

Chassis Systems Control **Adaptive Cruise Control: with built-in safety distance**



BOSCH

Invented for life



Less stress behind the wheel with Adaptive Cruise Control (ACC)

The driver assistance system ACC reduces stress for the driver while behind the wheel. It controls the vehicle's speed so that it remains at a predefined minimum distance to the preceding vehicle. The driver not only enjoys increased comfort – he/she is also better able to concentrate on the current traffic situation and automatically keeps the correct safety distance.

Why is ACC important?

In today's heavy traffic, driving is hard work. The driver must continually concentrate on the vehicle environment and dynamic traffic situations. He/she must frequently adjust speed by braking or accelerating to safely flow with traffic. With ACC driving is safer and more relaxed.

How and when is ACC used?

ACC extends the benefit of cruise control by an additional dimension: automatic distance control from the vehicle in front. As long as the road is clear, ACC automatically maintains a driving speed set by the driver.

If the driver approaches a vehicle or if another vehicle pulls into the lane, the driver does not need to apply the brakes. ACC takes over and ensures

that a defined safety distance is always maintained. This distance can be adapted to individual driving behavior. Once the lane is open again, ACC accelerates to the previous set speed selected by the driver.

Since ACC is a comfort and convenience system, brake interventions and vehicle acceleration only take place within defined limits.

Standard ACC can be activated from a speed of about 30 km/h (approx. 20 mph). It mainly supports the driver during long journeys on expressways and secondary roads.

The variant ACC Stop & Go controls the distance at speeds below 30 km/h (20 mph) and remains active until the vehicle comes to a standstill. This driv-

er assistance system can maintain a safe distance to the preceding vehicle even at very low speeds, for instance at walking speed. In stop-and-go traffic it can decelerate the vehicle to a standstill and resume automatically after the driver touches a button or presses the accelerator pedal. This reduces stress in heavy traffic and in traffic jams.

How does ACC work?

ACC registers the situation in front of the vehicle with the help of a radar sensor. ACC sends and receives radar signals to calculate distance and relative speed to preceding vehicles by evaluating the signals' reflections.

No obstacles ahead:
ACC drives at the
selected set speed

The range of the LRR3 long-range radar sensor is up to 250 m (approx. 820 feet)



In addition, ACC predicts the course being taken by its own vehicle and then decides whether any of the vehicles in front are relevant for distance control.

In order to adapt the speed to a given situation, ACC automatically sends commands to the engine management and/or – in combination with ESP® – to the braking system.

Is it necessary to change one's style of driving with ACC?

Even though ACC provides active support and reduces the stress level, the driver still remains completely responsible for the vehicle. The driver's actions always have priority over the ACC's commands. With ACC activated, the driver can increase the acceleration regulated by the system by using the accelerator pedal, for instance. As soon as the driver takes his/her foot off the pedal, ACC smoothly regulates the vehicle's

speed back to the selected set speed. Briefly applying pressure to the brake pedal suffices to switch off ACC. When ACC is switched on again by the operating switch, the last speed setting is activated.

Where is ACC available?

ACC is available on many upper to premium segment vehicles. Thanks to ongoing development of radar and circuit technologies, Bosch is continually reducing the system's price. This means it soon will be available in compact cars as well.

ACC accelerates again to the selected speed



ACC registers the vehicle moving out in front of it and follows at the defined distance



Adaptive Cruise Control (ACC) – from comfort system to safety system



Predictive Emergency Braking Systems

Accident research shows that prior to rear-end crashes most drivers do not apply the brake pedal strongly enough, or do not apply the brakes at all. That is why Bosch has developed Predictive Emergency Braking Systems, which enable a faster reaction to critical situations. These network the ACC radar sensor and the active safety system ESP® to support the driver with an intelligent predictive warning concept and effective brake assistance in case of emergency. Rear-end collisions can then be avoided or the consequences of a collision can be mitigated.

Predictive Collision Warning

If a vehicle gets increasingly closer to the preceding vehicle, Predictive Collision Warning identifies the danger in advance and warns the driver of an impending collision at an early stage. In combination with ESP®, the system triggers a short but noticeable brake

pulse. Alternatively, or additionally, it can also warn the driver by means of optical or acoustic signal or a short tug on the safety belt. The driver then gains important reaction time and is given the chance to prevent a collision by braking or by taking avoiding action.

Emergency Braking Assist

Emergency Braking Assist extends the functions included in Predictive Collision Warning. In a critical rear-collision situation, the function calculates the plausibility that emergency braking may be required and prepares the entire braking system immediately: It pre-fills the brake circuits, draws the brake pads up to the brake discs and reduces the triggering threshold for the hydraulic brake assist system.

If the driver reacts to the critical situation, full braking power is available hundredths of a second earlier. If he/she does not apply the brakes strongly enough, this function will apply deceleration measures calculated from data on the surroundings to avoid impact with a preceding obstacle.

Automatic Emergency Braking

Automatic Emergency Braking is a further extension and also includes the functions of Predictive Collision Warning and Emergency Braking Assist.

If the driver does not react to the previous system warning, or fails to react adequately, Automatic Emergency Braking intervenes. First, the system triggers Automatic Partial Braking as soon as the vehicle gets critically close to a preceding vehicle. The driver gains more time to react and the stopping distance can be shortened.

If the collision is imminent and no longer avoidable, the system triggers Automatic Full Braking in order to provide maximum possible vehicle deceleration and reduce consequences of the accident. This places the highest demand on precision in object recognition and on the evaluation of the risk of an accident. For this purpose the radar sensor can be supplemented by video technology as a further measuring system.

Robert Bosch GmbH
Chassis Systems Control
Driver Assistance

Postfach 16 61
71226 Leonberg
Germany

www.bosch-acc.com

Printed in Germany
292000P03H-C/SMC2-200906-En