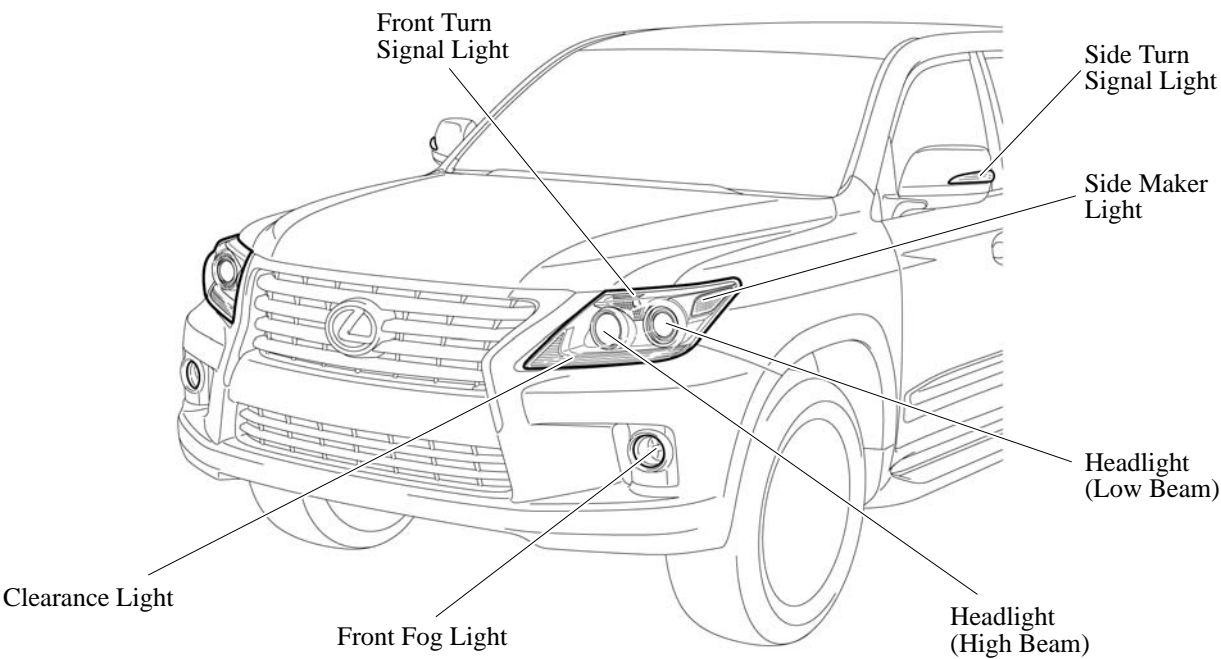


LIGHTING

FRONT LIGHT

The front exterior lights whose design has been changed are as follows:



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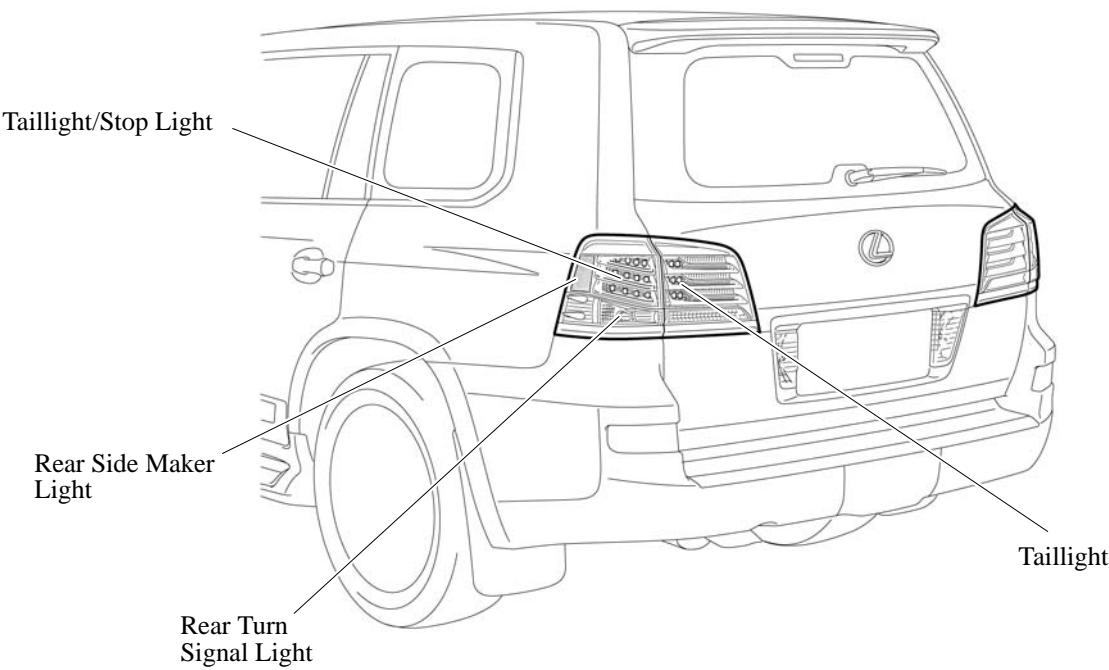
Specification

Light		Type	Wattage
Headlight	High Beam	Halogen Bulb	60 W
	Low Beam	Discharge Bulb	35 W
	Clearance Light	LED*1	1.2 W/11 W*2
	Front Turn Signal Light	Bulb	28 W
	Front Side Maker Light	LED*1	0.2 W
Front Fog Light		Bulb	55 W
Side Turn Signal Light		LED*1	1.1 W

\*1: Light Emitting Diode  
\*2: Operates daytime running light system

■ REAR LIGHT

The rear exterior lights whose design has been changed are as follows:



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► Specification ◀

Light		Type	Wattage
Rear Combination Light	Taillight/Stop Light	LED*	0.3 W/5.9 W
	Rear Turn Signal Light	Bulb	21 W
	Rear Side Marker Light	LED*	2.6 W
Taillight		LED*	0.6 W

\*: Light Emitting Diode

## ■ AUTOMATIC HIGH BEAM SYSTEM

### 1. Description

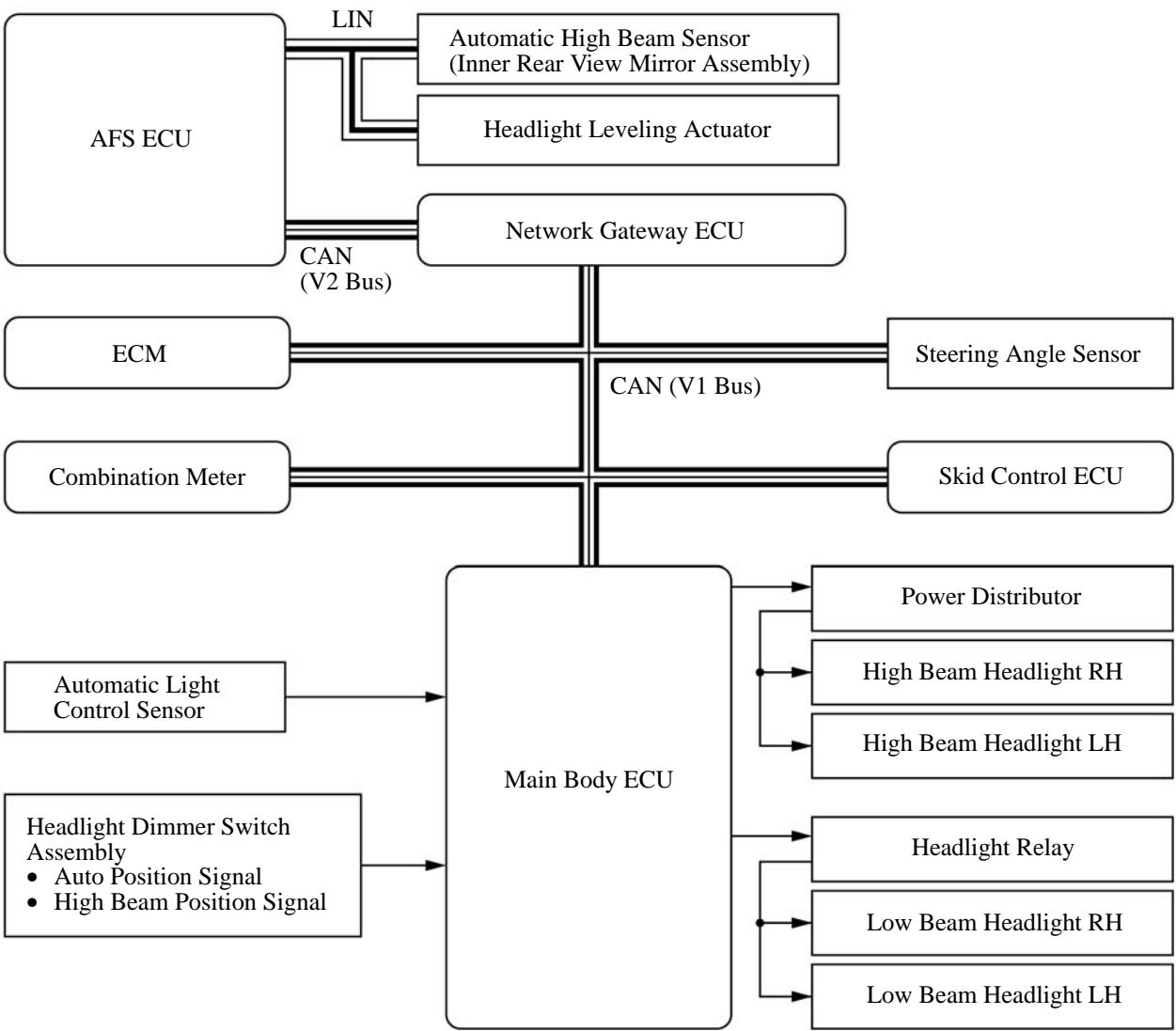
- An automatic high beam system is optional equipment.
- The automatic high beam system detects lights in front of the vehicle and automatically changes between high beams and low beams to support the driver during night driving.

### 2. Precaution for Automatic High Beam System

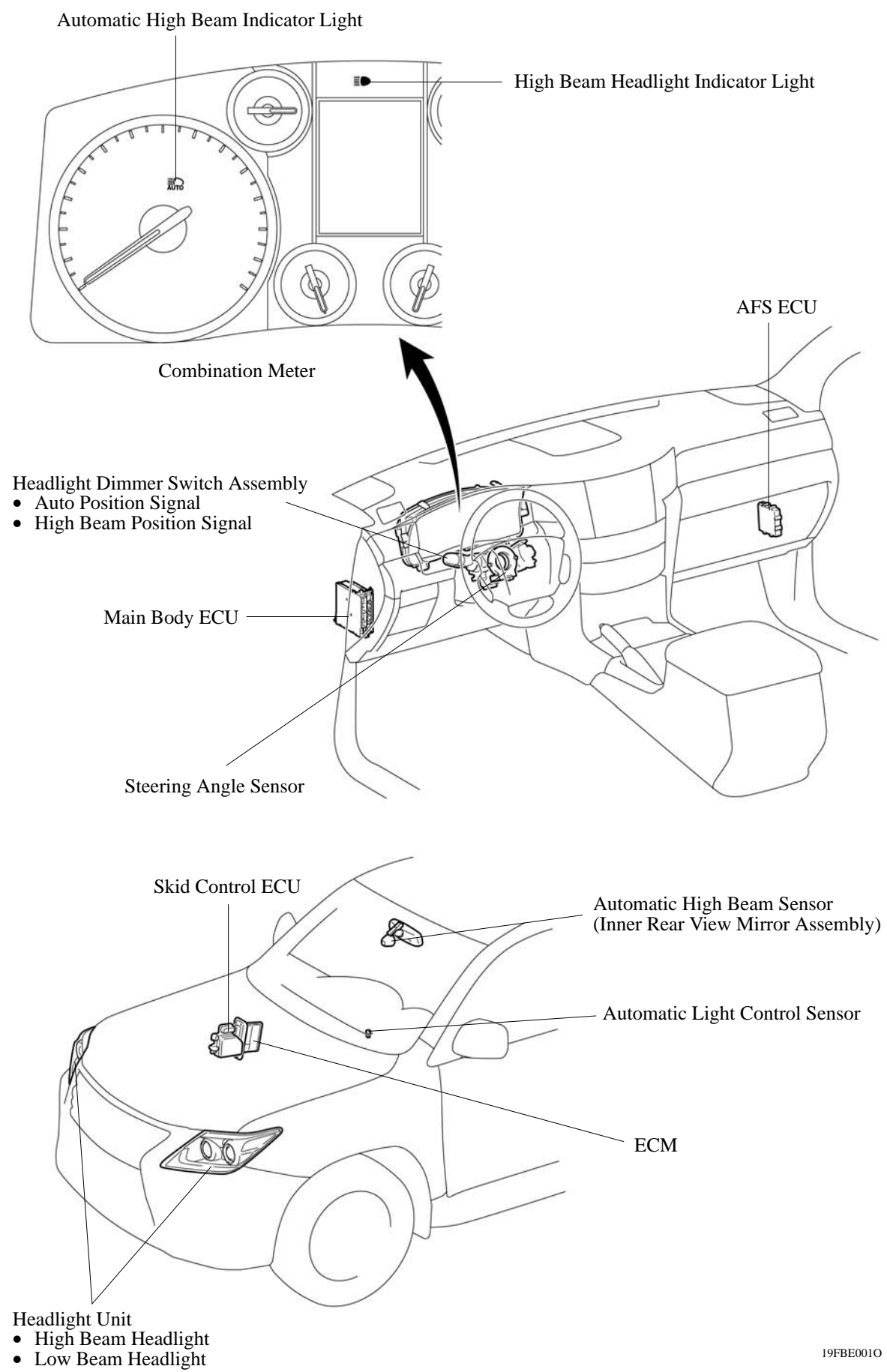
- The automatic high beam system is a system that helps ensure visibility by automatically switching the high beams on and off.
- However, due to control limitations of the automatic high beam system, it may be necessary to manually switch high beams on and off. When driving, for safety reasons, make sure to switch the high beams and low beams manually in accordance with the driving conditions.
- Under the following conditions, the automatic high beam system might not detect other vehicles or lights correctly, or the high beams might cause glare or flash pedestrians or the occupants of other vehicles. Manual operation should be considered.

Factor	Condition
Weather/Climate	When driving in bad weather (rain, snow, fog, sandstorms, etc.).
Windshield Glass	<ul style="list-style-type: none"> <li>• When the windshield glass is not clear (ice, snow or frost on the glass).</li> <li>• When the windshield glass is dirty (sand, mud, water stains or bugs on the glass).</li> <li>• When the windshield glass is cracked.</li> <li>• When the windshield glass is fogged-up.</li> <li>• When the windshield glass has a film attached.</li> <li>• When an object on the instrument panel reflects off of the windshield glass.</li> <li>• When any other abnormal conditions exist with the windshield glass.</li> </ul>
Automatic High Beam Sensor (Inner Rear View Mirror Assembly)	<ul style="list-style-type: none"> <li>• When a parking tag, magnifying lens or other accessory is mounted on the inner rear view mirror assembly.</li> <li>• When the inner rear view mirror assembly or its built-in camera is deformed.</li> <li>• When the automatic high beam sensor in the inner rear view mirror assembly is dirty.</li> <li>• When any other abnormal conditions exist with the inner rear view mirror assembly or its built-in automatic high beam sensor.</li> </ul>
Nearby Vehicles or Lights	<ul style="list-style-type: none"> <li>• When lights similar to headlights or taillights are in the vicinity of the vehicle.</li> <li>• When a nearby vehicle has no lights or its lights are off.</li> <li>• When a vehicle in front has misaligned lights, or its lights are changing color.</li> <li>• When a vehicle in front has extremely dirty headlights or taillights.</li> </ul>
Road Conditions	<ul style="list-style-type: none"> <li>• When driving in an area where the conditions often change between bright and dark.</li> <li>• When driving on a road with many uphill and downhill slopes.</li> <li>• When driving on a winding road or around a sharp curve.</li> <li>• When driving on a bumpy road (cobblestone pavement, gravel road, rough unpaved road, etc.).</li> <li>• When highly reflective objects are in front of the vehicle (mirrors, road signs, etc.).</li> </ul>
Vehicle Conditions	<ul style="list-style-type: none"> <li>• When the headlights are damaged, deformed or dirty.</li> <li>• When the vehicle posture is abnormal due to flat tire (or posture has changed due to the vehicle being fully loaded, a trailer being towed, road conditions etc.).</li> <li>• When the vehicle has other malfunctions or if the vehicle has been modified.</li> </ul>
Automatic High Beam System	<p>Malfunction:</p> <ul style="list-style-type: none"> <li>• When the automatic high beam indicator light on the combination meter is blinking.</li> </ul> <p>Others:</p> <ul style="list-style-type: none"> <li>• When the automatic high beam system does not seem to be changing between the high beams and low beams properly.</li> <li>• When the automatic high beam system is frequently changing between the high beams and low beams.</li> <li>• When the glare from the high beams would disturb pedestrians or the drivers of other vehicles.</li> </ul>

3. System Diagram



#### 4. Layout of Main Components



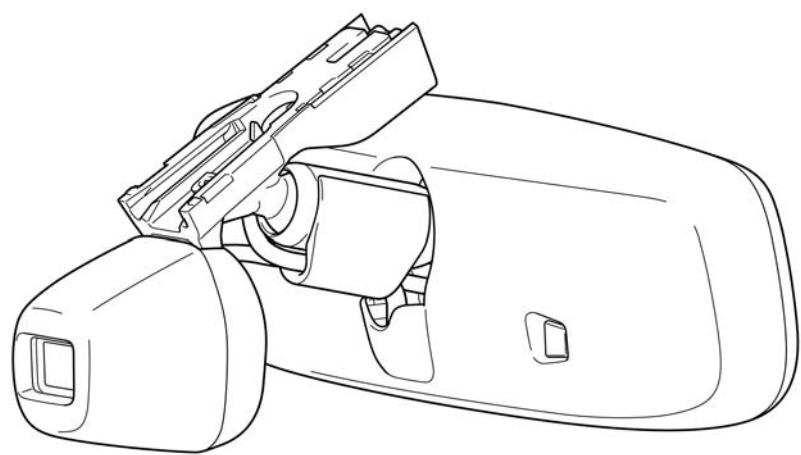
5. Function of Main Components

Component		Function
Automatic High Beam Sensor (Inner Rear View Mirror Assembly)		The automatic high beam sensor determines when to turn the high beams on and off after identifying the lights of oncoming vehicles, preceding vehicles and other lights from the picture information of its camera sensor. Then, it sends high beam request signals to the AFS ECU via Local Interconnect Network (LIN).
AFS ECU		The AFS ECU acts as the gateway between LIN and Controller Area Network (CAN).
Main Body ECU		<ul style="list-style-type: none"><li>• The main body ECU receives the signals from the headlight dimmer switch assembly and the automatic light control sensor.</li><li>• The main body ECU transmits the signals to the combination meter and the front controller.</li></ul>
Skid Control ECU		The skid control ECU outputs information about the speed of the front right wheel. This information is used by the automatic high beam sensor to control switching between the high and low beams of the automatic high beam system.
ECM		The ECM outputs a signal to indicate that the shift lever is in R. Based on this signal, the automatic high beam sensor determines the direction of vehicle movement.
Headlight Dimmer Switch Assembly		The headlight dimmer switch assembly transmits the auto position signal and the high beam position signal to the main body ECU.
Steering Angle Sensor		The steering angle sensor outputs the steering angle.
Combination Meter	Automatic High Beam Indicator Light	<ul style="list-style-type: none"><li>• The automatic high beam indicator light illuminates to inform the driver when the automatic high beam system is activated.</li><li>• The automatic high beam indicator light flashes to inform the driver when a malfunction is detected in this system.</li></ul>
	Headlight High Beam Indicator Light	The headlight high beam indicator light illuminates to inform the driver when the high beam headlights are on.
Front Controller		The front controller performs duty control for the high beam bulbs based on request signals that are received from the main body ECU.
Automatic Light Control Sensor		The automatic light control sensor detects the ambient light level and transmits it to the main body ECU.

6. Construction

Automatic High Beam Sensor (Inner Rear View Mirror Assembly)

The automatic high beam sensor consists of the Complementary Metal Oxide Semiconductor (CMOS) that receives images and the mirror portion that identifies light sources, and judges whether to turn high beam headlights on or off.



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Automatic High Beam Sensor  
(Inner Rear View Mirror Assembly)

1) Operating Condition

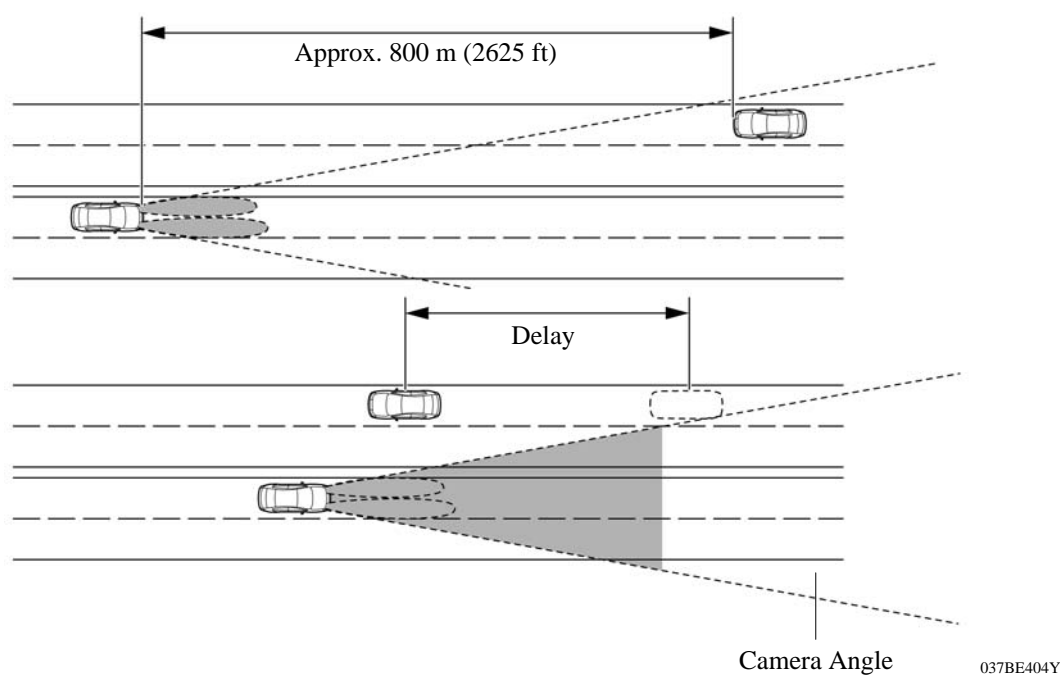
The automatic high beam system will operate as follows:

Item	Operating Condition
System Activation	When all of the following conditions are met, the automatic high beam system is activated and the automatic high beam indicator light turns on: <ul style="list-style-type: none"><li>• The engine switch is on (IG).</li><li>• The headlight dimmer switch assembly is in the auto position and high beam position.</li><li>• The automatic light control sensor outputs the night mode signal (to turn the headlights on).</li></ul>
High Beam Headlight On	When all of the following conditions are met, the automatic high beam system turns on the high beam headlights after a short delay: <ul style="list-style-type: none"><li>• Vehicle speed is more than approximately 34 km/h (21 mph).</li><li>• The area in front of the vehicle is dark.</li><li>• No oncoming vehicles are present with the headlights on.</li><li>• No preceding vehicles are present with the taillights on.</li><li>• Few streetlights are present along the street ahead.</li></ul>
High Beam Headlight Off	When any of the following conditions are met, the automatic system turns off the high beam headlights after a short delay: <ul style="list-style-type: none"><li>• Vehicle speed is less than approximately 27 km/h (17 mph).</li><li>• The area in front of the vehicle is not dark.</li><li>• An oncoming vehicle with headlights on is detected.</li><li>• A preceding vehicle with taillights on is detected.</li><li>• Several streetlights are present along the street ahead.</li></ul>

## 2) Operation

### a. When passing an oncoming vehicle

- The automatic high beam system turns the high beam headlights off when there is an oncoming vehicle before its distance reaches approximately 800 m (2625 ft).
- When an oncoming vehicle passes the automatic high beam sensor range, the automatic high beam system turns the high beam headlights on after a short delay.



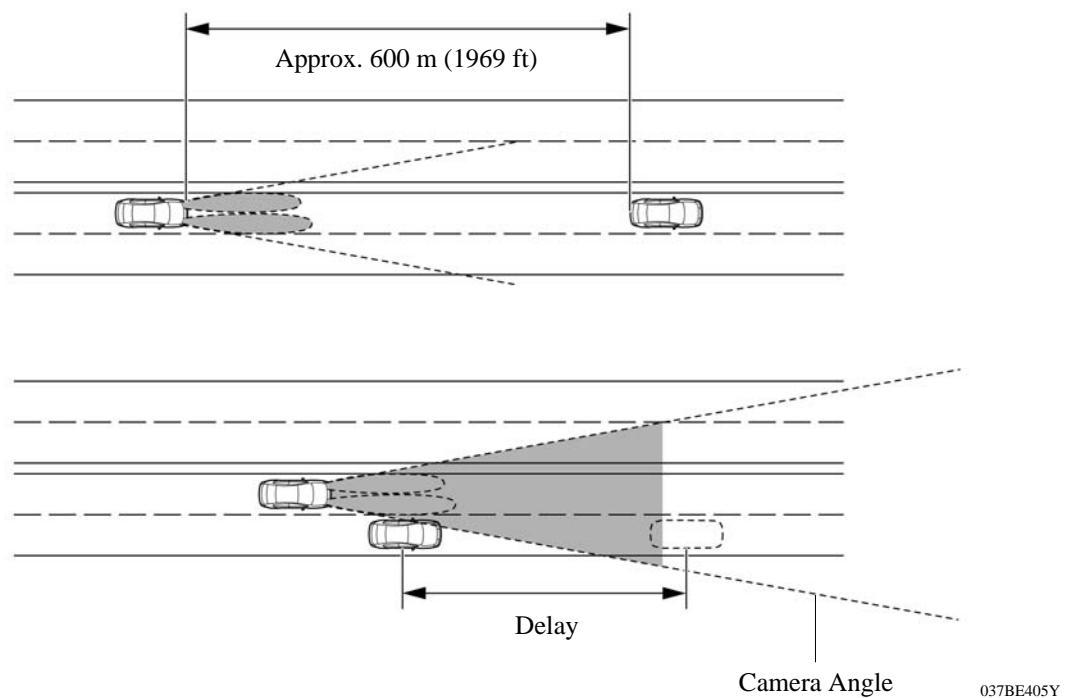
#### NOTE

- The detection distance varies depending on detected objects.
- Depending on the intensity of oncoming (and preceding) vehicle lights, the timing of turning the high beam headlights on and off will vary.



**b. When passing a preceding vehicle**

- The automatic high beam system turns the high beam headlights off when there is a preceding vehicle before its distance reaches approximately 600 m (1969 ft).
- When a preceding vehicle passes the automatic high beam sensor range, the automatic high beam system turns the high beam headlights on after a short delay.

**NOTE**

Depending on the intensity of preceding vehicle lights, the timing of turning the high beam headlights on and off will vary.

**7. Diagnosis**

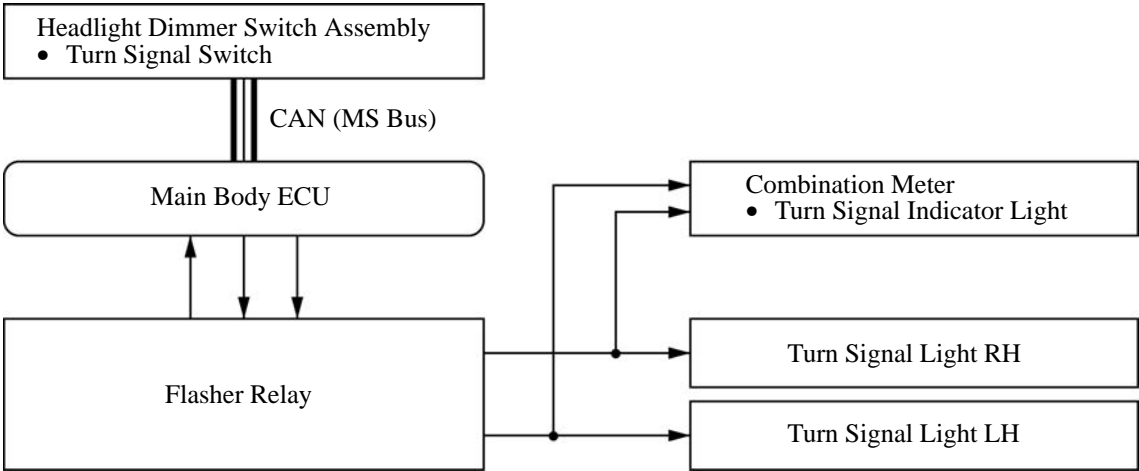
- When the AFS ECU or main body ECU detects a malfunction in the automatic high beam control system, a Diagnostic Trouble Code (DTC) is stored in memory.
- The DTCs can be read using the Techstream. For details, refer to the Repair Manual.

■ LANE CHANGE FLASHER SYSTEM

1. General

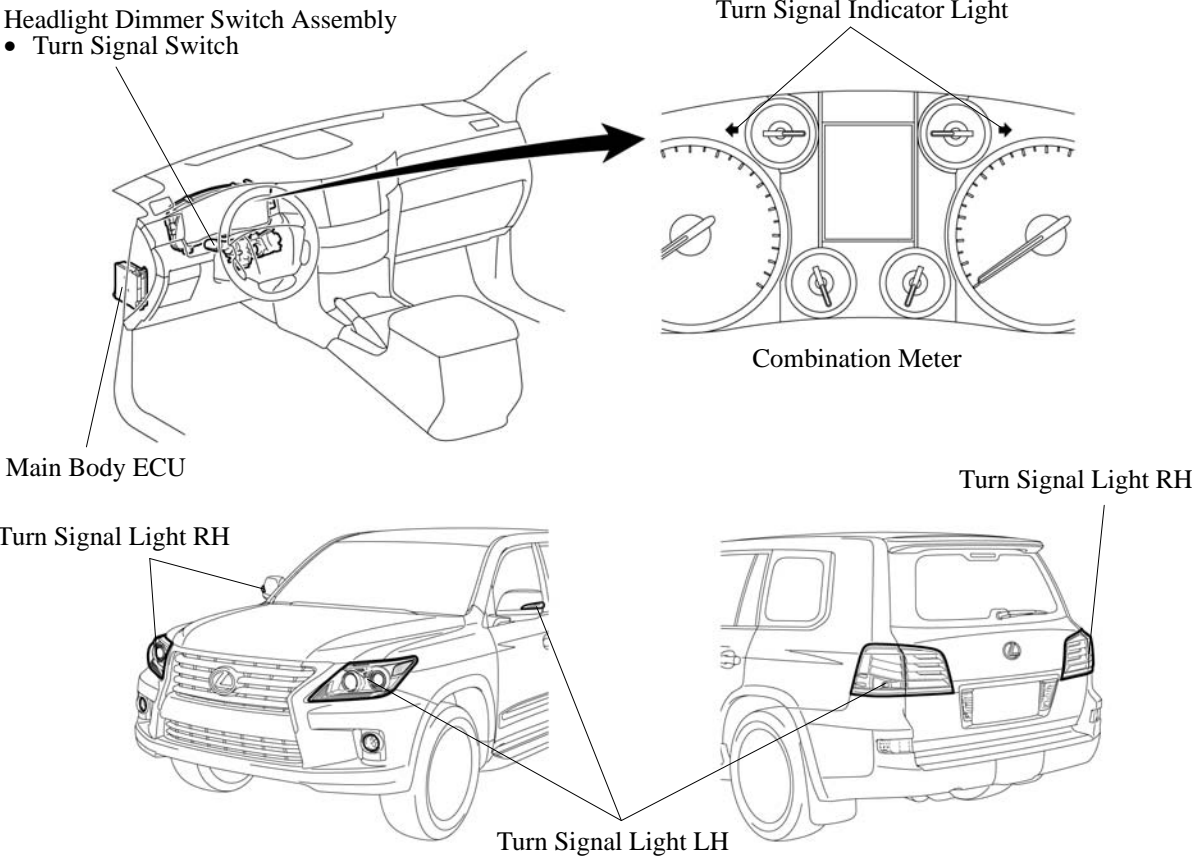
The lane change flasher system flashes the turn signal light a certain number of times when the turn signal switch (headlight dimmer switch assembly) is moved to the lane change position. By using the lane change flasher system when changing lanes, it is no longer necessary to hold the turn signal switch in the lane change position.

2. System Diagram



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3. Layout of Main Components

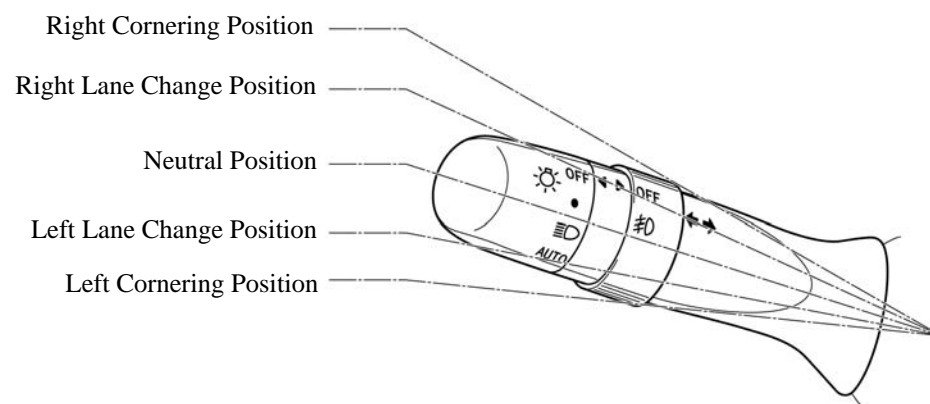


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## 4. Construction

### Turn Signal Switch (Headlight Dimmer Switch Assembly)

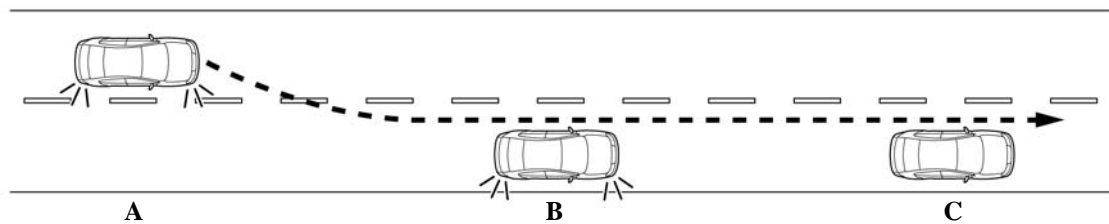
- The lane change flasher system is operated by moving the turn signal switch to the lane change position.
- After the turn signal switch has been moved to the lane change position, it will return to the neutral position once released from the hand.



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## 5. Operation

The lane change flasher system operates in the following way:



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Condition		Turn Signal Switch	Turn Signal Light
A	Commencing lane changing	Move to lane change position	Starts flashing
B	During lane changing	Not moved • If operation finishes during lane changing, flashing will start if the lane change position is moved to again.	Extinguishes after flashing 3 times*
C	Finishing lane changing	Not moved • If the turn signal light is flashing even after lane changing has finished, moving the switch in the direction opposite to the current position will extinguish the light.	Extinguishes

\*: The flashing frequency can be configured by means of the customization function (customizable parameter: off, 3, 5, 7, 9 or 11). For details, refer to the Repair Manual.