



Automated headlights and windscreen-wiper activation

These systems aim to relieve the driver of routine tasks so that he can **give his attention to the road** or avoid him forgetting to put on his headlights when driving conditions require it.



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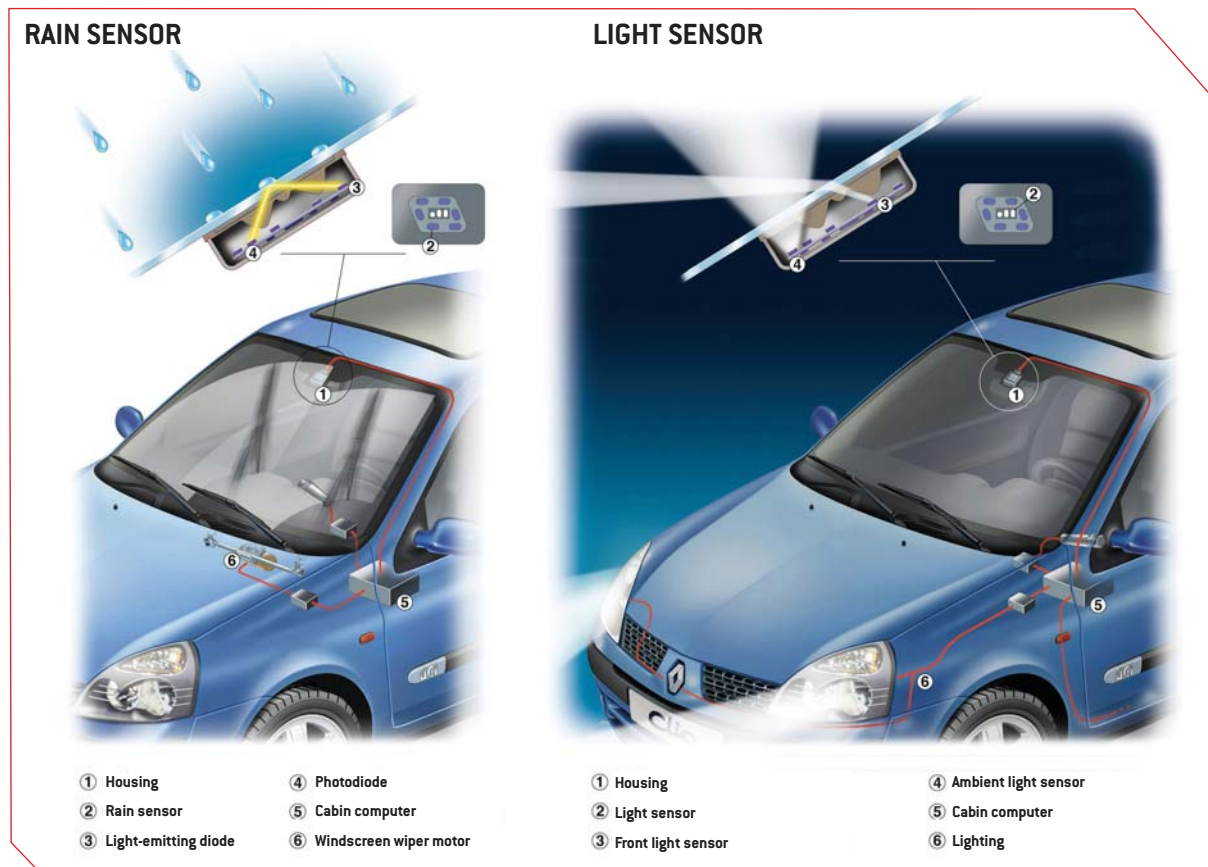
BASIC FACTS

The **driving station** of a current vehicle comprises an average of about thirty controls. However, as soon as the driver has to act on one of them, his attention is distracted from the road. Even if he is not aware of it and the fall-off in alertness is only very temporary, it is no less present. One must not lose sight of the fact that in only one second a car going at 90 kph travels

25 meters. At a speed of 130 kph, the distance in question is more than 36 meters. Each second lost can thus have serious repercussions during critical situations. Relieving the driver of performing operations that can be managed automatically to allow him to focus exclusively on driving therefore contributes to safety.



HOW DOES IT WORK?



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The rain sensor, placed behind the rear-view mirror, is based on the reflection of infra-red beams in the windscreen itself. To achieve this, two electro-luminescent diodes emit infra-red beams that penetrate the glass of the windscreen and are reflected on its external surface. These beams are emitted at an angle such that when reflected, they reach two photodiodes which measure their intensity. When the windscreen is dry, reflection is maximum. On the other hand, the presence of water decreases it because of the phenomena of infra-red diffraction within the drops. Furthermore, this loss of reflection is proportional to the quantity of water present on the surface of the windscreen. Thus, by measuring, through the photodiodes, modifications in reflection, the device computer determines not only if the windscreen is dry or wet, but also the quantity of water to be eliminated. It commands the activation of the windscreen wipers and their speed, according to the intensity of the rain.

The light sensor comprises three lenses that focus the light onto three photo-electric cells. This configuration makes it possible to divide "the luminous space" surrounding the vehicle into several zones through the directivity of each basic lens-cell pair. One pair measures the total ambient light, the second intercepts the frontal sources of light and the third makes it possible to distinguish a tunnel from a country road at night. By comparing the information gathered by these three devices, the system computer determines the situation with which the vehicle is confronted and commands the headlights in consequence. Furthermore, this "multi-sensor" configuration makes it possible for the computer to better manage transitions between zones of shade and zones of light.

The two systems interact. In night driving, for example, the threshold of windscreen-wiper activation is lowered. The driver remains in control of the system, of course, and can choose whether or not to activate it and can override it at any moment.

IN SHORT >>>

Windscreen wipers

Automatic activation of the windscreen wipers is controlled by an active infra-red sensor which detects the presence of water droplets on the windscreen by the modifications in reflection that they induce.

IN SHORT >>>

Lighting

Automatic lighting of the headlights is controlled by a passive light sensor. It measures available light using a set of photo-electric cells.