

Front Camera Module Upgrade

Saab 9-5 My 10-12



Introduction

This document describes the Front Camera Module upgrade that can be bought for Saab 9-5NG. The car must be equipped with a HUD and colour DIC. This system adds Forward Collision Alert, Following Distance Alert, Pedestrian Collision Alert, Lane Departure Warning, Traffic Sign Recognition and Intelligent High Beam. Lane Departure Warning and Intelligent High Beam must be activated in the instrument cluster for full functionality.

This system is designed to assist the driver, however always keep in mind that the system is no substitute for safe and alert driving.

System description

The system upgrade consists of a new forward-facing camera, a can bus gateway, a modified steering wheel button and wiring harness. The camera utilized is a Mobileye 630 that supports Forward Collision Alert, Following Distance Alert, Pedestrian Collision Alert, Lane Departure Warning, Traffic Sign Recognition and Intelligent High Beam. These features are supported in the inbuilt graphics of the Saab 9-5 my11-12 and are activated using the CAN bus gateway. The CAN bus gateway is connected to three CAN buses, the single wire low speed CAN bus, the High-Speed Vehicle CAN bus and the camera CAN bus. Additional equipment such as the Head Up display and the Instrument Panel Cluster are connected to either of these CAN buses and listens to messages sent by the gateway.

Operation

Forward Collision Alert (FCA)

FCA is activated at speeds above 10 km/h and alerts the driver with 8 beeps and a flashing red icon in the Head-Up display. Notification is made if the host vehicle is approaching another vehicle too fast. The judgement algorithm for an impending collision is performed by the camera and might be falsely triggered by objects such as parked vehicles etc.

A green vehicle icon is displayed in the Head-Up display (See Figure 1) if a vehicle is detected in front of the host vehicle. If this green icon is not shown, Forward Collision Alert will not work,

Following Distance Alert (FDA)

FDA or Tailgate Alert notifies the driver if the vehicle is following another vehicle too close. Notification is done by a solid red icon in the Head-Up display (See Figure 1). Three following distances in seconds can be set by pressing the upper part of the leftmost button on the steering wheel. The distances correspond to 1, 1.5 and 2 seconds (See Figure 2). The greater the speed, the greater the distance. This function can be turned off by pressing the button and releasing it after more than 2 seconds. A message will then be shown in the Instrument cluster: "Forward Collision Alert off!". This message is a bit ambiguous since the Forward Collision Alert and Pedestrian Collision Alert is still active, but the Following Distance Alert is turned off. This message was the only of the pre-made graphics available, thus the slight confusion.

Pedestrian Collision Alert (PDA)

PDA notifies the driver of an impending crash with a pedestrian. The system notifies the driver with 8 beeps and a red flashing icon in the Head-Up display.

Lane Departure Warning (LDW)

LDW notifies the driver if the vehicle unintentionally leaves the lane. This function is active at speeds above 63 km/h and is indicated by a yellow icon in RPM-meter of the instrument cluster. If the system has detected valid lane markings, the icon turns green and is then ready for notifying the driver. If the driver unintentionally leaves the lane three short beeps are heard in either left or right speaker at the same time as the icon flashes yellow. The system can be turned off by pressing the LDW-button in the centre console.

Traffic Sign Recognition (TSR)

TSR recognises Analog and digital Speed Signs as well as Overtaking Prohibited/Allowed. The last recognised speed signs are presented in the instrument cluster, both as a slide-in graphic and in the upper part of the Driver Information Center. Overtaking OK / Overtaking Not Ok are only presented as slide-in graphics.

Intelligent High Beam (IHC)

IHC turns High Beam on and off depending on driving situation. The system is activated by flashing the beam-stalk twice within two seconds. Active system is indicated by a slide-in message and a green IHC icon in the right part of the instrument cluster. Turning off the system is done by again flashing twice. The system actives High Beam when the ambient light is below a certain threshold, no city lights are detected, no oncoming vehicles are detected and no vehicle tail lights are detected. The High Beam decision can be temporarily overridden by flashing the high beam once. The system is then off for 15 seconds until it again makes a new High Beam decision.

Fault messages

“Camera Can’t see, clean window”

This message appears if the camera is subject to high dirt or heavy light such as low standing sun. During normal driving this condition only apply for a short while and is indicated by a yellow Lane Departure Warning Icon.



Figure 1 - Indications in Head-Up Display, green car icon and red collision warning/tailgate alert



Figure 2 - Distance setting as shown in Driver Instrument Cluster - Far distance visualized