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).

SAFETY INFORMATION

WARNING:

The Xenon headlamp system generates up to 28,000 volts. Make sure that the headlamps are switched off before working on the system. Failure to follow this instruction may result in personal injury

The following safety precautions must be followed when working on the xenon headlamp system:

1. DO NOT attempt any procedures on the xenon headlamps when the lights are switched on
2. Handling of the Xenon bulb must be performed using suitable protective equipment, e.g. gloves and goggles. The glass part of the bulb must not be touched

3. Xenon bulbs must be disposed of as hazardous waste

4. Only operate the lamp in a mounted condition in the reflector

There are comprehensive instructions on the correct procedures for Xenon headlamp system repairs in the workshop manual, refer to section 100-00 - General Information, Standard Workshop Procedures

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:

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

1. Verify the customer concern

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

Visual Inspection

MECHANICAL	ELECTRICAL
▪ Headlamp(s) condition and installation ▪ Bulb(s) and installation ▪ Bulb holder(s) and installation ▪ Lighting control switch and installation	▪ Fuses ▪ Relays ▪ Wiring harness ▪ Loose or corroded connector(s) ▪ Battery junction box

	▪ Body control module ▪ Headlamp power modules ▪ Instrument cluster ▪ Steering angle sensor module ▪ Transmission control module ▪ Engine control module ▪ Anti-lock brake system 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 DTCs and refer to the relevant DTC index

SYMPTOM CHART

SYMPTOM	POSSIBLE CAUSES	ACTION
Low beam lamp(s) inoperative High beam lamp(s) inoperative	▪ Bulb failure ▪ Fuse(s) blown ▪ Circuit fault ▪ Lighting control switch fault	Check the bulb and fuse condition. Check the headlamp circuits. Check the lighting control switch function. Refer to the electrical guides. Check for DTCs indicating a headlamp or related circuit fault
Low beam lamp(s) dim High beam	▪ Incorrect bulb rating ▪ Tourist	Check the bulb condition and rating. Check the tourist lever is set correctly. Check the headlamp circuits. Check the lighting control switch function. Refer to the electrical guides

lamp(s) dim	lever set in the wrong position ▪ Circuit fault ▪ Lighting control switch fault	
Low beam lamp(s) stuck on High beam lamp(s) stuck on	▪ Circuit fault ▪ Lighting control switch fault ▪ Headlamp timer function fault	Check the headlamp circuits. Check the lighting control switch function. Check the headlamp timer function. Refer to the electrical guides. Check for DTCs indicating a headlamp circuit fault
Headlamp low/high beam switching function inoperative	▪ Circuit fault ▪ Lighting control switch fault ▪ Xenon headlamp shutter mechanism fault	Check the headlamp circuits. Check the lighting control switch function. Check the xenon headlamp shutter mechanism operation. Refer to the electrical guides. Check for DTCs indicating a headlamp circuit fault
Warning indicator(s) inoperative	▪ Fuse(s) blown ▪ Lighting control switch fault ▪ Circuit fault ▪ Instrument cluster fault	Check the fuse(s). Check the lighting control switch function. Check the warning indicator circuits. Refer to the electrical guides. Check for DTCs indicating an instrument cluster or CAN system fault

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 bulb covers are correctly installed and 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 and to make sure that the bulb covers are installed correctly

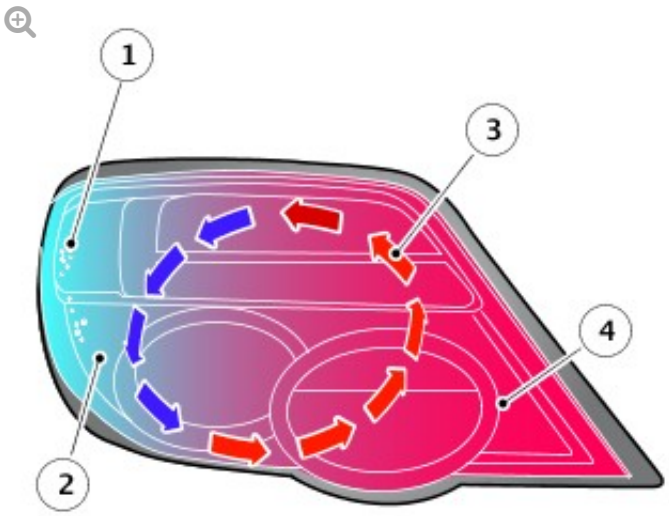
NOTES:

- The Owner's handbook clearly states that condensation may form on the inside of lamp lenses and is caused by atmospheric conditions. 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

The following illustration demonstrates the process:



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1. Moisture formation

2. Cool surfaces

3. Air circulation (convection)

4. Warm surfaces

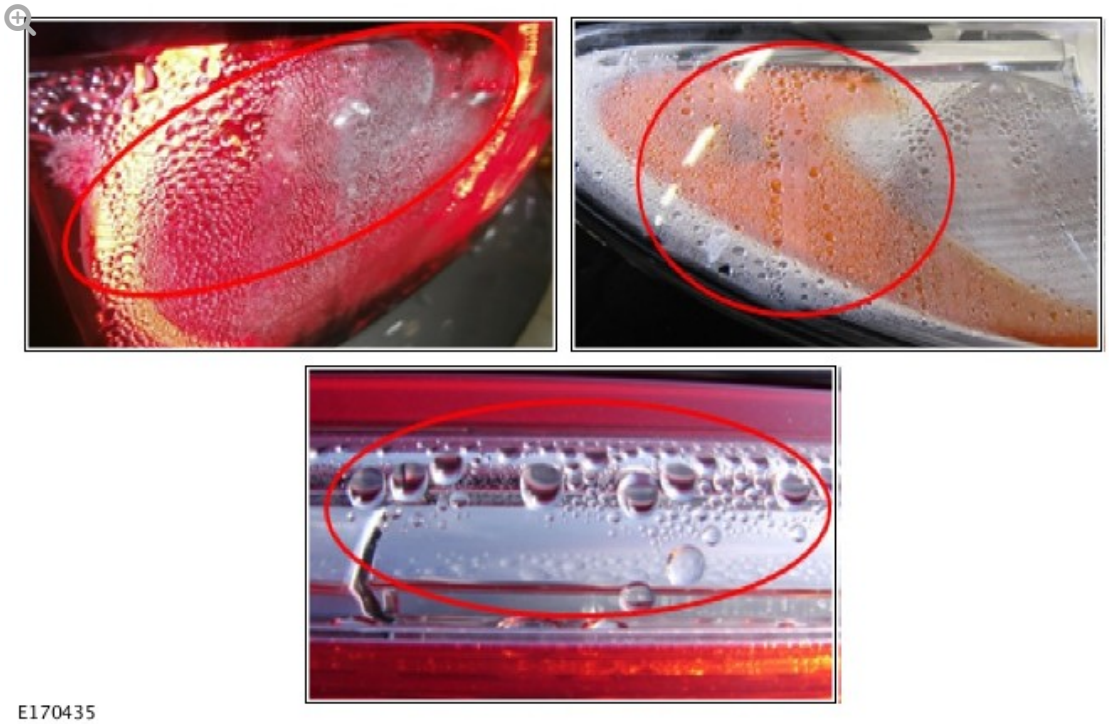
Shown below are examples of normal exterior lamp condensation. This would NOT be covered by warranty and the lamp(s) should not be replaced

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



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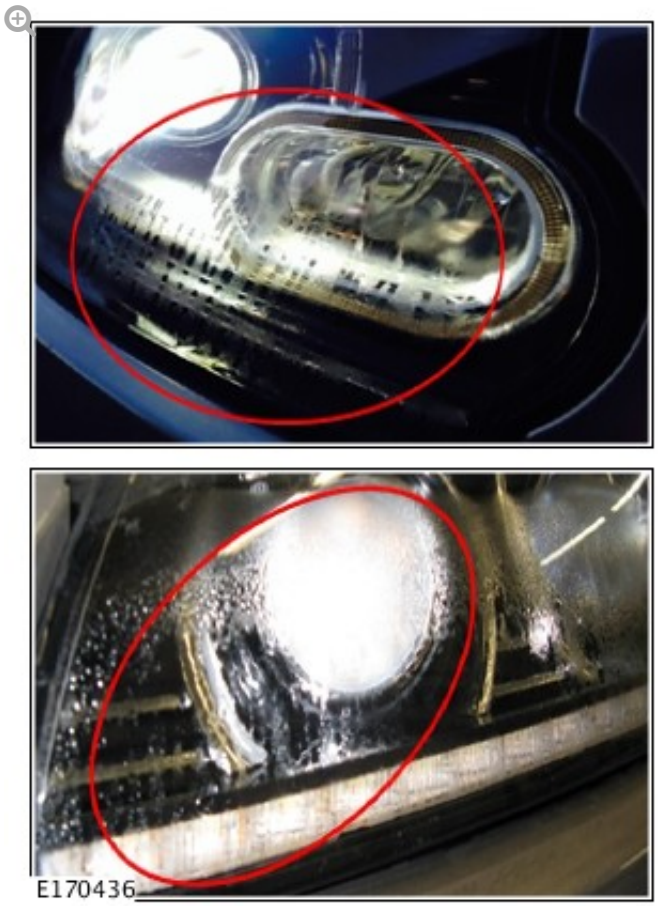
In the photographs shown below, note the drip marks or streaks in the condensation



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: (100-00 General Information)

Diagnostic Trouble Code Index - DTC: Body Control Module (BCM) (Description and Operation),
Diagnostic Trouble Code Index - DTC: Image Processing Control Module (IPCM) (Description and Operation).