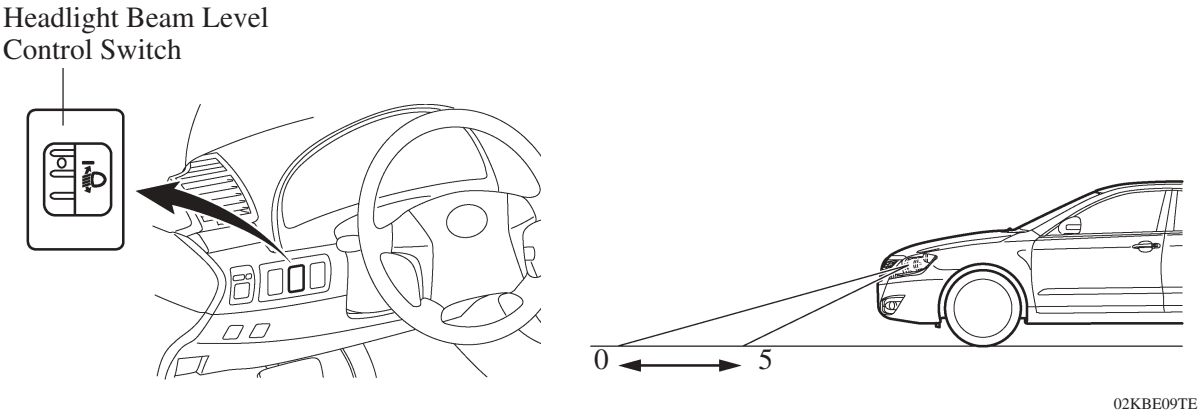
■HEADLIGHT BEAM LEVEL CONTROL SYSTEM

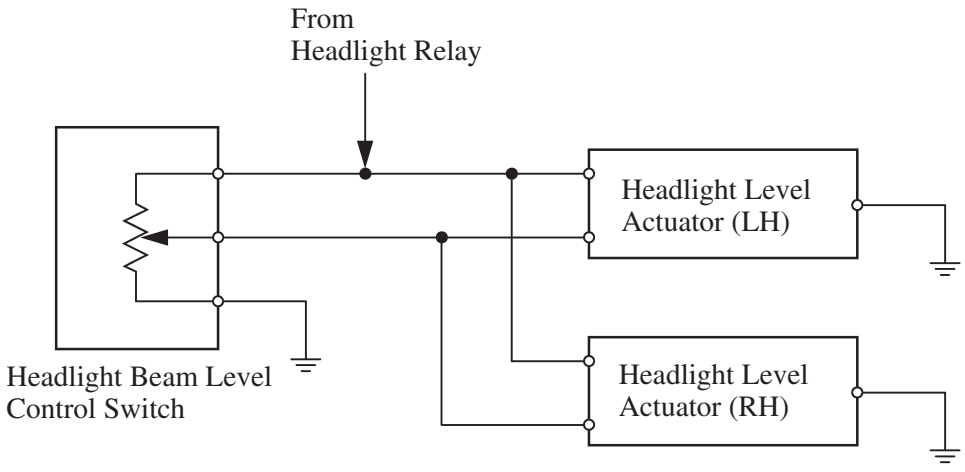
1. Manual Headlight Beam Level Control

When the vehicle posture changes due to the number (weight) of passengers and volume of luggage, this system enables the driver to manually adjust the headlight beam level (in 5-steps) to the appropriate level by using the headlight beam level control switch. The beam level of the headlights can be adjusted with the actuators that are integrated into the headlight units.



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▶ Wiring Diagram ◀



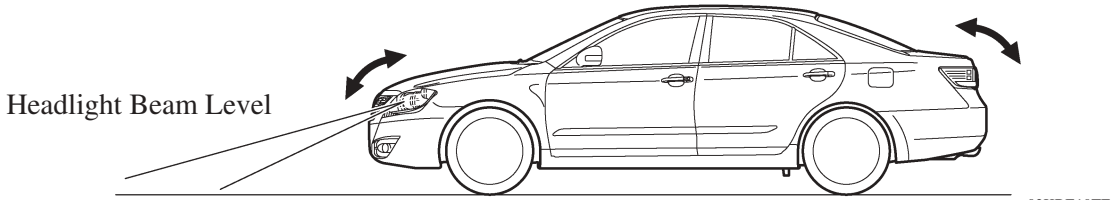
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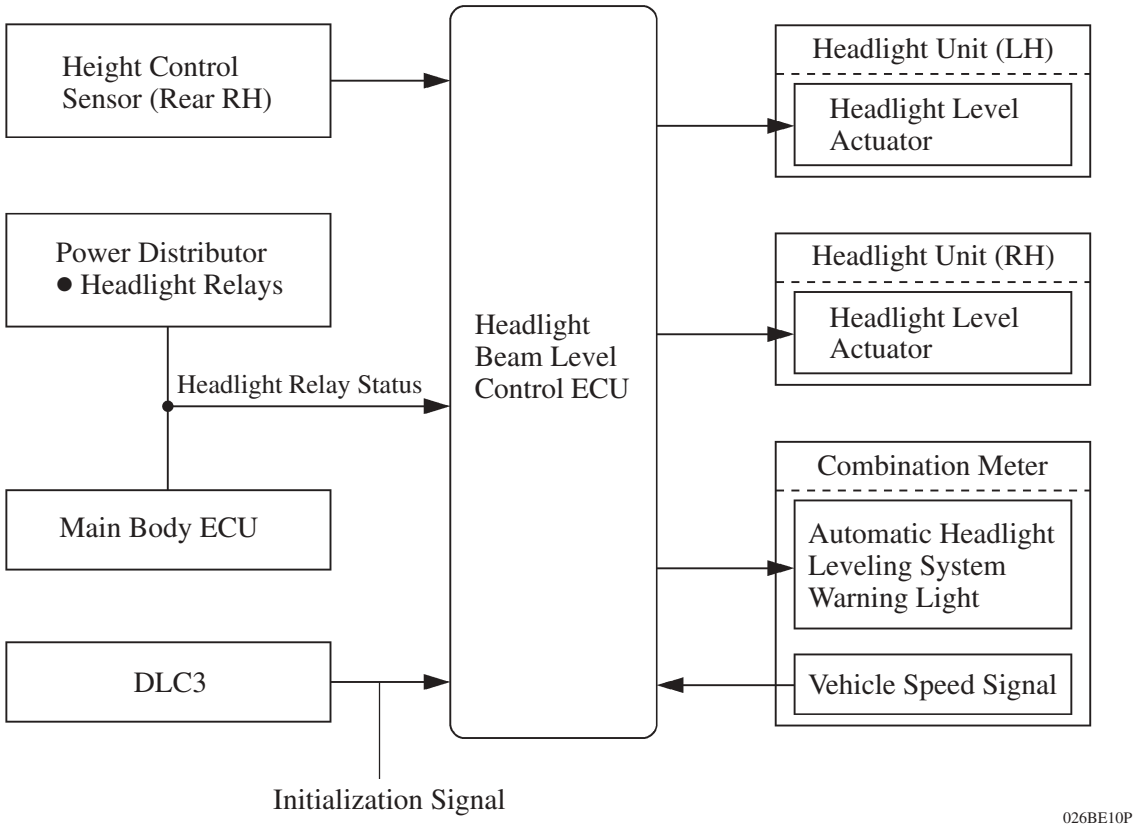
2. Automatic Headlight Beam Level Control (Models without intelligent AFS)

General

- The automatic headlight beam level control, which is controlled by the headlight beam level control ECU, is used on models without intelligent AFS.
- When the vehicle is stationary and the headlights are on, the automatic headlight beam level control system operates the headlight level actuator in accordance with the amount of variation in the vehicle posture.
- The automatic headlight beam level control system mainly consists of the headlight beam level control ECU, rear height control sensor, and two headlight level actuators.
- The headlight beam level control ECU calculates changes in the vehicle posture based on signals from the height control sensor (rear RH).
- The ECU then controls the headlight level actuator based on this information, in order to change the headlight reflector angle.



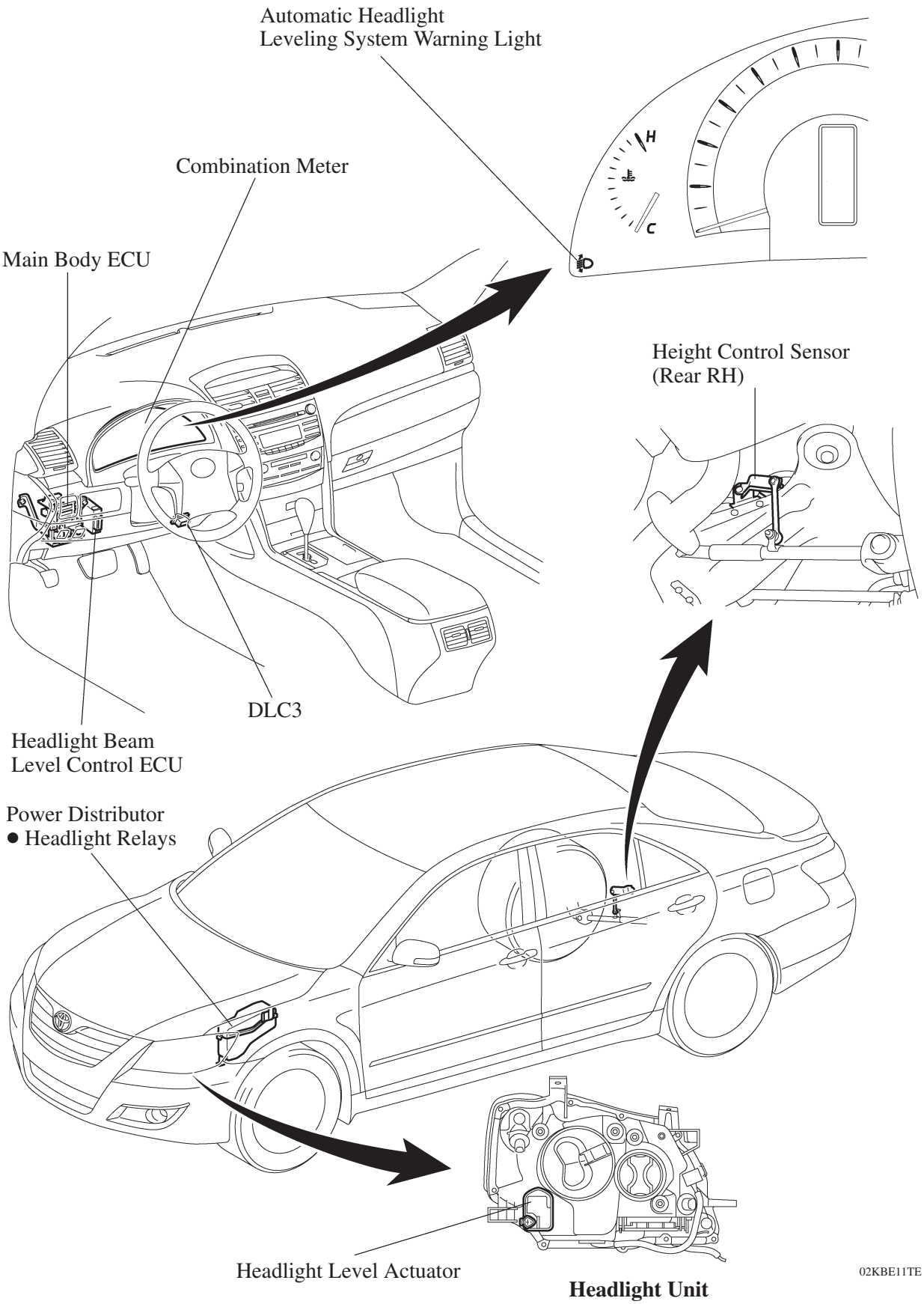
▶ System Diagram ◀



Service Tip

If the headlight beam level control ECU is replaced, or the rear height control sensor is removed, the headlight beam level control ECU must be initialized.
For details, see the Camry Repair Manual.

Layout of Main Components



Headlight Unit

Function of Main Components

Components		Function and Construction
Headlight Beam Level Control ECU		● Based on the signals that are transmitted by the height control sensor, this ECU detects the amount of variation in the vehicle posture. ● Based on the detected value, this ECU outputs a control signal to the headlight level actuator. ● When the ECU detects a malfunction, it outputs a warning display request signal to the combination meter (meter ECU). ● This ECU provides a fail-safe function.
Headlight Unit	Headlight Level Actuator	● Based on the signals received from the headlight beam level control ECU, the headlight level actuators move the reflectors in the headlights to vary their beams. ● These actuators use DC motors and precisely regulate the angles of the reflectors.
Height Control Sensor (Rear RH)		The height control sensor detects the amount of variation in the vehicle height, and outputs this information in the form of a signal to the headlight beam level control ECU.
Combination Meter		● Outputs the vehicle speed signal to the headlight beam level control ECU. ● If the system malfunctions, the combination meter (meter ECU) illuminates the automatic headlight leveling system warning light to alert the driver.

Fail-Safe

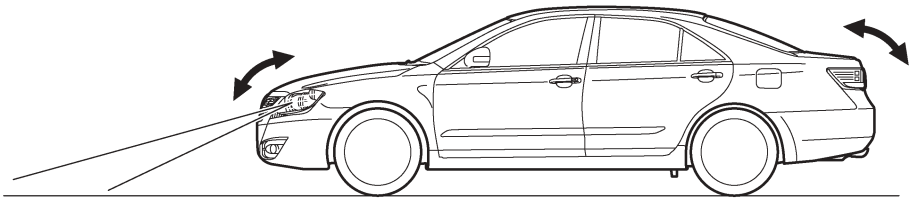
When any of the malfunctions below are detected, the headlight beam level control ECU stops transmitting output signals to the headlight level actuator, suspends headlight level control, and transmits a warning display request signal to the combination meter. On receiving this signal, the combination meter illuminates the automatic headlight leveling system warning light to alert the driver.

Item	Abnormality Detection Condition	Automatic Headlight Leveling System Warning Light
Height Control Sensor	● Abnormal height control sensor power source voltage (4.6 V or less) ● Abnormal height control sensor signal voltage (0.25 V or less, or 4.75 V or more)	ON
Power Source Voltage	Abnormal headlight beam level control ECU power source voltage (18.5 V or more, or 9 V or less)	OFF
Vehicle Speed	Excessive vehicle speed detected	OFF
ECU Reset During Driving	Headlight beam level control ECU reset while vehicle running (For example, headlight beam level control ECU power source circuit open momentarily)	OFF

3. Automatic Headlight Beam Level Control (Models with intelligent AFS)

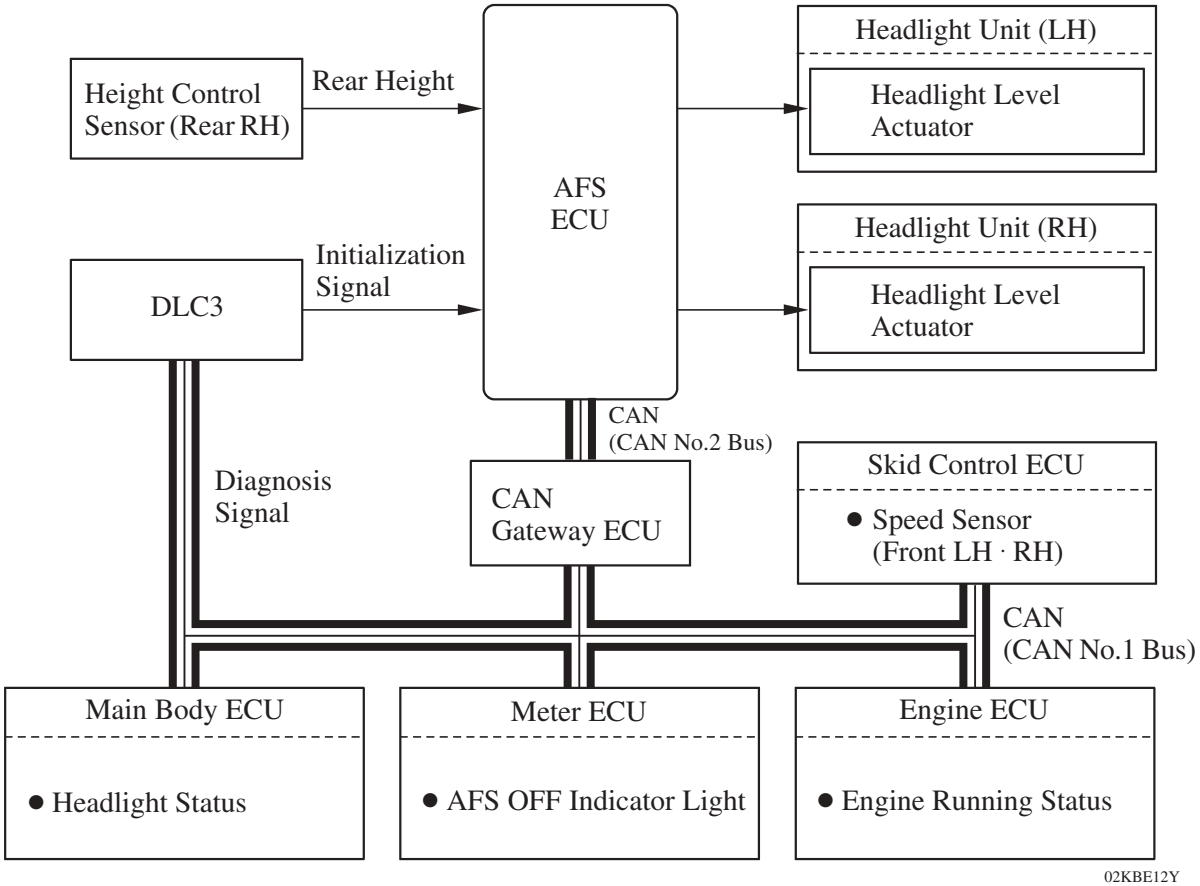
General

- The automatic headlight beam level control system, which is controlled by the AFS ECU, is used on models with intelligent AFS.
- When the headlights are on, the automatic headlight beam level control system operates the headlight level actuator in accordance with movement of the vehicle.
- The automatic headlight beam level control system mainly consists of the AFS ECU, rear height control sensor, and two headlight level actuators.
- The AFS ECU calculates changes in the vehicle posture based on signals from the height control sensor (rear RH) and each ECU.
- The ECU then controls the headlight level actuator based on this information, in order to change the headlight reflector angle.



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▶ System Diagram ◀



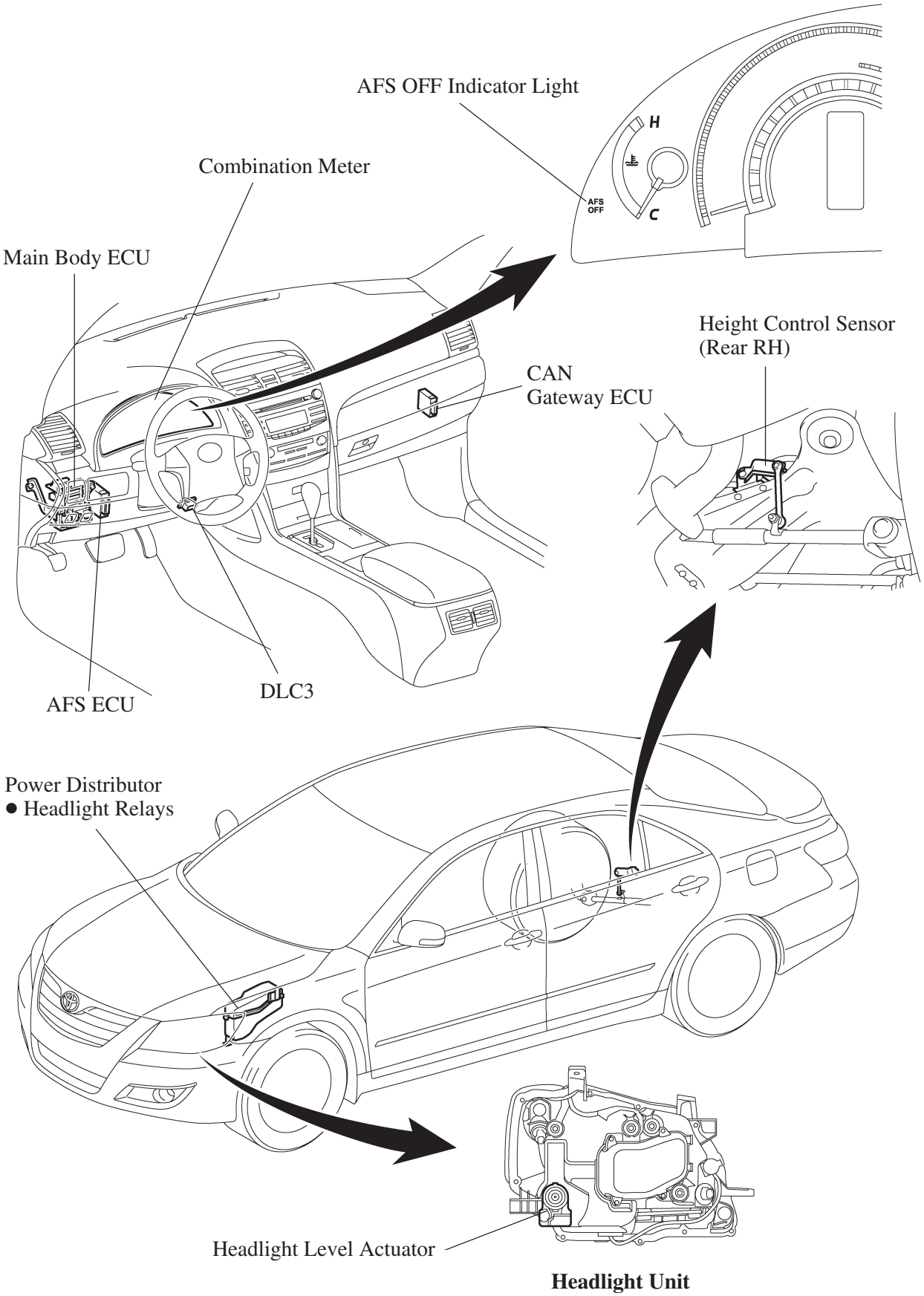
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Service Tip

If the AFS ECU is replaced, or the rear height control sensor is removed, the AFS ECU must be initialized.
For details, see the Camry Repair Manual.

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4. Layout of Main Components



Headlight Unit

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5. Function of Main Components

Component		Outline
AFS ECU		● Calculates changes in the vehicle posture based on the signals from the height control sensor and each ECU. ● Based on the detected value, this ECU outputs a control signal to the headlight level actuator. ● This ECU provides initial set control, fail-safe function and diagnosis function.
Headlight Unit	Headlight Level Actuator	● Based on the signals received from the AFS ECU, the actuators move the reflectors in the headlights to vary the Lo beam. ● These actuators use a step motor to precisely regulate the angle of the reflectors.
Height Control Sensor (Rear RH)		The height control sensor detects the amount of variation in the vehicle height, and outputs this information in the form of a signal to the AFS ECU.
Skid Control ECU		Transmits the speed sensor signal (Front LH and RH) to the AFS ECU.
Engine ECU		Transmits the engine running status signal to the AFS ECU.
Main Body ECU		Transmits the headlight status signal.
Combination Meter (Meter ECU)	AFS OFF Indicator Light	When the system malfunctions, the meter ECU alerts the driver by flashing the AFS OFF indicator light in accordance with the signal from the AFS ECU.

6. Initial Set Control

When the engine is started, the AFS ECU drives the headlight level actuator, moves the headlight reflector to the lower limit position and returns it to the proper position. The AFS ECU thus assesses the position of the headlight for reference control.

7. Fail-Safe

If the AFS ECU detects a malfunction in the automatic headlight beam level control system or intelligent AFS, it will take the actions indicated in the table below.

Trouble Area	Condition	AFS OFF Indicator Light
Headlight Swivel Actuator Malfunction	Continues to control until a position of 0.650 less than the current position is reached.	Flash
Steering Angle Sensor Signal Malfunction	Continues to control.	Flash
Speed Sensor Signal Malfunction	● Continues to control using the normal speed sensor signal if one signal fails. ● Judges that the vehicle speed is 0 mph (0 km/h) and continues to control if both speed sensor signals fail.	Flash
Height Control Sensor Signal Malfunction	● Stops the operation after returning to the initial position (If failure at higher than initial position). ● Stops the operation in the current condition (If failure at lower than initial position).	Flash
Headlight Level Actuator Malfunction	Normal Side Headlight Level Actuator: ● Stops the operation after returning to the initial position (If failure at higher than initial position). ● Stops in the current condition (If failure at lower than initial position).	Flash
	Abnormal Side Headlight Level Actuator: ● Stops in its current position.	
Communication Signal Malfunction	Skid Control ECU: ● Judges that the vehicle speed is 0 mph (0 km/h) and continues to control.	Flash
	Steering Angle Sensor: ● Normally controls the system.	Flash

8. Diagnosis

If the AFS ECU detects a malfunction in the automatic headlight beam level control system, the AFS ECU flashes the AFS OFF indicator light. At the same time, the DTC (Diagnostic Trouble Codes) are stored in memory. The DTC can be read by use of the intelligent tester II. For details, see the Camry Repair Manual.