



**** SOLUTION ****

Title Volvo Chassis - Fusion 2 Adaptive Cruise Function Document

Volvo Models

Volvo Model VN

**** SOLUTION ****

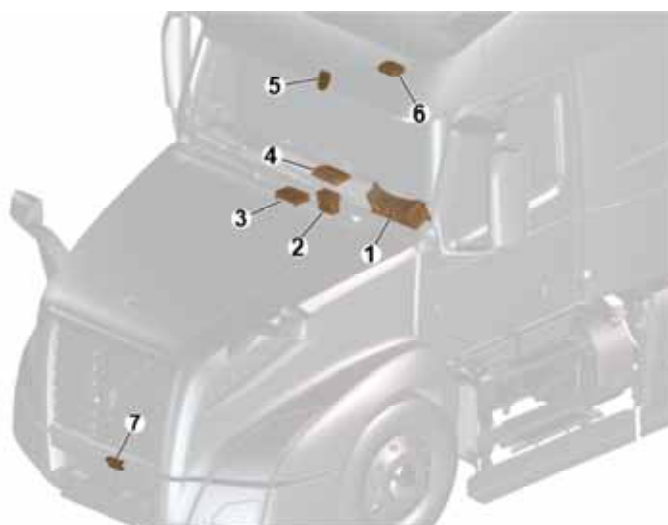
Cause Limited information regarding Fusion 2 Adaptive Cruise found in Trucks Dealer Portal (TDP).

Solution **Adaptive cruise control**

Adaptive cruise control function description

Component location Overview

1	Instrument cluster (A03)
2	Control unit VECU (Vehicle Electronic Control Unit) (A17)
3	Control unit LCM (Light Control Module) (A27)
4	Control unit brakes (A12B)
5	Forward looking camera (FLC20)
6	Safety direct processor (SDP)
7	Forward looking radar (FLR) (B82A)



Function description

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 vehicle.

Note:

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.



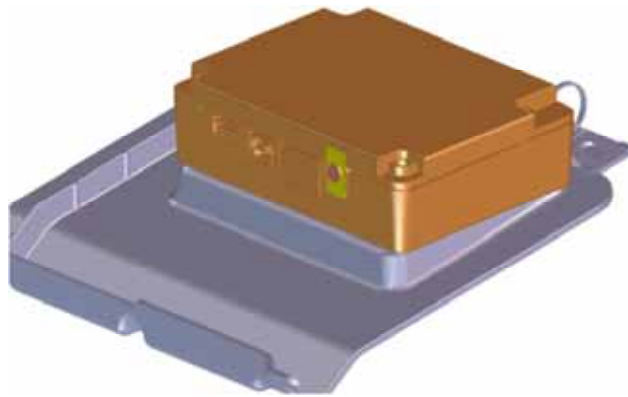
Control unit - Brakes

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.



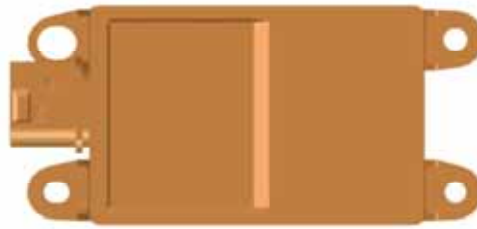
Safety direct processor (Only if the vehicle was ordered with data capture)

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

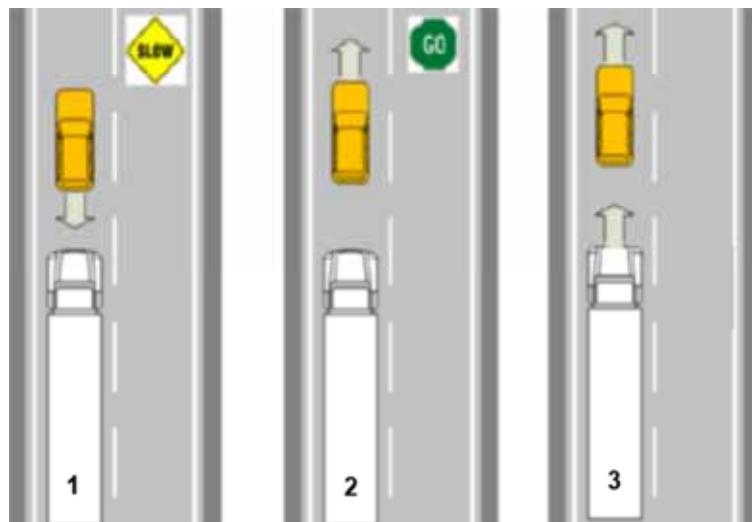
A radar is located at the front of the vehicle on the bumper or just behind on a cross member. The radar sensor is pre-aligned at the factory and no adjustment is required, unless the bumper or mounting cross-member is damaged/replaced, in this case the radar has to be aligned.



Adaptive cruise control (ACC)

When in Adaptive Cruise Control and the system has applied foundation brakes to maintain the desired ACC following distance, and thus disengaged cruise control mode. If above cruise control speed threshold, the driver must manually resume cruise control by pushing the cruise re-sume switch. When below the threshold, driver shall be required to accelerate the vehicle above speed threshold and resume cruise control manually.

- (1) Lead Vehicle reduces speed resulting in ACC system to apply foundation brakes to maintain following distance.
- (2) Lead Vehicle accelerates speed to again reestablish the desired ACC following distance.
- (3) With following distance than predefined following distance, and truck not below the defined cruise set speed the driver must manually resume ACC via the resume cruise control switch.

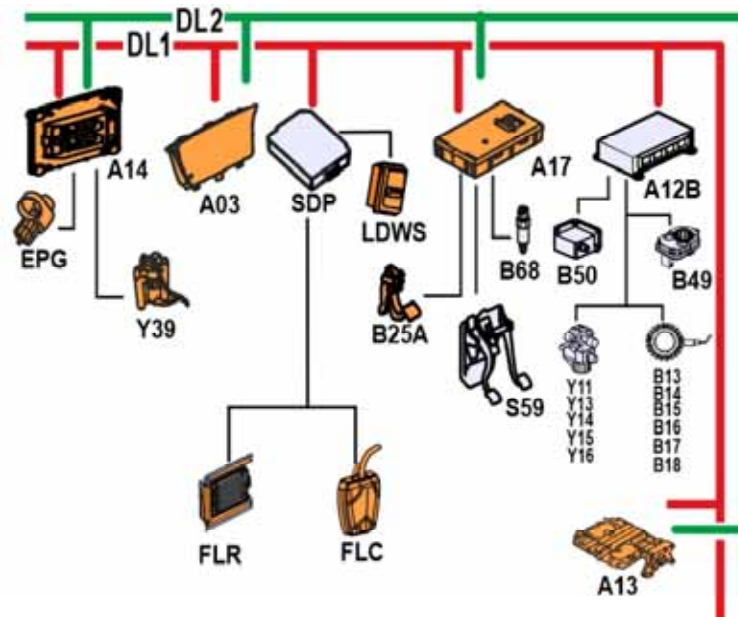


ACC (Adaptive Cruise Control)

Scenario

1. When the cruise control is active - it transmits the information to the instrument cluster (A03).

2. The vehicle speed sensor (B68) sends information to the VECU (A17) about actual vehicle speed. The forward looking radar (B82A) sends information to instrument cluster (A03) about forward object detection within the predefined time gap. VECU (A17) sends information to ECM (Engine Control Module) (A14C) about actual vehicle speed and CC set speed. The TECU (Transmission Electronic Control Unit) (A13B/A13E) (depending on variant) sends information to ECM (A14C) about available driveline retardation torque.
3. The FLR(B82A) sends a request to the control unit brakes (A12B) for deceleration rate. The control unit brakes (A12B) send the request to the ECM (A14C) to stop injection to maintain vehicle speed and the time gap.
4. If the de-throttle is not sufficient to reduce the speed, the control unit brakes (A12B) requests the ECM (A14C) to activate the engine brake to further reduce vehicle speed to keep time gap setting.
5. The ECM (A14C) activates the engine brake. If requested, the TECU (A13B /A13E) (depending on variant) activates the transmission downshifting.
6. The ECM (A14C) sends the actual engine brake torque value (% of reference torque) to VECU (A17). The TECU (A13B/A13E) sends the actual driveline retarder torque value (% of reference torque) to VECU (A17).
7. If the de-throttle and engine brake is not sufficient the control unit brakes (A12B) activates the foundation brakes enough to further slow the vehicle to maintain the time gap



Preconditions:

- The accelerator pedal is released.
- The ACC is active.
- The FLR is fully functional
- The control unit brakes is fully functional.

Parameters:

- The adaptive cruise control minimum speed, default or as set (as part of the Cruise Control).

- The adaptive cruise control time gap, default or as set.
- Cruise control speed setting, default or as set (as part of the Cruise Control).

ACC braking

The ACC has default CC (Cruise Control) set speed and a time gap between the ahead vehicle,

whenever the CC set speed and time gap setting overlapped the predetermined value, the system automatically adjust the CC set speed and time gap by increasing the retardation rate on applying CC brake.

Whenever the both the forward looking radar (FLR) and forward looking camera identify a path

vehicle in the direction of truck, the system warns the distance alert and the forward looking radar request a deceleration from the brake controller switch automatically adjust the time gap difference by de-throttle applying brake and foundation brakes as needed to maintain the time gap.

After retaining the CC set speed over 10 mph the system automatically resume the CC speed and time gap settings in to default values.

Solution visibility

Dealer distribution

Function Group

Function Group

3 electric power supply; lighting; instruments; software; warning and information system , 5 brake

Administration

Author

A044013

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A044013

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Variantes Kola

A5X - INTERIOR
GENERATION

A5D

GCX - COLLISION
AVOIDANCE SYSTEM

CAVS-AC4 , CAVS-AF4

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