



# Automatic roll bars for coupé-cabriolets

Because of the absence of a roof, **the rear-seat passengers of convertibles are particularly exposed in the event of a rollover.** To protect them effectively, while preserving the convertible aspect of the car, Renault has developed automatic roll bars that deploy at the start of a rollover.



RENAULT COMMUNICATION

## ❖ BASIC FACTS

In a convertible, the safety area in a rollover is materialised, on the one hand, by the leading edge of the windscreen and in addition, by the roll bars placed behind the rear seats. Their height is thus of primary importance to ensure rear-seat passengers an adequate level of safety. Unfortunately, endowing these elements with sufficient height is incompatible with the elegant style of a convertible. To combine appearance and safety, Renault turned to the development of automatic, retractable roll bars. Retracted, their appearance is identical to that of head-restraints, which is indeed their purpose in the event of a rear collision. On the other hand, as soon as their control unit detects the start of rollover, they are deployed to ensure protection of the passengers.

### IN SHORT ❖❖❖

As soon as the start of rollover is detected, the roll bars deploy to increase the safety zone. In the event of accidental deployment, no risk to the passengers is entailed, and a manual reset can be performed.



## HOW DOES IT WORK?

### 1 THE COMPUTER

A computer analyses the rolling and pitching movements of the car. As soon as its angle of incline exceeds 50° along its lateral axis, or 67° longitudinally, the computer commands deployment of the roll bars; their travel is 130 mm. To do this, it activates an electromagnet which in turn releases the springs. The time required for deployment of the roll bars is considerably longer than that of an airbag, for example, since it is half a second. However, this duration is fully adapted to the situation because the rollover movement of a car is relatively slow and always much greater than this lapse of time. Moreover, the use of electromechanical and not pyrotechnic mechanisms has additional advantages. On the one hand,

deployment of the roll bars is carried out in a relatively gradual manner which consequently carries no risk for the occupants of the car. Additionally, this solution allows for a manual reset of the system in the event of accidental deployment: a situation that can occur in certain cases of extreme driving where the computer may interpret strong rolling or strong pitching as the start of vehicle rollover. Lastly, if the roof of the convertible is up, this does not prevent deployment of the roll bars. However, in this case, they do not reach their position of full deployment, but stop once they are almost touching the roof. This ability to adapt to the situation is made possible by the choice of the electromechanical system.

### 2 TESTS

To test the system's effectiveness, the convertible is sent down a sloping ramp which occupies only half of the roadway. This causes the car to roll over. During this test, known

as the "corkscrew test", the deformation of various elements (windscreen and roll bars) are analysed to check that the roll bars deliver the correct level of protection to the occupants of the car.

