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| Last Modified: 7-13-2007 | | 1.6 D |
| Service Category: Vehicle Exterior | Section: Wiper/Washer | |
| Model Year: 2008 | Model: ES350 | Doc ID: RM000000PJF00UX |
| Title: WIPER AND WASHER: WIPER AND WASHER SYSTEM (w/ Rain Sensor): SYSTEM DESCRIPTION (2008 ES350) | | |

SYSTEM DESCRIPTION

1. WIPER AND WASHER SYSTEM

(a) The wiper and washer system may have some of the following functions:

| FUNCTION | NOTE |
|----------------------------|------|
| Raindrop Sensing | - |
| Washer Fluid Level Warning | - |

(b) The windshield wiper relay assembly (auto wiper relay) controls the wiper system.

2. RAINDROP SENSING FUNCTION

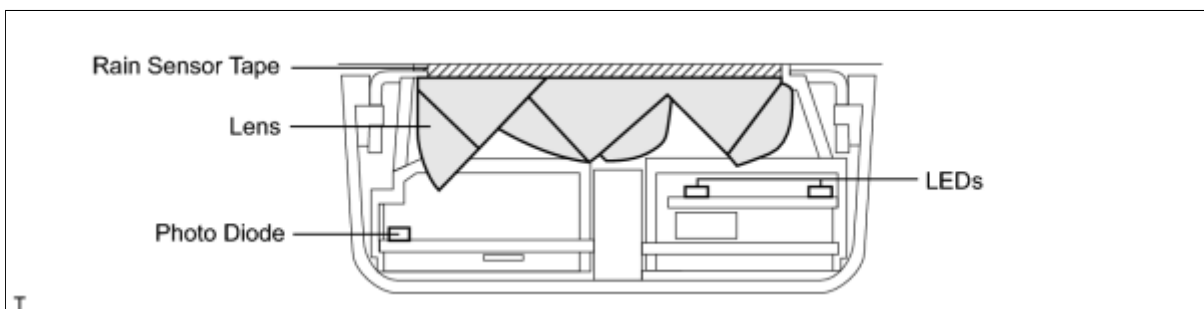
(a) General

(1) The raindrop sensing function controls the wiper timing in accordance with the amount of raindrops that strike the windshield glass when the windshield wiper switch assembly is in the AUTO position.

- The windshield wiper relay assembly (auto wiper relay) adjusts the wiper timing based on commands from the rain sensor. These adjustments are based on the vehicle speed and whether the vehicle is being driven or stops during automatic operation.
- The windshield wiper relay assembly (auto wiper relay) adjusts the wiper timing based on a command from the main body ECU. Wiper speed is adjusted based on the degree of brightness.
- The rain sensor sends a wiper operation instruction signal to the windshield wiper relay assembly (auto wiper relay) based on the amount of rainfall.
- The wiper speed sensitivity can be adjusted by operating the adjustment ring on the windshield wiper switch assembly.
- When the windshield wiper relay assembly is in the AUTO position, the rain sensor determines the wiper speed based on the vehicle speed received from the combination meter and the amount of raindrops. The rain sensor sends a signal to the windshield wiper relay assembly (auto wiper relay). The windshield wiper relay assembly (auto wiper relay) will vary the wiper speed in accordance with the signal received from the windshield wiper relay assembly (auto wiper relay).

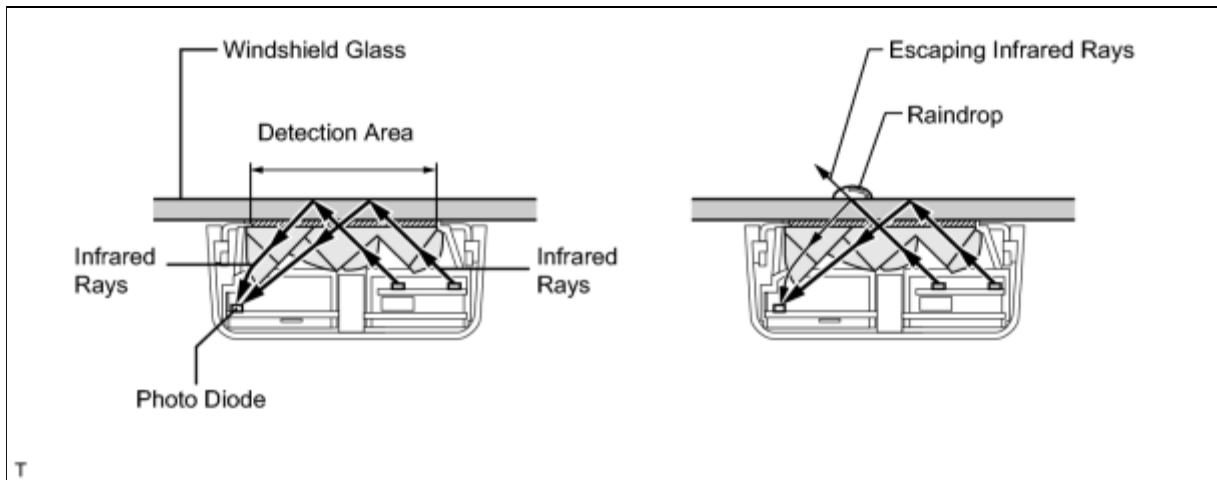
(b) Rain Sensor

(1) The rain sensor consists of 2 LEDs (Light Emitting Diodes) that emit infrared rays, a photo diode that can receive those rays, a lens, and rain sensor tape.



If the windshield glass is being replaced, make sure to use new rain sensor tape. Failure to do so will lead to a system malfunction.

- If no raindrops are present in the detection area, the infrared rays emitted by the LED are all reflected from the outer surface of the windshield glass and are received by the photo diode.
- If raindrops are present in the detection area, a portion of the emitted infrared rays penetrates the windshield glass due to the change in the difference of the index of refraction between the glass and the area outside the windshield glass (difference between air and water). The ability of the windshield glass to reflect the emitted rays back inside changes due to the presence of raindrops. This reduces the amount of infrared rays that are received by the photo diode. The amount of this reduction is then used to determine the amount of raindrops. Thus, this function selects the LO, and HI wiper operation in order to operate the wipers at an optimal speed and timing.



3. WASHER FLUID LEVEL WARNING

- (a) When the volume of washer fluid decreases to below a certain level (when the washer fluid level warning switch is turned ON), the combination meter assembly warns the driver through the master warning light illumination, the buzzer and the warning message on the multi-information display.

