

Extended PRE-SAFE® protection

Prevention is better than cure

Ten years ago, Mercedes-Benz unveiled a ground-breaking safety concept in the form of the PRE-SAFE® anticipatory occupant protection system, which has been undergoing continuous refinement ever since. Now, the safety pioneer is increasing protection levels once again.

Press Information

The new PRE-SAFE® functions can help to prevent collisions with pedestrians and vehicles in front in city traffic, defuse dangerous situations caused by traffic behind and enhance the protection offered by the seat belts.

Including pedestrian detection and City Brake function: BAS PLUS and PRE-SAFE® Brake

Pedestrian detection has been added to the BAS PLUS and PRE-SAFE® Brake functions, while autonomous braking for vehicles in front has undergone a major advance, too.

Thanks to the combination of stereo camera and radar sensors, it is now possible to detect pedestrians in front of the vehicle. Visual and acoustic warnings are triggered when a hazard is spotted. If the driver then reacts by braking, the braking power will be boosted by BAS PLUS as the situation requires, right up to a full brake application. Should the driver fail to react, PRE-SAFE® Brake triggers autonomous vehicle braking. The PRE-SAFE® Brake with pedestrian detection is active up to approx. 72 km/h, and is able to prevent collisions with pedestrians autonomously from an initial speed of up to 50 km/h.

Evaluations of GIDAS accident data carried out by Mercedes-Benz indicate that this new technology could avoid 6 percent of pedestrian accidents and reduce the severity of a further 41 percent. The operating range of the autonomous braking function for stationary vehicles has been optimised so that rear-end collisions can likewise be avoided at speeds of up to 50 km/h now.

BAS PLUS with Cross-Traffic Assist and PRE-SAFE[®] Brake with pedestrian detection rely on the same sensors employed for the adaptive cruise control system DISTRONIC PLUS with Steering Assist: the new stereo camera plus the multistage radar sensor system (see section "Under the microscope").

Safety measures in response to an imminent rear impact:

PRE-SAFE[®] PLUS

PRE-SAFE[®] PLUS offers an extension of the familiar occupant protection measures in situations where traffic behind poses a danger. A radar sensor in the rear bumper monitors the traffic behind the vehicle. If the risk of an impact from the rear is detected, the rear hazard warning lights are activated to alert the driver of the vehicle behind (not on vehicles with USA/Canada coding). Apart from this, the PRE-SAFE[®] anticipatory occupant protection measures, such as the reversible belt tensioners, are deployed. Plus, if the vehicle is stopped and the driver indicates a wish to remain stationary – by depressing the brake pedal, for example, activating the HOLD function or moving the selector lever to "P" – PRE-SAFE[®] PLUS will also come to the driver's aid by increasing the brake pressure in order to keep the vehicle firmly braked during a possible rear-end collision.

Keeping the vehicle firmly braked greatly reduces the strain placed on the occupants, such as the risk of whiplash injuries. At the same time, it serves to protect other road users by restricting uncontrolled vehicle movements after the initial impact that could lead to secondary collisions, such as running into a vehicle in front or colliding with pedestrians or other road users at junctions.

Intelligent countermovement: PRE-SAFE[®] Impulse

Mercedes-Benz is extending the front seat belt's protective function with the introduction of PRE-SAFE[®] Impulse: at an early phase of the crash, before the resulting deceleration starts to increase, the front occupants are pulled away from the direction of impact and deeper into their seats by their seat belts. By the time the accident enters the phase when loads peak, the extra distance they are retracted by can be used while dissipating energy in a controlled fashion. Pre-acceleration and force limitation allow the occupants to be

temporarily isolated from the effects of the crash, significantly reducing the risk and severity of injuries in a frontal collision.

With PRE-SAFE® Impulse, the seat belt strap can be retracted by pyrotechnic means at all three belt anchorage points, and released again with controlled force. The fundamental difference compared to conventional belt tensioners is that the force for retracting the belt strap is maintained for a much longer time. The deployment logic fires the seat belt system's belt tensioners progressively depending on the severity of the accident. In this way, the tensioning force can be adapted as required. The PRE-SAFE® Impulse system is integrated in the seat's structure and supplements the pyrotechnic reel tensioner with a pyrotechnic buckle and anchor fitting tensioner including central gas generator.