

RAIN SENSOR

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Outline

- The rain sensor detects the amount of rainfall on the windshield and calculates the windshield wiper operation speed based on the detected amount of rainfall.
- The rain sensor outputs the calculated windshield wiper operation signal to the front body control module (FBCM).
- The front body control module (FBCM) performs rain sensor fail-safe. (See FRONT BODY CONTROL MODULE (FBCM).)

Function

Rainfall Amount Detection Function

Caution

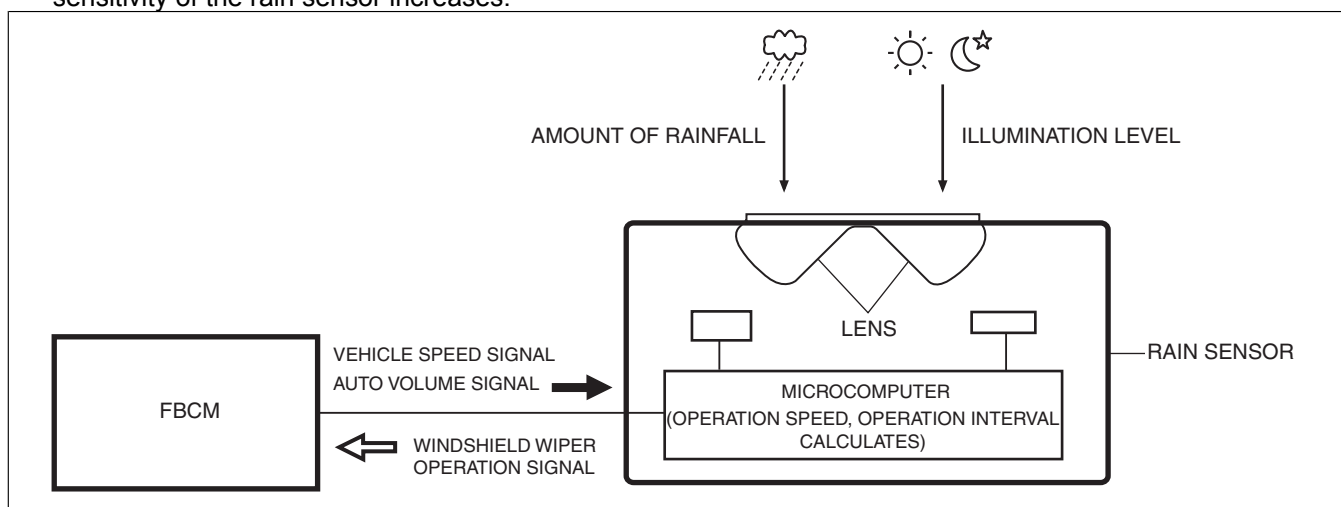
- **If the windshield is under any of the following conditions, the rain sensor cannot detect the amount of rainfall correctly and the windshield wipers operate incorrectly.**
 - **Stickers or labels are adhered to the rain sensor detection area in the upper part of the windshield.**
 - **The rain sensor detection area in the upper part of the windshield is dirty.**
- The rain sensor detects the amount of rainfall by the rate of reflected infrared light emitted from the built-in LED.
- The windshield wiper operation signal is calculated based on the detected amount of rainfall.

Initial Setting Function

- When the ignition is switched ON (engine off or on), the rain sensor detects and records the transparency of the windshield surface, which varies depending on wear and accumulation of dust.
- As a result, the rain sensor determines the optimal speed (LO/HI) for the windshield wipers and sends the windshield wiper operation signal to the front body control module (FBCM).
- The initial setting is performed everytime the ignition is switched ON (engine off or on).

Sensitivity Adjustment Function

- While the auto wiper is operating, sensitivity of the rain sensor can be optionally adjusted by operating the sensitivity adjustment volume on the wiper and washer switch which changes the volume signal input to the front body control module (FBCM).
 - Sensitivity of the rain sensor can be adjusted between 1 (low sensitivity) and 5 (high sensitivity) by operating the sensitivity adjustment volume according to the conditions such as rain intensity.
- While the auto wiper is operating, the sensitivity of the rain sensor is adjusted automatically according to the vehicle signal sent from the PCM via the front body control module (FBCM).
- While the auto wiper is operating, the rain sensor (auto light sensor) detects the illumination level above and in front of the vehicle.
- When the rain sensor detects an illumination level higher than a level required for turning on the TNS, the sensitivity of the rain sensor increases.



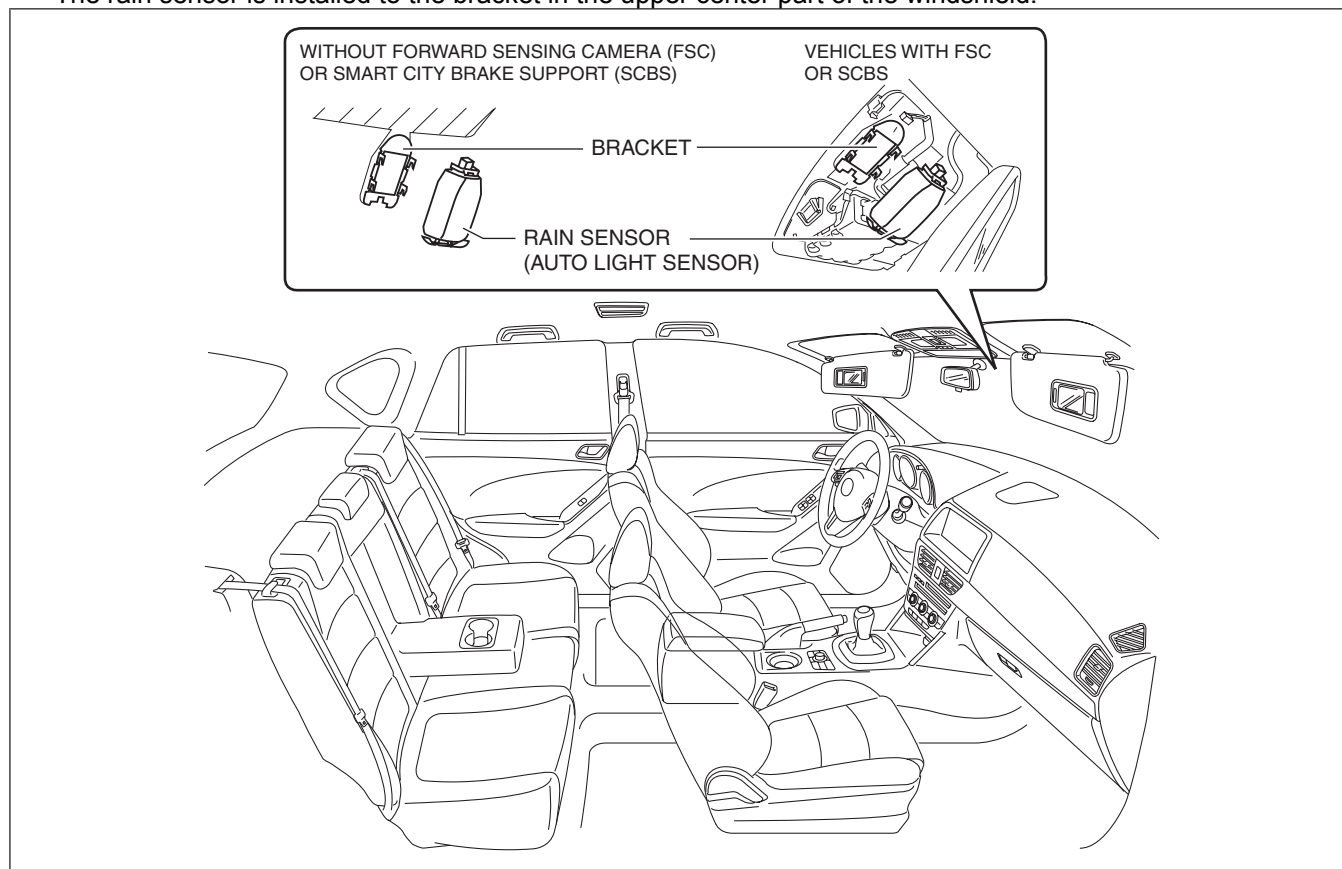
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On-board diagnostic function

- The rain sensor performs on-board diagnostics when the ignition is switched ON (engine off or on).
- If a malfunction is detected in the rain sensor, an error signal is sent to the front body control module (FBCM).
- The front body control module (FBCM) outputs DTCs based on error signals from the rain sensor.
- For details on DTCs, refer to the diagnostic system (FBCM), DTC table (FBCM) in the Workshop Manual.

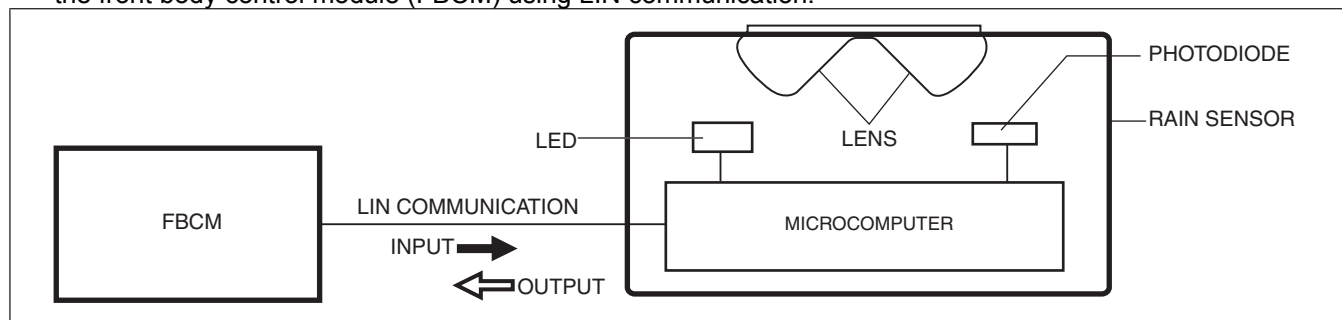
Construction

- The rain sensor is installed to the bracket in the upper center part of the windshield.



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- The rain sensor is integrated with the auto light sensor.
- The rain sensor consists of the lens, LED, photodiode, and microcomputer, and sends/receives signals between the front body control module (FBCM) using LIN communication.

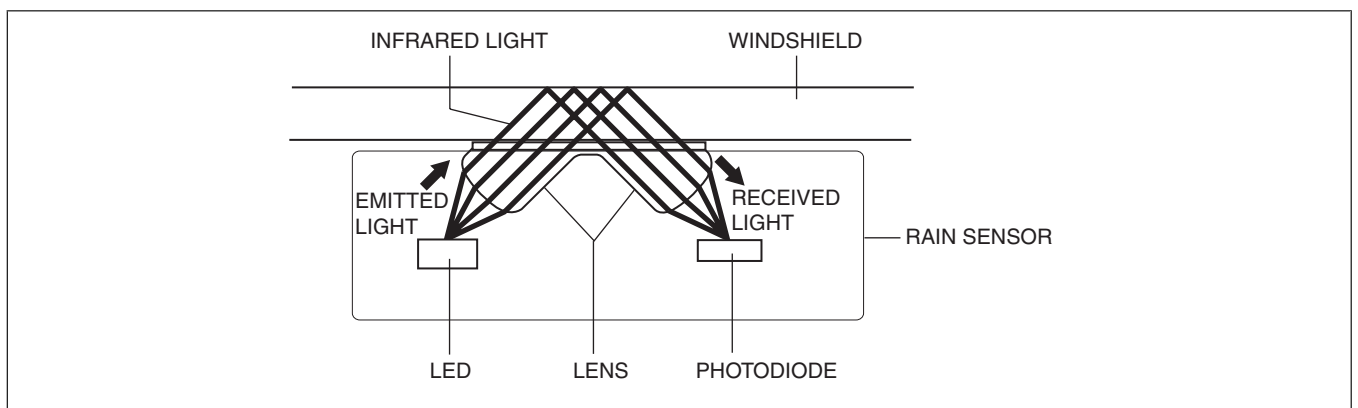


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Operation

Operation With No Rainfall Contacting Windshield

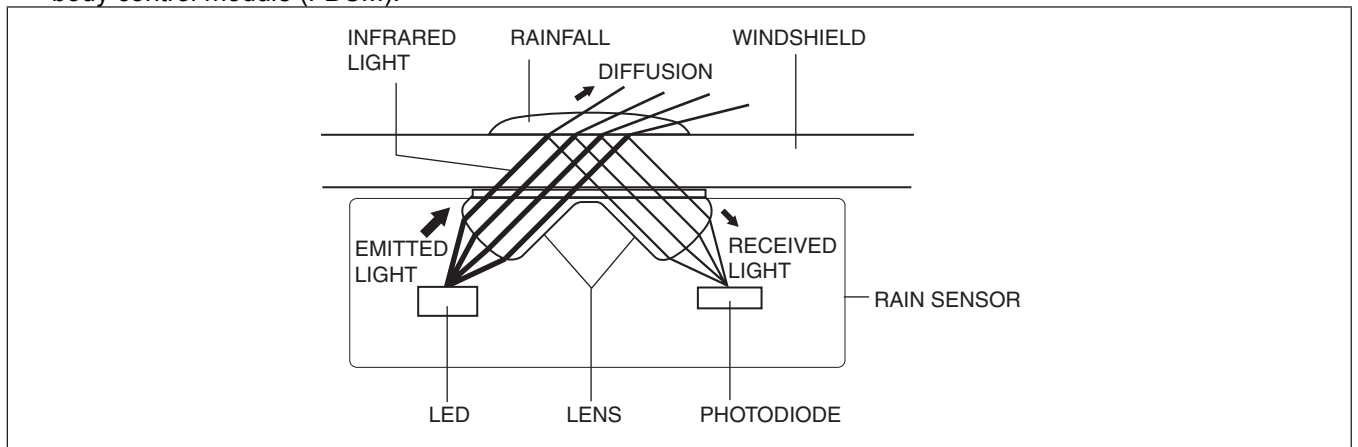
- Infrared light is emitted from the LED in the rain sensor towards the windshield.
- The emitted infrared light reflects off the windshield.
- The infrared light reflected off the windshield is received by the photodiode in the rain sensor.
- When the photodiode receives the light, the microcomputer in the rain sensor calculates the rainfall amount from the reflection rate, and sends a windshield wiper control signal to the front body control module (FBCM).



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Operation with Rainfall Contacting Windshield

1. Infrared light is emitted from the LED in the rain sensor towards the windshield.
2. Emitted infrared light goes through the windshield and penetrates the rain drops on the windshield.
3. The infrared light which cannot penetrate is reflected off the windshield and is received by the photodiode in the rain sensor.
4. When the photodiode receives the light, the microcomputer in the rain sensor calculates the rainfall amount from the reflection rate, converts this to an electrical signal and sends a windshield wiper control signal to the front body control module (FBCM).



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Fail-safe

- Function not equipped.