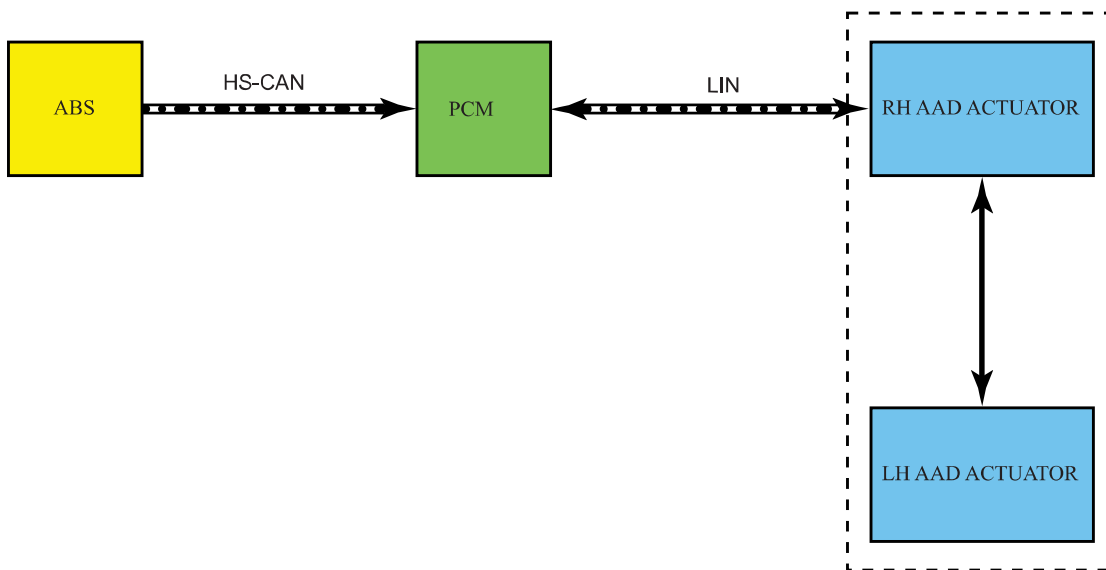


## Active Air Dam (AAD) - System Operation and Component Description



### System Diagram



E340695

### System Operation

#### Network Message Chart

##### PCM Network Input Messages

Broadcast Message	Originating Module	Message Purpose
Vehicle speed	<u>ABS</u> module	Vehicle speed is used to determine positioning of the active air dam.

### Component Description

#### AAD

The AAD system consists of two AAD actuators, a AAD blade (plastic spoiler plate), and mechatronic linkage components connecting the actuators to the AAD blade. The position the AAD blade is determined by commands from the PCM . The

AAD drive linkage mechanism connects the two AAD actuators and the AAD blade via individual screw-drives, which are fastened to the base of the bumper. The AAD blade moves in a vertical plane, from fully retracted (up) to fully extended (down) and, based on the position commanded by the PCM , is set in 1 of 11 positions, from 0 to 100 percent (approximately 10 percent of full movement range between positions).

After an engine starting event, a self-calibration of the AAD system commences with the AAD blade moving to the fully retracted or "home position" (0 percent) to learn its fully up position.

The AAD blade remains in the fully up position until the vehicle speed exceeds approximately 72 km/h (45 mph) continuously for approximately 15 seconds. When this condition is met, the AAD blade will extend fully down (100 percent) and if there are no system faults, the fully down position will be learned. If the end stop learning is successful, the AAD blade may be commanded to any one of the position steps, 0-100 percent. When the vehicle speed decreases below approximately 62 km/h (39 mph), the AAD blade will fully retract to the "home position".

At any point that in the AAD operation, if a blocked air dam fault is present, a movement is initiated in an attempt to resolve the problem. If the problem is not resolved after a programmed number of re-calibration attempts (approximately 10), a timer starts and sets a DTC when the timer reaches a predetermined limit.

During normal operation, the AAD blade will be fully retracted when the engine is turned OFF.

The PCM communicates the desired position (up, down or in between) of the AAD system. The AAD blade control is based on various PCM inputs (vehicle speed, braking state, and various driving modes).

The PCM communicates to the AAD actuator via a LIN . The LIN supports bi-directional communication between the AAD actuator(s) and PCM , allowing the AAD actuators to communicate position and fault information to the PCM .

The PCM sets AAD DTC when the fault information is communicated by the AAD actuator for a predetermined amount of time. Any failures of the LIN for over 10 seconds continuously results in the AAD actuator positioning the AAD blade fully retracted (up). There is no indication to the driver of the vehicle when a fault with the AAD system is present or an AAD DTC is set in the PCM .

### **AAD Actuator**

The RH is smart (lead) actuator and the LH is the dumb (follower) actuator. The smart actuator receive position requests from the PCM via the LIN communication network. The two actuator motors work in tandem to control the AAD blade. Each actuator is coupled to a screw drive, which in turn is connected to a bracket that is mounted to the AAD blade. Both actuators turn in unison to move the AAD blade up and down, while maintaining it in a level position. The AAD actuators can be serviced separately or can be serviced as an entire assembly.

The driver and passenger side AAD actuators are not interchangeable.

### **AAD Blade**

The AAD blade is a spoiler plate which moves up and down in a vertical plane, via linkage to a screw-drive mechanism, which is controlled by two actuator motors. The AAD is typically serviced as an entire assembly, which includes the AAD blade, AAD actuators, mounting brackets, screw-drives, and jumper wiring harness and also AAD actuators and AAD blade can be serviced individually.

