

Description

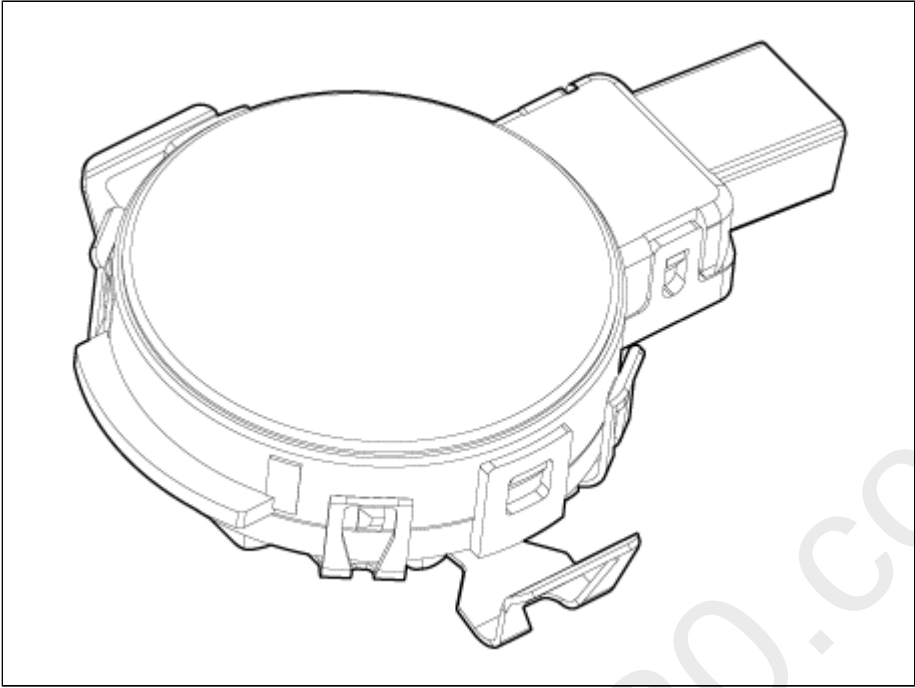
Integrated Rain Sensor

Integrated rain sensor (A) controls three systems: front wiper, auto-light, and central air conditioner.

1. Wiper Control System

When "AUTO" switch signal is received from the multi-function switch on the right, the integrated rain sensor detects the amount of rainfall. The sensor is installed inside the upper part of the front window for wiper motor control.

This system automatically controls the operation duration and speed of the wiper depending on the measured amount of rainfall even if the driver does not operate the wiper switch.



Functions and Operating Principles

Basic Principle

1. Detecting the amount of rainfall

The light (beam) emitted from light emitting diodes (LED) is totally reflected on the external surface of the windshield and comes back to the photo diodes. When there is water on the external surface of the windshield, the light is optically separated and reflected partially and the remaining brightness is measured by the photo diodes. Water remaining on the windshield results in the light being not totally reflected. The loss of brightness due to this indicates how much the glass surface is wet.

Interference

Rain sensor might malfunction due to the interferences listed below.

- 1. Dust on the measuring surface and other surfaces on the light path (surface of light emitting diodes and photo diodes, fiber optics, bracket, and glass surface of windshield joint area) weakens the received light.
- 2. Movement of windshield and bracket
- 3. Movement of bracket due to vibration
- 4. Damaged wiper blade

NOTICE

â When the integrated rain sensor does not operate or malfunctions, the driver should operate the wiper ç switch manually.

Automatic Operation

1. Operational status of rain sensor

Operation Mode	Operation

Direct Mode	It is the normal operational status of the integrated rain sensor when the wiper switch is in "Auto" and the sensor detected dry windshield. Based on this state, integrated rain sensor determines the operation mode of wiper depending on the rainfall and its duration.
Intermittent Mode	Integrated rain sensor activates the intermittent mode when wiper operation is done successively more than twice with a pause of 0.5 - 5 seconds.
Low Speed	The wiper operates continuously in low speed
High Speed	The wiper operates continuously in high speed

Safety Function

- When there is ice or foreign matter in the detecting area, integrated rain sensor cannot recognize the condition for operation correctly.

Detecting Special Conditions

- Rain sensor

Special Condition	Operation based on special conditions detecting
Splash	When integrated rain sensor detects a high level of water (splash) in Direct or Intermittent mode, the system switches from Park to High speed. Then, wiping is done once in High speed and once more in Low speed. If the condition of rainfall does not change after wiping, it returns to the original condition (Direct or Intermittent).
Smearing	Smearing is a thin oil film that has dried fast and occurs when a small amount of rainfall is wiped by a dirty or worn-out wiper blade. Operational signal should not be issued when smearing occurs in Direct or Intermittent mode.
Dirt	When no change is detected after wiping, integrated rain sensor determines that the windshield is dirty. In this state, operational signal should not be issued. If the windshield becomes clean (for example, by washer fluid), the integrated rain sensor returns to the normal condition.
Washer fluid	Integrated rain sensor does not respond to the washer fluid during the Washer mode. In other words, wiping speed does not change even if the washer fluid is sprayed (automatic operation of the washer pump is not reflected in the functioning of integrated rain sensor).

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