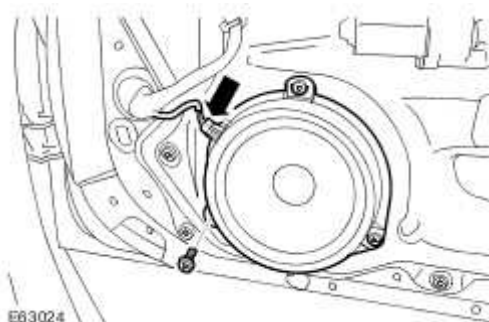
- 1 . Remove the front door trim panel.

For additional information, refer to Front Door Trim Panel (76.34.01)

- 2 . Remove the front door speaker.

➤ Remove the 3 Torx bolts.

➤ Disconnect the electrical connector.



Installation

- 1 . Install the front door speaker.

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

➤ Connect the electrical connector.

- 2 . Install the front door trim panel.

For additional information, refer to Front Door Trim Panel (76.34.01)

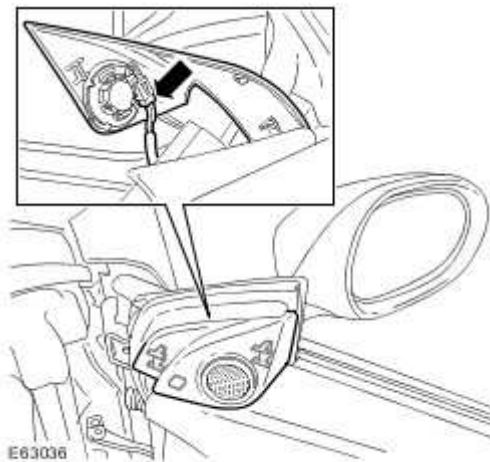
Front Door Tweeter Speaker (86.50.63)

Removal

1 . Remove the exterior mirror trim panel.

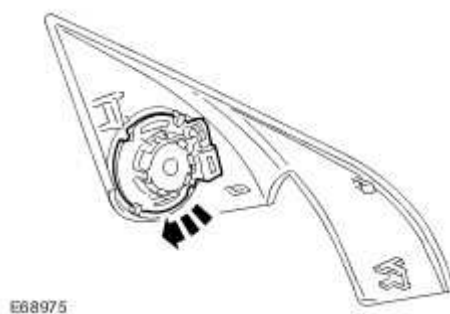
▶ Release the 3 clips.

▶ Disconnect the electrical connector.



2 . Release the speaker tweeter.

▶ Release from the clips.



Installation

1 . Install the speaker tweeter.

 Release from the clips.

2 . Install the exterior mirror trim panel.

 Connect the electrical connector.

 Secure with the clips.

Subwoofer Speaker (86.51.05)

Removal

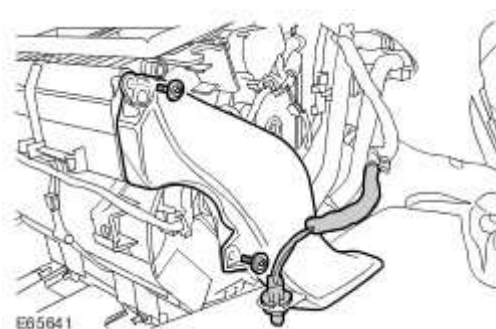
- 1 . Remove the instrument panel assembly.

For additional information, refer to Instrument Panel (76.46.01)

- 2 . Remove the heater duct.

▶ Remove the 2 Torx screws.

▶ Release the lampholder.



- 3

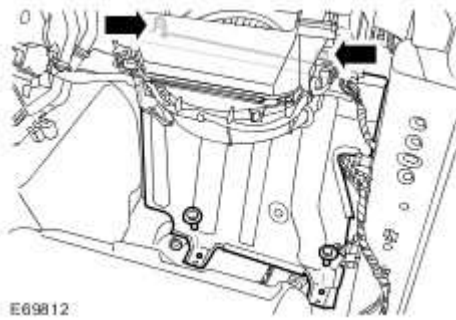


- **CAUTION: Make sure the wiring harness and electrical connectors are not damaged during the carpet release.**

Carefully release the carpet for access.

- 4 . Remove the subwoofer cover.

▶ Remove the 4 bolts.



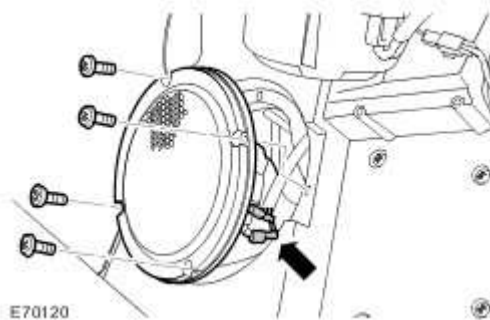
5 . NOTE:

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

Remove the subwoofer.

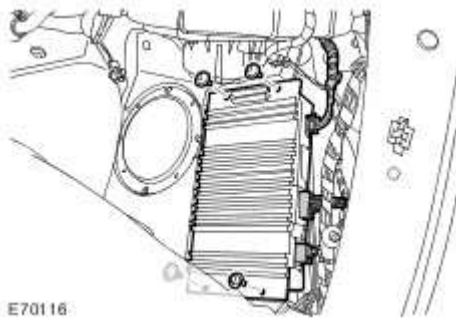
➤ Remove the 4 screws.

➤ Disconnect the 2 electrical connectors.



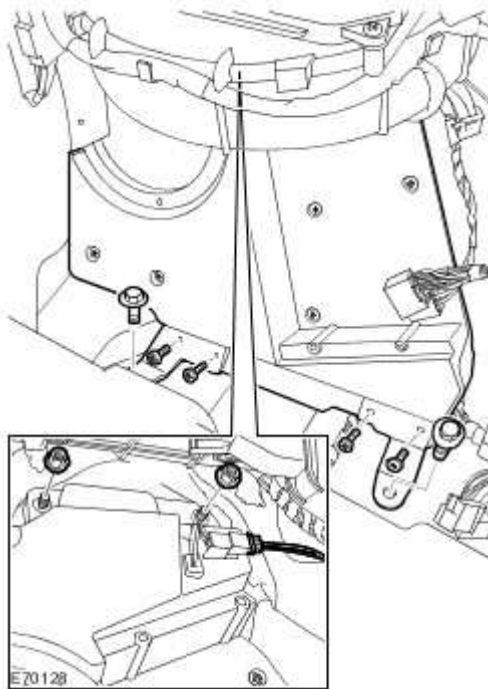
6 . Remove the amplifier.

➤ Remove the 4 Torx screws.



7 . Release the subwoofer speaker housing

- Remove the 2 nuts.
- Remove the 2 bolts.
- Remove both speaker housing support brackets.



8



CAUTION: Cover fibre optic cable connectors to minimise dust ingress and avoid bending the cables in a radius of less than 30 mm.

Remove the subwoofer speaker housing.

- ▶ Carefully disconnect the MOST connector.
- ▶ Disconnect the 3 electrical connectors.

Installation

1 . Install the subwoofer speaker housing.

- ▶ Install the brackets.
- ▶ Install the screws.
- ▶ Tighten the nuts to 5 Nm (4 lb.ft).
- ▶ Tighten the bolts to 10 Nm (7 lb.ft).

2 . Connect the subwoofer speaker housing electrical connectors.

- ▶ Connect the MOST connector.

3 . Install the amplifier.

4 . Install the subwoofer.

- ▶ Connect the electrical connectors.
- ▶ Install the screws.

5 . Install the subwoofer cover.

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

6



- **CAUTION: Make sure the carpet is correctly installed and that no foul-condition exists when the accelerator pedal is depressed.**

Install the carpet.

7 . Install the heater duct.



Install the Torx screws.



Install the lampholder.

8 . Install the instrument panel assembly.

For additional information, refer to Instrument Panel (76.46.01)

Quarter Panel Speaker - 2-Door (86.50.12)

Removal

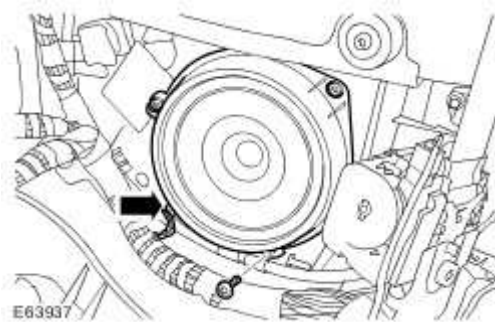
- 1 . Remove the rear quarter trim panel.

For additional information, refer to Rear Quarter Trim Panel - 2-Door (76.13.73)

- 2 . Remove the quarter panel speaker.

▶ Remove the 3 Torx screws.

▶ Disconnect the electrical connector.



Installation

- 1 . Install the quarter panel speaker.

▶ Connect the electrical connector.

▶ Install and tighten the Torx screws.

- 2 . Install the rear quarter trim panel.

For additional information, refer to Rear Quarter Trim Panel - 2-Door (76.13.73)

Quarter Panel Speaker - Convertible (86.50.12)

Removal

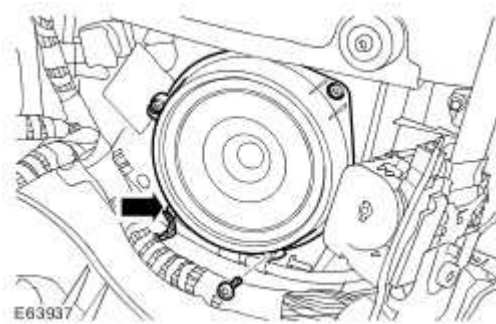
- 1 . Remove the rear quarter trim panel.

For additional information, refer to Rear Quarter Trim Panel - Convertible (76.13.73)

- 2 . Remove the quarter panel speaker.

➤ Remove the 3 Torx screws.

➤ Disconnect the electrical connector.



Installation

- 1 . Install the quarter panel speaker.

➤ Connect the electrical connector.

➤ Install and tighten the Torx screws.

- 2 . Install the rear quarter trim panel.

For additional information, refer to Rear Quarter Trim Panel - Convertible (76.13.73)

417 : Lighting

417-01 : Exterior Lightning

Specifications

Specifications

Bulbs

Lamp	Bulb Type
Number plate lamp	W5WL
Reverse lamp	LED (non-serviceable)
Side repeater indicator	WY5W
Headlamp unit:	
Cornering lamp	H8
Dip and main beam projector unit	D1S35W
Direction indicator	PY21W
Side lamp	W5W
Side marker	WY5W
Rear lamp unit:	
Direction indicator	PY21W Silver Vision
Side marker	W5W
Stop and tail	P21/5W
Tail lamp	W5W
Fog lamps:	
Front fog lamp	H11 55W
Rear fog lamp	LED (non-serviceable)

Adjustment

Item	Adjustment Setting
Headlamp aim (ROW)	-1% +/- 0.1%
Headlamp aim (NAS)	-0.7%
Fog lamp aim	-2% +/- 0.5%

Torque Specifications

Item	Nm	lb-ft	lb-in
Headlamp assembly - bolt	6	4	53
Headlamp leveling, front sensor - bolt	20	15	-
Headlamp leveling module - bolt	4	3	35
Headlamp leveling, rear sensor - bolt	20	15	-
High-mounted stop lamp - screw	2	-	18
Rear lamp assembly to gate/lid - nut	2.5	-	22
Rear lamp assembly to fender - nut	2	-	18

Front Fog Lamp Adjustment

1. Align the beam setting equipment to one fog lamp.

2. **NOTE:**

The fog lamp beam should be set at 1.2% below the horizontal and parallel.

Check the fog lamp beam alignment.

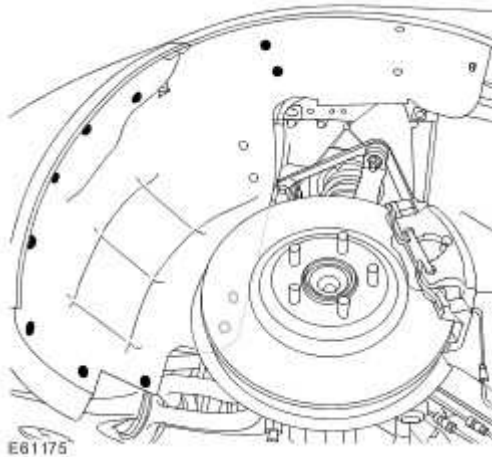
3. Turn the steering on to full lock for access.

4. **NOTE:**

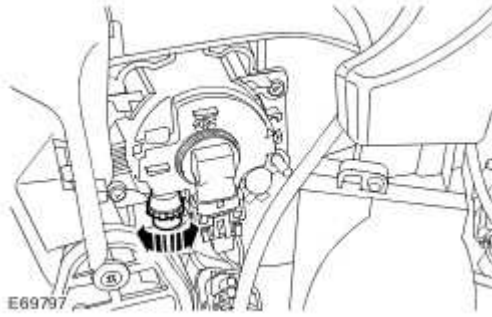
Wheel shown removed for clarity.

Release the front of the fender splash shield.

- Remove the 7 Torx bolts.
- Tie the splash shield aside.



5. Adjust the fog lamp using the thumb wheel.



6. Install the fender splash shield.
 - Tighten the Torx bolts.
7. To adjust the second fog lamp, repeat the above procedure.

Headlamp Adjustment (86.40.18)

1. Align the headlamp beam setting equipment to one headlamp.

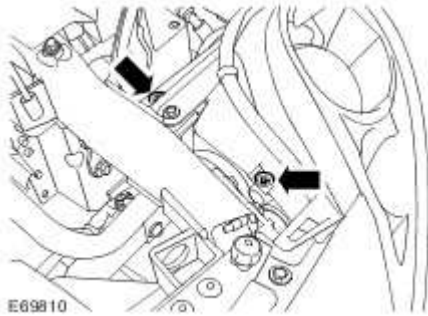
2. **NOTE:**

The headlamp setting is 1.2 % below horizontal and parallel.

Check the headlamp beam alignment.

3. Open the hood.

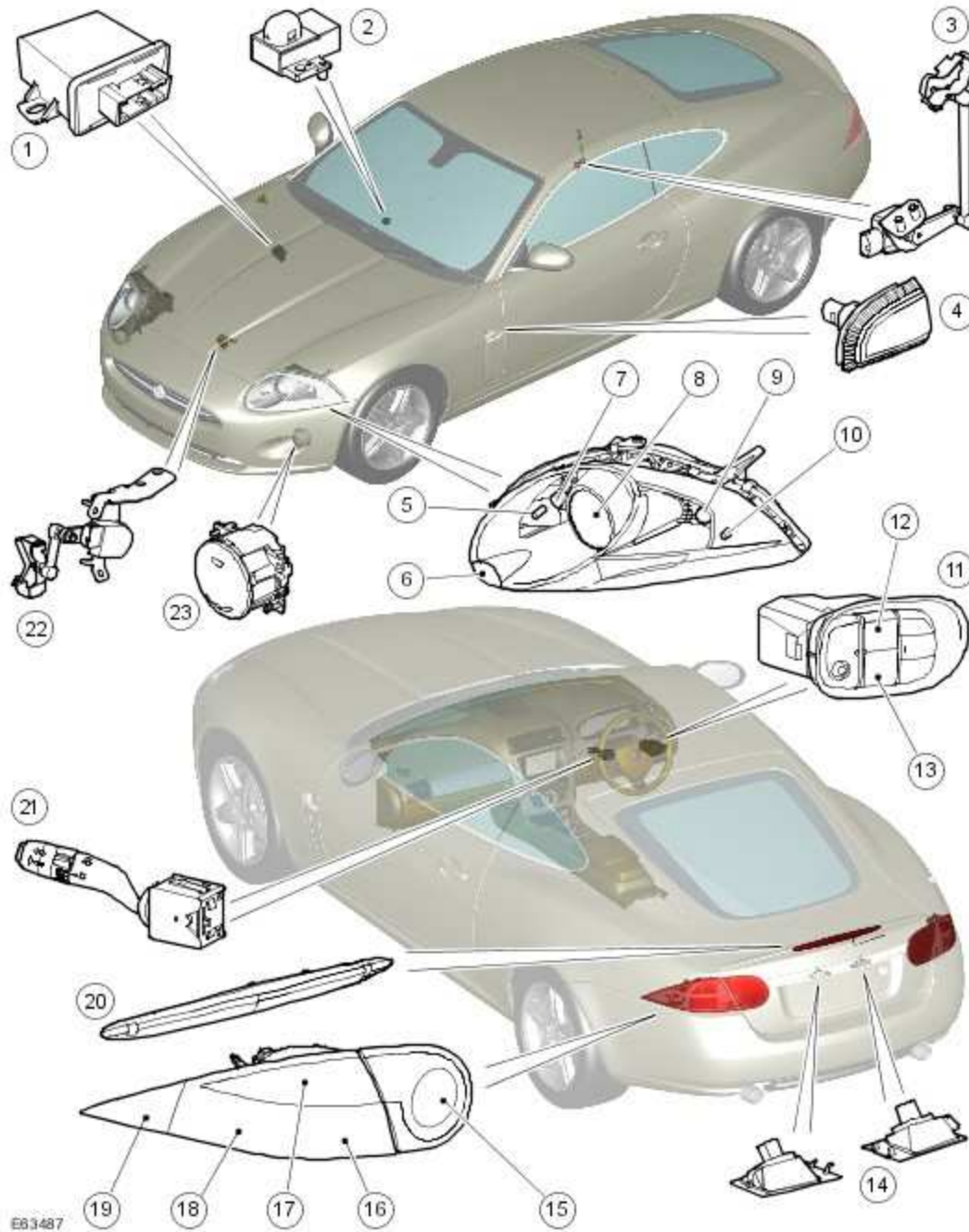
4. Adjust the headlamps with an Allen Key.



5. To adjust the second headlamp, repeat the above procedure.

Exterior Lighting

COMPONENT LOCATION



Item	Part Number	Description
1		Headlamp leveling/AFS control module

2		Light sensor
3		Rear height sensor
4		Turn signal indicator repeater lamp (2 off)
5		Cornering lamp
6		Headlamp power washer
7		Front side lamp
8		Xenon headlamp module
9		Front turn signal indicator
10		Side marker lamp
11		Auxiliary lighting switch
12		Front fog lamp switch
13		Rear fog lamp switch
14		License plate lamps
15		Reverse or rear fog lamp
16		Side lamp
17		Rear turn signal indicator
18		Side lamp/Stop lamp
19		Rear side marker lamp
20		High mounted stop lamp
21		Lighting switch
22		Front height sensor
23		Front fog lamp (2 off)

INTRODUCTION

The lighting systems are controlled by the Auxiliary Junction Box (AJB) and the CJB (central junction box) . The two boxes contain fuses, relays and microprocessors to control the power supply and functionality of the lighting systems.

Driver lighting selections using the LH (left-hand) steering column multifunction switch or the auxiliary lighting switch are passed to the CJB (central junction box) via the instrument cluster.

The lighting system has an 'auto' lights function which is controlled by the CJB (central junction box) on receipt of signals from the light sensor. The exterior lights are turned on or off in response to ambient light signals from the light sensor via the instrument cluster.

Two levels of headlamp are available; Bi-xenon or Bi-xenon with Adaptive Front lighting System (AFS). The AFS headlamp has a swiveling projector module which moves the headlamp beam in the direction of travel. The AFS headlamp also features a cornering/static bending lamp which illuminates the area at the side of the vehicle when turning into driveways for example.

The tail lamp is in two parts. The turn signal indicator, side and stop lamps are located in each rear fender. The reverse and rear fog lamps are located in separate units attached to the liftgate. The locations of the fog and reverse lamps changes depending if the vehicle is LHD (left-hand drive) or RHD (right-hand drive) . The turn signal indicator, side and stop lamps use conventional glass filament bulbs. The rear fog and reverse lamp use colored LED (light emitting diode) .

EXTERIOR BULB TYPE/RATING

The following table shows the bulbs used for the exterior lighting system and their type and specification.

Bulb	Type	Rating
Xenon Headlamps - Low/High beam	Xenon D1S	35W
Front fog lamps - Naturally aspirated	Halogen H11	55W
Front fog lamps - Supercharged	Halogen H3	55W
Rear fog lamp	LED (light emitting diode)	Not applicable
Turn signal indicator lamps - Front - Rest of World (ROW)	Bayonet PY21W	21W
Turn signal indicator lamps - Front - North American Specification (NAS)	Wedge S8W 3457K	27/7W
Turn signal indicator repeater lamps	Capless W5W	5W

Turn signal indicator lamps - Rear	Bayonet PY21W	21W
Side lamps - Front	Wedge W5W	5W
Stop / Side lamps	Bayonet - Twin filament - P21/5	21W/5W
High mounted stop lamp	LED (light emitting diode)	Not applicable
Licence plate lamps	Capless W5W	5W
Reverse lamp	LED (light emitting diode)	Not applicable
Cornering lamp	Halogen H8	35W
Side marker lamps (front/rear)	Capless W3W	3W

CENTRAL JUNCTION BOX AND AUXILIARY JUNCTION BOX

The CJB (central junction box) is an integrated unit located in the passenger compartment LH (left-hand) side on the 'A' pillar.

The Auxiliary Junction Box (AJB) is located in a central position, behind the rear seat.

CJB (central junction box) Control

The CJB (central junction box) receives inputs from the following switches via the instrument cluster and the medium speed CAN (controller area network) bus:

- LH (left-hand) steering column multifunction switch Side lamp position Headlamp position Automatic (AUTO) position Timer delay positions Turn signal indicators Headlamp flash and high beam
- Stop lamp switch
- Hazard flasher switch
- Sunload/Light sensor.

The following lamps are controlled by the CJB (central junction box) :

- Front side lamps
- Front side marker lamps
- Headlamps
- Cornering lamps
- Front fog lamps.

AJB Control

The following lamps are controlled by the AJB:

- Rear fog lamp
- Reverse lamp
- Stop lamps
- High mounted stop lamp
- Rear side lamps
- Rear side marker lamps
- Licence plate lamps
- Front and rear turn signal indicators and side repeaters

The AJB is also connected via a hardwired connection to the hazard flasher switch.

Circuit Protection

The AJB and the CJB (central junction box) provide circuit protection for all exterior lighting circuits. The exterior lighting circuits are protected by Field Effect Transistors (FETs). Operation of the exterior lighting circuits is protected by the FETs which can detect overloads and short circuits. The FETs respond to heat generated by increased current flow caused by a short circuit.

On a normal circuit this would cause the fuse to blow. The FETs respond to the heat increase and disconnect the power supply to the affected circuit. When the fault is rectified or the FET has cooled, the FET will reset and operate the circuit normally. If the fault persists the FET will cycle, disconnecting and reconnecting the power supply.

The CJB (central junction box) and the AJB store fault codes which can be retrieved using a Jaguar approved diagnostic system. The fault code will identify that there is a fault on a particular output which will assist with fault detection.

Alarm Indications

The exterior lighting system is used for alarm arm and disarm requests.

When the driver locks and arms the vehicle, a visual indication of a successful lock and arm request is displayed to the driver by a single flash of the hazard flashers. If the vehicle is superlocked then the hazard flashers will flash a second time (200ms off and 200ms on) to confirm the superlock request.

When the driver unlocks the vehicle, a visual indication of a successful lock and disarm request is displayed to the driver by the hazard flashers operating twice (200ms off and 200ms on).

If the alarm is triggered, the hazard flashers are operated for ten 30 second cycles of 200ms on and 200ms off with a 10 second delay between each cycle.

NOTE:

On NAS vehicles the delay between cycle when the alarm is triggered is 60 seconds. The alarm triggered hazard flasher operation varies depending on market.

Lights on Warning Chime

When the ignition is in the off mode or accessory mode conditions and the lighting switch is in the side lamp or headlamp position, a warning chime will sound if the driver's door is opened. This indicates to the driver that the exterior lights have been left switched on.

The chime is generated from the instrument cluster sounder on receipt of a lights on signal, a driver's door open signal and an ignition off or accessory mode signal via a medium speed CAN (controller area network) bus signal from the CJB (central junction box) .

Crash Signal Activation

When a crash signal is transmitted from the restraints control module, the AJB activates the hazard flashers. The hazard flashers continue to operate until the ignition is in the off or accessory modes and then returned to the ignition on mode. Once this condition has occurred, the restraints control module will cease transmission of the crash signal.

Headlamp Timer

The AJB controls a headlamp timer function which allows the headlamps to remain on for a period of time after leaving the vehicle. This is a driver convenience feature which illuminates the driveway after leaving the vehicle.

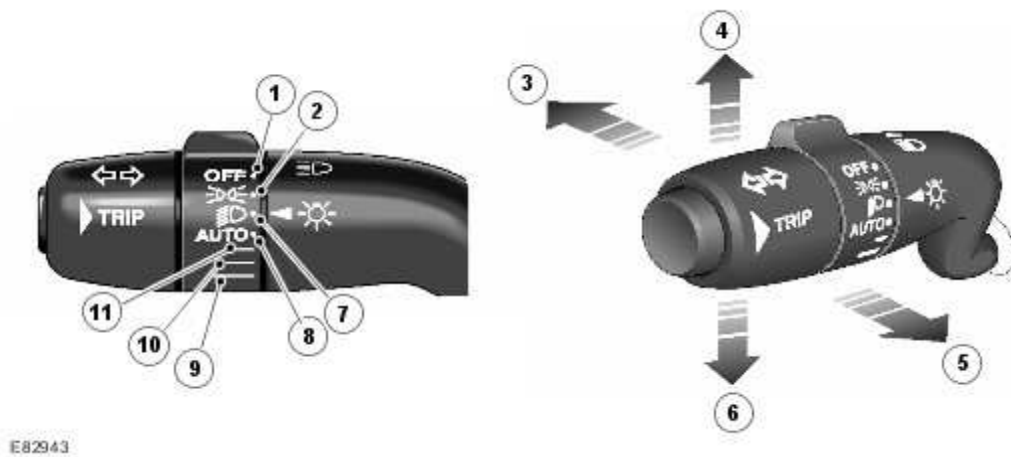
To select this feature, the lighting control switch on the steering column multifunction switch must be in one of the three headlamp timer positions when the ignition mode is changed from ignition on mode to off mode. The timer function will then be initiated and the low beam headlamps will be illuminated for the selected timer period.

NOTE:

If the lighting switch is in the AUTO position, the headlamp timer will not function when the ignition mode is changed to off.

The timer period can be adjusted using one of the 3 positions on the lighting control switch on the LH (left-hand) steering column multifunction switch. The 3 switch positions correspond to timer values of 30, 60 and 120 seconds.

LIGHTING CONTROL SWITCH



E82943

Item	Part Number	Description
1		Off position
2		Side lamp position
3		High beam position
4		RH (right-hand) turn signal indicator position
5		Headlamp flash/high beam off position
6		LH (left-hand) turn signal indicator position
7		Headlamp position
8		AUTO headlamp position
9		Headlamp timer 120 second delay position
10		Headlamp timer 60 second position
11		Headlamp timer 30 second position

The lighting control switch is located on the LH (left-hand) steering column multifunction switch. The switch is a rotary control with positions for the following lighting selections:

- Off
- Side lamps
- Headlamps
- AUTO headlamps

- Headlamp timer (3 time period selections).

The steering column multifunction switch also provides for the selection of low and high beam headlamps and also the headlamp flash function.

The steering column multifunction switch is connected to the instrument cluster by 3 wires. Two wires supply a signal voltage to the lighting switch and the headlamp timer positions. The third wire is a common ground. Each switch position is connected to the ground return via resistors which vary the return voltage to the instrument cluster. The instrument cluster senses the voltage returning and determines the switch position selected. The instrument cluster then generates an applicable message which is sent to the AJB and the CJB (central junction box) on the medium speed CAN bus for activation of the selected exterior lamps.

The steering column multifunction switch also provides the control for the turn signal indicators. The switch can be pushed down to select the LH (left-hand) turn signal indicators or pushed up to select the RH (right-hand) turn signal indicators. The switch has 2 positions. If the switch is pushed up or down gently and held, the turn signal indicators will operate until the switch is released, if the switch is pushed past a detent, the switch can be released and the selected position will automatically be cancelled when the manoeuvre is completed. If a turn signal indicator bulb fails, the green turn signal indicator warning indicator in the instrument cluster will flash at twice the normal rate and the audible ticking will also be at twice the normal rate.

The steering column multifunction switch also has a lane change function. If the switch is gently pushed to either turn signal indicator direction and then released, the turn signal indicators will flash 3 times and then automatically cancel.

AUXILIARY LIGHTING SWITCH



Item	Part Number	Description
1		Front fog lamp switch
2		Rear fog lamp switch

The auxiliary lighting switch is located in the instrument panel, adjacent to the steering column. The switch has 2 buttons which select the front and rear fog lamps. The buttons are non-latching

momentary switches.

The auxiliary lighting switch is connected to the instrument cluster by 3 wires. Two wires supply a signal voltage to the each fog lamp switch. The third wire is a common ground. Each switch position is connected to the ground return via a series of resistors which vary the supply voltage from the instrument cluster. The instrument cluster senses the voltage and determines the switch position selected. The instrument cluster then generates an applicable message which is sent to the AJB and the CJB (central junction box) on the medium speed CAN bus for activation of the selected fog lamps.

The front fog lamps can only be activated when the ignition is in the ignition power mode and side lamps or headlamps are active. The rear fog lamps can only be activated if the low beam headlamps are on or if the sidelamps and front fog lamps are on. A second press of each fog lamp button will switch of the selected fog lamps. If the lighting control switch or the ignition is changed to the off mode, then both fog lamps will be switched off and will need to be re-selected if required.

HEADLAMP ASSEMBLY

Two types of headlamp are available; Bi-Xenon and Adaptive Front lighting System (AFS). The headlamps are located with a locating dowel through the upper front bumper bracket and secured with 3 bolts to the front body structure. Bulb replacement requires the removal of the complete headlamp assembly.

The rear of the headlamp unit has removable access panels which allow access to the bulbs for replacement. A large cover, which is rotated anti-clockwise to remove allows access to the Xenon D1S bulb. Another removable cover provides access to the cornering lamp bulb and the side lamp bulb, which is retained with a spring clip. A smaller cover can be rotated anti-clockwise to provide access to the turn signal indicator bulb and the side marker lamp bulb.

The headlamps have two adjustment screws on the rear which allow for the manual setting of the vertical and horizontal alignment.

On NAS vehicles the headlamp is regarded as 'Visual Optically Left' aiming. The adjustment screws have to turned equal amounts to maintain the correlation in the vertical axis only. There is no horizontal adjustment. Refer to the Service Repair Procedures manual for headlamp alignment data and procedures.

Each headlamp has an integral 16 pin connector which provides inputs and outputs for the various functions of the headlamp assembly.

The low beam headlamps are switched on when the ignition is in the ignition mode and:

- the lighting control switch is in the headlamp position
- the lighting control switch is in the AUTO position and a 'lights on' signal is received by the CJB (central junction box) from a 'lights on' message generated by the AJB.

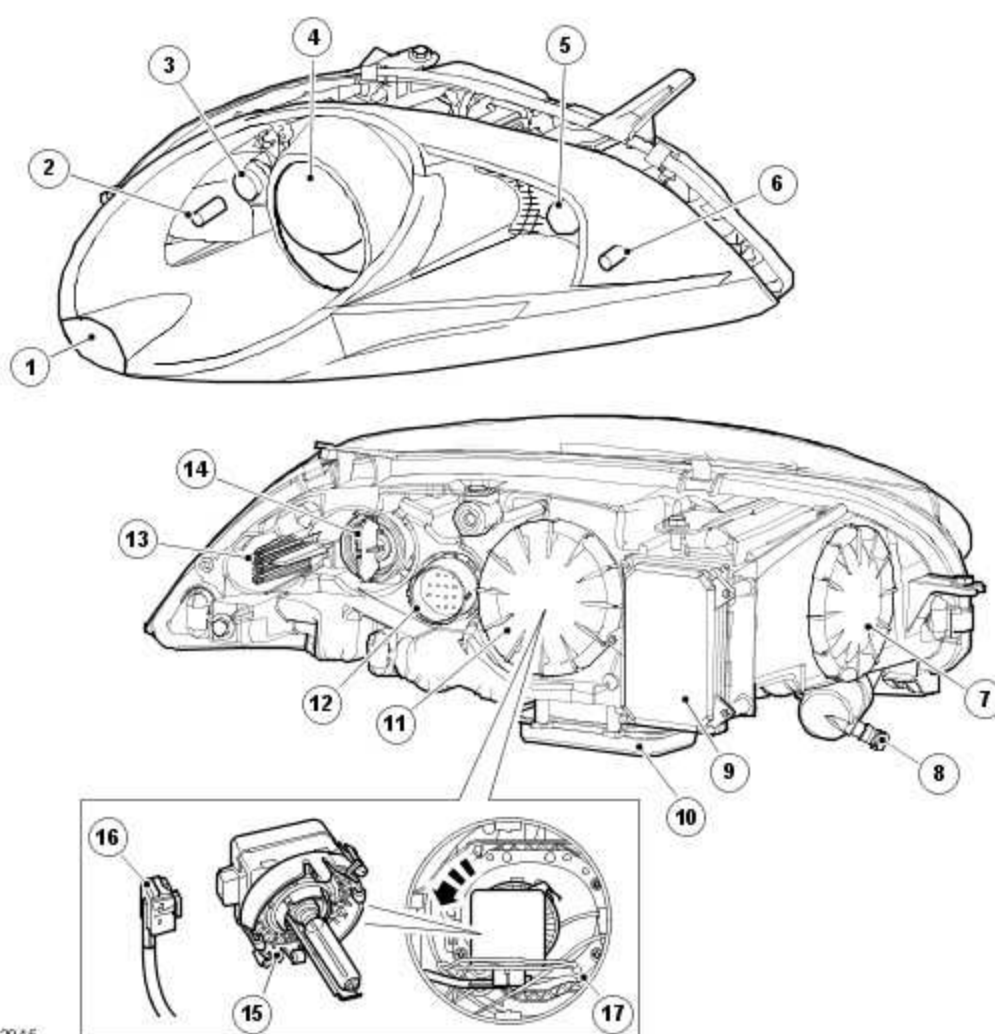
The low beam headlamps can also be operated by the headlamp timer function.

The high beam headlamps are switched on when the ignition is in the ignition mode and:

- The low beam headlamps are selected on or activated via the AUTO feature and the LH (left-hand) steering column multifunction switch is pushed forward, away from the driver

The high beam lamps will be switched off when:

- The LH (left-hand) steering column multifunction switch is moved rearwards, towards the driver.
- The low beam headlamps are switched off
- The ignition mode is changed to accessory or off mode.



E82945

Item	Part Number	Description
1		Headlamp power washer jet

2		Side lamp bulb
3		Cornering lamp (if fitted)
4		Xenon projector module
5		Turn signal indicator bulb
6		Side marker lamp bulb
7		Cover - Side lamp and cornering lamp
8		Powerwash hose connection
9		AFS power module (if fitted)
10		Xenon control module
11		Cover - Xenon bulb
12		Electrical connector
13		Side marker lamp bulb and holder
14		Turn signal indicator bulb and holder
15		Igniter electrical connector
16		Igniter unit and bulb
17		Mounting collar



WARNING: The Xenon system generates up to 28000 volts and contact with this voltage could lead to fatality. Make sure that the headlamps are switched off before working on the system.

The following safety precautions must be followed when working on the Xenon headlamp system:

- **DO NOT** attempt any procedures on the Xenon headlamps when the lights are switched on.
- Handling of the D1S Xenon bulb must be performed using suitable protective equipment, for example gloves and goggles. The glass part of the bulb must not be touched.
- Xenon bulbs must be disposed of as hazardous waste.
- Only operate the lamp in a mounted condition in the reflector.

The Xenon headlamp is known as Bi-Xenon because it operates as both a low and high beam unit. The Xenon lamp or High Intensity Discharge (HID) lamp as they are sometimes called, comprise an ellipsoidal lens with a solenoid controlled shutter to change the beam output from low to high beam.

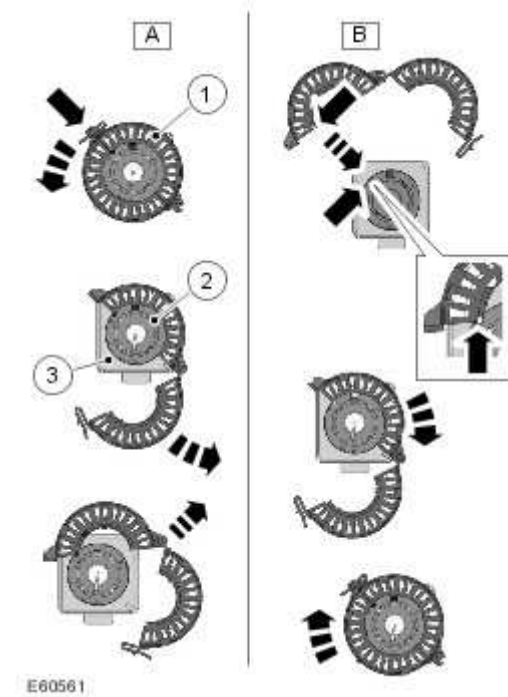
NOTE:

If the lighting control switch is in the OFF position, the Xenon lamps operate when the high beam 'flash' function is operated.

The Xenon headlamp system is controlled by the CJB (central junction box) using a control module for each headlamp and an igniter. The control modules and the igniters provide the regulated power supply required to illuminate the Xenon bulbs through their start-up phases of operation.

Xenon Headlamp Construction

Xenon Bulb Replacement



Item	Part Number	Description
A		Locking Ring Removal
B		Locking Ring Replacement
1		Mounting ring
2		Xenon bulb

3		Igniter
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The Xenon headlamp is a self contained unit located within the headlamp assembly. The unit comprises a reflector, an adaptor ring, the lens, a shutter controller and the xenon bulb, which together is an assembly known as the projector module.

The reflector is curved and provides the mounting for the Xenon bulb. The bulb locates in a keyway to ensure correct alignment in the reflector and is secured by a plastic mounting ring. The bulb is an integral part of the igniter and is electrically connected by a connector located in the igniter unit.

The shutter controller is a solenoid which operates the shutter mechanism via a lever. The shutter is used to change the beam projection from low beam to high beam and visa versa.

The Xenon bulbs illuminate when an arc of electrical current is established between 2 electrodes within the bulb. The Xenon gas sealed in the bulb reacts to the electrical excitation and the heat generated by the current flow to produce the characteristic blue/white light.

To operate at full efficiency, the Xenon bulb goes through 3 full stages of operation before full output for continuous operation is achieved. The 3 phases are; start-up phase, warm-up phase and continuous phase.

In the start-up phase, the bulb requires an initial high voltage starting pulse of up to 30000 volts to establish the arc. This is produced by the igniter. The warm-up phase begins once the arc is established. The Xenon control module regulates the supply to the bulb to 2.6A which gives a lamp output of 75W. During this phase, the Xenon gas begins to illuminate brightly and the environment within the bulb stabilizes, ensuring a continual current flow between the electrodes. When the warm-up phase is complete, the Xenon control module changes to continuous phase. The supply voltage to the bulb is reduced and the operating power required for continual operation is reduced to 35W. The process from start-up to continuous phase is completed in a very short time.

The Xenon control modules (one per headlamp) receive an operating voltage from the CJB (central junction box) when the headlamps are switched on. The modules regulate the power supply required through the phases of start-up.

The igniters (one per headlamp) generate the initial high voltage required to establish the arc. The igniters have integral coils which generate high voltage pulses required for start-up. Once the Xenon bulbs are operating, the igniters provide a closed circuit for the regulated power supply from the control modules.

Turn Signal Indicator Lamp

The turn signal indicator lamp is incorporated into the outer part of the headlamp assembly, outboard of the projector module. The turn signal indicator lamp uses a PY21W bayonet orange colored bulb in Rest Of World (ROW) markets. A S8W 27/7W wedge bulb is used in NAS markets.

The bulb is fitted into a holder which connects with contacts in the headlamp housing. The holder is fitted into an aperture in the headlamp housing and is rotated to lock in position. Access to the turn signal indicator bulb requires removal of the headlamp assembly.

The turn signal indicator lamps are operated by the LH (left-hand) steering column multifunction switch or by the hazard flasher switch. The steering column multifunction switch is only active when the ignition is in the ignition mode. The hazard flasher switch is active at all times. When active, the turn signal indicator lamps flash at a frequency cycle of 400 ms on and 400 ms off.

If a bulb fails, the remaining turn signal indicator lamps continue to flash at the normal speed. The applicable turn signal indicator in the instrument cluster will flash at double speed to indicate the failure to the driver.

Side Lamp

The side lamp is incorporated into the outer part of the headlamp assembly, above the cornering lamp. The side lamp shares the same housing and reflector as the cornering lamp.

The side lamp uses a W5W wedge fitting, orange colored bulb which is fitted in a holder and connected by wires to the main headlamp connector. The holder is a push fit into a receptacle in the headlamp housing. The bulb is accessible by removal of the cover on the side of the headlamp. Access to the bulb and the cover requires removal of the headlamp assembly.

The side lamps are operated by selecting side lamps or headlamps on the lighting control switch. The side lamps are operational at all times and are not dependant on the ignition mode. The side lamps will also be illuminated when the lighting control switch is in the AUTO position and a 'lights on' signal is received by the CJB (central junction box) from a 'lights on' message generated by the AJB.

Side Marker Lamp

The side marker lamp is located on the outer part of the headlamp, adjacent to the turn signal indicator bulb. The side marker lamp uses an orange colored W3W wedge fitting bulb, which is fitted in a holder which connects with contacts in the headlamp housing. The holder is fitted into an aperture in the headlamp housing and is rotated to lock in position. Access to the side marker bulb requires removal of the headlamp assembly.

The side marker lamp is active at all times when the side lamps are selected on using the lighting control switch. The side marker lamps will also be illuminated when the lighting control switch is in the 'AUTO' position and a 'lights on' signal is received by the CJB (central junction box) from a 'lights on' message generated by the AJB.

Cornering Lamp - Vehicles without AFS

The cornering lamp functionality differs between vehicles with or without the AFS system. The cornering lamps are designed to illuminate the direction of travel when cornering at low speeds. The design of the lens projects a spread of light from the vehicle at approximately 45 degrees to the vehicle axis.

The cornering lamp is incorporated into the inner part of the headlamp assembly, below the side lamp. The cornering lamp uses a 35W Halogen H8 bulb which is permanently fitted in an integral holder which is located in the headlamp housing. The holder is connected by a removable harness connector and the holder can be removed from the housing by rotating to unlock. The bulb is accessible by removal of a cover on the side of the headlamp. Access to the bulb and over requires removal of the headlamp assembly.

The cornering lamps are controlled by the LH (left-hand) steering column multifunction switch, when the lighting control switch is in the headlamps position and the ignition is in the ignition on mode. The cornering lamps are controlled by the CJB (central junction box) which uses turn signal indicator active and vehicle speed to operate the cornering lamps. The cornering lamps are deactivated if the vehicle speed exceeds 25 mph (40 km/h) with the turn signal indicators selected on or if the headlamp high beam is active.

Only one cornering lamp will illuminate at any one time. If the LH (left-hand) turn signal indicators are active, the LH (left-hand) cornering lamp will be illuminated and visa versa, providing the vehicle speed and the lighting control switch positions are correct.

Cornering Lamp - Vehicles with AFS

The cornering lamps fitted to vehicles with the AFS system functions differently to those fitted to vehicle with non AFS headlamps. The construction and light distribution of the cornering lamp with AFS is as described previously for cornering lamp without AFS.

The cornering lamps operate using high speed CAN (controller area network) signals from the steering angle sensor which are received by the CJB (central junction box) and the AFS control module. The AFS control module transmits a cornering lamp on request to the CJB (central junction box) which, if all operating conditions are correct, activates the cornering lamp.

When the operating parameters of the cornering lamp is achieved, the CJB (central junction box) fades the cornering lamp on using a PWM (pulse width modulation) voltage over a period of approximately 2 seconds. When the lamp is switched off, the CJB (central junction box) fades the bulb off by decreasing the PWM (pulse width modulation) voltage in a linear manner depending on vehicle speed and steering angle.

ADAPTIVE FRONT LIGHTING SYSTEM (AFS)

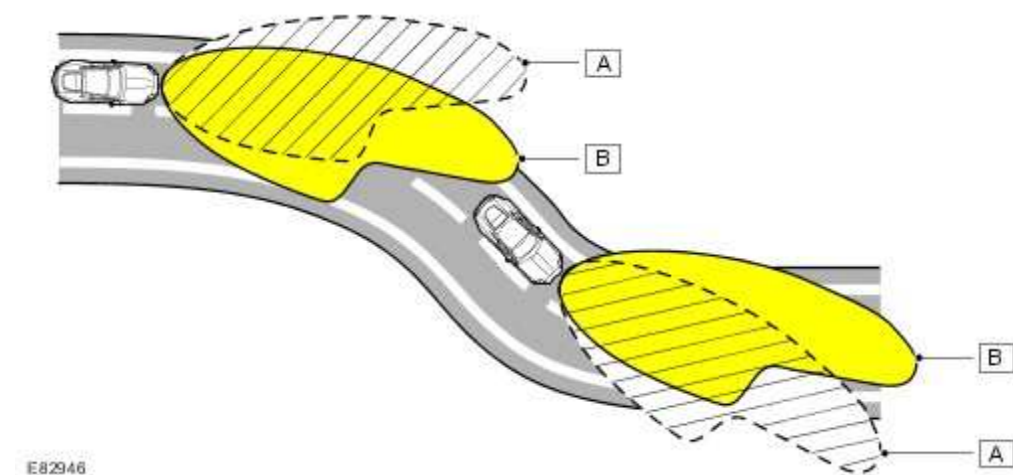
The AFS headlamp is similar in its construction to the Xenon, non-AFS headlamp. The projector module is constructed and functions as described for the Xenon headlamp but with the addition of the AFS system which allows the projector module to be moved vertically and horizontally. The AFS system is controlled by a AFS control module which is integral with the headlamp levelling module.

The AFS headlamp assembly contains an additional carrier frame which provides location for the AFS actuators. The remaining lamps are as described previously. The carrier frame is attached to the AFS vertical actuator. The projector module has a central pivot point which allows the module to move horizontally in response to operation of the AFS horizontal actuator.

The AFS actuators are bi-polar (2 phase) dc stepper motors which are driven by a power output from the AFS power module located on the rear of the headlamp assembly. Each stepper motor receives its position information from the AFS control module via the applicable AFS power module. When the actuators are powered to their requested positions, a holding current is applied to maintain the actuator position.

The actuators do not supply a positional feedback signal to the AFS control module. Each stepper motor requires referencing each time the AFS system becomes active. When the AFS system is active, each vertical actuator is driven to the low beam position and each horizontal actuator is driven to an inboard position until a mechanical stop in the actuator is reached. Once the stop is reached a step counter in the AFS control module is set to zero and the actuator is then powered to the operating position as determined by the AFS control module software.

The AFS control module receives front and rear vehicle height data from the height sensors to provide headlamp levelling adjustment via the vertical actuator motor. The AFS control module also receives vehicle speed signals from the ABS module to adjust the projector module vertically to increase the beam range as the vehicle speed increases.



Item	Part Number	Description
A		Conventional headlamp beam distribution
B		AFS swivel headlamp beam distribution

AFS Control Module

The AFS control module is located on the bulkhead, at the bottom of the RH (right-hand) 'A' pillar. The AFS control module is a dual functionality unit which also incorporates software to control the headlamp leveling. The AFS control module is connected to the high speed CAN (controller area network) bus and receives inputs from other vehicle systems on the status of the following parameters:

- Steering angle
- Vehicle speed
- Headlamp status
- Engine running
- Reverse gear selected
- AUTO lights on.

The AFS will only operate when the AFS control module receives an engine running signal on the high speed CAN (controller area network) bus from the ECM (engine control module) . When the engine running signal is received the AFS control module performs its initialisation routine.

The AFS will also function when the lighting control switch is in the AUTO position and the AFS control module receives a lights on signal from the light sensor and an engine running signal.

The AFS control module then monitors the inputs from the other vehicle systems to control the AFS functionality according to cornering angles and vehicle speed.

The AFS control module is connected to each AFS power module on a private Local Interconnect Network (LIN) bus. The power modules read operating values supplied from the AFS control module and control the output drivers for the stepper motor actuators inside the headlamp assembly.

AFS Operation

The AFS controls the swiveling angle of each projector module using speed and steering angle signals. The angles of each projector module differ to give the correct spread of light, for example, when turning left, the LH (left-hand) projector module will have a greater swiveling angle than the RH (right-hand) projector module.

Initialisation Procedure

When the AFS control module receives an ignition mode on signal, the control module performs the initialisation procedure which ensures that the headlamps are correctly aligned on both their vertical and horizontal axes.

The headlamp leveling motors are powered from their current position, which can be either the upper or lower limit or somewhere in between, to their lower position and then back to the 0 degrees position.

The AFS swivel initialisation starts less than 1 second after the headlamp leveling initialisation is activated to ensure that the headlamps are at or below the 0 degree position in the vertical axis, thus preventing glare to oncoming vehicles. The AFS swivel initialisation is completed in less than 2.5 seconds. The LH (left-hand) and RH (right-hand) AFS actuator motors are powered from the 0 degree position to their fully inboard position, then to their fully outboard position and then back to the 0 degree position.

Failure Mode

In the event of a failure of the AFS system, a warning indicator in the instrument cluster is illuminated to warn the driver. The AFS warning indicator illuminates when the ignition is in the ignition on mode

and will flash continuously until the fault is rectified. The AFS warning indicator will also be illuminated if a failure of the steering angle sensor or the vehicle speed signal is detected.

Illumination of the warning indicator does not necessarily mean that there is a fault with the AFS system. The fault may be caused by a failure of another system preventing the AFS system from operating correctly.

The AFS control module performs a diagnostic routine every time AFS is requested. If any fault is found, the AFS control module will suspend the operation of the AFS function.

If the AFS leveling system has failed with the projector module in a position other than the correct straight ahead position, the AFS control module will attempt to drive the projector module to a position a small amount lower than the standard position. If the swivel function has failed, the AFS control module will lower the projector module using the leveling actuator to a position much lower than standard to prevent excess glare to oncoming vehicles.

The AFS control module software can detect an internal failure of the control module control circuits. The control module will power the projector modules to the zero position and prevent further operation.

Faults can be investigated by interrogating the AFS control module using an approved Jaguar diagnostic system to check for fault codes.

AUTOMATIC HEADLAMP OPERATION

The automatic headlamp function is a driver assistance system. The driver can override the system operation by selection of side lamp or headlamp on if the ambient light conditions require front and rear lighting to be active. The automatic headlamp system uses a light sensor and the AJB, which is connected to the instrument cluster, via the medium speed CAN (controller area network) bus, to control 'AUTO' headlamp functionality.

The light sensor is located in the centre of the instrument panel upper surface. The sensor has three functions; houses the alarm system LED (light emitting diode) , auto lamp function for AUTO headlamps and sun load sensor for the A/C (air conditioning) system.

The sensor is hardwired to the instrument cluster which supplies a 5V current via a pull-up resistor to 2 photodiode light sensors within the sensor housing. The ambient light signals are returned to the instrument cluster by the light sensor varying the current drawn from the 5V output, hence varying the voltage at the 'pull-up' resistor. The instrument cluster then outputs a message relating to the ambient light level on the medium speed CAN (controller area network) bus. The AJB receives the message and determines if AUTO lamps are required to be activated.

Operation of the 'AUTO' headlamps requires the ignition to be in the ignition mode and the lighting control switch must be in the AUTO position. The AJB will only activate the AUTO headlamps on receipt of a valid ambient light signal on the medium speed CAN (controller area network) bus from the instrument cluster.

HEADLAMP LEVELING

Headlamp leveling provides for the automatic adjustment of the vertical aim of the headlamps. The leveling system is required to minimise glare to other road users when the vehicle attitude changes due to braking or acceleration.

Headlamp leveling is controlled by a headlamp leveling module which is located on the bulkhead, at the bottom of the RH (right-hand) 'A' pillar.

NOTE:

On vehicles with the AFS system, the headlamp leveling software is incorporated into the AFS control module and the module is known as the AFS control module.

The headlamp leveling system comprises the following components and information from other vehicle systems:

- Front and rear vehicle height sensors
- Two headlamp leveling, vertical adjustment motors
- Headlamp leveling module (or AFS control module if vehicle is fitted with AFS)
- Ignition in on mode
- Vehicle speed information from ABS (anti-lock brake system) module.

When the ignition is in the ignition power mode, power is supplied via the ignition relay in the battery junction box to the headlamp leveling module (or AFS control module if vehicle is fitted with AFS).

NOTE:

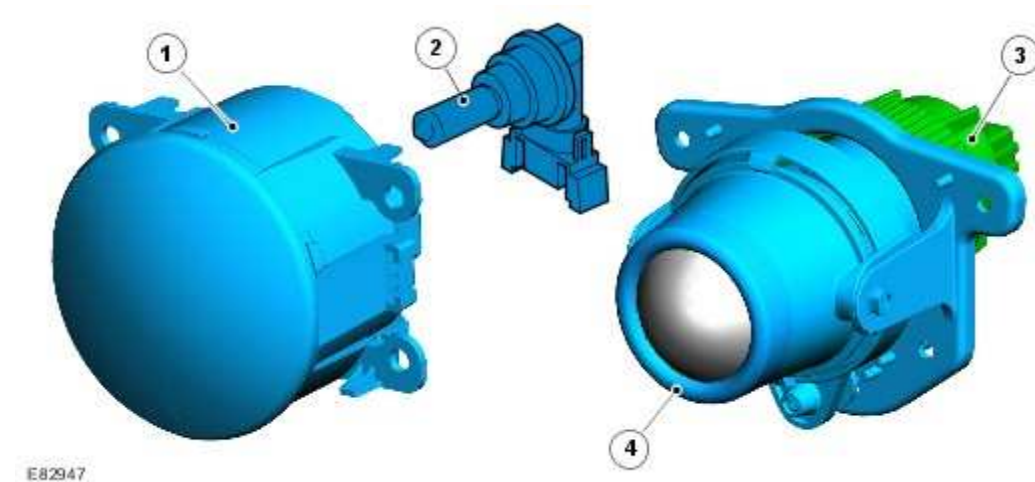
When the headlamp leveling module receives a power supply from the ignition relay, the module performs an initialization procedure to correctly align the vertical aim of the headlamps and to determine if the leveling motors are functioning correctly.

The headlamp leveling module receives information relating to vehicle attitude from the front and rear height sensors. The headlamp leveling module processes these signals and provides an output to the headlamp leveling motors to adjust the headlamp vertical aim according to vehicle speed and attitude.

DAYTIME RUNNING LAMPS

Refer to the DRL (daytime running lamps) section for details. For additional information, refer to Daytime Running Lamps (DRL) (417-04)

FRONT FOG LAMP



Item	Part Number	Description
1		Fog lamp - Naturally aspirated vehicles
2		Bulb H11
3		Bulb H3
4		Fog lamp - Supercharged vehicles

Two front fog lamps are located in apertures in the front bumper. The fog lamps are different in design between the naturally aspirated and supercharged vehicles.

Front Fog Lamp - Naturally Aspirated Vehicles

The front fog lamp is a conventional design with a clear lens and smooth surface reflector. An H11 55W halogen bulb is located at the rear of the fog lamp. The bulb has an integral holder and can be removed by rotating counter clockwise to remove from the lamp housing.

Fog lamp beam adjustment is provided by a rotary adjuster located on the underside of the lamp and is accessible from the rear of the bumper.

The front fog lamps are controlled by the auxiliary lighting switch and the CJB (central junction box) . Refer to the Auxiliary Lighting Switch section for switch operation.

Front Fog Lamp - Supercharged Vehicles

The front fog lamp is projector module, similar in design to the projector module used in the Xenon headlamp. A halogen H3 bulb is located in the rear of the lamp and secured with a spring clip. The bulb has a power lead which is secured to the rear of the lamp connector socket.

Fog lamp beam adjustment is provided by a screw at the top of the lamp. The screw is accessible

from the front of the lamp.

Front fog lamp control and operation is as described for 'Front Fog Lamp - Naturally Aspirated Vehicles.

Front Fog Lamp Functionality (NAS and Canadian Markets Only)

The front fog lamps operate as described previously but with the following differences which cover local laws governing lamp usage.

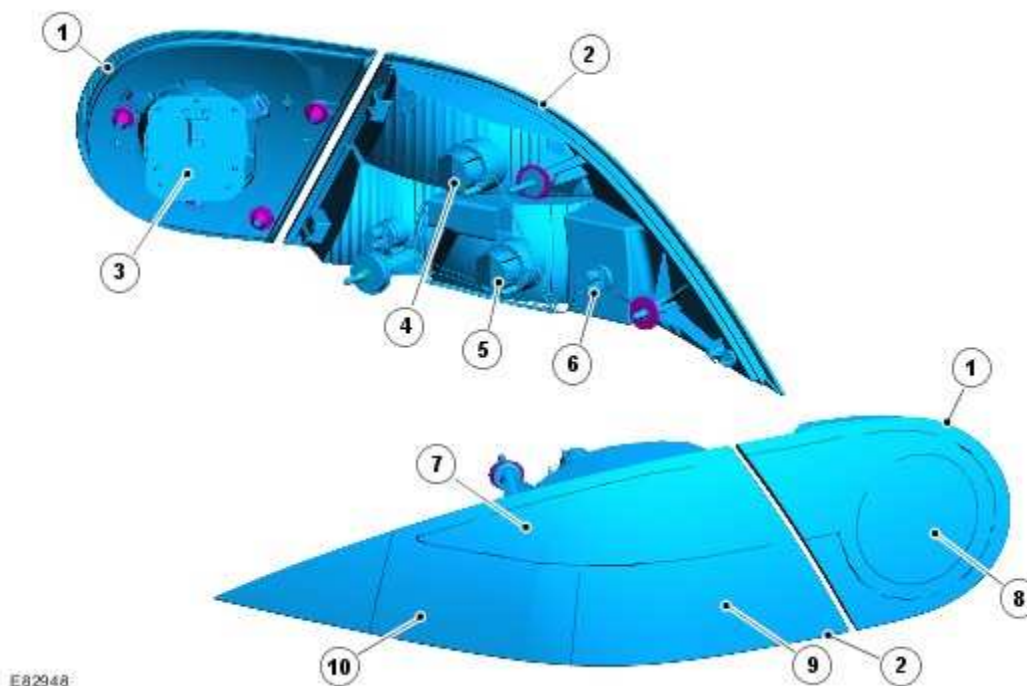
If the low beam headlamps and the front fog lamps are on at the same time, when the high beam headlamps are switched on, the front fog lamps will be automatically switched off. When the high beam headlamps are subsequently switched off, the front fog lamps will be switched on automatically.

NOTE:

The front fog lamps will also be switched off if the high beam 'flash' function is operated.

REAR LAMP ASSEMBLY

The rear lamp assembly is a 2 piece unit, with one part being located in the rear quarter panel and the second part being attached to the liftgate. The outer rear lamp assembly is located in a recess in the vehicle body and is secured with 2 nuts which screw onto studs in the lamp assembly. The inner rear lamp assembly is located in a recess in the liftgate and is secured with 3 nuts.



Item	Part Number	Description
1		Inner rear lamp assembly
2		Outer rear lamp assembly
3		Rear fog lamp or reverse lamp LED (light emitting diode) (market dependant)
4		Turn signal indicator bulb and holder
5		Stop lamp and Tail lamp bulb and holder
6		Side marker bulb and holder
7		Turn signal indicator
8		Rear fog lamp or reverse lamp (market dependant)
9		Stop lamp and tail lamp
10		Side marker lamp

Rear Stop and Side Lamp

The stop and side lamp are located in the lower section of the outer rear lamp assembly. A combined, twin filament 21W/5W bayonet fitting bulb is used. The stop lamp uses the 21W bulb filament and the side lamp uses the 5W bulb filament. The bulb is located in a holder which connects with contacts in the rear lamp housing. The holder can be released by rotating and pulling from the aperture.

The stop lamps are active when the ignition is in the ignition mode and the stop lamp switch is activated by pressing the brake pedal. The high mounted stop lamp will also be activated when the brake pedal is pressed. Operation of the stop lamp switch is sensed by the CJB (central junction box) which sends a message on the high speed CAN (controller area network) bus to the AJB which activates the stop lamps.

The stop lamps can also be activated by the adaptive speed control system. A signal from the adaptive speed control module is sent via the high speed CAN (controller area network) bus to the AJB which activates the stop lamps until an off message is received.

The side lamps are operated by selecting side lamps or headlamps on the lighting control switch. The side lamps are operational at all times and are not dependant on the ignition mode. The side lamps will also be illuminated when the lighting control switch is in the AUTO position and a 'lights on' signal is received by the CJB (central junction box) from the light sensor.

Turn Signal Indicator Lamp

The turn signal indicator lamp is located in the upper section of the outer rear lamp assembly and uses a PY21W bayonet fitting bulb. The bulb is located in a holder which connects with contacts in the rear lamp housing. The holder can be released by rotating and pulling from the aperture.

The turn signal indicator lamps are operated by the LH (left-hand) steering column multifunction switch or by the hazard flasher switch. The steering column multifunction switch is only active when the ignition is in the ignition mode. The hazard flasher switch is active at all times. When active, the turn signal indicator lamps flash at a frequency cycle of 400 ms on and 400 ms off.

If a bulb fails, the remaining turn signal indicator lamps continue to flash at the normal speed. The applicable turn signal indicator in the instrument cluster will flash at double speed to indicate the failure to the driver.

Reversing Lamp

The reversing lamp is located in the inner rear lamp assembly. The reversing lamp uses 3 LED (light emitting diode) . Only one reversing lamp is fitted and is located in the LH (left-hand) inner lamp assembly on RHD (right-hand drive) vehicles and in the RH (right-hand) inner lamp assembly on LHD (left-hand drive) vehicles.

The reversing lamp is activated on receipt of reverse selected message sent on the medium speed CAN signal from the TCM (transmission control module) to the AJB.

Rear Fog Lamp

The rear fog lamp is located in the inner rear lamp assembly. The fog lamp uses 3 LED (light emitting diode) 's. Only one fog lamp is fitted and is located in the RH (right-hand) inner lamp assembly on RHD (right-hand drive) vehicles and in the LH (left-hand) inner lamp assembly on LHD (left-hand drive) vehicles.

The rear fog lamp is controlled by the auxiliary lighting switch and the CJB (central junction box) . The rear fog lamp switch receives a power supply from the instrument cluster. When the rear fog lamp switch is pressed, a ground path is completed through a resistor. The current flow is monitored by the instrument cluster which determines that the switch has been pressed. The instrument cluster transmits a rear fog lamp on request message on the medium speed CAN (controller area network) bus to the AJB which activates the power supplies to the fog lamp provided the lighting switch is in the correct position and the ignition mode is correct.

When the ignition is in ignition on mode and the lighting control switch is in the side lamp or headlamp position and the front fog lamps are on, pressing the rear fog lamp switch on the auxiliary lighting switch will activate the rear fog lamp. Pressing the rear fog lamp switch for a second time will switch the rear fog lamp off. The rear fog lamp will also be deactivated if the lighting control switch is moved to the off position or the ignition mode is changed to off mode.

LICENCE PLATE LAMPS

Two licence plate lamps are located in the underside of the liftgate (hardtop) or luggage compartment lid (convertible) exterior trim finisher. Each lamp uses a W5W capless bulb which is located in a holder at the rear of the lamp.

The lamp can be removed from the finisher by using a wide flat blade screwdriver or similar tool, inserting it in the slot between the lamp lens and the finisher and gently levering the lamp from the surround. The bulb is pushed into a holder which in turn is a press fit in the lamp housing.

The licence plate lamps are illuminated at all times when the side lamps are active.

HIGH MOUNTED STOP LAMP

The high mounted stop lamp is located in the rear spoiler on the upper edge of the liftgate or luggage compartment lid. The lamp comprises 24 separate LED (light emitting diode) 's which illuminate through a red colored lens. The high mounted stop lamp functionality is the same as that described for the stop lamps.

TURN SIGNAL INDICATOR REPEATER LAMP

The turn signal indicator repeater lamps are located in each front fender and can be removed by sliding the lamp assembly rearwards and releasing the front edge from the fender. The lamps use a 5W capless bulb which is located in a holder in the rear of the lamp housing.

The repeater lamps have the same functionality as described for the turn signal indicators and the hazard flashers.

HAZARD FLASHERS

The hazard flashers are controlled by a non-latching switch located in the centre of the instrument panel. The hazard flashers operate at all times when selected and are not dependant on an ignition mode to be selected.

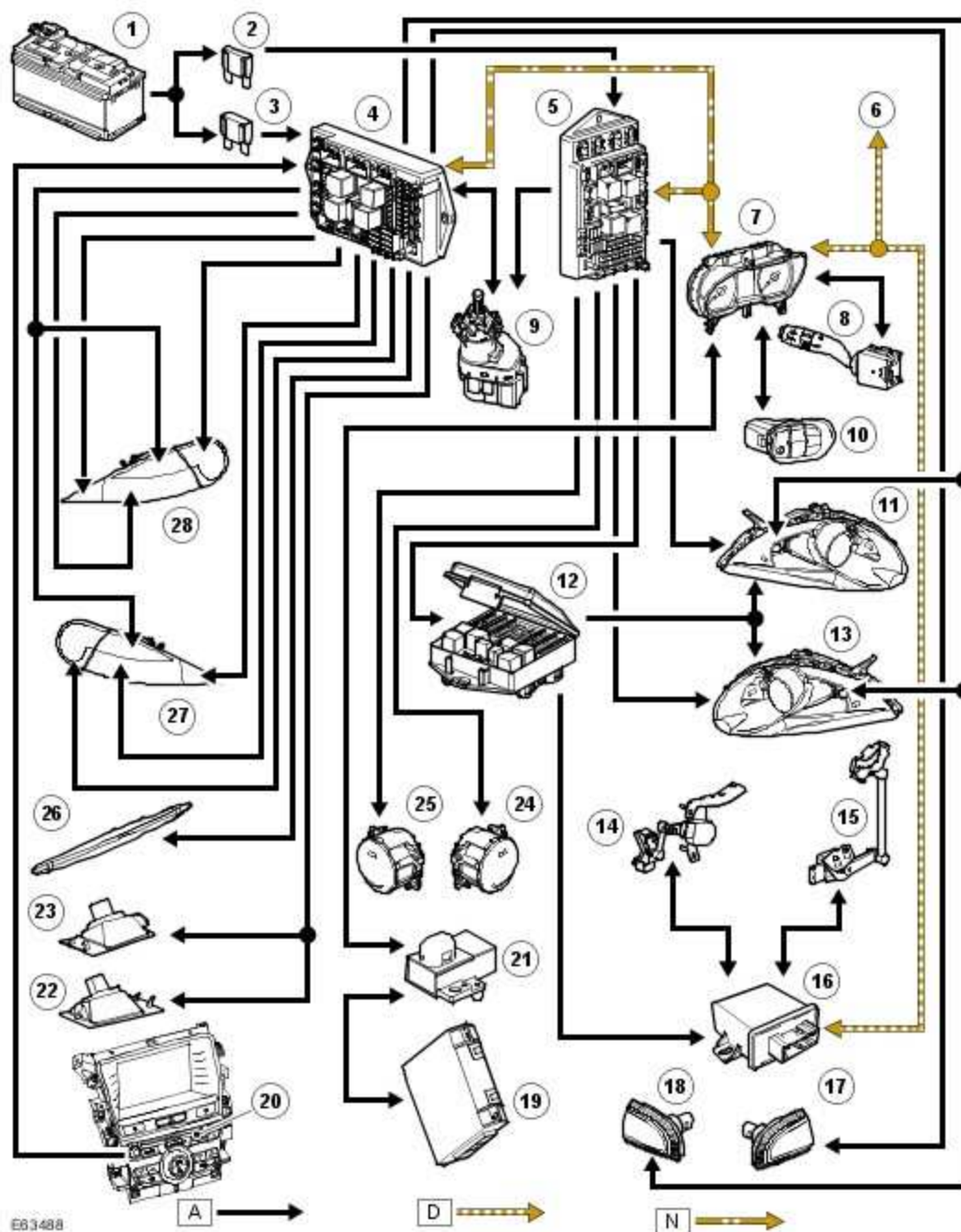
When the hazard flashers are selected on by the driver, a ground path is momentarily completed to the AJB which activates the front and rear and side repeater turn signal indicators. A second press of the switch is again sensed by the AJB and the hazard flasher will be deactivated. When the hazard flasher are active, they override any request for turn signal indicator operation.

The hazard flashers can also be activated by a crash signal from the RCM (restraints control module) . The signal is received on the medium speed CAN (controller area network) bus from the instrument cluster by the AJB which activates the hazard flashers. The hazard flasher can be cancelled by changing the ignition mode to accessory or off mode and then changing it to ignition on mode on or the crash mode signal is removed by the RCM (restraints control module) .

CONTROL DIAGRAM

NOTE:

A = Hardwired; D = High speed CAN bus



Item	Part Number	Description
1		Battery
2		Megafuse (175A)
3		Megafuse (175A)

4		Auxiliary Junction Box (AJB)
5		CJB (central junction box)
6		High speed CAN (controller area network) bus to other vehicle systems
7		Instrument cluster
8		LH (left-hand) steering column multifunction switch
9		Stop lamp switch
10		Auxiliary lighting switch
11		LH (left-hand) headlamp
12		Power distribution box
13		RH (right-hand) headlamp
14		Rear height sensor
15		Front height sensor
16		Headlamp leveling/AFS control module
17		LH (left-hand) side repeater
18		RH (right-hand) side repeater
19		A/C (air conditioning) control module
20		Hazard warning switch
21		Light sensor
22		LH (left-hand) license plate lamp
23		RH (right-hand) license plate lamp
24		LH (left-hand) front fog lamp
25		RH (right-hand) front fog lamp
26		High mounted stop lamp

27		RH (right-hand) tail lamp assembly
28		LH (left-hand) tail lamp assembly

Headlamps

Principles of Operation

For a detailed description of the exterior lighting system, refer to the Description and Operation section 417-00 - Exterior Lighting of the workshop manual.

Safety Information



WARNING: The Xenon Headlamp System generates up to 28,000 volts. Make sure that the headlamps are switched off before working on the system. Failure to follow this instruction may lead to fatality.



WARNING: The following safety precautions must be followed when working on the Xenon Headlamp System:

- **DO NOT** attempt any procedures on the Xenon Headlamps or circuits when the system is energized.
- Handling of the Xenon bulb must be performed using suitable protective equipment, e.g. gloves and goggles. The glass part of the bulb must not be touched.
- Only operate the lamp in a mounted condition in the reflector.
- All safety procedures and precautions must be followed to prevent personal injury.



CAUTION: Xenon bulbs must be disposed of as hazardous waste.

There are instructions on the correct procedures for Xenon Headlamp System repairs in the manual, refer to section 100-00 - General Information, Standard Workshop Practices of the workshop manual.

Inspection and Verification



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

- 1 . Verify the customer concern.

2 . Visually inspect for obvious signs of damage and system integrity.

Electrical
• Headlamp Leveling Module (HLM) • Bulb(s) • Photocell(s) • Ballast • Wiring harness/electrical connectors • Fuse(s)

3 . If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.

4 . If the cause is not visually evident, check for Diagnostic Trouble Codes (DTCs) and refer to the DTC Index.

Symptom Chart

Symptom	Possible Causes	Action
Low beam lamp(s) inoperative	• Bulb failure • Fuse(s) blown • Circuit fault • Lighting control switch fault • Left-hand steering column multifunction switch fault	Check the bulb and fuse condition (see visual inspection). Check the headlamp circuits. Check the lighting control switch function. Check the left-hand steering column multifunction switch operation. Refer to the electrical guides. Check for DTCs indicating a headlamp or related circuit fault.
High beam lamp(s) inoperative		
Low beam lamp(s) dim	• Incorrect bulb rating • Tourist lever set in the wrong position • Circuit fault • Lighting control switch fault • Left-hand steering column multifunction switch fault	Check the bulb condition and rating. Check the tourist lever is set correctly. Check the headlamp circuits. Check the lighting control switch function. Check the left-hand steering column multifunction switch function. Refer to the electrical guides.
High beam lamp(s) dim		
Low beam lamp(s) stuck on	• Circuit fault • Lighting control switch fault • Left-hand steering column multifunction switch fault • Headlamp timer	Check the headlamp circuits. Check the lighting control switch function. Check the left-hand steering column multifunction switch operation. Check the headlamp timer function. Refer to the electrical guides. Check for DTCs indicating a
High beam lamp(s) stuck on		

	function fault	headlamp circuit fault
Headlamp low/high beam switching function inoperative	• Circuit fault • Left-hand steering column multifunction switch fault • Xenon lamp shutter mechanism fault	Check the headlamp circuits. Check the left-hand steering column multifunction switch operation. Check the xenon lamp shutter mechanism operation. Refer to the electrical guides. Check for DTCs indicating a headlamp circuit fault
Warning lamp(s) inoperative	• Fuse(s) blown • Lighting control switch fault • Left-hand steering column multifunction switch inoperative • Circuit fault • Instrument cluster fault	Check the fuse(s) (see visual inspection). Check the lighting control switch function. Check the left-hand steering column multifunction switch function. Check the warning lamp circuits. Refer to the electrical guides. Check for DTCs indicating an instrument cluster or CAN system fault.
Headlamp Wet - Internal	• Condensation • Water Ingress	Check for outstanding Technical Service Bulletins (TSBs) relating to 'Headlamp Internal Condensation'. Carry out the instructions in the service bulletin to determine if the fault is related to condensation or water ingress.

DTC Index



CAUTION: When probing connectors to take measurements in the course of the pinpoint tests, use the adaptor kit, part number 3548-1358-00

NOTE:

If the Control Module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

NOTE:

Generic scan tools may not read the codes listed, or may read only five digit codes. Match the five digits from the scan tool to the first five digits of the seven digit code listed to identify the fault (the last two digits give extra information read by the manufacturer-approved diagnostic system).

NOTE:

When performing voltage or resistance tests, always use a digital multimeter (DMM) accurate to three decimal places and with a current calibration certificate. When testing resistance, always take the resistance of the DMM leads into account.

NOTE:

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

NOTE:

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

NOTE:

Prior to installation/replacement of the Headlamp assembly carry out all relevant internal visual and mechanical checks for correct cable location and termination including: checks for corroded, bent or backed out pins or terminals, incorrectly inserted connectors and harness damage due to chaffing or incorrect routing.

NOTE:

If the control module has been removed and reinstalled, carry out a DTC code clear, cycle the ignition state to off, then on. This will erase any DTCs that have been logged during the module installation procedure.

DTC	Description	Possible Cause	Action
B1A59-11	Front or Rear Height Sensors - Circuit short to ground	Front or Rear Height Sensors 5 volt supply short to ground	Refer to the electrical circuit diagrams, and check Front and Rear Height Sensors 5 volt supply circuit for short to ground
B1A59-12	Front or Rear Height Sensors - Circuit short to power	Front or Rear Height Sensors 5 volt supply short to power	Refer to the electrical circuit diagrams, and check Front and Rear Height Sensor 5 volt supply circuit for short to

			power
C1A04-11	Front Right Height Sensor - Circuit short to ground	Front Right Height Sensor signal circuit short to ground	Refer to the electrical circuit diagrams, and check Front Right Height Sensor signal circuit for short to ground
C1A04-15	Front Right Height Sensor - Circuit short to power or open circuit	Front Right Height Sensor signal circuit short to power or open circuit	Refer to the electrical circuit diagrams, and check Front Right Height Sensor signal circuit for short to power or open circuit
C1A04-64	Front Right Height Sensor - Signal plausibility failure	Sensor (PWM) Signal out of range	NOTE: This DTC may be logged if the vehicles wheels have been raised from the floor Check the location, security and mechanical operation of the Height Sensor. Refer to the electrical circuit diagrams, and check Front Right Height Sensor signal circuit for fault
C1A06-11	Rear Right Height Sensor - Circuit short to ground	Rear right Height Sensor signal circuit short to ground	Refer to the electrical circuit diagrams, and check Rear Right Height Sensor signal circuit for short to ground
C1A06-15	Rear Right Height Sensor - Circuit short to power or open circuit	Rear right Height Sensor signal circuit short to power or open circuit	Refer to the electrical circuit diagrams, and check Rear Right Height Sensor signal circuit for short to power or open circuit
C1A06-64	Rear Right Height Sensor - Signal plausibility failure	Sensor (PWM) Signal out of range	NOTE: This DTC may be logged if the vehicles wheels have been raised from the floor Check the location, security and mechanical operation of the Height Sensor. Refer to the electrical circuit diagrams, and check Rear Right Height Sensor signal circuit for fault

B1A57-01	Left Headlamp Leveling Motor - General Electrical Failure	- Internal Headlamp Motor Fault - Internal Headlamp Circuit Fault	Turn the Headlamp Switch on, cycle the ignition state to start the engine, look for any errors in the Headlamp Beam movement (compare with other headlamp) and visually inspect the lamp for internal damage or dislocation (ball joints out). If no faults are evident refer to the electrical circuit diagrams and check for circuit fault between the Headlamp Power Module and the swiveling feedback sensor. If no mechanical or circuit faults are evident, suspect headlamp internal fault, replace as required. Refer to the new module/component installation note at the top of the DTC Index
B1A58-01	Right Headlamp Leveling Motor - General Electrical Failure	- Internal Headlamp Motor Fault - Internal Headlamp Circuit Fault	Turn the Headlamp Switch on, cycle the ignition state to start the engine, look for any errors in the Headlamp Beam movement (compare with other headlamp) and visually inspect the lamp for internal damage or dislocation (ball joints out). If no faults are evident refer to the electrical circuit diagrams and check for circuit fault between the Headlamp Power Module and the swiveling feedback sensor. If no mechanical or circuit faults are evident, suspect headlamp internal fault, replace as required. Refer to the new module/component installation note at the top of the DTC Index
U0121-00	Lost communication with Anti-lock Brake System (ABS) Control Module - No sub type information	- Lost communication with the Anti-lock Brake System Module - CAN network fault	Check the Anti-lock Brake System Module for stored DTCs. Using the manufacturer approved diagnostic system, complete the CAN Network Integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Headlamp Leveling Module and the Anti-lock

			Brake System Module
U0121-86	Lost communication with Anti-lock Brake System (ABS) Control Module - Signal invalid	- Invalid signal from the Anti-lock Brake System Module - CAN network fault	Check the Anti-lock Brake System Module for stored DTCs. Using the manufacturer approved diagnostic system, complete the CAN Network Integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Headlamp Leveling Module and the Anti-lock Brake System Module
U0100-00	Lost communication with ECM - No sub type information	- Lost communication with the Engine Control Module - CAN network fault	Check the Engine Control Module for stored DTCs. Using the manufacturer approved diagnostic system, complete the CAN Network Integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Headlamp Leveling Module and the Engine Control Module
U0101-00	Lost communication with TCM - No sub type information	- Lost communication with the Transmission Control Module - CAN network fault	Check the Transmission Control Module for stored DTCs. Using the manufacturer approved diagnostic system, complete the CAN Network Integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Headlamp Leveling Module and the Transmission Control Module
U0443-00	Invalid data from Body Control Module B - No sub type information	- Invalid signal from the Auxiliary Junction Box - Auxiliary Junction Box fault	Check the Auxiliary Junction Box for stored DTCs. Using the manufacturer approved diagnostic system, complete the CAN Network Integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Headlamp Leveling Module and the Auxiliary Junction Box
U0001-49	High speed CAN communication Bus - Internal electronic failure	Adaptive Front Lighting System (AFS) Control Module internal electronic failure	Using the manufacturer approved diagnostic system, complete the CAN Network Integrity test. Refer to the electrical circuit diagrams and check the CAN network to the Headlamp

			Leveling Module. If no CAN Bus circuit faults are evident suspect Headlamp Leveling Module internal fault. Refer to the new module/component installation note at the top of the DTC Index
U0300-62	Internal Control Module software incompatibility - Signal Compare Failure.	Configuration data received over the CAN BUS is different from the stored configuration data	Check the correct Headlamp Leveling Module is installed to vehicle specification. Refit original or replace the module as required. Refer to the new module/component installation note at the top of the DTC Index
U0001-88	High Speed CAN Communication Bus - Bus off	- CAN Bus Off - CAN Bus Circuit fault	Check other modules for stored DTCs. Carry out the CAN Network Integrity test using the manufacturer approved diagnostic system
U3002-81	Vehicle Identification Number (VIN) - Invalid Serial Data received	- The stored Vehicle Identification Number is not the same as the Central Broadcast Vehicle Identification Number - The Headlamp Leveling Module has previously been installed to another vehicle	Check the correct Headlamp Leveling Module is installed to vehicle specification. Refit original or replace the module as required. Refer to the new module/component installation note at the top of the DTC Index
U3000-54	Control Module - Missing Calibration	Height Sensors not calibrated to vehicle	NOTE: Sensor calibration routine must be carried out with the vehicle unladen Calibrate the Headlamp Leveling sensors using the manufacturer approved diagnostic system, carry the out routine 'Headlamp and Axle Sensor Calibration' from the 'Module programming and configuration - Setup and Configuration - Lighting'
U3000-	Control Module -	Internal electronic	Install a new Headlamp Leveling

49	Internal electronic failure	failure	Module, refer to the new module installation note at the top of the DTC Index
U3000-55	Control Module - Not Configured	Incorrect Car Configuration File (CCF) data received	NOTE: The Car Configuration File (CCF) parameters required are (Vehicle type)(Headlamp type)(Gearbox type) and (Dayrunning light) Re-configure the Car Configuration File (CCF) File (CCF) as required using the manufacturer approved diagnostic system. Clear DTC and re-test. If the DTC remains suspect the Headlamp Leveling Module, refer to the new module installation note at the top of the DTC Index
U3003-17	Battery voltage	The power supply to the Module has been above 16 Volts for more than 1000 milliseconds	Suspect Charging fault. Check the battery condition and state of charge. Check the vehicle charging system. Refer to the relevant workshop manual section
U3003-16	Battery voltage	The power supply to the Module has been below 9 Volts for more than 1000 milliseconds	Suspect Battery or Charging fault. Check the battery condition and state of charge. Check the vehicle charging system. Refer to the relevant workshop manual section. Clear the DTC, cycle ignition state to off then on, if DTC returns refer to the electrical circuit diagrams and check power and ground circuit to the Headlamp Leveling Module

DTC Index



CAUTION: When probing connectors to take measurements in the course of the pinpoint tests, use the adaptor kit, part number 3548-1358-00

NOTE:

If the Control Module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

NOTE:

Generic scan tools may not read the codes listed, or may read only five digit codes. Match the five digits from the scan tool to the first five digits of the seven digit code listed to identify the fault (the last two digits give extra information read by the manufacturer-approved diagnostic system).

NOTE:

When performing voltage or resistance tests, always use a digital multimeter (DMM) accurate to three decimal places and with a current calibration certificate. When testing resistance, always take the resistance of the DMM leads into account.

NOTE:

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

NOTE:

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

NOTE:

Prior to installation/replacement of the Headlamp assembly carry out all relevant internal visual and mechanical checks for correct cable location and termination including: checks for corroded, bent or backed out pins or terminals, incorrectly inserted connectors and harness damage due to chaffing or incorrect routing.

NOTE:

If the control module has been removed and reinstalled, carry out a DTC code clear, cycle the

ignition state to off, then on. This will erase any DTCs that have been logged during the module installation procedure

NOTE:

The **Headlamp Power Module** is referenced as the **AFS ECU + Motors** in the circuit diagrams.

DTC	Description	Possible Cause	Action
B1A59-11	Front or Rear Height Sensors - Circuit short to ground	Front or Rear Height Sensors 5 volt supply short to ground	Refer to the electrical circuit diagrams, and check Front and Rear Height Sensors 5 volt supply circuit for short to ground
B1A59-12	Front or Rear Height Sensors - Circuit short to power	Front or Rear Height Sensors 5 volt supply short to power	Refer to the electrical circuit diagrams, and check Front and Rear Height Sensor 5 volt supply circuit for short to power
C1A04-11	Front Right Height Sensor - Circuit short to ground	Front Right Height Sensor signal circuit short to ground	Refer to the electrical circuit diagrams, and check Front Right Height Sensor signal circuit for short to ground
C1A04-15	Front Right Height Sensor - Circuit short to power or open circuit	Front Right Height Sensor signal circuit short to power or open circuit	Refer to the electrical circuit diagrams, and check Front Right Height Sensor signal circuit for short to power or open circuit
C1A04-64	Front Right Height Sensor - Signal plausibility failure	Sensor (PWM) Signal out of range	NOTE: This DTC may be logged if the vehicles wheels have been raised from the floor Check the location, security and mechanical operation of the Height Sensor. Refer to the electrical circuit diagrams, and check Front Right Height Sensor signal circuit for fault

C1A06-11	Rear Right Height Sensor - Circuit short to ground	Rear Right Height Sensor signal circuit short to ground	Refer to the electrical circuit diagrams, and check Rear Right Height Sensor signal circuit for short to ground
C1A06-15	Rear Right Height Sensor - Circuit short to power or open circuit	Rear Right Height Sensor signal circuit short to power or open circuit	Refer to the electrical circuit diagrams, and check Rear Right Height Sensor signal circuit for short to power or open circuit
C1A06-64	Rear Right Height Sensor - Signal plausibility failure	Sensor (PWM) Signal out of range	NOTE: This DTC may be logged if the vehicles wheels have been raised from the floor Check the location, security and mechanical operation of the Height Sensor. Refer to the electrical circuit diagrams, and check Rear Right Height Sensor signal circuit for fault
B1D66-00	Left Headlamp Power Module - No sub type information	- Headlamp Power Module internal fault - Headlamp Power Module circuit fault	NOTE: The power module is a service item This DTC is logged if the Headlamp Power Module supply voltage is above 16 volts / below 9.5 volts or the module suffers an internal failure. Record then clear the stored DTC, cycle the ignition state and check headlamp operation, if the DTC returns refer to the electrical circuit diagrams and check the power, ground and signal circuit of the Power Module for circuit fault. If no circuit faults are evident suspect the Headlamp Power Module has an internal

			fault, replace as required. Refer to the new module/component installation note at the top of the DTC Index
B1D67-00	Right Headlamp Power Module - No sub type information	- Headlamp Power Module internal fault - Headlamp Power Module circuit fault	NOTE: The power module is a service item This DTC is logged if the Headlamp Power Module supply voltage is above 16 volts / below 9.5 volts or the module suffers an internal failure. Record then clear the stored DTC, cycle the ignition state and check headlamp operation, if the DTC returns refer to the electrical circuit diagrams and check the power, ground and signal circuit of the Power Module for circuit fault. If no circuit faults are evident suspect the Headlamp Power Module has an internal fault, replace as required. Refer to the new module/component installation note at the top of the DTC Index
B1D66-46	Left Headlamp Power Module - Calibration/parameter memory failure	The parameter set of the power module does not match the Adaptive Front Lighting System (AFS) Control Module parameter set	NOTE: The power module is a service item Clear the DTC. Turn the Headlamp Switch on, cycle the ignition state to start the engine, check for stored DTCs, if DTC returns suspect the Headlamp Power Module has an internal fault, replace as required. Refer to the new module/component

			installation note at the top of the DTC Index
B1D67-46	Right Headlamp Power Module - Calibration/parameter memory failure	The parameter set of the power module does not match the Adaptive Front Lighting System (AFS) Control Module parameter set	NOTE: The power module is a service item Clear the DTC. Turn the Headlamp Switch on, cycle the ignition state to start the engine, check for stored DTCs, if DTC returns suspect the Headlamp Power Module has an internal fault, replace as required. Refer to the new module/component installation note at the top of the DTC Index
B1D68-01	Left Headlamp Swiveling Feedback Sensor circuit - General Electrical Failure	- Internal Headlamp Sensor Fault - Internal Headlamp Circuit Fault	Turn the Headlamp Switch on, cycle the ignition state to start the engine, look for any errors in the Headlamp Beam movement (compare with other headlamp) and visually inspect the lamp for internal damage or dislocation (ball joints out). If no faults are evident refer to the electrical circuit diagrams and check for circuit fault between the Headlamp Power Module and the Headlamp Swiveling Feedback Sensor. If no mechanical or circuit faults are evident suspect headlamp internal fault, replace as required. Refer to the new module/component installation note at the top of the DTC Index
B1D69-01	Right Headlamp Swiveling Feedback Sensor circuit - General	- Internal Headlamp Sensor Fault - Internal Headlamp Circuit Fault	Turn the Headlamp Switch on, cycle the ignition state to start the engine, look for any errors in the Headlamp Beam movement

	Electrical Failure		(compare with other headlamp) and visually inspect the lamp for internal damage or dislocation (ball joints out). If no faults are evident refer to the electrical circuit diagrams and check for circuit fault between the Headlamp Power Module and the Headlamp Swiveling Feedback Sensor. If no mechanical or circuit faults are evident suspect headlamp internal fault, replace as required. Refer to the new module/component installation note at the top of the DTC Index
B1D64-01	Left Headlamp Swiveling Motor circuit - General Electrical Failure	• Internal Headlamp Motor Fault • Internal Headlamp Circuit Fault	Turn the Headlamp Switch on, cycle the ignition state to start the engine, look for any errors in the Headlamp Beam movement (compare with other headlamp) and visually inspect the lamp for internal damage or dislocation (ball joints out). If no faults are evident refer to the electrical circuit diagrams and check for circuit fault between the Headlamp Power Module and the Headlamp Swiveling Motor. If no mechanical or circuit faults are evident suspect headlamp internal fault, replace as required. Refer to the new module/component installation note at the top of the DTC Index
B1D65-01	Right Headlamp Swiveling Motor circuit - General Electrical Failure	• Internal Headlamp Motor Fault • Internal Headlamp Circuit Fault	Turn the Headlamp Switch on, cycle the ignition state to start the engine, and check headlamp operation, look for any errors in the Headlamp Beam movement (compare with other headlamp) and visually inspect the lamp for internal damage or dislocation

			(ball joints out). If no faults are evident refer to the electrical circuit diagrams and check for circuit fault between the Headlamp Power Module and the Headlamp Swiveling Motor. If no mechanical or circuit faults are evident suspect headlamp internal fault, replace as required. Refer to the new module/component installation note at the top of the DTC Index
B10A3-71	Left Headlamp Swivel Actuator - Actuator stuck	• Internal Headlamp Actuator Fault • Internal Headlamp Circuit Fault	Turn the Headlamp Switch on, cycle the ignition state to start the engine, look for any errors in the Headlamp Beam movement (compare with other headlamp) and visually inspect the lamp for internal damage or dislocation (ball joints out). If no faults are evident refer to the electrical circuit diagrams and check for circuit fault between the Headlamp Power Module and the Swiveling Feedback Actuator. If no mechanical or circuit faults are evident suspect headlamp internal fault, replace as required. Refer to the new module/component installation note at the top of the DTC Index
B10A4-71	Right Headlamp Swivel Actuator - Actuator stuck	• Internal Headlamp Actuator Fault • Internal Headlamp Circuit Fault	Turn the Headlamp Switch on, cycle the ignition state to start the engine, look for any errors in the Headlamp Beam movement (compare with other headlamp) and visually inspect the lamp for internal damage or dislocation (ball joints out). If no faults are evident refer to the electrical circuit diagrams and check for circuit fault between the Headlamp Power Module and

			the Swiveling Feedback Actuator. If no mechanical or circuit faults are evident suspect headlamp internal fault, replace as required. Refer to the new module/component installation note at the top of the DTC Index
B1A57-01	Left Headlamp Leveling motor - General Electrical Failure	• Internal Headlamp Motor Fault • Internal Headlamp Circuit Fault	Turn the Headlamp Switch on, cycle the ignition state to start the engine, look for any errors in the Headlamp Beam movement (compare with other headlamp) and visually inspect the lamp for internal damage or dislocation (ball joints out). If no faults are evident refer to the electrical circuit diagrams and check for circuit fault between the Headlamp Power Module and the Leveling motor. If no mechanical or circuit faults are evident suspect headlamp internal fault, replace as required. Refer to the new module/component installation note at the top of the DTC Index
B1A58-01	Right Headlamp Leveling motor - General Electrical Failure	• Internal Headlamp Motor Fault • Internal Headlamp Circuit Fault	Turn the Headlamp Switch on, cycle the ignition state to start the engine, look for any errors in the Headlamp Beam movement (compare with other headlamp) and visually inspect the lamp for internal damage or dislocation (ball joints out). If no faults are evident refer to the electrical circuit diagrams and check for circuit fault between the Headlamp Power Module and the Leveling motor. If no mechanical or circuit faults are evident suspect headlamp internal fault, replace as required. Refer to the new

			module/component installation note at the top of the DTC Index
B1C98-11	Left Corner Lamp circuit defect - Circuit short to ground	Left Corner Lamp circuit short to ground	NOTE: On Adaptive Front Lighting System (AFS) equipped vehicles the power feed to the Corner Lamp is supplied via the Headlamp Power Module Refer to the electrical circuit diagrams, and check Left Corner Lamp circuit for short to ground
B1C98-13	Left Corner Lamp circuit defect - Circuit open	Left Corner Lamp circuit open	NOTE: On Adaptive Front Lighting System (AFS) equipped vehicles the power feed to the Corner Lamp is supplied via the Headlamp Power Module Refer to the electrical circuit diagrams, and check Left corner lamp circuit for open circuit
B1C99-11	Right Corner Lamp circuit defect - Circuit short to ground	Right Corner Lamp circuit short to ground	NOTE: On Adaptive Front Lighting System (AFS) equipped vehicles the power feed to the Corner Lamp is supplied via the Headlamp Power Module Refer to the electrical circuit diagrams, and check Right corner lamp circuit for short to ground

B1C99-13	Right Corner Lamp circuit defect - Circuit open	Right Corner Lamp circuit open	NOTE: On Adaptive Front Lighting System (AFS) equipped vehicles the power feed to the Corner Lamp is supplied via the Headlamp Power Module Refer to the electrical circuit diagrams, and check Right corner lamp circuit for open circuit
U1A39-00	Lost communication with Right Headlamp Power Module - No sub type information	- Communication Circuit fault - Headlamp Power Module internal fault - Headlamp Power Module Power or Ground supply fault	NOTE: This circuit uses shielded cable NOTE: The power module is a service item Refer to the electrical circuit diagrams, and check the power/ground supply and Communication circuit to the Headlamp Power Module. Using the manufacturer approved diagnostic system, clear stored DTCs in the Adaptive Front Lighting System (AFS) Control Module. Cycle the ignition state to off, then return to on and check for stored DTCs. If DTCs U1A39-00 and U1A38-00 return suspect Adaptive Front Lighting System (AFS) Control Module internal fault, If only DTC U1A39-00 returns suspect Headlamp Power Module internal fault. Replace as required. Refer to the

			new module/component installation note at the top of the DTC Index
U1A38-00	Lost communication with Left Headlamp Power Module - No sub type information	• Communication Circuit fault • Headlamp Power Module internal fault • Headlamp Power Module Power or Ground supply fault	NOTE: This circuit uses shielded cable NOTE: The power module is a service item Refer to the electrical circuit diagrams, and check the power/ground supply and Communication circuit to the Headlamp Power Module. Using the manufacturer approved diagnostic system, clear stored DTCs in the Adaptive Front Lighting System (AFS) Control Module. Cycle the ignition state to off, then return to on and check for stored DTCs. If DTCs U1A39-00 and U1A38-00 return suspect Adaptive Front Lighting System (AFS) Control Module internal fault, If only DTC U1A38-00 returns suspect Headlamp Power Module internal fault. Replace as required. Refer to the new module/component installation note at the top of the DTC Index
U0126-00	Lost communication with Steering Angle Sensor Module - No sub type information	• Lost communication with the Steering Angle Sensor Module • CAN network fault	Check the Steering Angle Sensor Module for stored DTCs. Using the manufacturer approved diagnostic system, complete the CAN Network Integrity test. Refer to the electrical circuit

			diagrams and check the CAN network between the Adaptive Front Lighting System (AFS) Control Module and the Steering Angle Sensor Module
U0126-86	Lost communication with Steering Angle Sensor Module - Invalid signal	- Invalid signal from the Steering Angle Sensor Module - CAN network fault	Check the Steering Angle Sensor Module for stored DTCs. Using the manufacturer approved diagnostic system, complete the CAN Network Integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Adaptive Front Lighting System (AFS) Control Module and the Steering Angle Sensor Module
U0121-00	Lost communication with Anti-lock Brake System (ABS) Control Module - No sub type information	- Lost communication with the Anti-lock Brake System Module - CAN network fault	Check the Anti-lock Brake System Module for stored DTCs. Using the manufacturer approved diagnostic system, complete the CAN Network Integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Adaptive Front Lighting System (AFS) Control Module and the Anti-lock Brake System Module
U0121-86	Lost communication with Anti-lock Brake System (ABS) Control Module - Signal invalid	- Invalid signal from the Anti-lock Brake System Module - CAN network fault	Check the Anti-lock Brake System Module for stored DTCs. Using the manufacturer approved diagnostic system, complete the CAN Network Integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Adaptive Front Lighting System (AFS) Control Module and the Anti-lock Brake System Module
U0100-	Lost communication with	Lost communication	Check the Engine Control

00	ECM - No sub type information	with the Engine Control Module CAN network fault	Module for stored DTCs. Using the manufacturer approved diagnostic system, complete the CAN Network Integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Adaptive Front Lighting System (AFS) Control Module and the Engine Control Module
U0101-00	Lost communication with TCM - No sub type information	- Lost communication with the Transmission Control Module - CAN network fault	Check the Transmission Control Module for stored DTCs. Using the manufacturer approved diagnostic system, complete the CAN Network Integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Adaptive Front Lighting System (AFS) Control Module and the Transmission Control Module
U0443-00	Invalid data from Body Control Module B - no sub type information	- Invalid signal from the Auxiliary Junction Box - Auxiliary Junction Box fault	Check the Auxiliary Junction Box for stored DTCs. Using the manufacturer approved diagnostic system, complete the CAN Network Integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Adaptive Front Lighting System (AFS) Control Module and the Auxiliary Junction Box
U0001-49	High speed CAN communication Bus - Internal electronic failure	- CAN network fault - Adaptive Front Lighting System (AFS) Control Module internal electronic failure	Using the manufacturer approved diagnostic system, complete the CAN Network Integrity test. Refer to the electrical circuit diagrams and check the CAN network to the Headlamp Leveling Module. If no CAN Bus circuit faults are evident suspect Adaptive Front Lighting System (AFS) Control

			Module internal fault, replace as required. Refer to the new module/component installation note at the top of the DTC Index
U0300-62	Internal Control Module software incompatibility - Signal Compare Failure.	- Configuration data received over the CAN BUS is different from the stored configuration data - The Headlamp Leveling Module has previously been installed to another vehicle	Check the correct Adaptive Front Lighting System (AFS) Control Module is installed to vehicle specification. Refit original or replace the module as required. Refer to the new module/component installation note at the top of the DTC Index
U0001-88	High Speed CAN Communication Bus - Bus off	- CAN Bus Off - CAN Bus Circuit fault	Carry out the CAN Network Integrity test using the manufacturer approved diagnostic system
U3002-81	Vehicle Identification Number (VIN) - Invalid Serial Data received	- The stored Vehicle Identification Number is not the same as the Central Broadcast Vehicle Identification Number - The Adaptive Front Lighting System (AFS) Control Module has previously been installed to another vehicle	Check the correct Adaptive Front Lighting System (AFS) Control Module is installed to vehicle specification. Refit original or replace the module as required. Refer to the new module/component installation note at the top of the DTC Index
U3000-54	Control Module - Missing Calibration	Height sensors not calibrated to vehicle	NOTE: Sensor calibration routine must be carried out with the vehicle unladen Calibrate the Headlamp Leveling sensors using the manufacturer approved diagnostic system, carry the out routine 'Headlamp and Axle Sensor Calibration' from the 'Module programming and configuration - Setup and

			Configuration - Lighting'
U3000-49	Control Module - Internal electronic failure	Internal electronic failure	Suspect an internal fault, replace the Adaptive Front Lighting System (AFS) Control Module as required, refer to the new module installation note at the top of the DTC Index
U3000-55	Control Module - Not Configured	Incorrect Car Configuration File (CCF) data received	NOTE: The Car Configuration File (CCF) parameters required are (Vehicle type)(Headlamp type)(Gearbox type) and (Dayrunning light) Re-configure the Car Configuration File (CCF) as required using the manufacturer approved diagnostic system. Clear DTC and re-test. If the DTC remains suspect the Adaptive Front Lighting System (AFS) Control Module, replace as required. Refer to the new module installation note at the top of the DTC Index
U3003-17	Battery voltage	The power supply to the Module has been above 16 Volts for more than 1000 milliseconds	Suspect Charging fault. Check the battery condition and state of charge. Check the vehicle charging system. Refer to the relevant workshop manual section
U3003-16	Battery voltage	The power supply to the Module has been below 9 Volts for more than 1000 milliseconds	Suspect Battery or Charging fault. Check the battery condition and state of charge. Check the vehicle charging system. Refer to the relevant workshop manual section. Clear the DTC, cycle ignition state to

			off then on, if DTC returns refer to the electrical circuit diagrams and check power and ground circuit to the Adaptive Front Lighting System (AFS) Control Module
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Front Fog Lamp (86.40.96)

Removal

NOTE:

Left-hand shown, right-hand similar.

- 1 . Disconnect the battery ground cable.
For additional information, refer to

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

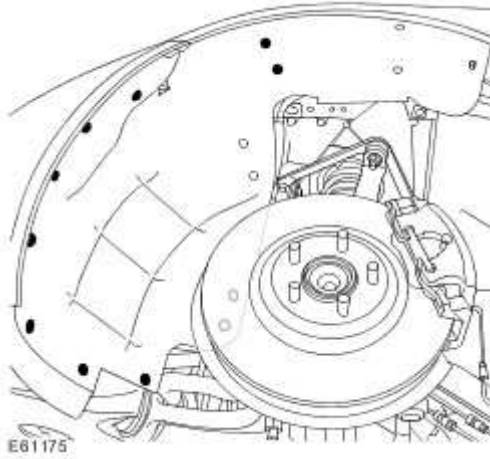
Raise and support the vehicle.

- 3 . Remove the front wheel and tire.
For additional information, refer to Wheel and Tire (74.20.05)

- 4 . Release the front of the fender splash shield.

 Remove the 11 Torx bolts.

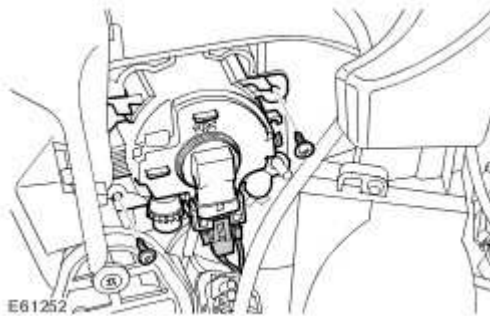
 Tie the splash shield aside.



5 . Remove the front fog lamp.

▶ Disconnect the electrical connector.

▶ Remove the 2 Torx screws.



Installation

1 . Install the front fog lamp.

▶ Tighten the Torx screws.

▶ Connect and secure the electrical connector.

2 . Install the fender splash shield.

 Tighten the Torx bolts.

3 . Install the wheel and tire.

For additional information, refer to Wheel and Tire (74.20.05)

4 . Connect the battery ground cable.

For additional information, refer to

5 . **NOTE:**

The fog lamp beam should be set at 1.2% below the horizontal and parallel.

Check the fog lamp beam alignment.

Headlamp Assembly (86.41.33)

Removal



WARNING: Vehicles fitted with Xenon headlamps, the following precautions must be observed. Failure to comply may result in exposure to ultra violet rays, severe electric shock, burns or the risk of explosion. Ensure the headlamps are switched off at all times. Eye and hand protection must be worn. Never switch on the lamps or test the bulbs with the lamp holder released from the headlamp.

1 . Disconnect the battery ground cable.

2 . Open the hood.

3



CAUTION: Always protect paintwork and glass when removing exterior components.

Release the headlamp assembly.

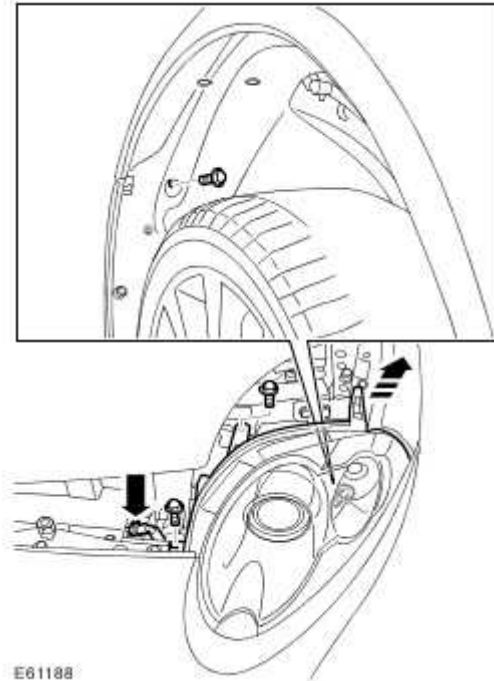


Remove the 3 bolts.



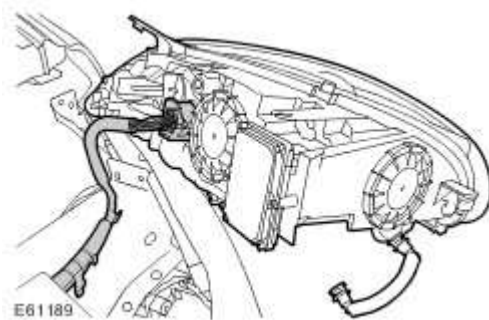
Release the locating pegs.

4 . Disconnect the washer jet hose.



5 . Remove the LH headlamp assembly.

▶ Disconnect the electrical connector.

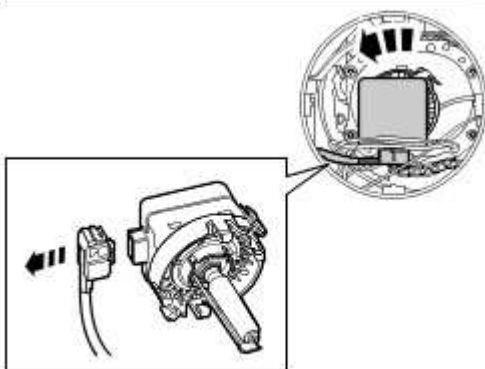
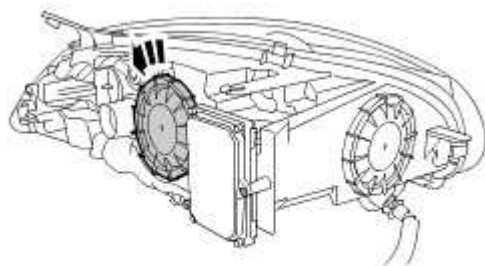


6 . Remove the headlamp bulb.

▶ Remove the cover.

▶ Disconnect the electrical connector.

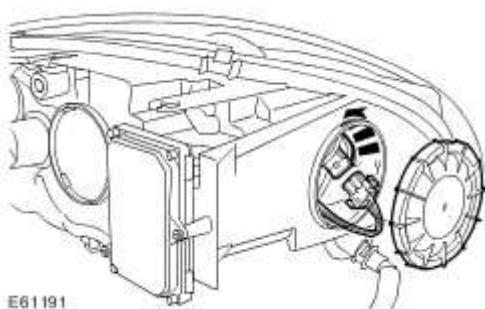
▶ Release the clip.



E61190

7 . Remove the headlamp inner bulb.

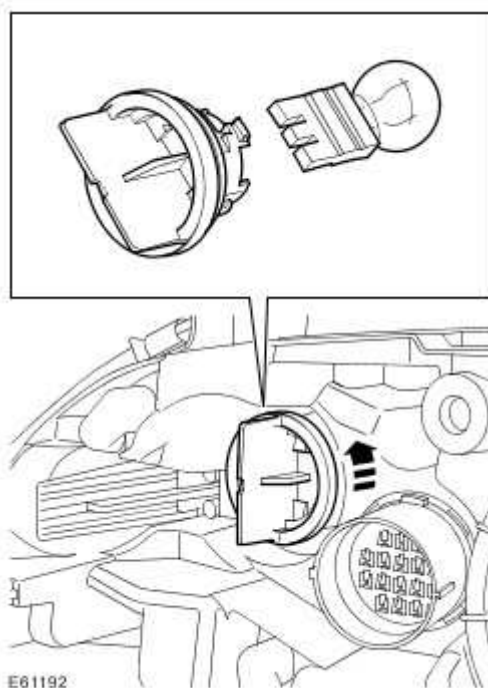
- Remove the cover.
- Disconnect the electrical connector.
- Release the clip.



E61191

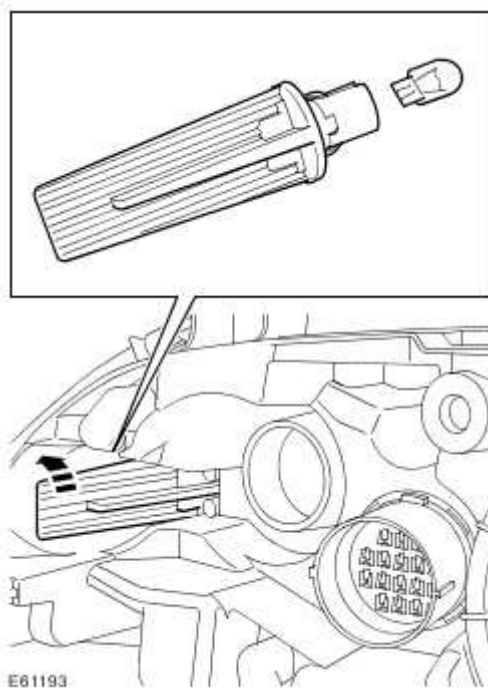
8 . Remove the turn signal indicator bulb.

- Release the bulb holder.



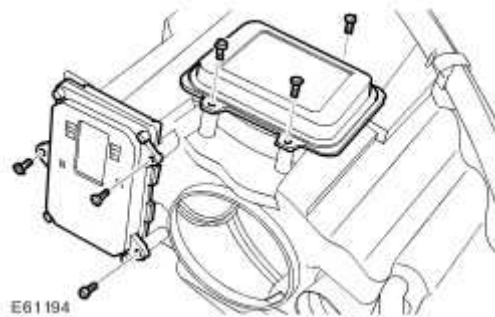
9 . Remove the side marker bulb.

► Release the bulb holder.



10 . Remove the gas discharge modules.

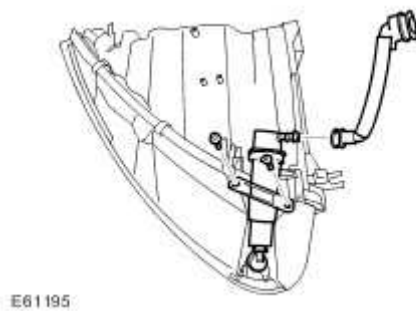
▶ Remove the 6 Torx screws.



11 . Remove the headlamp washer jet.

▶ Disconnect the washer jet hose.

▶ Remove the 2 Torx screws.



Installation

1 . Install the headlamp washer jet.

▶ Tighten the Torx screws.

▶ Connect the washer jet hose.

2 . Install the gas discharge modules.

 Tighten the Torx screws.

3 . Install the side marker bulb.

 Install the bulb holder.

4 . Install the turn signal indicator bulb.

 Install the bulb holder.

5 . Install the headlamp inner bulb.

 Connect and secure the electrical connector.

 Install the cover.

6 . Install the headlamp bulb.

 Connect and secure the electrical connector.

 Install the cover.

7 . Install the headlamp assembly.

 Connect and secure the electrical connector.

 Position the locating pegs.

8 . Connect the washer jet hose.

9 . Secure the headlamp assembly.

 Tighten the bolts.

10 . Close the hood.

11 . Connect the battery ground cable.

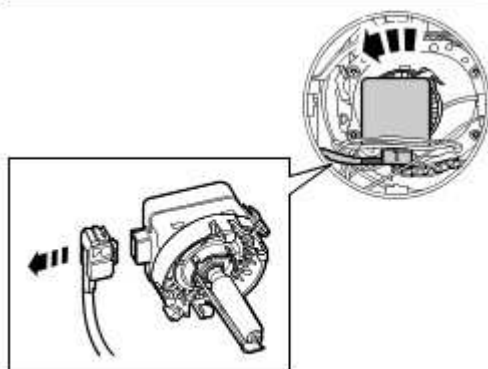
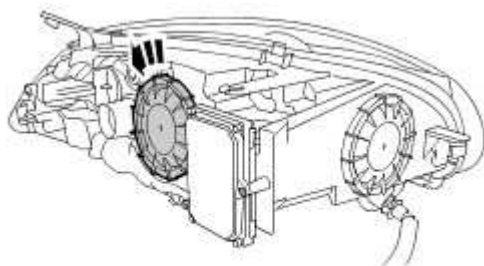
Headlamp Bulb - Vehicles With: High Intensity Discharge Headlamps (86.42.14)

Removal



WARNING: Vehicles fitted with Xenon headlamps, the following precautions must be observed. Failure to comply may result in exposure to ultra violet rays, severe electric shock, burns or the risk of explosion. Ensure the headlamps are switched off at all times. Eye and hand protection must be worn. Never switch on the lamps or test the bulbs with the lamp holder released from the headlamp.

- 1 . Disconnect the battery ground cable.
- 2 . Remove the headlamp assembly.
For additional information, refer to Headlamp Assembly (86.41.33)
- 3 . Remove the headlamp bulb.
 - Remove the cover.
 - Release the clip.
 - Disconnect the electrical connector.



E61190

4 . Remove the headlamp bulb retainer.

► Release the clip.



E60953

Installation

1 . Attach the headlamp bulb retainer.

2 . Install the headlamp bulb.

 Connect the electrical connector.

 Secure with the clip.

 Install the cover.

3 . Install the headlamp assembly.

For additional information, refer to Headlamp Assembly (86.41.33)

4 . Connect the battery ground cable.

Headlamp Leveling Module

Removal

- 1 . Disconnect the battery ground cable.

For additional information, refer to Specifications

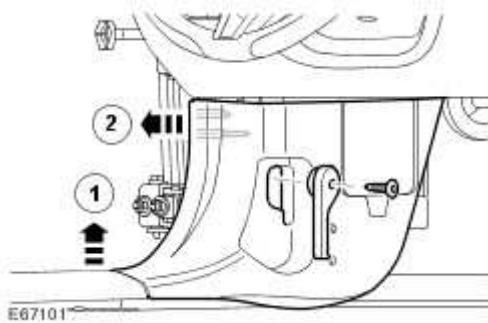
- 2 . Remove the blower motor.

For additional information, refer to Blower Motor (82.25.66)

- 3 . **NOTE:**

LH illustration shown, RH is similar.

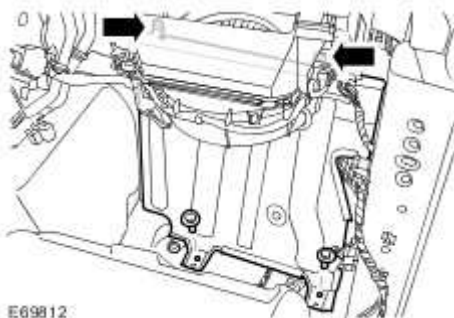
Remove the RH cowl side trim panel.



- 4 . Remove the subwoofer cover.

▶ Reposition the carpet for access.

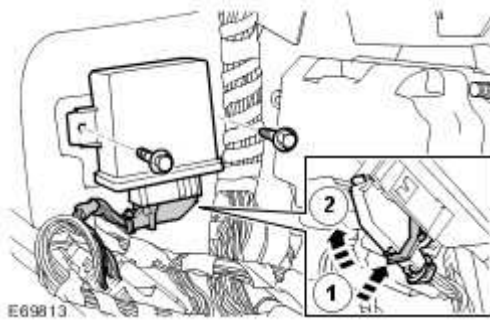
▶ Remove the 4 bolts.



5 . Remove the headlamp leveling module.

➤ Remove the 2 bolts.

➤ Disconnect the electrical connector.



Installation

1 . To install, reverse the removal procedure.

2 . Install the headlamp leveling module.

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

3 . Install the subwoofer cover.

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

Headlamp Leveling Front Sensor

Removal

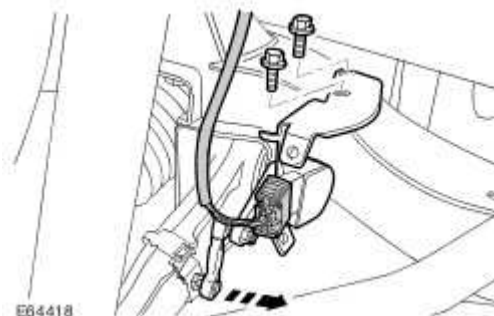
- 1  **WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.**

Raise and support the vehicle.

- 2 . Remove the LH front wheel and tire.
For additional information, refer to Wheel and Tire (74.20.05)

- 3 . Remove the headlamp levelling sensor.

- Disconnect the height sensor link.
- Disconnect the electrical connector.
- Remove the 2 bolts.



- 4 . **NOTE:**

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

Remove the height sensor link.

5 . NOTE:

Note the fitted position.

Remove the bracket.

▶ Remove the 2 Allen bolts.



Installation

1 . NOTE:

Align to the position noted on removal.

Install the bracket.

▶ Tighten the Allen bolts to 5 Nm (4 lb.ft).

2 . Install the height sensor link.

3 . Install the headlamp levelling sensor.

▶ Tighten the bolts to 25 Nm (18 lb.ft).

▶ Connect and secure the electrical connector.

▶ Connect the height sensor link.

4 . Install the wheel and tire.

For additional information, refer to Wheel and Tire (74.20.05)

Headlamp Leveling Rear Sensor

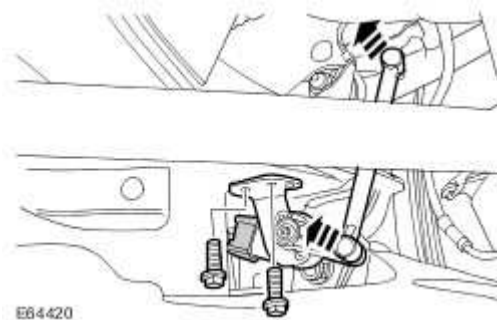
Removal

- 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 headlamp levelling sensor.

- Disconnect the height sensor link.
- Disconnect the electrical connector.
- Remove the 2 bolts.



- 3 . **NOTE:**

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

NOTE:

Note the fitted position.

Remove the bracket.

- Remove the 2 Allen bolts.



Installation

1 . NOTE:

Align to the position noted on removal.

Install the bracket.

▶ Tighten the Allen bolts to 5 Nm (4 lb.ft).

2 . Install the headlamp levelling sensor.

▶ Tighten the bolts to 25 Nm (18 lb.ft).

▶ Connect and secure the electrical connector.

▶ Install the height sensor link.

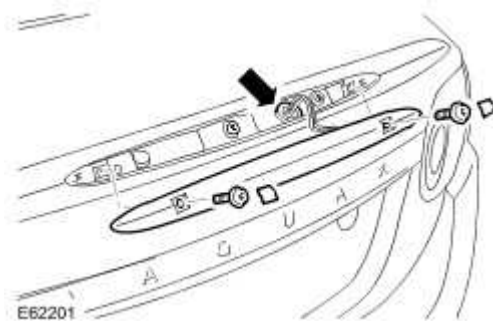
High Mounted Stoplamp (86.41.01)

Removal

- 1 . Remove the liftgate lower trim panel.
For additional information, refer to Liftgate Lower Trim Panel
- 2 . Disconnect the high mounted stoplamp electrical connector.



- 3 . Remove the high mounted stoplamp.
 - ▶ Carefully release the Torx bolt covers.
 - ▶ Remove the 2 Torx bolts.



Installation

- 1 . Install the high mounted stoplamp.
 - ▶ Tighten the Torx bolts to 6 Nm (4 lb.ft).

 Install the Torx bolt covers.

2 . Connect the high mounted stoplamp electrical connector.

3 . Install the liftgate lower trim panel.

For additional information, refer to Liftgate Lower Trim Panel

Rear Lamp Assembly (86.40.70)

Removal

NOTE:

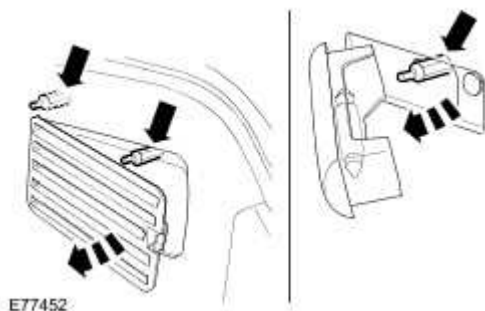
Take great care when removing the rear lamp assembly as the forward point of the lens can be easily damaged.

- 1 . Remove the luggage compartment grille.

 Release the clip.

- 2 . If installed, remove the loadspace lamp.

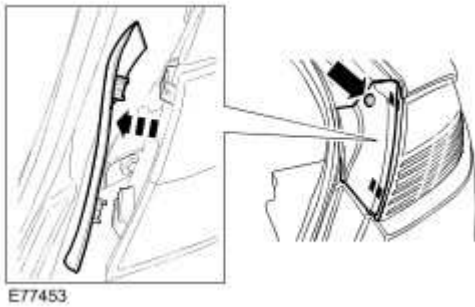
 Disconnect the electrical connector.



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

Remove the rear lamp assembly trim panel.

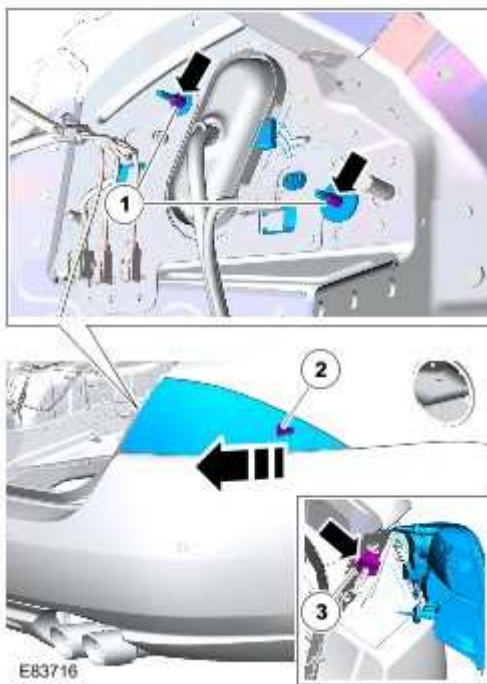
 Release the 3 clips.



- 4  **CAUTION:** Take great care when removing the rear lamp assembly as the forward point of the lens can be easily damaged.

Remove the rear lamp assembly.

- Remove the 2 nuts.
- Carefully release the clip.
- Disconnect the electrical connector.

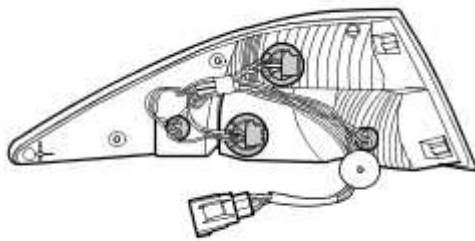


5 . NOTE:

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

Remove the wiring harness.

- ▶ Release the 4 bulb holders.



E77455

Installation

- 1 . Install the wiring harness

- ▶ Install the bulb holders.

2 . NOTE:

Align to the position noted on removal.

Install the rear lamp assembly.

- ▶ Secure with the clip.
- ▶ Tighten the nuts to 2 Nm (1.5 lb.ft).
- ▶ Connect the electrical connector.

3 NOTE:

.

Position the rear lamp assembly trim panel upper edge behind the rear quarter panel lip.

Install the rear lamp assembly trim panel.

 Secure with the clips.

4 . Install the loadspace lamp.

5 . Install the grille.

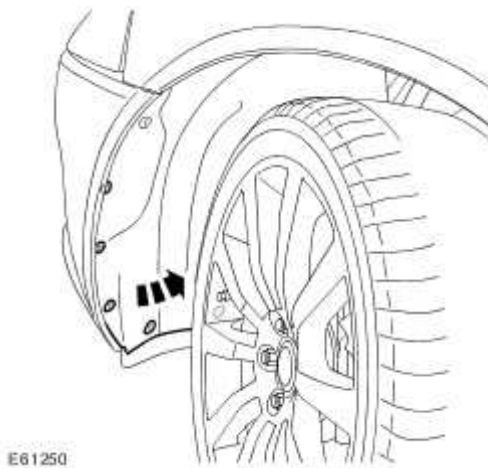
Fog Lamp Bulb

Removal

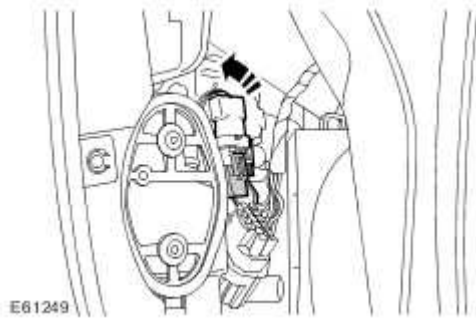
NOTE:

Left-hand shown, right-hand similar.

- 1 . Disconnect the battery ground cable.
For additional information, refer to
- 2 . Turn the steering on to full lock for access.
- 3 . Release the front of the fender splash shield.
 - ▶ Remove the 5 Torx bolts.
 - ▶ Tie the splash shield aside.



- 4 . Remove the front fog lamp bulb.
 - ▶ Release and disconnect the electrical connector.



Installation

1 . Install the fog lamp bulb.

▶ Connect and secure the electrical connector.

2 . Install the fender splash shield.

▶ Tighten the Torx bolts.

3 . Connect the battery ground cable.
For additional information, refer to

Rear Fog and Reversing Lamp - 2-Door

Removal

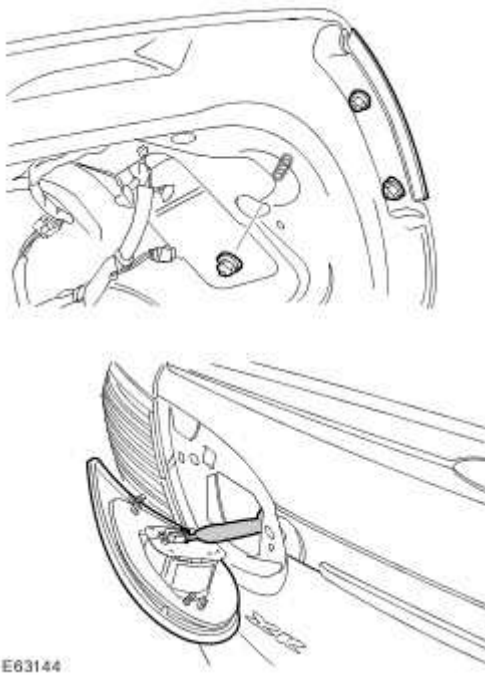
- 1 . Remove the liftgate lower trim panel.

For additional information, refer to Liftgate Lower Trim Panel

- 2 . Remove the fog and reversing lamp.

▶ Remove the 3 plastic nuts.

▶ Disconnect the electrical connector.



Installation

- 1 . Install the fog and reversing lamp.

▶ Connect the electrical connector.

▶ Install the plastic nuts.

2 . Install the liftgate lower trim panel.

For additional information, refer to Liftgate Lower Trim Panel

Rear Fog and Reversing Lamp - Convertible

Removal

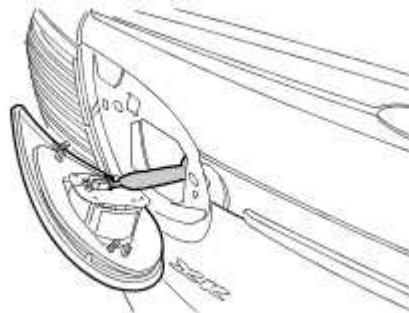
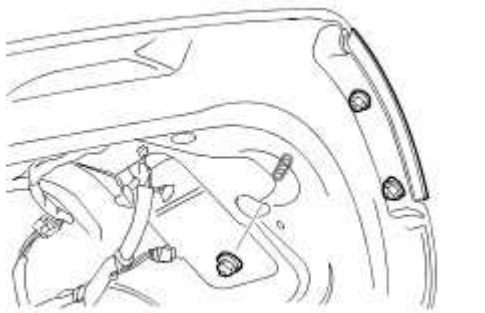
- 1 . Remove the luggage compartment lid trim panel.

For additional information, refer to Luggage Compartment Lid Trim Panel (76.19.05)

- 2 . Remove the reverse/fog lamp.

➤ Remove the 3 plastic nuts.

➤ Disconnect the electrical connector.



E63144

Installation

- 1 . Install the reverse/fog lamp.

➤ Connect the electrical connector.

➤ Install the plastic nuts.

2 . Install the luggage compartment lid trim panel.

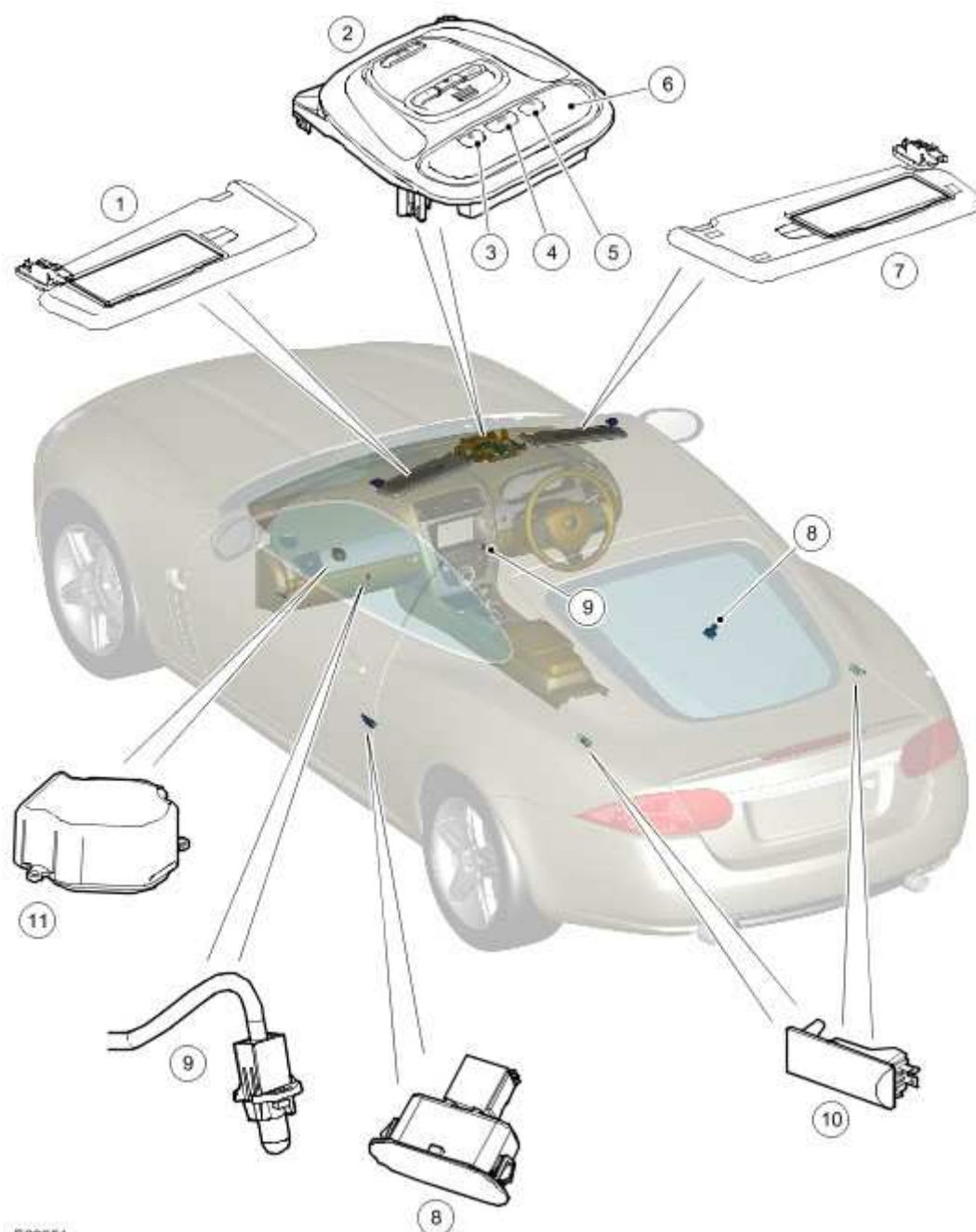
For additional information, refer to Luggage Compartment Lid Trim Panel (76.19.05)

417-02 : Interior Lighting

Description and operation

Interior Lighting

COMPONENT LOCATION



E63551

Item	Part Number	Description
1		Left Hand (LH) vanity mirror
2		Overhead console (Coupe version shown)
3		LH map reading lamp switch
4		Interior lamp switch
5		Right Hand (RH) map reading lamp switch
6		Map and interior lamps
7		RH vanity mirror
8		LH and RH door puddle lamps
9		LH and RH footwell lamps
10		LH and RH luggage compartment lamps
11		Glovebox lamp

INTRODUCTION

The interior lamps are controlled by the Central Junction Box (CJB) and have two modes of operation: manual and automatic. In the manual mode the interior lamps can be switched on and off using the momentary switches adjacent to each lamp or disabled completely using the same switches. In the automatic mode the interior lamp functionality is controlled by the CJB on receipt of various input signals.

The CJB receives the following inputs which affect the operation of the interior lamps:

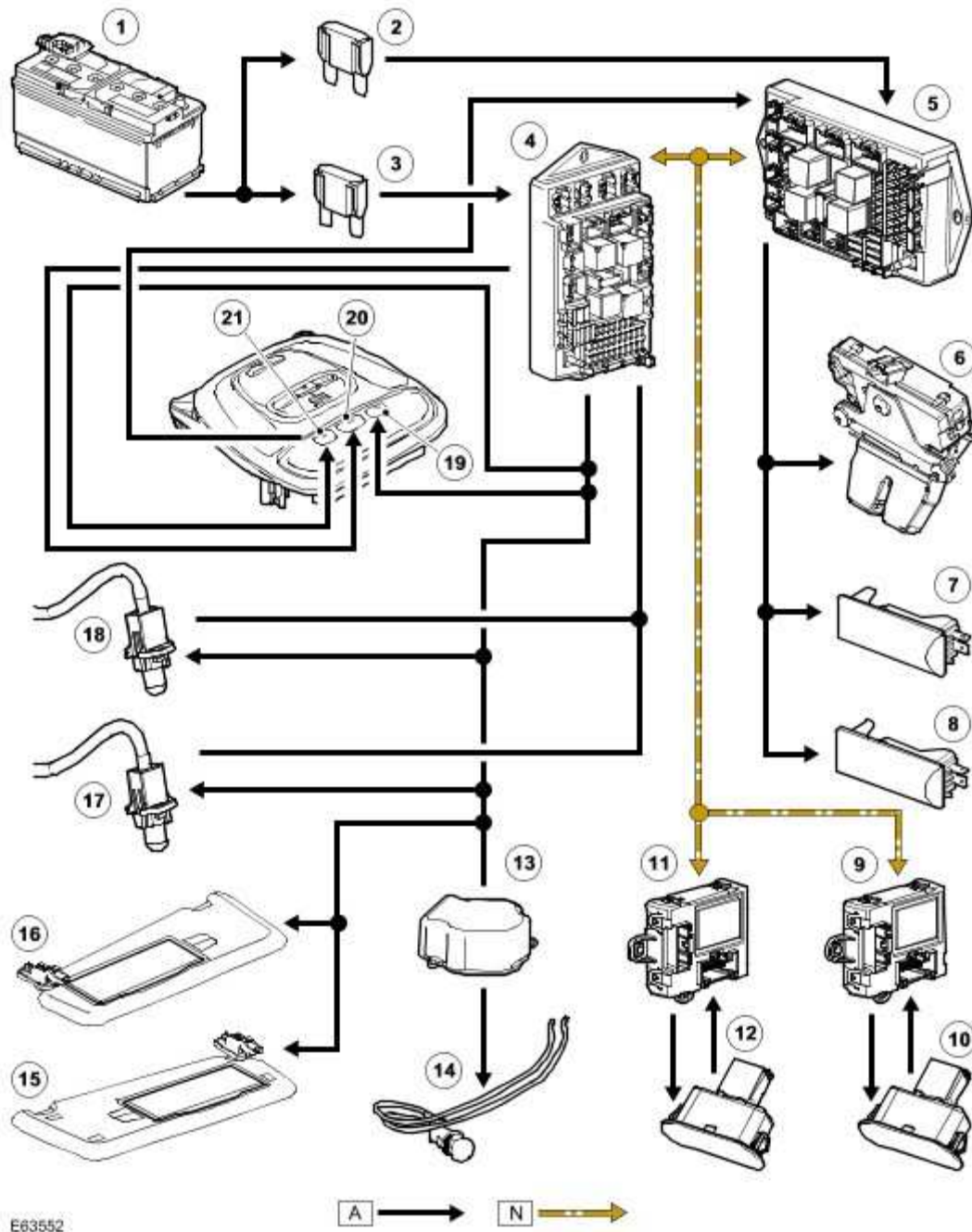
- Ignition switch
- Door latch switches
- Liftgate latch switch
- Glovebox lamp switch
- Unlock signal
- Main interior lamp switch
- Map reading lamp switches
- Delayed power off relay
- Vanity mirror lamp switches.

The driver's and passenger door puddle lamps are controlled by the driver's door module and the passenger door module respectively on receipt of Controller Area Network (CAN) signals from the CJB.

CONTROL DIAGRAM

NOTE:

A = Hardwired; N = Medium speed CAN bus



E63552

Item	Part Number	Description

1		Battery
2		Megafuse (175A)
3		Megafuse (175A)
4		CJB
5		Auxiliary junction box
6		Liftgate latch switch
7		Luggage compartment lamp
8		Luggage compartment lamp
9		Passenger door module
10		Passenger door puddle lamp
11		Driver's door module
12		Driver's door puddle lamp
13		Glovebox lamp switch
14		Glovebox lamp
15		Driver's vanity mirror
16		Passenger vanity mirror
17		Driver's footwell lamp
18		Passenger footwell lamp
19		Driver's map reading lamp
20		Interior lamp
21		Passenger map reading lamp

Interior Lighting

Principle of Operation

For a detailed description of the interior lighting system, refer to the relevant Description and Operation section in the workshop manual.

Interior Lighting

Inspection and Verification

- 1 . Verify the customer concern.
- 2 . Visually inspect for obvious signs of electrical damage and system integrity.

Electrical
• Fuse(s) • Bulb(s) • Wiring harness • Loose or corroded connector(s) • Accessories • Switch(es)

- 3 . If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
- 4 . If the cause is not visually evident, verify the symptom and refer to the manufacturer approved diagnostic system.

417-04 : Daytime Running Lamps (DRL)

Description and operation

Daytime Running Lamps (DRL)

INTRODUCTION

Daytime Running Lamps (DRL) use the full intensity low beam headlamps which are permanently illuminated when the vehicle is being driven. DRL are used in a number of markets and there are two systems to cover these markets.

For additional information, refer to Exterior Lighting (417-01 Exterior Lighting)

DRL CANADIAN MARKET

DRL for this market use full intensity low beam headlamps. The side marker lamps, tail lamps and license plate lamps will be on, but instrument cluster illumination will be off. DRL are active when the following parameters are met:

- PARK is not selected on automatic transmission selector lever
- Power mode 6 (ignition on) detected by the auxiliary junction box
- The Central Junction Box (CJB) receives an engine running signal
- The lighting control switch is in the off or side lamps position.

NOTE:

If the lighting control switch is moved to the headlamp position, DRL are deactivated and normal side lamp and headlamp functionality is operational.

NOTE:

Adaptive Front lighting System (AFS) (where fitted) is non-functional when the DRL are active.

NOTE:

When DRL are active, the headlamp flash function using the left hand steering column multifunction switch will operate normally.

The high beam headlamp function using the left hand steering column stalk switch will be deactivated. When the selector lever is in the PARK position on automatic transmission vehicles, DRL are turned off. This is to reduce battery discharge during long periods of engine idling in cold climate

conditions. When the selector lever is moved from the PARK position, normal DRL functionality is restored.

DRL DENMARK, HOLLAND, NORWAY, SWEDEN, FINLAND AND POLAND

DRL for these markets use full intensity low beam headlamps. Side lamps and license plate lamps will be on, but instrument cluster illumination will be off. DRL are active when the following parameters are met:

- Power mode 6 (ignition on) detected by the auxiliary junction box
- The CJB receives an engine running signal
- The lighting control switch is in the off position.

NOTE:

When DRL are active, the headlamp flash function using the left hand steering column multifunction switch will operate normally. The high beam headlamp function using the left hand steering column stalk switch will be deactivated.

If the lighting control switch is moved to the side lamp or headlamp positions, DRL are deactivated and normal side lamp and headlamp functionality is operational.

Daytime Running Lamps (DRL)

Principle of Operation

For a detailed description of the daytime running lamps, refer to the relevant Description and Operation section in the workshop manual.

Daytime Running Lamps (DRL)

Inspection and Verification

- 1 . Verify the customer concern.
- 2 . Visually inspect for obvious signs of electrical damage and system integrity.

Electrical
• Fuse(s) • Bulb(s) • Switch(es) • Electrical connector(s) • Wiring Harness

3 . If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.

4 . If the cause is not visually evident, verify the symptom and refer to the manufacturer approved diagnostic system.

418 : Electrical Distribution

418-00 : Module Communications Network

Specifications

Specifications

Torque Specifications

Item	Nm	lb-ft	lb-in
Junction box - nut/screw	4	3	35

Communications Network

INTRODUCTION

A number of different types of communication network are incorporated into the vehicle wiring harnesses for the transmission of commands and information between control modules. The configuration installed on a particular vehicle depends on the model and equipment level.

The communication networks available on the vehicle are:

- Medium speed Controller Area Network (CAN) bus
- High speed CAN bus
- Media Orientated System Transport (MOST) ring
- Local Interconnect Network (LIN) bus
- Private CAN bus

Bus	Baud Rate
Medium speed CAN bus	125 kbits/s
High speed CAN bus	500 kbits/s
MOST ring	24 mbits/s
LIN bus	9.6 kbits/s

CONTROLLER AREA NETWORK (CAN) BUS

The CAN bus is a high speed broadcast network where control modules automatically transmit information every few microseconds. Information is broadcast down a pair of twisted wires, known as 'CAN high' and 'CAN low'. Information is transmitted on the CAN bus as a voltage difference between the two wires.

Two CAN bus networks are used on the vehicle; medium speed and high speed, with the instrument cluster acting as a gateway between the two networks. The table below shows the wire colours used on both networks.

Network	High	Low
Medium Speed	White (W)	Blue (U)

High Speed	Yellow (Y)	Green (G)
------------	------------	-----------

Private CAN bus

The private CAN bus networks used on the vehicle can be either medium or high speed depending on which vehicle system they are being used. All private CAN bus networks are proprietary systems and cannot be interrogated using the Integrated Diagnostic System (IDS).

Diagnostic Socket

The diagnostic socket allows the transfer of information between the vehicle electronic control modules and the IDS. The diagnostic socket is connected directly to both the medium speed CAN bus and the high speed CAN bus and is located below the drivers side of the instrument panel.

MEDIA ORIENTATED SYSTEM TRANSPORT (MOST) RING

The MOST ring uses a fibre optic cable to transport data and audio around the information and entertainment system. The fibre optic cable is arranged in a ring, with each unit on the ring having a 'MOST in' and 'MOST out' connection.

MOST is a synchronous network. A timing master supplies the clock and all other components on the ring synchronize their operation to this clock. The timing master for the MOST ring is the Information and Entertainment control module.

When handling MOST fibre optic cables the following precautions should be observed.

- After disconnection of any cables, carefully install appropriate dust caps to protect the mating faces of the connectors from damage or contamination.
- Avoid introducing bends of less than 25 mm (0.98 inches) radius or kinks into the fibre optic cable during service or repair. Tight bends or kinks could impair operation, cause immediate system failure, or future system failure.
- Avoid excessive force, strain or stress on the fibers and connectors, especially permanent stress after reinstallation.

Software Download Socket

The MOST software download socket is located below the drivers side of the instrument panel. A service loop is fitted to the end of the socket to complete the MOST ring. If the service loop is removed the MOST ring will be broken and all components on the ring will stop operating.

NOTE:

The software download socket is used for engineering purposes only and must not be used in service.

Ring Break Diagnostics

Incorporated into the Auxiliary Junction Box (AJB) is a Ring Break Diagnostics (RBD) link. The RBD link houses a copper link which when removed initiates the ring break diagnostics mode. The ring break diagnostics mode allows the technician to locate an optical fiber break in the MOST ring. To initiate the ring break diagnostics mode, carry out the following process:

- Connect the Jaguar approved diagnostic system.
- Ensure the vehicle is in power mode 4 or greater.
- Remove the RBD link for the length of time specified by the Jaguar approved diagnostic system.
- Replace the RBD link.

After approximately 30 seconds a Diagnostic Trouble Code (DTC) will be logged in the Information and Entertainment Control Module, identifying the location of the fault. The DTC can be read and interrogated using the Jaguar approved diagnostic system.

LOCAL INTERCONNECT NETWORK (LIN) BUS

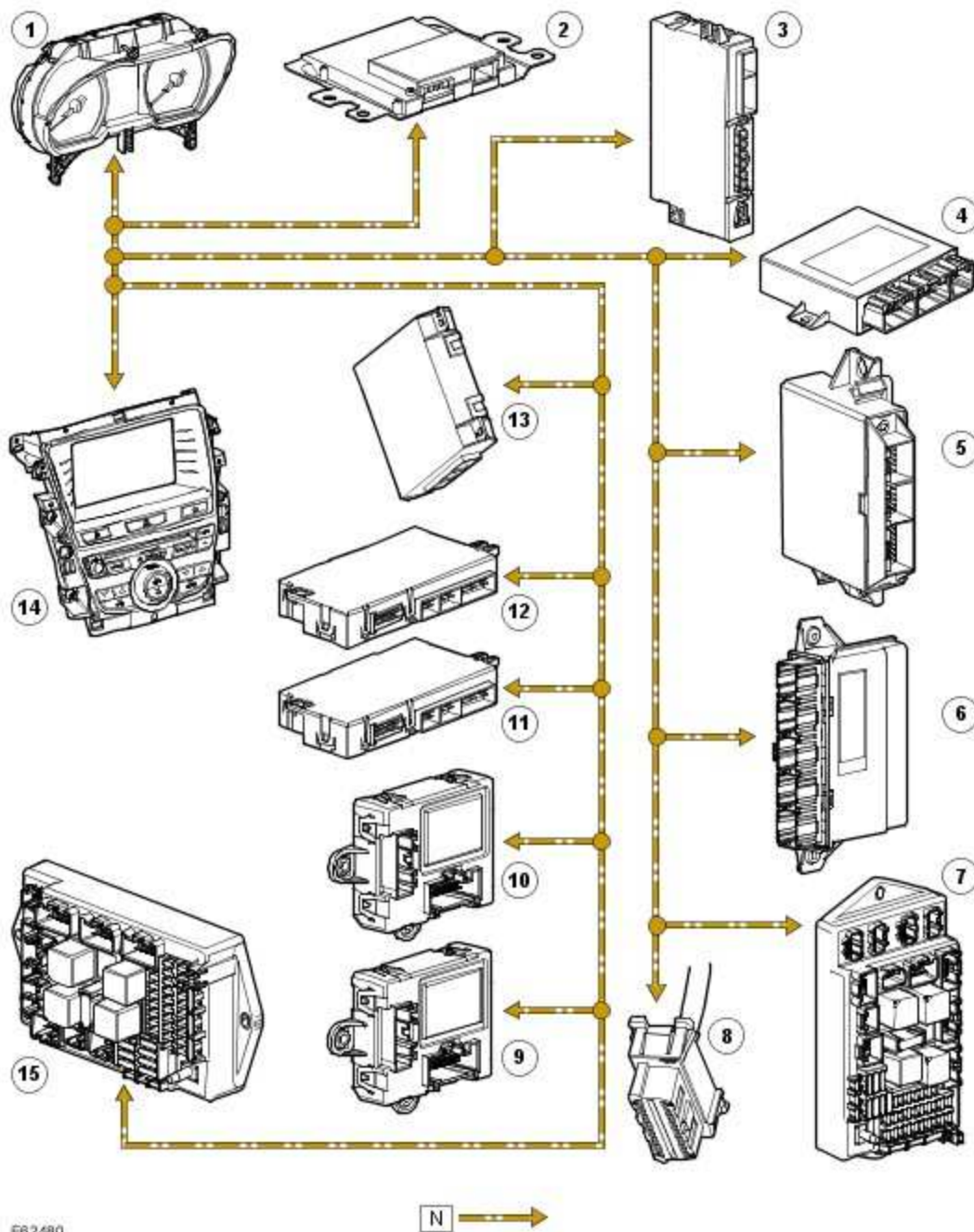
The LIN bus is a low speed broadcast network that employs master and slave components. The master component transmits a message to the slave components identifying which slave is to respond. This message has a header (slave identifier) and an empty data field. The identified slave component fills the data field with the relevant information and returns the message to the master component.

Unlike the CAN bus networks, the LIN bus utilizes a single wire network.

CONTROL DIAGRAM - MEDIUM SPEED CAN BUS

NOTE:

N = Medium speed CAN bus



E62480

Item	Part Number	Description
1		Instrument cluster
2		Information and Entertainment control module
3		Convertible top control module
4		Tire pressure monitoring control module

5		Parking aid module
6		Keyless vehicle module
7		Central Junction Box (CJB)
8		Diagnostic socket
9		Passenger door control module
10		Drivers door control module
11		Passenger seat module
12		Drivers seat module
13		Automatic Temperature Control (ATC) module
14		Integrated control panel
15		Auxiliary junction box

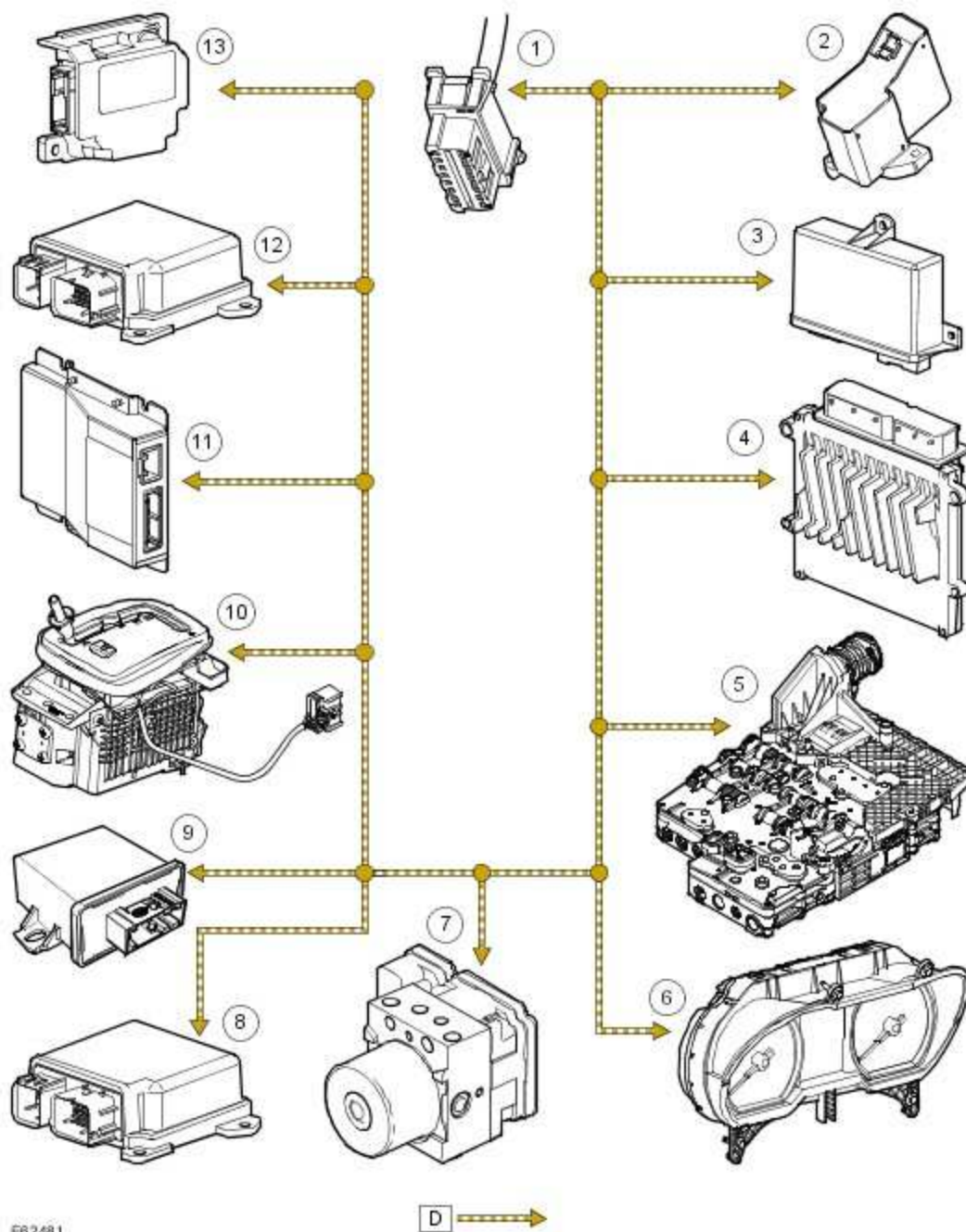
NOTE:

Only the buttons of the Integrated control panel are connected to the medium speed CAN bus.
The Touch Screen Display (TSD) is connected to the MOST ring.

CONTROL DIAGRAM - HIGH SPEED CAN BUS

NOTE:

D = High speed CAN bus



E62481

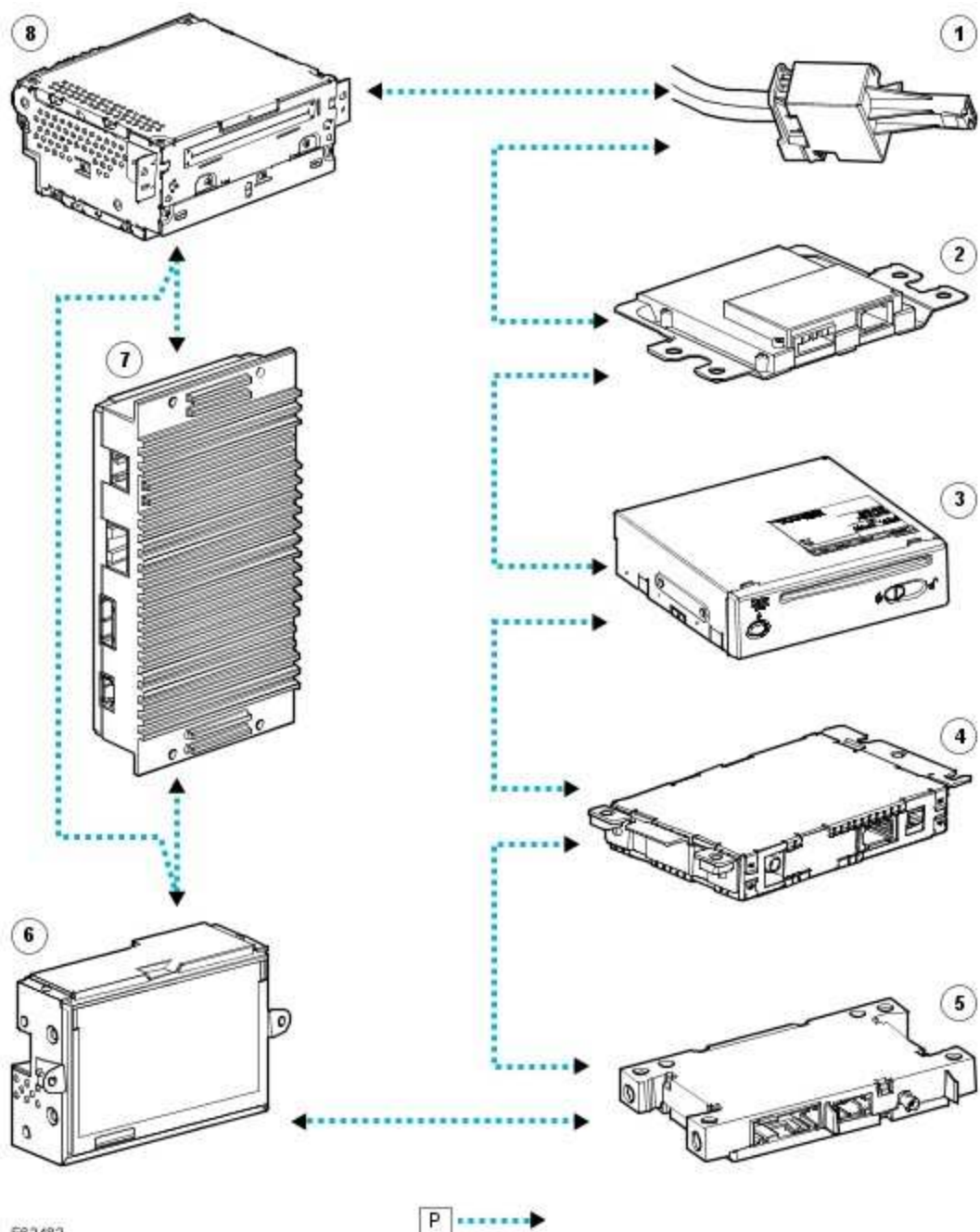
Item	Part Number	Description
1		Diagnostic socket
2		Electric steering column lock
3		Park brake module
4		Engine Control Module (ECM)

5		Transmission Control Module (TCM)
6		Instrument cluster
7		Anti-lock Brake System (ABS) module
8		Restraints control module
9		Adaptive front lighting system control module
10		Gear shift module
11		Adaptive Damping Control Module (ADCM)
12		Pedestrian protection module
13		Adaptive speed control module

CONTROL DIAGRAM - MOST RING (UP TO 2009 MY)

NOTE:

P = MOST ring



E62482

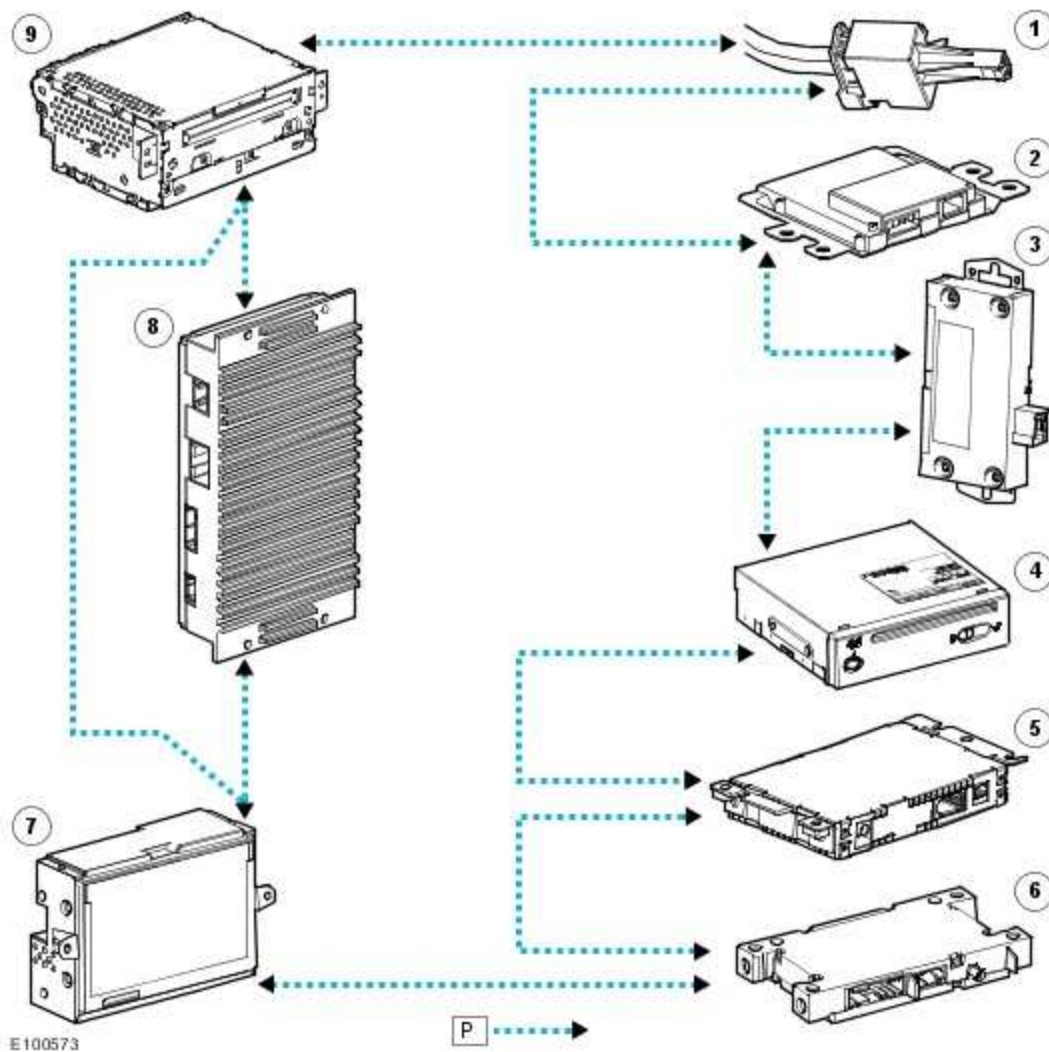
Item	Part Number	Description
1		Software download socket
2		Information and entertainment module
3		Multi-media module
4		DAB/SDARS receiver

5		Bluetooth® phone module
6		TSD
7		Audio system amplifier
8		Integrated audio module

CONTROL DIAGRAM - MOST RING (FROM 2009 MY)

NOTE:

P = MOST ring



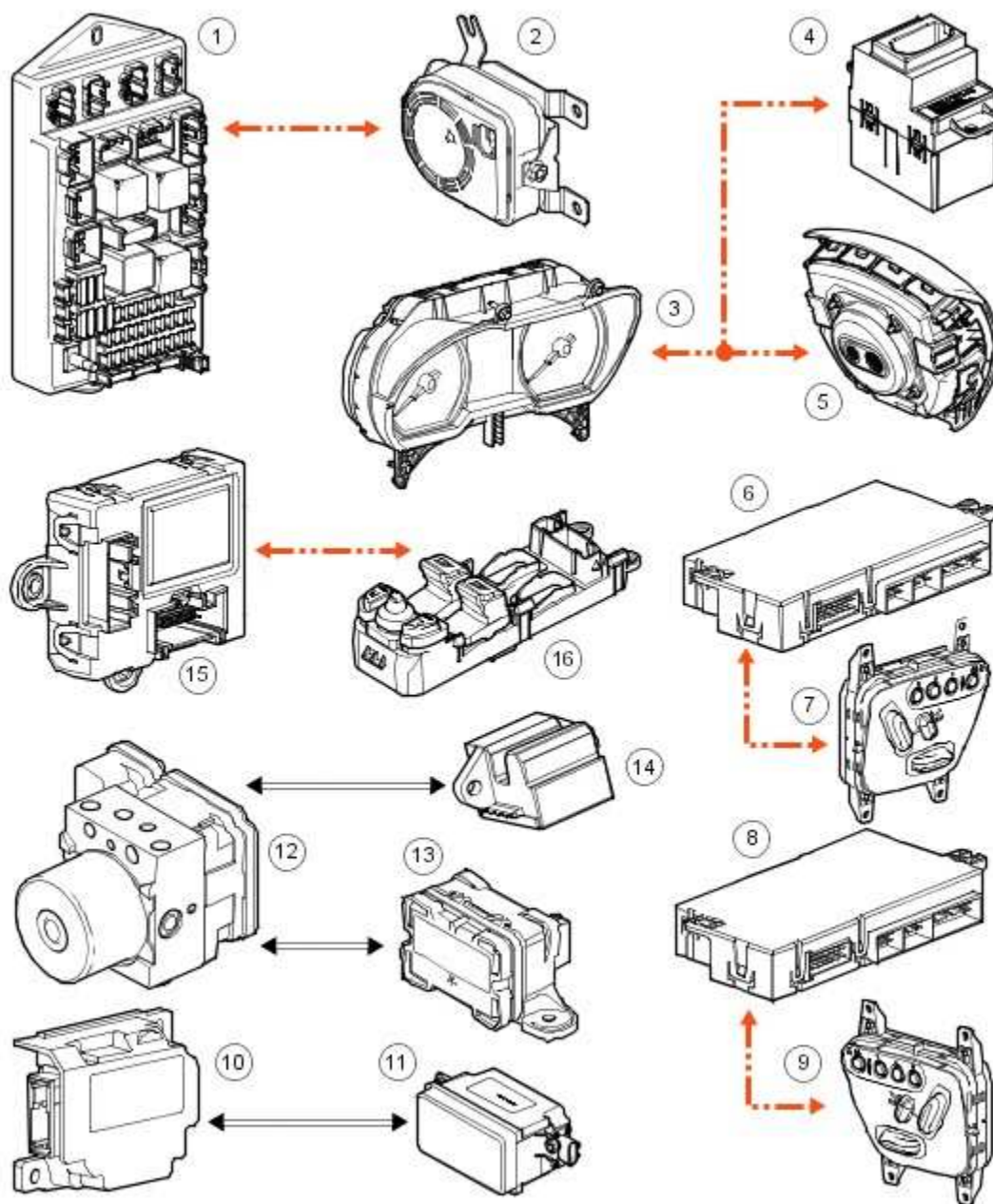
Item	Part Number	Description
------	-------------	-------------

1		Software download socket
2		Information and entertainment module
3		Auxiliary USB unit
4		Multi-media module
5		DAB/SDARS receiver
6		Bluetooth® phone module
7		TSD
8		Audio system amplifier
9		Integrated audio module

CONTROL DIAGRAM - LIN BUS AND PRIVATE CAN BUS

NOTE:

O = LIN bus; **U** = Private CAN bus



E62483



Item	Part Number	Description
1		CJB
2		Active anti-theft sounder
3		Instrument cluster

4		Engine start control module
5		Steering wheel module
6		Passenger seat module
7		Passenger seat switch module
8		Drivers seat module
9		Drivers seat switch module
10		Adaptive speed control module
11		Adaptive speed control radar
12		ABS module
13		Yaw rate/acceleration sensor
14		Steering angle sensor
15		Drivers door control module
16		Drivers door switch module

Communications Network

Principles of Operation

For a detailed description of the communications network, refer to the relevant Description and Operation section in the workshop manual.

Communications Network

Inspection and Verification



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



CAUTION: Electronic modules are sensitive to static electrical charges. If exposed to these charges, damage may result.

- 1 . Verify the customer concern.
- 2 . Visually inspect for obvious signs of electrical damage and system integrity.

Electrical
• Fuses (refer to electrical guide) • Wiring harness • Correct engagement of electrical connectors • Loose or corroded connections • Routing of fibre optic harnesses • Correct engagement of optical connectors • Correct placement of optical connectors (ring order) • Correct assembly of optical connectors (backout, etc) • Damage to fibre (chafing, abrasion, kinking, cuts, etc)

- 3 . If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
- 4 . If the cause is not visually evident check for diagnostic trouble codes (DTCs) and refer to the DTC Index.

DTC Index



CAUTION: When probing connectors to take measurements in the course of the pinpoint tests, use the adaptor kit, part number 3548-1358-00.

NOTE:

If the control module is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module.

NOTE:

Generic scan tools may not read the codes listed, or may read only five digit codes. Match the five digits from the scan tool to the first five digits of the seven digit code listed to identify the fault (the last two digits give additional information read by the manufacturer approved diagnostic system).

NOTE:

When performing electrical voltage or resistance tests, always use a digital multimeter (DMM) accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance, always take the resistance of the DMM leads into account.

NOTE:

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

NOTE:

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

NOTE:

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

Rear Junction Box (RJB)

DTC	Description	Possible Cause	Action
B100A51	Fuel pump authorisation target ID not stored	- RJB fault - Low speed CAN fault - Instrument cluster fault	Check power and ground supplies to RJB. Check CAN communications between RJB and instrument cluster. Check power and ground supplies to instrument cluster
B100A62	Fuel pump authorisation signal compare failure	- Low speed CAN fault - RJB fault - Instrument cluster fault - Incorrect module installed (RJB/Instrument cluster) - Write target SID synchronisation error following re-programming - Noise/EMC related error	Check CAN communications between RJB and instrument cluster. Check power and ground supplies to RJB and instrument cluster. Confirm correct module installed. Re-synchronise ID by re-configuring the RJB as a new module. Check CAN network for interference/EMC related issues
B100A63	Fuel Pump Authorisation Time Out	- RJB fault - Low speed CAN fault - Instrument cluster fault - Low battery voltage <9V	Check power and ground supplies to RJB and instrument cluster. Check CAN communications between RJB and instrument cluster. Check battery is in fully charged and serviceable condition, refer to the battery care manual
B102612	Steering column lock ground circuit short to power	Steering column lock ground circuit - short to power	Refer to the electrical circuit diagrams and test steering column lock ground circuit for short to power
B10AF12	Blower fan relay short to power	Blower fan relay circuit - short to power	Refer to the electrical circuit diagrams and test blower fan relay circuit for short to power
B10AF14	Blower fan relay open load or short to ground	Blower fan relay circuit - short to ground, high resistance	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system

B10DD12	Air bag deployed circuit short to ground	Air bag deployed circuit - short to ground	Refer to the electrical circuit diagrams and test air bag deployed circuit for short to ground
B10DD15	Air bag deployed circuit open circuit, short to power or no signal	Air bag deployed circuit - short to power, high resistance	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B10DD38	Air bag deployed circuit signal out of specification	Signal frequency incorrect	Refer to the electrical circuit diagrams and test air bag deployed circuit between RCM, ECM and RJB for short to power, ground and open circuit
B111211	Parking aid ignition supply short to ground or over temperature	Parking aid ignition supply circuit - short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B111213	Parking aid ignition supply open load	Parking aid ignition supply circuit - high resistance	Refer to the electrical circuit diagrams and test parking aid ignition supply circuit for high resistance
B111311	Left front comfort solenoid short to ground or over temperature	Left front comfort solenoid circuit - short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B111313	Left front comfort solenoid open load	Left front comfort solenoid circuit - high resistance	Refer to the electrical circuit diagrams and test left front comfort solenoid circuit for high resistance
B111411	Right front comfort solenoid short to ground or over temperature	Right front comfort solenoid circuit - short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B111413	Right front comfort solenoid open load	Right front comfort solenoid circuit - high resistance	Refer to the electrical circuit diagrams and test right front comfort solenoid circuit for high

			resistance
B111511	High mounted stop lamp control short to ground or over temperature	High mounted stop lamp control circuit - short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B111513	High mounted stop lamp control open load	High mounted stop lamp control circuit - high resistance	Refer to the electrical circuit diagrams and test high mounted stop lamp control circuit for high resistance
B111611	Left rear lamp assembly control circuit short to ground or over temperature	Left rear lamp assembly control circuit - short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B111613	Left rear lamp assembly control circuit open load	Left rear lamp assembly control circuit - high resistance	Refer to the electrical circuit diagrams and test left rear lamp assembly control circuit for high resistance
B111711	Right rear lamp assembly control circuit short to ground or over temperature	Right rear lamp assembly control circuit - short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B111713	Right rear lamp assembly control circuit open load	Right rear lamp assembly control circuit - high resistance	Refer to the electrical circuit diagrams and test right rear lamp assembly control circuit for high resistance
B111811	Left rear side marker control circuit short to ground or over temperature	Left rear side marker control circuit - short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B111813	Left rear side marker control circuit open load	Left rear side marker control circuit - high resistance	Refer to the electrical circuit diagrams and test left rear side marker control circuit for high resistance

B111911	Right rear side marker control circuit short to ground or over temperature	Right rear side marker control circuit - short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B111913	Right rear side marker control circuit open load	Right rear side marker control circuit - high resistance	Refer to the electrical circuit diagrams and test right rear side marker control circuit for high resistance
B111A11	License plate lamps control circuit short to ground or over temperature	License plate lamps control circuit - short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B111A13	License plate lamps control circuit open load	License plate lamps control circuit - high resistance	Refer to the electrical circuit diagrams and test license plate lamps control circuit for high resistance
B111D11	Luggage compartment lid open motor control circuit short to ground or over temperature	Luggage compartment lid open motor control circuit - short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B111D13	Luggage compartment lid open motor control circuit open load	Luggage compartment lid open motor control circuit - high resistance	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B111E11	Luggage compartment lid lamps power supply circuit short to ground or over temperature	Luggage compartment lid lamps power supply circuit - short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B111E13	Luggage compartment lid lamps power supply circuit open	Luggage compartment lid lamps power supply circuit - high resistance	Refer to the electrical circuit diagrams and test luggage compartment lid lamps power supply circuit for high resistance

	load		
B112311	Restraints ignition relay short to ground	Restraints ignition relay circuit - short to ground	Refer to the electrical circuit diagrams and test restraints ignition supply relay circuit for short to ground
B112312	Restraints ignition relay short to power	Restraints ignition relay circuit - short to power	Refer to the electrical circuit diagrams and test restraints ignition supply relay circuit for short to power
B113E23	External luggage compartment lid release switch stuck	Signal stuck low	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1A751C	Fuel sender No.1 fault	Fuel sender No.1 circuit - voltage out of range	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1A761C	Fuel sender No.2 fault	Fuel sender No.2 circuit - voltage out of range	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1A7911	Right fog lamp control circuit short to ground or over temperature	Right fog lamp control circuit - short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1A7913	Rear fog lamp control circuit open load	Rear fog lamp control circuit - high resistance	Refer to the electrical circuit diagrams and test rear fog lamp control circuit for high resistance
B1C5512	Horn relay short to power	Horn relay circuit - short to power	Refer to the electrical circuit diagrams and test horn control relay circuit for short to power
B1C5514	Horn relay open load or short to ground	Horn relay circuit - short to ground, high resistance	Carry out any pinpoint tests associated with this DTC using the manufacturer approved

			diagnostic system
B1C8312	Heated rear window relay coil short to power	Heated rear window relay circuit - short to power	Refer to the electrical circuit diagrams and test heated rear window relay circuit for short to power
B1C8314	Heated rear window relay coil open load or short to ground	Heated rear window relay circuit - short to ground, high resistance	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1C9111	Fuel filler door lock motor control circuit short to ground or over temperature	Fuel filler door lock motor control circuit - short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1C9113	Fuel filler door lock motor control circuit open load	Fuel filler door lock motor control circuit - high resistance	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1D0611	Left turn signal lamp control circuit short to ground or over temperature	Left turn signal lamp control circuit - short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1D0613	Left turn signal lamp control circuit open load	Left turn signal lamp control circuit - high resistance	Refer to the electrical circuit diagrams and test left turn signal lamp control circuit for high resistance
B1D0711	Right turn signal lamp control circuit short to ground or over temperature	Right turn signal lamp control circuit - short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1D0713	Right turn signal lamp control circuit open load	Right turn signal lamp control circuit - high resistance	Refer to the electrical circuit diagrams and test right turn signal lamp control circuit for high resistance
B1D3523	Hazard switch stuck	Signal stuck low	Carry out any pinpoint tests associated with this DTC using

			the manufacturer approved diagnostic system
B2A9016	Battery low	• Circuit voltage below threshold	Check battery is in fully charged and serviceable condition, refer to the battery care manual
B2A9116	Battery discharged	• Circuit voltage below threshold	Check battery is in fully charged and serviceable condition, refer to the battery care manual
C111A11	Right stoplamp short to ground or over temperature	• Right stoplamp control circuit - short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
C111A13	Right stoplamp control circuit open load	• Right stoplamp control circuit - high resistance	Refer to the electrical circuit diagrams and test right stoplamp control circuit for high resistance
C111B11	Left stoplamp control circuit short to ground or over temperature	• Left stoplamp control circuit - short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
C111B13	Left stoplamp control circuit open load	• Left stoplamp control circuit - high resistance	Refer to the electrical circuit diagrams and test left stoplamp control circuit for high resistance
C112011	Reversing lamp control circuit short to ground or over temperature	• Reversing lamp control circuit - short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
C112013	Reversing lamp control circuit open load	• Reversing lamp control circuit - high resistance	Refer to the electrical circuit diagrams and test reversing lamp control circuit for high resistance
P123011	Fuel pump relay short to ground	• Fuel pump relay circuit - short to ground	Refer to the electrical circuit diagrams and test fuel pump relay circuit for short to ground

P123012	Fuel pump relay short to power	Fuel pump relay circuit - short to power	Refer to the electrical circuit diagrams and test fuel pump relay circuit for short to power
U001088	Medium Speed CAN Communication Bus	bus off	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U014000	Lost communication CJB	Lost communication CJB	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U015500	Lost communication with instrument cluster	Lost communication with instrument cluster	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U016400	Lost communication with climate control module	Lost communication with climate control module	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U020600	Lost communication with convertible top module	Lost Communication with HDM	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U021400	Lost communication with remote keyless entry module	Lost communication with remote keyless entry module	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U030046	Internal control module software incompatibility	Calibration parameter failure	Re-configure the RJB using the manufacturer approved diagnostic system. Clear DTC and re-test, if DTC remains, suspect the RJB, refer to the new module installation note at the top of the DTC Index
U1A1449	CAN initialisation	Internal electronic failure	Install a new RJB, refer to the new module installation note at

	failure		the top of the DTC Index
U300049	Control module	Internal electronic failure	Install a new RJB, refer to the new module installation note at the top of the DTC Index
U300055	Stored vehicle configuration data does not match	Incorrect car configuration data received	Re-configure the RJB using the manufacturer approved diagnostic system. Clear DTC and re-test. If the DTC remains suspect the RJB, refer to the new module installation note at the top of the DTC Index
U300281	Vehicle Identification Number (VIN)	Vehicle/component mismatch. Corrupt VIN data being transmitted, module previously installed to other vehicle	Install original module, check for DTCs and refer to relevant DTC Index

Central Junction Box (CJB)

DTC	Description	Possible Cause	Action
B100951	Ignition authorisation	- Faulty instrument cluster - Target SID re-synchronisation error following programming - CAN fault	Check ignition, power and ground supplies to CJB and instrument cluster. Re-synchronize ID by re-configuring the instrument cluster as a new module. Check CAN communications between instrument cluster and tester
B100962	Ignition authorisation signal compare failure	- Low speed CAN fault - CJB fault - Instrument cluster fault - Incorrect module installed (CJB/Instrument cluster) - Target SID synchronisation error following re-programming - Noise/EMC related error	Check CAN communications between CJB and instrument cluster. Check ignition, power and ground supplies to CJB and instrument cluster. Confirm correct module is installed. Re-synchronise ID by re-configuring the instrument cluster as a new module. Check CAN network for interference/EMC related issues

B100963	Ignition authorisation time-out	• CJB fault • Low speed CAN fault • Instrument cluster fault • Low battery voltage <9V	Check Power and Ground supplies to CJB and instrument cluster. Check CAN communications between CJB and instrument cluster. Check battery is in fully charged and serviceable condition, refer to the battery care manual
B100964	Ignition authorisation signal plausibility failure	• CJB fault • Low speed CAN fault • Instrument cluster fault	Check power and ground supplies to CJB and instrument cluster. Check CAN communications between CJB and instrument cluster
B102611	Steering column lock power circuit short to ground or over temperature	• Circuit short to ground	Refer to the electrical circuit diagrams and test steering column lock power circuit for short to ground
B102613	Steering column lock power circuit open load	• Circuit open	Refer to the electrical circuit diagrams and test steering column lock power circuit for high resistance
B102B67	Passive key authorisation signal incorrect after event	• CJB fault • Low speed CAN fault • Remote Keyless Entry (RKE) module fault • Write target SID synchronisation error following re-programming	Check power and ground supplies to CJB and RKE module. Check CAN communications between CJB and RKE module. Re-synchronise ID by re-configuring the RKE module as a new module
B102B87	Passive key authorisation missing message	• CJB fault • Low speed CAN fault • RKE module fault • Key fob battery low/battery contact issue • Interference from other RF signal • EMC/noise • Receiver fault • Receiver not programmed correctly • Serial communications fault (between receiver and RKE module)	Check power and ground supplies to CJB, RKE module and receiver. Check CAN communications between CJB and instrument cluster. Check key fob battery. Confirm vehicle surroundings, move vehicle. Check CAN network for interference/EMC related issues. Disconnect battery, then re-connect - confirm operation by re-programming keys. Check

		• Key fault • Passive antenna fault • Confirm placement of key within vehicle	serial circuit between receiver and RKE module. Confirm spare key works. Refer to the electrical circuit diagrams and test circuits to all 3 antennas. Check whereabouts of key
B108A23	Start button stuck	• Signal stuck low	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B108A29	Start button fault	• Signal invalid	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B109511	Wiper On Off relay control circuit short to ground	• Circuit short to ground	Refer to the electrical circuit diagrams and test wiper On Off relay control circuit for short to ground
B109512	Wiper On Off relay control circuit short to power	• Circuit short to power	Refer to the electrical circuit diagrams and test wiper On Off relay control circuit for short to power
B109612	Wiper speed relay control circuit short to power	• Circuit short to power	Refer to the electrical circuit diagrams and test wiper speed relay control circuit for short to power
B109614	Wiper speed relay control circuit open load or short to ground	• Circuit short to ground or open	Refer to the electrical circuit diagrams and test wiper speed relay control circuit for high resistance or short to ground
B109712	Heated front windshield relay control circuit short to power	• Circuit short to power	Refer to the electrical circuit diagrams and test heated front windshield relay control circuit for short to power
B109714	Heated front windshield relay control circuit	• Circuit short to ground or open	Refer to the electrical circuit diagrams and test heated front windshield relay control circuit

	open load or short to ground		for high resistance or short to ground
B109F11	Intrusion sensor module power circuit short to ground	• Circuit short to ground	Refer to the electrical circuit diagrams and test intrusion sensor module power circuit for short to ground
B10AD11	Rain sensor power circuit short to ground or over temperature	• Circuit short to ground	Refer to the electrical circuit diagrams and test rain sensor power circuit for short to ground
B10AD13	Rain sensor power circuit open load	• Circuit open	Refer to the electrical circuit diagrams and test rain sensor power circuit for high resistance
B10AD49	Rain sensor internal fault	• Internal electronic failure	Install a new rain sensor. Rain Sensor (84.12.10)
B10DB23	Front left global close	• Signal stuck low	Refer to the electrical circuit diagrams and test Front left global close circuit for short to ground
B10DC23	Front right global close	• Signal stuck low	Refer to the electrical circuit diagrams and test Front right global close circuit for short to ground
B10E511	ECM wake-up signal short to ground	• Circuit short to ground	Refer to the electrical circuit diagrams and test ECM wake-up signal for short to ground
B10F111	Key In switch circuit short to ground	• Circuit short to ground	Refer to the electrical circuit diagrams and test Key In switch circuit for short to ground
B10F311	Front left side lamp control circuit short to ground or over temperature	• Circuit short to ground	Refer to the electrical circuit diagrams and test front left side lamp control circuit for short to ground
B10F313	Front left side lamp control circuit	• Circuit open	Refer to the electrical circuit diagrams and test front left side

	open load		lamp control circuit for high resistance
B10F411	Front right side lamp control circuit short to ground or over temperature	• Circuit short to ground	Refer to the electrical circuit diagrams and test front right side lamp control circuit for short to ground
B10F413	Front right side lamp control circuit open load	• Circuit open	Refer to the electrical circuit diagrams and test front right side lamp control circuit for high resistance
B10F812	Cigar lighter relay control circuit short to power	• Circuit short to power	Refer to the electrical circuit diagrams and test cigar lighter relay control circuit for short to power
B10F814	Cigar lighter relay control circuit open load or short to ground	• Circuit short to ground or open	Refer to the electrical circuit diagrams and test cigar lighter relay control circuit for high resistance or short to ground
B10F912	Accessory socket 'B' relay short to power	• Circuit short to power	Refer to the electrical circuit diagrams and test Accessory socket 'B' relay for short to power
B10F914	Accessory socket 'B' relay open load or short to ground	• Circuit short to ground or open	Refer to the electrical circuit diagrams and test Accessory socket 'B' relay for high resistance or short to ground
B10FA12	Delayed power off relay power output circuits short to power	• Circuit short to power	Refer to the electrical circuit diagrams and test delayed power off relay power output circuits for short to power
B10FA14	Delayed power off relay power output circuits open load or short to ground	• Circuit short to ground or open	Refer to the electrical circuit diagrams and test delayed power off relay power output circuits for high resistance or short to ground

B10FF11	Engine Junction Box (EJB) and ECM ignition relay control circuit short to ground or over temperature	• Circuit short to ground	Refer to the electrical circuit diagrams and test EJB and ECM ignition relay control circuits for short to ground
B10FF13	Engine Junction Box (EJB) and ECM ignition relay control circuit open load	• Circuit open	Refer to the electrical circuit diagrams and test EJB and ECM ignition relay control circuits for high resistance
B110011	O2 sensor heater relay control circuit short to ground or over temperature	• Circuit short to ground	Refer to the electrical circuit diagrams and test O2 sensor heater relay control circuit for short to ground
B110013	O2 sensor heater relay control circuit open load	• Circuit open	Refer to the electrical circuit diagrams and test O2 sensor heater relay control circuit for high resistance
B113F12	Intruder detection arm/disarm control circuit short to power	• Circuit short to power	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B114011	Engine crank authorisation circuit short to ground or over temperature	• Engine crank authorisation circuit short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B114013	Engine crank authorisation circuit open load	• Engine crank authorisation circuit high resistance	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B114211	Ignition supply status circuits 1 short to ground or over temperature	• Circuit short to ground	Refer to the electrical circuit diagrams and test ignition supply status circuits 1 for short to ground

B114213	Ignition supply status circuits 1 open load	• Circuit open	Refer to the electrical circuit diagrams and test ignition supply status circuits 1 for high resistance
B114311	Ignition supply status circuits 2 short to ground or over temperature	• Circuit short to ground	Refer to the electrical circuit diagrams and test ignition supply status circuits 2 for short to ground
B114313	Ignition supply status circuits 2 open load	• Circuit open	Refer to the electrical circuit diagrams and test ignition supply status circuits 2 for high resistance
B114411	Steering wheel heater supply circuit short to ground or over temperature	• Circuit short to ground	Refer to the electrical circuit diagrams and test steering wheel heater supply circuit for short to ground
B114413	Steering wheel heater supply circuit open load	• Circuit open	Refer to the electrical circuit diagrams and test steering wheel heater supply circuit for high resistance
B114611	Passive sounder supply circuit short to ground or over temperature	• Circuit short to ground	Refer to the electrical circuit diagrams and test passive sounder supply circuit for short to ground
B114613	Passive sounder supply circuit open load	• Circuit open	Refer to the electrical circuit diagrams and test passive sounder supply circuit for high resistance
B114711	Front left fog lamp control circuit short to ground or over temperature	• Circuit short to ground	Refer to the electrical circuit diagrams and test front left fog lamp control circuit for short to ground
B114713	Front left fog lamp control circuit open load	• Circuit open	Refer to the electrical circuit diagrams and test front left fog lamp control circuit for high

			resistance
B114811	Front right fog lamp control circuit short to ground or over temperature	• Circuit short to ground	Refer to the electrical circuit diagrams and test front right fog lamp control circuit for short to ground
B114813	Front right fog lamp control circuit open load	• Circuit open	Refer to the electrical circuit diagrams and test front right fog lamp control circuit for high resistance
B115A11	Front passenger seat heater supply circuit short to ground or over temperature	• Circuit short to ground	Refer to the electrical circuit diagrams and test front passenger seat heater supply circuit for short to ground
B115A13	Front passenger seat heater supply circuit open load	• Circuit open	Refer to the electrical circuit diagrams and test front passenger seat heater supply circuit for high resistance
B115B11	Front driver seat heater supply circuit short to ground or over temperature	• Circuit short to ground	Refer to the electrical circuit diagrams and test front driver seat heater supply circuit for short to ground
B115B13	Front driver seat heater supply circuit open load	• Circuit open	Refer to the electrical circuit diagrams and test front driver seat heater supply circuit for high resistance
B1A9801	LIN Bus short to ground or power	• General electrical failure	Refer to the electrical circuit diagrams and test LIN Bus for short to ground or power
B1A9881	LIN Bus header error	• Invalid serial data received	Refer to the electrical circuit diagrams and test LIN circuit to battery backed sounder for short to ground, power, high resistance

B1A9883	LIN Bus checksum error	Value of signal protection calculation incorrect	Install a new CJB, refer to the new module installation note at the top of the DTC Index
B1B651C	Front left seat heater temperature sensor fault	Circuit voltage out of range	Refer to the electrical circuit diagrams and test front left seat heater temperature sensor circuit for short to ground, power, high resistance
B1B661C	Front right seat heater temperature sensor fault	Circuit voltage out of range	Refer to the electrical circuit diagrams and test front left seat heater temperature sensor circuit for short to ground, power, high resistance
B1C4323	Master light switch stuck	Signal stuck low	Refer to the electrical circuit diagrams and test master light switch circuit for short to ground
B1C4523	Front wiper park position stuck	Signal stuck low	Refer to the electrical circuit diagrams and test wiper park position switch circuit for short to ground
B1C7812	Powerwash relay control circuit short to power	Circuit short to power	Refer to the electrical circuit diagrams and test powerwash relay control circuit for short to power
B1C7814	Powerwash relay control circuit open load or short to ground	Circuit short to ground or open	Refer to the electrical circuit diagrams and test powerwash relay control circuit for high resistance or short to ground
B1C7911	Windshield washer pump control circuit short to ground or over temperature	Circuit short to ground	Refer to the electrical circuit diagrams and test windshield washer pump control circuit for short to ground
B1C7913	Windshield washer pump control circuit open load	Circuit open	Refer to the electrical circuit diagrams and test windshield washer pump control circuit for

			high resistance
B1C9811	Front left cornering lamp control circuit short to ground or over temperature	• Circuit short to ground	Refer to the electrical circuit diagrams and test front left cornering lamp control circuit for short to ground
B1C9813	Front left cornering lamp control circuit open load	• Circuit open	Refer to the electrical circuit diagrams and test front left cornering lamp control circuit for high resistance
B1C9911	Front right cornering lamp control circuit short to ground or over temperature	• Circuit short to ground	Refer to the electrical circuit diagrams and test front right cornering lamp control circuit for short to ground
B1C9913	Front right cornering lamp control circuit open load	• Circuit open	Refer to the electrical circuit diagrams and test front right cornering lamp control circuit for high resistance
B1D0011	Front left low beam control circuit short to ground or over temperature	• Circuit short to ground	Refer to the electrical circuit diagrams and test front left low beam control circuit for short to ground
B1D0013	Front left low beam control circuit open load	• Circuit open	Refer to the electrical circuit diagrams and test front left low beam control circuit for high resistance
B1D0111	Front right low beam control circuit short to ground or over temperature	• Circuit short to ground	Refer to the electrical circuit diagrams and test front right low beam control circuit for short to ground
B1D0113	Front right low beam control circuit open load	• Circuit open	Refer to the electrical circuit diagrams and test front right low beam control circuit for high resistance

B1D0211	Front left high beam control circuit short to ground or over temperature	• Circuit short to ground	Refer to the electrical circuit diagrams and test front left high beam control circuit for short to ground
B1D0213	Front left high beam control circuit open load	• Circuit open	Refer to the electrical circuit diagrams and test front left high beam control circuit for high resistance
B1D0311	Front right high beam control circuit short to ground or over temperature	• Circuit short to ground	Refer to the electrical circuit diagrams and test front right high beam control circuit for short to ground
B1D0313	Front right high beam control circuit open load	• Circuit open	Refer to the electrical circuit diagrams and test front right high beam control circuit for high resistance
B1D1711	Battery backed sounder power circuit short to ground	• Circuit short to ground	Refer to the electrical circuit diagrams and test battery backed sounder power circuit for short to ground
B1D1787	Battery backed sounder reply failure	• Missing message	Refer to the electrical circuit diagrams and test LIN Bus for short to ground, power or high resistance
B1D2711	Heater coolant pump control circuit short to ground or over temperature	• Circuit short to ground	Refer to the electrical circuit diagrams and test heater coolant pump control circuit for short to ground
B1D2713	Heater coolant pump control circuit open load	• Circuit open	Refer to the electrical circuit diagrams and test heater coolant pump control circuit for high resistance
P080111	Reverse inhibit to rear view mirror	• Circuit short to ground	Refer to the electrical circuit diagrams and test reverse inhibit

	circuit short to ground or over temperature		to rear view mirror circuit for short to ground
P080113	Reverse inhibit to rear view mirror circuit open load	• Circuit open	Refer to the electrical circuit diagrams and test reverse inhibit to rear view mirror circuit for open load
U001088	Medium speed CAN communication Bus	• Bus Off	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U014200	Lost communication with RJB	• Lost communication with RJB	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U015500	Lost communication with instrument cluster	• Lost communication with instrument cluster	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U015600	Lost communication with Information and Entertainment module	• Lost Communication with Information and Entertainment module	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U016400	Lost communication with climate control module	• Lost communication with climate control module	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U019900	Lost communication with Driver Door Module (DDM)	• Lost communication with DDM	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U020000	Lost communication with Passenger Door Module	• Lost communication with PDM	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system

	(PDM)		
U020600	Lost communication with convertible top module	Lost communication with convertible top module	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U021400	Lost communication with remote keyless entry module	Lost communication with remote keyless entry module	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U030000	Internal control module software incompatibility	Invalid configuration message is received	Re-configure the RJB using the manufacturer approved diagnostic system. Clear the DTC and retest. If the DTC is still logged suspect the CJB module, refer to the new module installation note at the top of the DTC Index
U030046	Internal control module software incompatibility	Calibration parameter failure	Re-calibrate the CJB using the manufacturer approved diagnostic system
U1A1449	CAN initialisation failure	Internal electronic failure	Install a new CJB, refer to the new module installation note at the top of the DTC Index
U201011	Switch illumination supply circuit short to ground or over temperature	Circuit short to ground	Refer to the electrical circuit diagrams and test switch illumination supply circuit for short to ground
U201013	Switch illumination supply circuit open load	Circuit open	Refer to the electrical circuit diagrams and test switch illumination supply circuit for high resistance
U300049	Control module	Internal electronic failure	Install a new CJB, refer to the new module installation note at the top of the DTC Index

U300055	Stored vehicle configuration data does not match	Incorrect car configuration data received	Re-configure the RJB using the manufacturer approved diagnostic system. Clear DTC and re-test. If the DTC remains suspect the CJB, refer to the new module installation note at the top of the DTC Index
U300087	Control Module	Missing message	Re-configure the RJB using the manufacturer approved diagnostic system. Check CJB for DTCs and refer to the DTC Index. Check CAN network integrity using the manufacturer approved diagnostic system
U300281	Vehicle Identification Number (VIN)	Vehicle/component mismatch. Corrupt VIN data being transmitted, module previously installed to other vehicle	Install original module, check for DTCs and refer to relevant DTC Index
U300316	Battery voltage	Circuit voltage below threshold	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U300317	Battery voltage	Circuit voltage above threshold	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system

Auxiliary Junction Box (AJB) (86.70.55)

Removal

- 1 . Remove the cover and disconnect the battery ground cable.
For additional information, refer to

- 2 . Release the auxiliary junction box access cover.

▶ Release from the clip.



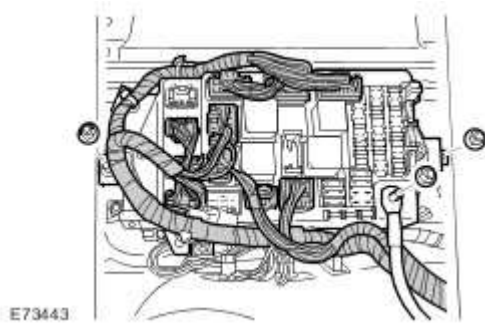
- 3 . Release the auxiliary junction box.

▶ Disconnect the 10 electrical connectors.

▶ Disconnect the battery positive cable.

- 4 . Remove the auxiliary junction box.

▶ Remove the 2 nuts.



Installation

1 . Install the auxiliary junction box.

➤ Tighten the nuts to 10 Nm (7 lb.ft).

2 . Secure the auxiliary junction box.

➤ Connect the electrical connectors.

➤ Tighten the battery positive lead nut to 10 Nm (7 lb.ft).

3 . Secure the auxiliary junction box access cover.

➤ Secure in the clip.

4 . Connect the battery ground cable and install the cover.

For additional information, refer to

Central Junction Box (CJB) (86.70.72)

Removal

- 1 . Remove the cover and disconnect the battery ground cable.

For additional information, refer to

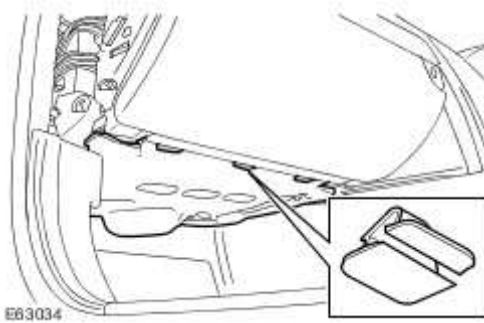
2



- **CAUTION: Removal of the clips is a delicate procedure, damage will occur if any force is used.**

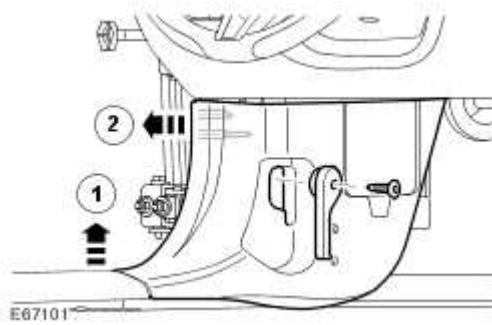
Remove the passenger side footwell trim panel.

- ▶ Remove the 3 clips.



- 3 . Remove the cowl side trim panel.

- ▶ Remove the Torx screw.
- ▶ Remove the hood release lever.
- ▶ Release the forward edge of the scuff plate trim panel.
- ▶ Carefully release the clips.



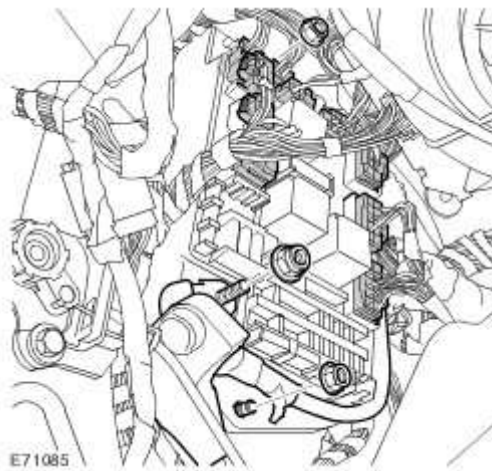
4 . Release the CJB.

▶ Release the battery positive cables.

5 . Remove the CJB.

▶ Disconnect the 10 electrical connectors.

▶ Remove the 2 nuts.



Installation

1 . Install the CJB.

▶ Disconnect the electrical connectors.

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

2 . Secure the CJB.

 Attach the battery positive cables.

 Tighten the nut to 25 Nm (18 lb.ft).

3 . Install the cowl side trim panel.

 Align the pegs and secure the clip.

 Install the scuff plate trim panel.

 Install the hood release lever and secure with the screw.

4 . Install the passenger side footwell trim panel.

 Carefully secure the clips.

5 . Connect the battery ground cable and install the cover.

For additional information, refer to

6 . Using WDS, configure a new CJB.

418-01 : Module Configuration

Diagnosis and testing

Module Configuration

Principles of Operation

Module Configuration

There are two modes of configuration data. The first type requires configuration information so that the module can interact with the vehicle correctly. This information will be transferred to the new module using the manufacturer approved diagnostic system, so that it will contain the same settings as the old module.

New modules which require configuration after installation are:

- Anti-lock control - stability assist module
- Speed control module
- Climate control module
- Adaptive damping module
- Headlamp levelling module
- Driver door module (DDM)
- Driver seat module (DSM)
- Engine control module (ECM)
- Parking brake module
- Central Junction Box (CJB)
- Navigation system display module
- Integrated audio module (CD player)
- Information and entertainment module
- Integrated control panel
- Audio amplifier
- Instrument cluster
- Remote keyless entry (RKE) module
- Multimedia (navigation) module
- Parking aid module
- Passenger door module (PDM)
- Pedestrian protection system module
- Passenger seat module (PSM)
- Restraints control module (RCM)
- Rear Junction Box (RJB)
- Steering column lock
- Transmission control module (TCM)
- Telephone control module
- Tire pressure monitoring system

Customer Driven Preferences

The second type of configuration data is customer preference driven. These are items that the customer may or may not want to have enabled. Typically, customer preference items can be toggled on or off by the use of a compatible scan tool. You may need to ask the customer which preferences they had enabled prior to installation of a new module, although after installation they will automatically learn the settings by receiving information from existing modules.

To carry out the customer preference configuration process, use the manufacturer approved diagnostic system. Refer to the configuration menu and select 'Vehicle Configuration'. Customer options can be selected or de-selected by modifying the 'Car Configuration File'.

418-02 : Wiring Harnesses

Removal and installation

Engine Wiring Harness - 4.2L NA V8 - AJV8

Removal

- 1 . Remove the cover and disconnect the battery ground cable.

For additional information, refer to

2



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

Raise and support the vehicle.

- 3 . Remove the engine cover.

For additional information, refer to Engine Cover (76.11.35)

- 4 . Remove the engine control module (ECM).

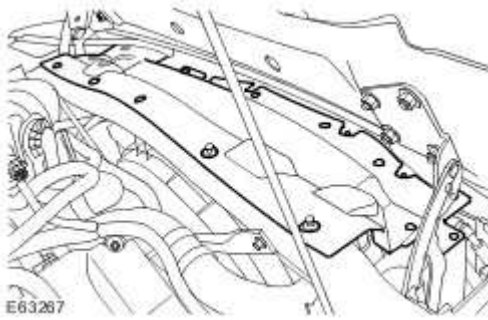
For additional information, refer to Engine Control Module (ECM) (18.30.01)

- 5 . Recover the A/C refrigerant.

- 6 . Remove the fan cowl.

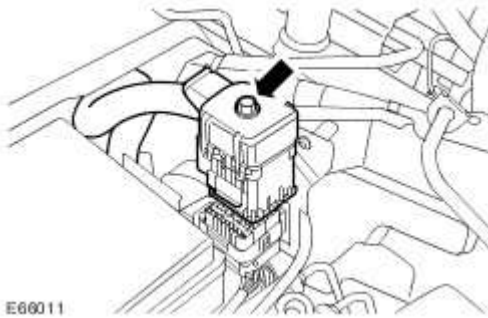


Remove the 15 clips.



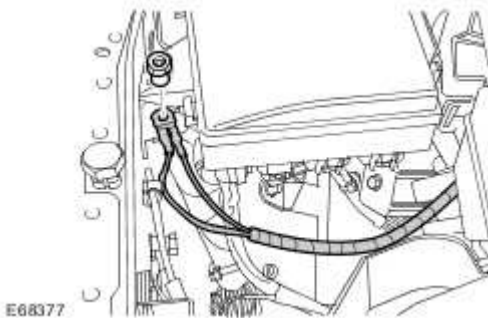
7 . Release and disconnect the engine wiring harness electrical connector.

► Fully loosen the bolt.



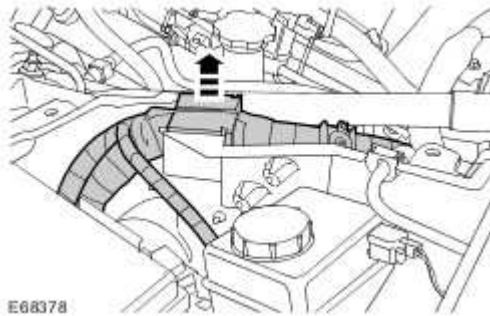
8 . Release the ground cable from the power distribution box bracket.

► Remove the nut.



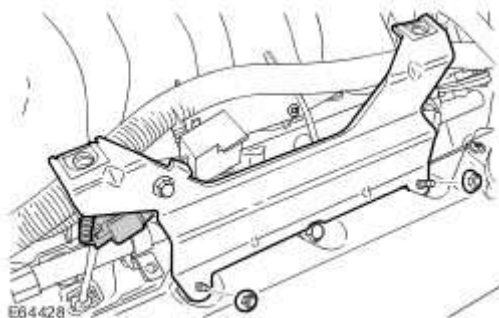
9 . Release the engine wiring harness from the engine compartment side wall.

- ▶ Release the grommet.



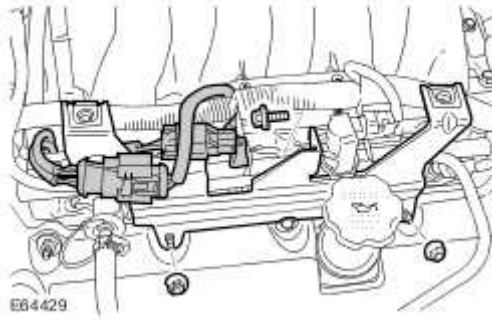
10 . Remove the engine cover RH bracket.

- ▶ Remove the 2 nuts.
- ▶ Disconnect the electrical connector.



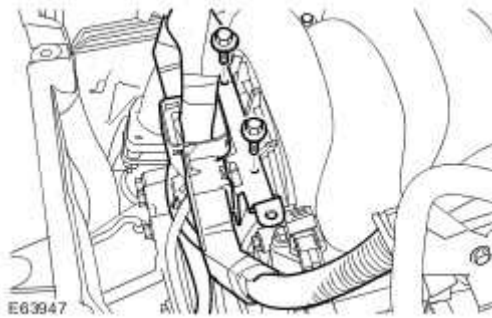
11 . Remove the engine cover LH bracket.

- ▶ Remove the 2 nuts.
- ▶ Release the 2 electrical connectors.
- ▶ Remove the purge valve bolt.



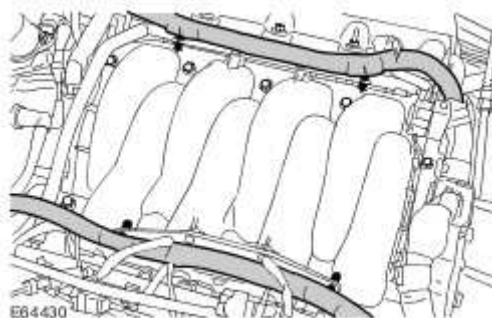
12 . Release the engine wiring harness from the rear of the engine.

▶ Remove the 2 bolts.

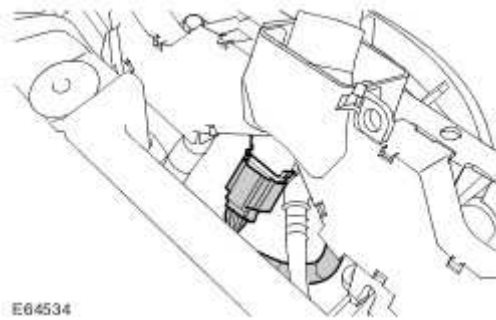


13 . Release the engine wiring harness from the intake manifold.

▶ Release the 4 clips.



14 . Disconnect the manifold absolute pressure (MAP) sensor electrical connector.

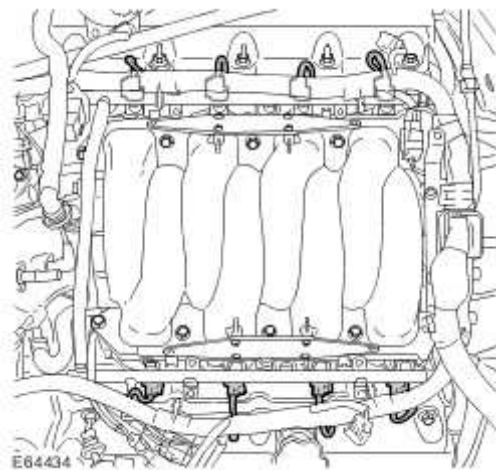


15 . Disconnect the fuel rail pressure (FRP) sensor electrical connector.

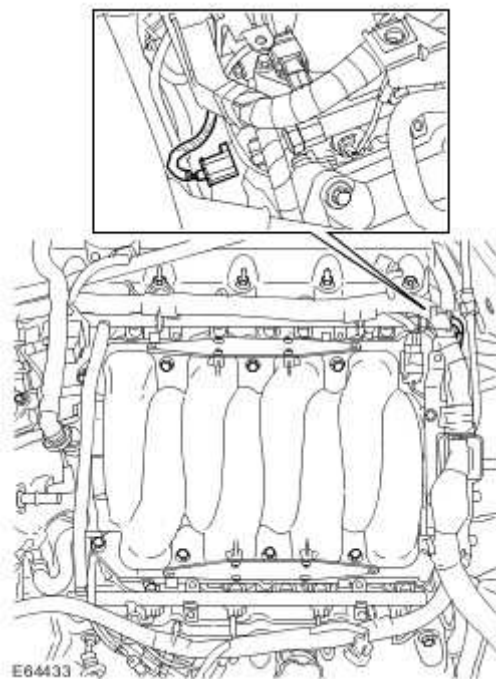
16 . Disconnect the knock sensors (KS) electrical connector.



17 . Disconnect the 8 fuel injector electrical connectors.



18 . Disconnect the fuel temperature sensor electrical connector.



19 . Disconnect the throttle position (TP) sensor electrical connector.



20 . Disconnect the exhaust gas recirculation (EGR) valve electrical connector.

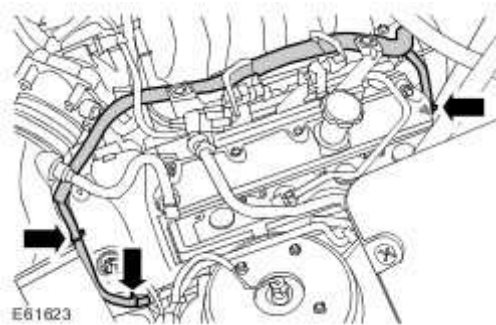


21 . NOTE:

LH illustration shown, RH is similar.

Release the engine wiring harness from the LH valve cover.

- ▶ Release the 3 clips.
- ▶ Repeat the above procedure for the RH side.

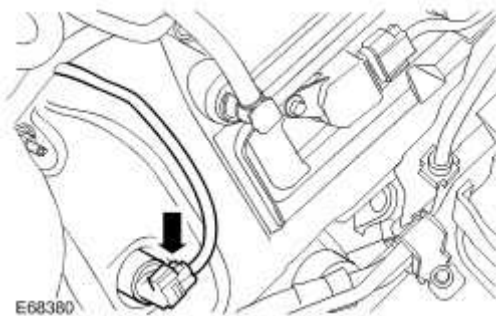


22 . NOTE:

LH illustration shown, RH is similar.

Disconnect the LH variable camshaft timing (VCT) oil solenoid electrical connector.

- ▶ Repeat the above procedure for the RH side.



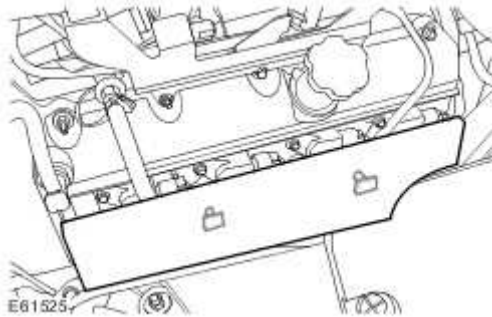
23 . NOTE:

LH illustration shown, RH is similar.

Remove the LH ignition coil-on-plug cover.

▶ Release from the 2 clips.

▶ Repeat the above procedure for the RH side.

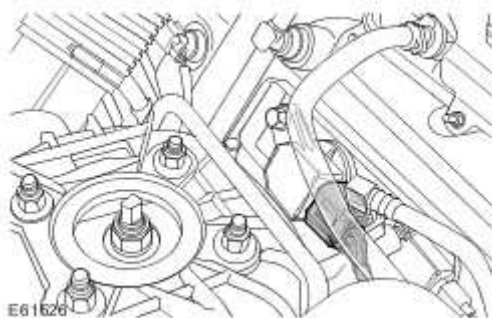


24 . NOTE:

LH illustration shown, RH is similar.

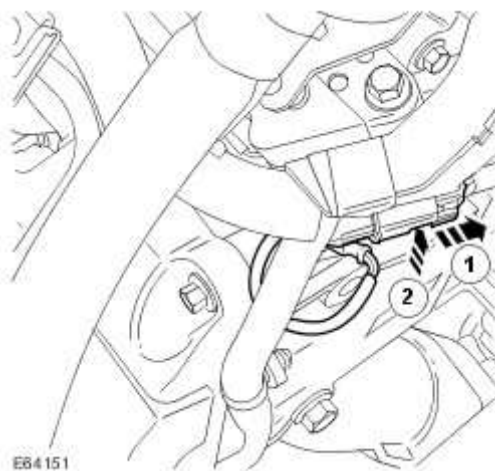
Disconnect the ignition coil-on-plug electrical connector.

▶ Repeat the above procedure for the remaining 7 coil-on- plugs.



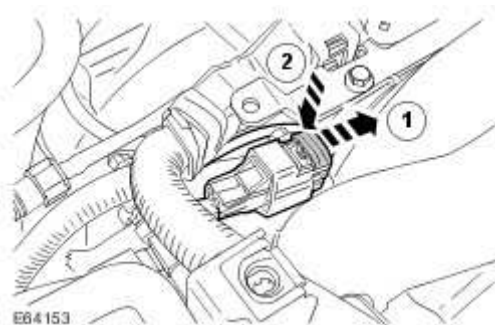
25 . Disconnect the LH camshaft position CMP sensor electrical connector.

▶ Slide the red connector latch to one side.

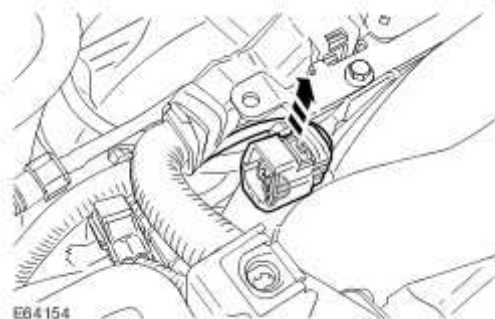


26 . Disconnect the RH CMP sensor electrical connector.

▶ Slide the red connector latch to one side.

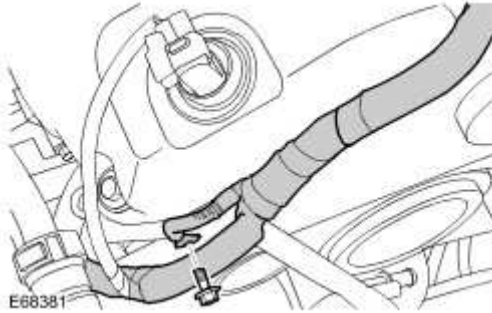


27 . Release the RH CMP sensor electrical connector.



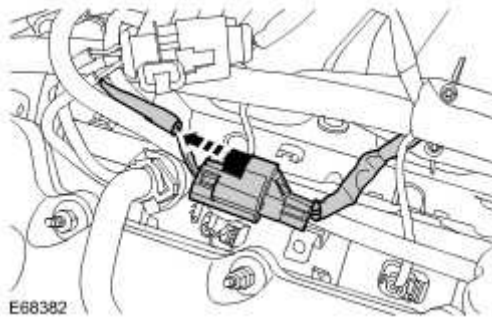
28 . Disconnect the engine front cover ground cable.

▶ Remove the bolt.



29 . Disconnect the engine coolant temperature (ECT) sensor electrical connector.

▶ Slide the red connector latch to one side.



30 . Remove the power steering pump.

For additional information, refer to Power Steering Pump - 4.2L NA V8 - AJV8 (57.20.14)

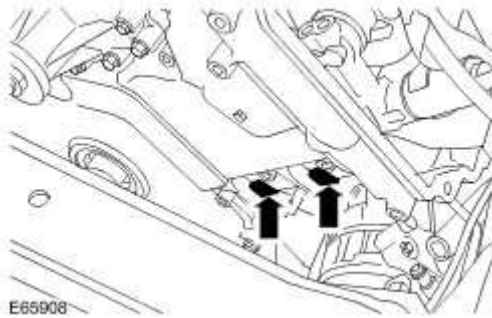
31 . Remove the power steering pump mounting bracket.

▶ Remove the 4 bolts.

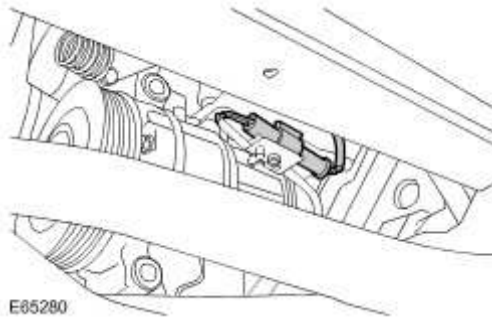


32 . LH side: Release the engine wiring harness.

▶ Release the 2 clips.

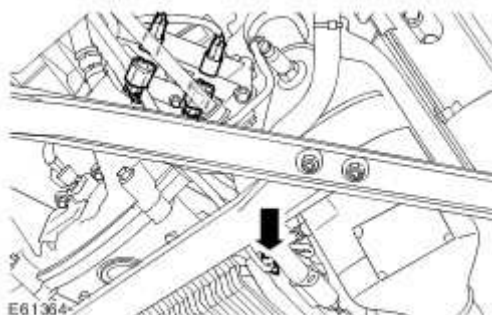


33 . Disconnect the A/C compressor electrical connector.



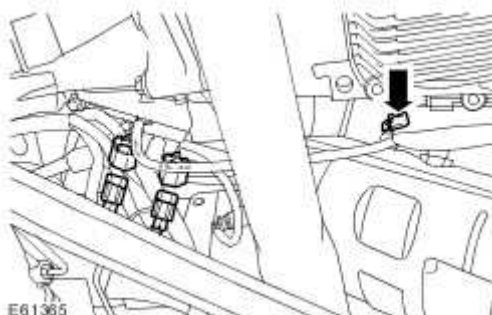
34 . Release and disconnect the 2 LH HO2S electrical connectors.

▶ Release the clip.



35 . Release and disconnect the 2 RH HO2S electrical connectors.

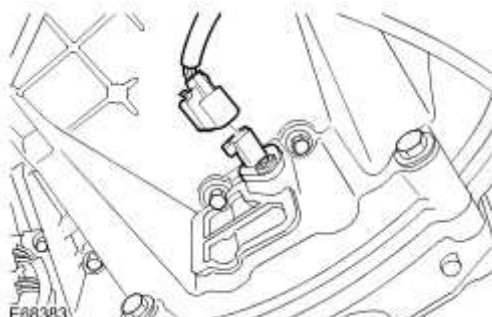
► Release the clip.



36 . **NOTE:**

Clean the components general area prior to dismantling.

Disconnect the crankshaft position (CKP) sensor electrical connector.



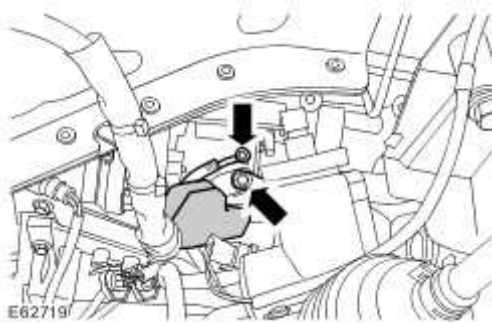
37 . Disconnect the starter motor battery positive and generator cables.

▶ Release the cover.

▶ Remove the nut.

38 . Disconnect the starter motor solenoid electrical connector.

▶ Remove and discard the nut.



39 . Disconnect the engine oil pressure (EOP) sensor electrical connector.

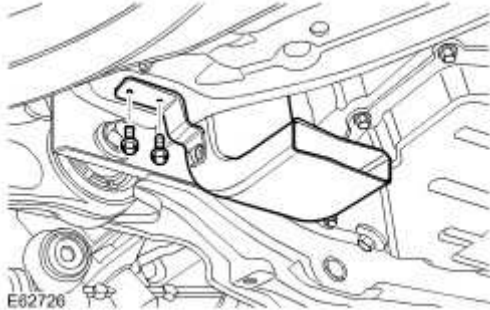


40 . Disconnect the engine oil temperature sensor electrical connector.



41 . Remove the generator cooling duct.

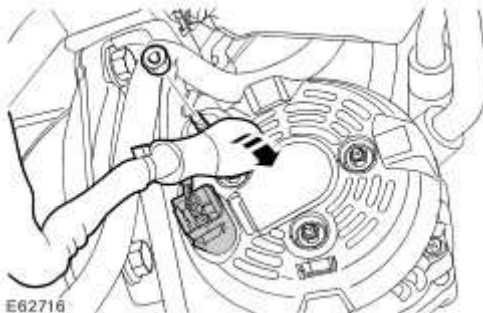
▶ Remove the 2 screws.



42 . Disconnect the generator electrical connectors.

▶ Release the cover.

▶ Remove the nut.

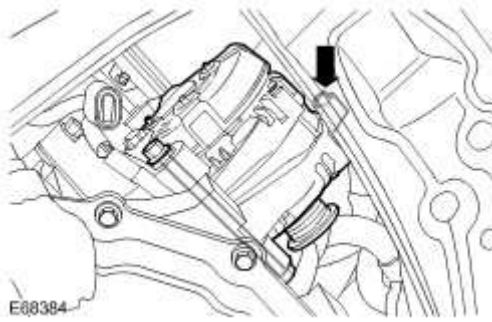


43 . Release the generator.

▶ Remove the nut.

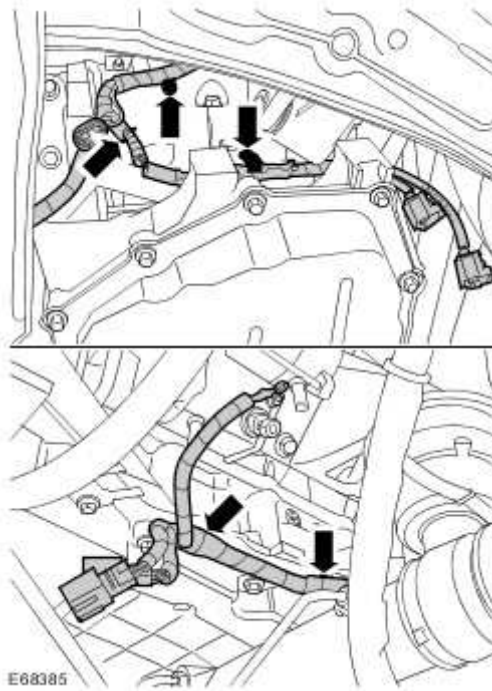
▶ Remove the nut and bolt.

▶ Position the generator aside to access the engine wiring harness clips.



44 . RH side: Release the engine wiring harness.

▶ Release the 5 clips.



45 . Remove the engine wiring harness.

Installation

1 . Install the engine wiring harness.

2 . RH side: Attach the wiring harness.

▶ Secure the clips.

3 . Install the generator.

▶ Tighten the nut to 25 Nm (18 lb.ft).

▶ Tighten the nut and bolt to 40 Nm (30 lb.ft).

4 . Connect the generator electrical connectors.

▶ Tighten the nut to 12 Nm (9 lb.ft).

▶ Secure the cover.

5 . Install the generator cooling duct.

▶ Tighten the screws.

6 . Connect the engine oil temperature sensor electrical connector.

7 . Connect the EOP sensor electrical connector.

8 . Connect the starter motor solenoid electrical connector.

▶ Tighten the new nut to 7 Nm (5 lb.ft).

9 . Connect the starter motor battery positive and generator cables.

▶ Tighten the nut to 10 Nm (7 lb.ft).

▶ Secure the cover.

10 . Connect the CKP sensor electrical connector.

11 . Connect and secure the HO2S electrical connectors.

 Secure the 2 clips.

12 . Connect the A/C compressor electrical connector.

13 . LH side: Attach the wiring harness.

 Secure the clips.

14 . Install the power steering pump mounting bracket.

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

15 . Install the power steering pump.

For additional information, refer to Power Steering Pump - 4.2L NA V8 - AJV8 (57.20.14)

16 . Connect and secure the ECT sensor electrical connector.

17 . Connect the engine front cover ground cable.

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

18 . Connect and secure the CMP sensor electrical connectors.

19 . Connect the ignition coil-on-plug electrical connectors.

20 . Install the ignition coil-on-plug covers.

 Position and secure the clips.

21 . Connect the VCT solenoid electrical connectors.

22 . Attach the engine wiring harness to the valve covers.

 Secure with the clips.

23 . Connect the EGR valve electrical connector.

24 . Connect the TP sensor electrical connector.

25 . Connect the fuel temperature sensor electrical connector.

26 . Connect the fuel injector electrical connectors.

27 . Connect the KS electrical connector.

28 . Connect the FRP sensor electrical connector.

29 . Connect the MAP sensor electrical connector.

30 . Attach the engine wiring harness to the intake manifold.

 Secure with the clips.

31 . Attach the engine wiring harness to the rear of the engine.

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

32 . Install the engine cover LH bracket.

▶ Attach the purge valve, align the peg and tighten the bolt to 6 Nm (4 lb.ft).

▶ Secure the electrical connectors.

▶ Tighten the nuts to 6 Nm (4 lb.ft).

33 . Install the engine cover RH bracket.

▶ Connect the electrical connector.

▶ Tighten the nuts to 6 Nm (4 lb.ft).

34 . Attach the ground cable to the power distribution box bracket.

▶ Tighten the nuts to 25 Nm (18 lb.ft).

35 . Attach the engine wiring harness to the engine compartment side wall.

▶ Position and secure the grommet.

36 . Connect the engine wiring harness electrical connector and secure with the captive bolt.

37 . Recharge the A/C system.

38 . Install the fan cowl.

 Secure with the clips.

39 . Install the ECM.

For additional information, refer to Engine Control Module (ECM) (18.30.01)

40 . Install the engine cover.

For additional information, refer to Engine Cover (76.11.35)

41 . Connect the battery ground cable and install the cover.

For additional information, refer to

Engine Wiring Harness - 4.2L SC V8 - AJV8

Removal

- 1 . Remove the cover and disconnect the battery ground cable.
For additional information, refer to Specifications

2



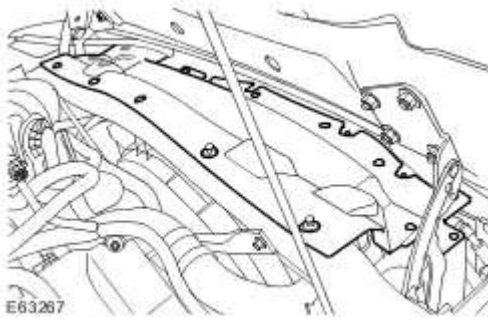
- **WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.**

Raise and support the vehicle.

- 3 . Remove the intake air resonator.
For additional information, refer to Intake Air Resonator
- 4 . Remove the engine control module (ECM).
For additional information, refer to Engine Control Module (ECM) (18.30.01)
- 5 . Recover the A/C refrigerant.
- 6 . Remove the fan cowl.

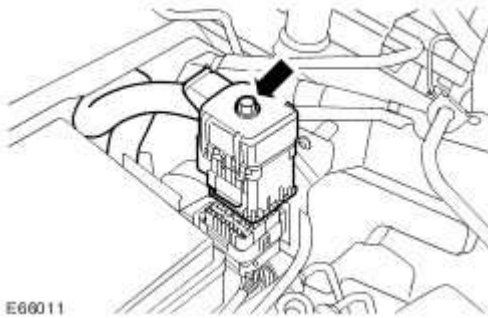


Remove the 15 clips.



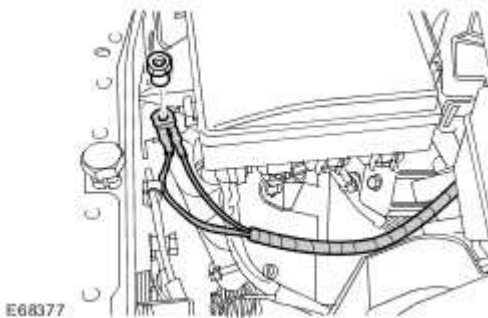
7 . Release and disconnect the engine wiring harness electrical connector.

► Fully loosen the bolt.



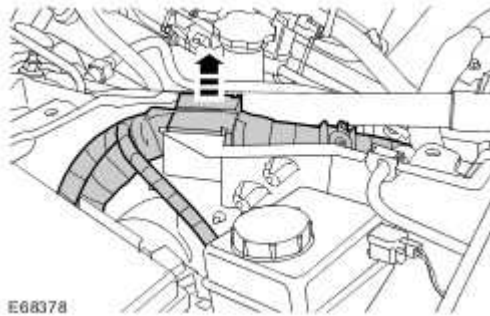
8 . Release the ground cable from the power distribution box bracket.

► Remove the nut.



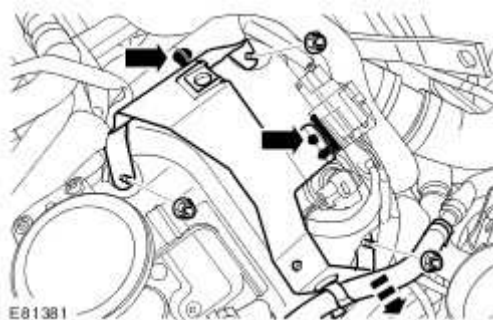
9 . Release the engine wiring harness from the engine compartment side wall.

- ▶ Release the grommet.



10 . Remove the engine cover RH bracket.

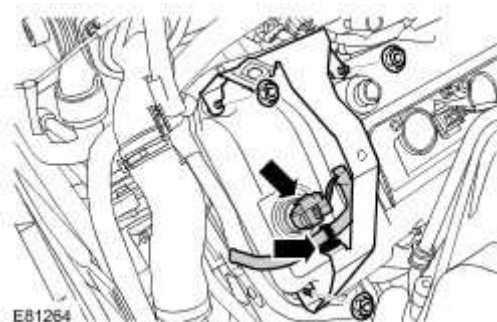
- ▶ Remove the 3 nuts.
- ▶ Release the 2 wiring harness clips.
- ▶ Release the hose.



11 . Disconnect the LH variable camshaft timing (VCT) oil control solenoid electrical connector.

12 . Remove the engine cover LH bracket.

- ▶ Remove the 3 nuts.
- ▶ Release the wiring harness.

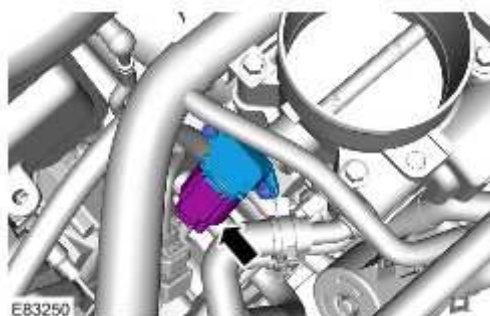


13 . Release the wiring harness from the rear of the engine.

▶ Remove the 2 bolts.



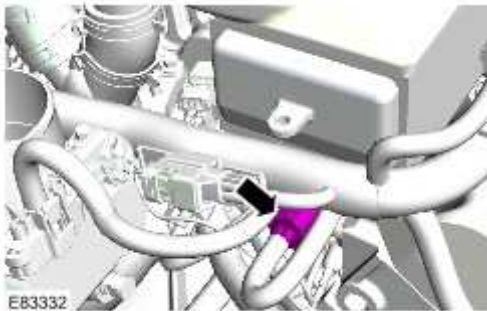
14 . Disconnect the manifold absolute pressure (MAP) sensor electrical connector.



15 . Disconnect the knock sensors (KS) electrical connector.



16 . Disconnect the fuel temperature sensor electrical connector.



17 . Disconnect the throttle position (TP) sensor electrical connector.



18 . Disconnect the exhaust gas recirculation (EGR) valve electrical connector.



19 . Disconnect the purge control valve (PCV) electrical connector.

▶ Release the wiring harness.



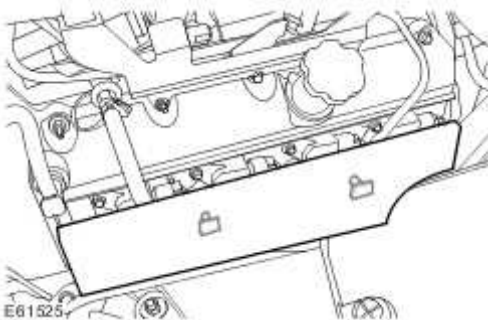
20 . **NOTE:**

LH illustration shown, RH is similar.

Remove the ignition coil-on-plug cover.

▶ Release from the 2 clips.

▶ Repeat the above procedure for the RH side.

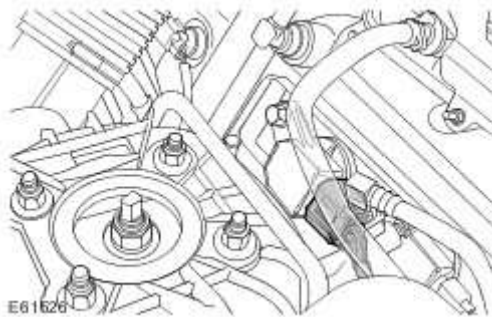


21 . **NOTE:**

LH illustration shown, RH is similar.

Disconnect the ignition coil-on-plug electrical connector.

- ▶ Repeat the above procedure for the remaining 7 coil-on- plugs.

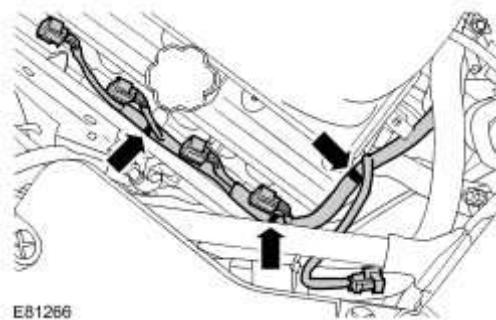


22 . NOTE:

LH illustration shown, RH is similar.

Release the coil-on-plug wiring harness.

- ▶ Release the 3 clips.
- ▶ Repeat the above procedure for the RH side.



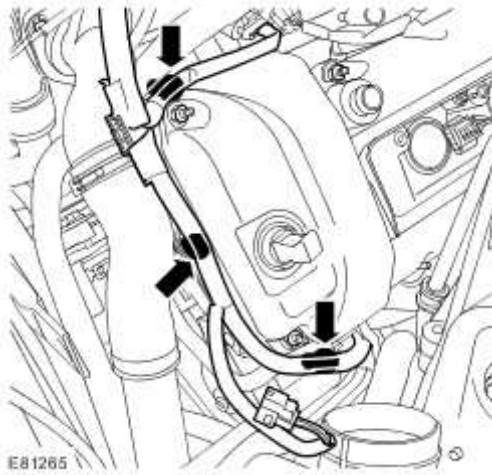
23 . NOTE:

LH illustration shown, RH is similar.

Release the engine wiring harness from the valve cover.

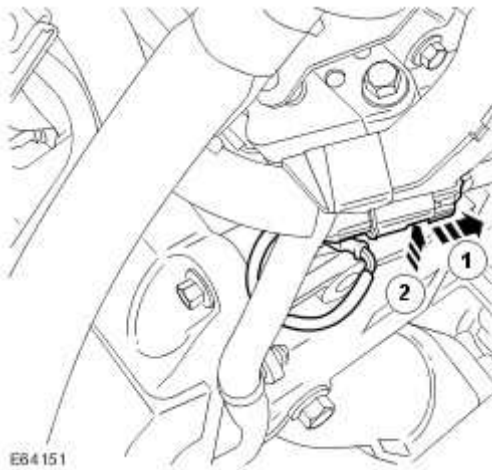
▶ Release the 3 clips.

▶ Repeat the above procedure for the RH side.



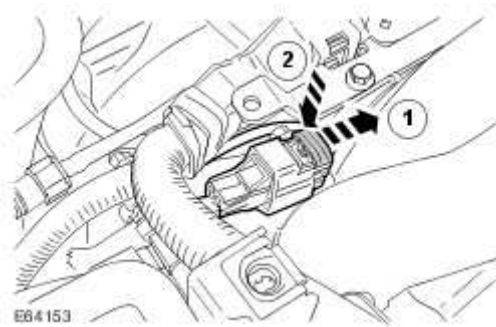
24 . Disconnect the LH camshaft position CMP sensor electrical connector.

▶ Slide the red connector latch to one side.



25 . Disconnect the RH CMP sensor electrical connector.

▶ Slide the red connector latch to one side.



26 . Disconnect the LH fuel injector wiring harness electrical connector.

▶ Slide the red connector latch to one side.

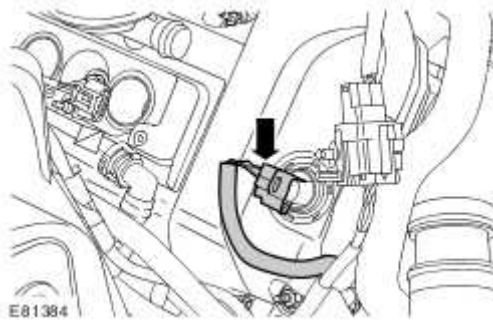


27 . Disconnect the RH fuel injector wiring harness electrical connector.

▶ Slide the red connector latch to one side.



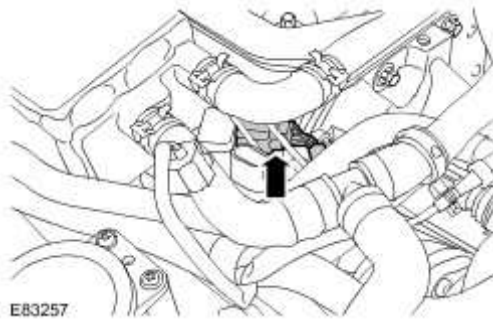
28 . Disconnect the variable camshaft timing (VCT) oil control solenoid electrical connector.



29 . Disconnect the fuel rail pressure (FRP) sensor electrical connector.



30 . Disconnect the intake air temperature (IAT) sensor electrical connector.



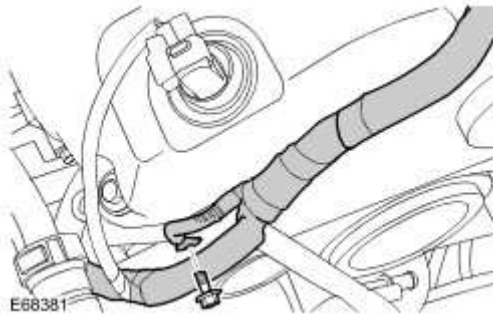
31 . Disconnect the RH mass air flow (MAF) sensor electrical connector.

▶ Slide the red connector latch to one side.



32 . Disconnect the engine front cover ground cable.

▶ Remove the bolt.



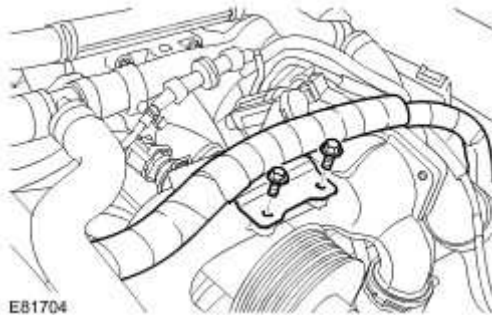
33 . Disconnect the secondary air injection switching valve electrical connector.



34 . Disconnect the engine coolant temperature (ECT) sensor electrical connector.

35 . Release the engine wiring harness from the coolant manifold.

▶ Remove the 2 bolts.



36 . Remove the power steering pump.

For additional information, refer to Power Steering Pump - 4.2L SC V8 - AJV8 (57.20.14)

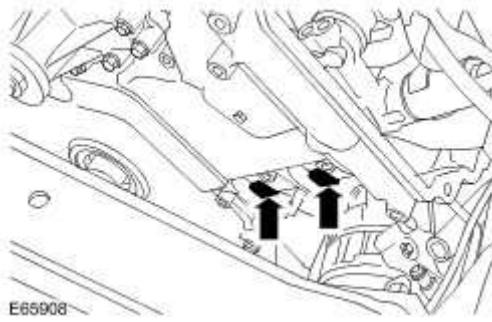
37 . Remove the power steering pump mounting bracket.

▶ Remove the 4 bolts.

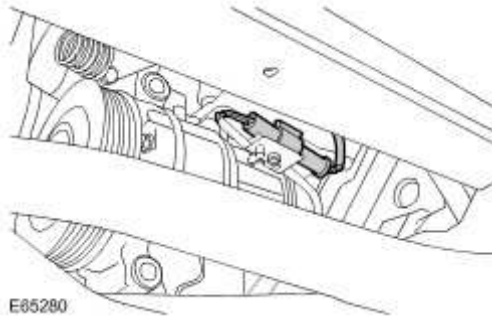


38 . LH side: Release the engine wiring harness.

▶ Release the 2 clips.

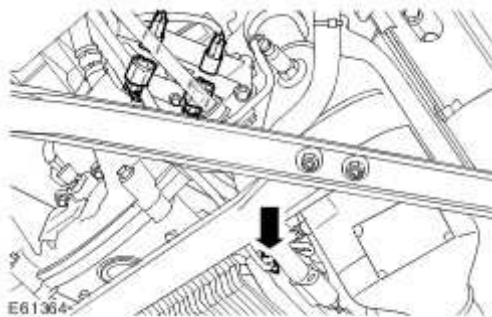


39 . Disconnect the A/C compressor electrical connector.



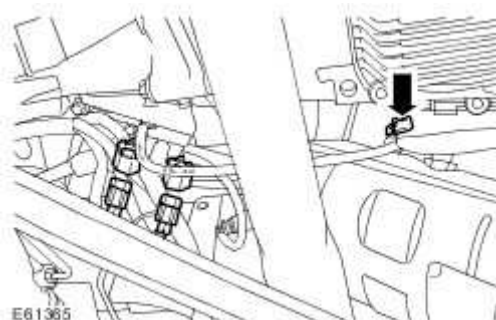
40 . Release and disconnect the 2 LH HO2S electrical connectors.

▶ Release the clip.



41 . Release and disconnect the 2 RH HO2S electrical connectors.

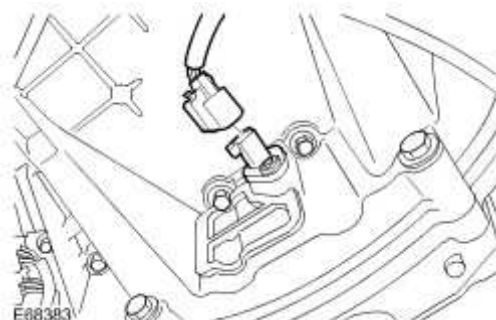
▶ Release the clip.



42 . NOTE:

Clean the components general area prior to dismantling.

Disconnect the crankshaft position (CKP) sensor electrical connector.



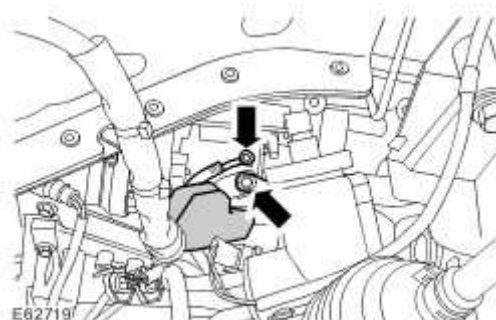
43 . Disconnect the starter motor battery positive and generator cables.

▶ Release the cover.

▶ Remove the nut.

44 . Disconnect the starter motor solenoid electrical connector.

▶ Remove and discard the nut.



45 . Disconnect the engine oil pressure (EOP) sensor electrical connector.

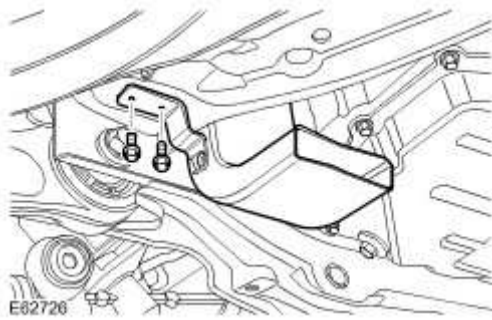


46 . Disconnect the engine oil temperature sensor electrical connector.



47 . Remove the generator cooling duct.

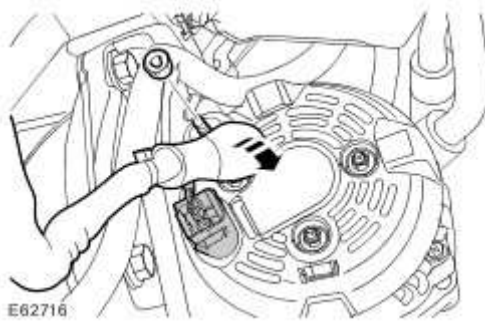
▶ Remove the 2 screws.



48 . Disconnect the generator electrical connectors.

▶ Release the cover.

▶ Remove the nut.

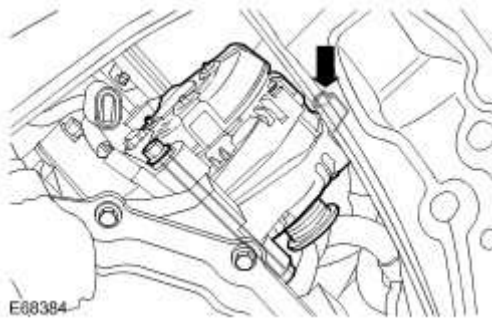


49 . Release the generator.

▶ Remove the nut.

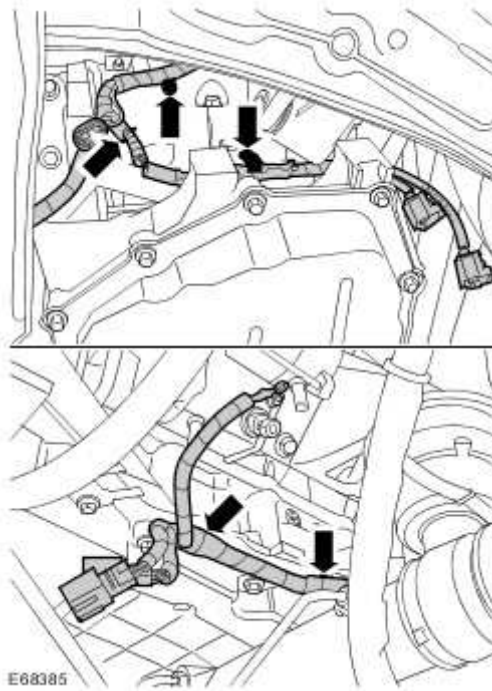
▶ Remove the nut and bolt.

▶ Position the generator aside to access the engine wiring harness clips.



50 . RH side: Release the engine wiring harness.

▶ Release the 5 clips.



51 . Remove the engine wiring harness.

Installation

1 . Install the engine wiring harness.

2 . RH side: Attach the wiring harness.

▶ Secure the clips.

3 . Install the generator.

▶ Tighten the nut to 25 Nm (18 lb.ft).

▶ Tighten the nut and bolt to 40 Nm (30 lb.ft).

4 . Connect the generator electrical connectors.

▶ Tighten the nut to 12 Nm (9 lb.ft).

▶ Secure the cover.

5 . Install the generator cooling duct.

▶ Tighten the screws.

6 . Connect the engine oil temperature sensor electrical connector.

7 . Connect the EOP sensor electrical connector.

8 . Connect the starter motor solenoid electrical connector.

▶ Tighten the new nut to 7 Nm (5 lb.ft).

9 . Connect the starter motor battery positive and generator cables.

▶ Tighten the nut to 10 Nm (7 lb.ft).

▶ Secure the cover.

10 . Connect the CKP sensor electrical connector.

11 . Connect and secure the HO2S electrical connectors.

 Secure the 2 clips.

12 . Connect the A/C compressor electrical connector.

13 . LH side: Attach the wiring harness.

 Secure the clips.

14 . Install the power steering pump mounting bracket.

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

15 . Install the power steering pump.

For additional information, refer to Power Steering Pump - 4.2L SC V8 - AJV8 (57.20.14)

16 . Attach the engine wiring harness to the coolant manifold.

 Tighten the bolts to 6 Nm (4 lb.ft).

17 . Connect and secure the ECT sensor electrical connector.

18 . Connect the secondary air injection switching valve electrical connector.

19 . Connect the engine front cover ground cable.

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

20 . Connect the MAF sensor electrical connector.

21 . Connect the IAT sensor electrical connector.

22 . Connect the FRP sensor electrical connector.

23 . Connect and secure the fuel injector wiring harness electrical connectors.

24 . Connect and secure the CMP sensor electrical connectors.

25 . Connect the ignition coil-on-plug electrical connectors.

26 . Attach the coil-on-plug wiring harness.

 Secure with the clips.

27 . Attach the engine wiring harness to the valve covers.

 Secure with the clips.

28 . Connect the PCV electrical connector.

 Secure the wiring harness.

29 . Install the ignition coil-on-plug covers.

 Position and secure the clips.

30 . Connect the VCT solenoid electrical connectors.

31 . Connect the EGR valve electrical connector.

32 . Connect the TP sensor electrical connector.

33 . Connect the fuel temperature sensor electrical connector.

34 . Connect the KS electrical connector.

35 . Connect the FRP sensor electrical connector.

36 . Connect the MAP sensor electrical connector.

37 . Attach the engine wiring harness to the rear of the engine.

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

38 . Install the engine cover LH bracket.

 Tighten the nuts to 6 Nm (4 lb.ft).

 Attach the wiring harness.

39 . Install the engine cover RH bracket.

 Tighten the nuts to 6 Nm (4 lb.ft).

 Secure the wiring harness.

 Secure the hose.

40 . Attach the ground cable to the power distribution box bracket.

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

41 . Attach the engine wiring harness to the engine compartment side wall.

 Position and secure the grommet.

42 . Connect the engine wiring harness electrical connector and secure with the captive bolt.

43 . Recharge the A/C system.

44 . Install the fan cowl.

 Secure with the clips.

45 . Install the ECM.

For additional information, refer to Engine Control Module (ECM) (18.30.01)

46 . Install the intake air resonator.

For additional information, refer to Intake Air Resonator

47 . Connect the battery ground cable and install the cover.

For additional information, refer to Specifications

419 : Electronic Feature Group

419-01A : Anti-theft - Active

Specifications

Specifications

Torque Specifications

Item	Nm	lb-ft	lb-in
Antenna - bolt	5	-	44
Anti-theft alarm horn - nut	8	-	71
Battery backed sounder to bracket - nut	6	-	53
Battery backed sounder bracket to body - nut	8	-	71
Intrusion sensors - nut/screw	2	-	18
Keyless vehicle module - nut	5	-	44

Anti-Theft - Active

Authoring Template

COMPONENT LOCATION

Item	Part Number	Description
1		Keyless vehicle module
2		Left Hand (LH) and Right Hand (RH) door latch micro switches
3		Central Door Locking (CDL) RF receiver
4		Liftgate latch micro switch
5		Slave intrusion detection module
6		Intrusion detection module
7		Hood ajar switch
8		Passive anti-theft alarm horn (if fitted)
9		Battery backed sounder (if fitted) or battery backed sounder with tilt sensor (if fitted)
10		Vehicle horns

INTRODUCTION

The active anti-theft system monitors the hinged panels for unauthorized opening. In some markets the anti-theft system also incorporates monitoring of the vehicle interior and vehicle tilt sensing.

The active anti-theft alarm system is controlled by the following body system control modules:

- Central Junction Box (CJB)
- LH door module
- RH door module

- Auxiliary junction box
- Keyless vehicle module
- Instrument cluster.

The CJB is the main controller in the system. The CJB controls the following security functions, in addition to other vehicle functions:

- Locking, double locking and unlocking
- Monitoring of hinged panel microswitches and panel ajar states
- Microwave intrusion detection modules
- Anti-theft horns or battery backed sounder
- Passive arming and disarming
- Panic alarm function
- Transceiver coil and transponder reading
- Valet function (via Touch Screen Display (TSD))
- Interior lighting.

Two levels of vehicle locking are available; perimeter mode locks all opening panels and volumetric mode (if fitted) monitors the vehicle interior for intrusion and incorporates a tilt sensor to monitor if the vehicle is being moved.

Door Modules

The door modules provide the interface between the door latch motors, the door and latch microswitches and the CJB. The door modules provide door microswitch switch status information and enable the door motors on request from the CJB or the keyless vehicle module. Additionally, the door modules also control the exterior mirror functions. For additional information, refer to Rear View Mirrors (501-09)

Auxiliary Junction Box and Central Junction Box (CJB)

The auxiliary junction box controls, in conjunction with the CJB:

- the horns
- the liftgate latch motors and microswitches (including the liftgate external release switch)
- the liftgate ajar switch
- the turn signal indicators
- the fuel filler flap operation

The auxiliary junction box is also has a connection to the Restraints Control Module (RCM) for automatic operation of the interior lights and the turn signal indicators in the event of an accident.

The CJB and auxiliary junction box are both fitted with an anti-theft sense line. If the auxiliary junction box is disconnected when the alarm system is active, the full alarm will be activated by the CJB. If the CJB is disconnected when the alarm system is active, the auxiliary junction box takes control of the security system and sounds the full alarm. The alarm will also be activated if the instrument cluster is disconnected when the active anti-theft alarm system is active.

NOTE:

If the CJB is replaced, the new module will require configuring to the master car configuration using the Integrated Diagnostic System (IDS).

The CJB automatically arms and disarms the active anti-theft system when the vehicle is locked and unlocked after successful confirmation that a valid remote handset/smart key has been used.

Keyless Vehicle Module

The keyless vehicle module interfaces with the CDL RF receiver and collects RF signal information which is transmitted from the Smart Key. This information is translated into commands which are passed on the medium speed Controller Area Network (CAN) bus to the CJB, auxiliary junction box, the door modules and the instrument cluster.

The keyless vehicle module also monitors the liftgate external release switch, 2 interior antennae, 1 luggage compartment antenna and an additional rear bumper antenna and 2 door handle antennae if the passive entry system is fitted.

On vehicles with passive entry, the additional fast latch motors are controlled via the keyless vehicle module and the locking status is passed to the CJB on the medium speed CAN bus.

Instrument Cluster

The instrument cluster controls the alarm indicator which is incorporated into the sunload/light sensor mounted on the instrument panel.

The instrument cluster also controls, in conjunction with the Engine Control Module (ECM), the engine immobilization. The ECM controls the engine crank and fuel functions and the instrument cluster processes the valid transponder information.

Alarm Indicator

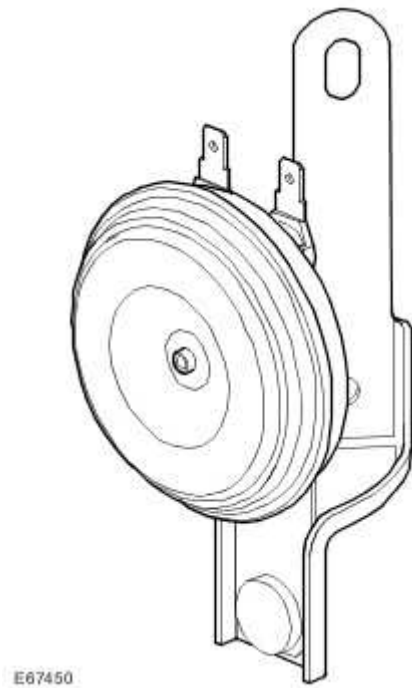
The alarm indicator is a Light Emitting Diode (LED) located in the body of the sunload/light sensor. When the ignition is off the indicator gives a visual indication of the active anti-theft system to show if the alarm system set or unset.

When the ignition is on, the indicator provides a visual indication of the status of the passive anti-theft (engine immobilization) system. If the immobilization system is operating correctly, the LED will be illuminated for 3 seconds at ignition on and then extinguish.

If a fault exists in the immobilization system, the LED will be either permanently illuminated or flashing for 60 seconds. This indicates that a fault exists and fault code has been recorded. After the 60 second period the LED will flash at different frequencies which indicate the nature of the fault. For additional information, refer to Anti-Theft - Active (419-01A)

Operation of the alarm indicator is controlled by the instrument cluster which varies the flash rate of the LED to indicate the system status of the alarm and the immobilization systems.

Passive Anti-Theft Horn (if fitted)



The passive anti-theft horn is located in the RH rear corner of the engine compartment and attached to the bulkhead. The anti-theft horn is connected directly to the CJB which activates the anti-theft horn when the alarm is triggered.

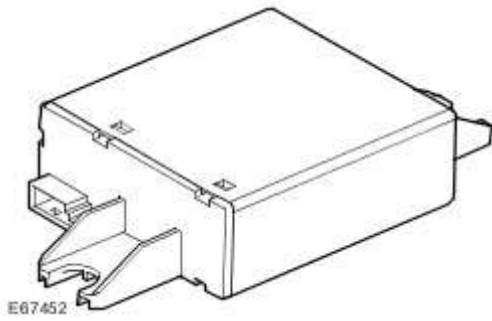
Battery Backed Sounder (if fitted)

The battery backed sounder is located in the RH rear corner of the engine compartment and attached to the bulkhead.

On vehicles with a battery backed sounder, a tilt sensor can be incorporated which monitors the vehicle attitude. The CJB monitors the tilt sensor and can detect if the vehicle is being moved, towed or raised and activate the alarm system. The type of battery backed sounder can be identified by a suffix change to the part number; sounders without a tilt sensor have the suffix AA and sounders incorporating a tilt sensor have the suffix BA.

Operation of the sounder is controlled by the CJB on a Local Interconnect Network (LIN) bus. The sounder is also connected with a permanent battery supply via the CJB. An integral, rechargeable battery powers the sounder if the battery power supply from the CJB is interrupted.

Intrusion Detection Modules



The intrusion detection modules are an optional fitment in some markets and are not available in other markets. Two intrusion detection modules are fitted. One module is located on the front of the floor console and monitors the front seat area, the second module is fitted at the rear of the floor console and monitors the rear seat area. The modules are wired together in parallel with the forward module being the master and the rearward module being the slave module.

Each intrusion detection module comprises two microwave sensors which allow the interior of the vehicle to be monitored. The intrusion detection modules also monitor the vehicle interior on soft top models when the soft top is down.

The intrusion detection modules are activated with the volumetric mode which in turn is enabled when the vehicle is double locked. The vehicle can be locked and alarmed with the module de-activated if a pet is to be left in the vehicle for example by single locking the active anti-theft system. The intrusion detection modules can also be de-activated by deselecting the 'Intrusion/Tilt' option in the 'Vehicle Settings' screen on the Touch Screen Display (TSD).

NOTE:

The TSD method of de-activation of the intrusion detection modules is only for one arm cycle. They will revert to active once the vehicle is subsequently unlocked and then locked.

When the volumetric mode is active, if the vehicle battery voltage falls to below 9 volts, the CJB will ignore any inputs from the modules to prevent false alarm activation.

CONTROL DIAGRAM

NOTE:

A = Hardwired; **D** = High speed CAN bus; **N** = Medium speed CAN bus; **O** = LIN Bus

Item	Part	Description
------	------	-------------

	Number	
1		Battery
2		Megafuse (175A)
3		Megafuse (175A)
4		Steering column lock
5		CJB
6		Power distribution box
7		Vehicle horns
8		Liftgate latch ajar switch
9		Intrusion detection module
10		Slave intrusion detection module
11		Keyless vehicle module
12		Hood ajar switch
13		CDL RF receiver
14		Instrument cluster
15		Light sensor (security LED)
16		RH door module
17		LH door module
18		LH door latch ajar switch
19		RH door latch ajar switch
20		Battery backed sounder (if fitted) or battery backed sounder with tilt sensor (if fitted)
21		Passive anti-theft alarm horn (if fitted)

22		Auxiliary junction box
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PRINCIPLES OF OPERATION

The CJB automatically arms and disarms the active anti-theft system when it operates the Central Locking System (CLS).

On vehicles without intrusion detection modules, only the perimeter mode is available to monitor the hinged panels and the validity of the Smart key.

When perimeter mode is active, the CJB monitors panel ajar micro switches located in the latch mechanisms of the driver and passenger doors and the liftgate. A separate hood ajar micro switch, located in the engine compartment, monitors the hood status.

When volumetric mode is active, the CJB monitors the interior of the vehicle for movement using 2 microwave intrusion detection modules located within the center console.

Arming

On vehicles without intrusion detection modules and a tilt sensor, the active anti-theft system is armed in the perimeter mode when the vehicle is either locked or double locked.

On vehicles fitted with intrusion detection modules, the system has 2 modes of operation; perimeter mode and volumetric mode.

Perimeter Mode

- Perimeter mode only monitors the hinged panels and validity of the remote handset/smart key in the start control module. Perimeter mode is activated by a single press of the lock button on either the Smart key or the door handle lock button on vehicles with the Passive Entry system.

Volumetric Mode

- Volumetric mode monitors the vehicle interior for intrusion. If the vehicle is fitted with a battery backed sounder, which incorporates a tilt sensor, the vehicle attitude is also monitored when volumetric mode is active. Volumetric mode is activated by a second press of the lock button on either the Smart Key or the door handle lock button on vehicles with the Passive Entry system. The second press of either lock button must occur within 3 seconds of the first press. The second press of the lock button also activates the perimeter mode double locking feature.

The CJB arms the active anti-theft system when it locks or double locks the vehicle providing the following conditions are met:

- All doors, liftgate and hood are closed
- The Smart key is not sensed inside the vehicle

- With no valid Smart Key outside of the vehicle
- The CJB is not in transit mode.

When the vehicle has successfully completed its locking routine, confirmation will be given by a long single flash of the turn signal indicators to indicate the locked condition. If double locking is activated then confirmation will be given by a double flash of the turn signal indicators, one flash for locked and one long flash for double locked. In certain markets an audible warning is emitted to confirm arming or double locking.

Mislock

If any doors, liftgate or hood is open when a lock or double lock request is received, the anti-theft alarm system remains disarmed and the CJB generates a short mislock sound on the vehicle horns, battery backed sounder or passive anti-theft horn and the turn signal indicators will not flash. Each attempt to lock will be confirmed by two audible chimes being emitted.

When the CJB arms the active anti-theft alarm system, it first enables perimeter mode and monitors the status of the hinged panels. If the vehicle is double locked and the vehicle is fitted with a battery backed sounder, an arming signal is sent from the CJB to enable the sounder. If the vehicle is fitted with intrusion detection modules, the CJB then sends an arming signal to the modules and the tilt sensor when double locked. The CJB ignores the signals from the intrusion detection modules for the first 30 seconds to allow time for the vehicle interior to settle and prevent false alarm activation.

If the liftgate is opened via the Smart Key or external mechanical lock the intrusion detection modules and the tilt sensor are inhibited until the liftgate is closed.

Disarming

The CJB will disarm the active anti-theft system when it receives an unlock request from the Smart Key or, on vehicles with Passive Entry, when the Smart Key is sensed and the driver's or passenger door handles are pulled.

The CJB can selectively disarm parts of the active anti-theft system to prevent false alarm activation under certain conditions as follows:

- When the vehicle active anti-theft alarm system is armed in volumetric mode, if the vehicle battery voltage decreases to less than 9 V, the CJB will disable the volumetric mode and remain in the perimeter mode only. This prevents false alarm activation because the intrusion detection modules do not operate below 9 volts.
- On vehicles fitted with a battery backed sounder, if the vehicle battery voltage decreases from 9.5 to 9 V in more than a 30 minute period, the CJB de-activates the battery backed sounder and if required, will use the vehicle horns to sound an audible alarm trigger warning. This prevents false alarm activation. At voltages below 9 volts, the CJB will not generate the 'heartbeat' signal to the battery backed sounder. If the sounder fails to receive the 'heartbeat' signal, it interprets this as the CJB has been tampered with and self activates its sounder. If the battery voltage subsequently rises above 9.5 V, the CJB will re-arm the battery backed sounder.
- If the vehicle is unlocked using the unlock button on the smart key and within 45 seconds a hinged panel is not opened, the CJB automatically re-locks the vehicle and re-arms the active

anti-theft system (if 'auto re-lock' feature is enabled). This prevents leaving the vehicle unlocked and disarmed by accidental operation of the Smart Key unlock button.

Alarm

When the alarm is triggered, the CJB activates audible and visual warnings. The audible warnings are produced by the vehicles horns, the passive anti-theft horn or the battery backed sounder or a combination of the audible devices. Visible indications are produced using the turn signal indicator.

The CJB activates the vehicle horns, passive anti-theft horn or battery backed sounder for 30 seconds or a combination of the audible devices. The activation is stopped for 5 second and, if the alarm trigger is still present, the CJB will cycle again for 30 seconds. This will be repeated for up to a maximum of 10 cycles (3 cycles in some markets) of 30 seconds for any one arming period. The CJB will deactivate the alarm if the 10 cycles (3 cycles in some markets) have been completed and the alarm trigger is still present or until it receives a disarm signal.

NOTE:

If the battery backed sounder is triggered due tamper detection, the visual indication using the turn signal indicators is not activated.

The alarm can be triggered by any of the hinged panels being opened, an intrusion detection module detects a movement inside the vehicle, the tilt sensor detects vehicle movement, the CJB is disconnected or an ignition tamper is detected (invalid Smart Key).

Battery Backed Sounder

When the CJB arms the active anti-theft system, in either the perimeter mode or the volumetric mode, the CJB sends an arming signal to the sounder on the LIN bus. When the system is armed in the volumetric mode, the CJB also sends an arming signal to the tilt sensor (if fitted).

On receipt of the arming signals, the sounder and the tilt sensor respond with a status message. If the CJB does not receive the status signals within 12 seconds, the CJB assumes there is a fault and responds with a disarm signal to either the sounder and/or the tilt sensor and stores a related fault code. If the sounder is disarmed when the active anti-theft system is armed and the system is subsequently triggered, the CJB instructs the auxiliary junction box to energize the horn relay and use the vehicle horns to sound the audio warning in place of the sounder.

When the sounder is armed, the CJB sends a periodic (heartbeat) signal to the sounder which prompts the sounder to monitor the vehicle battery supply and the LIN bus link with the CJB. The sounder will operate if:

- it receives an alarm signal from the CJB or the tilt sensor
- the power supply or the LIN bus link from the CJB is disrupted.

The tilt sensor measures the longitudinal and lateral angle of the vehicle over a range of $\pm 16^\circ$ from the horizontal. When the active anti-theft system is armed in volumetric mode, the tilt sensor stores

the current vehicle angles in its memory and monitors the tilt sensor readings. If the vehicle angle changes in either direction by more than the alarm limit, the tilt sensor activates the sounder.

If the alarm system is active and the battery or battery backed sounder is disconnected, the battery backed sounder will operate without the visual indication of the turn signal indicators flashing.

Customer Programmable Security Features

A number of security features can be programmed to the customers requirements by use of the Touch Screen Display (TSD).

Global Open/Close

The global open/ close feature allows the driver to fully raise/lower the driver and passenger windows with a single press of a Smart Key button. The button must be pressed and held for more than 2 seconds. Either or both of the open/close functions can be disabled from the TSD.

NOTE:

Remote global close is not available in some markets, i.e. NAS market.

From the 'Home' screen, select the 'Vehicle' screen and select 'Veh. Settings'. The 'Security' button will be highlighted as the default selection. Scroll the screen until the 'Global Open' and 'Global Close' selections are displayed. Global open and/or global close can be switched on or off by touching the applicable button on the TSD.

Valet Mode

Valet mode allows the liftgate to be inhibited when in valet mode. When in valet mode, if either the switch pack or exterior luggage compartment release button is pressed, an audible warning chime is emitted to warn that the liftgate is inhibited.

Enabling Valet Mode

Using the emergency key from the Smart Key, lock the glovebox. From the 'Home' screen, select the 'Valet' button'. The valet mode screen is displayed and requires a four digit Personal Identification Number (PIN) for access. Enter the PIN using the digits on the TSD and press 'OK'. When the PIN is accepted the screen displays 'Valet On'. The glovebox and the liftgate are now locked in valet mode. On leaving the vehicle, only give the attendant the Smart Key without the emergency key installed.

Disabling Valet Mode

After entering the vehicle, access the valet mode screen and enter the four digit PIN number and touch the 'OK' button. When the PIN is accepted, the screen displays 'Valet Off'. Unlock the glovebox using the emergency key and replace the emergency key in its stowage slot in the Smart Key.

Single Point Entry

The single point entry feature only unlocks one door, all other panels remain locked.

On vehicles with the remote Central Locking system (CLS), a single press of the unlock button on the

Smart key unlocks only the driver's door and the liftgate. A second press will unlock the passenger door.

On vehicles with the passive entry system, the first door handle which is pulled will only open that door to gain access to the vehicle. The remaining door and the liftgate will revert to central locking. The locked door can be unlocked by operating the interior door release lever and the liftgate can be released using the liftgate release button in the auxiliary lighting switch, the Smart Key liftgate release button or the exterior liftgate release button.

From the 'Home' screen, select the 'Vehicle' screen and select 'Veh. Settings'. The 'Security' button will be highlighted by default. Select '2 stage unlock' and touch the on or off button to enable or disable the single point entry feature.

Changing from central locking to single point entry and back again can also be carried out by pressing the lock and unlock buttons on the Smart Key simultaneously. The turn signal indicators will flash for 4 seconds to confirm that the change has been performed.

Drive Away Locking

The drive away door locking feature locks the doors and the liftgate if they are unlocked when the transmission selector lever is not in 'P' and the vehicle speed is more than 7 km/h (5 mph).

From the 'Home' screen, select the 'Vehicle' screen and select 'Veh. Settings'. The 'Security' button will be highlighted by default. Scroll the screen until the 'Drive away locking' section is displayed. Select the drive away locking feature on or off by touching the applicable button on the TSD.

Smart Key Additional Features

The Smart Key has convenience buttons in addition to the lock/unlock buttons.

Panic alarm

A panic alarm feature allows the driver to activate the vehicle alarm system using the Smart Key. The 'panic' button, identified by a triangle symbol, can be pressed 3 times or pressed and held for more than 3 seconds to activate the panic alarm.

Global Open/Close

A global open and close feature can be operated from the Smart Key. This feature allows the vehicle windows to be opened/closed by a single press of the lock or unlock button. The button must be pressed and held for more than 2 seconds to activate the global open/close feature.

NOTE:

Remote global close is not available in some markets, i.e. NAS market.

Liftgate Release

A liftgate release button can be pressed to open the liftgate. This will operate with car locked and alarmed or unlocked. If the vehicle is locked and alarmed, when the liftgate release button is pressed, the liftgate can be opened without triggering the alarm system. When the liftgate is subsequently closed, the alarm will be re-activated.

Headlamp Convenience

A headlamp convenience button can be pressed to operate the headlamp to assist departure or approach to the vehicle. A single press of the button will operate the headlamps for approximately 25 seconds after which they will automatically turn off. A second press of the button will turn off the headlamps if the 25 second period has not been reached. Pressing the Stop/Start button within the 25 second period will also turn off the headlamp convenience feature.

Convenience Mode

When a door is opened, for a vehicle with either remote RF central locking or passive entry, the vehicle's electrical system initiates the convenience mode. The following systems become active:

- Memory - seat adjustment and steering column
- Interior and exterior lighting
- TSD and Audio
- Instrument cluster message centre
- Horn
- Cigar lighter and power socket.

Anti-Theft - Active

The complexity of the electronics involved with the anti-theft system, and the multiplexed communication network which are connected to it, preclude the use of workshop general electrical test equipment. Therefore, reference should be made to the manufacturer approved diagnostic system for detailed instructions on testing the anti-theft system.

The manufacturer approved diagnostic system systematically tests and analyses all functions and the various systems affected by it.

Where a fault is indicated, some basic diagnostic methods may be necessary to confirm that connections are good and that wiring is not damaged before installing a new component.

Antenna

Removal

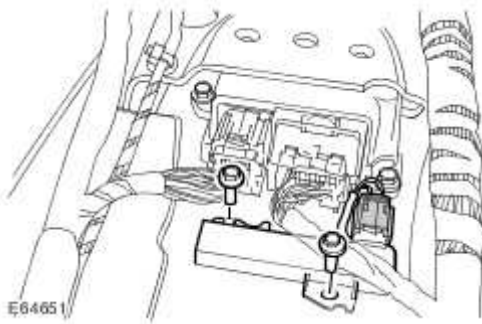
- 1 . Remove the floor console.

For additional information, refer to Floor Console (76.25.01)

- 2 . Remove the keyless vehicle antenna.

➤ Remove the 2 Torx bolts.

➤ Disconnect the electrical connector.



Installation

- 1 . Install the keyless vehicle antenna.

➤ Connect the electrical connector.

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

- 2 . Install the floor console.

For additional information, refer to Floor Console (76.25.01)

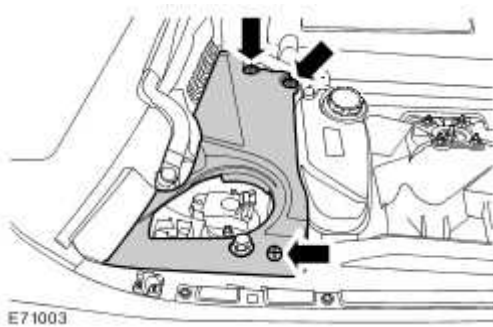
Anti-Theft Alarm Horn (86.52.03)

Removal

- 1 . Make the pedestrian protection system safe.
For additional information, refer to

- 2 . Remove the air intake cover.

▶ Remove the 3 clips.



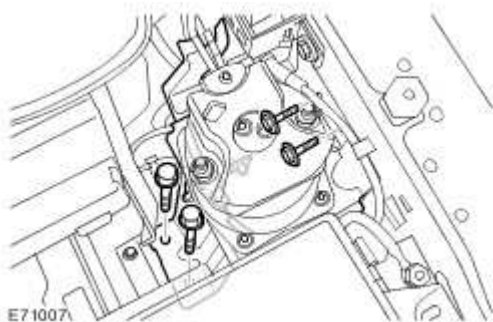
- 3 . Release the pedestrian protection actuator bracket.

▶ Release the 3 wiring harness clips.

▶ Remove the 4 bolts.

- 4 . Remove the pedestrian protection actuator and bracket.

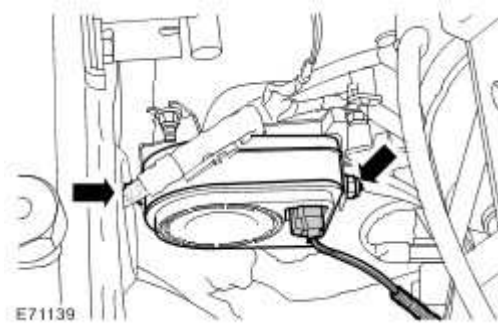
▶ Disconnect the electrical connector.



5 . Remove the anti-theft alarm horn.

▶ Loosen but do not remove the 2 nuts.

▶ Disconnect the electrical connector.



Installation

1 . Install the anti-theft alarm horn.

▶ Connect the electrical connector.

▶ Tighten the nuts to 10 Nm (7 lb.ft).

2 . Install the pedestrian protection actuator and bracket.

▶ Connect the electrical connector.

3 . Secure the pedestrian protection actuator bracket.

▶ Attach the wiring harness clips.

▶ Tighten the bolts to 8 Nm (6 lb.ft).

4 . Install the air intake cover.

 Install the 3 clips.

Rear Intrusion Sensor

Removal

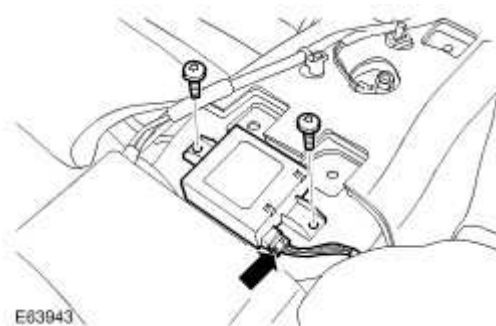
- 1 . Remove the rear seat armrest.

For additional information, refer to Rear Seat Armrest (76.70.39)

- 2 . Remove the rear intrusion sensor.

▶ Disconnect the electrical connector.

▶ Remove the 2 Torx bolts.



Installation

- 1 . Install the rear intrusion sensor.

▶ Tighten the Torx bolts to 6 Nm (4 lb.ft).

▶ Connect the electrical connector.

- 2 . Install the rear seat armrest.

For additional information, refer to Rear Seat Armrest (76.70.39)

419-01B : Anti-Theft - Passive

General procedures

Anti-Theft Security Access

1. The complexity of the electronics involved with the passive anti-theft system of which the security access is a part, and the multiplexed communication network which are connected to it preclude the use of workshop general electrical test equipment. Therefore, reference should be made to the Jaguar approved diagnostic system for detailed instructions on security access . The Jaguar approved diagnostic system systematically tests and analyses all functions and the various systems affected by it.

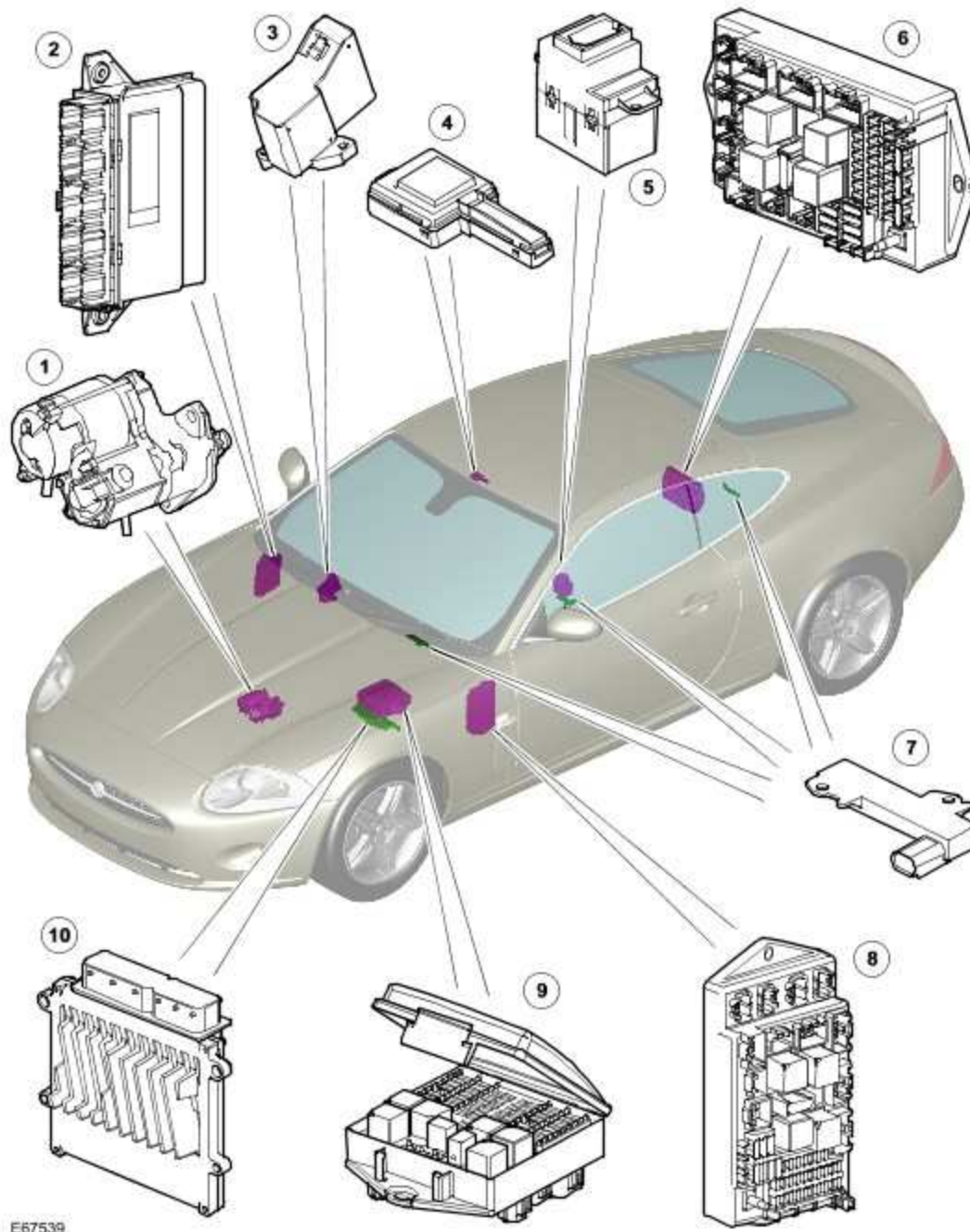
Key Programming Using Diagnostic Equipment

1. The complexity of the electronics involved with the anti-theft, of which the key programming is a part, and the multiplexed communication network which are connected to it preclude the use of workshop general electrical test equipment. Therefore, reference should be made to the Jaguar Approved Diagnostic System for detailed instructions on key programming . The Jaguar approved diagnostic system systematically tests and analyses all functions and the various systems affected by it.

All new keys must be programmed using IDS. When using IDS to programme new key(s), the lost or obsolete key(s) will cease to function.

Anti-Theft - Passive

COMPONENT LOCATION



E67539

Item	Part Number	Description
1		Starter motor and solenoid

2		Keyless vehicle module
3		Electric steering column lock (Not NAS)
4		RF receiver
5		Start control module
6		Auxiliary junction box
7		Low Frequency (LF) antennae - Passive start system (3 off)
8		Central Junction Box (CJB)
9		Power distribution box
10		Engine Control Module (ECM)

INTRODUCTION

The Passive Anti-Theft System (PATS) prevents the vehicle from being driven away by unauthorized persons. This is achieved by having uniquely coded keys (both passive and transponder) and an encoded data exchange between multiple control modules. Unauthorized starting is prevented by inhibiting the fuel, engine (spark, injectors and crank) and ignition systems from operating.

The PATS is a function of the 'Passive Start' system. The system uses the following components:

- 'Smart Key'
- LF antennae - 3 off
- RF receiver
- Keyless vehicle module
- Start control module
- CJB
- ECM
- Instrument cluster.

The system is automatic and requires no input from the driver. The engine start system is initiated when the start/stop switch and the brake pedal are pressed simultaneously. Refer to Engine Controls for details of the ignition modes. For additional information, refer to Electronic Engine Controls (303-14 Electronic Engine Controls - Vehicles Without: Supercharger)

The engine management system will only allow engine crank, spark and injector functions when the following conditions are met:

- A hardwired Park/Neutral signal is received from the Transmission Control Module (TCM)

- A hardwired ignition signal is received from the CJB
- A hardwired crank request signal is received from the CJB
- Encrypted data exchange between the instrument cluster and the ECM is verified.

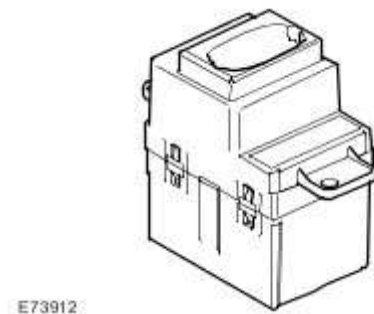
Before the CJB will send the hardwired ignition signal, it must satisfactorily complete the following:

- Exchange encrypted data with the keyless vehicle module to validate the smart key
- Exchange encrypted data with the instrument cluster to authorize the ignition status.

Additionally, before the CJB will send the hardwired crank request signal it must receive the following signals:

- Brake pressure signal from the ABS module which must be greater than a pre-determined threshold
- Hardwired transmission in 'Park' (P) signal from the selector lever.

START CONTROL MODULE



The start control module is located in the floor console, at the rear of the arm rest. The start control module is used if the keyless vehicle module is unable to authorise the Smart Key.

If the keyless vehicle module is unable to identify the Smart Key for any reason, for example if the Smart Key battery voltage is low or there is local RF interference, the transponder within the Smart Key can be read in the conventional manner. The driver will be alerted to this by a chime and a message in the instrument cluster message center 'SMART KEY NOT FOUND, PLEASE INSERT IN SLOT'. The Smart Key can be inserted into the start control module.

To insert the Smart Key, lift the arm rest on the floor console and slide back the spring loaded access cover on the start control module. Insert the Smart Key, with the key fob loop uppermost, into the slot. The start control module is motorized and will draw the Smart Key into the slot once inserted.

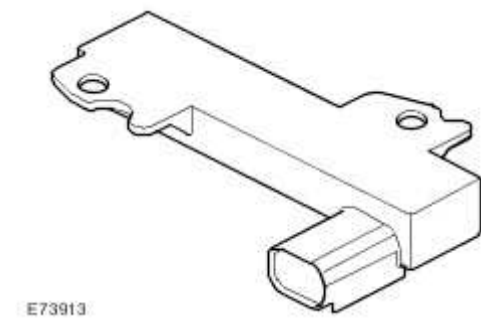
The start control module will then read the transponder within the Smart Key and, if the transponder identification is valid, pass authorization to the instrument cluster on the Local Interconnect Network (LIN) bus.

NOTE:

Inserting the Smart Key into the start control module will not charge the Smart Key battery. The battery is non-chargeable and must be replaced with a new CR2032 battery if defective.

A message 'REMOVE SMART KEY' will be displayed if the Smart Key is still in the start control module and the driver's door is opened. The Smart Key can be removed by pushing downwards on the key fob loop and releasing. The start control unit motor will then drive the Smart Key out from the slot.

LF ANTENNA



Three Low Frequency (LF) antennae for the passive start system are positioned in specific locations in the vehicle. The LF antennae are positioned in the following locations:

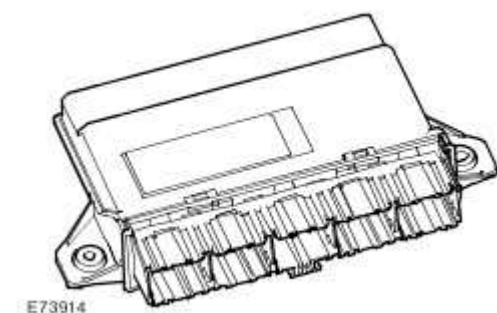
- Behind center console, below heater assembly and audio modules.
- In floor console between the driver and passenger seats, below start control module.
- On the battery tray.

NOTE:

On vehicles with the passive entry system, three additional antennae are used; one integrated into the rear bumper and one in each door handle assembly. These are only used by the passive entry system and have no function in the passive start system.

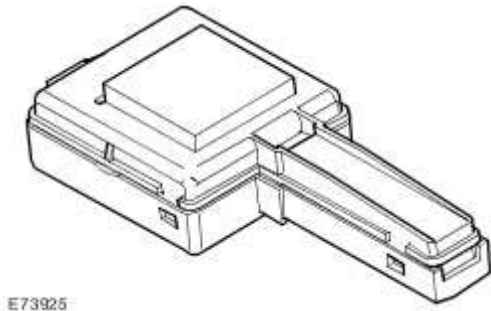
The keyless vehicle module transmits an LF signal via the antennae which is received by the Smart Key. The Smart Key then responds by transmitting a Radio Frequency (RF) signal which is received by the RF receiver and passed to the keyless vehicle module for authorization.

KEYLESS VEHICLE MODULE



The keyless vehicle module is located on the Right Hand (RH) 'A' pillar. The module controls signal transmissions to and from the Smart Key and provides authorization to allow the vehicle to be entered and started. The module has a medium speed Controller Area Network (CAN) connection to the Central Junction Box (CJB) for authorizing vehicle unlocking and starting.

RF RECEIVER

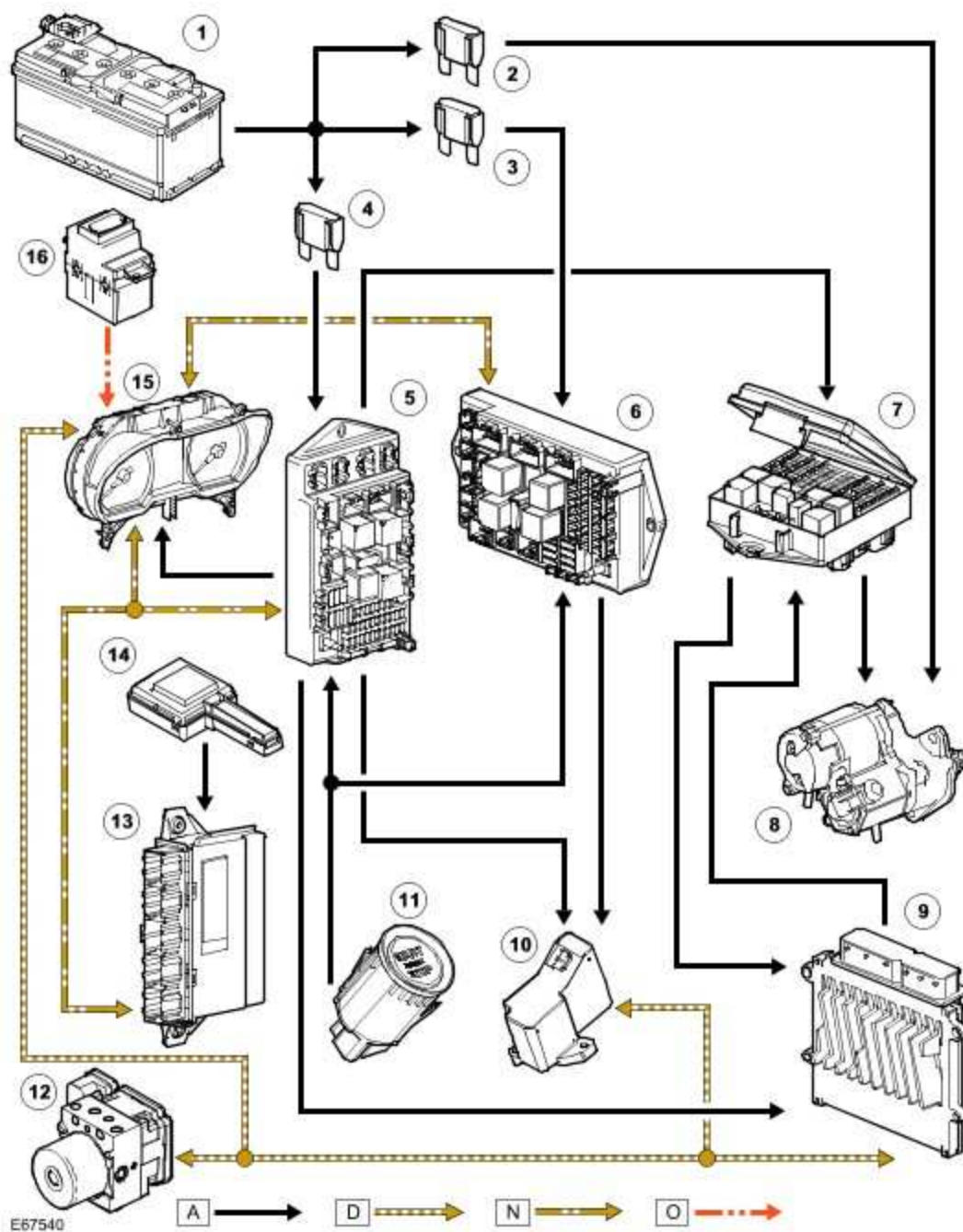


The RF receiver is located behind the overhead console. The receiver is available in two variants; 315 Mhz or 433 Mhz depending on market requirements. Transmissions are received from the Smart Key for key identification and remote lock/unlock requests or requests for operation of additional features.

CONTROL DIAGRAM

NOTE:

A = Hardwired; **D** = High speed CAN bus; **N** = Medium speed CAN bus; **O** = LIN bus



Item	Part Number	Description
1		Battery
2		Megafuse (400 A)
3		Megafuse (175 A)
4		Megafuse (175 A)

5		CJB
6		Auxiliary junction box
7		Power distribution box
8		Starter motor and solenoid
9		ECM
10		Electric steering column lock (Not NAS)
11		Start/Stop switch
12		ABS module
13		Keyless vehicle module
14		RF receiver
15		Instrument cluster
16		Start control module

PRINCIPLES OF OPERATION

At the request of the CJB, the keyless vehicle module prompts each of the LF antennae to output a LF signal. When the Smart Key is within range, it detects the LF signals and responds with an RF identification signal. The RF signal is detected by the RF receiver and passed to the keyless vehicle module.

NOTE:

The LF antenna located in the rear bumper and in each door handle are only fitted if the vehicle has the Passive Entry option.

The keyless vehicle module authorizes the Smart Key and passes this information to the CJB via the medium speed CAN bus. Once the CJB receives the authorization and confirms response with internal calculation, it passes the result to the instrument cluster on the medium speed CAN bus. Once the CJB receives the authorization and confirms the response, it allows the ignition to be activated when the start/stop switch is pressed.

On receipt of the authorization message, the instrument cluster initiates the unlocking of the electric steering column lock (if fitted). Once the electric steering column lock is unlocked and power has

been removed, the instrument cluster will set its internal key status to valid. The instrument cluster will pass this key valid authorization to the auxiliary junction box. Once the auxiliary junction box receives the authorization and confirms the response with an internal calculation, it will enable the Fuel Pump Driver Module (FPDM).

The CJB also controls the engine crank request. If the transmission selector lever is in the park position and the driver presses the brake pedal and simultaneously presses the start/stop switch, the CJB interprets this as an engine crank request.

Before the engine crank request is allowed, the CJB compares a brake pressure signal received from the ABS module. The brake pressure signal is compared to an internally stored threshold value within the CJB. If the signal is greater than the stored threshold value, a crank request signal is sent to the ECM on the high speed CAN bus.

NOTE:

If the Smart Key is not in the vehicle and an attempt is made to start the engine by pressing the start/stop switch, a message 'SMART KEY NOT FOUND, PLEASE INSERT IN SLOT' is displayed in the instrument cluster message center.

If the keyless vehicle module is unable to identify the Smart Key for any reason, the Smart Key can be inserted into the start control module. The start control unit will then read the transponder within the Smart Key and, if the transponder identification is valid, pass authorization to the instrument cluster on the Local Interconnect Network (LIN) bus.

If a replacement Smart Key is required, 2 Integrated Diagnostic System (IDS) diagnostic procedures are required to synchronize the passive start/entry and transponder functions of the Smart Key. If any module, which is involved in the Smart Key authorization process, require replacement, an IDS diagnostic procedure is also required to synchronize the replacement module into the system.

Anti-Theft - Passive

Principle of Operation

For a detailed description of the Anti-Theft - Passive system, refer to the relevant Description and Operation section in the workshop manual.

Anti-Theft - Passive

Inspection and Verification

Anti-theft - Passive

The best method to confirm the correct operation of the Passive Anti-Theft System (PATS) is to check the LED (located in the center of the instrument panel). The LED should illuminate solid for 3 seconds, when the ignition status is set to ON, and then extinguish. This validates all PATS functions (i.e. the key transponder matches a stored key code, the challenge/response sequence between the respective modules was successful resulting in the EMS being enabled).

Ignition fails to operate

Check that the smart key is located within the vehicle interior, and that it is the correct one for the vehicle. Insert the smart key into the start control unit (located in floor console cubby box), this is an alternative method to allow Ignition On/Engine Start.

Check that the start button circuit to the CJB is not open circuit or short circuit to power.

Check that the CAN network is not malfunctioning, i.e. open circuit or short circuit. This would mean that the remote keyless entry module, Central Junction Box (CJB) and instrument cluster would be unable to communicate.

Engine fails to crank

If a PATS fault is detected, the LED will flash for 60 seconds at 4Hz with a 50% duty cycle. At the end of this period, the LED will flash a 2 digit code; this code is repeated 10 times. The meaning of these fault codes along with the frequency of flashing is given in the accompanying table. As a general rule a fault code of 16 or less will cause the vehicle not to crank. Additionally, the manufacturer approved diagnostic system should be used to check the instrument cluster, CJB & ECM for Diagnostic Trouble Codes (DTCs).

One potential occurrence for failing to crank could be due to the 'Not In Park' switch (input to the CJB) or the P & N start switch (input to the ECM).

Check the Crank Request output from the CJB to ECM is not short circuit to ground or open circuit.

Check the Starter Relay circuit.

NOTE:

Due to Smart Start both sides of Relay Coil are switched directly from ECM (If conditions correct)

Check that the Steering Column Lock correctly operates and the steering wheel can turn freely.

Check that the CAN network is not malfunctioning, i.e. the CAN circuit is open or short circuit. This would mean that the instrument cluster and ECM would be unable to communicate resulting in no Challenge being performed to enable the ECM. This would be supported by LED Flash Code 24, see PATS Fault Code Table.

Also check the CAN network between the ABS module and the CJB. The CJB uses the CAN_BrakePressureTMC signal to determine if the brake pedal has been pressed in order to allow an engine crank. The CJB uses a value of 0x03, if the CJB sees a value less than this, it will not enable the Crank Request Output.

Engine cranks but will not start

If the Engine is cranking it means that the ECM has passed the authorisation required with the Instrument Cluster. If this authorisation failed, the ECM would not engage the starter relay. This could be confirmed by verifying the PATS LED prove out (illuminated solid for 3 seconds) or by reading DTCs from the instrument cluster and ECM.

In this case, the fuel pump circuit should be verified. The Fuel Pump Delivery Module (FPDM), which is supplied via the RJB (authentication required with the instrument cluster) and controlled by the ECM, supplies the fuel pump.

In all cases of suspected non-start issues, the most logical failure modes should be eliminated first. i.e.

- Check all relevant supplies and grounds to the relevant modules listed herein.
- Note any unusual behaviour from other systems/functionality.
- Note any functions that are not operating as expected.

PATS Fault Codes

For the various PATS modes/faults listed in the table, the instrument cluster will store a DTC and indicate this to the customer during the detection period defined in the 'when logged' column, by illuminating the indicator as described for 60 seconds and then flashing the LED 10 times as appropriate. The indication will stop immediately the ignition status is set to OFF any time during the fault indication sequence. Up to 4 DTCs could be stored per key read sequence (1-10 read attempts). No DTCs will be stored until all retry attempts are complete. Only the highest priority fault code will be flashed.

To determine the fault code from the LED: The LED will flash initially ten times with 1.5 seconds between. The LED will remain OFF for 2.5 seconds then flash a number of times with 0.5 seconds

between (the number of times the LED flashes represents the first digit of the code), the LED will remain OFF for 1.5 seconds then flash a number of times with 1.5 seconds between (the number of times the LED flashes represents the second digit of the code).

The PATS LED will be commanded on as shown under 'indication'. Normal PATS operations are complete within 400ms of the ignition switch transition from OFF to ON or START, worst case for ECM communication problems will be less than 2 seconds. If PATS is not complete during the 2 seconds the ECM will terminate PATS and await the next ignition ON or START event. PATS faults will be indicated via the LED as soon as possible and will terminate the LED prove out. At ignition OFF all previous flashing will cease and the perimeter anti-theft system will control the LED when the vehicle is locked and armed.

Mode of Operation/Fault	When Logged	Ignition Status	DTC	LED Fault Code	Indication
Prove out	N/A	Transition from OFF to ON	N/A	N/A	3 Seconds of steady illumination
Perimeter Anti-theft Control	N/A	OFF - Vehicle locked and armed	N/A	N/A	Off or 0.5Hz flashing at 5% duty cycle $\pm$ 20% until Off
Start Control Unit already programmed	Key Insert	Any	B1B0105	N/A	No Indication
Start Control Unit status = invalid response	Key Insert	Any	B1B0167	N/A	No Indication
Start Control Unit programming error	Key Insert	Any	B1B0151	N/A	No Indication
Start Control Unit challenge response error	Key Insert	OFF	B1B0162	N/A	No Indication
Key Programming timer expired or Key Auth Timer expired	Key Insert	Any	B1B0187	N/A	No Indication
Transponder challenge response error	Key Insert	Any	B1B0164	N/A	No Indication
Transponder keys stored below minimum number required	B&A/Dealer	Any	B1B0100	N/A	No Indication

Transponder not programmed	B&A/Dealer	Any	B1B0155	N/A	No Indication
If the instrument cluster sends a 'theft' key status to the ECM or the ECM returns a status message containing the data 'Disabled/Theft', the instrument cluster will set this DTC	EMS CAN communication	OFF to ON	B1B3364	16	60 seconds of 4Hz flashing at 50% duty cycle followed by fault code 16 flashing 10 times
During manufacturing a Target ID is transferred from the ECM when requested by the instrument cluster. The instrument cluster stores this unique vehicle number in EEPROM. If this ID fails to store in EEPROM correctly, the instrument cluster will set this DTC	B&A/Dealer	OFF to ON	B1B3305	22	60 seconds of steady indication followed by fault code 22 flashing 10 times
If the status message received from the ECM contains the data challenge response error, the instrument cluster will set this DTC	Challenge/Response	OFF to ON	B1B3362	23	60 seconds of steady indication followed by fault code 23 flashing 10 times
After the instrument cluster has transmitted its first PATS idle message, it will start a 2 second timer running. If the PATS sequence does not complete (Cluster received the Enable msg) within this time period the instrument cluster will set this DTC	Idle message missing	OFF to ON	B1B3387	24	60 seconds of steady indication followed by fault code 24 flashing 10 times

- 1 . If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
- 2 . If the cause is not visually evident, verify the symptom and refer to the manufacturer approved diagnostic system.

419-02 : Remote Convenience

General procedures

Universal Transmitter Programming



WARNING: A garage door opening system that cannot stop or reverse itself after detecting an object in its path does not meet current federal safety standards. To decrease the risk of serious injury or death, do not use this HomeLink[®] transmitter with a door opening system that lacks stop and reverse features as required by federal standards. This includes any garage door opening system manufactured before April 1, 1982. For more information, call HomeLink[®] customer assistance at 1-800-355-3515.

1.



CAUTION: During this procedure, the system that you are programming will be made to operate. Make sure that people or objects are clear of the garage door or gate being programmed.

Verify the hand-held transmitter is operative.

2. Prepare for programming the universal transmitter by erasing all three channels by holding down the two outside buttons until the red light begins to flash (20-30 seconds). Release both buttons.



VUJ0004177

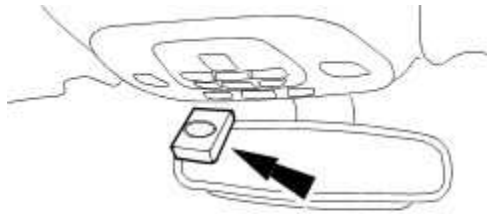
3. Select one of the three universal transmitter channels to be programmed by pressing the desired button.

4. Hold the end of the hand-held transmitter 50-150mm (2-6 in) from the front surface of the universal transmitter so that the red light can still be seen.

5. **NOTE:**

During programming, the hand-held transmitter may automatically stop transmitting after two seconds, which may not be long enough to program the universal transmitter. If programming this type of hand-held transmitter, continue to hold the button on the universal transmitter while re-pressing the hand-held transmitter button every two seconds (Canada only).

Use both hands to press the hand-held transmitter button and the desired button on the universal transmitter. Do not release either button.



VUJ0004176

6. Hold down both buttons until the red light on the universal transmitter flashes, first slowly and then rapidly. Release both buttons when the rapid flashing begins. The universal transmitter has successfully learned the new frequency signal and can be used in place of the hand-held transmitter(s).

7. NOTE:

If the hand-held transmitter appears to program the universal transmitter but does not open the garage door, the garage door opener may have a 'code protected' or 'rolling code' feature.

To operate, simply press the appropriate button on the universal transmitter. The red light is on while the signal is being transmitted.

Training a Garage Door Opener Equipped With ' Rolling Codes'

1. Program the hand-held transmitter to the universal transmitter.
2. Train the garage door opener receiver to recognize the universal transmitter.
 1. Remove the cover panel from the garage door opener receiver.
 2. Locate the training button on the garage door opener receiver. Location and color of the button may vary by garage door opener manufacturer. Refer to the garage door opener instruction manual or call HomeLink customer assistance at 1-800-355-3515.
 3. Press the training button on the garage door opener receiver for 1-2 seconds.

4. Press the programmed universal transmitter button for as long as the universal transmitter red light flashes (1-2 seconds). Release the button and re-press the button to confirm that the universal transmitter is trained to the receiver.
5. The garage door opener should recognize the universal transmitter.

Erasing Channels

1. NOTE:

Individual channels cannot be erased, but can be reprogrammed using the procedures for programming.

To erase all three programmed channels, hold down the two outside buttons until the red light begins to flash (20-30 seconds). Release both buttons.

Universal Transmitter

Inspection and Verification

- 1 . Verify the customer concern by operating the system.
- 2 . Visually inspect for obvious signs of mechanical damage.

Mechanical
• Damaged universal transmitter • Damaged receiver

- 3 . If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
- 4 . If the concern is not visually evident, verify the concern and refer to the Symptom Chart. Refer to the electrical circuit diagrams for schematic and connector information.

Symptom Chart

Symptom	Possible Cause	Action
The universal transmitter is inoperative	• Universal transmitter • Receiver unit	GO to Pinpoint Test G92661p1.

Pinpoint Tests

PINPOINT TEST G92661p1 : THE UNIVERSAL TRANSMITTER IS INOPERATIVE

G92661t1 : CHECK THE ROOF CONSOLE ASSEMBLY OPERATION

1. Check the illumination of the interior lamp.
 - Does the interior lamp illuminate?

-> **Yes**

GO to Pinpoint Test G92661t2.

.

-> **No**

Check and rectify fault with interior lamp circuit. TEST the system for normal operation.

G92661t2 : PROGRAM HAND-HELD TRANSMITTER INTO UNIVERSAL TRANSMITTER

1. NOTE:

If the garage door is equipped with rolling codes, refer to Training a Garage Door Opener Equipped With "Rolling Codes."

Program the universal transmitter.

Universal Transmitter Programming

- **Did the universal transmitter program successfully?**

-> **Yes**

The universal transmitter is OK. VERIFY receiver operation.

-> **No**

REPLACE the roof console assembly. TEST the system for normal operation.

419-07 : Navigation System

Specifications

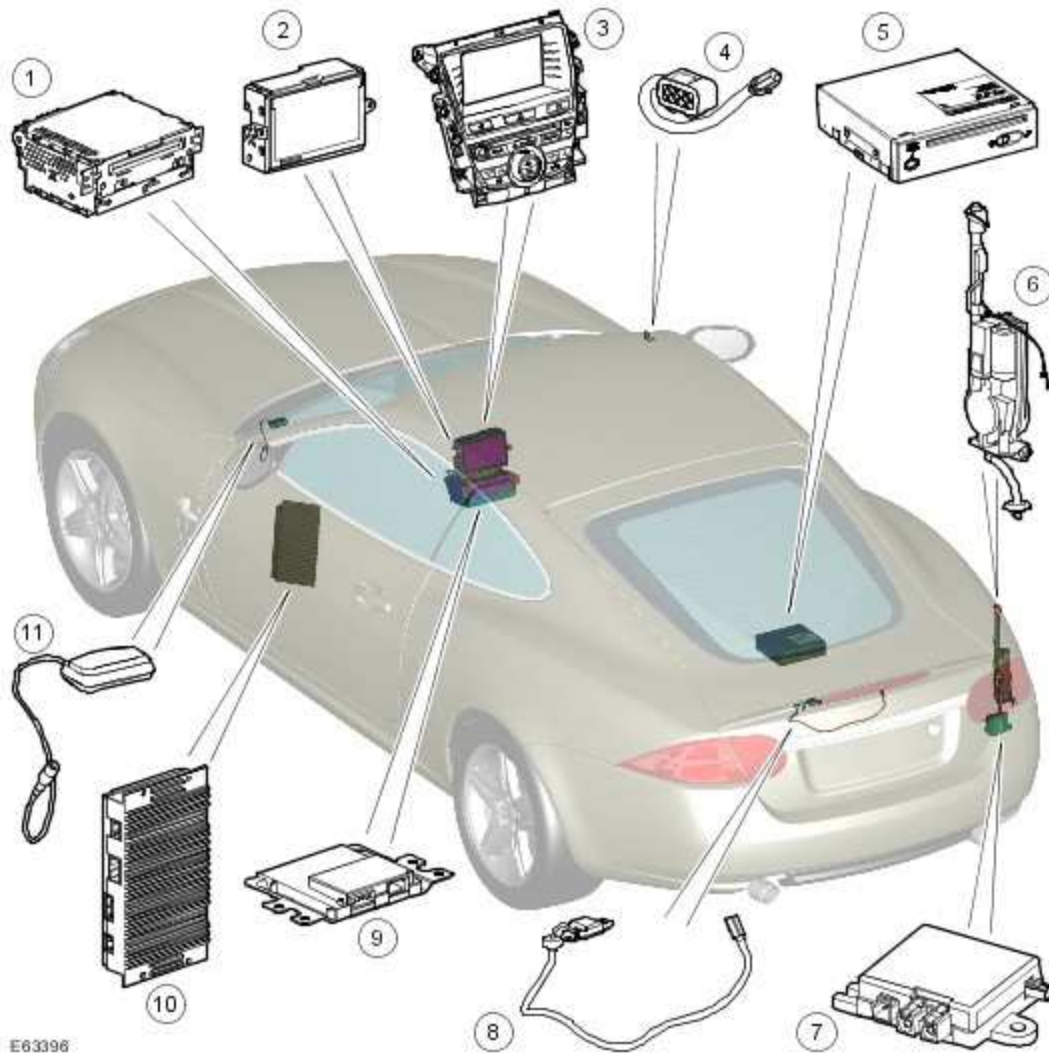
Specifications

Torque Specifications

Item	Nm	lb-ft	lb-in
Antenna - bolt	1.5	-	13
Display module to module bracket - bolt	3	-	26
Display module to module bracket - screw	2.5	-	22
Navigation system module to bracket - bolt	2	-	18

Navigation System

COMPONENT LOCATION



Item	Part Number	Description
1		Integrated Audio Module
2		Touch Screen Display
3		Integrated Control Panel
4		Microphone

5		Navigation computer
6		AM/FM antenna
7		FM antenna signal splitter
8		GPS antenna
9		Information and entertainment control module
10		Audio amplifier
11		Vehicle Information and Communication Systems (VICS) beacon antenna (Japan only)

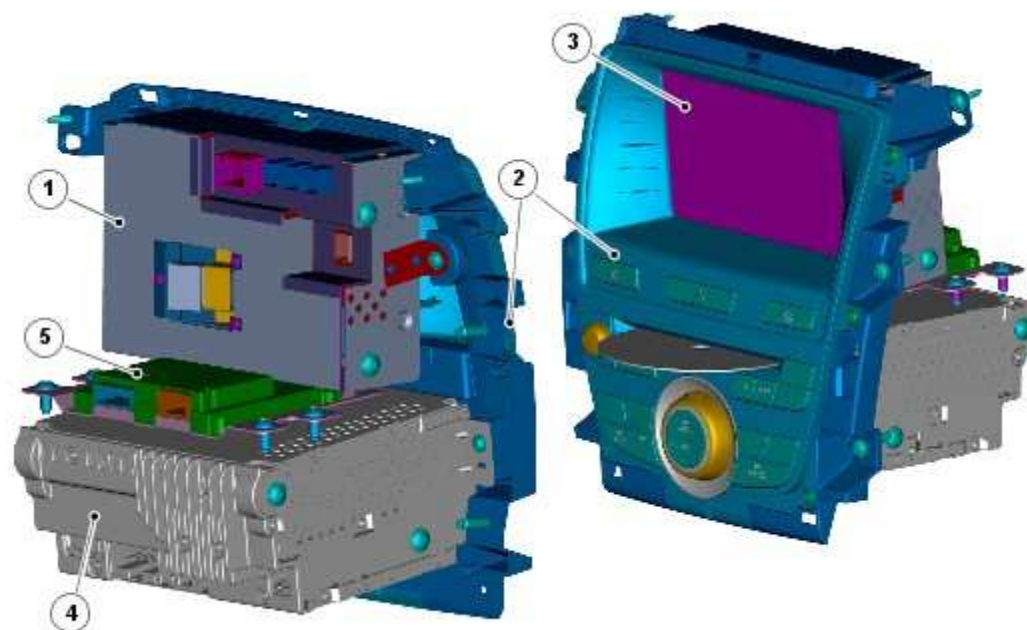
INTRODUCTION

The navigation system provides audible and visual route guidance information to enable the driver to reach a desired destination. The system allows the driver to choose the desired route using minor or major roads or motorways and the quickest or shortest route. Directions to hospitals, museums, monuments and hotels are also available. The computer uses map information stored on a DVD-ROM to determine the best route for the journey and provide the driver with details of directions and approaching junctions.

The navigation system is controlled from the integrated control panel and the Touch Screen Display (TSD). Control signals from the touch screen display are sent on the MOST ring to the navigation computer. The navigation computer uses a dedicated GVIF bus to transmit its video signals to the TSD.

Vehicles with navigation systems also incorporate additional traffic information systems. These are market dependant and are as follows:

- Japan-Voice recognition and VICS
- Europe-TMC
- NAS-No TMC, VICS or voice rrecognition

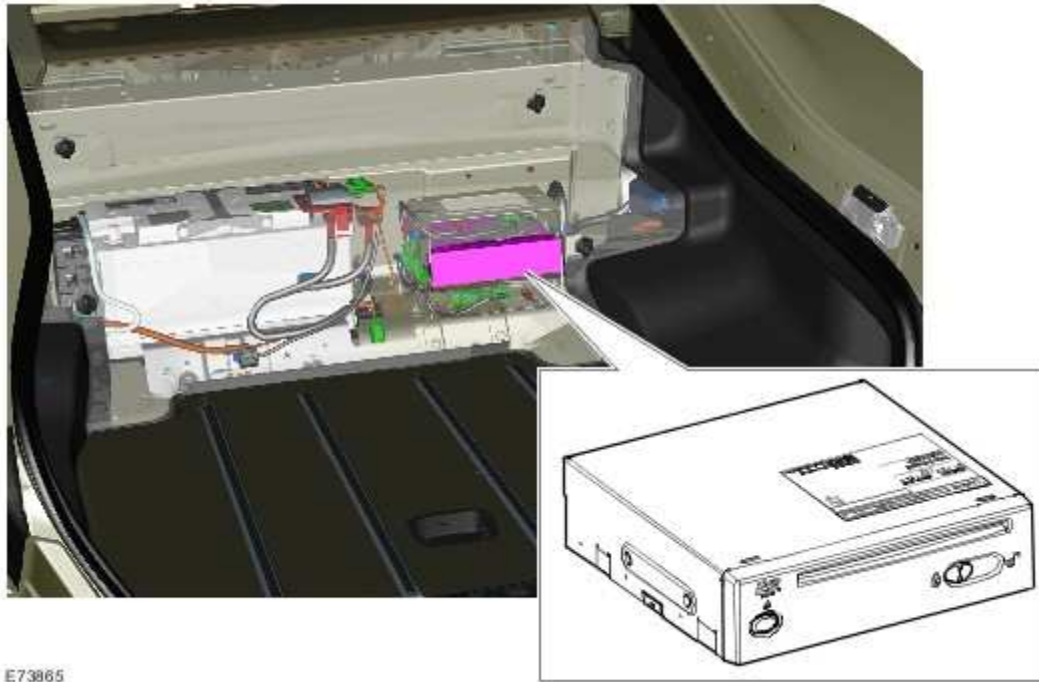


E73869

Item	Part Number	Description
1		TSD (rear)
2		ICP
3		TSD (front)
4		IAM
5		ICM

NAVIGATION COMPUTER

The navigation computer is located in the rear loadspace next to the battery.



The navigation computer incorporates the following:

- GPS receiver
- VICS receiver (Japan only)
- Traffic Message Channel (TMC) receiver

The navigation computer is connected to the MOST bus. The navigation computer generates its own graphics and transmits them to the TSD on a dedicated GVIF (Gigabyte video Interface) bus.

The navigation computer contains a solid state piezo gyro which measures the motion of the vehicle around its vertical axis. The gyro operates on the principle known as the Coriolis force. The Coriolis force is the force that appears to accelerate a body moving away from its rotational axis against the direction of rotation of the axis.

Using inputs from the ABS module, the GPS antenna and the gyro sensor, the computer calculates the vehicle's current position, direction and speed.

The navigation computer houses the DVD-ROM drive. The drive is used to read map data from region specific DVD's. The regions are as follows:

- Europe (3 discs)
- NAS (2 discs)
- Japan, Middle east and Australia (1disc)

A button, located adjacent to the DVD slot, is provided to eject the DVD from the unit. Prior to ejecting the disc the slot protection has to be slid to the side. If the ignition is on, or the Entertainment System is in 1-hour mode, one press of the button will eject the DVD.

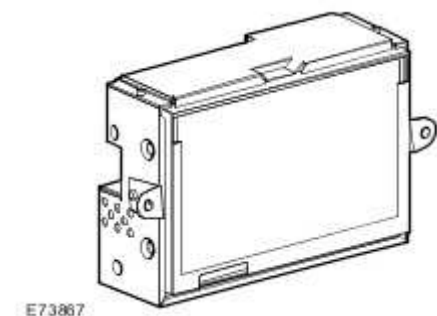
The GPS receiver receives information from between 1 and 8 satellites at any one time. This information is received from the GPS antenna. The built in GPS receiver is used for calculating the position (i.e. Latitude, longitude and height), direction and speed.

The navigation computer uses non-volatile memory to store settings and configuration information when it is powered down. This process takes place just before the computer turns off.

For the Japanese market the navigation computer incorporates a VICS receiver. The VICS receiver, receives information from the beacon antenna in the center of the instrument panel and the electric FM antenna. The VICS system receiver allows the vehicle to receive information about traffic conditions from roadside transmitters and adjust the navigation instructions accordingly.

For certain European markets the navigation computer incorporates the Traffic Message Channel (TMC) receiver. The TMC receiver decodes TMC data. The navigation computer then displays this information on the TSD and also re-routes the navigation guidance around any traffic hold ups. The TMC data is received via the electric FM (frequency modulation) antenna via the antenna signal splitter.

TOUCH SCREEN DISPLAY (TSD)



The Touch Screen Display (TSD) is located in the center of the instrument panel. TSD is a touch sensitive 7 inch LCD (liquid crystal display) VGA screen containing 800 x 480 pixels in a 15:9 format. The TSD is connected to the Information and Entertainment system on the Media Oriented Systems Transport (MOST) ring. The MOST ring is a fibre optic communications data bus that allows high speed transfer of control instructions and audio around the system.

The TSD processes its own video for system operation but receives the navigation graphics from the navigation computer on a dedicated serial link called GVIF (Gigabit Video Interface).

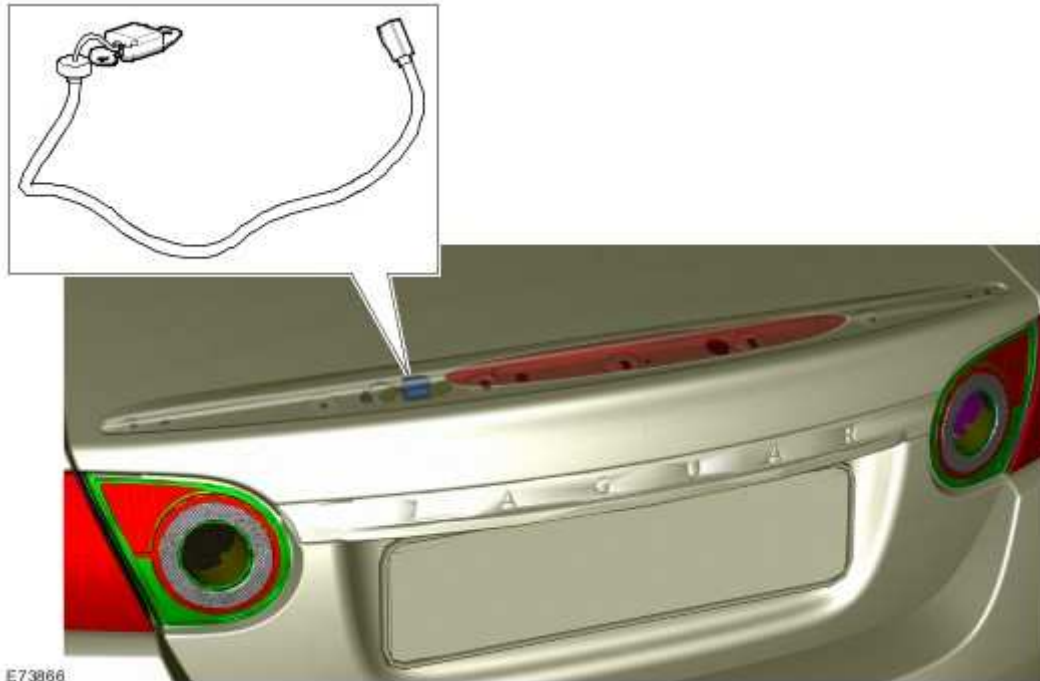
The TSD is also the control interface for the following vehicle systems:

- Climate control
- Audio system
- Heated seats
- Customer programmable security features

- Cellular phone
- Vehicle settings

The TSD navigation control signals are sent on the MOST ring to the navigation computer,

GPS ANTENNA



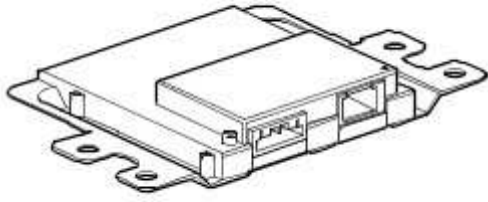
The GPS (global positioning system) antenna is located in the rear liftgate spoiler. The GPS antenna is connected to the GPS computer by a single co-axial cable and passes signals from the GPS satellites to the navigation computers built in receiver for processing.

It is possible for the GPS antenna to lose the signal from the GPS satellites:

- In hilly or tree lined areas
- Built up areas with tall buildings
- In multi storey car parks
- In garages
- In tunnels
- In bridges
- During heavy rain or thunderstorms.

When the signal is lost the navigation computer will continue to give guidance using memory mapped data from the DVD (digital versatile disc) map until the signal is restored.

INFORMATION AND ENTERTAINMENT CONTROL MODULE



E73868

The Information and Entertainment Control Module (ICM) is located between the TSD and the IAM. The ICM is mounted in the vehicle using four M6 bolts.

The ICM is the gateway between the vehicle MS CAN bus and the Information and Entertainment system MOST bus.

INFORMATION AND ENTERTAINMENT CONTROL PANEL



E73872

The Information and Entertainment Control Panel is connected to the MS CAN bus. The ICP incorporates switches for audio system control, climate control hazard warning lamps and the navigation system. The navigation system is operated from the TSD via signals on the MOST ring. Hard switches on the ICP send CAN signals to the ICM which transfers signals to the relevant module on the MOST ring.

VICS BEACON ANTENNA (JAPAN ONLY)

VICS Beacon Antenna

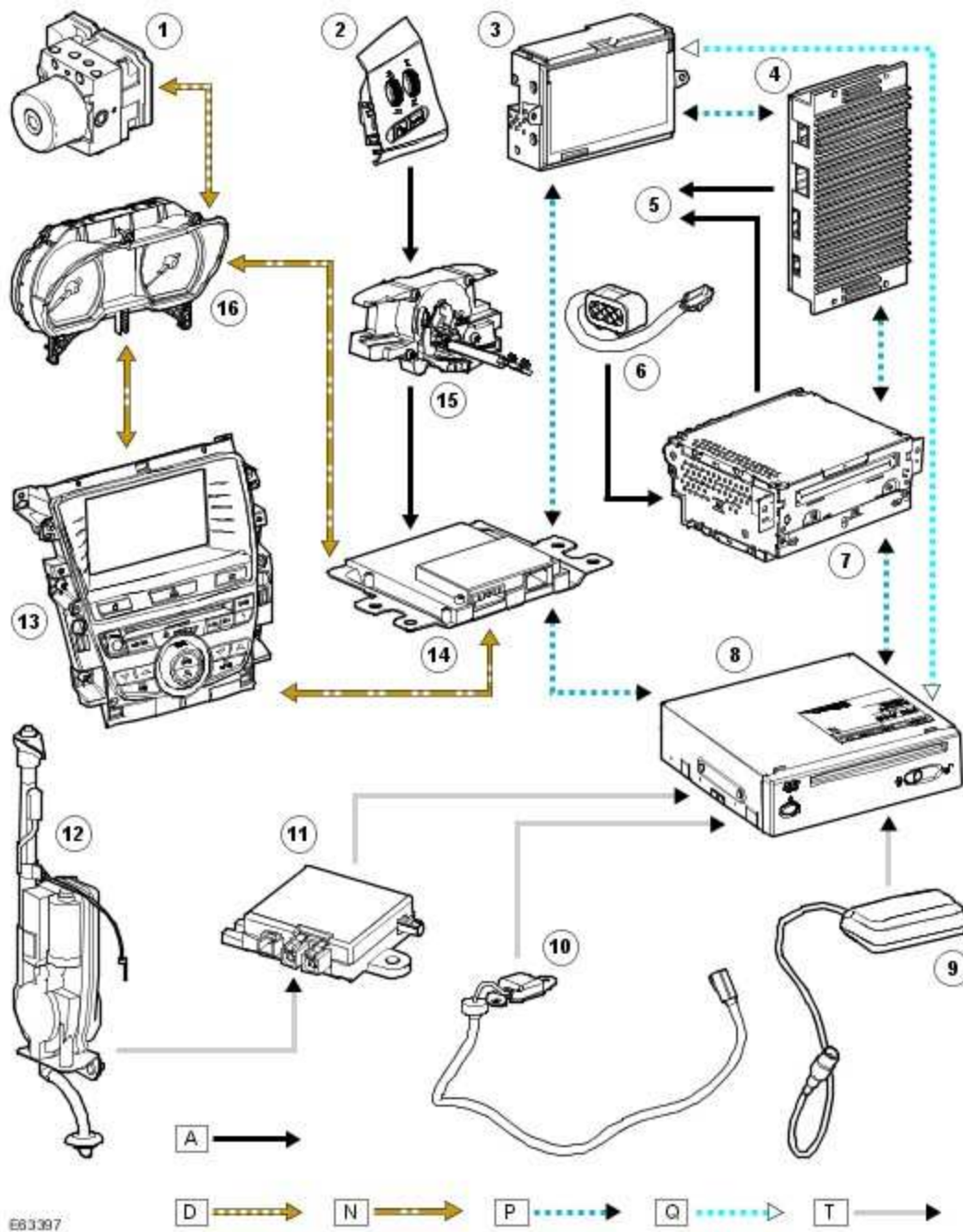


The VICS beacon antenna is located on top of the instrument panel. The antenna receives infra red and RF signals from road side transmitters. The Antenna is connected to the navigation computer which incorporates a VICS receiver.

CONTROL DIAGRAM

NOTE:

A = Hardwired; D = High speed CAN bus; N = Medium speed CAN; P = MOST ring; Q = GVIF; T = Coaxial



Item	Part Number	Description
1		ABS control module
2		Steering wheel controls
3		Touch Screen Display (TSD)

4		Audio amplifier
5		Speakers
6		Microphone
7		Integrated Audio Module
8		Navigation computer
9		Vehicle Information and Communication Systems (VICS) beacon antenna (Japan only)
10		GPS Antenna
11		AM/FM antenna splitter
12		AM/FM antenna
13		Integrated Control Panel
14		Information and entertainment control module
15		Clock spring
16		Instrument cluster

PRINCIPLES OF OPERATION

The system used to calculate the current position of the vehicle is called the GPS (global positioning system) . The system utilizes satellites which are owned by the United States Department of Defense (DoD). A total of 24 satellites orbit the earth every 12 hours at a height of 20,000 km (12500 miles), and between 5 and 11 of these satellites can be seen from a single point at any given time. The orbits are tilted to the earth's equator by 55 degrees to ensure coverage of polar regions. Each satellite transmits radio signals to provide information about the satellite position i.e. latitude, longitude, altitude, almanac data and an accurate time signal generated by an on-board atomic clock. Each satellite contains four atomic clocks.

The vehicle needs to receive data from at least four different satellites to give a three dimensional fix on its current position.

As the vehicle moves, this information is continually being updated. The computer determines which satellites are 'visible' to the system and their current position and relationship to each other. Using this information the computer can account for positional deviations of the satellites and compensate to enhance the accuracy of the navigation system.

The GPS (global positioning system) signal is also known as the Precision Positioning Signal (PPS).

PPS predictable accuracy is:

- 22 meters horizontal accuracy
- 27.7 meters vertical accuracy
- 200 nanoseconds time accuracy.

The navigation system provides computer generated audible and visual route guidance information to enable the driver to reach a desired destination. The system allows the driver to choose the desired route using minor or major roads or highways and the quickest or shortest route. Directions to hospitals, museums, monuments and hotels are also available. The computer uses map information stored on a DVD-ROM to determine the best route for the journey and provide the driver with details of directions and approaching junctions.

The navigation system receives GPS (global positioning system) information via the GPS antenna. The GPS signals are used by the navigation computer to calculate the vehicles position. Once the driver has input a desired destination the navigation computer can calculate a route, based on the drivers pre-determined preferences or the default settings in the navigation computer.

The navigation system is accessed by pressing the navigation soft key on the TSD.

Navigation is initiated by the driver inputting a destination. This can be achieved by:

- Entering in an address using the TSD.
- Entering a post code.
- Choosing a previous destination.
- Choosing a point of interest from the map disc database.
- Choosing the home location
- Choosing a memory stored location.

The driver is then guided to the destination by a scrolling map display and voice guidance. The display can be varied by scale and display type.

In addition to the standard navigation system there are two market dependant systems that supply extra information to the navigation system and the driver. These are:

- Traffic Message Channel (TMC)
- Vehicle Information and Communication System (VICS) (Japan only).

Traffic Message Channel (TMC)

The Traffic Message Channel (TMC) is a function of the FM (frequency modulation) Radio Data System (RDS). The system broadcasts real-time traffic and weather information. Data messages are received and decoded by the TMC receiver and passed onto the navigation system, which then delivers them via the navigation system interface. TMC messages can be filtered by the navigation computer so that only those relevant to the current journey are displayed, allowing the navigation

system to offer dynamic route guidance - alerting the driver of a problem on the planned route and calculating an alternative route to avoid the incident. All TMC events on the map can be viewed not just the ones on the calculated route.

TMC traffic information systems conform to a global standard that has been adopted by traffic data gatherers, information service providers, broadcasters and vehicle/receiver manufacturers. TMC information is received via the normal FM (frequency modulation) radio antenna.

All TMC receivers use the same list of event codes, while the location database (on the map disc) contains both a country-specific set of location codes for the strategic European road network.

TMC traffic data is currently broadcast in many European countries.

Vehicle Information and Communication System (VICS)

The VICS system supplies the navigation computer with information to enable the navigation computer to re-route the navigation guidance or to inform the vehicle driver of traffic conditions in the vehicles vicinity. Information is provided to the system through three routes:

- RF transmission
- Infra-red transmission
- FM (frequency modulation) multiplex transmissions.

The RF transmissions are generally transmitted from road side beacons mainly on expressways. The information transmitted is as follows:

- Traffic congestion
- Travel time to next intersection
- Traffic conditions in surrounding areas and expressway turn offs
- Traffic accidents
- Speed limits
- Lane regulations
- Tire change
- Parking availability at expressway service areas and parking areas.

The Infra-Red transmissions are received by the beacon antenna mounted on the top of the instrument panel.

Infra-Red transmissions are transmitted from road side beacons on major trunk roads. The information transmitted is:

- Traffic congestion and travel time
- Traffic accidents
- Breakdowns
- Road works restrictions
- Parking availability.

FM (frequency modulation) transmissions are broadcast as part of the normal RDS FM (frequency modulation) transmission. Information transmitted is:

- Traffic congestion and travel time for wide areas
- Traffic accidents, road works, speed limits and lane restrictions for a wide area
- Parking availability information.

FM transmissions are received via the FM antenna and split from the normal FM transmissions by the FM signal splitter.

Navigation System

Principle of Operation

For a detailed description of the navigation system, refer to the relevant Description and Operation section in the workshop manual.

Navigation System

Inspection and Verification

1 . Verify the customer concern.

2 . Visually inspect for obvious signs of damage, water ingress and system integrity.

Mechanical	Electrical
Navigation system DVD player Mechanism	- Navigation system display - Navigation system module - GPS antenna - Wiring harness for damage and corrosion - ABS Module - Electrical connector(s) - Audio unit

3 . If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.

4 . If the cause is not visually evident, check for Diagnostic Trouble Codes (DTCs) and refer to the DTC Index.

Symptom Chart

Symptom	Possible Cause	Action
Poor satellite reception	- Electrical harness open/short circuit, disconnected - Component failure - No reception from satellite	GO to Pinpoint Test G841057p1.
Map disc will not insert/eject	- Electrical harness open/short circuit, disconnected - Component failure	GO to Pinpoint Test G841057p2.

	• Map disc failure	
Black screen (navigation map screen does not display)	• Electrical harness open/short circuit, disconnected • Component failure • GVIF cable	GO to Pinpoint Test G841057p3.
Navigation map screen color is abnormal	• Electrical harness open/short circuit, disconnected • Component failure • GVIF cable	GO to Pinpoint Test G841057p4.
Vehicle's current position mark turns independently	• Electrical harness open/short circuit, disconnected • Component failure • Vehicle on a turntable in a parking building	GO to Pinpoint Test G841057p5.
Car current position not stable	• Electrical harness open/short circuit, disconnected • Component failure	GO to Pinpoint Test G841057p6.
Map display is incomplete	• Map disc contaminated/damaged • Electrical harness open/short circuit, disconnected • Incorrect market map disc • Component failure	GO to Pinpoint Test G841057p7.
No navigation voice guidance	• Voice guidance soft key set to OFF position • Volume level set too low • Component failure	GO to Pinpoint Test G841057p8.
No response to pressing navigation menu	• Interruption during map disc update • Electrical harness open/short circuit, disconnected • Incorrect Navigation Control Module (NCM) installed • Incorrect car configuration	GO to Pinpoint Test G841057p9.

	data received	
'NO DVD PLEASE INSERT MAP DVD' message is displayed	A disc other than the map disc is inserted	Insert the correct map disc
'UNABLE TO READ DATA CONSULT YOUR DEALER' message is displayed	DVD player abnormality	Check and install a new Navigation Control Module (NCM) as required. Refer to the new module/component installation note at top of DTC Index.
'UNABLE TO READ DATA TEMPERATURE IS TOO HIGH' message is displayed	- Operating temperature has been exceeded - Navigation Control Module (NCM) internal temperature is high	Move the vehicle to a cool location, and turn the engine OFF. Wait for a while, then verify conditions again. If the temperature around the Navigation Control Module (NCM) is high, take measures to lower temperature
'UNABLE TO READ DVD CORRECTLY CHECK IF THE DVD IS DAMAGED OR DIRTY' message is displayed	Check map disc for contamination, deformation, cracks, scratches or non-genuine disc	Clean the map disc and retest, replace the map disc
'UNABLE TO READ DATA CHECK IF MAP DVD IS CORRECT' message is displayed	Incorrect DVD map disc is inserted	Insert a map disc with the correct part number

DTC Index



CAUTION: When probing connectors to take measurements in the course of the pinpoint tests, use the adaptor kit, part number 3548-1358-00.

NOTE:

If the control module is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module.

NOTE:

Generic scan tools may not read the codes listed, or may read only five digit codes. Match the five digits from the scan tool to the first five digits of the seven digit code listed to identify the fault (the last two digits give additional information read by the manufacturer approved diagnostic system).

NOTE:

When performing electrical voltage or resistance tests, always use a digital multimeter (DMM) accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance, always take the resistance of the DMM leads into account.

NOTE:

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

NOTE:

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

NOTE:

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

DTC	Description	Possible Cause	Action
B1A8911	Satellite antenna	Satellite antenna circuit - short to ground	Check satellite antenna connections. Refer to the electrical circuit diagrams and test satellite antenna circuit for short to ground
B1A8913	Satellite antenna	Satellite antenna circuit - open circuit	Check satellite antenna connections. Refer to the electrical circuit diagrams and test satellite antenna circuit for open circuit
B1A891B	Satellite antenna	Satellite antenna - circuit resistance above threshold	Install a new navigation system module, refer to the new module installation note at the top of the DTC Index
B1D5514	Antenna #2	TMC/VICS FM antenna circuit -	Check TMC/VICS FM antenna connections. Refer to the electrical circuit diagrams and

	Circuit	open	test TMC/VICS FM antenna circuit for open circuit
B1D5614	Antenna #3 Circuit	VICS antenna circuit - open	Check VICS antenna connections. Refer to the electrical circuit diagrams and test VICS antenna circuit for open circuit
U200531	Control Module	Missing vehicle speed message	Check ABS module and Instrument Cluster for speed related DTCs and refer to relevant DTC Index. Anti-Lock Control - Stability Assist Instrument Cluster
U300049	Control Module	Internal electronic failure	Install a new navigation system module, refer to the new module installation note at the top of the DTC Index
U300055	Stored vehicle configuration data does not match	Incorrect car configuration data received	Using the manufacturer approved diagnostic system check/amend the Car Configuration File parameter in block 2, byte 127 to match vehicle market/specification. If the DTC remains check navigation system module part number and ensure the correct component is installed to vehicle market/specification
U300087	Control Module	Missing message	Re-configure the RJB using the manufacturer approved diagnostic system. Check navigation module for DTCs and refer to the DTC Index. Check CAN network integrity using the manufacturer approved diagnostic system
U300098	Control module	Component or system over temperature	Check for additional DTCs and refer to DTC Index. Clear DTC and re-test/monitor condition for re-occurrence
U300362	Battery voltage	Circuit voltage mismatch with navigation control module	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U300317	Battery voltage	Circuit voltage above threshold	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system

Pinpoint Tests

NOTE:

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval Program is in operation, prior to the installation of a new module/component.

NOTE:

Navigation Diagnostic Screen Access

- 1. With the vehicle at rest, place the ignition switch in either "ACC", "ON", or start the engine.
- 2. On the "Menu" screen, press the top center of the screen for more than three seconds.
- 3. Enter the PIN code, and then touch "OK". 660: Diagnosis Menu screen 661: System Check screen (DTC code verification screen) 662: GPS Information screen.
- 4. The diagnostics screen will be displayed.

PINPOINT TEST G841057p1 : Poor satellite reception

G841057t1 : SYSTEM CHECK FOR DTCs

1. Check the system for DTCs which may be logged.

- **Are any system DTCs logged?**

-> **Yes**

Carry out repair actions to correct the DTCs logged.

Check satellite reception. GO to Pinpoint Test G841057t3.

-> **No**

GO to Pinpoint Test G841057t2.

G841057t2 : RETRO-INSTALL INSTALLATIONS CHECK

1. Check to see if there are any retro-install installations (anti-theft, radar, etc.)

- **Are there any retro-install installations?**

-> **Yes**

Aftermarket items may cause either electrical or radio frequency interference that can cause satellite reception to deteriorate.

Remove the power supply (including backup power supplies) from any aftermarket items installed. If reception returns to normal after disconnection of aftermarket items, carry out the following. Alter the installation position of any aftermarket items. Check satellite reception. GO to Pinpoint Test G841057t3.

-> **No**

GO to Pinpoint Test G841057t3.

G841057t3 : SATELLITE RECEPTION CHECKS

1. Check the 'ST' column of the navigation diagnostics GPS information screen (PIN code 662) after 10 minutes have passed. There must be more than 4 'P's displayed for accurate positioning. Check the 'HDOP' value, this must be less than 5.

- **Are there more than 4 'P's displayed and is HDOP less than 5?**

-> **Yes**

Satellite reception is normal.

-> **No**

Confirm the GPS antenna is connected to the navigation module.

Refer to the electrical circuit wiring diagrams and check the integrity of the coaxial cable and connectors from the Navigation Control Module (NCM) to the GPS antenna.

Install a new GPS antenna or coaxial cable as required.

Re-check satellite reception.

PINPOINT TEST G841057p2 : Map disc will not insert/eject

G841057t4 : CHECK NAVIGATION DISC SLOT SHUTTER

1. Check the navigation map disc slot shutter is open.

- **Is the navigation map disc slot shutter is open?**

-> **Yes**

GO to Pinpoint Test G841057t5.

-> **No**

Open the map disc slot shutter.

GO to Pinpoint Test G841057t5.

G841057t5 : CHECK NAVIGATION MAP DISC WILL INSERT/EJECT

1. Check that it is possible to insert/eject navigation map disc.

- **Is it possible to insert/eject navigation map disc?**

-> **Yes**

Operation is normal.

-> **No**

Refer to the electrical circuit diagrams and check power supply and ground connections to the Navigation Control Module (NCM). If power supply and ground connections are good, install a new Navigation Control Module (NCM) as required. Refer to the new module/component installation note at top of DTC Index.

PINPOINT TEST G841057p3 : Black screen (navigation map screen does not display)

G841057t6 : CHECK SCREEN SAVER FUNCTION

1. Check the screen saver function operation.

- **Does the screen saver function operate?**

-> **Yes**

Press the display panel button. GO to Pinpoint Test G841057t8.

-> **No**

GO to Pinpoint Test G841057t8.

G841057t8 : CHECK DISPLAY BACKLIGHT

1. Check the display backlight operation.

- **Does the display backlight operate?**

-> **Yes**

Refer to the electrical circuit diagrams and check the GVIF cable between Navigation Control Module (NCM) and HLDF screen is properly connected.

If the GVIF cable between Navigation Control Module (NCM) and HLDF screen is properly connected, check and install a new GVIF cable as required. Refer to the new module/component installation note at top of DTC Index.

If the GVIF cable between Navigation Control Module (NCM) and HLDF screen is properly connected and **NOT** damaged, check and install a new Navigation Control Module (NCM) as required. Refer to the new module/component installation note at top of DTC Index.

Re-check the system.

-> **No**

Check the HLDF display.

Re-check the system.

PINPOINT TEST G841057p4 : Navigation map screen colour is abnormal

G841057t9 : COLOUR BAR CHECK

1. Carry out the display diagnostics 'colour bar check' (PIN code 660).

- **Are the results of the display diagnostics 'colour bar check' normal?**

-> **Yes**

Check the HLDF display.

Re-check the system.

-> **No**

Check the condition of the map disc for dirt or scratches.

Refer to the electrical circuit diagrams and check the GVIF cable between Navigation Control Module (NCM) and HLDF screen is properly connected.

If the GVIF cable between Navigation Control Module (NCM) and HLDF screen is properly connected, check and install a new GVIF cable as required. Refer to the new module/component installation note at top of DTC Index.

If the GVIF cable between Navigation Control Module (NCM) and HLDF screen is properly connected and **NOT** damaged, check and install a new Navigation Control Module (NCM) as required. Refer to the new module/component installation note at top of DTC Index.

Re-check the system.

PINPOINT TEST G841057p5 : Vehicle's current position mark turns independently

G841057t10 : VEHICLES CURRENT POSITION MARK TURNS INDEPENDENTLY

1. Determine if the ignition status was turned to Auxiliary or On, while the vehicle was in motion with steering turned such as after an engine stall.

- **Was ignition status set to Auxiliary or On?**

-> **Yes**

The angular speed of the vehicle at the time of the ignition status change will be logged as the standard value. To re-set the standard value, turn ignition status to 'OFF' then to 'Auxiliary' or 'On' with the vehicle stationary.

Re-test the vehicle.

-> **No**

Check and install a new Navigation Control Module (NCM) as required. Refer to the new module/component installation note at top of DTC Index.

PINPOINT TEST G841057p6 : Car current position not stable

G841057t11 : SYSTEM CHECK FOR DTCs

1. Check the system for DTCs which may be logged.

- **Are any system DTCs logged?**

-> **Yes**

Carry out repair actions to correct the DTCs logged.

Re-check the system for car current position not stable.

-> **No**

GO to Pinpoint Test G841057t12.

G841057t12 : VEHICLE SPEED INPUT CHECK

1. Select Vehicle Sensor from the navigation diagnostic menu screen (PIN code 660), check Current speed. The current speed must match the speedometer.

- **From the Vehicle Sensor screen, does the current speed must match the speedometer?**

-> **Yes**

GO to Pinpoint Test G841057t13.

-> **No**

Carry out MOST ring circuit checks.

Check the Anti-Lock Brake System Module for related DTCs and refer to the relevant DTC Index.

Carry out network integrity tests using the manufacturer approved diagnostic system. Refer to electrical circuit diagrams and check CAN circuits if required. Repair wiring harness as required.

G841057t13 : CHECK NUMBER OF SATELLITES

1. From the navigation diagnostic GPS information screen (PIN code 662), check the number of satellites displayed.

- **Is the number of satellites displayed on the screen 0?**

-> **Yes**

Carry out pinpoint test A "Poor Satellite Reception"

-> **No**

GO to Pinpoint Test G841057t14.

G841057t14 : CHECK IF SYMPTOMS ARE OCCURRING IN PARTICULAR LOCATIONS

1. Confirm if the 'car current position not stable' symptom is occurring in particular locations.

- **Is the 'car current position not stable' symptom occurring in particular locations?**

-> **Yes**

Signal reflections from buildings or a particular location may be responsible.

-> **No**

Carry out pinpoint test A "Poor Satellite Reception"

PINPOINT TEST G841057p7 : Map display is incomplete

G841057t15 : SYSTEM CHECK FOR DTCs

1. Check the system for DTCs which may be logged.

- Are any system DTCs logged?

-> Yes

Carry out repair actions to correct the DTCs logged.

Re-check the system for 'Map display is incomplete'.

-> No

GO to Pinpoint Test G841057t16.

G841057t16 : CHECK MAP DISC

1. Check map disc for contamination, deformation, cracks, scratches or non-genuine disc and correct market.

- Has a fault been identified with the map disc?

-> Yes

Replace the map disc.

Re-check the system for 'Map display is incomplete'.

-> No

Check and install a new Navigation Control Module (NCM) as required. Refer to the new module/component installation note at top of DTC Index.

PINPOINT TEST G841057p8 : No navigation voice guidance

G841057t17 : CHECK ALL AUDIO OUTPUT SYSTEMS

1. Check audio output across all systems.

- Is there sound output across all systems?

-> Yes

GO to Pinpoint Test G841057t18.

-> **No**

GO to Pinpoint Test G841057t19.

G841057t18 : CHECK VOICE GUIDANCE SOFT KEY

1. Check navigation screen menu, voice guidance soft key is not set to OFF position.

- **Is the voice guidance soft key set to OFF position?**

-> **Yes**

Set the voice guidance soft key to ON position.

Re-check the system

-> **No**

GO to Pinpoint Test G841057t19.

G841057t19 : VOLUME LEVEL CHECK

1. Check the volume level is not set too low.

- **Is the volume level set too low?**

-> **Yes**

Increase the volume level and re-test vehicle.

-> **No**

Refer to electrical circuit diagrams and check integrity of amplifier and speaker system wiring harness and connectors.

GO to Pinpoint Test G841057t20.

G841057t20 : NAVIGATION VOICE ONLY NOT AUDIBLE

1. Press the 'Navigation voice repeat' soft key.

- **After the navigation voice repeat soft key is pressed, can voice still not be heard even though it has become louder?**

-> **Yes**

Check and install a new Navigation Control Module (NCM) as required. Refer to the new module/component installation note at top of DTC Index.

-> **No**

Operation is normal.

PINPOINT TEST G841057p9 : No response to pressing navigation menu

G841057t21 : NO RESPONSE TO PRESSING NAVIGATION MENU

1. Check that the engine was not turned 'OFF' during a navigation software update.

- **Was the engine turned 'OFF' during a navigation software update?**

-> **Yes**

Check the correct map disc is inserted into the Navigation Control Module (NCM). Start the engine and allow to idle for 15 minutes Turn the engine 'OFF', and then start the engine again. Verify that the navigation screen displays. Navigation was in the program update mode.

-> **No**

GO to Pinpoint Test G841057t23.

G841057t22 : NO RESPONSE TO PRESSING NAVIGATION MENU

1. Check that the engine was not turned 'OFF' after inserting the new map disc.

- **Was the engine turned 'OFF' after inserting the new map disc?**

-> **Yes**

Check the correct map disc is inserted into the Navigation Control Module (NCM). Start the engine and allow to idle for 15 minutes Turn the engine 'OFF', and then start the engine again.

-> **No**

GO to Pinpoint Test G841057t23.

G841057t23 : NO RESPONSE TO PRESSING NAVIGATION MENU

1. Check the "Loading" button on the navigation diagnostics screen (PIN code 660) has been pressed, and "YES" has been selected.

- **Has the "Loading" button on the navigation diagnostics screen been pressed, and has "YES" been selected?**

-> **Yes**

Check the correct map disc is inserted into the Navigation Control Module (NCM). Start the engine and allow to idle for 15 minutes Turn the engine 'OFF', and then start the engine again.

-> **No**

Refer to electrical circuit diagrams and check integrity of navigation system wiring harness and connectors.

GO to Pinpoint Test G841057t24.

G841057t24 : SYSTEM CHECK FOR DTCs

1. Check the system for DTCs which may be logged.

- **Is DTC U300055 logged?**

-> **Yes**

Using the manufacturer approved diagnostic system check/amend the Car Configuration File parameter in block 2, byte 127 to match vehicle market/specification. If the DTC remains check navigation system module part number and ensure the correct component is installed to vehicle market/specification.

-> **No**

GO to Pinpoint Test G841057t25.

G841057t25 : NO RESPONSE TO PRESSING NAVIGATION MENU

1. Turn the engine 'OFF', wait for a moment, and then turn the engine 'ON' again.

- **Does the navigation screen fail to display even if the navigation button is pressed?**

-> **Yes**

Check the HLDF is installed correctly.

Check the Navigation Control Module (NCM) is installed correctly.

-> **No**

Operation is normal.

Navigation System Antenna (86.62.06)

Removal

- 1 . Remove the rear spoiler.

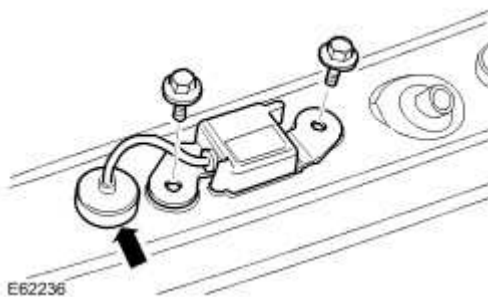
For additional information, refer to Rear Spoiler (76.19.86.60)

- 2 . Disconnect the electrical connector.



- 3 . Remove the navigation system antenna.

▶ Remove the 2 bolts.



Installation

- 1 . Install the navigation system antenna.

▶ Tighten the bolts to 6 Nm (4 lb.ft).

 Connect the electrical connector.

2 . Install the rear spoiler.

For additional information, refer to Rear Spoiler (76.19.86.60)

Navigation System Display Module (86.62.07)

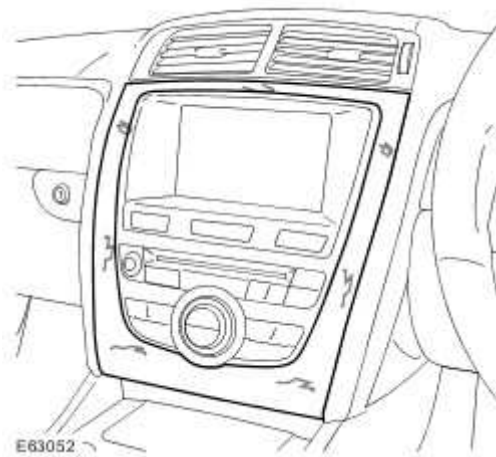
Removal

- 1 . Disconnect the battery ground cable.

For additional information, refer to

- 2 . Remove the instrument panel center reinforcement trim panel.

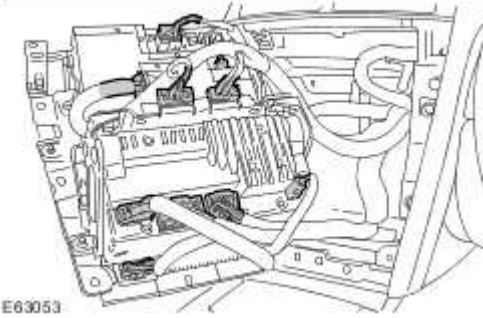
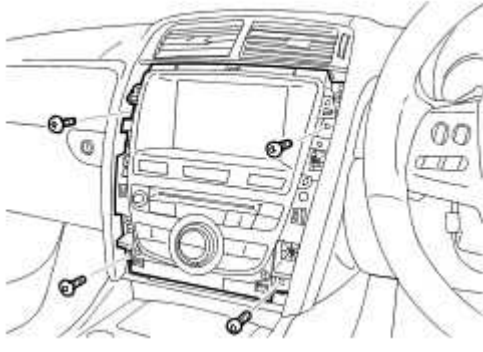
▶ Release from the 5 clips.



- 3  **CAUTION: Protect the surrounding trim from damage when changing the component.**

Release the navigation system module bracket.

- ▶ Remove the 4 Torx screws.
- ▶ Disconnect the 10 electrical connectors.
- ▶ Release the assembly.

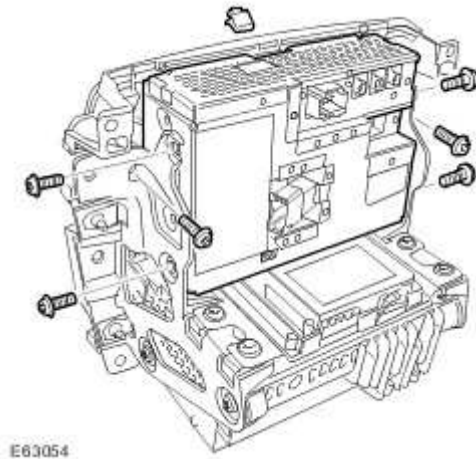


4 . NOTE:

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

Remove the navigation screen module.

- Remove the trim panel veneer upper retaining clip.
- Remove the 2 Torx screws.
- Remove the 4 Torx bolts.



E63054

Installation

1 . Install the navigation screen module.

- Tighten the Torx bolts to 6 Nm (4 lb.ft).
- Tighten the Torx screws.
- Install the clip.

2 . Install the navigation system module bracket.

- Connect the electrical connectors.
- Tighten the Torx screws.

3 . Install the instrument panel center reinforcement trim panel.

- Align the pegs and secure with the clips.

4 . Connect the battery ground cable.

For additional information, refer to

Navigation System Module (86.62.05)

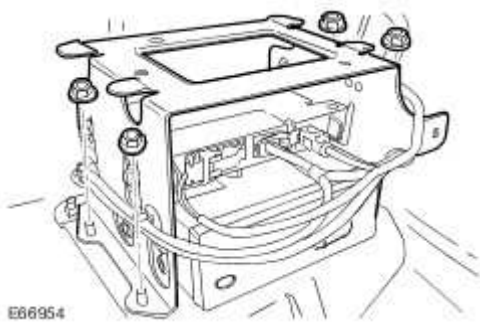
Removal

- 1 . Remove the cover and disconnect the battery ground cable.

For additional information, refer to

- 2 . Release the navigation system module bracket.

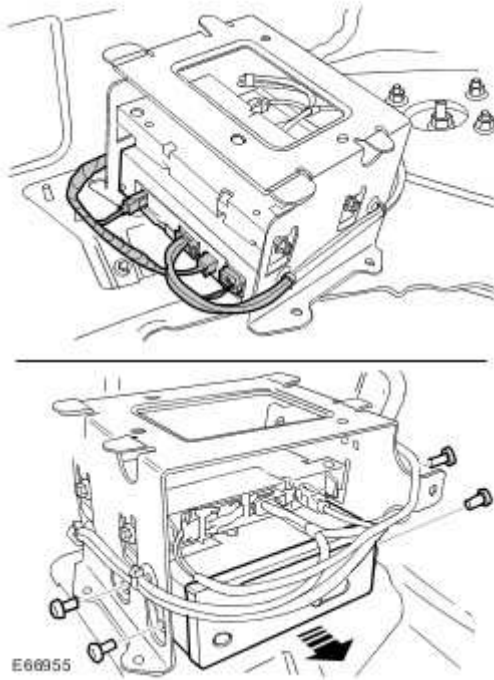
- ▶ Remove the 4 nuts.



- 3 . Remove the navigation system module.

- ▶ Disconnect the 4 electrical connectors.

- ▶ Remove the 4 Torx bolts.



Installation

1 . Install the navigation system module.

- ▶ Tighten the Torx bolts to 6 Nm (4 lb.ft).
- ▶ Connect the electrical connectors.

2 . Install the navigation system module bracket.

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

3 . Connect the battery ground cable and install the cover.

For additional information, refer to

419-08 : Cellurar Phone

Specifications

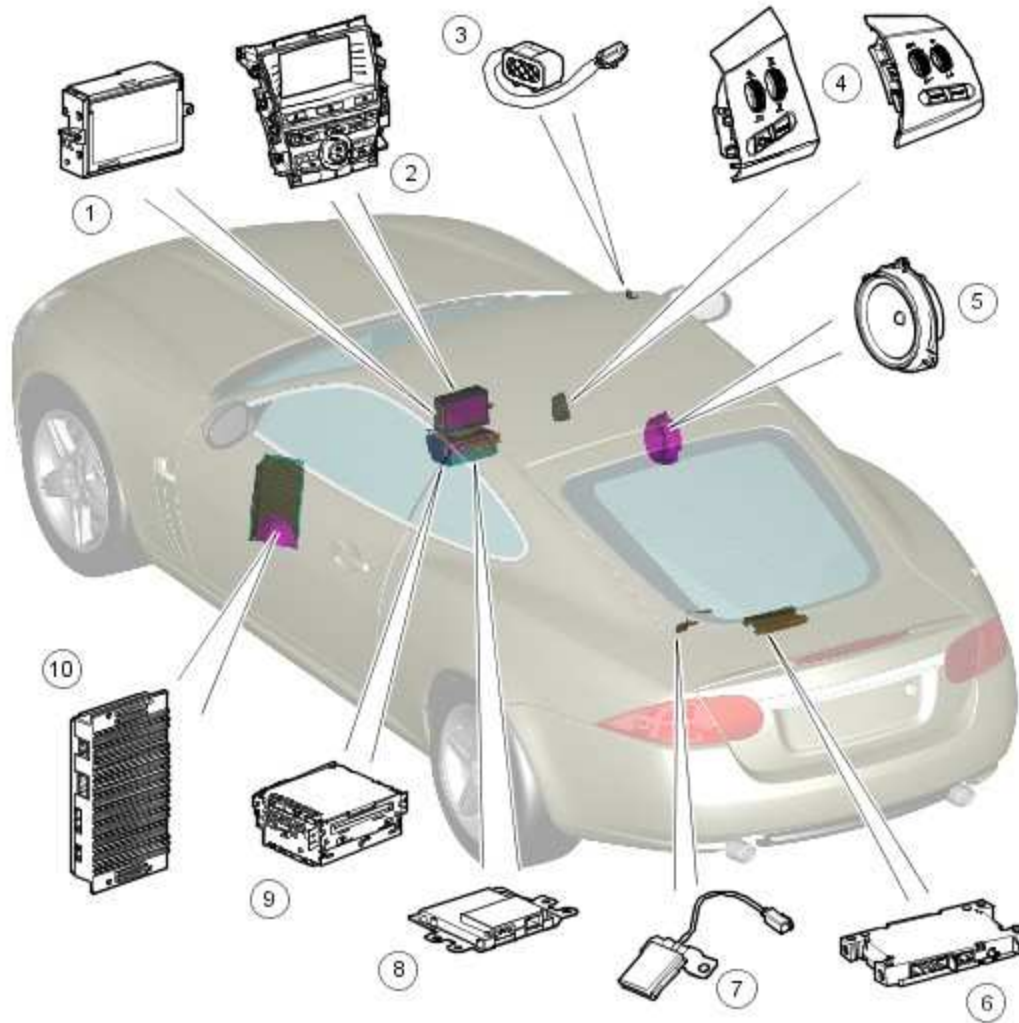
Specifications

Torque Specifications

Item	Nm	lb-ft	lb-in
Cellular (Bluetooth) phone antenna	7	5	62
Transceiver module	6	4	53

Cellular Phone

COMPONENT LOCATION



E63432

Item	Part Number	Description
1		Touch Screen Display (TSD)
2		Integrated control panel
3		Microphone
4		Steering wheel controls

5		Speakers
6		Telephone control module
7		Bluetooth antenna
8		Information and entertainment module
9		Integrated Audio Module
10		Audio amplifier

INTRODUCTION

The cellular phone system is based on using the customers own Bluetooth capable handset with the vehicle Information and Entertainment system.

NOTE:

There is no physical connection (cradle) between the phone handset and the Telephone Control Module. Communications between the two components are purely Bluetooth. This can limit the available functions dependant on the handset used.

The cellular phone system comprises the following components:

- Telephone Control Module
- Microphone
- Bluetooth antenna

The system allows the driver to send, receive and end phone calls using the Touch Screen Display (TSD), steering wheel switches and voice recognition system.

Phone dialing is achieved using one of the following methods:

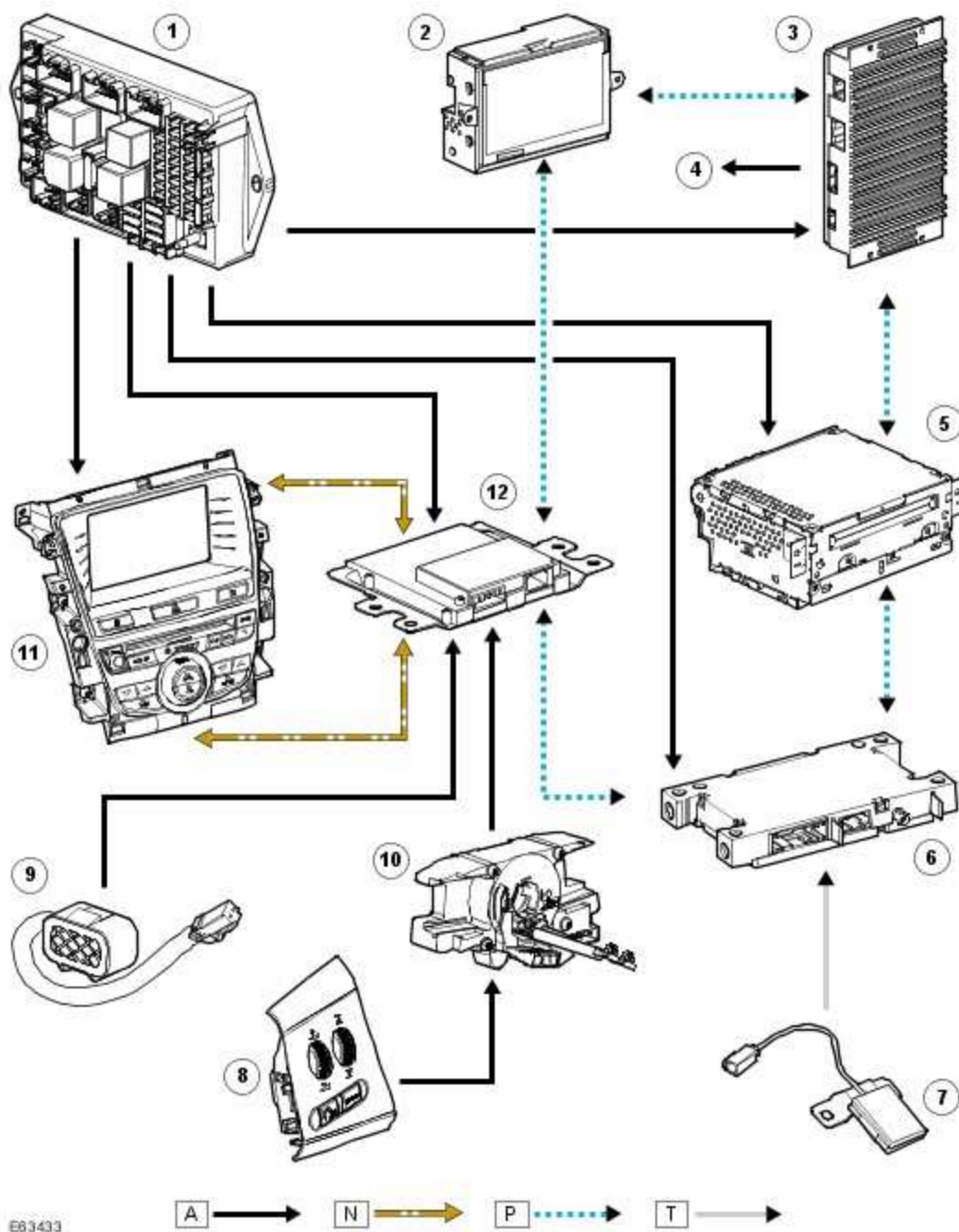
- Dialing a number using the TSD keypad
- Selecting a number from the handsets phonebook
- Selecting from the handsets call register, typically the last 10 calls made, received and missed.

The Telephone Control Module is connected to the Information and Entertainment system on the MOST ring. This allows audio and control signals to be routed to and from the Telephone Control Module.

CONTROL DIAGRAM

NOTE:

A=Hardwired; N=Medium speed CAN; P=MOST; T=Coaxial



Item	Part Number	Description
1		Auxiliary junction box
2		Touch Screen Display (TSD)
3		Audio amplifier

4		Speakers
5		Integrated audio module
6		Telephone control module
7		Bluetooth antenna
8		Steering wheel controls
9		Microphone
10		Clock spring
11		Integrated control panel
12		Information and entertainment module

Cellular Phone Antenna (86.51.17)

Removal

- 1 . Remove the rear seat armrest.

For additional information, refer to Rear Seat Armrest (76.70.39)

- 2 . Release the auxiliary junction box access cover.

▶ Release from the clip.



- 3 . Remove the cellular phone antenna.

▶ Remove the 2 nuts.

▶ Disconnect the electrical connector.



Installation

1 . Install the cellular phone antenna.

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

 Connect the electrical connector.

2 . Secure the auxiliary junction box access cover.

 Secure in the clip.

3 . Install the rear seat armrest.

For additional information, refer to Rear Seat Armrest (76.70.39)

Transceiver Module

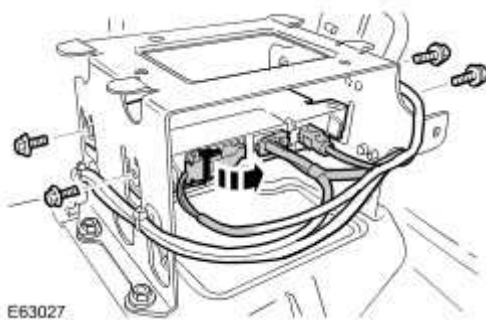
Removal

- 1 . Remove the cover and disconnect the battery ground cable.
For additional information, refer to

- 2 . Remove the transceiver module.

▶ Disconnect the 3 electrical connectors.

▶ Remove the 4 bolts.



Installation

- 1 . Install the transceiver module.

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

▶ Connect the electrical connectors.

- 2 . Connect the battery ground cable and install the cover.
For additional information, refer to

419-10 : Multifonction Electronic Modules

Specifications

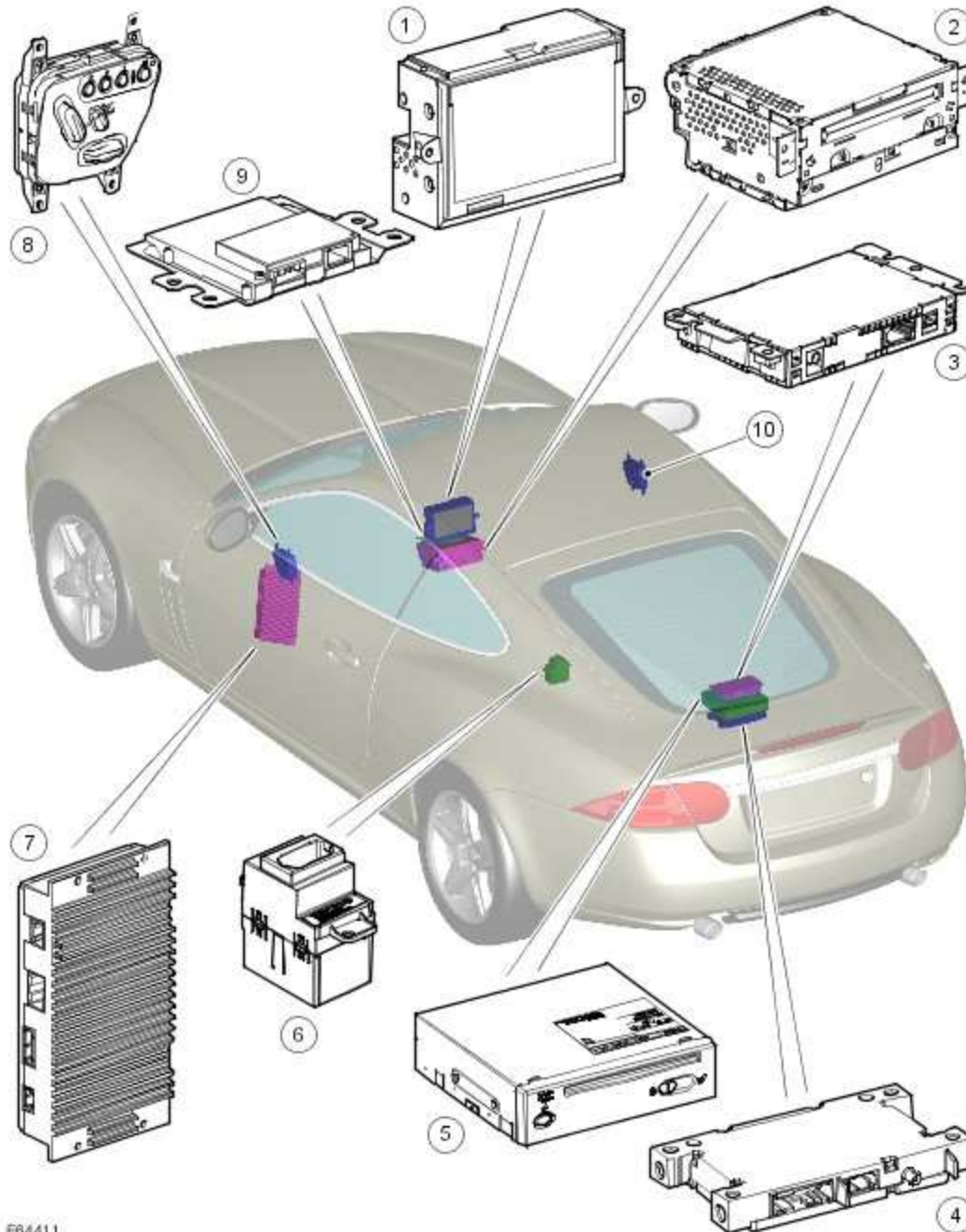
Specifications

Torque Specifications

Item	Nm	lb-ft	lb-in

Module Controlled Functions

COMPONENT LOCATION-MOST/LIN

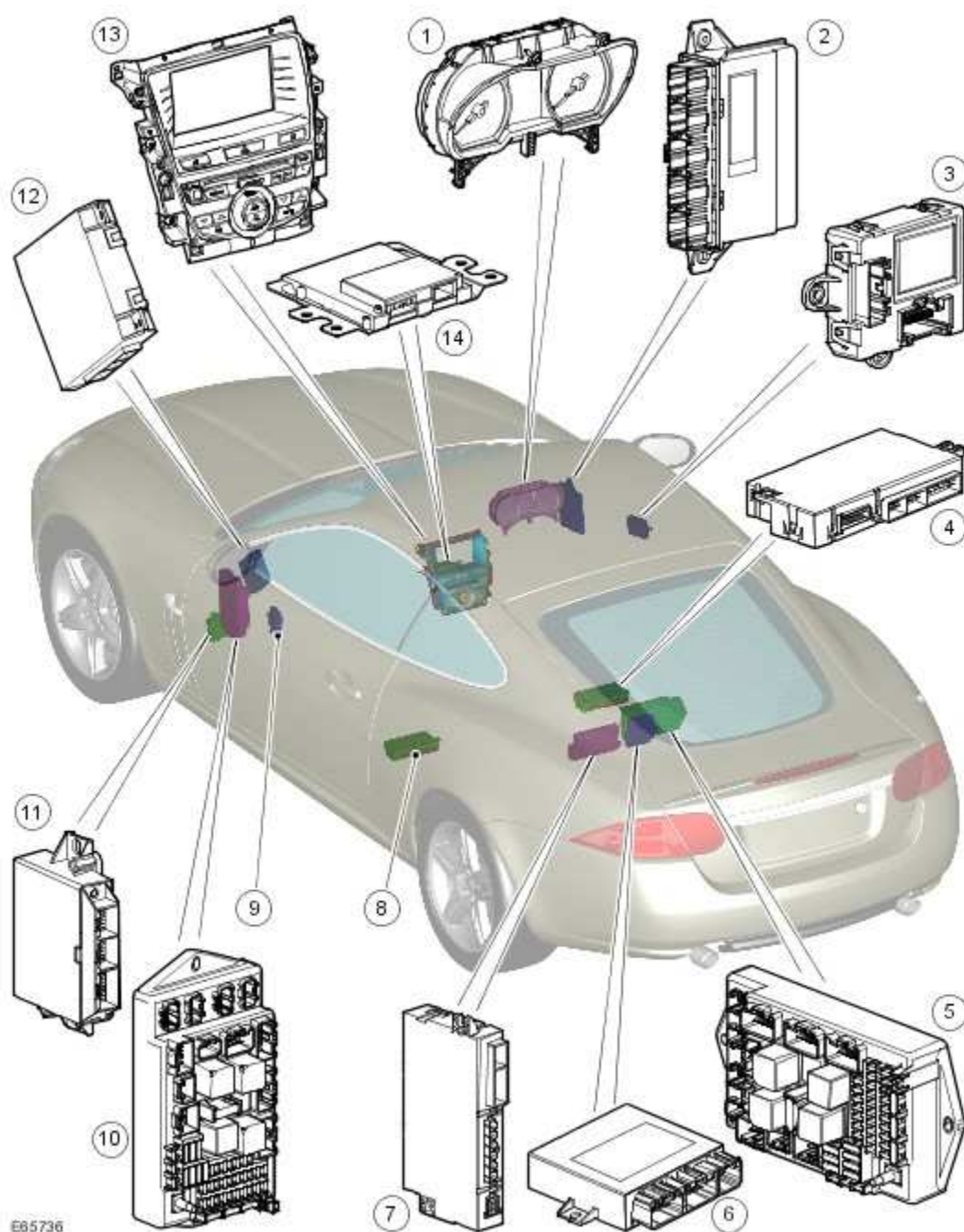


EB4411

Item	Part Number	Description
1		Touch Screen Display (TSD)

2		Integrated audio module
3		Bluetooth® phone module
4		SDARS/DAB module (where fitted)
5		Navigation computer
6		Engine start control module
7		Audio amplifier
8		Passenger door module
9		Information and entertainment control module
10		Drivers door module

COMPONENT LOCATION-MEDIUM SPEED CAN

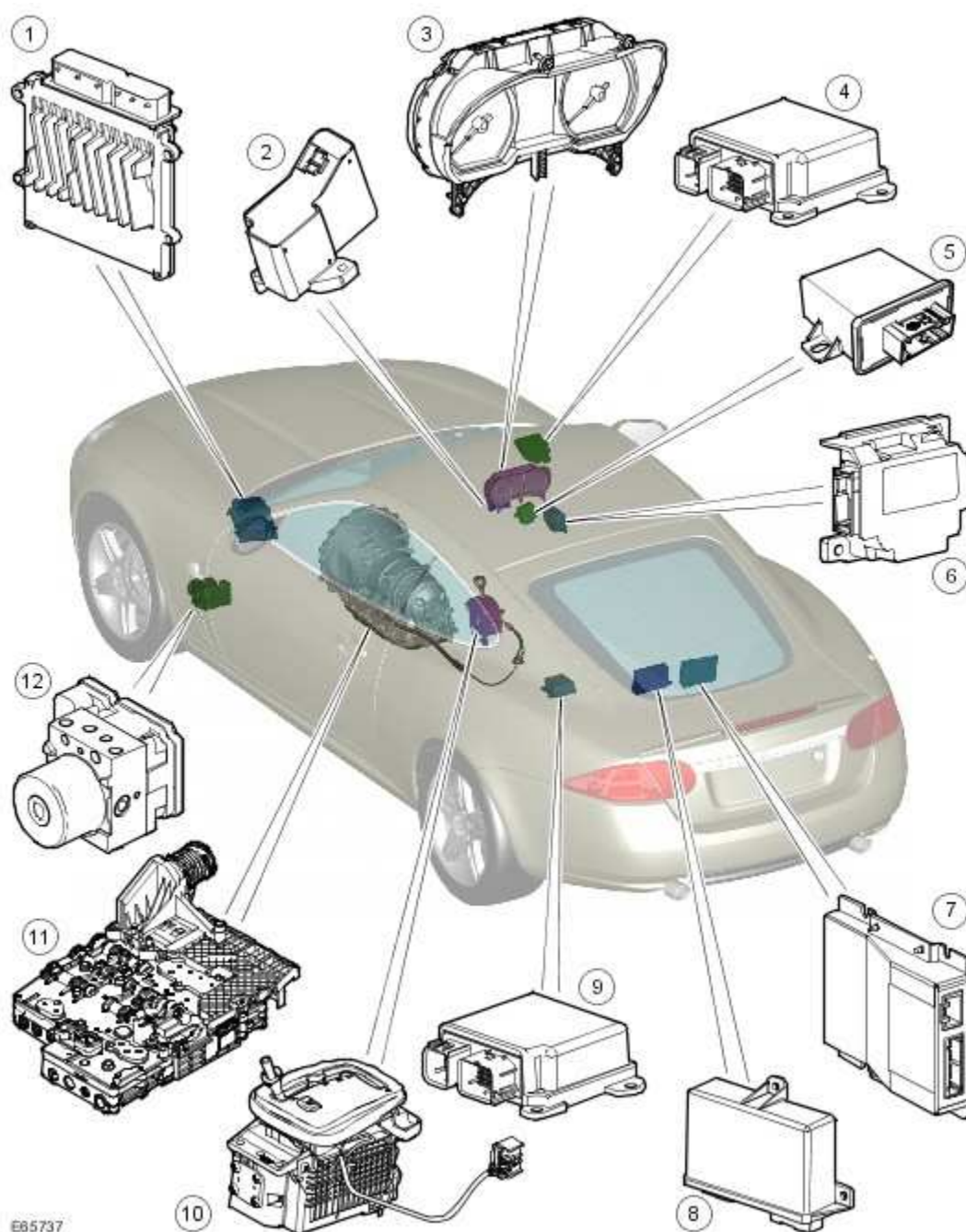


E65736

Item	Part Number	Description
1		Instrument cluster
2		Keyless vehicle module
3		Drivers door control module
4		Drivers seat module

5		Auxiliary junction box
6		Tire Pressure Monitoring System (TPMS) module
7		Convertible top control module (convertible vehicle only)
8		Passenger seat module
9		Passenger door control module
10		CJB
11		Parking aid control module
12		ATC control module
13		Integrated control panel
14		Information and entertainment control module

COMPONENT LOCATION-HIGH SPEED CAN



E65737

Item	Part Number	Description
1		ECM
2		Steering column lock
3		Instrument cluster
4		Pedestrian Protection System module

5		Headlamp leveling/adaptive front lighting module
6		Adaptive speed control module
7		Active Damping Control Module (ADCM)
8		Electric park brake module
9		RCM
10		L Gate
11		TCM
12		ABS control module

INTRODUCTION

The vehicle electrical system consists of a number of control modules connected via two multiplexed CAN busses For additional information, refer to Communications Network (418-00 Module Communications Network)

. The Instrument cluster acts as a gateway between the two CAN bus systems.

Lower speed control modules use a Local Interconnect (LIN) Bus. Control modules on the LIN bus are generally configured to be master/slave i.e. one module controls other module(s).

The vehicle entertainment system uses a fibre optic bus system which uses the MOST protocol for transmission of data and audio to the relevant components of the audio system.

Module	Bus System	Function	Location
ECM	HS CAN	Controls the engine in response to various sensor inputs.	Front LH side in engine compartment adjacent to bulkhead.
ABS	HS CAN	Controls the braking force applied to the road wheels.	In the engine compartment next to the ECM.
Instrument cluster	HS CAN and MS CAN LIN Bus.	Gateway between High speed and Medium speed CAN, Gateway between the CAN busses and the LIN bus	On the drivers side in the instrument panel.

Parking aid control module	MS CAN.	Control of parking sensors and routing of audio feedback to driver	Lower LH A post below the CJB.
Navigation computer	MOST, GVIF	Route guidance output based on inputs from GPS satellites and driver destination.	In the luggage compartment to the right of battery.
RCM	MS CAN.	Controls the deployment of supplementary restraint components.	On the transmission tunnel between the seats under the trim.
Tire Pressure Monitoring System (TPMS) module	MS CAN.	Monitors the vehicle tires to warn of deflation.	Behind the rear seats next to the Auxiliary Junction Box.
TCM	MS CAN.	Electronic control of the automatic gear change.	In the sump of the transmission.
Steering column lock	MS CAN.	Inhibits the steering from being turned without the proper security parameters being met.	On the steering column.
Headlamp leveling/adaptive front lighting module	HS CAN.	Controls headlamp levels and adaptive front lighting system.	RH foot well mounted against inner bulk head.
Adaptive speed control module	HS CAN.	Controls vehicle road speed in relation to other vehicles when in speed control mode.	At the bottom of the RH A post.
CJB	MS CAN.	Controls body functions and power distribution.	In the passenger compartment LH side on the A post.
Auxiliary junction box	MS CAN.	Controls body functions and power distribution.	In the center behind the backrest of the rear passenger seat.
Active Damping Control Module (ADCM)	HS CAN.	Controls the adjustment of the dampers.	Behind the backrest of the RH rear passenger seat.
Electric park brake module	HS CAN.	Controls the application and release of the parking brake.	Behind the auxiliary junction box.

Air conditioning control module	MS CAN.	Controls the operation of the climate control/air-conditioning system.	Attached to the side of Air conditioning unit.
Information and entertainment control module	MS CAN.	Gateway between the MOST and CAN systems for information and control distribution.	Behind the Touch Screen Display and above the integrated audio unit.
Drivers door module	MS CAN.	Memory/adjustment functions for seats, steering column and mirrors and security functions.	In the drivers door behind the trim.
Passenger door module	MS CAN.	Memory/adjustment functions for seats, steering column and mirrors and security functions.	In the passenger door behind the trim.
Integrated control panel	MS CAN.	Contains controls for entertainment system and air conditioning system	Center of the instrument panel surrounding the Touch Screen Display.
Drivers seat module	MS CAN.	Controls seat positioning and memory seat functions.	Under the drivers seat.
Passenger seat module	MS CAN.	Controls seat positioning and memory seat functions.	Under the front passenger seat.
Keyless vehicle module	MS CAN.	Allows the vehicle to be opened and started without the use of a key.	Right hand 'A' Post.
L Gate	MS CAN.	Electronic control of the selected gear/driving mode.	On top of the transmission tunnel.
Key Start Control Module	LIN Bus		In the center consol.
Pedestrian Protection System module	HS CAN.	Control and monitoring of Pedestrian Protection System	On the RH side under the wheel arch liner at the top of the wheel arch.

Multifunction Electronic Module

Description and Operation

For a detailed description of the multifunction electronic control modules, refer to the relevant Description and Operation section in the workshop manual.

Module Controlled Functions

Inspection and Verification

- 1 . Verify the customer concern.
- 2 . Visually inspect for obvious signs of electrical damage.

Electrical
• Fuse(s) • Electrical connector(s) • Wiring Harness

- 3 . If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
- 4 . If the cause is not visually evident, check for DTCs and refer to the DTC Index.

DTC Index



CAUTION: When probing connectors to take measurements in the course of the pinpoint tests, use the adaptor kit, part number 3548-1358-00.

NOTE:

If the control module is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module.

NOTE:

The DTC Index in this section shows information for DTCs that could be logged in the Driver Door Module (DDM) or Passenger Door Module (PDM). For diagnosis and testing information for: Driver/Passenger Seat module.

Seats Information and Entertainment module.

Audio System Remote Keyless Entry module.

Locks, Latches and Entry Systems

NOTE:

Generic scan tools may not read the codes listed, or may read only five digit codes. Match the five digits from the scan tool to the first five digits of the seven digit code listed to identify the fault (the last two digits give additional information read by the manufacturer approved diagnostic system).

NOTE:

When performing electrical voltage or resistance tests, always use a digital multimeter (DMM) accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance, always take the resistance of the DMM leads into account.

NOTE:

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

NOTE:

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

NOTE:

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

DTC	Description	Possible Cause	Action
B109C15	Front Courtesy Light	Short to power or open circuit	Refer to the electrical circuit diagrams and test front courtesy light circuit for short to power or open circuit
B109D11	Front Courtesy	Short to ground	Refer to the electrical circuit diagrams and test front

	Light		courtesy light circuit for short ground
B10EB11	Driver door double locking motor	Short to ground	Refer to the electrical circuit diagrams and test driver door double locking motor circuit for short ground
B10EB15	Driver door double locking motor	Short to power or open circuit	Refer to the electrical circuit diagrams and test driver door double locking motor circuit for short to power or open circuit
B10EC11	Passenger door double locking motor	Short to ground	Refer to the electrical circuit diagrams and test passenger door double locking motor circuit for short ground
B10EC15	Passenger door double locking motor	Short to power or open circuit	Refer to the electrical circuit diagrams and test passenger door double locking motor circuit for short to power or open circuit
B110811	Driver door central locking motor	Short to ground	Refer to the electrical circuit diagrams and test driver door central locking motor circuit for short ground
B110815	Driver door central locking motor	Short to power or open circuit	Refer to the electrical circuit diagrams and test driver door central locking motor circuit for short to power or open circuit
B110911	Passenger door central locking motor	Short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B110915	Passenger door central locking motor	Short to power or open circuit	Carry out any pinpoint tests associated with this DTC using the manufacturer approved

			diagnostic system
B116311	Left Mirror Heater Output short to ground	• Short to ground	Refer to the electrical circuit diagrams and test left mirror heater output circuit for short to ground
B116315	Left Mirror Heater Output short to power	• Short to power or open circuit	Refer to the electrical circuit diagrams and test left mirror heater output circuit for short to power or open circuit
B116411	Right Mirror Heater Output short to ground	• Short to ground	Refer to the electrical circuit diagrams and test right mirror heater output circuit for short to ground
B116415	Right Mirror Heater Output short to power	• Short to power or open circuit	Refer to the electrical circuit diagrams and test right mirror heater output circuit for short to power or open circuit
B116511	Left Front Puddle Lamp Output short to ground	• Short to ground	Refer to the electrical circuit diagrams and test left front puddle lamp output circuit for short to ground
B116515	Left Front Puddle Lamp Output open load or short to power	• Short to power or open circuit	Refer to the electrical circuit diagrams and test left front puddle lamp output circuit for short to power or open circuit
B116611	Right Front Puddle Lamp Output short to ground	• Short to ground	Refer to the electrical circuit diagrams and test right front puddle lamp output circuit for short to ground
B116615	Right Front Puddle Lamp Output open load or short to battery	• Short to power or open circuit	Refer to the electrical circuit diagrams and test right front puddle lamp output circuit for short to power or open circuit
B117E72	Front Power Window up	• Actuator stuck open	Install a new DDM/PDM, refer to the new module installation note at the top of

			the DTC Index
B117E73	Front Power Window up	Actuator stuck closed	Install a new DDM/PDM, refer to the new module installation note at the top of the DTC Index
B117F72	Front Power Window down	Actuator stuck open	Install a new DDM/PDM, refer to the new module installation note at the top of the DTC Index
B117F73	Front Power Window down	Actuator stuck closed	Install a new DDM/PDM, refer to the new module installation note at the top of the DTC Index
B118929	Front Window Position Sensor	Signal invalid	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B118A29	Rear Window Position Sensor	Signal invalid	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1A9411	Driver Mirror	Short to ground	Refer to the electrical circuit diagrams and test driver mirror fold motor circuit for short to ground
B1A9415	Driver Mirror	Short to power or open circuit	Refer to the electrical circuit diagrams and test driver mirror fold motor circuit for short to power or open circuit
B1A9511	Passenger Mirror	Short to ground	Refer to the electrical circuit diagrams and test passenger mirror fold motor circuit for short to ground
B1A9515	Passenger Mirror	Short to power or open circuit	Refer to the electrical circuit diagrams and test passenger mirror fold motor circuit for

			short to power or open circuit
B1A9883	LIN Bus Circuit #1	Value of signal protection calculation incorrect	Refer to the electrical circuit diagrams and test LIN circuit between driver switch pack and DDM for short/open circuits, clear DTC and re-test. If DTC remains install a new switch pack. Window Control Switch (86.25.08)
B1A9886	LIN Bus Circuit #1	Signal Invalid	Refer to the electrical circuit diagrams and test LIN circuit between driver switch pack and DDM for short/open circuits, clear DTC and re-test. If DTC remains install a new switch pack. Window Control Switch (86.25.08)
B1A9887	LIN Bus Circuit #1	Missing Message	Refer to the electrical circuit diagrams and test LIN circuit between driver switch pack and DDM for short/open circuits, clear DTC and re-test. If DTC remains install a new switch pack. Window Control Switch (86.25.08)
B1C0911	Driver Left/Right Mirror Motor Circuit	Short to ground	Refer to the electrical circuit diagrams and test driver left/right mirror motor circuit for short to ground
B1C0915	Driver Left/Right Mirror Motor Circuit	Short to power or open circuit	Refer to the electrical circuit diagrams and test driver left/right mirror motor circuit for short to power or open circuit
B1C1011	Driver Up/Down Mirror Motor	Short to ground	Refer to the electrical circuit diagrams and test driver

	Circuit		up/down mirror motor circuit for short to ground
B1C1015	Driver Up/Down Mirror Motor Circuit	• Short to power or open circuit	Refer to the electrical circuit diagrams and test driver up/down mirror motor circuit for short to power or open circuit
B1C1111	Passenger Left/Right Mirror Motor Circuit	• Short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1C1115	Passenger Left/Right Mirror Motor Circuit	• Short to power or open circuit	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1C1211	Passenger Up/Down Mirror Motor Circuit	• Short to ground	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1C1215	Passenger Up/Down Mirror Motor Circuit	• Short to power or open circuit	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1C1311	Driver Up/Down Mirror Motor Feedback Circuit	• Short to ground	Refer to the electrical circuit diagrams and test driver up/down mirror motor feedback circuit for short to ground
B1C1315	Driver Up/Down Mirror Motor Feedback Circuit	• Short to power or open circuit	Refer to the electrical circuit diagrams and test driver up/down mirror motor feedback circuit for short to power or open circuit
B1C1411	Driver Left/Right Mirror Motor Feedback Circuit	• Short to ground	Refer to the electrical circuit diagrams and test driver left/right mirror motor feedback circuit for short to

			ground
B1C1415	Driver Left/Right Mirror Motor Feedback Circuit	Short to power or open circuit	Refer to the electrical circuit diagrams and test driver left/right mirror motor feedback circuit for short to power or open circuit
B1C1511	Passenger Up/Down Mirror Motor Feedback Circuit	Short to ground	Refer to the electrical circuit diagrams and test passenger up/down mirror motor feedback circuit for short to ground
B1C1515	Passenger Up/Down Mirror Motor Feedback Circuit	Short to power or open circuit	Refer to the electrical circuit diagrams and test passenger up/down mirror motor feedback circuit for short to power or open circuit
B1C1611	Passenger Left/Right Mirror Motor Feedback Circuit	Short to ground	Refer to the electrical circuit diagrams and test passenger left/right mirror motor feedback circuit for short to ground
B1C1615	Passenger Left/Right Mirror Motor Feedback Circuit	Short to power or open circuit	Refer to the electrical circuit diagrams and test passenger left/right mirror motor feedback circuit for short to power or open circuit
C1B1411	Sensor Supply #1	Short to ground	Refer to the electrical circuit diagrams and test window sensor supply circuit for short to ground
C1B1415	Sensor Supply #1	Short to power or open circuit	Refer to the electrical circuit diagrams and test window sensor supply circuit for short to power or open circuit
U001000	Medium speed CAN communication	Medium speed CAN communication Bus	Carry out any pinpoint tests associated with this DTC using the manufacturer approved

	Bus		diagnostic system
U014000	Lost communication with CJB	Logged when subscribed CAN message missing from CJB	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U020800	Lost communication With Driver Seat Module (DSM)	Missing message	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U030000	Internal control module software incompatibility	Invalid configuration message is received	Re-configure the RJB using the manufacturer approved diagnostic system. Clear the DTC and retest. If the DTC is still logged suspect the DDM/PDM, refer to the new module installation note at the top of the DTC Index
U200224	Switch	Signal stuck high	Clear DTC and re-test. If DTC remains, install a new passenger side window switch
U201011	Switch illumination	Circuit short to ground	Carry out CAN network tests using the manufacturer approved diagnostic system
U201012	Switch illumination	Circuit short to battery	Carry out CAN network tests using the manufacturer approved diagnostic system
U201208	Car Configuration Parameter(s)	Bus signal/message failures	Cycle the ignition status and re-test. If DTC remains, re-configure the RJB using the manufacturer approved diagnostic system
U201324	Switch Pack	Signal stuck high	Clear DTC and re-test. If DTC remains, install a new driver side window switch pack. Window Control Switch (86.25.08)

U201444	Control module hardware	Data Memory Failure	Install a new DDM/PDM, refer to the new module installation note at the top of the DTC Index
U210000	Initial configuration not complete	No sub type information	Re-configure the DDM/PDM using the manufacturer approved diagnostic system
U300049	Control module	Internal electronic failure	Install a new DDM/PDM, refer to the new module installation note at the top of the DTC Index
U300255	Vehicle Identification Number (VIN)	Not configured	Re-configure the relevant module as new using the manufacturer approved diagnostic system and re-test. If DTC remains install a new module, refer to the new module installation note at the top of the DTC Index
U300281	Vehicle Identification Number (VIN)	Vehicle/component mis-match. Corrupt VIN data being transmitted, module previously installed to other vehicle	Install original module, check for DTCs and refer to relevant DTC Index
U300362	Battery voltage	Mis-match of battery voltage, of 2 volts or lower, between DDM/PDM and RJB	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system

Driver Seat Module (DSM) (86.75.28)

Removal

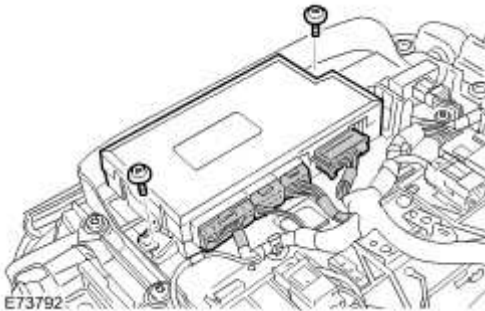
- 1 . Remove the front seat.

For additional information, refer to Front Seat (76.70.01)

- 2 . Remove the front seat control module.

▶ Disconnect the 4 electrical connectors.

▶ Remove the 2 Torx bolts.



Installation

- 1 . Install the front seat control module.

▶ Connect the electrical connectors.

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

- 2 . Install the front seat.

For additional information, refer to Front Seat (76.70.01)

Information and Entertainment Module (86.53.48)

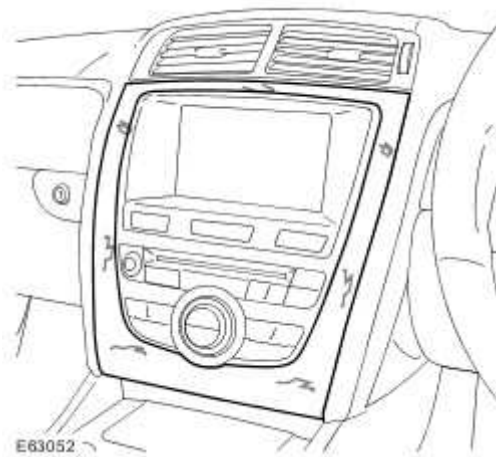
Removal

- 1 . Disconnect the battery ground cable.

For additional information, refer to

- 2 . Remove the instrument panel center reinforcement trim panel.

▶ Release from the 5 clips.

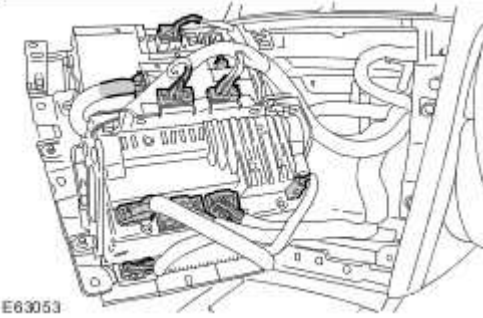
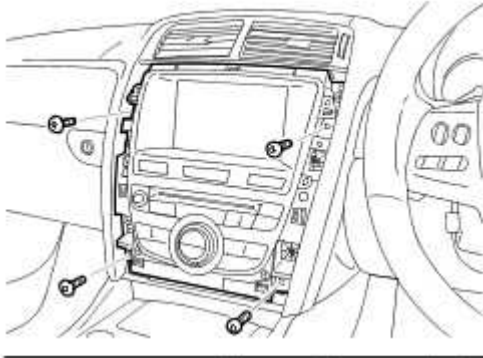


- 3  **CAUTION: Protect the surrounding trim from damage when changing the component.**

Release the navigation system module bracket.

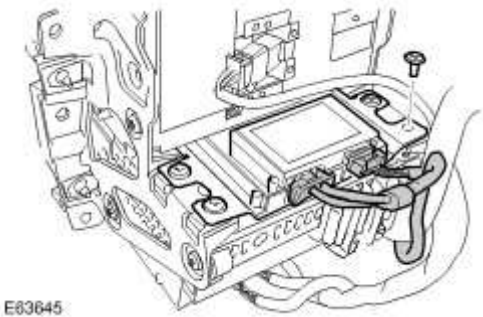
▶ Remove the 4 Torx screws.

▶ Release the assembly.



4 . Remove the information and entertainment module.

- Remove the 4 Torx bolts.
- Disconnect the 2 electrical connectors.



Installation

1 . Install the information and entertainment module.

- Tighten the Torx bolts to 6 Nm (4 lb.ft).

 Connect the electrical connectors.

2 . Install the navigation system module bracket.

 Tighten the Torx screws.

3 . Install the instrument panel center reinforcement trim panel.

 Align the pegs and secure with the clips.

4 . Connect the battery ground cable.
For additional information, refer to

5 . Connect WDS to the vehicle and configure a new module.

Remote Keyless Entry (RKE) Module

Removal

NOTE:

This module is installed on the inside of the RH A-pillar above the footwell and does not change with the hand of drive.

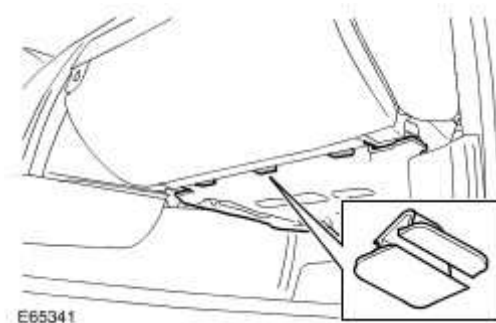
- 1 . Remove the cover and disconnect the battery ground cable.

For additional information, refer to

- 2  **CAUTION:** Removal of the clips is a delicate procedure, damage will occur if any force is used.

Remove the RH side footwell trim panel.

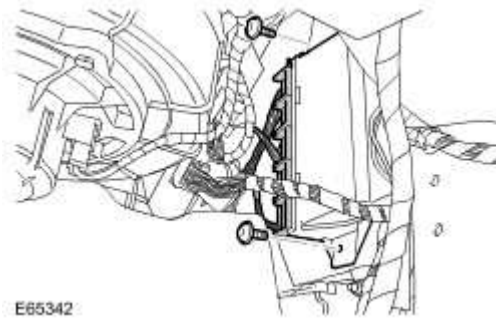
- Remove the 3 clips.



- 3 . Remove the keyless entry module.

- Remove the 2 Torx screws.

- Disconnect the 5 electrical connectors.



Installation

1 . Install the keyless entry module.

▶ Connect the electrical connectors.

▶ Install the screws.

2 . Install the RH side footwell trim panel.

▶ Carefully secure the clips.

3 . Connect the battery ground cable and install the cover.

For additional information, refer to

4 . Connect WDS to the vehicle and configure a new module.