RAIN SENSOR

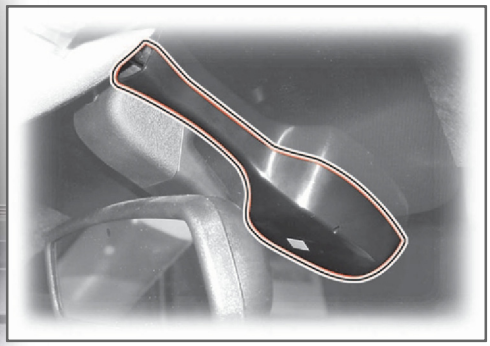
8611-09

OVERVIE

1. SYSTEM LAYOUT AND OVERVIEW

The rain sensing wiper unit in this vehicle doesn't control the wiper directly. The rain sensing unit detects the amount of rain drops and sends the operating signal to STICS, and STICS drives the wiper directly.

Rain Sensor Unit
(Auto Light Sensor Integrated Type)



A sensor that emits infrared rays through LED and then detects the amount of rain drops by receiving reflected rays against sensing section (rain sensor mounting section on the windshield) with photodiode. The auto light sensor is Integrated into the rain sensor.

Multifunction Wiper Switch:
AUTO and Sensitivity Control

AUTO: Wiper operates automatically by rain sensor
FAST <-------> SLOW: Auto delay/Auto speed control. A position that controls sensitivity against rains on the windshield and transmits wiping demand signal accordingly.

1) Internal Components

Emitter lens
The LED which is located at bottom emits the infrared rays and the lens guides the infrared rays to target point.

Auto light sensor (Vertical)

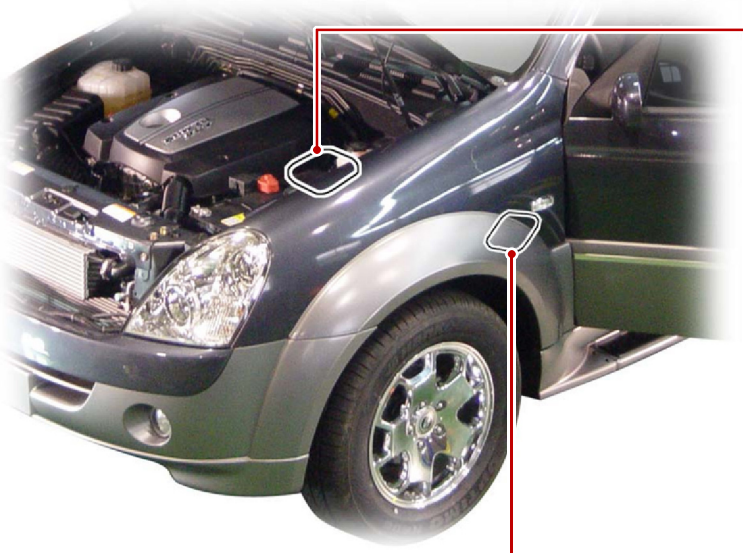
Auto light sensor (Horizon)

Enlarged auto light sensor section

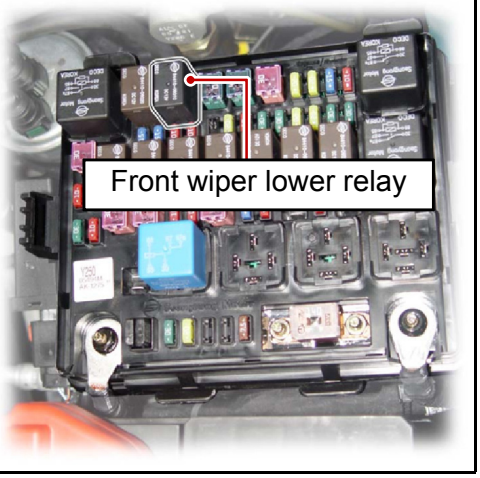
Modification basis	
Application basis	
Affected VIN	

2) Related Components

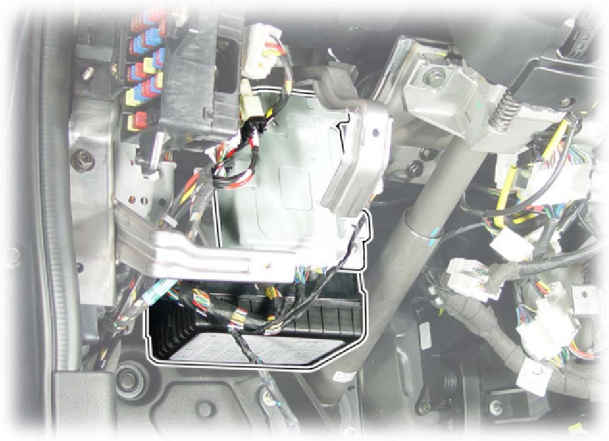
The rain sensing unit detects the amount of rain drops and sends the operating signal to STICS, and STICS drives the wiper directly. At this moment, STICS determines the wiper operation mode (washer, MIST, AUTO), then sends the information to the rain sensor.



Engine Compartment Fuse and Relay Box



IP Lower Relay Box



3) Auto Light Sensor and Rain Sensor Coupled Control

1. Rain detected headlamp:
   If it rains heavy which requires the intermediate INT speed, the headlamps are turned on automatically.

2. Night detected wiping:
   When the auto light control turns on the headlamps and the rain sensor detects the rain, the wiper sensitivity is automatically increased by one level.
   (For example, the AUTO wiper switch is at the 3rd level, but the wiper operates at the 4th level.)

2. OPERATION MODE OF RAIN SENSING WIPER SYSTEM

Driver Switch Positions		Operation Mode
MIST (transmits the manual operation mode signal to sensor)		As long as the switch is in MIST position, the wiper motor operates in low speed. The wiper blade returns to parking position if the switch returns to the original position. The rain sensor ignores inputs during parking signal periods.
OFF (transmits the manual operation mode signal to sensor)		The wiper motor rotates in low speed until it returns to parking position. When the system is in manual mode, the sensitivity of sensor will be set to 2 (AUTO 2) internally. By doing so, immediate wiping with proper intervals is possible when a driver sets the system from OFF to AUTO.
AUTO 1 (low sensitivity)	SLOW ▲	Auto delay/auto speed control. Low sensitivity against rains on windshield. When the switch is in AUTO position, the sensor transmits the wiping request signal to STICS.
AUTO 2 (low/med sensitivity)		Auto delay/auto speed control. Low/medium sensitivity against rains on windshield.
AUTO 3 (medium sensitivity)		Auto delay/auto speed control. Medium sensitivity against rains on windshield.
AUTO 4 (med/hi sensitivity)		Auto delay/auto speed control. Medium/high sensitivity against rains on windshield.
AUTO 5 (high sensitivity)	▼ FAST	Auto delay/auto speed control. High sensitivity against rains on windshield.
LOW SPEED (transmits the manual operation mode signal to sensor)		The wiper motor rotates continuously in low speed of approx. 45 rev./minute (in the normal battery voltage). The rain sensor operations are same as in MIST.
HI SPEED (transmits the manual operation mode signal to sensor)		The wiper motor rotates continuously in high speed of approx. 70 rev./minute at (in the normal battery voltage). The rain sensor operations are same as in MIST.

1. Rain detected head light:

If it rains heavy which requires the highest INT speed, the headlamps are turned on automatically.

2. Night detected wiping:

When the auto light control turns on the headlamps and the rain sensor detects the rain, the wiper sensitivity is automatically increased by one level. (i.e. the AUTO wiper switch is at the 3rd level, but the wiper operates at the 4th level.)

3. FUNCTIONS AND CHECKS OF RAIN SENSOR

The followings are the detailed description of the functions and operations of the rain sensing wiper control.

1) Front Windshield Glass and Coupler Attachment

Check the outer windshield surface of sensing area for wear, damage and scratch. The sensor is able to compensate the wear up to a specific level. Check the coupler attached surface of windshield for porosity. If the porosity exists, the sensor cannot function properly.

CAUTION

- If the installed wiper brushes are out of specification (size and length), the rain sensing area cannot be fully wiped.
- In this case, the rain sensor's sensitivity could be decreased and the wipers are not properly operated.

2) Recognition of AUTO Mode

1. When the engine is started with the multifunction wiper switch in "AUTO" position, the wiper operates one cycle to remind a driver that the wiper switch is in "AUTO" position.
2. When the wiper switch is turned to "AUTO" from "OFF", the wiper operates one cycle. It always operates one cycle for the initial operation, however, the wiper does not operate afterwards to prevent the wiper blade wear if not raining when turning the wiper switch to "AUTO" from "OFF". However, the wiper operates up to 5 minutes after rain stops.
3. If this function does not occur, check No. 2 terminal on the rain sensor. If any defective cannot be found, check the wiper relay (LOW) for defective.

CAUTION

- As described, the STICS recognizes if the wiper switch is in "AUTO" position. If there is no problem, go to diagnosis mode in STICS and check the terminal that receives signal from wiper and communication lines between rain sensor unit and STICS.

3) Instant Wipe Function

When the variable resistance knob on the multifunction wiper switch is turned by each 1 stage from low sensitivity (S mark) to high sensitivity (F mark), the wiper operates one cycle.

CAUTION

- When the variable resistance knob is rotated by 4 stage from 0 stage without stoping, the wiper operates one cycle. The wiper operates one cycle when changing the wiping stage (0 → 1, 1 → 2, 2 → 3).

4) Washer Coupled Wiper Function

Check the washer coupled wiper operation by pressing the washer switch.

5) Irregular Operations (Abrupt Operations)

- Check the sensor for coming off.
- Check the rain sensor cover's installation status.
- Check that the customer is familiar to how to control the wiper sensitivity.
  Check that the customer can select the sensitivity by selecting the variable resistance value (stage 1 to stage 5), that is, the wiper sensitivity control value. And, also check whether the sensitivity is selected to the highest value of FAST (stage 5).
- Check the wiper blade for wear.
  If the wiper blade cannot wipe the glass uniformly and clearly, the irregular operations could be occurred. And, the wiper blade should be replaced with new one with same specifications.

6) Self Diagnosis

▶ Poor Sensing

Position the wiper switch to "AUTO" position and rotate the variable resistance knob from "FAST" toward "SLOW" by one step. At this moment, check if the wiper operates one cycle.
The wiper operates when the windshield glass is excessively worn or scratched, the windshield glass is not cleared wiped due to using worn wiper blade or different wiper blade, or the rain sensor is not improperly installed.

▶ Poor Sensor

Rotate the variable resistance knob toward "SLOW" by 1 more step. At this moment, check if the wiper operates one cycle.
If the wiper operates, this is caused when the sensor is defective or the sensor has the communication problem with STICS.