



Volvo Chassis - Volvo Fusion 2 Collision Warning System Information



> Internal Content

Collision warning system

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Impact Meta Data

Valid From	28.06.2019
Valid To	01.01.2099
PD string	VN

Collision warning with emergency brake function description

Component location Overview

1	Instrument cluster
2	Control unit VECU (Vehicle Electronic Control Unit)
3	Control unit LCM (Light Control Module)
4	Control unit ABS (Antilock Braking System)
5	Forward looking camera
6	Safety direct processor
7	Forward looking radar

Function

The Collision warning with emergency brake (CW-EB), automatically detects a probable forward collision and provides a warning to the driver as well as activates the vehicle braking system to decelerate the vehicle. The purpose of the deceleration is to avoid or mitigate the severity of a collision in the event that the driver does not respond to the warning.

- The Collision warning with emergency brake (CW-EB) shall be activated when vehicle speed is above 15km/h.
- The function can be activated/deactivated using an CW-EB switch situated on the dashboard.
- The driver can, at any time during operative action performed by the CW-EB system (during the warning and emergency braking phases), take control and override the system with a conscious action. A kick-down action will interrupt an ongoing emergency brake.



Function description

Forward looking camera

Forward looking camera

The camera is a visible light spectrum camera mounted near the top and center of the windshield of the vehicle.

The system supplies feedback to the driver during lane departure warning incidents using audible alerts. The camera supplies supplemental visual data that along with the radar sensor which helps the system generate data about the traffic and environment around the

The bendix wingman fusion camera has been developed to recognize license motorized vehicles and may not be able to consistently recognize other objects (such as certain trailers and non-motorized vehicles). This will impact the system's ability to apply the enhanced CMT function as well as stationary vehicle braking.

Control unit - Brakes

Brake controller located in the cab of the vehicle controls the antilock braking and full stability functions for the vehicle, using a set of wheel speed, yaw, steering and load sensors. In system the controller also manages actions requested by the forward looking radar.

Safety direct processor (Only if the vehicle was ordered with data capture)


If the customer chooses the Data Capture option, a safety direct processor will be located close to the camera in the cab of the vehicle typically in an over the windshield compartment. The SDP collects, stores, and transmits data via on board computers (OBC). Additionally, the SDP will capture video from triggering events. The data and video is available through the Safety direct web portal.

Forward looking radar

A radar is located at the front of the vehicle on the bumper or just behind on a cross member. The radar sensor is pre-aligned at the factory and no adjustment is required, unless the bumper or mounting cross-member is damaged /replaced, in this case the radar has to be aligned.

Automatic Emergency Braking (AEB)

Reduced risk for frontal collisions, Collision mitigation on stationary and moving vehicles Increased retardation performance to max 6m/s^2 to allow for up to 50mph vehicle deceleration depending on vehicle and road conditions.

 Live UI Stationary forward vehicle resulting in Automatic Emergency Braking (AEB) application.

- (2) Rapid approach to a slow moving forward vehicle resulting in Automatic Emergency Braking (AEB) application.
- (3) Rapidly decelerating forward vehicle resulting in Automatic Emergency Braking (AEB) application.

Multi-lane continuation of Automatic Emergency Braking (AEB)

If braking due to a vehicle in the same lane ahead and the driver changes to an adjacent lane, the system shall continue to apply the brakes if another vehicle is detected.

- (1) Evasive maneuver to adjacent lane with lower speed or stationary vehicle in that adjacent lane.
- (2) Evasive maneuver to adjacent lane with lower speed vehicle transitioning to that adjacent lane.
- (3) Evasive maneuver with multiple Adjacent Lanes Blocked by stationary vehicles.

Collision warning function scenario

Function scenario

Collision warning with emergency braking

The forward collision warning function warns the driver when a vehicle appears in front of the vehicle and becomes a potential threat. This is achieved by measuring the distance to the object in front and calculating the time to a potential collision. Based on this information, the forward collision warning warns the driver to take action by emitting an audio warning and flashing a telltale. The emergency braking function reduces the severity of a forward collision and tries to avoid it. By collecting and processing information on distance and motion of an obstacle, vehicle speed, drive commands and driver actions, emergency braking determines if the obstacle ahead presents a threat. If a collision is calculated as unavoidable without immediate action on the brakes from the driver, emergency braking will activate the brakes to reduce the force of the impact or try to avoid the collision.

- The system only takes into account vehicles ahead that are driving in the same direction in the same and adjacent lanes, not oncoming traffic.
- Braking lightly will not affect the emergency braking, while forceful braking will (if possible) increase the braking effect.



- The driver will receive warnings before a collision becomes

unavoidable; these warnings are handled by the forward collision warning function.

- Any modifications to the area in front of the sensor may not guarantee the correct function of the system.
- Depress the accelerator pedal beyond the kick down point to stop unwanted emergency braking.
- The system is deactivated after three incidents of full braking. The function can be reactivated at the next key cycle.
- After a collision or minor impact that could have affected the area around the sensor, visit an authorized workshop to ensure full function and correct setting of the sensor.

Scenario

The FLR (B82A) indicates a rapidly decreasing distance to an obstacle ahead that is confirmed by the FLC.

1. A warning is sent from the FLR(82A) to the instrument cluster (A03). The warning is issued to the driver via the speaker and the blinking of a visual telltale both in the instrument cluster (A03).

2. Then if the driver does not react, full brake starts.

3. FLR(82A) sends braking request to the control unit brakes (A12B) The control unit brakes (12B) requests:

- to ECM (Engine Control Module) (A14B) to stop injection.
- TECU (Transmission Electronic Control Unit) (A13E) to disengage the drive line for vehicles with AMT.
- Control unit brakes (A12B) then activates the wheel brakes.
- The LCM (A27) monitors the messages from the FLR(82A) and the vehicle speed during the braking event and turns on the hazard lights when the vehicle slows to 5mph.

4. After the vehicle has stopped,

- The control unit brakes (A12B) maintains the braking until the driver takes back the control of the vehicle by pressing the accelerator or brake pedal, by applying the parking brake.

- Vehicle speed is above minimum emergency braking activation speed.
- The FLR is fully functional.
- The FLC is fully functional.
- Control unit brakes is fully functional.



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