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EXTERIOR LIGHTING

HEADLAMPS (G2401017)

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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



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 when 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.



NOTES:

- If a control module or a component may be at fault and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual, or determine if any prior approval program 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

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

Visual Inspection

MECHANICAL	ELECTRICAL
■ Headlamp leveling motor(s) and linkage(s) condition and installation ■ Lighting control switch and installation	■ Fuses ■ Wiring harness

MECHANICAL	ELECTRICAL
Steering column multifunction switch and installation	- Loose or corroded connector(s) - Battery junction box - Headlamp power modules - Headlamp control module - ABS control module - Integrated suspension control module - LIN circuits - CAN circuits

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

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

5. Check JLR claims submission system for open campaigns. Refer to the corresponding bulletins and SSMs which may be valid for the specific customer complaint and complete the recommendations as required

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	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

SYMPTOM	POSSIBLE CAUSES	ACTION
	- Image processing module - Steering column multifunction switch - Rain/light sensor - Headlamp circuit short circuit to power	- 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 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 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
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	Adaptive front lighting system fault	

SYMPTOM	POSSIBLE CAUSES	ACTION
alignment incorrect	■ 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	
A1: CHECK IF CORRECT HEADLAMPS ARE INSTALLED	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	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	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	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	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	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 Exterior Lighting, Description and Operation).
A4: TEST LASER SUPPLEMENTARY HIGH BEAM FOR CORRECT OPERATION	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	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 Exterior Lighting, Description and Operation).

PINPOINT TEST B : LASER SUPPLEMENTARY HIGH BEAM TESTS	
B1: CHECK FOR LIGHTING SYSTEM RELATED DTCS	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	1 Using the Jaguar Land Rover approved diagnostic equipment, check for lighting system DTCs
	Are there any lighting system DTCs set? 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 Exterior Lighting, Description and Operation).
B2: CHECK FOR LIGHTING SYSTEM RELATED DTCS	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	1 Using the Jaguar Land Rover approved diagnostic equipment, check for lighting system DTCs

B2: CHECK FOR LIGHTING SYSTEM RELATED DTCS	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	Are DTCs U0046/U2301 (Chassis CAN communication issue) set? Yes GO toB3. No GO toB6.
B3: WIRING CHECK	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	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 toB4. No GO toB5.
B4: COMPLETE WIRING REPAIRS	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	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 Exterior Lighting, Description and Operation).
B5: CLEAR THE DTCS	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	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 Exterior Lighting, Description and Operation).
B6: CHECK FOR LIGHTING SYSTEM DTCS	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	1 Using the Jaguar Land Rover approved diagnostic equipment, check for lighting system DTCs
	Is DTC U3000 set? Yes GO toB7. No GO toB8.

B7: CLEAR THE DTCS	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	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 Exterior Lighting, Description and Operation).
B8: CHECK FOR BODY CONTROL MODULE/GATEWAY MODULE DTCS	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	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 Exterior Lighting, Description and Operation).

FRONT AND REAR LAMP CONDENSATION

Some customers may complain of condensation/misting/fogging inside the exterior lamps. Condensation/misting/fogging is a natural phenomenon which can occur under wet and/or humid atmospheric conditions. It is triggered by temperature differences between the inside and outside of the lamp unit. Exterior lights have vents and are not completely closed to the environment, therefore replacing the light unit will not correct this symptom. With the introduction of clear plastic lenses, condensation is likely to be more noticeable but does not affect the performance of the lamp. Condensation will clear with regular use of the lights under warmer and drier atmospheric conditions

A lamp that exhibits condensation should be evaluated under warm (20°C ± 5°C) and dry conditions (50% RH ± 5% RH) with all functions operating for a minimum of 60 minutes for LED lamps or 30 minutes for all other lamps. If the condensation **improves** (i.e.: it starts to clear, but has not necessarily completely cleared) during this time, it indicates that the lamp is functioning as normal . This means the lamp integrity has NOT been breached and **the lamp must NOT be replaced**

CAUTION:

Where appropriate, make sure that bulb covers are correctly installed and make sure that all breathers (tubes or weathershield patches) are free from dirt/debris and installed correctly (contamination or poor fitting can all contribute 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 and to make sure that the bulb covers /breathers are installed correctly



NOTES:

- The owner's handbook clearly states that condensation may form on the inside of lamp lenses and is caused by atmospheric conditions. It explains that it is not detrimental to lamp performance and will clear during normal usage
- Pools of water and high levels of condensation would indicate that the lamps' sealing has been compromised. Check for damage and inspect the condition of caps and breathers
- Differing layout on the opposing sides of the vehicle can lead to different levels of condensation inside the lamps from side to side. As a result of this, the rate at which condensation clears may also differ from side to side
- Photographic evidence of the condensation levels prior to and after drying time should be provided with every returned part. Failure to do so may result in the claim being rejected
- This information bulletin contains examples of normal condensation generated from atmospheric conditions. A thin mist can form on the interior of clear plastic lenses, this is not detrimental to the lamp's performance. This thin mist will eventually clear through normal use, exiting through the lamp's venting system

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

LED lamps project less heat towards the clear lens and therefore condensation can occur and can take longer to clear than in other types of lamps

The following process describes the formation and clearance of condensation:

1. Air and moisture enter the device through the ventilation when the vehicle is OFF
2. The temperature of the lens surface falls below the dew point, due to driving/rain/washing or daily temperature variations
3. Condensation is formed on the cold lens surface
4. The temperature of the cold surface rises again due to sunshine and/or lamp operation and the moisture inside the lamp is removed through the ventilation, the condensation will clear
5. Time to clear depends on the lamp design, environmental conditions and the amount of condensation formed

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



E170433



In the photograph shown below, note the standing water within the lamp, this is not acceptable and clearly shows a water ingress related fault with the lamp



E170437

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

[Diagnostic Trouble Code Index - DTC: Body Control Module \(BCM\)](#) (Description and Operation),
[Diagnostic Trouble Code Index - DTC: Image Processing Module \(IPMA\)](#) (Description and Operation).

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