Driver Assistance Systems

Description and Operation

Driver Assistance Systems Configuration Reference

During the course of vehicle diagnosis and repair, part replacement, or collision repair, components related to advanced driver assistance systems may need to be accessed or removed. In some cases, a calibration may need to be performed after service to ensure proper operation of the system. Below is a list of available systems, components involved in the system, and when these components require a calibration procedure be performed. Refer to the appropriate Service Information document for specific calibration instructions, as well as any additional programming operations needed if the component was replaced.

System Description

System	RPO	Abbreviation	Description
Super Cruise	UKL	—	– Super Cruise is a driver assistance feature that enhances Adaptive Cruise Control by allowing hands-free driving under compatible highway driving conditions while helping prompt the driver to pay close attention to the road so they are ready to take control. The Active Safety Control Module 1 is the primary control module for Super Cruise operation, while Active Safety Control Module 2 is a redundant control module for backup operation. – The Super Cruise driver assistance feature uses Global Positioning System (GPS) sensing, GPS-enhanced data, a high-precision map and network of cameras to maintain automatic control of vehicle steering on compatible highways. – Super Cruise is available only on compatible highways that are separated from opposing traffic. The GPS uses real-time corrections and map data to determine the vehicle's location while the Frontview Camera - Windshield detects the marked lanes on the road to help the vehicle automatically steer and maintain lane position. Map data is provided by the Digital Map Module. – The system works with Adaptive Cruise Control – Advanced, which is designed to detect vehicles traveling in the same direction in its path and accelerate or brake the vehicle to maintain a driver-selected following gap time from a vehicle ahead, even in stop-and-go traffic conditions. The Long Range Radar Sensor Module is used to detect other vehicles. – When engaged, Super Cruise utilizes a Driver Attention System. It provides feedback on system status while tracking the driver's head position and using alerts that prompt the driver to pay close attention to the road and steer manually when needed. The Driver Attention System uses the Driver Monitoring System Control Module and Driver Monitoring System Camera to monitor the driver.
Adaptive Cruise Control - Advanced	KSG with UGN	ACC	– Adaptive Cruise Control — Advanced uses the Active Safety Control Module, Frontview Camera - Windshield, and Long Range Radar Sensor Module that look directly ahead to monitor vehicles that a driver is following. This feature helps drivers follow a vehicle ahead at the following gap they select (Far, Medium, or Near) while they steer. This helps reduce the driver's need to frequently brake and accelerate. – If the system does not detect a vehicle ahead, Adaptive Cruise Control — Advanced works just like regular cruise control and maintains a selected cruise speed. When the system detects a vehicle ahead in the driving lane, the VEHICLE AHEAD icon will appear in green. When the vehicle detected ahead is within the selected following gap setting, Adaptive Cruise Control – Advanced can automatically slow the vehicle down and adjust vehicle speed to follow the vehicle ahead at the selected following gap. – Just like regular Cruise Control, Adaptive Cruise Control — Advanced uses the cruise control ON/OFF, CANCEL, SET and RESUME buttons on the steering wheel.

System Description (cont'd)

System	RPO	Abbreviation	Description
Adaptive Cruise Control - Camera	KSG without UGN	ACC	– Adaptive Cruise Control – Camera uses the Frontview Camera - Windshield that looks directly ahead to monitor vehicles that a driver is following. This feature helps drivers follow a vehicle ahead at the following gap they select (Far, Medium, or Near) while they steer. This helps reduce the driver's need to frequently brake and accelerate. – If the system does not detect a vehicle ahead, Adaptive Cruise Control – Camera works just like regular cruise control and maintains a selected cruise speed. When the system detects a vehicle ahead in the driving lane, the VEHICLE AHEAD icon will appear in green. When the vehicle detected ahead is within the selected following gap setting, Adaptive Cruise Control – Camera can automatically slow the vehicle down and adjust vehicle speed to follow the vehicle ahead at the selected following gap. – Just like regular Cruise Control, Adaptive Cruise Control – Camera uses the cruise control ON/OFF, CANCEL, SET and RESUME buttons on the steering wheel.
Forward Collision Alert	UEU with UGN	FCA	– Forward Collision Alert can alert the driver when it detects a front-end collision is imminent with a vehicle ahead they are following. The system can also alert the driver if they are following a detected vehicle much too closely. – Forward Collision Alert uses the Active Safety Control Module, Frontview Camera - Windshield, and Long Range Radar Sensor Module. Some Cadillac vehicles also use two Short Range Radar Sensor Modules.
Forward Collision Alert	UEU without UGN	FCA	– Forward Collision Alert can alert the driver when it detects a front-end collision is imminent with a vehicle ahead they are following. The system can also alert the driver if they are following a detected vehicle much too closely. – Forward Collision Alert uses the Frontview Camera - Windshield.
Enhanced Automatic Emergency Braking	UGN	EAEB	– Enhanced Automatic Emergency Braking can help reduce a collision's severity or avoid the collision by automatically applying hard, emergency braking if the driver hasn't, or by enhancing driver hard braking. – Enhanced Automatic Emergency Braking uses the Active Safety Control Module, Frontview Camera - Windshield, and Long Range Radar Sensor Module. Some Cadillac vehicles also use two Short Range Radar Sensor Modules. When in FORWARD gear, these sensors look directly ahead to monitor vehicles in the lane ahead; when a vehicle is detected ahead, a green vehicle ahead icon is displayed.
Automatic Emergency Braking	UHY	AEB	– Automatic Emergency Braking can help reduce a collision's severity or avoid the collision by automatically applying hard, emergency braking if the driver hasn't, or by enhancing driver hard braking. – Automatic Emergency Braking uses the Frontview Camera - Windshield. When in FORWARD gear, these sensors look directly ahead to monitor vehicles in the lane ahead; when a vehicle is detected ahead, a green vehicle ahead icon is displayed.
Front Pedestrian Braking	UKJ	FPB	– Front Pedestrian Braking can alert the driver when a collision is detected to be imminent with a pedestrian directly ahead at speeds below 50 mph. It can also help reduce the collision's severity or avoid the collision by automatically applying the brakes if the driver has not already done so, or by enhancing driver braking. – When in FORWARD or NEUTRAL gear between 5-50 mph, the Frontview Camera - Windshield looks directly ahead to detect nearby pedestrians (up to approximately 131 ft. away).
Reverse Automatic Braking	UVZ	RAB	– Reverse Automatic Braking can alert you in Reverse when it detects a collision with a detected object directly behind the vehicle is imminent, and if necessary automatically apply hard emergency braking if you have not already. – Reverse Automatic Braking uses one or two Short Range Radar located at the rear of the vehicle, behind the rear fascia, as well as the ultrasonic Parking Assist Sensors to identify objects behind the vehicle.

System Description (cont'd)

System	RPO	Abbreviation	Description
Lane Keep Assist with Lane Departure Warning	UHX	LKA	– Lane Keep Assist with Lane Departure Warning can help drivers avoid crashes due to unintentionally drifting out of their lane. It does this by providing gentle steering wheel tuning assists when the system detects the driver unintentionally drifting out of their lane with no turn signal or steering activity. It can also provide Lane Departure Warning alerts when a lane marker is crossed. – Lane Keep Assist with Lane Departure Warning uses the Frontview Camera - Windshield. It operates when the vehicle is in Forward gear moving 37-112 mph (60-180 kph).
Lane Departure Warning	UFL	LDW	– Lane Departure Warning alerts when a detected lane marker is crossed without first using the turn signal. – Lane Departure Warning uses the Frontview Camera - Windshield. It operates when the vehicle is in Forward gear moving 37-112 mph (60-180 kph).
Lane Change Alert with Side Blind Zone Alert	UKC	LCA with SBZA	– Lane Change Alert with Side Blind Zone Alert can provide lighted side-mirror alerts when a moving vehicle is detected rapidly approaching or is in a side blind zone. – Lane Change Alert with Side Blind Zone Alert use the Left Side Object Sensor Module and Right Side Object Sensor Module, which are hidden radar sensors in the rear corners of the vehicle. When in FORWARD gear, these sensors look for moving vehicles located behind the side mirror in the next lane over.
Side Blind Zone Alert	UFT	SBZA	– Side Blind Zone Alert can provide lighted side-mirror alerts when a moving vehicle is detected in a side blind zone. – Side Blind Zone Alert uses the Left Side Object Sensor Module and Right Side Object Sensor Module, which are hidden radar sensors in the rear corners of the vehicle. When in FORWARD gear, these sensors look for moving vehicles located behind the side mirror in the next lane over.
Rear Cross Traffic Alert	UFG	RCTA	– When the vehicle is in REVERSE, Rear Cross Traffic Alert can alert the driver of traffic crossing behind the vehicle approaching from the left or right side. – Rear Cross Traffic Alert uses the Left Side Object Sensor Module and Right Side Object Sensor Module, which are hidden radar sensors in the rear corners of the vehicle.
IntelliBeam, Auto High Beam Assist	TQ5 UWH UVG	—	– IntelliBeam, auto high beam assist, is designed to automatically turn the high-beams on or off, depending on the ambient lighting conditions or other vehicles on the road. This feature may turn the high-beams on when it's dark out, and turn them off when the high-beams may impact other drivers (such as when an approaching vehicle is detected). – IntelliBeam use the Frontview Camera - Windshield to determine ambient lighting conditions and identify other vehicles on the road.
Rear Parking Assist	UD7	RPA	– Rear Parking Assist can provide distance alerts to nearby detected objects behind the vehicle to help park and avoid collisions at low speeds when in Reverse. – Rear Parking Assist uses the Parking Assist Control Module and 3 or 4 ultrasonic Parking Assist Sensors located in the rear fascia or bumper.
Front and Rear Parking Assist	UD5	FRPA	– Front and Rear Parking Assist can provide distance alerts to nearby detected objects in front of or behind the vehicle to help park and avoid collisions at low speeds. – Front and Rear Parking Assist uses the Parking Assist Control Module and 8 ultrasonic Parking Assist Sensors located in the front and rear fascias or bumpers.
Automatic Parking Assist	UFQ	APA	– Automatic Parking Assist helps drivers parallel and perpendicular park while moving at idle speed by automatically steering the vehicle into a detected parking space while the driver follows text commands, selects gears, performs braking, and performs acceleration beyond idle speeds. – Automatic Parking Assist uses the Parking Assist Control Module and 12 ultrasonic Parking Assist Sensors located in the front and rear fascias or bumpers.

System Description (cont'd)

System	RPO	Abbreviation	Description
Automatic Parking Assist with Braking	UKG	APA	– While moving at idle speed (maximum speed of 3 mph), the available Automatic Parking Assist with Braking feature helps the driver parallel and perpendicular park by automatically steering and braking the vehicle into a detected parking space. The driver follows text commands, selects the gear and must be prepared to override and take control if needed – Automatic Parking Assist with Braking uses the Parking Assist Control Module and 12 ultrasonic Parking Assist Sensors located in the front and rear fascias or bumpers.
Curb View Camera - Analog	UVJ	—	– Provides a view of the scene immediately ahead of the vehicle on the infotainment display to help drivers avoid nearby objects, such as curbs, poles and parked vehicles at low speeds. – Analog Curb View Cameras can be identified by multiple wires at the camera electrical connector.
Curb View Camera - Digital	UVA	—	– Provides a high-resolution digital view of the scene immediately ahead of the vehicle on the infotainment display to help drivers avoid nearby objects, such as curbs, poles and parked vehicles at low speeds. – Digital Curb View Cameras can be identified by a coax cable connection at the camera.
Surround Vision	UVH	—	– Surround Vision provides an analog, overhead bird's-eye view of the scene around the vehicle at low speeds to help drivers with low-speed maneuvers like parking. – Analog Surround Vision Cameras can be identified by multiple wires at the camera electrical connector.
HD Surround Vision	UV2 UVI UVS UXP	—	– High Definition (HD) Surround Vision provides a high-resolution digital bird's-eye view of the scene around the vehicle, as well as provides more views than the analog system. Some HD Surround Vision systems may provide additional cameras related to towing and trailers. – Digital Surround Vision Cameras can be identified by a coax cable connection at the camera.
Rear Vision Camera	UVC UVB UXN	—	– The Rear Vision Camera provides the driver with a view of the scene directly behind the vehicle on the infotainment system display (or inside rearview mirror) to help park and avoid crashing into nearby objects when in REVERSE. If the vehicle is equipped with a High Definition (HD) Rear Vision Camera, this feature provides the driver with a high resolution "digital" view. – Analog Rear Vision Cameras can be identified by multiple wires at the camera electrical connector. Digital Rear Vision Cameras can be identified by a coax cable connection at the camera.
Rear Camera Mirror	DRZ	—	– Compared to a traditional inside rearview mirror, the Rear Camera Mirror may provide a wider, less obstructed field of view. This helps when driving, changing lanes, and checking for vehicles and traffic conditions. If equipped, drivers can zoom and make vertical tilt adjustments. – The system uses a rear-looking camera located in the back of the vehicle at or near its center-line.
Night Vision	UV3	—	– Night Vision is designed to provide the driver an infrared night vision image of the area lit beyond the headlamps that highlights and provides alerts of detected pedestrians or large animals. – The system uses the Night Vision Camera, located in the lower grille below the driver-side headlamp, and a Night Vision Camera Control Module. Warmer objects, such as pedestrians or large animals, typically appear as whiter in appearance on the Night Vision image.

Component Location

Component	Location
Frontview Camera - Windshield	The Frontview Camera - Windshield is located on the windshield, near the inside rearview mirror. A bracket is secured with adhesive to the windshield and the Frontview Camera - Windshield clips into the bracket.
Long Range Radar Sensor Module	On most vehicles, the Long Range Radar Sensor Module is located in the center grill area, behind the brand emblem. On some vehicles, the Long Range Radar Sensor Module is located behind the lower fascia.

Component Location (cont'd)

Component	Location
Short Range Radar Sensor Module	On some Cadillac vehicles with UGN, two Short Range Radar Sensor Modules are located behind the front fascia, one on the left and one on the right. Some vehicles may have one or two Short Range Radar Sensor Modules located behind the rear fascia, one on the left and one on the right, or one in the center. Some vehicles with Super Cruise have two additional Short Range Radar Sensor Modules located at the left rear and right rear side, behind the fascia. These Short Range Radar Sensor Modules take the place of the Left and Right Side Object Sensor Module for this application. Some vehicles with Super Cruise also have two Short Range Radar Sensor Modules located behind the front fascia, one on the left and one on the right.
Left Side Object Sensor Module Right Side Object Sensor Module	The Left Side Object Sensor Module and Right Side Object Sensor Module are located on the left and right vehicle body sides, behind the rear fascia, or in the rear bumper.
Park Assist Sensor	The park assist sensors are located in the front and rear fascias or bumpers.
Curb View Camera	The Curb View Cameras are located at the front of the vehicle, in the fascia or grill. On the display, the Curb View also uses the image from the Rear Vision Camera.
Surround Vision Camera	The Surround Vision Cameras are located in the front grill or fascia area, left outside rearview mirror, right outside rearview mirror, and at the rear center of the vehicle. Some systems may have additional cameras for viewing the pickup bed and provisions for trailer cameras.
Rear Vision Camera	The Rear Vision Camera is located at the rear center of the vehicle.
Rear Camera Mirror Camera	The Rear Camera Mirror Camera is located at the rear center of the vehicle.
Night Vision Camera	The Night Vision Camera is located in the lower grille or fascia.

Calibration

Note: Unless otherwise noted, calibration is performed using GDS2.

Component	When Calibration is Required	Comment
Frontview Camera - Windshield	Frontview Camera - Windshield was replaced	SPS programming is required after replacement. Some vehicles will immediately begin calibration after programming, vehicle other may require calibration to be started using GDS2. Refer to Service Information for specific programming and calibration instructions after replacement.
	Frontview Camera - Windshield was removed from the bracket and reinstalled	—
	Windshield was replaced or removed and reinstalled	—
	After a collision repair or airbag deployment	—
	Any of the following DTCs are set in the Frontview Camera - Windshield: • DTC B1008 - Calibration Data • DTC B395D - Camera Misaligned Any of the following DTCs are set in the Active Safety Control Module: • DTC B101E - Electronic Control Unit Software	Always refer to the appropriate diagnostic procedure in Service Information when diagnosing DTCs.
Long Range Radar Sensor Module	Long Range Radar Sensor Module was replaced	SPS programming is required after replacement. Refer to Service Information for specific programming and calibration instructions after replacement.
	Long Range Radar Sensor Module was removed and reinstalled	—
	After a collision repair or airbag deployment	—
	Any of the following DTCs are set in the Active Safety Control Module: • DTC B390C - Long Range Radar Sensor Module	Always refer to the appropriate diagnostic procedure in Service Information when diagnosing DTCs.

Calibration (cont'd)

Note: Unless otherwise noted, calibration is performed using GDS2.		
Component	**When Calibration is Required**	**Comment**
Short Range Radar Sensor Module	No calibration is required	SPS programming is required after replacement. Refer to Service Information for specific programming instructions.
Left Side Object Sensor Module Right Side Object Sensor Module	No calibration is required	The B218L Side Object Sensor Module - Left and B218R Side Object Sensor Module - Right are always performing coarse and fine calibration during operation. No specific calibration is required as a part of service, simply drive the vehicle to begin calibration. SPS programming is required after replacement. Refer to Service Information for specific programming instructions.
Park Assist Sensor	**Except 2013+ Chevrolet Spark, 2017+ Chevrolet Cruze, 2018+ Chevrolet Equinox, 2018+ GMC Terrain, and Buick Envision** No calibration is required	—
	2013+ Chevrolet Spark, 2017+ Chevrolet Cruze, 2018+ Chevrolet Equinox, 2018+ GMC Terrain, and Buick Envision Calibration required using GDS2 after replacement of the Parking Assist Sensor	—
Curb View Camera - Analog	Curb View Camera was replaced	—
	Curb View Camera was removed and reinstalled	—
	Fascia, grill, or Curb View Camera mounting location was removed or replaced	—
Curb View Camera - Digital	No calibration is required	—
Surround Vision Camera - Analog	Surround Vision Camera was replaced	—
	Surround Vision Camera was removed and reinstalled	—
	Fascia, grill, bumper, applique, outside rearview mirror, or Surround Vision Camera mounting location was removed or replaced	—
Surround Vision Camera - Digital	No calibration is required	—
Rear Vision Camera	No calibration is required	—
Rear Camera Mirror Camera	No calibration is required	—
Night Vision Camera	Night Vision Camera was replaced	—
	Night Vision Camera was removed and reinstalled	—
	Fascia, grill, or Night Vision mounting location was removed or replaced	—
	Vehicle ride height has significantly changed from the factory position	—

Slow Calibration

Component	If slow to calibrate or calibration will not complete
Frontview Camera - Windshield	Make sure the vehicle is being driven in an area conducive to calibration. An ideal calibration environment is a two-lane divide highway with lane makings on both side of the lane, driving the vehicle between 56-90km/h (35-56 MPH). Any of the following conditions may increase the length of time require to complete calibration or result in an inability to complete calibration: • Heavy traffic • Stop and go traffic • Mountain roads • Curves in the roadway • No lane markings • Poor lane markings • Botts Dots-type lane markings • Dirty windshield glass • Operating the vehicle outside the 56-90km/h (35-56 MPH) range • Driving in adverse weather, such as snow, fog, or extreme rain, or driving directly into the sun • Cracked or damaged windshield • Frontview Camera - Windshield is not properly installed or is not fully secured in the windshield bracket • Vehicle add-on equipment that blocks the Frontview Camera - Windshield, such as a windshield tint strip or vinyl banner, or equipment that blocks the view of the road, such as bug deflectors or grill guards • Windshield not properly centered in the windshield opening
Long Range Radar Sensor Module	Make sure the vehicle is being driven in an area conducive to calibration. An ideal calibration environment has stationary objects on the roadside, such as mailboxes and street signs, minimal curves and hills, multiple vehicles to follow at a distance of 30-50 m (100-165 ft) while driving the vehicle greater than 56 km/h (35 MPH). Any of the following conditions may increase the length of time require to complete calibration or result in an inability to complete calibration: • Heavy traffic • Stop and go traffic • No traffic • Limited number of road side objects • Mountain or hilly roads • Sharp curves • Tunnels • Collision damage • Incorrect collision repair • Bent or damaged Long Range Radar Sensor Module bracket or mounting surface
Left Side Object Sensor Module Right Side Object Sensor Module	The Left Side Object Sensor Module and Right Side Object Sensor Module are always performing coarse and fine calibration during operation. As such, no specific calibration is required as a part of service. However, some operating conditions may slow the calibration process and result in limited system functionality: • Operating the vehicle in an area with no traffic or a limited number of road side objects • Mud or slow build-up in the sensor area • Bumper stickers or labels on the rear fascia or bumper near the sensor • Damage to the rear fascia, underlying vehicle body structure, or sensor bracket • Incorrect collision repair