

Press Release

Jan 11, 2008 | ID: 13830

Collision Warning with Auto Brake helps prevent rear-end collisions

Volvo Cars continues to address the problem of rear-end collisions by introducing Collision Warning with Auto Brake - a refined warning technology that makes the car brake by itself if the driver doesn't act when a rear-end collision with a moving or stationary vehicle is imminent.

"This can mean the difference between a serious injury and minor consequences for the occupants of both vehicles," says Jan Ivarsson, Senior Manager Safety Strategy & Requirements. The new technology is available in the Volvo S80, V70 and XC70 in Europe since the end of 2007 and will be introduced in North America in the beginning of 2008.

Rear impacts represent a third of all reported accidents - and in more than 50 percent of these accidents, the driver doesn't brake at all.

The new Collision Warning with Auto Brake initially warns the driver and pre-charges the brakes. The brakes are automatically activated if the driver doesn't act when a rear-end collision with a moving or stationary vehicle is imminent.

Collision Warning with Auto Brake has an elevated technology level compared to the Collision Warning with Brake Support that was introduced in 2006.

Combining radar and camera

While the original function, introduced in the Volvo S80, is radar-based, Collision Warning with Auto Brake uses both radar and a camera to detect vehicles in front of the car. The long-range radar reaches 150 metres in front of the car while the camera range is 55 metres.

By using Data Fusion to combine information from the radar and the camera, the function becomes more efficient.

"Since the Collision Warning with Auto Brake combines information both from the radar sensor and the camera, it gives such a high confidence level that automatic braking is possible if a collision is imminent.

The function is programmed to activate autonomous braking only if both sensors agree that the situation is critical," says Jonas Tisell, technical project manager for Collision Warning with Auto Brake at Volvo Cars.

One of the main advantages of the camera is the possibility of detecting stationary vehicles and warning the driver while maintaining a low false-alarm level.

"Statistics show that 50 percent of all rear-end collisions involve a stationary object, which means that Collision Warning with Auto Brake covers twice as many situations as its predecessor" says Jonas Tisell.

To adapt the Collision warning function to different conditions and individual driving styles, its sensitivity can be regulated in the car settings menu. There are three alternative sensitivity positions.

Begins with a warning - and pre-charging of the brakes

If the car approaches another vehicle from behind and the driver does not react, a red warning light flashes in the head-up display on the windscreen. At the same time, an audible signal can be heard. This helps the driver react and an accident can be avoided in most cases.

"The head-up display gives a clear and very efficient warning. The red light appearing on the windscreen in front of the driver produces the same gut-reaction effect as when you see a brake

light in front of you," says Jonas Tisell.

If the risk of a collision increases despite the warning, the brake support is activated. To shorten the reaction time the brakes are prepared by the brake pads being placed against the discs. The brake pressure is also reinforced hydraulically, ensuring effective braking even if the driver does not press the brake pedal particularly hard.

Auto Brake lowers impact speed

If the driver doesn't brake and the sensors determine that a collision is imminent, the brakes are activated. Auto Brake is designed to lower the impact speed as much as possible and thereby reduce the risk of injury to the occupants of both vehicles.

"A reduction in collision speed from 60 km/h (38 mph) to 50 km/h (31 mph), for example, gives approximately 30 percent less impact energy. This can mean the difference between a serious injury and minor consequences for the occupants. However, if the driver reacts on the warning, the Collision Warning with Auto Brake can help avoid the impact entirely," says Jonas Tisell.

Adaptive Cruise Control (ACC)

To make driving more comfortable, Volvo Cars has developed Adaptive Cruise Control, ACC. It helps the driver by maintaining the distance to the car in front and this function contributes to relaxed driving control when the traffic flow is uneven.

Adaptive Cruise Control uses a radar sensor to continuously measure the distance to the vehicles in front and it automatically adapts the speed of the car to ensure that the distance is maintained. The driver activates the cruise control, sets the desired maximum speed between 30 km/h (19 mph) and 200 km/h (125 mph) and chooses a time interval to the car in front. There is a choice of five different time intervals between 1 and 2.6 seconds.

When the radar sensor detects a slower vehicle in front of the car, the speed is automatically matched to that vehicle even when it changes speed.

"Since Adaptive Cruise Control handles part of the routine driving operations the driver can focus further ahead and drive with greater safety margins," says Jonas Tisell.

Distance Alert (DA)

Distance Alert helps the driver keep a proper distance to the vehicle in front even when the Adaptive Cruise Control is disengaged.

Distance Alert is activated via a button in the centre console. As with ACC, the driver can choose between five settings. If the time gap to the car in front becomes shorter than the selected value, the driver gets visual information in the head-up display on the lower part of the windscreen.

If Distance Alert is engaged and ACC is activated, the DA function is temporarily disengaged.

Both ACC and Distance Alert are tailored to help the driver comfortably follow national regulations regarding the required distance to the vehicle in front.

Certain limitations

Poor light, fog, snow and extreme weather conditions can make functions unavailable. In situations where objects are invisible to the camera due to low visibility, the functions will be degraded back to the functionality level of the previous "Collision Warning with Brake Support", which only uses the radar sensor.

Keywords:

Press Releases, 2008, XC70 (2008-2016), V70 (2008-2016), S80 (2008-2016), Product News

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