

## ■ AUTOMATIC HEADLIGHT BEAM LEVEL CONTROL SYSTEM

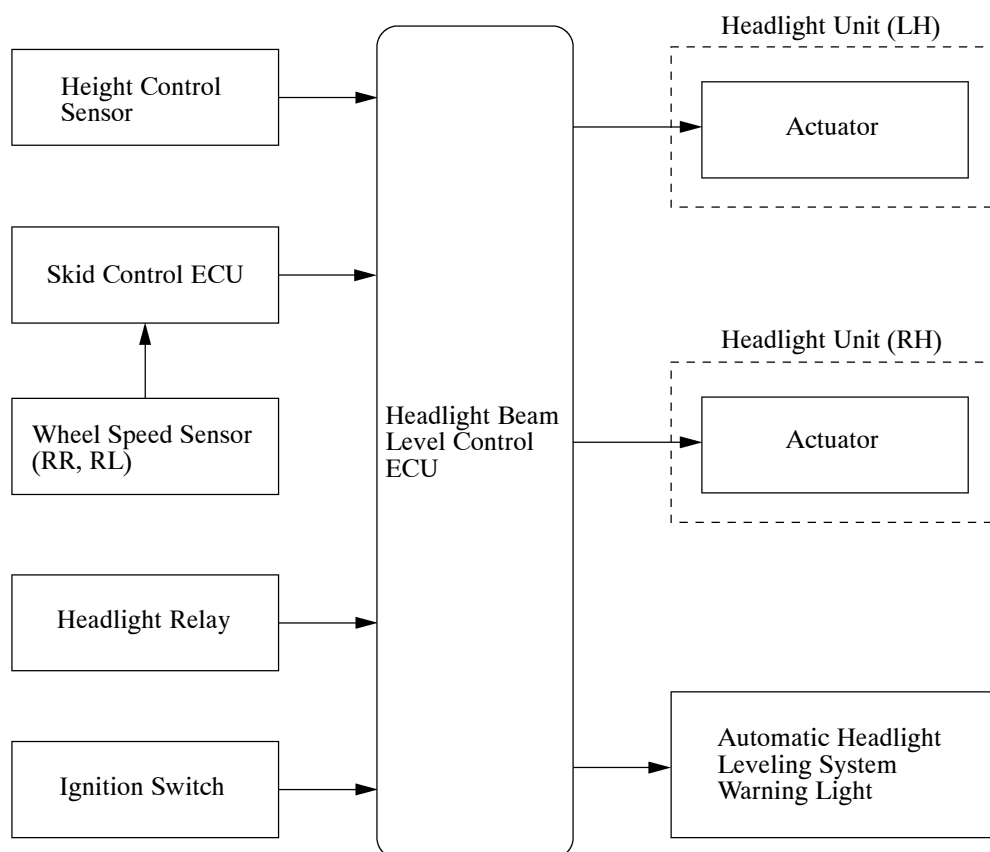
### 1. General

- The automatic headlight beam level control system regulates the orientation of the reflectors of the headlights in relation to the posture of the vehicle that has been detected by sensor. Thus, it is a system that maintains the headlight beams to a constant level while the vehicle is being driven.  
This system is optional equipment.
- This system has the differences shown in the table below for models with Intelligent AFS and without Intelligent AFS. However, basic operation is the same for both models.

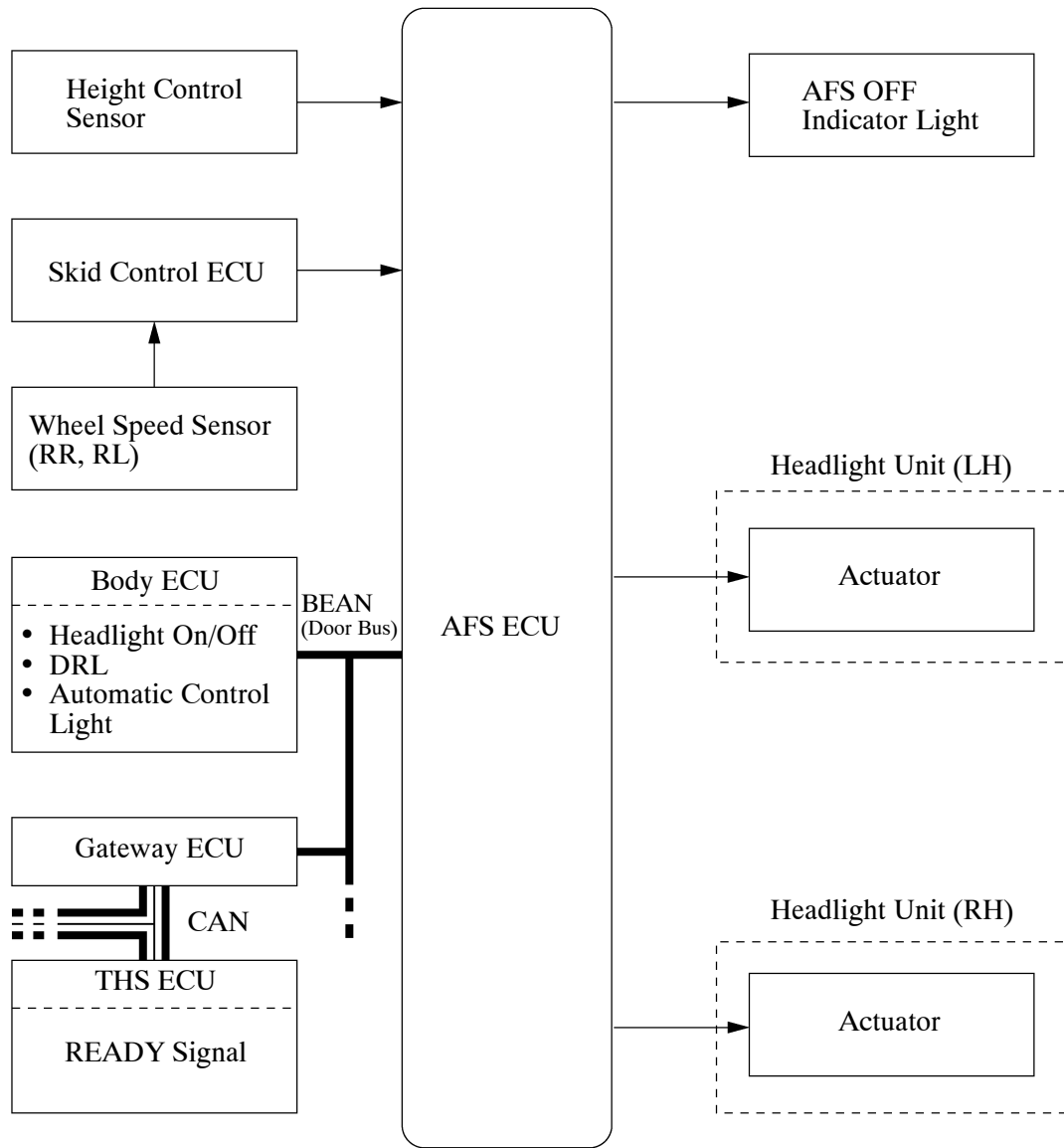
| System                       | without Intelligent AFS                                                                                                                                                                            | with Intelligent AFS                                                                                                                                                             |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Headlight Beam Level Control | Reflector is driven up and down by 1 actuator (step motor type)                                                                                                                                    | ←                                                                                                                                                                                |
| Vehicle Height Detection     | Height Control Sensor                                                                                                                                                                              | ←                                                                                                                                                                                |
| System Control               | Headlight Beam Level Control ECU                                                                                                                                                                   | AFS ECU                                                                                                                                                                          |
| Operation in System abnormal | <ul style="list-style-type: none"> <li>• Lights up the master warning light</li> <li>• Displays a warning message on the combination meter.</li> <li>• System control in fail-safe mode</li> </ul> | <ul style="list-style-type: none"> <li>• AFS OFF indicator light flashing</li> <li>• System control in fail-safe mode</li> <li>• DTC (Diagnostic Trouble Code) output</li> </ul> |

### 2. System Diagram

#### ► Models without Intelligent AFS ◀



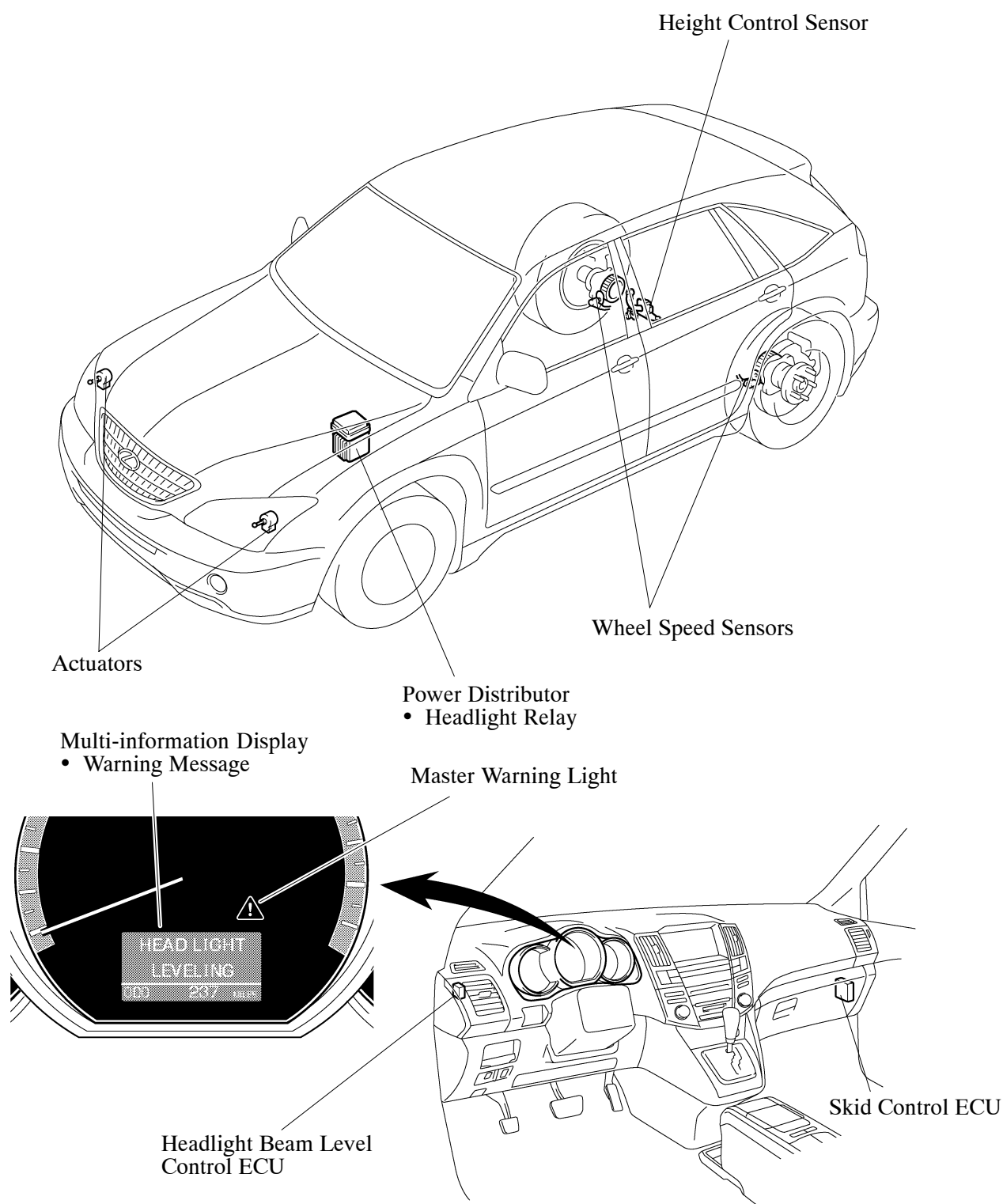
► Models with Intelligent AFS ◀



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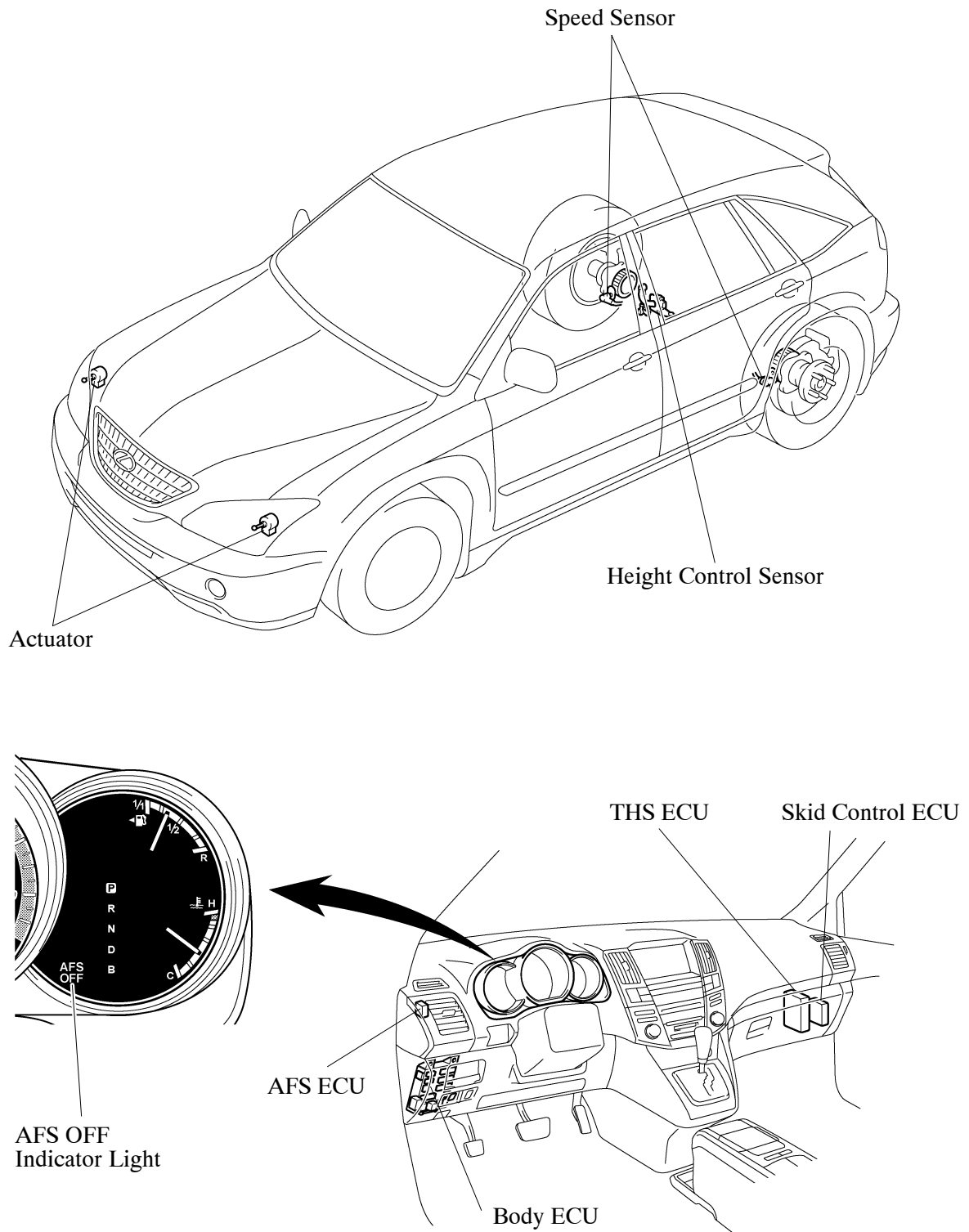
### 3. Layout of Main Components

#### ► Models without Intelligent AFS ◀



**LHD Model**

► Models with Intelligent AFS ◀



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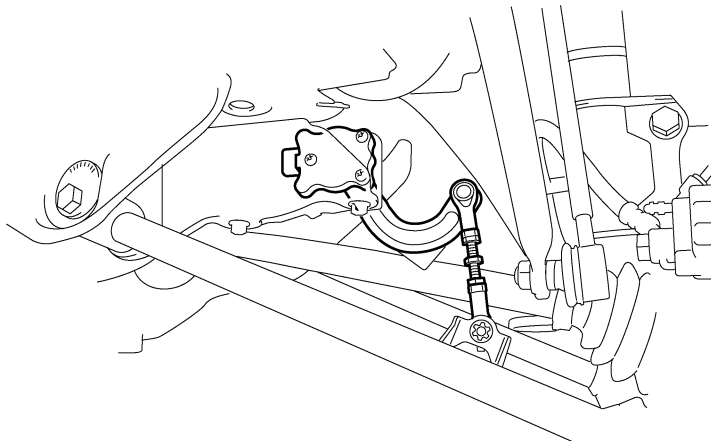
## 4. Construction

### AFS ECU/Headlight Beam Level Control ECU

- This system is controlled by the AFS ECU in models with Intelligent AFS. In models without Intelligent AFS, this system is controlled by the headlight beam level control ECU, the same as in the current RX300. However, basic operation of both ECUs is the same.
- Based on the signals that are transmitted by the rear height control sensor and the skid control ECU, this ECU detects the amount of variance of the vehicle posture. Based on the detected value, this ECU outputs control signals to the actuator.
- The headlight beam level control ECU provides initial set control and a fail-safe function. In addition to this function, the AFS ECU also outputs the DTC for malfunction locations.

### Height Control Sensor

- The rear height control sensor detects the amount of variance of the vehicle height while the vehicle is being driven, and output this amount in the form of signals to the AFS ECU/headlight beam level control ECU.



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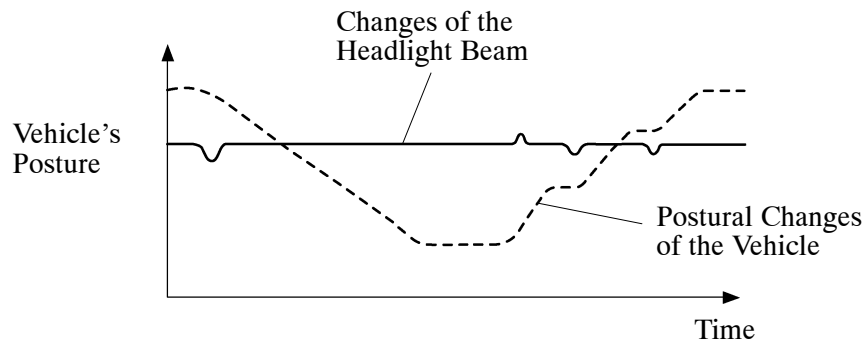
### Actuator

Based on the signals received from the AFS ECU (models with Intelligent AFS)/headlight beam level control ECU (models without Intelligent AFS), each actuator moves the reflector in the headlight to vary its beam. This actuator uses a step motor to precisely regulate the angle of the reflector.

## 5. Operation

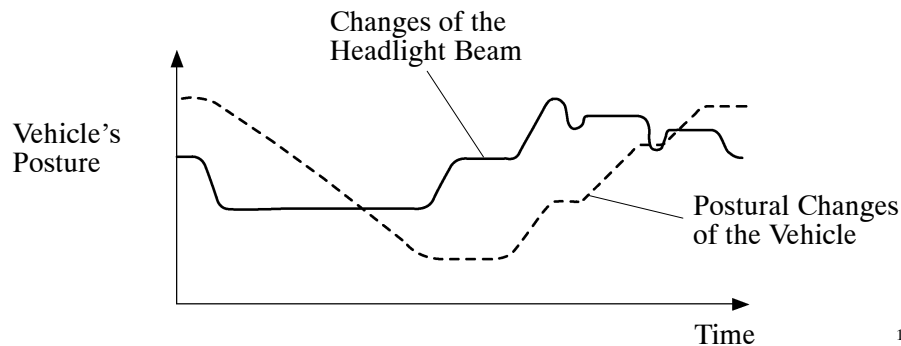
The AFS ECU (models with Intelligent AFS)/the headlight beam level control ECU (models without Intelligent AFS) is input the vehicle speed signal from the skid control ECU and the posture change signal of the vehicle from the height control sensor.

Based on these signals, the AFS ECU (models with Intelligent AFS)/the headlight beam level control ECU (models without Intelligent AFS) calculates the vehicle's pitch angle change and controls the actuator in accordance with that change amount, and then operates the reflector of the headlight.



**with Automatic Headlight Beam Level Control**

151LBE21



**without Automatic Headlight Beam Level Control**

151LBE20

## 6. Initial Set Control

When the AFS ECU (models with Intelligent AFS) receives a “READY” signal from the THS ECU, or the headlight beam level control ECU (models without Intelligent AFS) receives an ON signal from the ignition switch, this control operates the actuator to lower the light beams to the lowest end.

Then, it returns to the proper position. Thus, AFS ECU (models with Intelligent AFS)/the headlight beam level control ECU (models without Intelligent AFS) assesses the position of the light beam that forms the reference for control.

## 7. Fail-Safe Function

The AFS ECU (models with Intelligent AFS)/the headlight beam level control ECU (models without Intelligent AFS) operates in the fail-safe mode if an abnormal condition such as those listed below has been detected, and blinks the AFS OFF indicator light (models with Intelligent AFS)/illuminates the automatic headlight leveling system warning light (models without Intelligent AFS).

### ► Models with Intelligent AFS ◀

| Trouble Area                                     | Headlight Leveling Actuator                                                                                                                                    | Headlight Swivel Actuator                                                                               | AFS OFF Indicator Light |
|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|-------------------------|
| Vehicle speed sensor signal malfunction          | Controlling continues                                                                                                                                          | Stops operation after returning to initial position                                                     | Blinks                  |
| Vehicle height signal malfunction                | Stops operation after returning to initial position (Fail at higher than initial position)<br>Stops at current condition (Fail at lower than initial position) | Stops operation after returning to initial position                                                     | Blinks                  |
| Leveling actuator Malfunction                    | Stops at current condition                                                                                                                                     | Stops operation after returning to initial position                                                     | Blinks                  |
| Steering sensor Malfunction                      | Lowers by 0.8° than initial position and then re-starts controlling                                                                                            | Stops at current condition and then returning to initial position after 10 seconds                      | Blinks                  |
| Communication signal malfunction                 | Controlling continues                                                                                                                                          | Stops operation after returning to initial position                                                     | Blinks                  |
| Swivel actuator action malfunction               | Lowers by 0.8° than initial position                                                                                                                           | Stops operation after returning to initial position (Stops at current condition when unable to operate) | Blinks                  |
| Swivel actuator communication signal malfunction | Lowers by 0.8° than initial position                                                                                                                           | Stops operation after returning to initial position (Stops at current condition when unable to operate) | Blinks                  |

### ► Models without Intelligent AFS ◀

| Trouble Area                                                   | Condition               | Automatic Headlight Leveling System Warning Light |
|----------------------------------------------------------------|-------------------------|---------------------------------------------------|
| Headlight leveling actuator circuit is open                    | Stop leveling operation | Light up                                          |
| Headlight leveling actuator circuit is short                   | Stop leveling operation | Light up                                          |
| Vehicle speed sensor signal error                              | Controlling continues   | Light up                                          |
| Height control sensor signal level error                       | Stop leveling operation | Light up                                          |
| Headlight leveling actuator high voltage                       | Stop leveling operation | Goes off                                          |
| Pitch angle calculation error (only for air suspension models) | Stop leveling operation | Light up                                          |

## 8. Diagnosis (models with Intelligent AFS)

- When the AFS ECU detects a malfunction in the automatic headlight beam level control system, the AFS ECU sets a DTC (Diagnostic Trouble Code) and stores it in memory.
- The DTC can be accessed the use of the intelligent tester II. For details, see the LEXUS RX400h Repair Manual (Pub. No. RM1139E).