PUBLISHED: 13-JAN-2017
2017.0 DISCOVERY (LR), 417-01

EXTERIOR LIGHTING

APPROACH LAMP (G1948104)

REMOVAL AND INSTALLATION

86.41.01	LAMP - APPROACH - EXTERIOR MIRROR - RENEW	ALL DERIVATIVES	0.1	USED WITHINS

REMOVAL

CAUTION:

Take extra care not to damage the component.

NOTE:

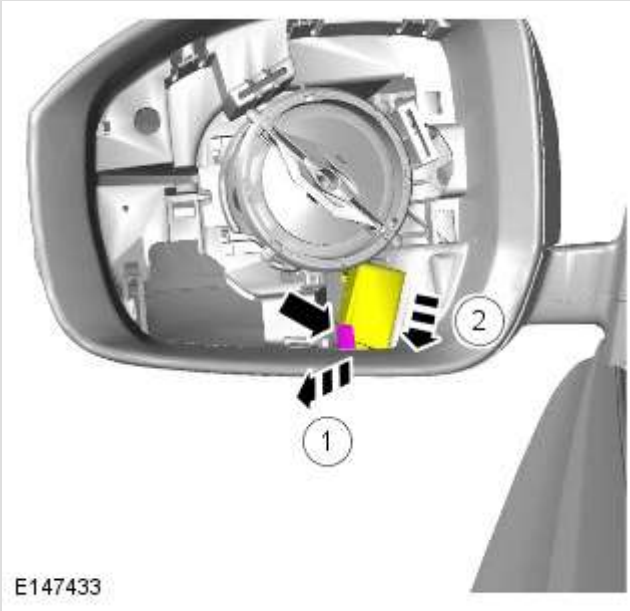
Removal steps in this procedure may contain installation details.

1. Remove the exterior mirror glass.
   Refer to: Exterior Mirror Glass (501-09 Rear View Mirrors, Removal and Installation).

2.

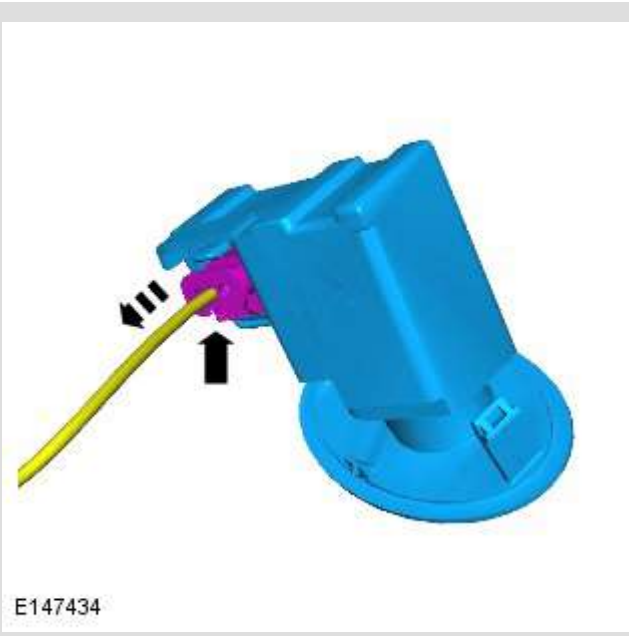
NOTE:

Left illustration shown, right is similar.



Release the approach lamp.

3.



Remove the approach lamp.

INSTALLATION

1. To install, reverse the removal procedure.

PUBLISHED: 22-JUN-2015
2017.0 DISCOVERY (LR), 417-01

EXTERIOR LIGHTING

DIAGNOSIS AND TESTING

PRINCIPLE OF OPERATION

For a detailed description of the exterior lighting system and operation, refer to the relevant description and operation section of the workshop manual. REFER to: Exterior Lighting (417-01 Exterior Lighting, Description and Operation).

INSPECTION AND VERIFICATION

CAUTION:

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

NOTE:

Prior to carrying out fault diagnosis of the trailer lamp system, verify the operation of the towing vehicle lighting system with the trailer lighting plug(s) disconnected from the vehicle socket(s)

1. Verify the customer concern

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

Visual Inspection

MECHANICAL	ELECTRICAL
▪ Lighting control switch and installation	▪ Fuses

▪ Rain/Light sensor condition and installation ▪ Wiper control switch and installation	▪ Relays ▪ Wiring harness ▪ Loose or corroded connector(s) ▪ Battery junction box ▪ Body control module ▪ Rain/Light sensor control module ▪ LIN circuits ▪ CAN circuits

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

1. 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 relevant DTC index

SYMPTOM CHART

SYMPTOM	POSSIBLE CAUSES	ACTION
Side and headlamp(s) inoperative when the automatic headlamp switch option is selected	▪ Fuse(s) blown ▪ Lighting control switch fault ▪ Wiper control switch fault ▪ Circuit fault ▪ Rain /Light sensor fault ▪ LIN circuit fault	Check the fuse(s). Check the lighting and wiper control switch functions. Check the automatic headlamp circuit. Refer to the electrical guides. Check for DTCs indicating a rain/light sensor or LIN system fault
Automatic headlamp switch illumination inoperative	▪ Fuse(s) blown ▪ Lighting control switch fault	Check the fuse(s). Check the lighting control switch function. Check the automatic headlamp relay circuit. Refer to the electrical guides. Check for DTCs indicating an automatic headlamp fault

	▪ Circuit fault ▪ Automatic headlamp relay fault	

DTC INDEX

For a list of diagnostic trouble codes (DTCs) that could be logged on this vehicle, please refer to Section 100-00. REFER to: Diagnostic Trouble Code (DTC) Index - DTC: Body Control Module (BCM) (100-00, Description and Operation).

PUBLISHED: 21-NOV-2016
2017.0 DISCOVERY (LR), 417-04

DAYTIME RUNNING LAMPS

DESCRIPTION AND OPERATION

OVERVIEW

The Daytime Running Lamps (DRL) and side lamps are incorporated into the headlamp assemblies.
For additional information, refer to: Exterior Lighting (417-01, Description and Operation).

On vehicles with halogen headlamps, the DRL use the same lamp as the side lamp.

On vehicles with Light Emitting Diode (LED) headlamps, the 'signature' side lamp LEDs are used for the DRL function, but are illuminated at a higher intensity for DRL operation than for side lamp operation.

DESCRIPTION

For additional information, refer to: Exterior Lighting (417-01, Description and Operation).

OPERATION

REST OF THE WORLD

The Daytime Running Lamps (DRL) are switched on when the following conditions are met:

- Ignition is in power mode 7 - engine running
- Lighting control switch is in the off position or in the 'AUTO' position (rain/light sensor not requesting exterior lighting operation).

The DRL remain off if:

- 'P' (Park) is still selected
- The vehicle has not moved since the engine was manually started (not started using stop/start sequence - only applies to vehicles with the auto stop/start system).

The DRL are illuminated at a higher intensity than the side lamp operation.

Depending on market, the DRL will be dimmed to the intensity of the side lamp or switched off when the turn signal indicator on that side is active. For example, if the left turn signal indicator is active, the left the DRL is dimmed or switched off until the turn signal indicator becomes inactive. The opposite headlamp DRL will remain on at full intensity.

If the hazard warning lamps become active, the DRL are switched off until the hazard warning lamps are deactivated.

The DRL are switched off when the following conditions occur:

- Ignition state is changed to power mode 4 (accessory) or power mode 0 (locked and alarmed)
- Lighting control switch is moved from off to side lamps or headlamps position
- Lighting control switch is in the 'AUTO' position and the rain/light sensor requests exterior lighting on

The DRL are not switched off when the headlamp flash function is operated.

NORTH AMERICAN SPECIFICATION

The Daytime Running Lamps (DRL) are switched on when the following conditions are met:

- Ignition is in power mode 7 - engine running
- Lighting control switch is in the off position or in the 'AUTO' position (rain/light sensor not requesting exterior lighting operation).

The DRL remain off if:

- Park is still selected
- The vehicle has not moved since the engine was manually started (not started using stop/start sequence - only applies to vehicles with the auto stop/start system).

The DRL will be switched off when the turn signal indicator on that side is active. For example, if the left turn signal indicator is active, the left DRL will be switched off until the turn signal indicator becomes inactive. The opposite headlamp DRL will remain on at full intensity.

If the hazard warning lamps become active, the DRL are switched off until the hazard warning lamps are deactivated.

The DRL are switched off when the following conditions occur:

- Park is selected
- Ignition state is changed to power mode 4 (accessory) or power mode 0 (locked and alarmed)
- Lighting control switch is moved to the headlamps on position
- Lighting control switch is in the 'AUTO' position and the rain/light sensor requests exterior lighting on.

The DRL will not be switched off when the headlamp flash function is operated.

PUBLISHED: 22-JUN-2015
2017.0 DISCOVERY (LR), 417-04

DAYTIME RUNNING LAMPS

DIAGNOSIS AND TESTING

PRINCIPLES OF OPERATION

For a detailed description of the Daytime Running Lamps, refer to the relevant Description and Operation section in the workshop manual. REFER to: Daytime Running Lamps (DRL) (417-04 Daytime Running Lamps (DRL), Description and Operation).

INSPECTION AND VERIFICATION

CAUTION:

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

NOTE:

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

1. Verify the customer concern

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

Visual Inspection

MECHANICAL	ELECTRICAL

▪ Headlamps	▪ Fuses ▪ Wiring harnesses and connectors ▪ Body control module

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

1. 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

1. Check DDW for open campaigns. Refer to the corresponding bulletins and SSMs which may be valid for the specific customer complaint and carry out the recommendations as required

SYMPTOM CHART

SYMPTOM	POSSIBLE CAUSES	ACTION
Daytime running lamps inoperative	▪ Daytime running lamps working as specified or within system limitations ▪ Car configuration file mismatch with vehicle specification ▪ Daytime running lamps circuit short circuit to ground, short circuit to power, open circuit, high resistance ▪ Headlamp internal failure	**NOTE:** After updating the car configuration file, set the ignition to on and wait 30 seconds before clearing the DTCs. ▪ For a detailed description of the daytime running lamps, refer to the relevant Description and Operation section in the workshop manual. ▪ Using the manufacturer approved diagnostic system, check and up-date the car configuration file as necessary. Clear the DTCs and retest ▪ Refer to the electrical circuit diagrams and check the daytime running lamps circuit for short circuit to ground, short circuit to power, open circuit, high resistance ▪ Install a new headlamp

DTC INDEX

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

REFER to: Diagnostic Trouble Code (DTC) Index - DTC: Body Control Module (BCM) (100-00, Description and Operation).

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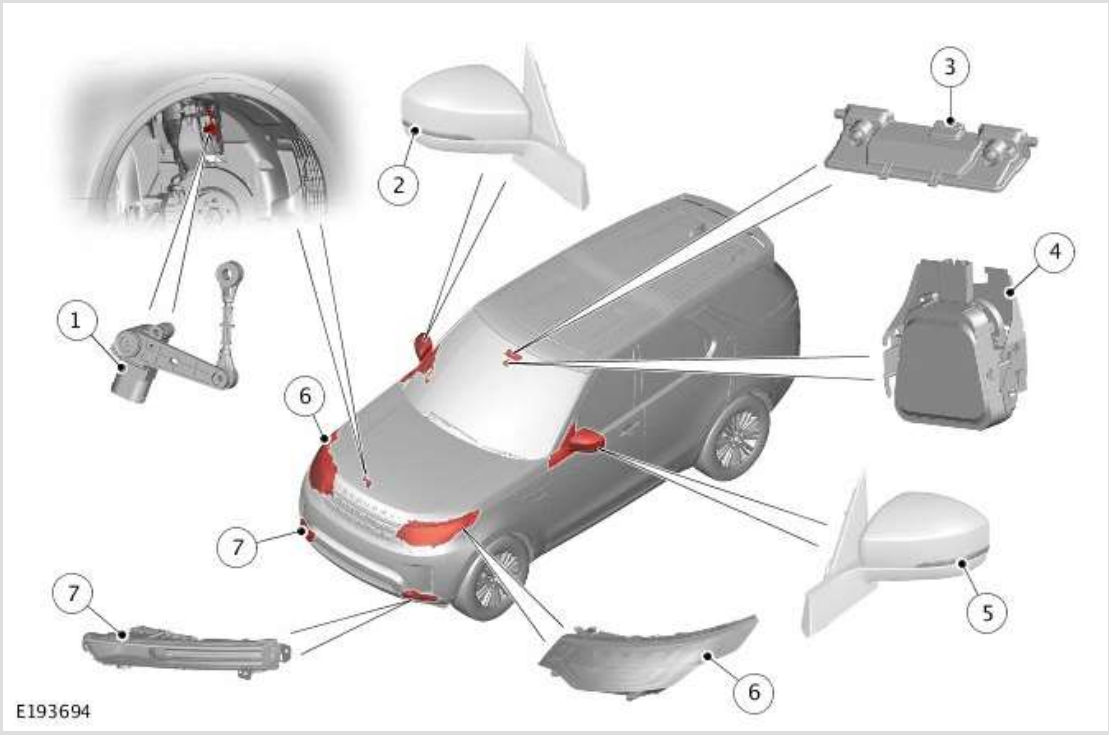
2017.0 DISCOVERY (LR), 417-01

EXTERIOR LIGHTING

DESCRIPTION AND OPERATION

COMPONENT LOCATION

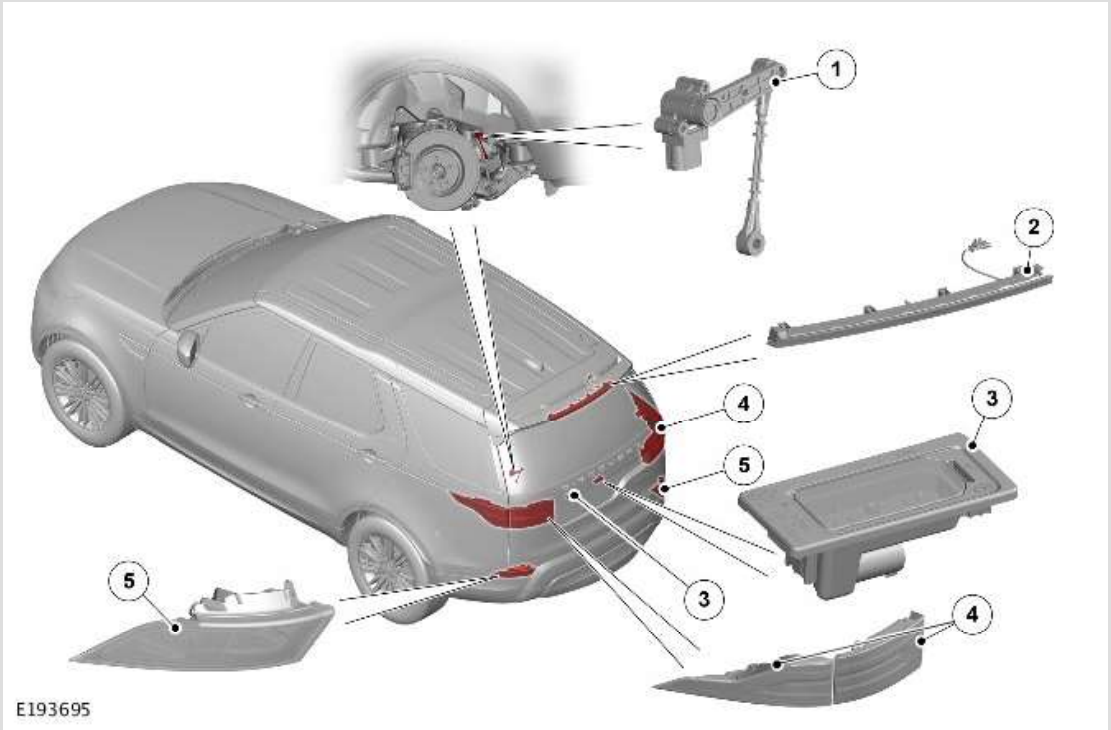
COMPONENT LOCATION - 1 OF 3



ITEM	DESCRIPTION
1	Front height sensor - Light Emitting Diode (LED) headlamps only
2	Side repeater lamp - Right
3	Image Processing Module (IPMA)
4	Rain/light sensor
5	Side repeater lamp - Left
6	Front headlamp assembly (2 off)

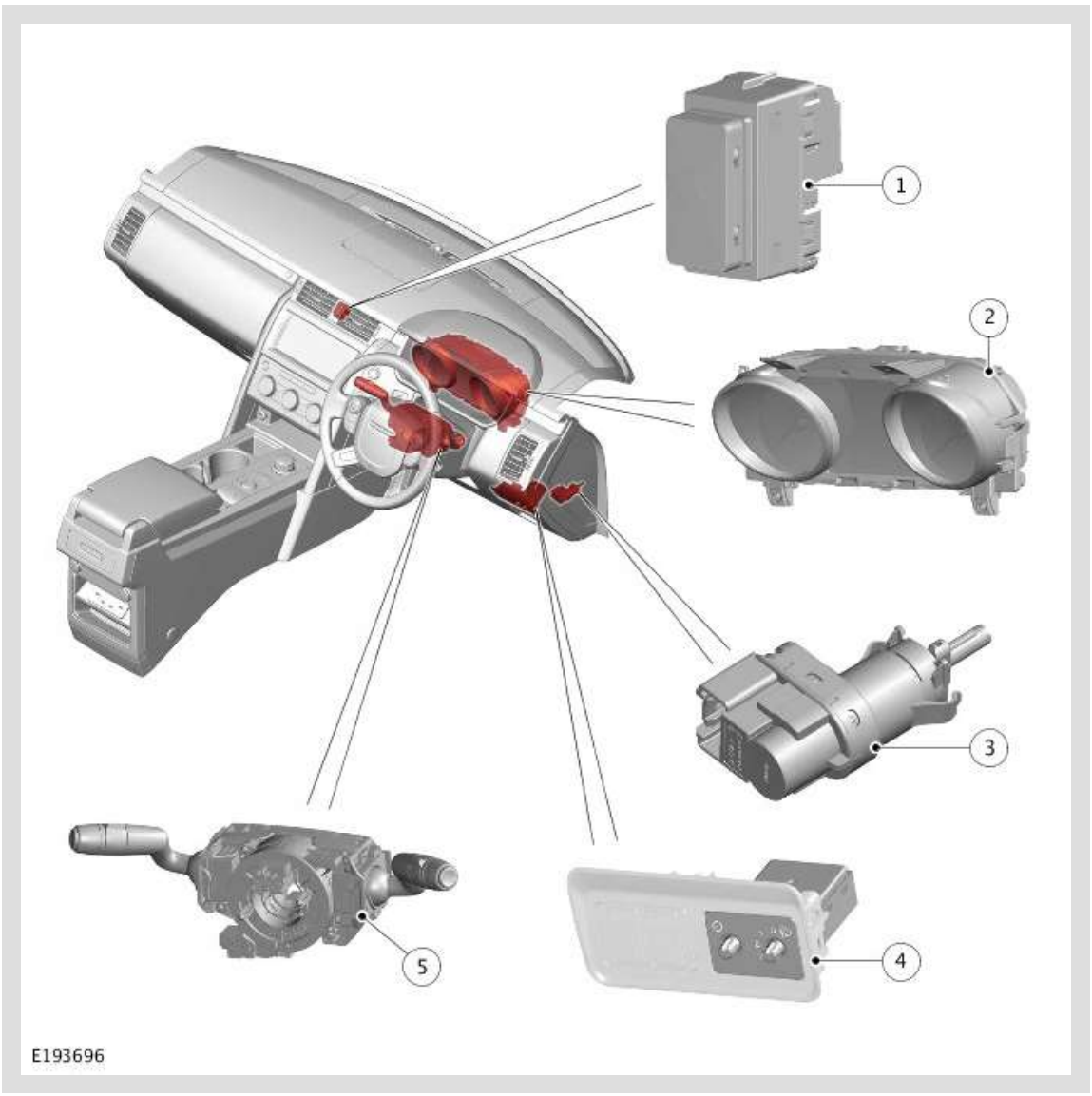
7	Front fog lamp (2 off)

COMPONENT LOCATION - 2 OF 3



ITEM	DESCRIPTION
1	Rear height sensor - Light Emitting Diode (LED) headlamps only
2	High Mounted Stop Lamp (HMSL)
3	License plate lamp (2 off)
4	Tail lamp assembly (2 off)
5	Rear fog lamp (2 off)

COMPONENT LOCATION - 3 OF 3



ITEM	DESCRIPTION
1	Hazard warning lamp switch
2	Instrument Cluster (IC)
3	Brake pedal switch

4	Auxiliary lighting switch
5	Left steering column multifunction switch

OVERVIEW

EXTERIOR LIGHTING

The exterior lighting consists of:

- Two headlight assemblies, each containing a:
  - Headlamp
  - Static bending lamp
  - Turn signal indicator lamp
  - Combined Daytime Running Lamp (DRL) and side lamp
  - Side marker lamp and reflector (North American Specification (NAS) only).
- Two tail lamp assemblies, each containing a:
  - Turn signal indicator lamp
  - Tail lamp unit
  - Stop lamp
  - Rear side markers
  - Reverse lamps.
- The front and rear fog lamps
- The lighting control switch and steering column multifunction switch
- The Body Control Module/Gateway Module (BCM/GWM)
- The High Mounted Stop Lamp (HMSL)
- The front and rear height sensors (Adaptive Front lighting System (AFS) Light Emitting Diode (LED) headlamps)
- Two license plate lamps
- The auxiliary lighting switch
- The brake pedal switch
- The Image Processing Module (IPMA) (model/market dependant)
- The hazard warning lamp switch
- Warning indicators
- The rain/light sensor

- The Battery Junction Box (BJB).

The exterior lighting is controlled by the BCM/GWM as follows:

- Control and monitoring of the exterior lamps including the turn signal indicators and hazard warning lamp functionality.
- Monitoring and evaluation of control inputs from other system control modules and output of applicable messages to the Instrument Cluster (IC) message center.

The BCM/GWM is connected to the High Speed (HS) Controller Area Network (CAN) buses and the FlexRay bus. The BCM/GWM contains a microprocessor which performs the control, monitoring and evaluation of functions.

Driver lighting selections are made using the lighting control switch and left steering column multifunction switch, the rear fog lamp switch and the hazard warning lamp switch. The BCM/GWM operates the brake lamps using the inputs from the brake pedal switch.

Depending on model and market specification, the lighting system may have:

- An Auto High Beam (AHB) function, where the headlamps are automatically switched between low and high beam in response to signals from the IPMA.
- An Adaptive Front lighting System (AFS) function, which automatically changes the low beam lighting modes.
- An Autolamps function, where the exterior lights are automatically turned on or off in response to signals from the rain/light sensor used for automatic wiper operation. For additional information, refer to: Wipers and Washers (501-16 Wipers and Washers, Description and Operation).

In certain markets the headlamps feature a static bending lamp which illuminates the area at the side of the vehicle when turning into driveways for example.

DESCRIPTION

HEADLAMP ASSEMBLIES

Three headlamp variants are available depending on model specification:

- Halogen
- Light Emitting Diode (LED)
- Adaptive Front lighting System (AFS) Light Emitting Diode (LED).

The headlamps are sealed units, with scratch resistant polycarbonate lenses bonded to the headlamp body.

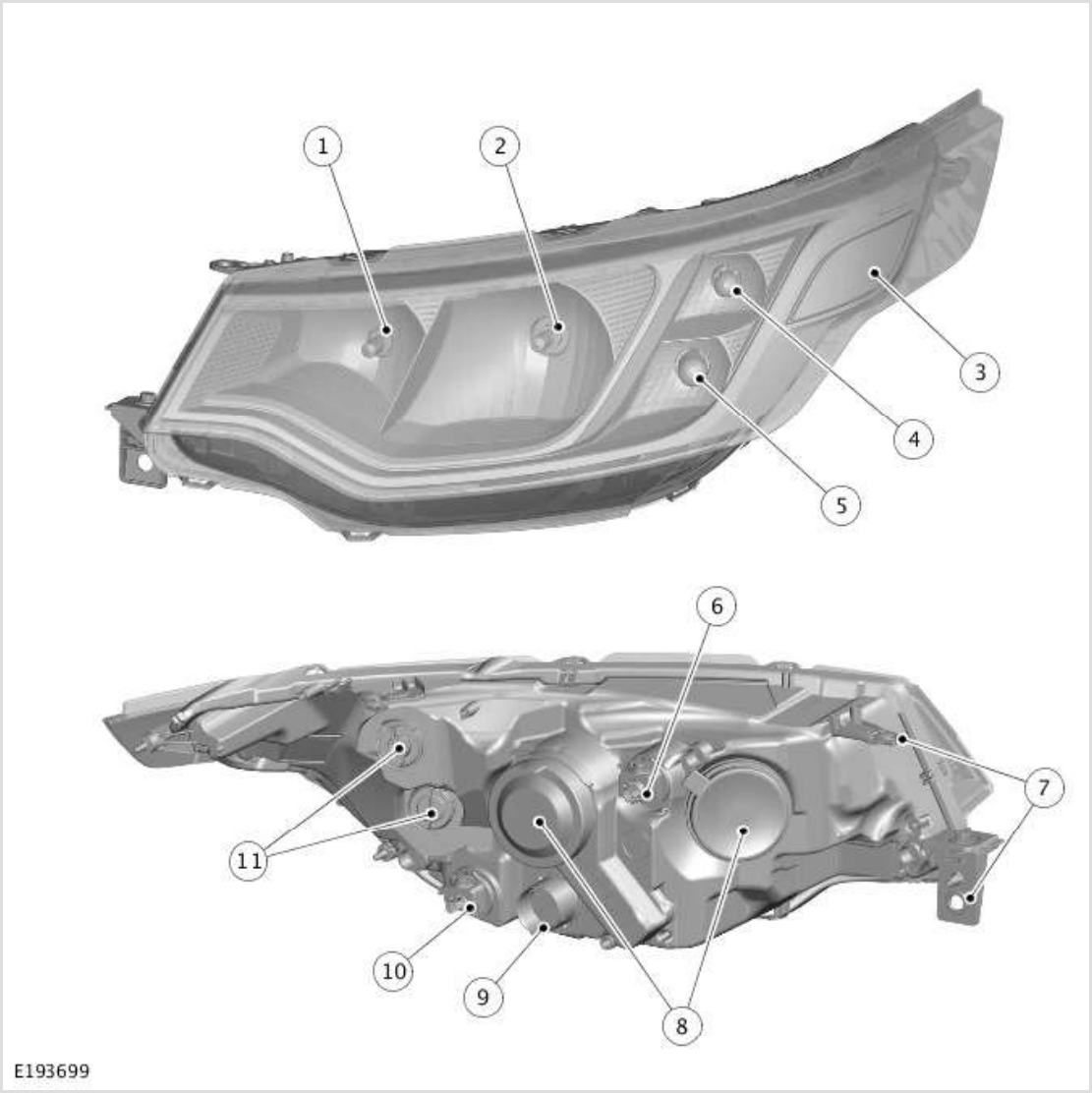
The halogen headlamps has sealed access covers and sealed bulb holders to provide a watertight environment for the headlamp internal components. A vent is located at the outer rear face of the headlamp body. The vent is used to prevent fogging of the lens and to allow the headlamp unit to 'breath' in response to internal temperature changes. This allows ventilation of the headlamp while preventing the ingress of water. Access to the halogen headlamp is available via the open hood.

The LED headlamp has no access cover as it is a sealed unit.

On North American Specification (NAS) vehicles, the side marker lamp LED is colored amber. The side marker lamp lens is designed so that light from the LED also illuminates the amber colored side marker reflector area at the side of the lamp without the need for an additional bulb.

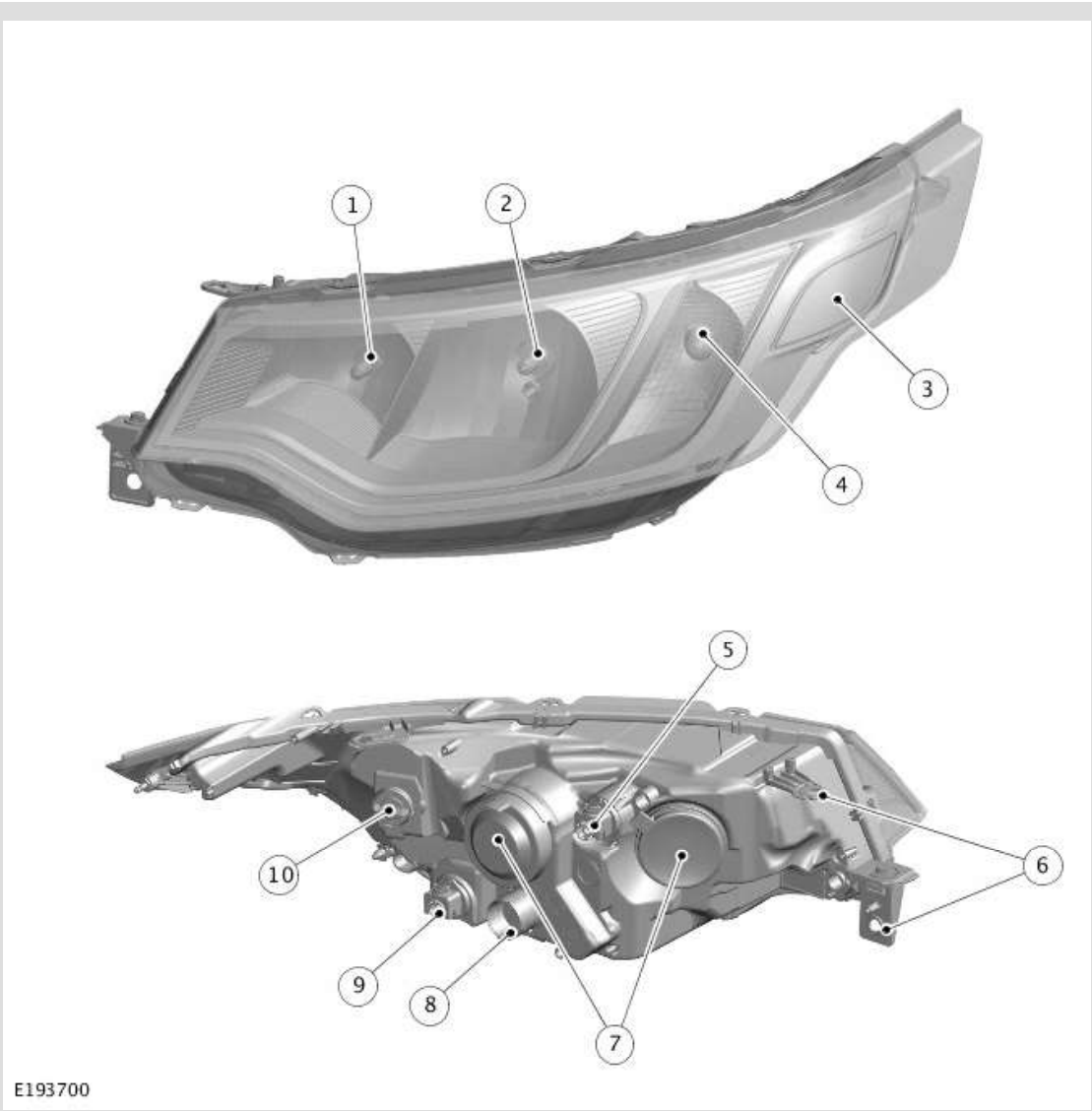
HEADLAMP

Halogen Headlamp



ITEM	DESCRIPTION
1	Low beam
2	High beam
3	Side marker reflector
4	Turn signal indicator
5	Daytime Running Lamp (DRL) and side lamp
6	Vertical adjuster
7	Headlamp mounting bracket
8	Bulb access cover
9	Electrical connector
10	Horizontal adjuster
11	Bulb access cover

Halogen Headlamp - North American Specification Vehicles Only

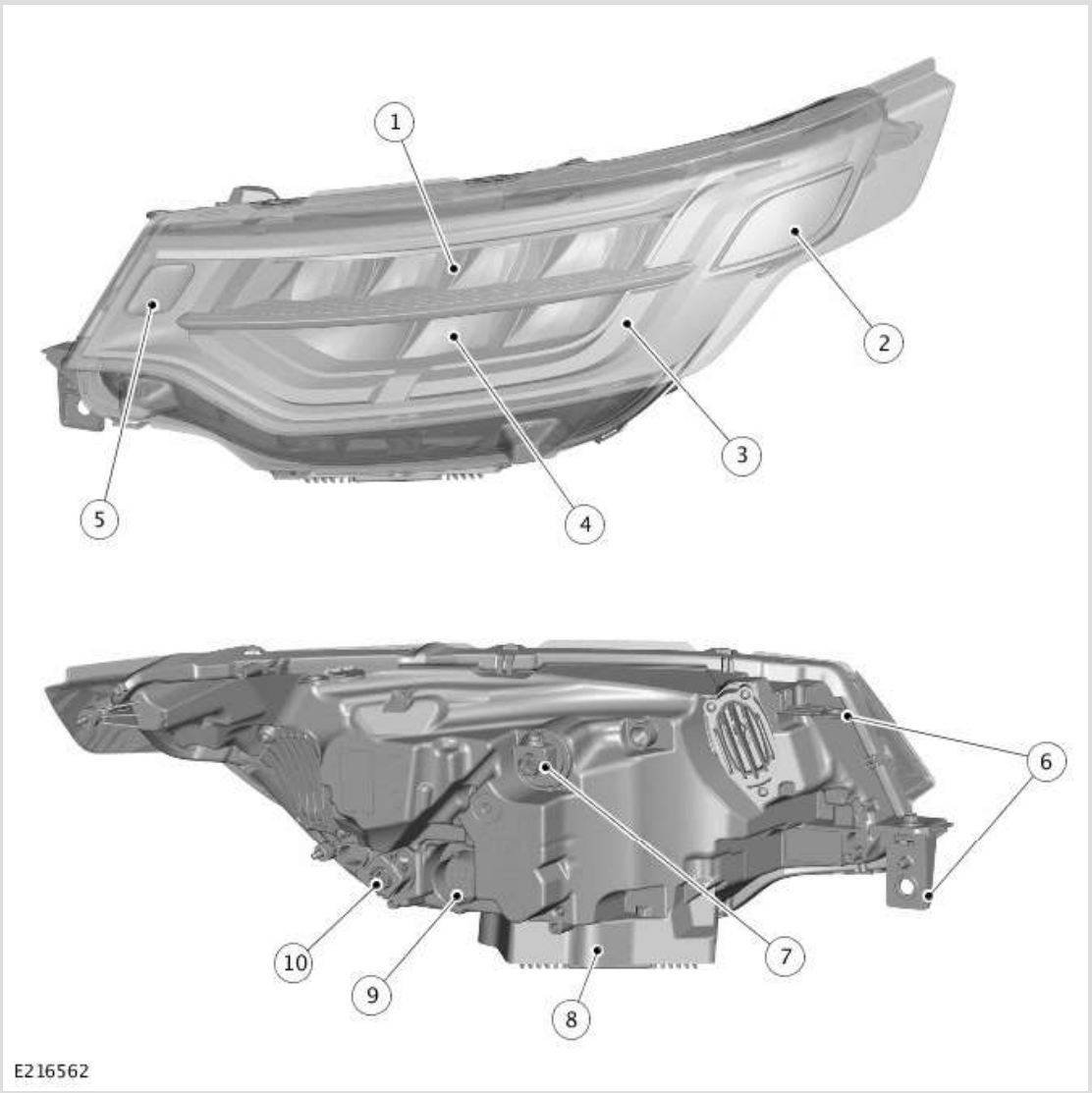


ITEM	DESCRIPTION
1	Low beam
2	High beam
3	Side marker reflector
4	Daytime Running Lamp (DRL), turn signal indicator and side marker lamp
5	Vertical adjuster
6	Headlamp mounting bracket
7	Bulb access cover
8	Electrical connector
9	Horizontal adjuster
10	Bulb access cover

The halogen headlamp is a self-contained unit located within the headlamp assembly. The unit comprises a reflector, an adaptor ring, the lens and the halogen bulb, which together forms an assembly.

The H7 bulb is located in an integral holder which locates in a keyway to provide the correct alignment in the reflector and is secured by rotating to the locked position.

LIGHT EMITTING DIODE HEADLAMP - IF EQUIPPED



ITEM	DESCRIPTION
1	Light Emitting Diode (LED) - Low beam module
2	Side marker reflector
3	Daytime Running Lamp (DRL) and turn signal indicator
4	LED - High beam module
5	Static bending lamp - Vehicles with Adaptive Front lighting System (AFS) only
6	Headlamp mounting bracket

7	Vertical adjuster
8	Light Emitting Diode Driver Module (LEDDM)
9	Electrical connector
10	Horizontal adjuster

The Light Emitting Diode (LED) headlamp is a self contained unit located within the headlamp assembly. The LED headlamp has a low and high beam module.

The low and high beam modules are powered and controlled by the Light Emitting Diode Driver Module (LEDDM) located in each headlamp. The LEDDM is attached to the underside of the headlamp assembly and secured with 3 screws. The LEDDM and the headlamp assembly are a single unit and must not be separated. Each LEDDM is connected to the Body Control Module/Gateway Module (BCM/GWM) via hardwired and Local Interconnect Network (LIN) bus connections. Vertical movement is controlled by an actuator, operated by the BCM/GWM for automatic headlamp leveling.

The cooling of the LEDDM allows the warm air to be used for de-icing and demisting the lens of the headlamp assembly. The cooling of the LEDDM provides long life of the LED headlamp assembly.

The greatest advantage offered by white LEDs lies in the color of their light, which is also known as the color temperature. Reaching approximately 6,000° Kelvin the intensity of their light is just about the same as the quality of daylight. When referring to light, Kelvin is a unit of color temperature.

HEADLAMP LEVELING

Headlamp leveling provides for the adjustment of the vertical aim of the headlamps to minimize glare to other road users when the vehicle attitude changes due to vehicle loading.

Two types of headlamp leveling are available dependent on the type of headlamps fitted to the vehicle:

- Manual headlamp leveling - Halogen headlamps only
- Automatic headlamp leveling - Light Emitting Diode (LED) and Adaptive Front lighting System (AFS) LED headlamps only.

MANUAL HEADLAMP LEVELING - HALOGEN HEADLAMPS ONLY

NOTE:

Headlamp leveling is not available on North American Specification (NAS) market vehicles.

The manual headlamp leveling system comprises the following components:

- Two headlamp leveling motors
- Headlamp leveling rheostat rotary control.

A rotary thumbwheel controller is located adjacent to the instrument panel dimmer control in the auxiliary lighting switch. The rotary thumbwheel controller is connected to a rheostat which gives a variable output to the headlamp leveling Direct Current (DC) motors. The motors respond to the output and move to adjust the headlamp vertical alignment as required.

Movement of the leveling rotary control produces a variable voltage output via a hardwired connection. The motors react to the supplied voltage and move the headlamp to the requested position which relates to the supplied voltage from the leveling rotary control. The headlamps can be lowered from their un-laden position to compensate for changes in vehicle attitude due to loading.

The control has four defined positions to compensate for a drop in height at the rear of the vehicle and avoid dazzle to oncoming drivers.

The positions are defined as follows:

ROTARY CONTROL ROTATION	VEHICLE LOAD
0	Driver only
1	Driver and front seat passenger
2	Driver and passengers in all seats
3	Maximum gross vehicle weight or maximum rear axle load

AUTOMATIC HEADLAMP LEVELING

Automatic headlamp leveling is only available on vehicles with Light Emitting Diode (LED) and Adaptive Front lighting System (AFS) LED headlamps. The system is not a dynamic headlamp leveling system and changes in vehicle inclination due to positive and negative acceleration are not compensated.

Automatic headlamp leveling provides for the static, periodic adjustment of the vertical aim of the headlamps to minimize glare to other road users when the vehicle attitude changes due to loading. Automatic headlamp leveling is controlled by the Body Control Module/Gateway Module (BCM/GWM).

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.

The headlamp leveling system is active when the ignition is switched on (power mode 6 or above). When the lighting control switch is moved to the side lamp or headlamp position, a Local Interconnect Network (LIN) bus message is passed from the Steering Wheel Module (SWM) to the BCM/GWM for the selected function. The BCM/GWM then issues a 'lights on' message on the High Speed (HS) Controller Area Network (CAN) chassis systems bus.

Signals from the front right and rear right height sensors are used to periodically re-align the vertical aim of the headlamps to their optimum position.

HEADLAMP DELAY

The Body Control Module/Gateway Module (BCM/GWM) controls a headlamp delay function which illuminates after the occupants leave the vehicle. The headlamp delay will operate on low beam headlamps only when the lighting control switch is in the AUTO position and the ignition is off (power mode 0) or in accessory (power mode 4).

The headlamp delay is activated when the lighting control switch is in the AUTO position and the engine is switched off. The message center displays a 'HEADLIGHT DELAY' message and the low beam headlamps will be activated for a period of approximately 30, 60 or 120 seconds. After the delay period, the BCM/GWM automatically switches off the delay function, extinguishing the headlamps. The delay period can be adjusted using the Instrument Cluster (IC) 'Vehicle Settings' menu. The feature can also be disabled using this menu.
For additional information, refer to: Message Center (413-08, Description and Operation).

The headlamp delay feature can also be switched on when approaching the vehicle or switched off by operating the headlamp switch on the smart key.

ADAPTIVE FRONT LIGHTING SYSTEM - IF EQUIPPED

The Adaptive Front lighting System (AFS) uses the low beam module to switch the different light modes.

The AFS sub-system comprises the following components in each headlamp assembly:

- Light Emitting Diode Driver Module (LEDDM)
- Low beam module
- Leveling motor.

The Light Emitting Diodes (LEDs) within the low beam modules are controlled by the LEDDM. There are different input signals that are received from the Body Control

Module/Gateway Module (BCM/GWM) in order to change the different lighting modes. These signals are transmitted through the Local Interconnect Network (LIN) bus from the BCM/GWM to the LEDDMs in the headlamp assemblies.

STATIC BENDING LAMPS - ADAPTIVE FRONT LIGHTING SYSTEM ONLY

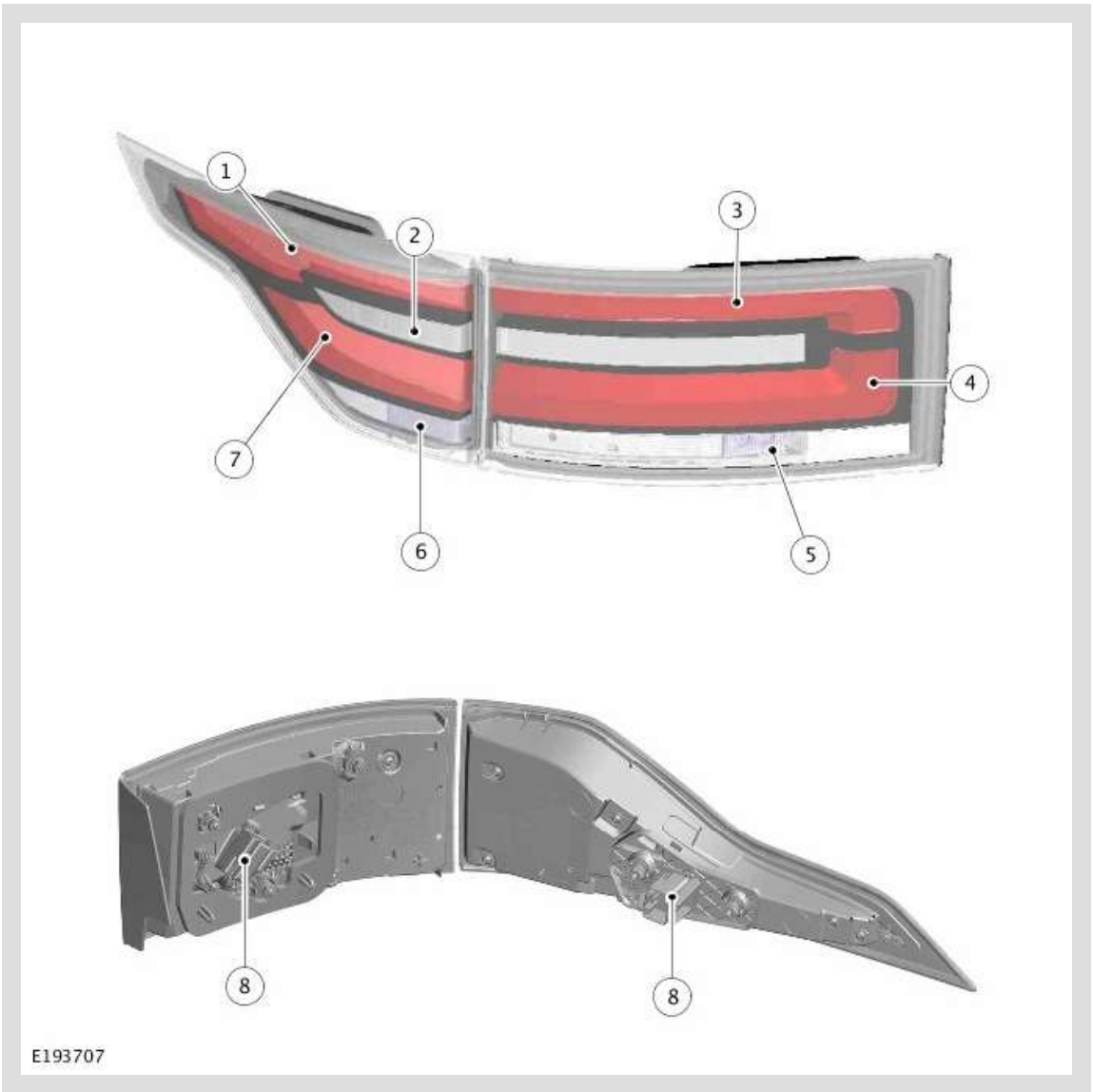
NOTE:

Static bending lamps only operate when the low beam is active and the transmission is in DRIVE or in SPORT.

The Light Emitting Diode (LED) static bending lamps are designed to illuminate the direction of travel when cornering at low speeds. The static bending lamp function is controlled by the Body Control Module/Gateway Module (BCM/GWM).The static bending lamp functionality operates using inputs from the steering angle sensor and vehicle speed information from the Anti-lock Brake System (ABS) control module. The static bending lamp is incorporated into the headlamp assembly. The design of the lens projects a spread of light from the vehicle at approximately 45 degrees to the vehicle axis. The static bending lamp uses LEDs located in the headlamp housing.

The static bending lamps operate with a steering angle sensor signal which is received by the BCM/GWM. The signal is transmitted by the Steering Wheel Module (SWM) on the High Speed (HS) Controller Area Network (CAN) chassis systems bus. The BCM /GWM monitors this signal and vehicle speed and activates the static bending lamp LED. When the operation parameters of the lamp are reached, the BCM/GWM snaps the static bending lamp LED on. When the lamp is switched off, the BCM/GWM fades the LED off by decreasing the Pulse Width Modulation (PWM) voltage in a linear manner over a period of 1 second. The static bending lamps can only be active for a maximum of 3 minutes at any given time.

TAIL LAMP ASSEMBLIES



ITEM	DESCRIPTION
1	Side marker lamp
2	Turn signal indicator

3	Tail lamp
4	Tail lamp
5	Reverse lamp
6	Stop lamp
7	Tail lamp
8	Electrical connector

The tail lamp assembly is a two piece unit. The tail lamp assembly - outer is fixed to the body of the vehicle. The tail lamp assembly - inner is fixed to the tailgate.

The tail lamp assemblies have the following functions:

- Tail lamp assembly - outer: Tail/Turn signal indicator and stop lamp
- Tail lamp assembly - inner: Tail and reverse lamp

The tail lamp assembly - outer is located in a recess in the vehicle body and the tail lamp assembly - inner in a recess in the tailgate.

REAR STOP/TAIL LAMPS

The stop lamps on each side comprises Light Emitting Diodes (LEDs).

The stop lamp is activated when the following conditions occur:

- The ignition is switched on (power mode 6 or above) and
- The brake pedal switch is active (by depressing the brake pedal).

The High Mounted Stop Lamp (HMSL) will also be activated when the brake pedal is pressed. The stop lamps can also be activated by the Anti-lock Brake System (ABS) control module. The ABS control module sends a message to the Body Control Module /Gateway Module (BCM/GWM) on the FlexRay bus, which supplies power to the stop lamps and HMSL.
For additional information, refer to: Braking Control System (206-11 Brake Controls, Description and Operation).

The tail lamps are operated by selecting side lamps or headlamps on the lighting control switch. The tail lamps can be switched on at all times and are not dependent on power mode. The tail lamps will also be illuminated when the lighting control switch is in the 'AUTO' position and a 'lights on' signal is received by the BCM/GWM from the rain /light sensor.

TURN SIGNAL INDICATOR

The turn signal indicator is a Light Emitting Diode (LED) and located adjacent to the tail lamp.

The turn signal indicators are operated by the left steering column multifunction switch or by the hazard warning lamp switch. The left steering column multifunction switch is only active with the ignition in switched on (power mode 6). The hazard warning lamp switch is active at all times. When active, the turn signal indicators will flash at a frequency cycle of 400 ms on 400 ms off.

If a light fails, the remaining turn signal indicator on that side of the vehicle flashes at normal speed. The applicable turn signal indicator in the Instrument Cluster (IC) will flash at double speed with the audible alert at twice the normal rate as well to alert the driver to the failure.

REVERSE LAMP

The reverse lamp is located in the inner tail lamp assembly and is a Light Emitting Diode (LED).

The reverse lamp is active when the following conditions occur:

- The ignition is switched to on (power mode 6) and
- The Body Control Module/Gateway Module (BCM/GWM) receives a reverse gear signal.

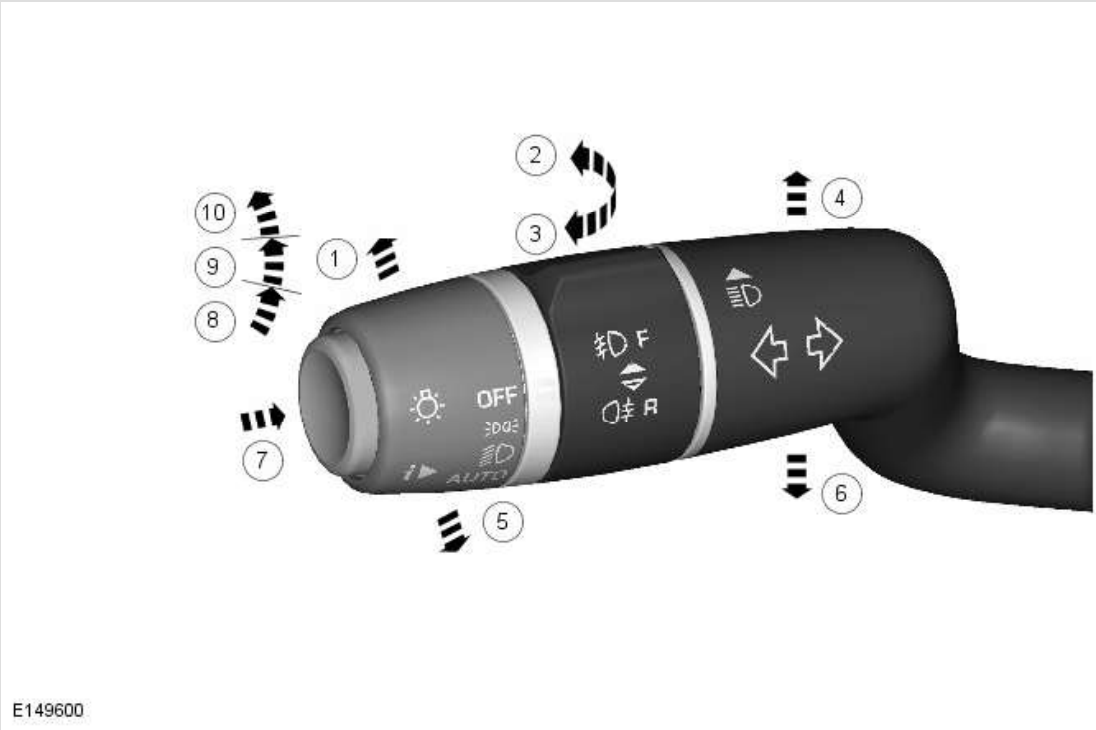
The automatic transmission have a reverse switch which senses when reverse gear is selected and engaged. The reverse gear signal is sent to the BCM/GWM on the High Speed (HS) Controller Area Network (CAN) powertrain systems bus.

SIDE MARKER LAMP - NORTH AMERICAN SPECIFICATION VEHICLES ONLY

The side marker lamp is located in the outer part of the tail lamp assembly and uses Light Emitting Diode (LED).

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. The 'lights on' signal is received by the Body Control Module/Gateway Module (BCM/GWM) from the rain/light sensor.

LEFT STEERING COLUMN MULTIFUNCTION SWITCH



ITEM	DESCRIPTION
1	High beam
2	Front fog lamps
3	Rear fog lamps
4	Right turn signal indicator
5	Headlamp high beam flash
6	Left turn signal indicator
7	Trip computer information
8	Side lamps
9	Low beam
10	Autolamps on

The left steering column multifunction switch allows the following selections:

- All exterior lamps off
- Side lamps on
- Low beam headlamps on
- Autolamps activation
- Headlamp low/high beam
- Headlamp high beam flash
- Left/right turn signal indicators
- Rear fog lamps
- Front fog lamps
- Trip computer functions.

The multifunction switch positions are all connected via a resistive ladder. The output from the resistive ladder is connected to the Steering Wheel Module (SWM) which converts the switch operation to Local Interconnect Network (LIN) bus signals. The signals are received by the Body Control Module/Gateway Module (BCM/GWM) which operates the required exterior lighting selection.

FOG LAMPS

The fog lamps are controlled by a rotary, non-latching switch on the left steering column multifunction switch. The switch is a momentary switch in both positions for front and rear fog lamps. The front and rear fog lamps can be selected individually. Movement of the switch in either direction will activate or deactivate the selected fog lamps. When active, the fog lamps will remain on until deselected or the headlamps are switched off or when the ignition is in auxiliary power mode 4 or lower. The applicable Instrument Cluster (IC) warning indicators will illuminate when the fog lamps are active.

AUTOLAMPS

The 'AUTO' Autolamps function is a driver assistance system. The driver can override the system operation by selection of side lamp or low beam headlamp on.

The automatic headlamp system uses a rain/light sensor. The rain/light sensor is connected to the Body Control Module/Gateway Module (BCM/GWM) via a Local Interconnect Network (LIN) bus. The BCM/GWM reacts to the signals from the rain /light sensor and activates the exterior lamps as required.

The light sensor is incorporated in the rain/light sensor located on the inside of the windshield, below the Rear View Mirror (RVM). The wiper system also uses the rain /light sensor for automatic wiper operation.
For additional information, refer to: Wipers and Washers (501-16 Wipers and Washers, Description and Operation).

The light sensor measures the ambient light around the vehicle in a vertical direction and also the angular light level from the front of the vehicle. The BCM/GWM uses the signals from the rain/light sensor, vehicle speed signals, wiper switch position and the park position of the front wipers to control the system.

The lights may operate in the following circumstances:

- Twilight
- Darkness
- Rain
- Tunnels
- Underground or multistory car parks.

Autolamps is selected by rotating a rotary switch on the left steering column multifunction switch to the 'AUTO' position. When the lighting control switch is in the 'AUTO' position, a reference voltage from the Steering Wheel Module (SWM) flows through 4 resistors in the lighting control switch. The returned signal voltage is detected by the SWM which sends a LIN bus signal to the BCM/GWM. The BCM/GWM then activates the auto headlamp function to which activates the headlamps and front and rear side/tail lamps.

The rain/light sensor receives an ignition signal from the BCM/GWM. The rain/light sensor continually outputs a LIN bus message to the BCM/GWM with information regarding the ambient light levels. When the ambient light level reaches a predetermined value, the BCM/GWM activates the Autolamps feature. The BCM/GWM can also activate the Autolamps when it receives information regarding rain fall from the rain/light sensor which subsequently activates the auto wipers function.

The Autolamps feature operates in the following circumstances:

- The ignition is switched on (power mode 6 or above)
- The 'AUTO' position is selected on the left steering column multifunction switch
- A 'lights on' request signal is received from the rain/light sensor.

When the 'AUTO' system is active, the side lamp warning indicator in the Instrument Cluster (IC) will be illuminated.

HIGH BEAM ON AND FLASH FUNCTIONS

The high beam is operated by pushing the left steering column multifunction switch towards the instrument panel. The switch will latch in the high beam position. When the high beam headlamps are active, the blue high beam warning indicator will illuminate in the Instrument Cluster (IC).

The high beam flash function is operated by pulling the left steering column multifunction switch away from the instrument panel. The non-latching switch will operate the high beam headlamps for as long as the switch is held. The switch will return to the high beam off position when released. The blue high beam warning indicator will illuminate when the high beam headlamps are active.

High beam can also be automatically operated by the Image Processing Module (IPMA) (if equipped), see below.

TURN SIGNAL INDICATORS

The left and right turn signal indicators are operated by moving the left steering column multifunction switch up or down to select right or left turn signal indicators respectively. The switch will latch in each position.

The switch has a turn signal indicator lane change function which is configurable by the dealer. If the switch is gently pushed, but not latched, to either turn signal indicator position and then released, the applicable turn signal indicators will flash 3 times and then will be automatically cancelled.

If a turn signal indicator fails, the green turn signal warning indicator in the Instrument Cluster (IC) will flash at twice the normal rate. The audible ticking from the IC sounder will also be at twice the normal rate.

SIDE LAMPS AND HEADLAMPS

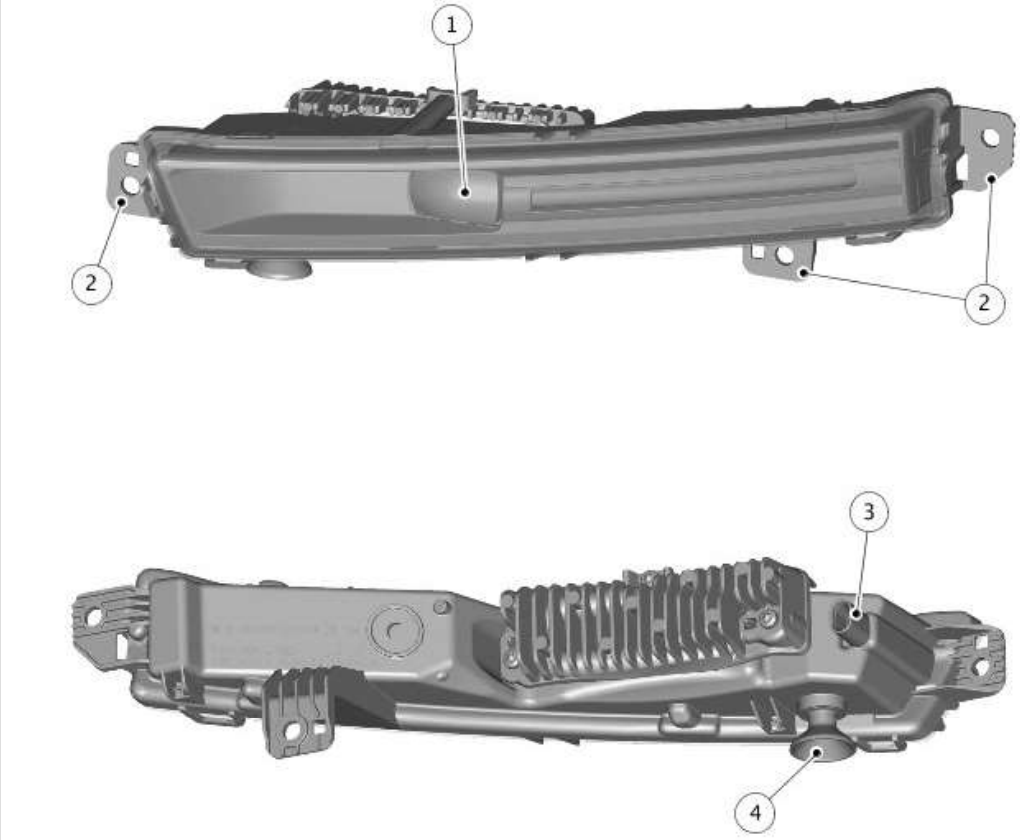
The side lamps and headlamps are selected by a rotary switch on the left steering column multifunction switch.

Rotating the switch from the off position to the side lamps position illuminates the following:

- The front side lamps
- The tail lamps
- The license plate lamps
- The instrument panel illumination.

Rotating the switch to the headlamps position, switches on the headlamps in addition to the lamps illuminated by the side lamp position.

FRONT FOG LAMPS



ITEM	DESCRIPTION
1	Light Emitting Diode (LED) light source
2	Attachment holes
3	Electrical connector
4	Adjuster

The 2 front fog lamps are available as an option or standard fitment on vehicles fitted with Light Emitting Diode (LED) headlamps.

The front fog lamps are located in apertures in the front bumper. Each lamp is secured in the bumper with 3 screws. Each fog lamp has an adjuster which is used to set the fog lamp to the correct alignment.

Each fog lamp uses a LED light source which is controlled by the Body Control Module /Gateway Module (BCM/GWM).

The fog lamp switch can be rotated to activate the front fog lamps when the following conditions occur:

- The ignition is switched on (power mode 6 or above)
- The lighting control switch is in the side lamp or headlamp position, or
- The lighting control switch is in the AUTO position and rain/light sensor is requesting low beam.

The front fog lamp warning indicator is illuminated in the Instrument Cluster (IC) when the front fog lamps are active.

Front Fog Lamp Functionality - North American Specification and Canadian Markets Only

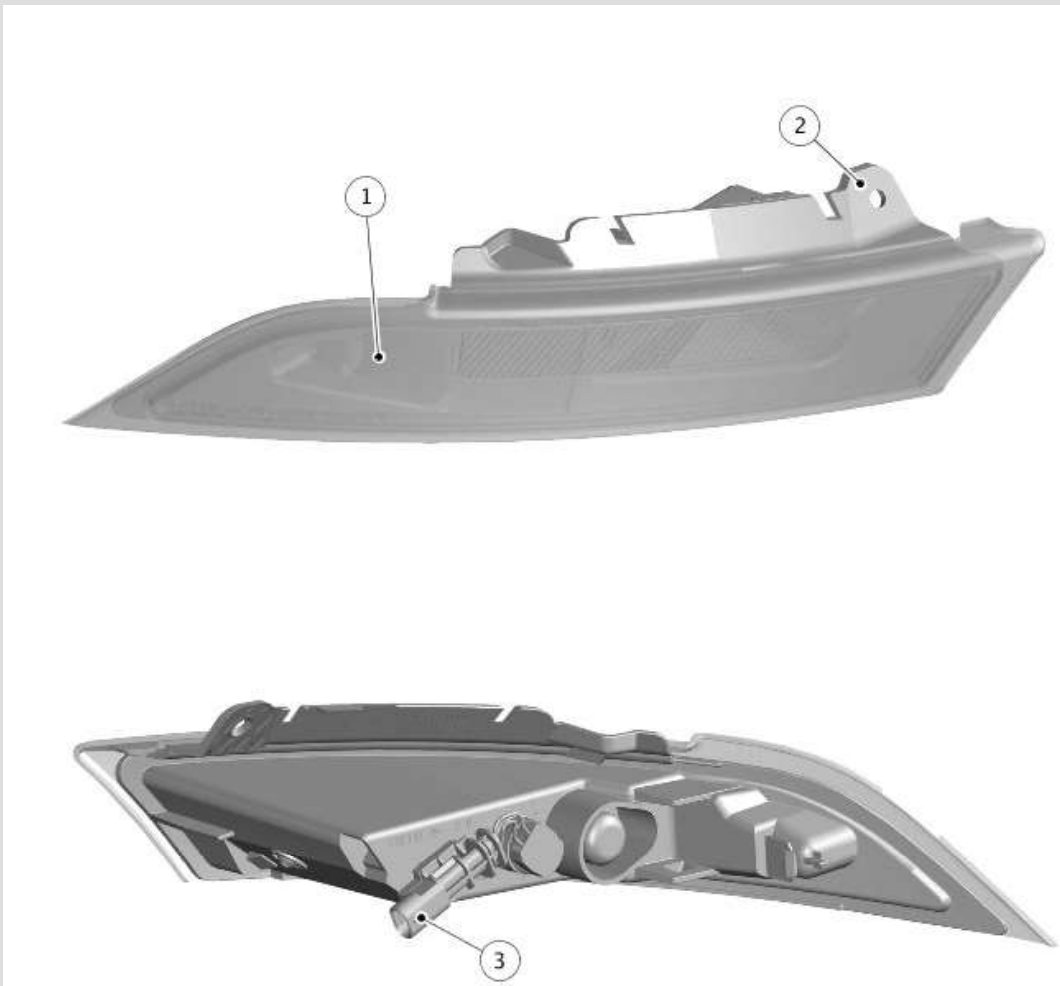
The front fog lamps operate as described previously but with the following differences which cover local laws governing lamp usage.

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 FOG LAMP



ITEM	DESCRIPTION
1	Light Emitting Diode (LED) light source
2	Attachment hole
3	Electrical connector

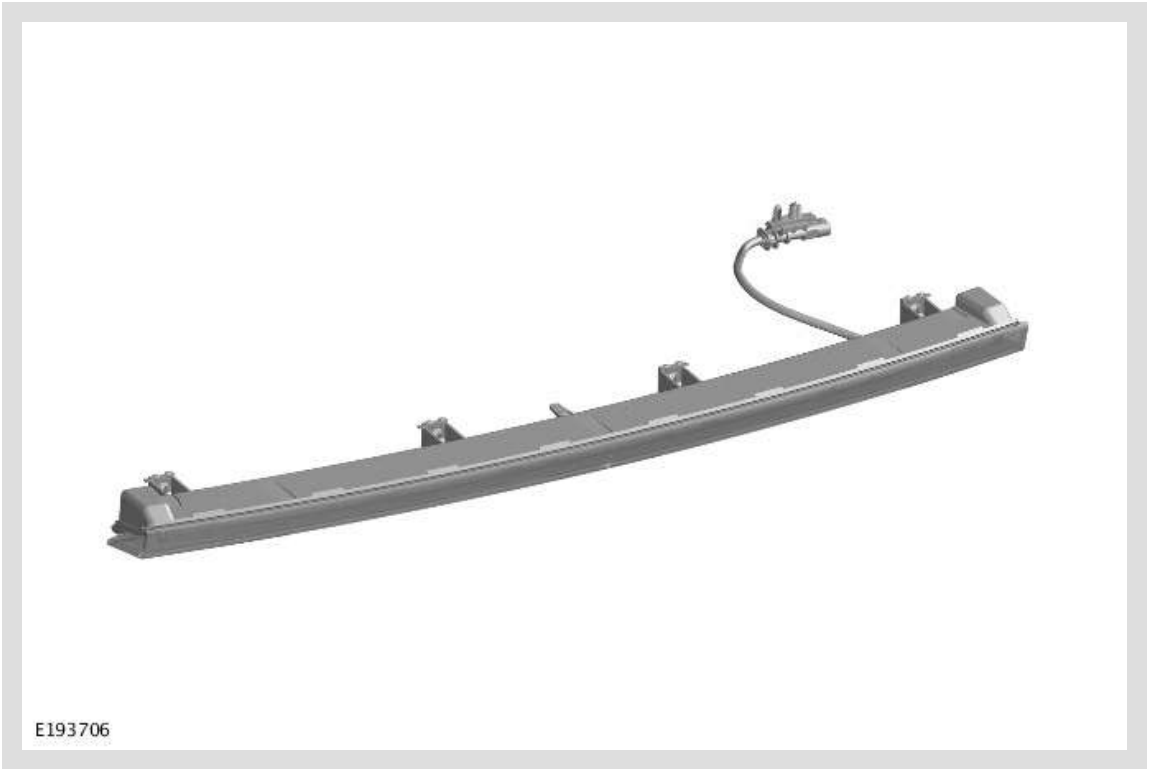
The rear fog lamp is located in the bumper and uses a Light Emitting Diode (LED) light source. Operation of the rear fog lamp is controlled by the Body Control Module /Gateway Module (BCM/GWM).

The fog lamp switch can be rotated to activate the rear fog lamps when the following conditions occur:

- The ignition is switched on (power mode 6 or above)
- The lighting control switch is in the side lamp or headlamp position.

The rear fog lamp warning indicator is illuminated in the Instrument Cluster (IC) when the rear fog lamps are active.

HIGH MOUNTED STOP LAMP



The High Mounted Stop Lamp (HMSL) is located above the rear window in a central position. The lamp comprises a plastic housing with a red colored lens. The lamp is illuminated by Light Emitting Diodes (LEDs).

The HMSL is activated, along with the tail lamp stop lamps, when the ignition is switched on and the brake pedal is depressed.

The HMSL and the stop lamps can also be activated by the Anti-lock Brake System (ABS) control module. A signal on the FlexRay bus from the ABS control module is passed to the Body Control Module/Gateway Module (BCM/GWM) which supplies power to the stop lamps.

LICENSE PLATE LAMPS

There are 2 license plate lamps are fitted into the tailgate finisher, above the license plate on the tailgate. Each lamp uses Light Emitting Diodes (LED).

The lamps are secured to the tailgate finisher with integral clips. The lamps can be released from the tailgate finisher using a small, flat blade screwdriver. The license plate lamps are active at all times when the side lamps are switched on.

SIDE REPEATER LAMPS

The side repeater lamps are located in the door mirrors.

The side repeater lamps comprises Light Emitting Diodes (LEDs). The side repeater lamps have the same functionality as the front and rear turn signal indicator lamps. The side repeater lamps are operated by the left steering column multifunction switch or by the hazard warning lamp switch. The steering column multifunction switch is only active with power mode 6, the hazard warning lamp switch is active at all times, regardless of the power mode. When active, the side repeater lamps will flash at a frequency cycle of 400 ms on and 400 ms off. If a side repeater lamp fails, the turn signal indicator lamps continue to flash at the normal rate.

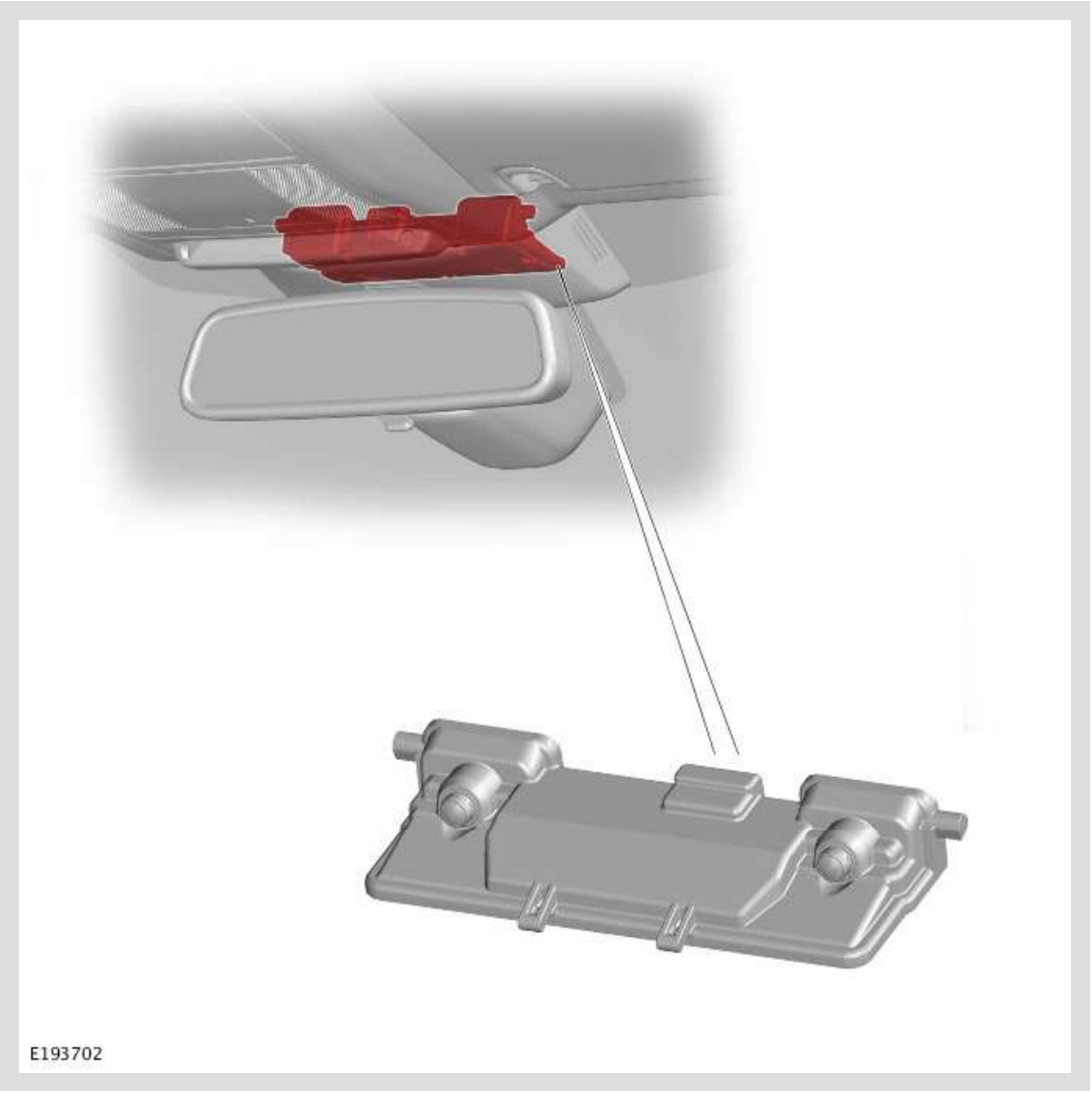
HEIGHT SENSORS

The front and rear height sensors used by the headlamp leveling system are both located on the right side of the vehicle.

Each sensor has 3 connections with the Suspension Control Module (SUMB):

- Power
- Ground
- Signal.

IMAGE PROCESSING CONTROL MODULE



The Image Processing Control Module (IPMA) is a module that has two built in forward facing cameras with the lens directed through the windshield. The IPMA is located above the Rear View Mirror (RVM) behind the RVM covers. The IPMA is attached to a bracket, which is bonded to the windshield.

The camera is a low resolution image sensor that detects headlamps and tail lamps of the vehicles ahead. The IPMA evaluates the image data, checking for light intensity and

location. Depending on the image data, the control module then sends a low or high beam request message to the Body Control Module/Gateway Module (BCM/GWM) via the High Speed (HS) Controller Area Network (CAN) chassis systems bus.

BRAKE PEDAL SWITCH

The brake pedal switch is mounted on the bracket for the brake pedal. The brake pedal switch is connected to the vehicle harness using a four-pin multiplug. The brake pedal switch is a combined switch, contains a stop lamp switch and a brake test switch in one housing. The stop lamp switch is normally open, the brake test switch is normally closed to ground. The output connections are hardwired to the Body Control Module /Gateway Module (BCM/GWM) and the Powertrain Control Module (PCM).

The input connection of one pole is a fused power supply from the Passenger Junction Box (PJB). When the brake pedal is pressed, the switch contacts close. The BCM/GWM compares the signals from the two poles to confirm the status of the stop lamp switch, which it uses to operate the stop lamps.

HAZARD WARNING LAMPS

The hazard warning lamps are controlled by a non-latching switch in the center of the instrument panel. The hazard warning lamps operate at all times when selected and are not dependent on the ignition power mode.

When the hazard warning lamps are selected on, all of the turn signal indicators operate as previously described and both left and right turn signal indicators in the Instrument Cluster (IC) also flash. The hazard warning lamps flash at a rate of 400 ms on and 400 ms off. When the hazard warning lamps are active, they override any request for turn signal indicator operation.

If a trailer is connected to the vehicle the trailer turn signal indicators will flash at the same frequency as the vehicle turn signal indicators. The trailer warning indicator in the IC will also flash. If a trailer turn signal indicator bulb is defective, the trailer warning indicator will not flash.

The hazard warning lamps can also be activated by a crash signal from the Restraints Control Module (RCM). This is received by the Body Control Module/Gateway Module

(BCM/GWM) which activates the hazard warning lamps. The hazard warning lamps can be cancelled when crash mode is cancelled by the RCM.

TRAILER LIGHTING

Several different types of trailer socket can be fitted to the vehicle depending on market specifications. Refer to the Electrical Reference Library for specific socket details.

The Body Control Module/Gateway Module (BCM/GWM) monitors the turn signal indicators and can detect if more than two lamps are fitted. When a trailer is detected, the trailer warning indicator in the Instrument Cluster (IC) will flash in synchronization with the turn signal indicator.

If one or more of the turn signal indicators on the vehicle or the trailer are defective, the trailer warning indicator will not flash to alert the driver to the bulb failure.

DAYTIME RUNNING LAMPS

Daytime Running Lamps (DRL) are a market requirement in certain countries.

For market information and DRL functionality refer to the DRL section.
For additional information, refer to: Daytime Running Lamps (417-04 Daytime Running Lamps, Description and Operation).

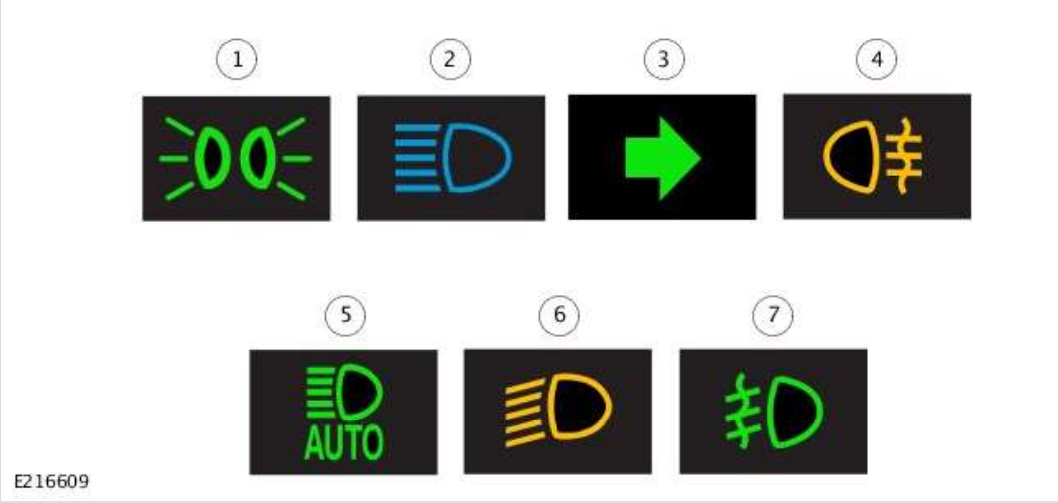
The DRL on halogen headlamps is a dual filament bulb, shared with the side lamp. The DRL operate at a higher intensity than the side lamp illumination. On Light Emitting Diode (LED) headlamps the DRL and side lamps use the same string of LEDs. The DRL operate at a higher intensity output than the side lamp illumination.

INSTRUMENT PANEL DIMMER CONTROL

The dimmer rotary thumbwheel controller is located adjacent to the headlamp leveling control (if equipped) in the auxiliary lighting switch. The dimmer control provides a Pulse Width Modulation (PWM) output to control the illumination brightness of the Instrument Cluster (IC), switches and other instrument panel illumination.

The dimmer rotary thumbwheel is connected to a rheostat and a high side switch. The rheostat is a variable resistor which provides a high or low resistance according to its set position. This output is passed to a switchable capacitor or a high side switch. The high side switch uses the output from the rheostat to determine the switching frequency of the capacitor which provides the PWM output of between 8V and 12V to determine the brightness of the illumination.

WARNING INDICATORS



ITEM	DESCRIPTION
1	Side lamps warning indicator
2	Headlamp high beam warning indicator
3	Turn signal indicators
4	Rear fog lamps warning indicator
5	Auto High Beam (AHB) warning indicator
6	Dipped beam warning indicator
7	Front fog lamps warning indicator

The exterior lighting and the Adaptive Front lighting System (AFS) warning indicators are activated by the Body Control Module/Gateway Module (BCM/GWM). The BCM /GWM sends High Speed (HS) Controller Area Network (CAN) chassis systems bus messages to the Instrument Cluster (IC).

OPERATION

BODY CONTROL MODULE/GATEWAY MODULE

The Body Control Module/Gateway Module (BCM/GWM) controls the exterior lighting system through interconnections as follow:

- Left steering column multifunction switch
- Side lamp position
- Low beam position
- Automatic ('AUTO') position
- Front fog lamp switch - If equipped
- Rear fog lamp switch
- Turn signal indicators
- High beam switch
- Headlamp flash
- Stop lamp switch
- Manual headlamp leveling control switch - Vehicles with halogen headlamp only
- Automatic headlamp leveling - Vehicles with Light Emitting Diode (LED) headlamp only
- Hazard warning lamp switch
- Reverse gear signal - Transmission Control Module (TCM)
- Rain/light sensor - Local Interconnect Network (LIN) signal.

CIRCUIT PROTECTION

There are 2 40A fusible links in the Passenger Junction Box (PJB) protect the power supply to the Body Control Module/Gateway Module (BCM/GWM), left and right lighting circuits respectively. All exterior lighting circuits are protected by Field Effect Transistors (FETs), located in the BCM/GWM, 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 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 BCM/GWM stores Diagnostic Trouble Codes (DTC) which can be retrieved using the Jaguar Land Rover approved diagnostic equipment. The DTC will identify that there is a fault on a particular output which assists in fault detection.

ALARM INDICATIONS

The exterior lighting system is used for arm and disarm requests. When the driver locks or unlocks the vehicle, a visual indication of a successful lock or unlock request is displayed to the driver by the hazard warning indicators.
For additional information, refer to: Anti-Theft - Active (419-01 Anti-Theft - Active, Description and Operation).

LIGHTS-ON WARNING CHIME

The lights-on warning chime indicates to the driver that the exterior lights have been left on when the driver door is opened.

The chime is generated from the Instrument Cluster (IC) sounder on receipt of a signal from the Body Control Module/Gateway Module (BCM/GWM).

The BCM/GWM activates the signal, if the following signals are present:

- Lights-on signal from the left steering column multifunction switch.
- The ignition is switched off.
- The driver door is opened.

The BCM/GWM transmits a message to the IC on the High Speed (HS) Controller Area Network (CAN) chassis systems bus to activate the warning chime.

CRASH SIGNAL ACTIVATION

In the event of an accident of a severity to activate and deploy the airbags, the Restraints Control Module (RCM) sends a request to activate the hazard warning lamps. The request signal is sent to the Body Control Module/Gateway Module (BCM/GWM) via the High Speed (HS) Controller Area Network (CAN) chassis systems bus.

The hazard warning lamps will continue to operate until one of the following occurs:

- The power mode is changed to the accessory mode (power mode 4).
- The power mode is changed to ignition off (power mode 0).
- The RCM no longer transmits the crash signal.

HEADLAMPS

The low beam headlamps are switched on when the ignition is on and one of the following occurs:

- The lighting control switch is the headlamp position.

- The lighting control switch is in the autolamps position and a lights on signal is received by the Body Control Module/Gateway Module (BCM/GWM) from the rain /light sensor.
- The headlamps can be switched on by pressing the headlamp switch on the smart key. The smart key signals are relayed to the BCM/GWM by the Remote Function Actuator (RFA) on the High Speed (HS) Controller Area Network (CAN) body systems bus.

The low beam headlamps can also be operated by the headlamp delay feature.

The high beam headlamps are switched on when the ignition is on and one of the following occurs:

- The lighting control switch is in the headlamp position or the headlamps are activated by the autolamps feature and the left steering column multifunction switch is pushed forward, away from the driver.
- The Auto High Beam (AHB) system is active.

The headlamp flash function operates with the ignition on or off, when the left steering column multifunction switch is pulled towards the driver.

HEADLAMP DELAY TIMER

The Body Control Module/Gateway Module (BCM/GWM) controls a headlamp delay function which illuminates the driveway after leaving the vehicle. The BCM/GWM activates the low beam headlamps for the required delay period. The delay timer is set within the Instrument Cluster (IC) 'Vehicle Set-up Menu'. The default timing is 30 s, but the timing can be changed to between 0 s (OFF), 30 s (default), 60 s, 120 s and 240 s.
For additional information, refer to: Message Center (413-08, Description and Operation).

AUTO HIGH BEAM

WARNING:

The Auto High Beam (AHB) system is designed as a driving aid only. Should the road conditions require, it is the driver’s responsibility to consider other road users and operate the high beam headlamps in a safe manner. In certain circumstances the driver will be required to intervene.

The Auto High Beam (AHB) operates as part of the autolamps system.

The AHB will automatically operate the high beam headlamps when necessary, if the following conditions are present:

- When driving at night with the lighting control switch in the ‘AUTO’ position and the left steering column multifunction switch in the central position.
- Sufficient darkness (approximately 1 lux or less)
- Suitable road speed.

NOTE:

The exterior lighting on threshold for the autolamps system is approximately 100 lux which is measured by the rain/light sensor. At light levels below this value the low beam headlamps and exterior lights will be switched on. The AHB will not function until the light level has reached approximately 1 lux. At light levels above 1 lux high beam is not required and therefore is not activated.

The AHB warning indicator in the Instrument Cluster (IC) confirms to the driver when the AHB system is selected and enabled.

Auto High Beam Activation

The AHB will only activate and illuminate the warning indicator, to show the system is activated for high beam control, when the following conditions are met:

- The AHB is enabled in the IC 'Vehicle setup' menu.
- The lighting control switch is in the 'AUTO' position.
- The left steering column multifunction switch is in the central position.
- The ambient light level is below 100 lux.
- The system has not been overridden or cancelled.
- The Image Processing Module (IPMA) image sensor view is not blocked.

High Beam Control

When the AHB activated, the Body Control Module/Gateway Module (BCM/GWM) will switch the headlamps to high beam when all the following conditions occur:

- No relevant oncoming traffic.
- No relevant preceding traffic.
- In non-urban environment, for example with no street lighting.
- Ambient light level is below 1 lux.
- Road speed is suitable.

Low Beam Control

The BCM/GWM will switch the headlamps to low beam when any of the following conditions occur:

- Relevant preceding traffic is present.
- In urban environment, namely with street lighting.
- Ambient light level is above 1 lux.
- Road speed is not suitable.
- Unrecognizable reflective inputs from road signs or markings.

Road Speed

The BCM/GWM receives the road speed signal from the Anti-lock Brake System (ABS) control module. The BCM/GWM and the ABS control module communicate on the High Speed (HS) Controller Area Network (CAN) chassis systems bus. When the other activation conditions are correct, the BCM/GWM will switch the headlamps to high beam when the road speed has increased above 40 km/h (25 mph).

When the road speed decrease below 24 km/h (15 mph), the BCM/GWM will switch the headlamps to low beam. The 15 km/h (10 mph) difference between the on and off road speed thresholds prevents the system continually switching between high and low beam at low speeds.

Override

The driver can manually override the AHB function at any time. When the AHB system is activated, pulling the left steering column multifunction switch to the high beam 'flash' position or pushing it forward to the high beam position will de-activate the system and the AHB warning indicator in the IC will extinguish.

When the multifunction switch is returned to the central position, from a forward high beam position, the system is re-activated and the AHB warning indicator will illuminate again.

Correct Performance

In addition, the AHB function will only exhibit best performance if all of the following conditions are met:

- No false inputs are received by the Image Processing Module (IPMA) camera, such as reflected light from certain static signs.
- Headlamps are correctly aligned AHB function has been set for correct hand of drive in the 'Vehicle set-up menu' of the Instrument Cluster (IC).

- The Image Processing Module (IPMA) camera has been through a self-learning 'auto aim' calibration procedure if any components have been replaced.
- There are no large reflective items, for example white papers, sitting on top of the instrument panel in near view of the IPMA camera, or stickers placed directly in front of the camera.

Enabling or disabling AHB will not affect the hand of drive settings once set.

Auto High Beam Limitations

The AHB function can occasionally have difficulty distinguishing between light from other vehicles or reflected light from static highly reflective road signs.

These situations may cause the AHB function to undesirably operate the high beam headlamps or take no action at all.

Examples of these situations are as follows:

- Hollows or crests in the road
- Highly reflective static road signs
- Tight bends
- Poorly illuminated vehicles, for example cyclists or small mopeds
- Highway central barriers
- Extreme weather conditions, for example fog or heavy snow
- Exterior domestic or industrial lighting.

There are situations when a driver is able to judge if a high beam deactivation is desirable before the AHB system actually operates, for example over a crest of a hill. Headlamps from an oncoming vehicle can sometimes be seen on the horizon prior to the detection sensor receiving an input. It is the driver's preference to determine if early intervention is desired in this and similar situations.

Auto High Beam Calibration

To achieve effective operation of the AHB, a calibration routine is performed on vehicle build and system tolerances are set to an accuracy of ± 0.2 degrees. This initial calibration is a 'one time only' procedure. Should the AHB components or the windshield require replacement, an automatic calibration routine will be performed. The calibration procedure is a continual process that takes place during a normal drive cycle at night.

The calibration procedure could take between 10 - 30 minutes depending on the following driving conditions:

- If sufficient road markings (lane markings) are visible to the image sensor - approximately 10 minutes.
- If insufficient road markings are visible, the system uses the tail lights of preceding vehicles - approximately 30 minutes.

NOTE:

Until this calibration is complete the system may not react correctly during operation. This should be made clear to the customer before vehicle handover.

Due to mechanical calibration tolerance the correct mirror assembly must be used for the vehicle model types in question and it is not exchangeable with other vehicle model types. After any rectification work and before any calibration drives, the headlamps should be checked for correct alignment.

Auto High Beam Diagnosis

NOTE:

Windshield stickers, stone chips, dirt and general road film will affect the successful operation of the IPMA camera if sufficient blocking is present. Avoid placing reflective objects on the instrument panel, for example white paper, which can affect the image sensor.

The AHB has a self-diagnosis capability. The BCM/GWM can compare data from the rain /light sensor to light levels detected by the IPMA camera. If a deviation is detected it is assumed that the ambient light available to the IPMA camera is being restricted by dirt or other blockage and the system will be deactivated.

The Diagnostic Trouble Codes (DTC)s are stored in the BCM/GWM. The DTCs can be accessed using the Jaguar Land Rover approved diagnostic equipment. Within the diagnostic system is a procedure to test the basic operation of the camera function.

In the event of a fault, the warning strategy to the driver is as follows:

- The IPMA internal fault - The AHB warning indicator will extinguish with no additional message to driver.
- The BCM/GWM has lost all communication with the IPMA - The AHB warning indicator will extinguish with no additional message to driver.
- The IPMA is blocked - The AHB warning indicator will extinguish with an additional 'Camera Blocked' message within the message center.

ADAPTIVE FRONT LIGHTING SYSTEM

When the Body Control Module/Gateway Module (BCM/GWM) receives an ignition on signal, the control module performs the initialization procedure which ensures that the headlamps are correctly aligned on both their vertical and horizontal axes.

The Adaptive Front lighting System (AFS) swivel initialization starts less than 1 second after the headlamp leveling initialization 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 initialization is completed in less than 2.5 seconds. The left and right AFS actuator motors are powered from the 0 degree position to a small movement to the inboard position, then another small movement to the outboard position and then back to the 0 degree position.

FAILURE MODE

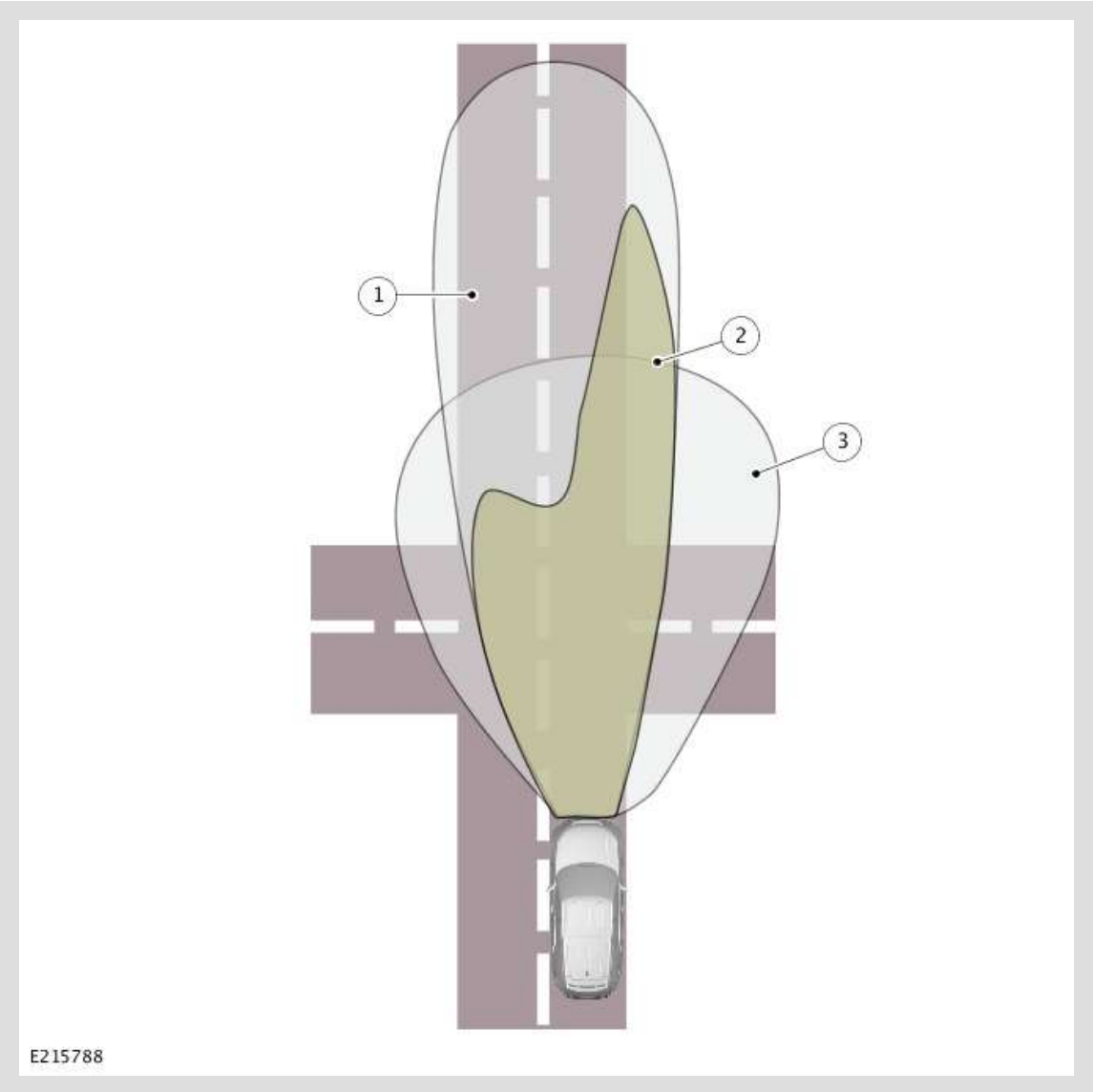
The Adaptive Front lighting System (AFS) function is enabled when the low beam headlamps are switched on automatically by the rain light sensor when the lighting control switch is in the AUTO position. If the lighting control switch is moved to any other position then AFS operation will cease and the lighting system will default to the appropriate condition for the new lighting control switch setting.

The AFS will only operate when the Body Control Module/Gateway Module (BCM/GWM) receives an engine running signal. The engine running signal is provided by the Powertrain Control Module (PCM) on the FlexRay bus.

The AFS consists of the following light modes of operation in which the components of the AFS adapt automatically to according to the conditions described below:

- City mode - operates below 48 km/h (30 mph).
- Country mode - operates between 49 km/h (30.5 mph) and 110 km/h (68 mph).
- Adverse weather mode - operates below 64 km/h (40 mph).
- Motorway mode- operates above 110 km/h (68 mph).

Schematic View - Adaptive Front lighting System Light Modes



ITEM	DESCRIPTION
1	Motorway mode
2	Country mode and Adverse weather mode
3	City mode

City Mode

The City mode is activated to allow greater visibility around the vehicle during city traffic conditions and to identify other road users such as:

- Pedestrians
- Cyclists
- Oncoming vehicles.

Above 48 km/h (30 mph) City mode will transition to Country mode. In order to prevent repeated switching between modes the transition from Country mode to City mode will occur at 40 km/h (25 mph) as the vehicle speed decreases. If the conditions for Adverse weather mode are met whilst City mode is active then Adverse weather mode will take priority.

Country Mode

The Country mode is the standard low beam as normally defined for non-AFS vehicles. The Country mode has a greater forward range of illumination as it includes the kink beam. The Country mode will be used whilst setting the initial aim of the low beam.

Whenever PARK gear is selected the light mode will be changed to Country mode. When the transmission removed from PARK the light mode resumes to the last activated mode.

Above 110 km/h (68 mph) Country mode will transition to Motorway mode. In order to prevent repeated switching between lighting modes the transition from Motorway mode to Country mode will occur at 90 km/h (56 mph) as the vehicle speed decreases. If the conditions for Adverse weather mode are met whilst Country mode is active then Adverse weather mode will take priority.

Adverse Weather Mode

The Adverse weather mode is a specially designed variant of Country mode. The optical design is not able to achieve the requirements of wet road mode but gets as close as possible to this whilst remaining compliant optically to a Country mode beam. The Adverse weather mode reduces the amount glare caused by light reflecting up off a wet road surface.

The Adverse weather mode will be active when the following conditions are met:

- The vehicle speed is between 0 km/h and 64 km/h (40 mph).
- The front wipers must have been in continual operation for 120 seconds, either manually or automatically.

Above 64 km/h (40 mph) Adverse weather mode will transition to Country mode. In order to prevent repeated switching between lighting modes the transition from Country mode to Adverse weather mode will occur at 55 km/h (34 mph) as the vehicle speed decreases.

Motorway Mode

The Motorway mode is activated to allow greater focus on distance during motorway driving or driving at higher speeds. The Motorway mode enables the driver to be more focused on far vision and reduce distractions caused by excessive light at the sides of the vehicle.

The Motorway mode shall be active when the vehicle speed is above 110 km/h (68 mph). In order to prevent repeated switching between lighting modes the transition from Motorway mode to Country mode shall occur at 90 km/h (56 mph) as the vehicle speed decreases.

Initialization Procedure

When the BCM/GWM receives an ignition on signal, it performs the initialization procedure which provides that the headlamps are correctly aligned.

The leveling initialization starts less than 1 second after the headlamp leveling initialization is activated to make sure that the headlamps are at or below the 0 degree position in the vertical axis, thus preventing glare to oncoming vehicles.

Failure Mode

In the event of a failure of the AFS, a warning indicator in the Instrument Cluster (IC) is illuminated to warn the driver. The AFS warning is contained in the message notification on the message center, and will continuously appear 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.

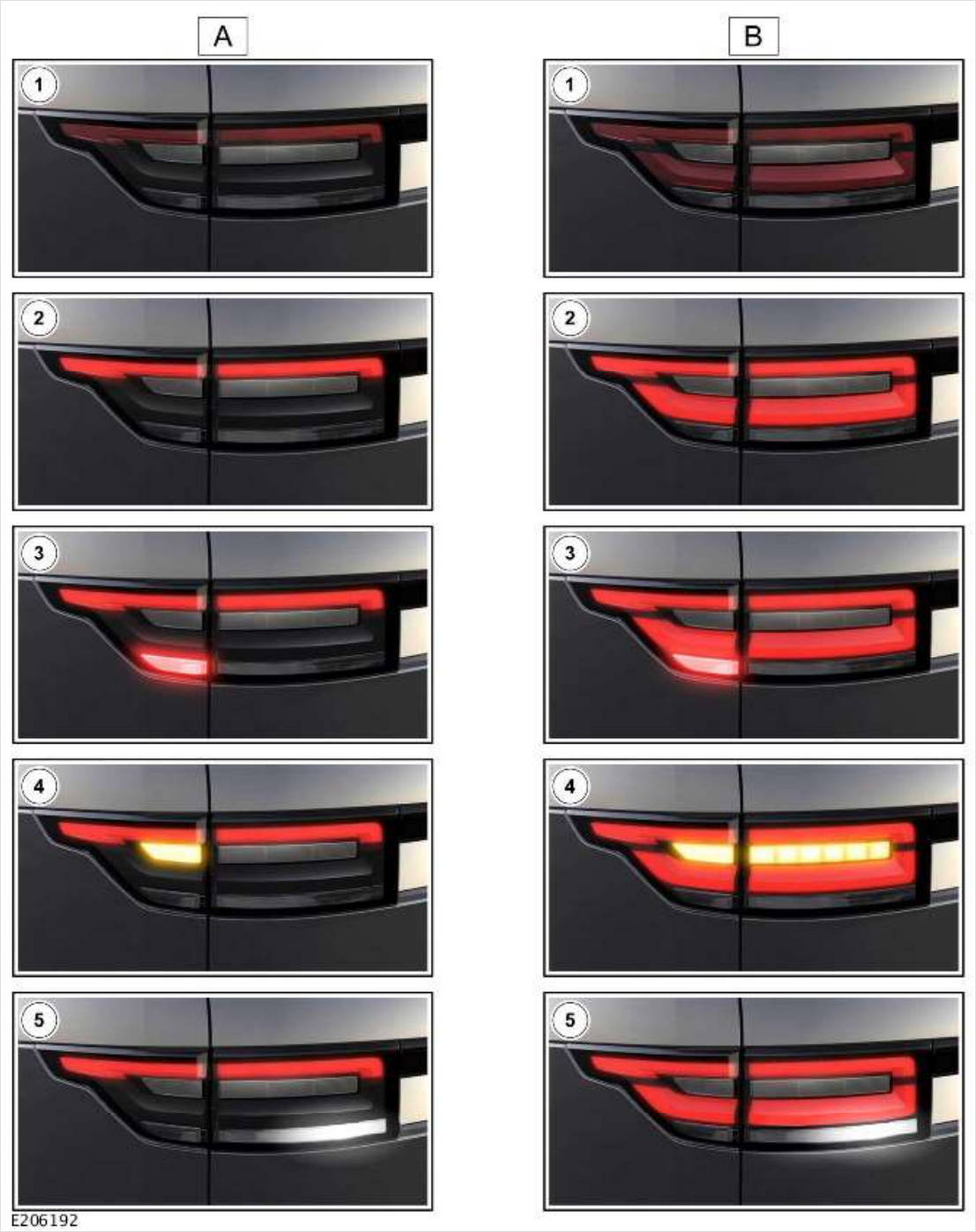
Illumination of the AFS warning indicator does not necessarily mean that there is a fault with the AFS. The fault may be caused by a failure of another system preventing the AFS operating correctly.

The BCM/GWM performs a diagnostic routine every time AFS is requested. If any fault is found, the BCM/GWM will suspend the operation of the AFS function.

Faults can be investigated by interrogating the BCM/GWM using the Jaguar Land Rover approved diagnostic equipment to check for Diagnostic Trouble Codes (DTCs).

TAIL LAMP OPERATION

Rest Of World Market Vehicles



ITEM	DESCRIPTION
A	Vehicles with 'Low line' specification
B	Vehicle with 'High line' specification
1	Tail lamp off
2	Tail lamp on
3	Stop lamp
4	Turn signal indicator
5	Reverse lamp

North American Specification Market Vehicles

ITEM	DESCRIPTION
A	Vehicles with 'Low line' specification
B	Vehicle with 'High line' specification
1	Tail lamp off
2	Tail lamp on
3	Stop lamp
4	Turn signal indicator

5	Reverse lamp

EMERGENCY BRAKING ACTIVATION

During emergency braking, if vehicle deceleration exceeds a stored value, the Anti-lock Brake System (ABS) control module sends signals to the Body Control Module/Gateway Module (BCM/GWM). The BCM/GWM and the ABS control module communicate on the High Speed (HS) Controller Area Network (CAN) chassis systems bus. The BCM/GWM automatically activates the hazard warning lamps at a faster rate than normal (approximately 4 Hz). If the vehicle speed reduces below 5 km/h (3 mph), the hazard warning lamps remain active but switch to the normal rate of operation.

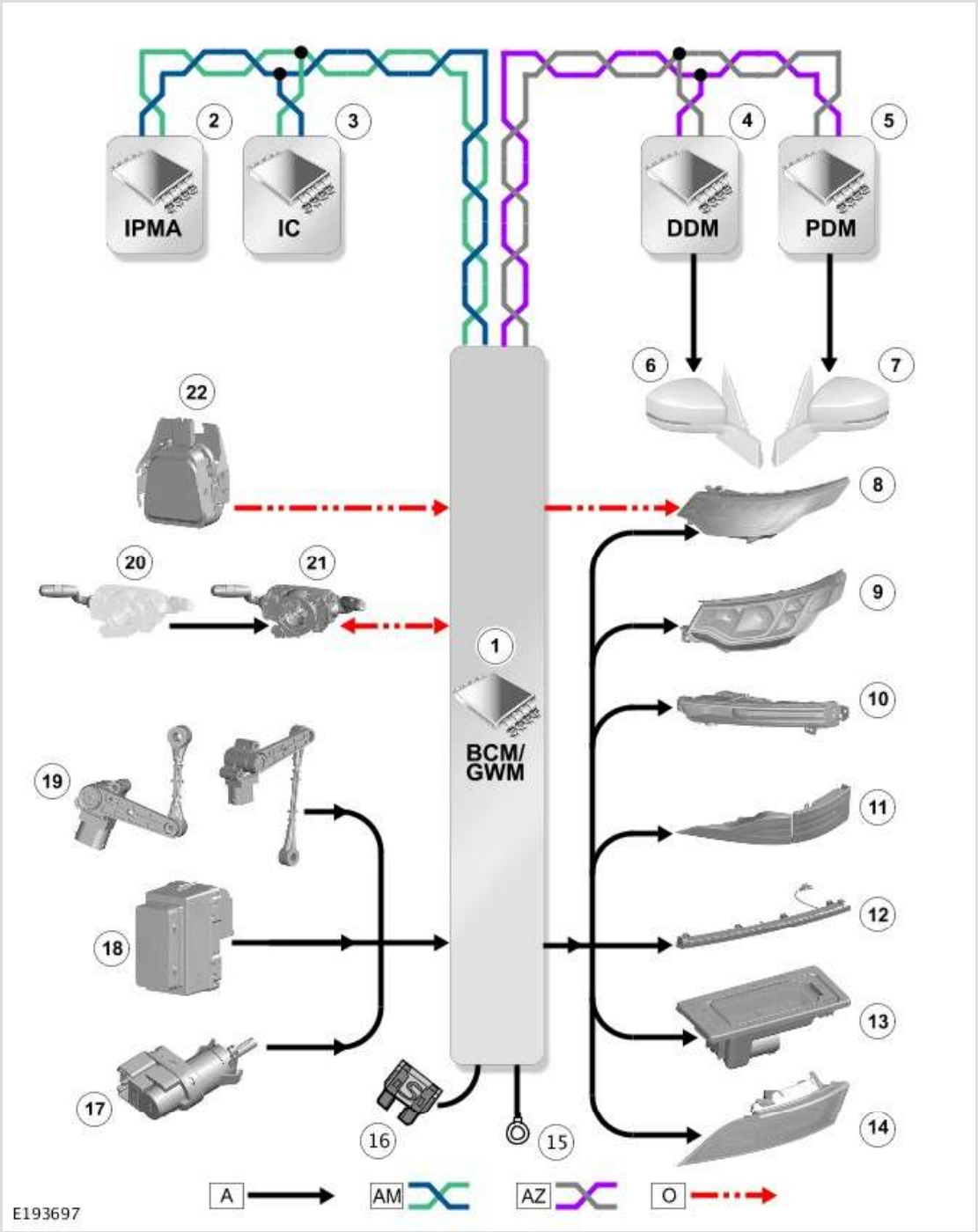
The emergency braking activation of the hazard warning lamps is cancelled when one of the following occurs:

- The vehicle deceleration falls below a second (lower) stored value.
- The Dynamic Stability Control (DSC) OFF or TracDSC mode is selected.
- The left or right turn signal indicators are selected.

LIGHT EMITTING DIODE FAILURE

If one Light Emitting Diode (LED) in the lamp group fails, then all other LEDs in that group are extinguished by the lamp. The affected lamp unit must be replaced.

CONTROL DIAGRAM



A = HARDWIRED: AM = HIGH SPEED (HS) CONTROLLER AREA NETWORK (CAN) CHASSIS SYSTEMS BUS: AZ = HIGH SPEED (HS) CONTROLLER AREA NETWORK (CAN) BODY SYSTEMS BUS: O = LOCAL INTERCONNECT NETWORK (LIN) BUS.

ITEM	DESCRIPTION
1	Body Control Module/Gateway Module (BCM/GWM)
2	Image Processing Module (IPMA)
3	Instrument Cluster (IC)

4	Driver Door Module (DDM)
5	Passenger Door Module (PDM)
6	Side repeater lamp - Right
7	Side repeater lamp - Left
8	Light Emitting Diode (LED) headlamp assembly (2 off) - If equipped
9	Halogen headlamp assembly (2 off)
10	Front fog lamp (2 off)
11	Tail lamp assembly (2 off)
12	High Mounted Stop Lamp (HMSL)
13	License plate lamp (2 off)
14	Rear fog lamp (2 off)
15	Ground
16	Power supply
17	Brake pedal switch
18	Hazard warning lamp switch
19	Height sensors (2 off)
20	Left steering column multifunction switch
21	Steering Wheel Module (SWM)
22	Rain/light sensor

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2017.0 DISCOVERY (LR), 417-01

EXTERIOR LIGHTING

SPECIFICATIONS

General specifications

Item	Specification	Rating
Low beam headlamp bulb - vehicles with conventional headlamps	Halogen H7 Long Life (LL)	55W
High beam headlamp bulb - vehicles with conventional headlamps	Halogen H7 LL	55W
Front fog lamp	LED	-
Rear fog lamp	LED	-
Front turn signal bulb	Bulb	5W
Front turn signal	LED	-
Rear turn signal	LED	-
Side repeater	LED	-
Side lamp	LED	-
Side lamp bulb	Bulb	25W
Stop lamp	LED	-
High mounted stop lamp (HMSL)	LED	-
Tail lamp	LED	-
License plate lamp bulb	Festoon	5W
Reversing lamp	LED	-
Side marker lamp bulb - front and rear- Federal	LED	-

WARNING:

Refer to the general information - electrical precautions section of this manual prior to carrying out any procedures on the high intensity discharge headlamp system installed to certain vehicles.

Torque specifications

ITEM	NM	LB-FT	LB-IN
Front fog lamp bolts	2.5	-	22
Headlamp bolts	5	-	44
Rear lamp bolts	2.5	-	22
Stop lamp nuts	2.5	-	22
Rear fog lamp bolts	2.3	-	20
Side repeater lamp bolts	1.5	-	13

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EXTERIOR LIGHTING

DIAGNOSIS AND TESTING

PRINCIPLE OF OPERATION

For a detailed description of the fog lamps system and operation, refer to the relevant Description and Operation section of the workshop manual. REFER to: Exterior Lighting (417-01, Description and Operation).

INSPECTION AND VERIFICATION

CAUTION:

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

1. Verify the customer concern

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

Visual Inspection

MECHANICAL	ELECTRICAL
▪ Rear fog lamp condition and installation ▪ Fog lamp switch condition and installation	▪ Fuses ▪ Wiring harness ▪ Loose or corroded connector(s) ▪ Fog lamp relay ▪ Fog lamp warning indicator ▪ Fog lamp switch ▪ Body control module ▪ Battery junction box

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

1. 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
Fog lamp inoperative	▪ Fuse(s) blown ▪ Circuit fault ▪ Switch inoperative	Check the fuse(s). Check the fog lamp circuits. Check the switch function. Refer to the electrical guides
Fog lamp dim	▪ Circuit fault ▪ Switch fault	Check the fog lamp circuits. Check the switch function. Refer to the electrical guides
Warning indicator inoperative	▪ Fuse(s) blown ▪ Switch inoperative ▪ Circuit fault ▪ Instrument cluster fault	Check the fuse(s). Check the switch function. Check the warning indicator circuits. Refer to the electrical guides. Check for DTCs indicating an instrument cluster fault

DTC INDEX

For a list of Diagnostic Trouble Codes (DTCs) that could be logged on this vehicle, please refer to Section 100-00.
REFER to: Diagnostic Trouble Code Index - DTC: Body Control Module (BCM) (100-00 General Information, Description and Operation).

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EXTERIOR LIGHTING

FRONT FOG LAMP (G1948105)

REMOVAL AND INSTALLATION

86.40.96	LAMP ASSEMBLY - FOG /DRIVING - RENEW	ALL DERIVATIVES	1.3	USED WITHINS

REMOVAL

NOTE:

Removal steps in this procedure may contain installation details.

1. **WARNING:**

   Make sure to support the vehicle with axle stands.

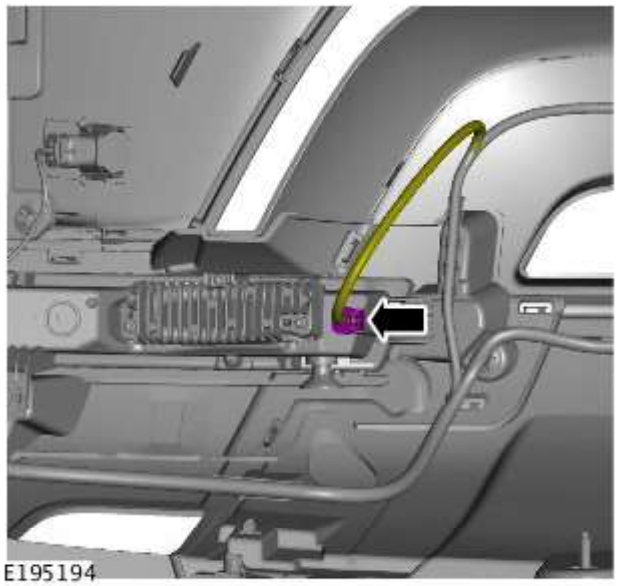
   Raise and support the vehicle.

2. Remove the front bumper.
   Refer to: Front Bumper (501-19 Bumpers, Removal and Installation).

3.

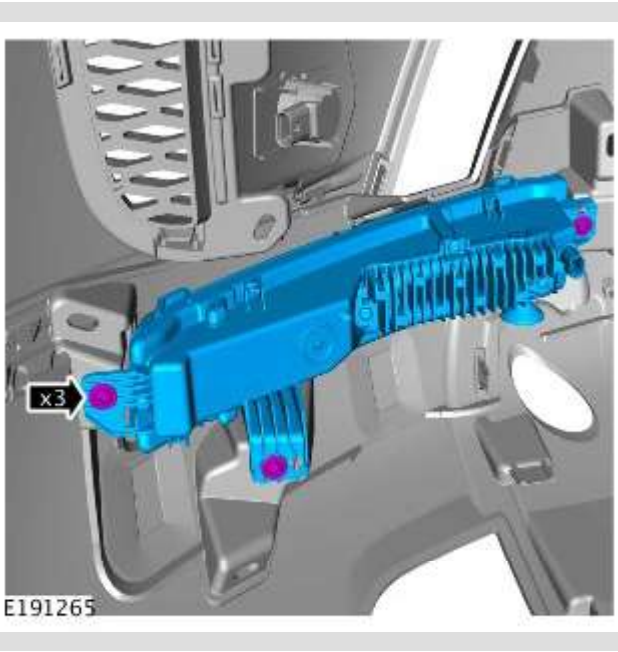
CAUTION:

Make sure the wiring harness and electrical connectors are not damaged during this operation.



Disconnect the front fog lamp electrical connector.

4.



Remove the three screws.

Torque: **2.5 Nm**

5.

CAUTION:

Take extra care not to damage the edges of the component.

Remove the front fog lamp.

INSTALLATION

1. To install, reverse the removal procedure.

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2017.0 DISCOVERY (LR), 417-01

EXTERIOR LIGHTING

FRONT TURN SIGNAL LAMP BULB (G2006838)

REMOVAL AND INSTALLATION

86.40.41	BULB - TURN SIGNAL LAMP - FRONT - RENEW	2000 CC, INGENIUM DIESEL	0.2	USED WITHINS	

REMOVAL

CAUTION:

Protect the surrounding paintwork to avoid damage.

NOTE:

Removal steps in this procedure may contain installation details.

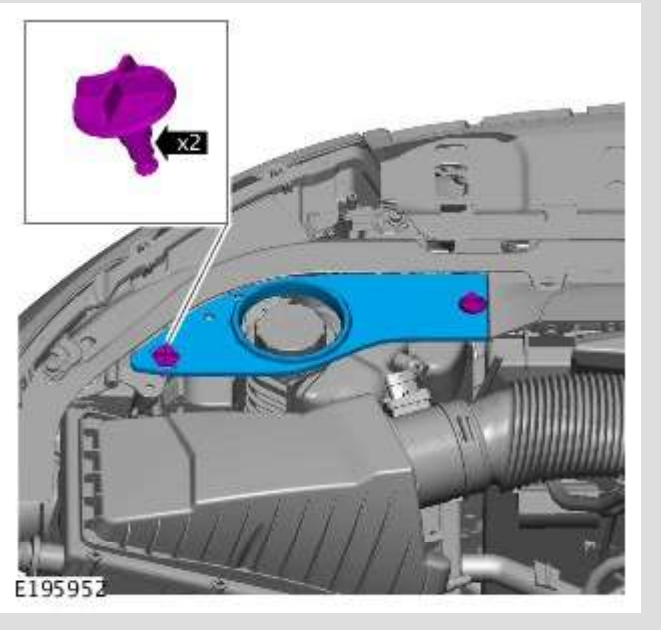
1. Disconnect the battery ground cable.
   Refer to: Specifications (414-00 Battery and Charging System - General Information, Specifications).

2. Remove the left air cleaner assembly.
Refer to: Left Air Cleaner (303-12 Intake Air Distribution and Filtering - V6 S /C 3.0L Petrol, Removal and Installation).
Refer to: Air Cleaner (303-12 Intake Air Distribution and Filtering - INGENIUM I4 2.0L Diesel, Removal and Installation).
Refer to: Left Air Cleaner (303-12 Intake Air Distribution and Filtering - TDV6 3.0L Diesel, Removal and Installation).

3.

CAUTION:

Use a suitable plastic trim tool to release the component.

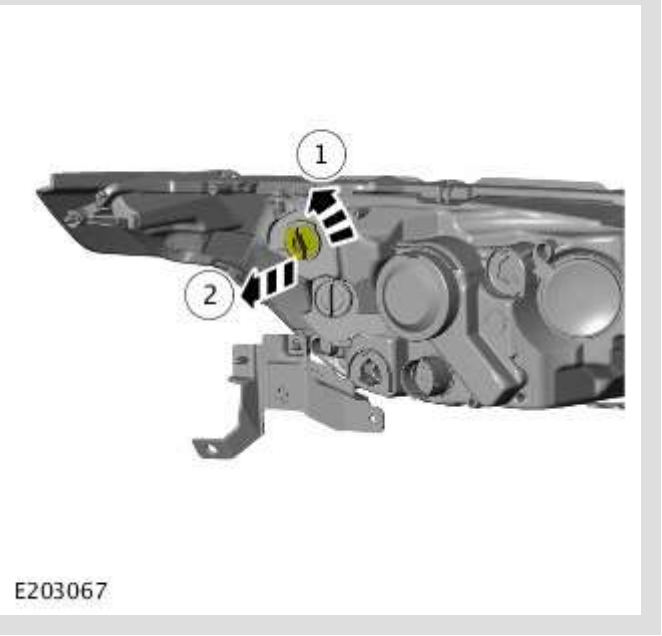


Remove the trim panel.

4.

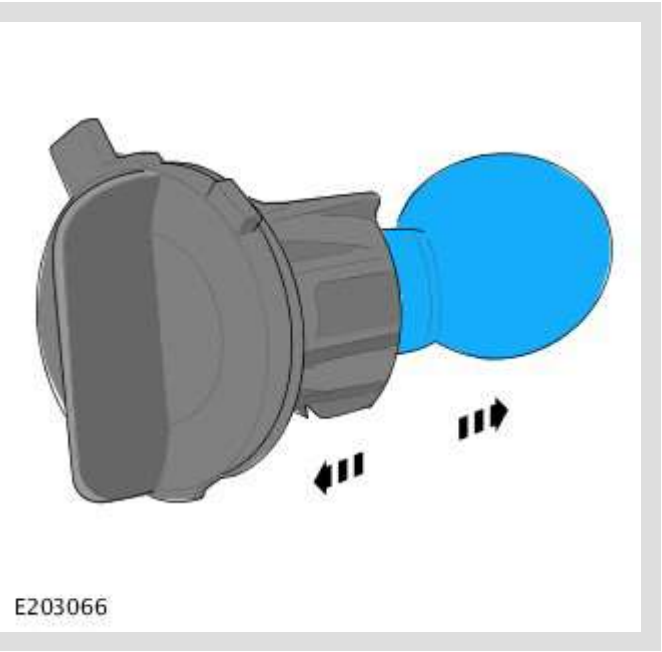
CAUTION:

Take extra care not to damage the component.



Release the turn signal indicator bulb.

5.



Remove the turn signal indicator bulb.

INSTALLATION

1. To install, reverse the removal procedure.

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2017.0 DISCOVERY (LR), 417-01

EXTERIOR LIGHTING

HEADLAMP ADJUSTMENT (G1948103)

GENERAL PROCEDURES

86.40.17	HEADLAMPS - PAIR - ALIGN BEAM	ALL DERIVATIVES	0.3	USED WITHINS

CHECK

NOTE:

Left illustrations shown, right similar.

1. Carry out the air suspension manual control procedure.
   Refer to: Air Suspension Manual Tight Tolerance Setting Mode (204-05 Vehicle Dynamic Suspension, General Procedures).

2. Align the headlamp beam setting equipment to one headlamp.

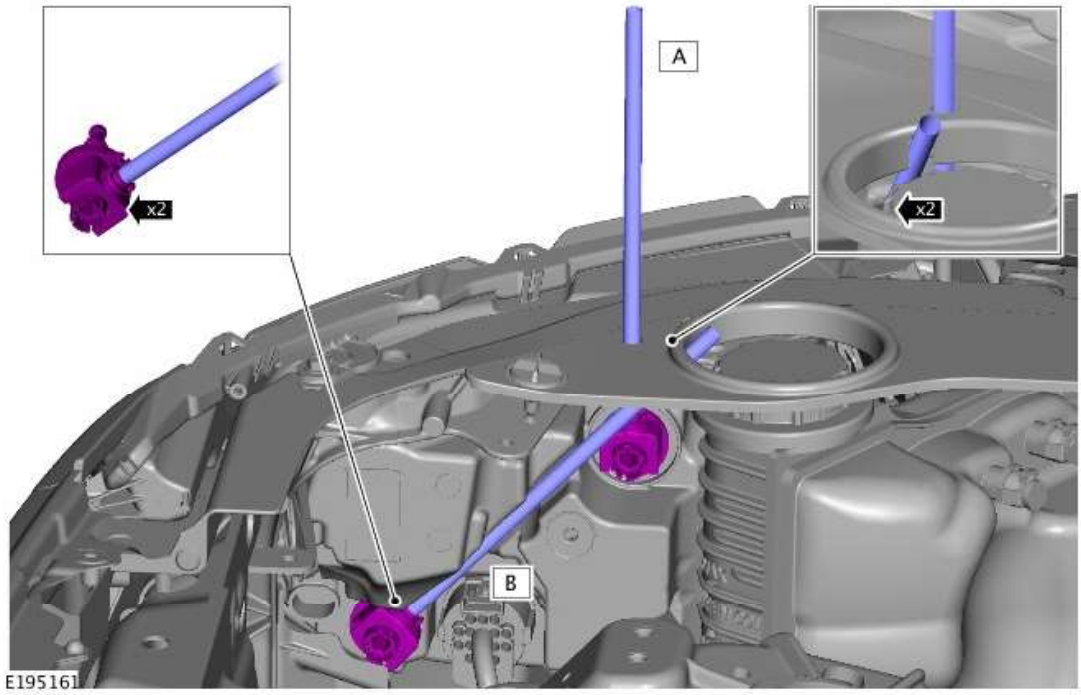
3. Switch the headlamps On and to low beam.

ADJUSTMENT

1.

NOTE:

The headlamp setting is 1.2 % below horizontal and parallel.



- Using the suitable tool adjust the headlamp as shown.
- Rotate the adjuster 'A' for vertical alignment.
- Rotate the adjuster 'B' for horizontal alignment.

2. Repeat the above procedure for the other side headlamp.

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EXTERIOR LIGHTING

HEADLAMP ASSEMBLY (G1948106)

REMOVAL AND INSTALLATION

86.40.02	HEADLAMP ASSEMBLY - OUTER /SINGLE - RENEW	ALL DERIVATIVES	1.7	USED WITHINS

REMOVAL

CAUTION:

Protect the surrounding paintwork to avoid damage.

NOTE:

Removal steps in this procedure may contain installation details.

1.

WARNING:

Make sure to support the vehicle with axle stands.

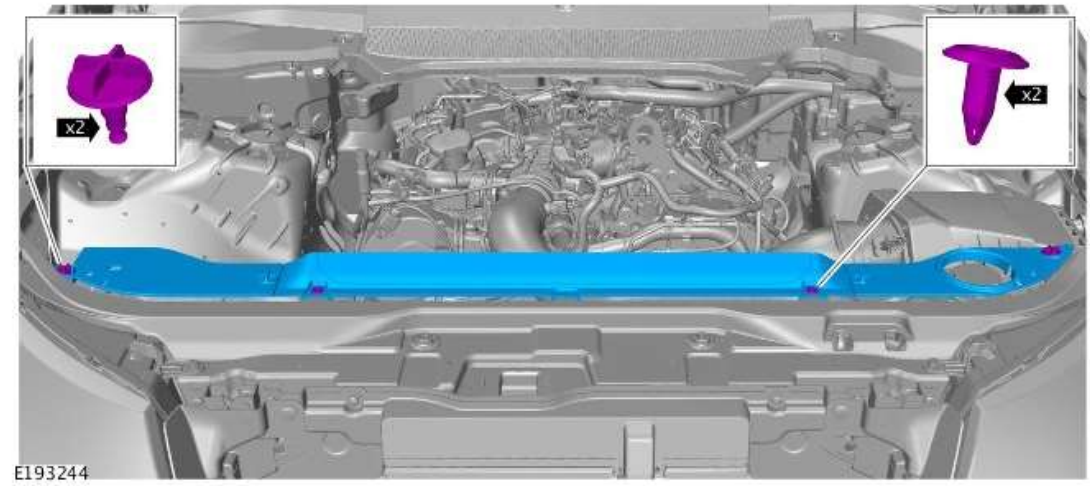
Raise and support the vehicle.

2. Disconnect the battery ground cable.
Refer to: Specifications (414-00 Battery and Charging System - General Information, Specifications).

3. Remove the front bumper.
Refer to: Front Bumper (501-19 Bumpers, Removal and Installation).

4. **CAUTION:**

Use a suitable plastic trim tool to release the component.

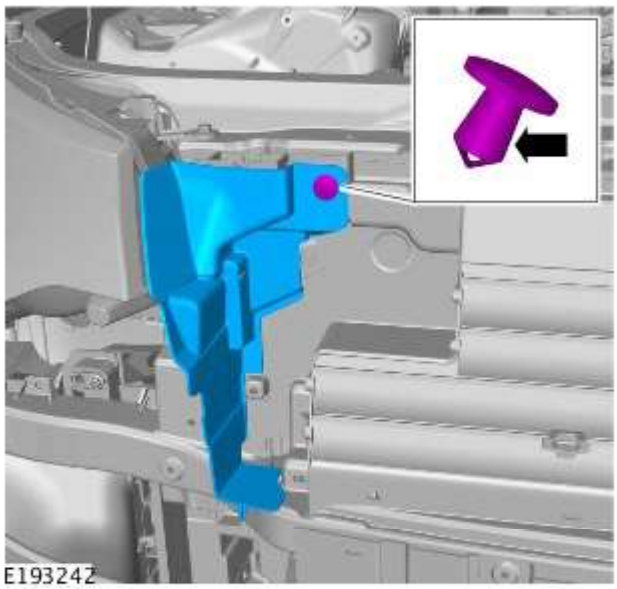


Remove the trim panels.

5.

CAUTION:

Use a suitable plastic trim tool to release the component.

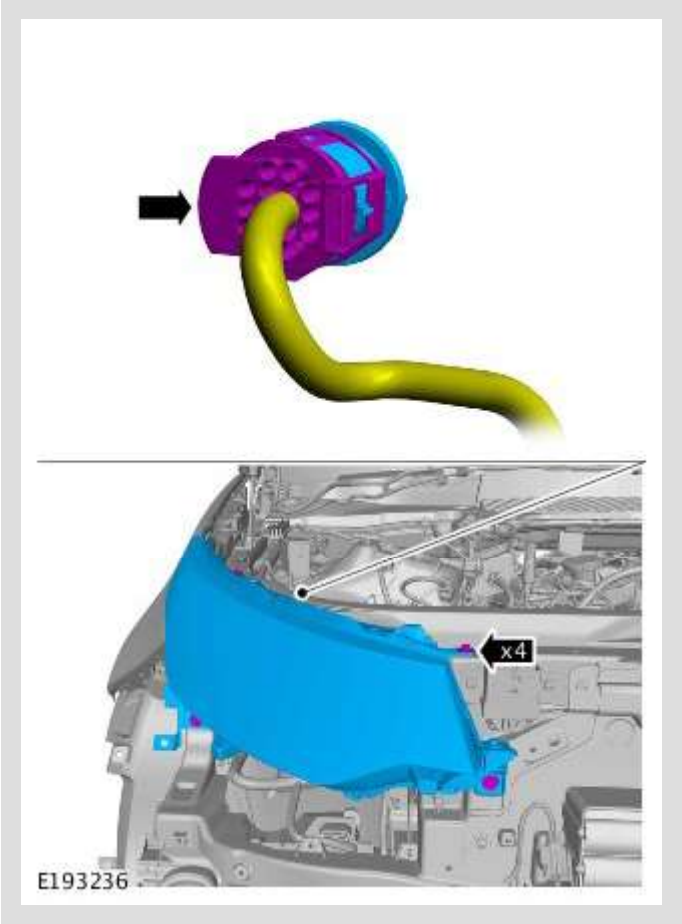


Remove the cover.

6.

CAUTION:

Take extra care not to damage the component.



Remove the headlamp assembly.
Torque: **5 Nm**

INSTALLATION

1. To install, reverse the removal procedure.

2. Check the headlamp beam alignment.
Refer to: Headlamp Adjustment (417-01 Exterior Lighting, General Procedures).

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EXTERIOR LIGHTING

DIAGNOSIS AND TESTING

PRINCIPLE OF OPERATION

For a detailed description of the headlamp leveling system and operation, refer to the relevant description and operation section of the workshop manual. REFER to: Exterior Lighting (417-01, Description and Operation).

INSPECTION AND VERIFICATION

CAUTION:

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

1. Verify the customer concern

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

Visual Inspection

MECHANICAL	ELECTRICAL
▪ Headlamp leveling motor(s) and linkage(s) condition and installation ▪ Steering column multifunction switch and installation	▪ Fuses ▪ Wiring harness ▪ Loose or corroded connector(s) ▪ Battery junction box ▪ Headlamp power modules ▪ Engine control module ▪ ABS control module

	▪ Integrated suspension control module ▪ LIN circuits ▪ CAN circuits

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

1. 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
Headlamp leveling system inoperative Headlamp alignment incorrect	▪ Fuse(s) blown ▪ Leveling motor /linkage fault ▪ Headlamp leveling circuit fault ▪ Suspension system fault ▪ Chassis controller module fault	Check the fuse(s) condition. Check the headlamp leveling motor and linkage condition. Check the headlamp leveling circuit. Refer to the electrical guides. Check for DTCs indicating headlamp leveling circuit, suspension system fault(s) or CAN system fault

DTC INDEX

For a list of diagnostic trouble codes (DTCs) that could be logged on this vehicle, please refer to Section 100-00. REFER to:

Diagnostic Trouble Code Index - DTC: Body Control Module (BCM) (100-00 General Information, Description and Operation),
Diagnostic Trouble Code Index: Integrated Suspension Control Module (100-00, Description and Operation).

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2017.0 DISCOVERY (LR), 417-01

EXTERIOR LIGHTING

HEADLAMP SWITCH (G1948108)

REMOVAL AND INSTALLATION

86.65.09	SWITCH - MASTER LIGHTING - RENEW	ALL DERIVATIVES	0.2	USED WITHINS

REMOVAL

NOTE:

Removal steps in this procedure may contain installation details.

1. Remove the left steering column multifunction switch.
   For additional information, refer to: Steering Column Multifunction Switch (211-05, Removal and Installation).

INSTALLATION

1. To install reverse the removal procedure.

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EXTERIOR LIGHTING

DIAGNOSIS AND TESTING

PRINCIPLE OF OPERATION

For a detailed description of the exterior lighting system and operation, refer to the relevant description and operation section of the workshop manual. REFER to: Exterior Lighting (417-01, Description and Operation).

SAFETY INFORMATION

WARNING:

The laser supplementary high beam emits highly concentrated visible light which can cause irritation or damage to the retina in the back of the eye. The laser supplementary high beam modules used in these headlights are classified by legislation as Class 2M light-emitting diodes. Do not look directly into the headlights or other light sources whilst low or high beam functions are operating.

CAUTION:

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

NOTE:

- If a control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component.
- When performing voltage or resistance tests, always use a digital multimeter accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance always take the resistance of the digital multimeter leads into account.
- Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

1. Verify the customer concern

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

INSPECTION AND VERIFICATION

CAUTION:

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

1. Verify the customer concern

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

Visual Inspection

MECHANICAL	ELECTRICAL
▪ Headlamp leveling motor(s) and linkage(s) condition and installation ▪ Bulb(s) and installation (halogen) ▪ Bulb holder(s) and installation (halogen) ▪ Steering column multifunction switch and installation	▪ Fuses ▪ Wiring harness ▪ Loose or corroded connector(s) ▪ Battery junction box ▪ Headlamp power modules ▪ Engine control module

	■ ABS control module ■ Integrated suspension control module ■ LIN circuits ■ CAN circuits

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

1. 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 CAUSES	ACTION
Headlamp (s) inoperative	■ Body system fault ■ Steering column multifunction switch ■ Headlamp LED failure ■ Headlamp laser module failure ■ Headlamp circuit short circuit to ground, short circuit to power, open circuit, high resistance	■ Using the Jaguar Land Rover approved diagnostic equipment, check the body control module for related DTCs and refer to the relevant DTC index ■ Install a new steering column multifunction switch ■ Install a new headlamp ■ Refer to the electrical circuit diagrams and check the headlamp circuit for short circuit to ground, short circuit to power, open circuit, high resistance
Headlamp (s) dim	■ Body system fault ■ Headlamp LED failure ■ Low voltage ■ Temperature above threshold ■ Headlamp circuit high resistance	■ Using the Jaguar Land Rover approved diagnostic equipment, check the body control module for related DTCs and refer to the relevant DTC index ■ Install a new headlamp ■ Refer to the electrical circuit diagrams and check the headlamp circuit for high resistance
Headlamp (s) stuck on	■ Body system fault ■ Headlamp control module ■ Image processing module ■ Steering column multifunction switch ■ Rain/light sensor	■ Using the Jaguar Land Rover approved diagnostic equipment, check the body control module and headlamp control module for related DTCs and refer to the relevant DTC index ■ Install a new steering column multifunction switch ■ Install a new rain/light sensor ■ Refer to the electrical circuit diagrams and check the headlamp circuit for short circuit to power

	▪ Headlamp circuit short circuit to power	
Headlamp low/high beam switching function inoperative	▪ Body system fault ▪ Headlamp control module ▪ Steering column multifunction switch ▪ Headlamp shutter circuit short circuit to ground, short circuit to power, open circuit, high resistance ▪ Headlamp internal failure - Shutter mechanism	▪ Using the Jaguar Land Rover approved diagnostic equipment, check the body control module and headlamp control module for related DTCs and refer to the relevant DTC index ▪ Install a new steering column multifunction switch ▪ Refer to the electrical circuit diagrams and check the headlamp shutter circuit for short circuit to ground, short circuit to power, open circuit, high resistance ▪ Install a new headlamp
Auto high beam assist inoperative	▪ Body system fault ▪ Image processing module fault ▪ Steering column multifunction switch ▪ Rain/light sensor ▪ Headlamp shutter circuit short circuit to ground, short circuit to power, open circuit, high resistance ▪ Configuration / Menu selection	▪ Using the Jaguar Land Rover approved diagnostic equipment, check the body control module for related DTCs and refer to the relevant DTC index ▪ Install a new steering column multifunction switch ▪ Install a new rain/light sensor ▪ Refer to the electrical circuit diagrams and check the headlamp shutter circuit for short circuit to ground, short circuit to power, open circuit, high resistance ▪ Check if the feature is enabled in the vehicle set up menu
Low beam lamp(s) inoperative High beam lamp(s) inoperative	▪ Bulb failure ▪ Fuse(s) blown ▪ Circuit fault ▪ Steering column multifunction switch fault	▪ Check the bulb and fuse condition. Check the headlamp circuits. Check the steering column multifunction switch function. Refer to the electrical guides. Check for DTCs indicating a headlamp or related circuit fault
Low beam lamp(s) dim High beam lamp(s) dim	▪ Incorrect bulb rating ▪ Circuit fault ▪ Steering column multifunction switch fault	Check the bulb condition and rating. Check the headlamp circuits. Check the steering column multifunction switch function. Refer to the electrical guides
Low beam lamp(s) stuck on High beam lamp(s) stuck on	▪ Circuit fault ▪ Steering column multifunction switch fault ▪ Headlamp timer function fault	Check the headlamp circuits. Check the steering column multifunction switch function. Check the headlamp timer function. Refer to the electrical guides. Check for DTCs indicating a headlamp circuit fault

Warning indicator(s) inoperative	▪ Body system fault ▪ Headlamp control module ▪ Instrument cluster fault ▪ Steering column multifunction switch	▪ Using the Jaguar Land Rover approved diagnostic equipment, check the body control module and headlamp control module for related DTCs and refer to the relevant DTC index ▪ Using the Jaguar Land Rover approved diagnostic equipment, check the instrument cluster for related DTCs and refer to the relevant DTC index ▪ Install a new steering column multifunction switch
Headlamp leveling system inoperative	▪ Adaptive front lighting system fault ▪ Body system fault ▪ Adaptive damping system fault ▪ Headlamp internal failure - Leveling motor/linkage	▪ Using the Jaguar Land Rover approved diagnostic equipment, check the body control module for related DTCs and refer to the relevant DTC index ▪ Using the Jaguar Land Rover approved diagnostic equipment, check the integrated suspension control module for related DTCs and refer to the relevant DTC index ▪ Install a new headlamp
Headlamp alignment incorrect	▪ Adaptive front lighting system fault ▪ Body system fault ▪ Adaptive damping system fault ▪ Headlamp internal failure - Leveling motor/linkage	▪ Using the Jaguar Land Rover approved diagnostic equipment, check the body control module for related DTCs and refer to the relevant DTC index ▪ Using the Jaguar Land Rover approved diagnostic equipment, check the integrated suspension control module for related DTCs and refer to the relevant DTC index ▪ Install a new headlamp

LASER SUPPLEMENTARY HIGH BEAM SYMPTOM CHART

SYMPTOM	POSSIBLE CAUSES	ACTION
Laser supplementary high beam inoperative	▪ Laser module failure ▪ Laser is not enabled ▪ Input signal failure	▪ GO to Pinpoint Test **A.**
Laser supplementary high beam partial function	▪ Laser module failure ▪ LED failure	▪ GO to Pinpoint Test **B.**
Laser supplementary high beam degraded function	▪ Laser module failure ▪ LED failure	▪ GO to Pinpoint Test **B.**
Laser supplementary high beam intermittent failure	▪ Camera false detection	▪ GO to Pinpoint Test **B.**

Laser supplementary high beam unintended function	▪ Camera does not detect	▪ GO to Pinpoint Test **B.**

PINPOINT TESTS

PINPOINT TEST A : LASER SUPPLEMENTARY HIGH BEAM TESTS	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	A1: CHECK IF CORRECT HEADLAMPS ARE FITTED
	1 Check headlamps for correct part numbers
	Are the correct headlamps with the correct part numbers for laser headlamps installed? **Yes** **GO to A2** . **No** Install new headlamps with the correct part numbers
	A2: CHECK FOR FAULT MESSAGES AND WARNING LIGHTS
	1 Check for headlamp system fault or camera system fault messages/warning lights in the instrument cluster
	Are there any headlamp or camera system fault messages/warning lights illuminated? **Yes** GO to Pinpoint Test **B.** **No** **GO to A3** .
	A3: CHECK IF LASER SUPPLEMENTARY HIGH BEAM IS ENABLED
	1 Check if laser supplementary high beam is enabled in the vehicle set up menu
	Is laser supplementary high beam enabled in the vehicle set up menu? **Yes** **GO to A4** . **No** Enable laser supplementary high beam in the vehicle set up menu. Refer to the relevant Description and Operation section of the workshop manual and confirm the operation of the laser functionality during a night drive. Inform customer of the function in vehicle set up menu. REFER to: Exterior Lighting (417-01, Description and Operation).
	A4: TEST LASER SUPPLEMENTARY HIGH BEAM FOR CORRECT OPERATION
	1 Test vehicle under correct conditions for laser supplementary high beam
	Has the vehicle been driven under the laser activation conditions and the fault been confirmed? **Yes** GO to Pinpoint Test **B.** **No** Refer to the relevant Description and Operation section of the workshop manual and confirm the operation of the laser functionality during a night drive. REFER to: Exterior Lighting (417-01, Description and Operation).

PINPOINT TEST B : LASER SUPPLEMENTARY HIGH BEAM TESTS	
TEST	

CONDITIONS	DETAILS/RESULTS/ACTIONS
B1: CHECK FOR LIGHTING SYSTEM RELATED DTCS	
	1 Using the Jaguar Land Rover approved diagnostic equipment, check for lighting system DTCs
	Are there any lighting system DTCs logged? **Yes** GO to B2 . **No** Refer to the relevant Description and Operation section of the workshop manual and confirm the operation of the laser functionality during a night drive. Inform customer of the function in vehicle set up menu. REFER to: Exterior Lighting (417-01, Description and Operation).
B2: CHECK FOR LIGHTING SYSTEM RELATED DTCS	
	1 Using the Jaguar Land Rover approved diagnostic equipment, check for lighting system DTCs
	Are DTCs U0046/U2301 (Chassis CAN communication issue) logged? **Yes** GO to B3 . **No** GO to B6 .
B3: WIRING CHECK	
	1 Refer to the electrical circuit diagrams and check the headlamp control module circuits for short circuit to ground, short circuit to power, open circuit, high resistance
	Were any faults present? **Yes** GO to B4 . **No** GO to B5 .
B4: CARRY OUT WIRING REPAIRS	
	1 Repair vehicle wiring harness as necessary. Using the Jaguar Land Rover approved diagnostic equipment, clear the DTCs
	Is the fault still present? **Yes** Contact the Jaguar Land Rover technical helpdesk for further assistance. **No** Refer to the relevant Description and Operation section of the workshop manual and confirm the operation of the laser functionality during a night drive. REFER to: Exterior Lighting (417-01, Description and Operation).
B5: CLEAR THE DTCS	
	1 Using the Jaguar Land Rover approved diagnostic equipment, clear the DTCs
	Is the fault still present? **Yes** Contact the Jaguar Land Rover technical helpdesk for further assistance. **No** Refer to the relevant Description and Operation section of the workshop manual and confirm the operation of the laser functionality during a night drive. REFER to: Exterior Lighting (417-01, Description and Operation).
B6: CHECK FOR LIGHTING SYSTEM DTCS	
	1 Using the Jaguar Land Rover approved diagnostic equipment, check for lighting system DTCs

	Is DTC U3000 logged? **Yes** GO to B7 . **No** GO to B8 .
B7: CLEAR THE DTCS	
	1 Using the Jaguar Land Rover approved diagnostic equipment, clear the DTCs
	Is the fault still present? **Yes** Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, contact the Jaguar Land Rover technical helpdesk. **No** Refer to the relevant Description and Operation section of the workshop manual and confirm the operation of the laser functionality during a night drive. REFER to: Exterior Lighting (417-01, Description and Operation).
B8: CHECK FOR BODY CONTROL MODULE/GATEWAY MODULE DTCS	
	1 Using the Jaguar Land Rover diagnostic equipment, check the body control module /gateway module and image processing module for DTCs
	Are there any related DTCs? **Yes** Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, contact the Jaguar Land Rover technical helpdesk. **No** Refer to the relevant Description and Operation section of the workshop manual and confirm the operation of the laser functionality during a night drive. REFER to: Exterior Lighting (417-01, Description and Operation).

FRONT AND REAR LAMP CONDENSATION

Some customers may complain of condensation/mist inside exterior lamps. Condensation/mist is a natural phenomenon which can occur when there is a temperature difference between the inside and outside of the lamp unit. This condensation is considered to be as a result of normal atmospheric conditions and replacing the light unit will not correct this symptom. With the introduction of clear lenses condensation is likely to be more noticeable but does not affect the performance of the lamp. Condensation will clear when the lights have been on for some length of time and in warmer ambient temperatures

A lamp that exhibits condensation should be evaluated after a drying time where all the functions have been operated for a minimum of 30 minutes. If the condensation has started to clear during this time it indicates that the lamp sealing has NOT been breached and will eventually clear. The lamp must NOT be replaced

CAUTION:

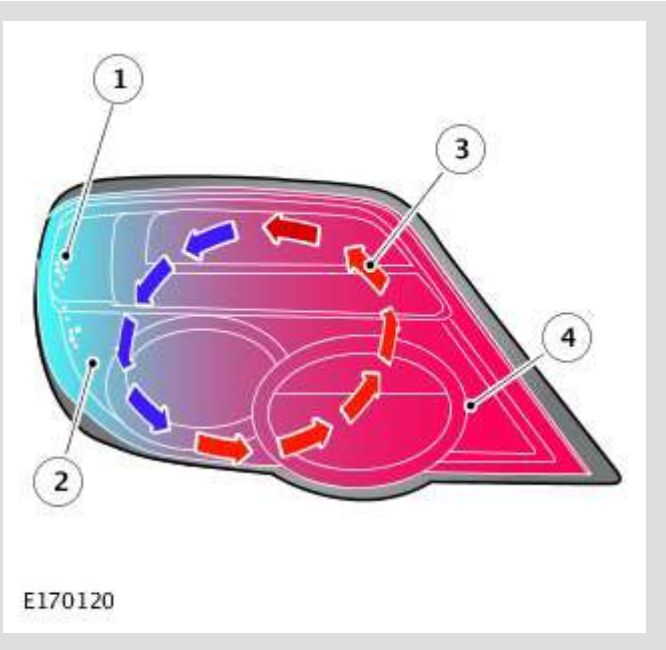
Make sure that all breathers (tubes or membrane patches) are free from dirt and debris and are fitted correctly as these can all lead to the formation of condensation. If any of these are determined to be the cause of the condensation, measures should be taken to dry out the lamps.

NOTE:

The Owner's handbook clearly states that condensation may form on the inside of lamp lenses and is caused by atmospheric conditions. That it is not detrimental to lamp performance and will clear during normal usage

Condensation or moisture can be more noticeable during the months of spring and autumn when there is a likelihood of a higher moisture content in the air. It can occur when there is a temperature difference on either side of the lens surface. This can often be seen in the evening and morning sunshine or when cold water makes contact with a warm lamp lens. When a lamp is warmed unevenly by the sunshine the surface area in direct sunlight will be approximately 10°C higher than the remainder of the lamp. When warm air circulates within the lamp and makes contact with the colder surfaces moisture can appear on the lens as water condenses out of the warmer air. Condensation may occur when washing a vehicle with cold water on a warm day or when the lamps are warm and vice versa. This is the same phenomena as with the formation of dew on the surface of a glass window pane

The following illustration demonstrates the process:



1. Moisture formation

1. Cool surfaces

1. Air circulation (convection)

1. Warm surfaces

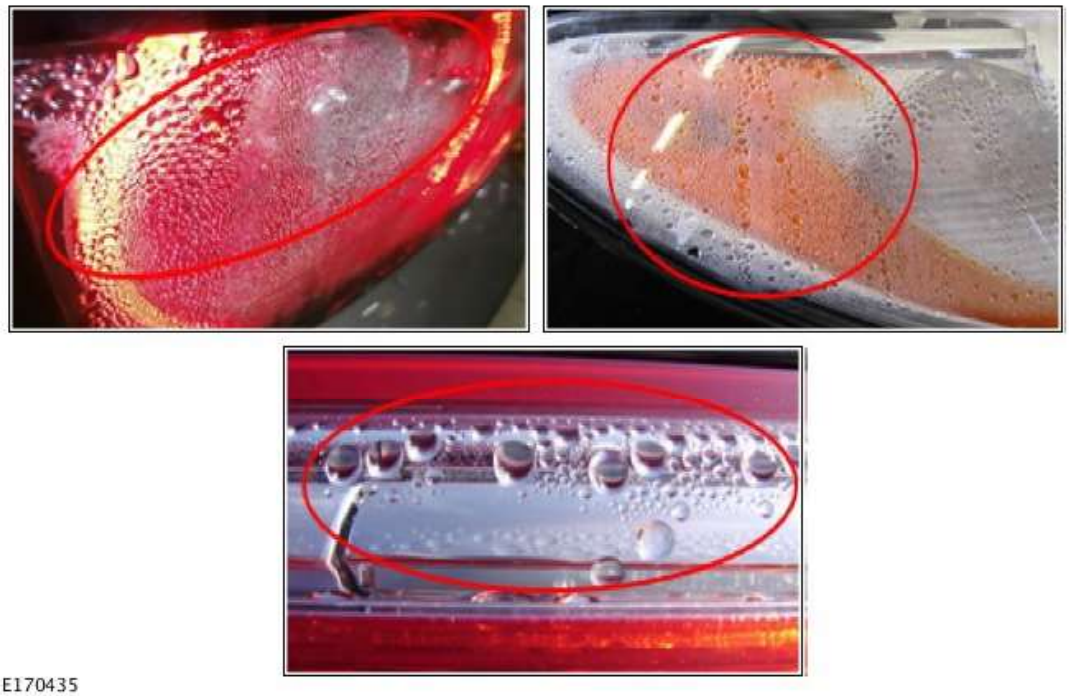
Shown below are examples of normal exterior lamp condensation. This would NOT be covered by warranty and the lamp(s) should not be replaced

In the photographs shown below, there are no visible streaks, drip marks or droplets in the condensation mist

In the photographs shown below, the condensation mist does not obstruct the view of the lamp interior

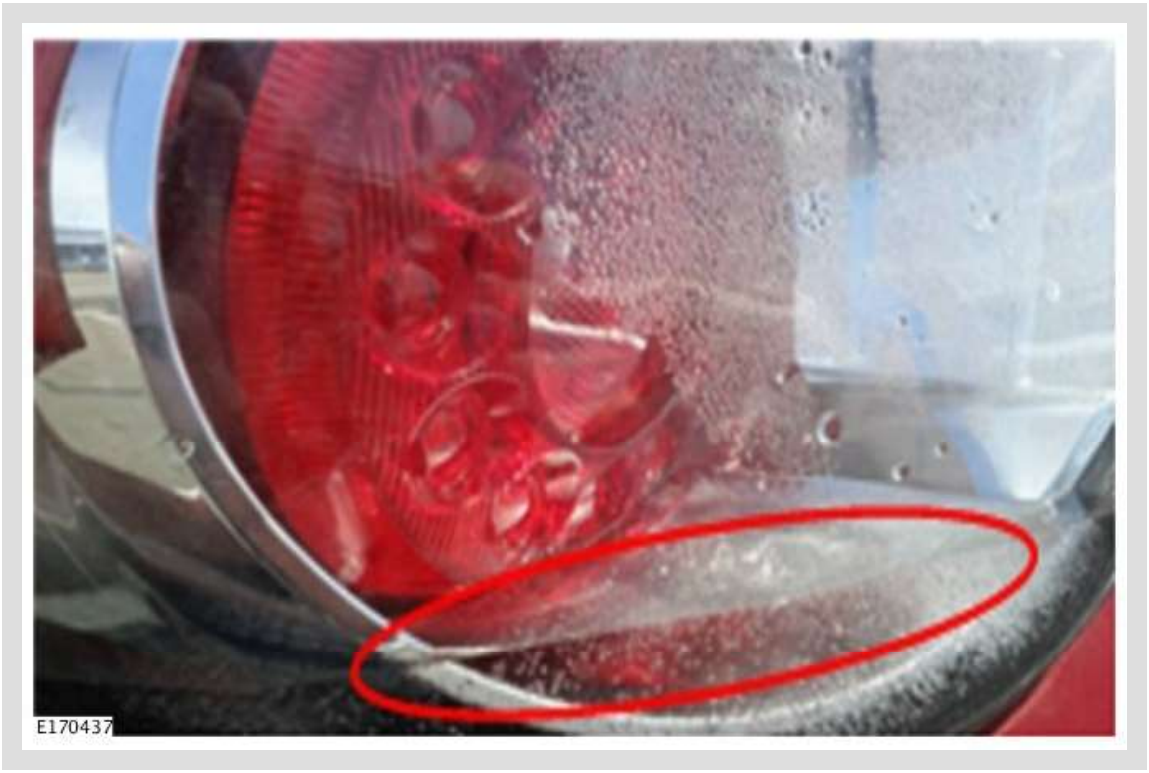
Shown below are examples of abnormal exterior lamp condensation that may be covered by warranty. Warranty may be accepted providing the lamp does not exhibit any visible signs of external damage

In the photographs shown below, note the large water droplets



In the photographs shown below, note the drip marks or streaks in the condensation

In the photograph shown below, note the standing water within the lamp



In the photograph shown below, note the thick mist covering the lens with water droplets

DTC INDEX

For a list of diagnostic trouble codes (DTCs) that could be logged on this vehicle, please refer to Section 100-00. REFER to:

Diagnostic Trouble Code Index - DTC: Body Control Module (BCM) (100-00 General Information, Description and Operation),
Diagnostic Trouble Code Index - DTC: Image Processing Module (IPMA) (100-00, Description and Operation).

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2017.0 DISCOVERY (LR), 417-01

EXTERIOR LIGHTING

HIGH BEAM HEADLAMP BULB (G2009676)

REMOVAL AND INSTALLATION

REMOVAL

NOTE:

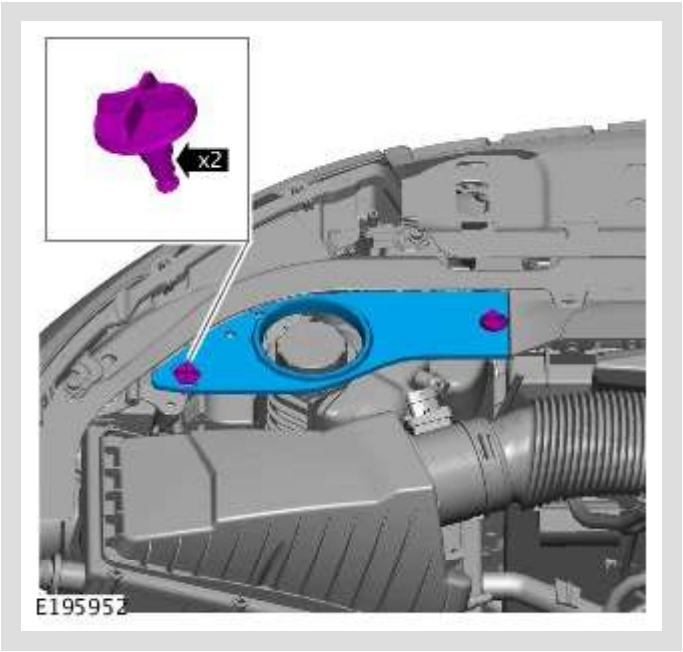
The ignition must be switched off.

1. Disconnect the battery ground cable.
   Refer to: Specifications (414-00 Battery and Charging System - General Information, Specifications).

2.

CAUTION:

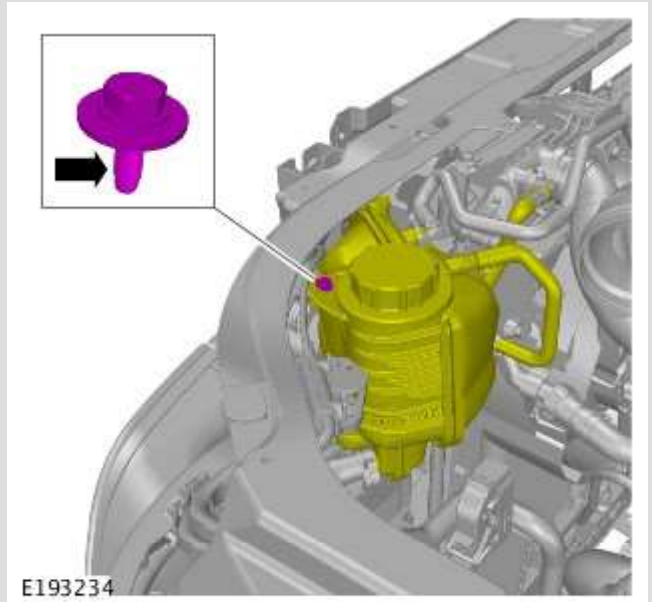
Use a suitable plastic trim tool to release the component.



Remove the trim panel.

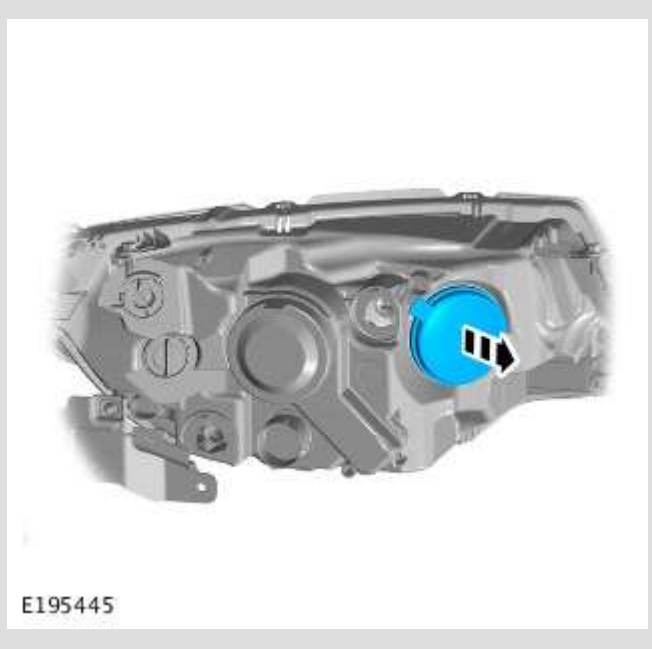
3. Remove the left air cleaner assembly.
Refer to: Left Air Cleaner (303-12 Intake Air Distribution and Filtering - TDV6 3.0L Diesel, Removal and Installation).
Refer to: Left Air Cleaner (303-12 Intake Air Distribution and Filtering - V6 S /C 3.0L Petrol, Removal and Installation).
Refer to: Air Cleaner (303-12 Intake Air Distribution and Filtering - INGENIUM I4 2.0L Diesel, Removal and Installation).

4.



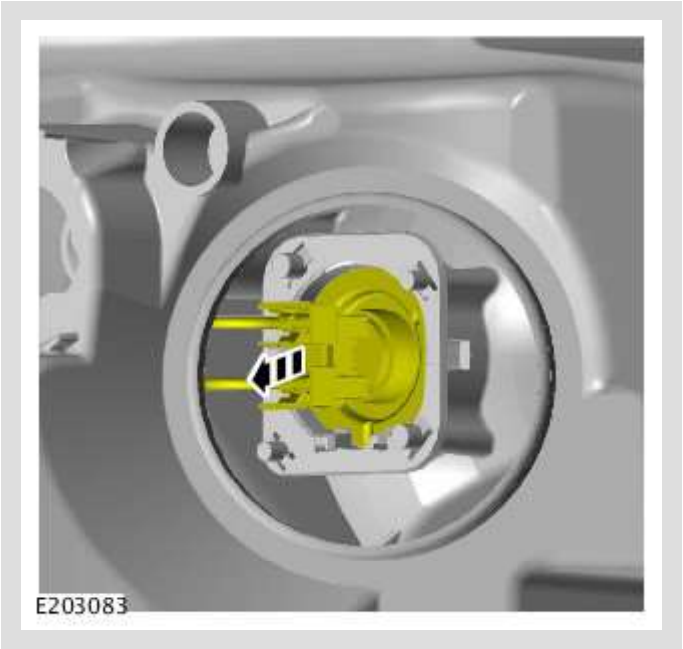
- Remove the screw. Release the expansion tank and position it aside.
  Torque: **7 Nm**

5.



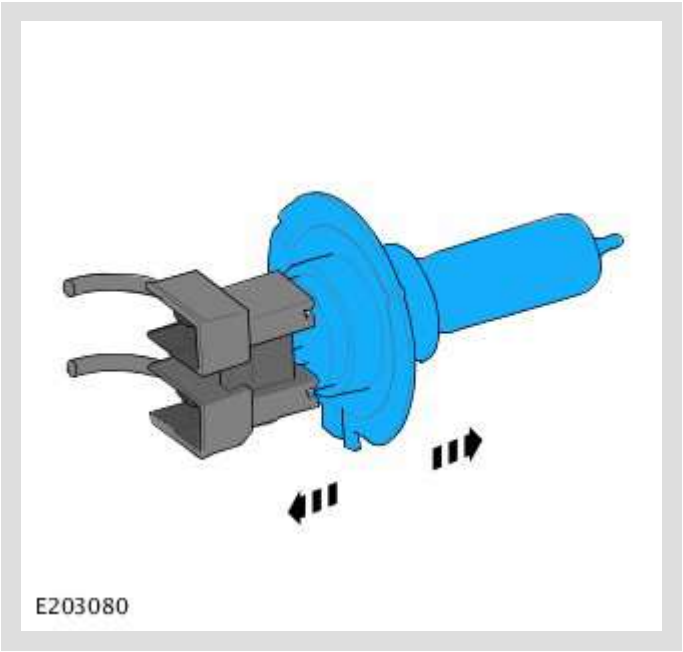
Remove the high beam bulb cap.

6.



Release the high beam bulb.

7.



Remove the high beam bulb.

INSTALLATION

1. To install, reverse the removal procedure.

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2017.0 DISCOVERY (LR), 417-01

EXTERIOR LIGHTING

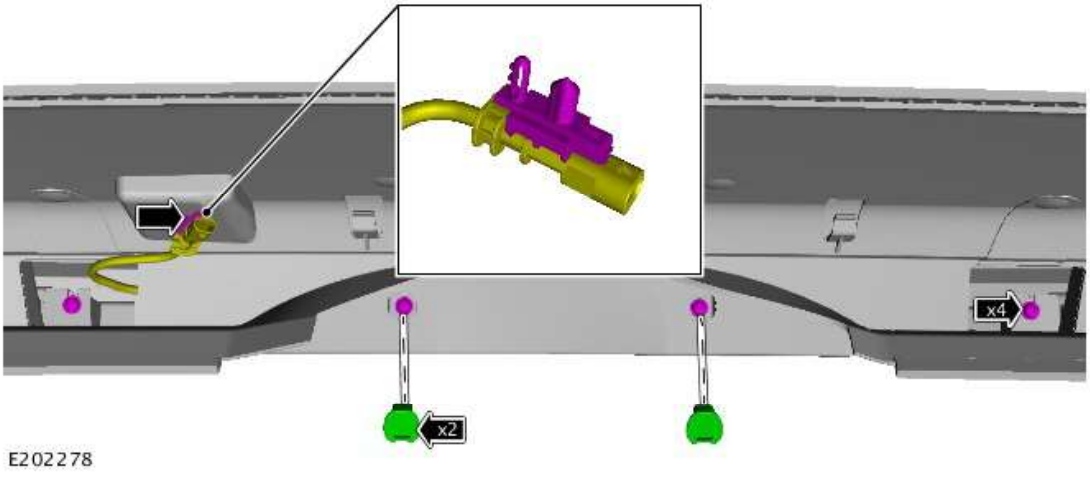
HIGH MOUNTED STOPLAMP (G2076910)

REMOVAL AND INSTALLATION

REMOVAL

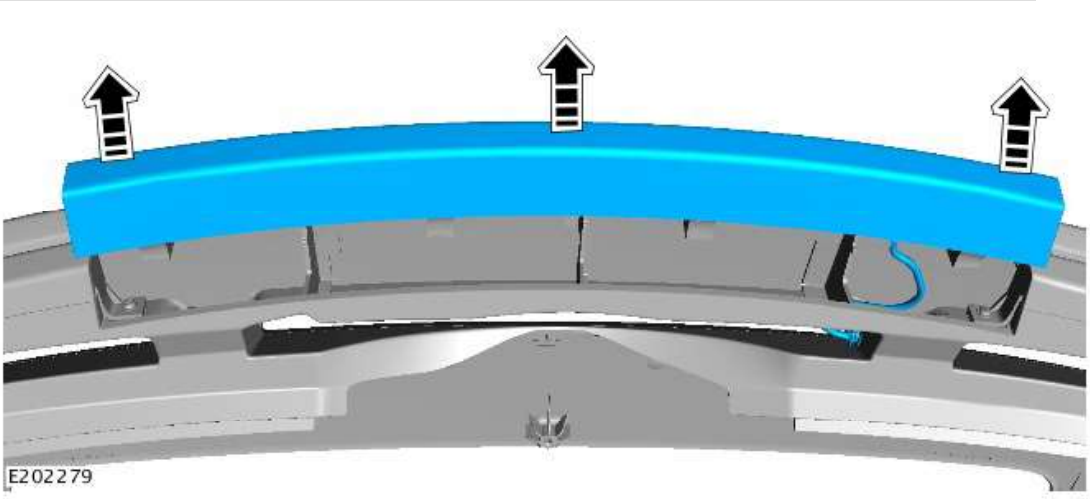
1. Remove the rear spoiler.
Refer to: Rear Spoiler (501-08, Removal and Installation).

2.



- Release the stop lamp electrical connector from the rear spoiler.
- Remove the two stop lamp screw covers.
- Remove the stop lamp retaining screws.

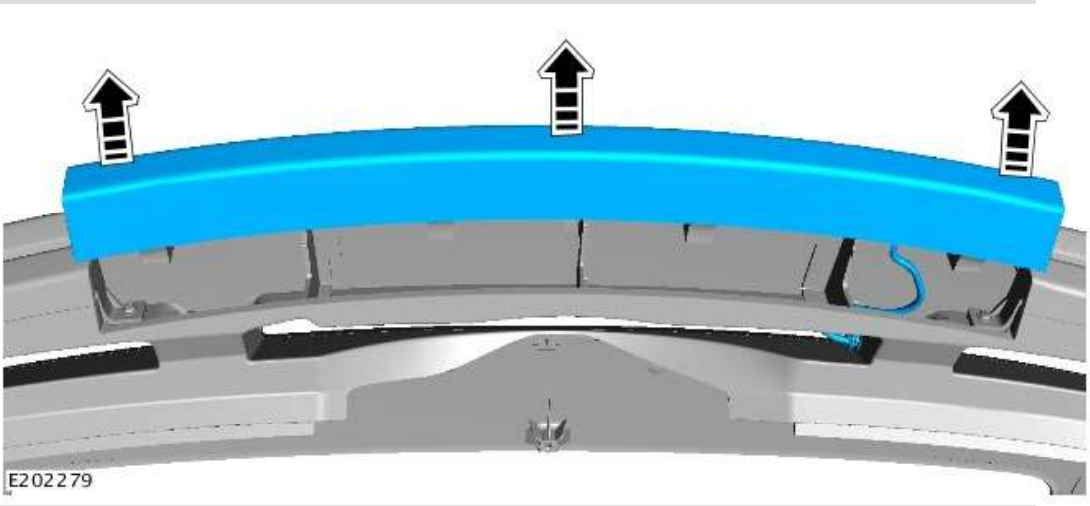
3.



Remove the stop lamp.

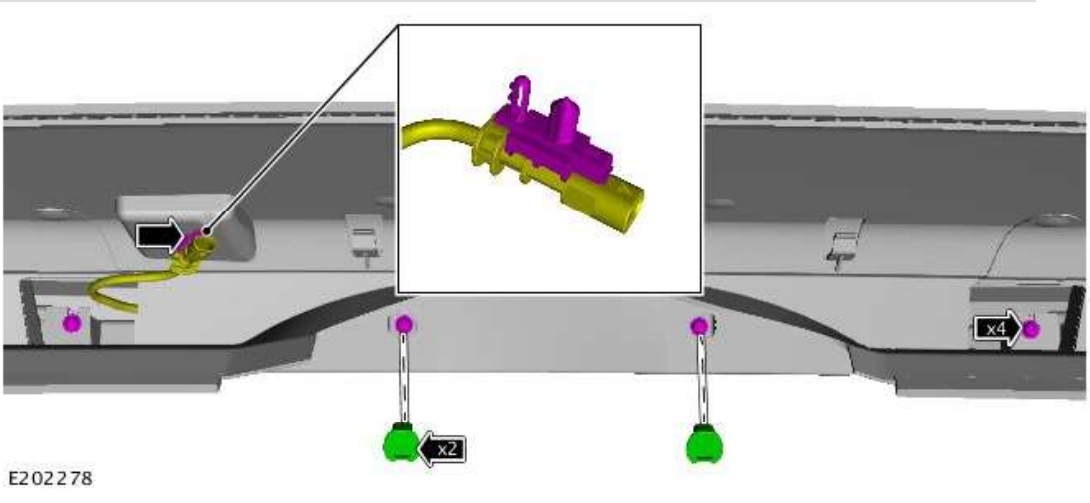
INSTALLATION

1.



Install the stop lamp.

2.



- Install the stop lamp retaining screws.
- Install the two stop lamp screw covers.
- Install the stop lamp electrical connector from the rear spoiler.

3. Install the rear spoiler.
Refer to: Rear Spoiler (501-08, Removal and Installation).

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INTERIOR LIGHTING

DIAGNOSIS AND TESTING

PRINCIPLE OF OPERATION

For a detailed description of the interior lighting system and operation, refer to the relevant description and operation section of the workshop manual.
REFER to: Interior Lighting (417-02 Interior Lighting, Description and Operation).

INSPECTION AND VERIFICATION

CAUTION:

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

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.

1. Verify the customer concern

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

Visual Inspection

MECHANICAL	ELECTRICAL

▪ Main interior lamp condition and installation ▪ Map reading lamp(s) condition and installation ▪ Vanity mirror lamp(s) condition and installation ▪ Glove compartment lamp condition and installation ▪ Footwell lamp(s) condition and installation ▪ Door mirror approach lamp(s) condition and installation ▪ Puddle lamp(s) condition and installation ▪ Luggage compartment lamp condition and installation ▪ Ambient lighting LEDs in rear door handles, door pockets, floor consoles (front and rear) condition and installation	▪ Bulbs ▪ Fuses ▪ Battery junction box ▪ Body control module ▪ Wiring harness ▪ Loose or corroded connector(s) ▪ Main interior lamp switch ▪ Map reading lamp switches ▪ Vanity mirror lamp switches ▪ Glove compartment lamp switch ▪ Ambient lighting LEDs in rear door handles, door pockets, floor consoles (front and rear) ▪ Tailgate lamp 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

1. 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 relevant DTC index

1. Check DDW for open campaigns. Refer to the corresponding bulletins and SSMs which may be valid for the specific customer complaint and carry out the recommendations as required

SYMPTOM CHART

SYMPTOM	POSSIBLE CAUSES	ACTION
Front/rear interior lamp inoperative	▪ Automatic mode switched off ▪ Fuse(s) blown ▪ Circuit fault ▪ Switch fault ▪ Lamp internal failure	▪ GO to Pinpoint Test **A.**
Ambient lighting LED inoperative	▪ LED failure ▪ Fuse(s) blown ▪ Circuit fault	▪ Check the LED condition ▪ Check the LED connector ▪ Check the fuse(s) ▪ Check the lamp circuits

Map reading lamp(s) inoperative	▪ Fuse(s) blown ▪ Circuit fault ▪ Switch fault ▪ Lamp internal failure	▪ Check the fuse(s) ▪ Check the lamp circuits ▪ Check the switch function ▪ Check the lamp
Vanity mirror lamp(s) inoperative	▪ Fuse(s) blown ▪ Circuit fault ▪ Switch fault ▪ Lamp internal failure	▪ Check the fuse(s) ▪ Check the lamp circuits ▪ Check the switch function ▪ Check the lamp
Glove compartment lamp inoperative	▪ Fuse(s) blown ▪ Circuit fault ▪ Switch fault ▪ Lamp internal failure	▪ Check the fuse(s) ▪ Check the lamp circuits ▪ Check the switch function ▪ Check the lamp
Footwell lamp inoperative	▪ Fuse(s) blown ▪ Circuit fault ▪ Lamp internal failure	▪ Check the fuse(s) ▪ Check the lamp circuits ▪ Check the lamp
Door mirror approach lamp(s) inoperative	▪ Fuse(s) blown ▪ Circuit fault ▪ Lamp internal failure	▪ Check the fuse(s) ▪ Check the lamp circuits ▪ Check the lamp
Puddle lamp(s) inoperative	▪ Bulb failure ▪ Fuse(s) blown ▪ Circuit fault	▪ Check the bulb condition ▪ Check the fuse(s) ▪ Check the lamp circuits
Luggage compartment lamp inoperative	▪ Fuse(s) blown ▪ Circuit fault ▪ Switch fault ▪ Lamp internal failure	▪ Check the fuse(s) ▪ Check the lamp circuits ▪ Check the switch function ▪ Check the lamp

PINPOINT TESTS

PINPOINT TEST A : INTERIOR LAMP FUNCTION TESTS

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: INTERIOR LAMP FUNCTION TEST 1	
	1 Lock the vehicle
	2 Unlock the vehicle using the smart key unlock switch
	3 Visually check the front and rear interior lamps
	Are any of the interior lamps illuminated? **Yes** Test passed. **GO to A2** . **No** Test failed. GO to Pinpoint Test **B.**
A2: INTERIOR LAMP FUNCTION TEST 2	
	1 Visually check the front and rear interior lamps
	Is the front interior lamp illuminated? **Yes** Test passed. **GO to A3** . **No** Test failed. GO to Pinpoint Test **E.**
A3: INTERIOR LAMP FUNCTION TEST 3	
	1 Visually check the front and rear interior lamps
	Is the rear left interior lamp illuminated? **Yes** Test passed. **GO to A4** . **No** Test failed. GO to Pinpoint Test **F.**
A4: INTERIOR LAMP FUNCTION TEST 4	
	1 Visually check the front and rear interior lamps
	Is the rear right interior lamp illuminated? **Yes** Test passed. **GO to A5** . **No** Test failed. GO to Pinpoint Test **G.**
A5: INTERIOR LAMP FUNCTION TEST 5	
The interior lamps should extinguish 20 seconds after the vehicle was unlocked if a door was not opened.	
	1 Wait for the interior lamps to extinguish
	2 Visually check the front and rear interior lamps
	Have the front and rear interior lamps extinguished? **Yes** Test passed. **GO to A6** . **No** Test failed. Check the instrument cluster for a message indicating that a door is open when it is closed
A6: INTERIOR LAMP FUNCTION TEST 6	

The vehicle will lock 30 seconds after it was unlocked if a door was not opened. If this has occurred, unlock the vehicle using the smart key unlock switch and wait until the interior lamps extinguish before continuing.

	1 Open a door
	2 Visually check the front and rear interior lamps
	Are the front and rear interior lamps illuminated? **Yes** Test passed. **GO to A7** . **No** Test failed. Check the instrument cluster for an absence of door open message when a door is open

A7: INTERIOR LAMP FUNCTION TEST 7

Steps 2 to 4 should be completed within 20 seconds.

	1 Enter the vehicle
	2 Close the door
	3 Start the engine
	4 Visually check the front and rear interior lamps
	Have the front and rear interior lamps extinguished? **Yes** Test passed. **GO to A8** . **No** Test failed. Using the manufacturer approved diagnostic system, check the body control module for related DTCs and refer to the relevant DTC index

A8: INTERIOR LAMP FUNCTION TEST 8

	1 Briefly touch the front interior lamp lens
	2 Visually check the front and rear interior lamps
	Are the front and rear interior lamps illuminated? **Yes** Test passed. **GO to A9** . **No** Test failed. GO to Pinpoint Test **D.**

A9: INTERIOR LAMP FUNCTION TEST 9

	1 Briefly touch the front interior lamp lens
	2 Visually check the front and rear interior lamps
	Have the front and rear interior lamps extinguished? **Yes** Test passed. **GO to A10** . **No** Test failed. GO to Pinpoint Test **D.**

A10: INTERIOR LAMP FUNCTION TEST 10

	1 Stop the engine
	2 Visually check the front and rear interior lamps

	Are the front and rear interior lamps illuminated? **Yes** Test passed. GO to A11 . **No** Test failed. Using the manufacturer approved diagnostic system, check the body control module for related DTCs and refer to the relevant DTC index
A11: INTERIOR LAMP FUNCTION TEST 11	
	1 Exit the vehicle
	2 Close the door
	3 Lock the vehicle
	4 Visually check the front and rear interior lamps
	Have the front and rear interior lamps extinguished? **Yes** Tests complete **No** Test failed. Using the manufacturer approved diagnostic system, check the body control module for related DTCs and refer to the relevant DTC index

PINPOINT TEST B : AUTO MODE FUNCTION TESTS	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
B1: AUTO MODE FUNCTION TEST 1	
Interior lamps auto mode off is also known as Hunting mode.	
	1 Set the ignition to on
	2 Touch the front interior lamp lens for 5 seconds (or until the interior lamp flashes)
	3 Check the touch screen for a message
	Was "Auto function on" displayed on the touch screen? **Yes** Test passed. GO to B2 . **No** Test failed. GO to B3 .
B2: AUTO MODE FUNCTION TEST 2	
	1 Open a door
	2 Close the door
	3 Visually check the front and rear interior lamps
	Are the front and rear interior lamps illuminated? **Yes** Tests complete **No** Test failed. GO to Pinpoint Test C.
B3: AUTO MODE FUNCTION TEST 3	
	1 Touch the front interior lamp lens for 5 seconds (or until the interior lamp flashes)

	2 Check the touch screen for a message
	Was "Auto function on" displayed on the touch screen? **Yes** Auto mode now set to on. GO to Pinpoint Test **C.** **No** Test failed. GO to Pinpoint Test **D.**

PINPOINT TEST C : BATTERY AND CHARGING SYSTEM TESTS	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
C1: BATTERY AND CHARGING SYSTEM TEST 1	
Interior lamp operation is inhibited if the battery state of charge is below threshold	
	1 Refer to the relevant section of the workshop manual and test the battery and charging system
	Are the battery and charging system operating within specification? **Yes** Test passed. GO to Pinpoint Test **E.** **No** Refer to the relevant section of the workshop manual and repair the battery and charging system as necessary

PINPOINT TEST D : INTERIOR LAMP SIGNAL TESTS	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
D1: INTERIOR LAMP SIGNAL TEST 1	
	1 Using the manufacturer approved diagnostic system, check datalogger signal - Master Interior Light Switch (0xD902)
	2 Briefly touch the front interior lamp lens and check for a change in the signal
	Did the signal change? **Yes** Tests inconclusive. GO to Pinpoint Test **A.** **No** Test failed. **GO to D2** .
D2: INTERIOR LAMP SIGNAL TEST 2	
In step 1, do not disconnect the electrical connector(s). The lamp is removed for access only.	
	1 Refer to the relevant section of the workshop manual and remove the front interior lamp
	2 Set a multimeter to measure voltage
	3 Connect the multimeter to terminals 19 (YE-GY) and 10 (BK)
	Does the multimeter display battery voltage? **Yes** Test passed. **GO to D3** . **No** Test failed. **GO to D4** .

D3: INTERIOR LAMP SIGNAL TEST 3	
	1 Connect the multimeter to terminals 19 (YE-GY) and 10 (BK)
	2 Briefly touch the front interior lamp lens and check for a change in the voltage
	Did the multimeter measure 0V? **Yes** Tests inconclusive. GO to Pinpoint Test **A.** **No** Install a new front interior lamp
D4: INTERIOR LAMP SIGNAL TEST 4	
	1 Connect the multimeter to terminal 10 (BK) and earth
	Did the multimeter measure 0V? **Yes** Refer to the electrical circuit diagrams and check the front interior lamp switch signal circuit for open circuit, high resistance **No** Refer to the electrical circuit diagrams and check the front interior lamp earth circuit for open circuit, high resistance

PINPOINT TEST E : FRONT INTERIOR LAMP TESTS	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
E1: FRONT INTERIOR LAMP TEST 1	
In step 1, do not disconnect the electrical connector(s). The lamp is removed for access only.	
	1 Refer to the relevant section of the workshop manual and remove the front interior lamp
	2 Open a door
	3 Set a multimeter to measure voltage
	4 Connect the multimeter to front interior lamp terminals 18 (GY-VT) and 10 (BK)
	Does the multimeter display battery voltage? **Yes** Install a new front interior lamp. To continue with interior lamp function test GO to Pinpoint Test **A.** **No** Test failed. **GO to E2** .
E2: FRONT INTERIOR LAMP TEST 2	
	1 Open a door
	2 Connect the multimeter to front interior lamp terminal 10 (BK) and earth
	Did the multimeter measure 0V? **Yes** Refer to the electrical circuit diagrams and check the front interior lamp supply circuit for open circuit, high resistance **No** Refer to the electrical circuit diagrams and check the front interior lamp earth circuit for open circuit, high resistance

PINPOINT TEST F : REAR LEFT INTERIOR LAMP TESTS	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
F1: REAR LEFT INTERIOR LAMP TEST 1	
In step 1, do not disconnect the electrical connector(s). The lamp is removed for access only.	
	1 Refer to the relevant section of the workshop manual and remove the rear left interior lamp
	2 Open a door
	3 Set a multimeter to measure voltage
	4 Connect the multimeter to rear left interior lamp terminals 2 (GY-VT) and 3 (BK)
	Does the multimeter display battery voltage? **Yes** Install a new rear left interior lamp. To continue with interior lamp function test GO to Pinpoint Test **A.** **No** Test failed. **GO to F2** .
F2: REAR LEFT INTERIOR LAMP TEST 2	
	1 Open a door
	2 Connect the multimeter to rear left interior lamp terminal 3 (BK) and earth
	Did the multimeter measure 0V? **Yes** Refer to the electrical circuit diagrams and check the rear left interior lamp supply circuit for open circuit, high resistance **No** Refer to the electrical circuit diagrams and check the rear left interior lamp earth circuit for open circuit, high resistance

PINPOINT TEST G : REAR RIGHT INTERIOR LAMP TESTS	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
G1: REAR RIGHT INTERIOR LAMP TEST 1	
In step 1, do not disconnect the electrical connector(s). The lamp is removed for access only.	
	1 Refer to the relevant section of the workshop manual and remove the rear right interior lamp
	2 Open a door
	3 Set a multimeter to measure voltage
	4 Connect the multimeter to rear right interior lamp terminals 2 (GY-VT) and 3 (BK)
	Does the multimeter display battery voltage? **Yes** Install a new rear right interior lamp. To continue with interior lamp function test GO to Pinpoint Test **A.** **No** Test failed. **GO to G2** .

G2: REAR RIGHT INTERIOR LAMP TEST 2	
	1 Open a door
	2 Connect the multimeter to rear right interior lamp terminal 3 (BK) and earth
	Did the multimeter measure 0V? **Yes** Refer to the electrical circuit diagrams and check the rear right interior lamp supply circuit for open circuit, high resistance **No** Refer to the electrical circuit diagrams and check the rear right interior lamp earth circuit for open circuit, high resistance

DTC INDEX

For a list of diagnostic trouble codes (DTCs) that could be logged on this vehicle, please refer to Section 100-00. REFER to:

Diagnostic Trouble Code (DTC) Index - DTC: Body Control Module (BCM) (100-00, Description and Operation),
Diagnostic Trouble Code (DTC) Index - DTC: Driver/Passenger Door Module (DDM /PDM) (100-00 General Information, Description and Operation).