

## Parking Aid - Parking Aid

### Diagnosis and Testing

#### Principles of Operation

For a detailed description of the parking aid system, characteristics and limitations refer to the relevant Description and Operation section in the workshop manual. REFER to: (413-13 Parking Aid)

[Parking Aid](#) (Description and Operation),

[Parking Aid](#) (Description and Operation),

[Parking Aid](#) (Description and Operation).

#### Parking Aid System On-Board Self-Test

As part of the strategy of the system if any DTC's are detected, a long high-pitched tone approx 3 seconds will sound and the parking aid switch (where fitted) indicator LED will flash 6 times at ignition on.

- If a fault is present when the parking aid system is activated then the parking aid switch (where fitted) status LED will flash 6 times indicating an issue with front or rear parking aid sensors, wiring switch, parking aid control module or hard wired sounders.
- The rear parking aid sounder/rear audio system will emit an error tone for approx 3 seconds at ignition on if a fault is detected with the front or rear sensors, the switch, or if there is a controller area network (CAN) bus error.
- (Only applicable to vehicles fitted with front parking aid and a hard wired rear parking aid sounder). If there is a fault with the rear parking aid sounder the error tone will come from the front parking aid sounder unit (integral with the instrument cluster).

#### Audible and Visual Warnings when Parking Aid System is in Error State

Rear Parking Aid System Fitted and No Parking Aid System Switch Fitted	Rear Parking Aid System Fitted and Parking Aid System Switch Fitted	Front and Rear Parking Aid System Fitted with Parking Aid System Switch Fitted
A long high-pitched error tone will sound at Ignition On for approx 3 seconds	<ul style="list-style-type: none"><li>• A long high-pitched error tone will sound at ignition on for approx 3 seconds and the parking aid switch indicator LED will flash 6 times at ignition on. Every time the parking aid system is activated within the same ignition cycle, parking aid switch indicator LED will flash 6 times</li></ul>	<ul style="list-style-type: none"><li>• A long high-pitched error tone will sound at ignition on for approximately 3 seconds and the parking aid switch indicator LED will flash 6 times at ignition on. Every time the parking aid system is activated within the same ignition cycle the parking aid switch indicator LED will flash 6 times</li></ul>

#### Inspection and Verification

##### CAUTIONS:



If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the warranty policy and procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.



Diagnosis by substitution from a donor vehicle is not acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.



Do not apply any grease based products to any parking aid system connector or pins.

##### NOTES:



Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system)



When performing electrical voltage or resistance tests, always use a digital multimeter (DMM) accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance, always take the resistance of the DMM leads into account.



Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.



Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.



If diagnostic trouble codes are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.
3. Ensure that the parking aid sensor face is clear of contamination that could affect the performance of the sensor.

#### Visual Inspection

Mechanical	Electrical
<ul style="list-style-type: none"> <li>• Parking aid sensor condition/damaged</li> <li>• Parking aid sensor installation and holder</li> <li>• Parking aid sensor alignment</li> <li>• Parking aid sensor contamination</li> <li>• Bumper cover(s)</li> <li>• Vehicle ride height</li> <li>• Non standard/non manufacturer approved accessories fitted</li> </ul>	<ul style="list-style-type: none"> <li>• Battery</li> <li>• Fuse(s)</li> <li>• Relays</li> <li>• Wiring harness</li> <li>• Electrical connector(s)</li> <li>• Front parking aid sensor(s)</li> <li>• Rear parking aid sensor(s)</li> <li>• Parking aid switch and LED</li> <li>• Parking aid control module</li> <li>• Parking aid sounder</li> <li>• Audio system</li> </ul>

4. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.

5. If the cause is not visually evident, check for Diagnostic Trouble Codes (DTCs) and refer to the DTC Index.

#### Symptom Chart



**CAUTION:** Do not apply any grease based products to any parking aid system connector or pins.

#### NOTES:




Please note if this diagnosis is being carried out on a vehicle without a hard wired parking aid speaker, ensure the in car infotainment system is fully functional and configured correctly



Parking aid sensors that are painted incorrectly and not to the manufacturer standards, will not be considered in any warranty claim

Symptom	Possible Causes	Action
<b>NOTE:</b> Permanent/Intermittent fault  Parking aid system not functioning correctly. (No DTCs displayed)	<ul style="list-style-type: none"> <li>• Front or rear parking aid sensors dirty</li> <li>• Front or rear parking aid sensor position incorrect</li> <li>• Front or rear parking aid sensor incorrectly installed</li> <li>• Front or rear parking aid sensor coupling rings not installed/incorrectly installed</li> <li>• Parking aid control module or parking aid sensor connector not fully latched</li> <li>• Parking aid sensors painted without being removed from the bumper assembly or not painted to the manufacturer specification</li> </ul>	<ul style="list-style-type: none"> <li>• Clean front or rear parking aid sensors</li> <li>• Check the front or parking aid rear sensor position</li> <li>• Check the front or rear parking aid sensor are correctly installed</li> <li>• Check front or rear parking aid sensor coupling rings are installed/installed correctly</li> <li>• Ensure all parking aid system connectors are correctly latched</li> <li>• Remove parking aid sensor and ensure correctly painted parking aid sensor is installed               <ul style="list-style-type: none"> <li>- Parking aid sensors that are painted incorrectly and not to the manufacturer standards, will not be considered in any warranty claim</li> </ul> </li> </ul>

 <p><b>NOTE:</b> Permanent/Intermittent fault</p> <p>Parking aid system not functioning correctly. (No DTCs displayed). System characteristics or environmental effects</p>	<ul style="list-style-type: none"> <li>• Parking aid sensors incorrectly mounted</li> <li>• Incorrect vehicle ride height</li> <li>• Dirty parking aid sensor face. Ice/snow covered sensor. Debris trapped between parking aid sensor and parking aid sensor body. Heavy rain or water splash from the ground</li> <li>• Non standard, bumper, exhausts/tailpipes, tow bar or external spare wheel mounting</li> <li>• Area around vehicle is not clear of obstacles such as channels, gutters or other items on the ground</li> <li>• Exhaust gas and warm air clouds creating ghost echoes</li> <li>• Vehicle not on level ground or next to a gradient</li> <li>• Parking aid sensors painted without being removed from the bumper assembly or not painted to the manufacturer specification</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure the sensors are a tight fit in the holder and locked. Ensure the sensors are central in the holder and bumper and at the correct angle</li> <li>• Ensure vehicle ride height is within the specified limits. Rectify as required</li> <li>• Clean the sensor face as required. Defrost the sensor and dry as required. Clear any debris from the sensor and holder as required. Water flowing over the sensor is a system limitation. (no action required)</li> <li>• Check for non standard, bumper, exhausts/tailpipe, tow bar or external spare wheel mounting that may be being detected by the parking aid system. Rectify as required</li> <li>• Ensure the area around the vehicle is clear of any obstacles, move the vehicle to a suitable area before continuing diagnosis</li> <li>• Ensure no exhaust gas or warm area clouds are in the area around the parking aid sensor detection range</li> <li>• Ensure the vehicle is on level ground and clear of any ramps, potholes or speed bumps, move the vehicle to a suitable area before continuing diagnosis</li> <li>• Remove parking aid sensor and ensure correctly painted parking aid sensor is installed <ul style="list-style-type: none"> <li>- Parking aid sensors that are painted incorrectly and not to the manufacturer standards, will not be considered in any warranty claim</li> </ul> </li> </ul>
<p>Parking aid sensors are being returned with no faults found or signs of water ingress/corrosion</p>	<p>Possible issue with sensor connectors not latched correctly</p>	<ul style="list-style-type: none"> <li>• When either no/intermittent operation has been reported the following action should be taken</li> <li>• Using Datalogger identify the position of the suspect parking aid sensor within the bumper</li> <li>• 1. Visually locate the position of the suspect parking aid sensor. Inspect and provide details in claim if the sensor has any sign of physical damage</li> <li>• 2. Remove the bumper. Disconnect the wiring at the main harness connector. Inspect the main harness connectors and terminals for signs of damage, backed out pins, corrosion and water ingress, or damage to the seals. Provide details in claim if any of the above symptom's are present</li> <li>• 3. Attempt to remove the harness connector from the suspect parking aid sensor without using the connector latch i.e. lightly pull back on <b>ALL</b> wires together, ensuring the harness is held close to the back of the connector, not elsewhere on the wiring harness. <b>DO NOT</b> apply excessive force. If the connector can be removed without using the latch, provide details in claim if connector is loose. If the connector is fully latched, disconnect it from the sensor</li> <li>• 4. Inspect and provide details in claim if the suspect sensor harness connector has any sign of water ingress/corrosion</li> <li>• 5. Inspect and provide details in claim if the suspect parking aid sensor harness connector shows any sign that the terminals have backed-out of the connector or for any damage to the terminal seals. Replace/repair the harness as required and proceed</li> <li>• 6. Remove the suspect parking aid sensor from the bumper. Inspect the parking aid sensor connector for signs of water ingress/corrosion. Provide details in claim if corrosion/water ingress is present</li> <li>• 7. Exchange the suspect parking aid sensor with another parking aid sensor within the bumper that is performing correctly. Reconnect all sensors and reconnect the bumper main harness connector. Repeat step 1. Confirm if the original fault now</li> </ul>

		<p>appears at the new position of the suspect parking aid sensor, if so, proceed to step</p> <ul style="list-style-type: none"> <li>• 8. If not, carry out the appropriate open circuit and short circuit checks between the original suspect parking aid sensor harness connector and the parking aid control module</li> <li>• 9. Refit the parking aid sensors to their original position in the bumper</li> <li>• 10. Reconnect the parking aid sensor to the bumper harness connector. Reconnect main harness connector and refit the bumper</li> <li>• 11. Repeat Step 1. If fault is still present, <b>replace only the faulty sensor</b></li> </ul>
--	--	---

## PINPOINT TEST A : PARKING AID SYSTEM NOT FUNCTIONING CORRECTLY WITH NO DTCS LOGGED

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<b>A1: PERMANENT FAULT</b>	
	<p><b>1</b> When the parking aid system is activated, there is a vibration on the parking aid sensor membrane. This can be verified by touching the parking aid sensor face with a hard item such as a pencil, ball-pen, small screwdriver, or fingernail. <b>Ensure no damage is caused to sensor painted surface.</b></p>
	<p>Are the parking aid sensor(s) vibrating?</p> <p><b>Yes</b> <a href="#">GO to A2</a> .</p> <p><b>No</b> <a href="#">GO to A5</a> .</p>
<b>A2: SENSORS VIBRATING WITH PARKING AID FAULT</b>	
	<p><b>1</b> Clean the parking aid sensor face.</p>
	<p>Parking aid system functioning correctly?</p> <p><b>Yes</b> No further action required.</p> <p><b>No</b> <a href="#">GO to A3</a> .</p>
<b>A3: SENSORS VIBRATING WITH PARKING AID FAULT</b>	
	<p><b>1</b> Check parking aid sensors correctly mounted. Parking aid sensor holder correctly mounted. Parking aid sensor decoupler ring fitted or fitted correctly. Parking aid sensor positioning correct. Parking aid sensor painted without being removed from the bumper assembly or not painted to manufacturer specification. Rectify as required.</p>
	<p>Parking aid system functioning correctly?</p> <p><b>Yes</b> No further action required.</p> <p><b>No</b> <a href="#">GO to A4</a> .</p>
<b>A4: SENSORS VIBRATING WITH PARKING AID FAULT</b>	
	<p><b>1</b> Carry out speaker test. Only applicable to vehicles with rear hard wired parking aid speakers. Check the parking aid speaker wiring circuit and connector. Rectify as required. Check and install a new parking aid speaker as required. Vehicles with audio parking aid. Confirm audio system is functioning correctly. Refer to the relevant section of the workshop manual.</p>
	<p>Parking aid system functioning correctly.</p> <p><b>Yes</b> No further action required.</p>
<b>A5: SENSORS NOT VIBRATING WITH PARKING AID FAULT</b>	
	<p><b>1</b> Isolate the fault to front or rear parking aid sensors</p>
	<p>Are all rear parking aid sensors vibrating?</p> <p><b>Yes</b> <a href="#">GO to A6</a> .</p> <p><b>No</b> <a href="#">GO to A10</a> .</p>
<b>A6: FRONT SENSORS NOT VIBRATING WITH PARKING AID FAULT</b>	
	<p><b>1</b> Check the parking aid control module is correctly configured. Check and update the car configuration file as required.</p>
	<p>Parking aid system functioning correctly?</p> <p><b>Yes</b> No further action required.</p> <p><b>No</b> <a href="#">GO to A7</a> .</p>
<b>A7: FRONT SENSORS NOT VIBRATING WITH PARKING AID FAULT</b>	
	<p><b>1</b> Check the correct parking aid control module is installed to the vehicle.</p>
	<p>Parking aid system functioning correctly?</p> <p><b>Yes</b> No further action required.</p> <p><b>No</b> <a href="#">GO to A8</a> .</p>

<b>A8: FRONT SENSORS NOT VIBRATING WITH PARKING AID FAULT</b>	
	<p><b>1</b> If all 4 front parking aid sensors are not vibrating, carry out harness test on common ground, power supply. Check main parking aid harness connector to bumper harness connector. Rectify as required.</p>
	<p>Parking aid system functioning correctly?</p> <p><b>Yes</b> No further action required.</p> <p><b>No</b> <a href="#">GO to A9 .</a></p>
<b>A9: FRONT SENSORS NOT VIBRATING WITH PARKING AID FAULT</b>	
	<p><b>1</b> Check and install a new parking aid control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component.</p>
	<p>Parking aid system functioning correctly.</p> <p><b>Yes</b> No further action required.</p>
<b>A10: REAR SENSORS NOT VIBRATING WITH PARKING AID FAULT</b>	
	<p><b>1</b> Check the parking aid control module is correctly configured. Check and update the car configuration file as required.</p>
	<p>Parking aid system functioning correctly?</p> <p><b>Yes</b> No further action required.</p> <p><b>No</b> <a href="#">GO to A11 .</a></p>
<b>A11: REAR SENSORS NOT VIBRATING WITH PARKING AID FAULT</b>	
	<p><b>1</b> If all 4 rear parking aid sensors are not vibrating, carry out harness test on common ground, power supply. Check main parking aid harness connector to bumper harness connector. Rectify as required.</p>
	<p>Parking aid system functioning correctly.</p> <p><b>Yes</b> No further action required.</p> <p><b>No</b> <a href="#">GO to A12 .</a></p>
<b>A12: REAR SENSORS NOT VIBRATING WITH PARKING AID FAULT</b>	
	<p><b>1</b> Check and install a new parking aid control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component.</p>
	<p>Parking aid system functioning correctly.</p> <p><b>Yes</b> No further action required.</p>
<b>PINPOINT TEST B : PARKING AID SYSTEM NOT FUNCTIONING CORRECTLY WITH NO DTCS LOGGED</b>	
<b>TEST CONDITIONS</b>	<b>DETAILS/RESULTS/ACTIONS</b>
<b>B1: PARKING AID SYSTEM GIVES WARNING SIGNAL WITHOUT OBSTACLE</b>	
	<p><b>1</b> Clean the parking aid sensor face. Check for any damage to the parking aid sensor face. Rectify as required. Snow, water or ice on sensor face. Parking aid sensor face has been repainted to the incorrect thickness. Rectify as required.</p>
	<p>Parking aid system functioning correctly?</p> <p><b>Yes</b> No further action required.</p> <p><b>No</b> <a href="#">GO to B2 .</a></p>
<b>B2: PARKING AID SYSTEM GIVES WARNING SIGNAL WITHOUT OBSTACLE</b>	
	<p><b>1</b> Ensure the vehicle ride height is within manufacturer specified limits. Rectify as required.</p>
	<p>Parking aid system functioning correctly?</p> <p><b>Yes</b> No further action required.</p> <p><b>No</b> <a href="#">GO to B3 .</a></p>
<b>B3: PARKING AID SYSTEM GIVES WARNING SIGNAL WITHOUT OBSTACLE</b>	
	<p><b>1</b> Check for any non standard accessories are not fitted, such as tow bar, bike rack, body kit, modified exhaust, lighting or licence plate holder.</p>
	<p>Parking aid system functioning correctly?</p> <p><b>Yes</b> No further action required.</p> <p><b>No</b> <a href="#">GO to B4 .</a></p>
<b>B4: PARKING AID SYSTEM GIVES WARNING SIGNAL WITHOUT OBSTACLE</b>	
	<p><b>1</b> Limitations or characteristics of the parking aid system such as vehicle on a gradient, exhaust gas vapour, signal reflection.</p>
	<p>Parking aid system functioning correctly?</p> <p><b>Yes</b> No further action required.</p>

	<p><b>No</b></p> <p>For a detailed description of the parking aid system, refer to the relevant Description and Operation section in the workshop manual.</p> <p>REFER to: <a href="#">Parking Aid</a> (413-13 Parking Aid, Description and Operation) /  <a href="#">Parking Aid</a> (413-13 Parking Aid, Description and Operation) /  <a href="#">Parking Aid</a> (413-13 Parking Aid, Description and Operation).</p>
--	---

## DTC Index

For a list of diagnostic trouble codes that could be logged on this vehicle, please refer to Section 100-00.

REFER to: [Diagnostic Trouble Code \(DTC\) Index - DTC: Parking Aid Module \(PAM\)](#) (100-00 General Information, Description and Operation).