Adaptive cruise control (ACC)

PRINCIPLE OF OPERATION
The Adaptive Cruise Control (ACC) system is designed to aid the driver to maintain a gap from the vehicle ahead or a set road speed if there is no slower vehicle ahead. The system is intended to provide enhanced operation of the vehicle when following other vehicles which are in the same lane and travelling in the same direction.

The ACC system is based on the use of a radar sensor which projects a beam directly forward of the vehicle so as to detect objects ahead.

The radar sensor is mounted centrally behind the bumper, above the grille, to provide a clear view forward for the radar beam.

WARNING
ACC is not a collision warning or avoidance system. Additionally, ACC will not react to:
- Stationary or slow moving vehicles below 10 km/h (6 mph).
- Pedestrians or objects in the roadway.
- Oncoming vehicles in the same lane.

The ACC system is based on the use of a radar sensor which projects a beam directly forward of the vehicle so as to detect objects ahead.

USING ACC

<table>
<thead>
<tr>
<th>WARNING</th>
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<tbody>
<tr>
<td>! Only use ACC when driving on main roads, with free flowing traffic.</td>
</tr>
<tr>
<td>! Do not use in poor visibility, specifically fog, heavy rain, spray or snow.</td>
</tr>
<tr>
<td>! Do not use on icy or slippery roads.</td>
</tr>
<tr>
<td>! It is the driver’s responsibility to stay alert, drive safely and be in control of the vehicle at all times.</td>
</tr>
<tr>
<td>! Keep the front of the vehicle free from dirt, metal badges or objects, including vehicle front protectors, which may interfere with radar operation.</td>
</tr>
<tr>
<td>! Do not use ACC when entering or leaving a motorway.</td>
</tr>
</tbody>
</table>

The system is operated by adjustment controls mounted on the steering wheel. The driver can also intervene at any time by use of the brake or accelerator pedals.
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The steering wheel controls operate as follows:

1. Speed adjust control: Use the thumbwheel to set the speed. Rotate upwards (+) to increase, or downwards (-) to decrease the set speed.
2. Gap increase or decrease. Four settings available by adjusting the thumb wheel.
3. **CANCEL** - Cancels but retains the set speed in memory.
4. **RESUME** - Resumes the set speed after it has been cancelled.

**Setting the speed**
Accelerate as normal until the required speed is reached.

Roll the speed adjustment control upwards (+) and the vehicle speed will then be stored in the memory and the system engaged.

**Changing the speed**

There are three ways to change the set speed:

- Accelerate or brake to the desired speed then roll the speed adjustment control upwards (+).
- Increase or decrease the speed by rolling the speed adjustment control upwards (+) or downwards (-) until the required set speed is shown on the message center. The vehicle speed will gradually change to the selected speed.
- Increase or decrease the speed in steps of 2 km/h (1 mph) by rolling the speed adjustment control upwards (+) or downwards (-) briefly until the desired speed is obtained.

ACC operates between approximately 34 km/h and 180 km/h (21 mph and 112 mph) dependent on the country specification.

Set speeds outside this range will not be captured.

The ACC may apply the brakes to slow down the vehicle to the new set speed. The new set speed will be displayed on the message center until ACC is cancelled.
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Follow mode gap settings

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When in follow mode the vehicle will not decelerate automatically to a stop, nor will the vehicle always decelerate quickly enough to avoid a collision without driver intervention.

Once a set speed has been selected, the driver can release the accelerator and the set road speed will be maintained.

When a vehicle ahead enters the same lane or a slower vehicle is ahead in the same lane, the vehicle speed will be adjusted automatically until the gap to the vehicle ahead corresponds to the default gap setting (Gap 3, identified by 3 chevrons is the default). The vehicle is now in follow mode.

The warning indicator in the instrument panel will be illuminated.

The message center will display the gap set.

The shortest (Gap 1), represented by 1 chevron and the longest (Gap 4), represented by 4 chevrons, are illustrated above.

The vehicle will then maintain the constant time gap to the vehicle ahead until:
- The vehicle ahead accelerates to a speed above the set speed.
- The vehicle ahead moves out of lane or out of view.
- A new gap distance is set.

If necessary, the vehicle brakes will be automatically applied to slow the vehicle to maintain the gap to the vehicle in front.

The maximum braking which is applied by the ACC system is limited and can be overridden by the driver applying the brakes, if required.

**Note:** Driver braking will cancel ACC.

If the ACC system predicts that its maximum braking level will not be sufficient, then an audible warning will sound while the ACC continues to brake. **DRIVER INTERVENE** will be displayed on the message center. The driver should take immediate action.

When in follow mode, the vehicle will automatically return to the set speed when the road ahead is clear, for instance when:
- The vehicle in front accelerates or changes lane.
- The driver changes lane to either side or enters an exit lane.

The driver should intervene if appropriate.

**WARNING**

When in follow mode the vehicle will not decelerate automatically to a stop, nor will the vehicle always decelerate quickly enough to avoid a collision without driver intervention.
Adaptive cruise control (ACC)

Changing the follow mode set gap
The gap to the vehicle ahead can be adjusted by rotating the gap increase/decrease control on the steering wheel. Four gap settings are available and the selected gap is represented by the corresponding number of chevrons in front of the car icon displayed on the message center (Gap 1 = 1 chevron, Gap 4 = 4 chevrons). After the ignition is switched on, the default gap setting (Gap 3), will be automatically selected ready for ACC operation.

Note: When the ignition is switched off, the gap setting will revert to the default setting (gap level 3) when switched on again.

Note: It is the driver’s responsibility to select a gap appropriate to the driving conditions.

Overriding the speed and follow mode

Whenever the driver is overriding the ACC by depressing the accelerator pedal, the ACC will not automatically apply the brakes to maintain separation from any vehicle ahead.

The set speed and gap can be overridden by pressing the accelerator pedal when cruising at constant speed or in follow mode. If the vehicle is in follow mode, the warning indicator will extinguish when the ACC is overridden and CRUISE OVERRIDE will be displayed on the message center. When the accelerator is released, the ACC function will operate again and vehicle speed will decrease to the set speed, or a lower speed if follow mode is active.

Automatic low speed switch off
If vehicle speed decreases below 30 km/h (18 mph), the ACC system automatically switches off and the warning indicator will extinguish.

If the brakes were being applied by the ACC system, they will be slowly released.
This will be accompanied by an audible warning and DRIVER INTERVENE will be displayed on the message center. The driver must take control.

Automatic switch off
ACC will disengage, but not clear the memory when:
• The CANCEL button is pressed.
• The brake pedal is pressed.
• Neutral, Park or Reverse gear positions are selected.
• Dynamic Stability Control activates.

ACC will disengage, and clear the memory when:
• The ignition system is switched off.
• Maximum vehicle speed is reached.
• A fault occurs in the ACC system.

Resuming the speed and follow mode

Whenever the driver is overriding the ACC by depressing the accelerator pedal, the ACC will not automatically apply the brakes to maintain separation from any vehicle ahead.

By pressing the RESUME button after ACC has been cancelled (e.g. after braking), the ACC will become active again, provided that the set speed memory has not been erased. The set speed will be displayed for four seconds and the original set speed will be resumed, unless a vehicle ahead causes follow mode to become active.
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Hints on driving with ACC
The system acts by regulating the speed of the vehicle using engine control and the brakes. Gear changes may occur in response to deceleration or acceleration whilst in ACC.

ACC is not a collision avoidance system. However, during some situations the system may provide the driver with an indication that intervention is required.

An audible alarm will sound, accompanied by the message DRIVER INTERVENE if the ACC detects:
- A failure has occurred whilst the system is active
- That using maximum ACC braking only is not sufficient.

**Note:** ACC operates when the gear selector lever is in position **S** or **D**.

**Note:** When engaged, the accelerator pedal rests in the raised position. Fully release the pedal to allow normal ACC operation.

**Note:** When braking is applied by the ACC, the vehicle brake lamps will be switched on although the brake pedal will not move.

Detection beam issues

1. When driving on a different line to the vehicle in front.
2. With vehicles which edge into your lane which can only be detected once they have moved fully into your lane.
3. There may be issues with the detection of vehicles in front when going into and coming out of a bend.

**CAUTION**
In these cases ACC may brake late or unexpectedly. The driver should stay alert and intervene if necessary.
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ACC malfunction
If a malfunction occurs during operation of the system in cruise or follow modes, the ACC system will switch off and cannot be used until the fault is cleared. The message DRIVER INTERVENE appears briefly and is then replaced by the message CRUISE NOT AVAILABLE. If malfunction of the ACC or any related system occurs at any other time the message CRUISE NOT AVAILABLE will be displayed. It will not be possible to activate the ACC system in any mode.

Accumulations of dirt, snow or ice on the radar or cover, may inhibit ACC operation. Fitting of a vehicle front protector, applying stone chip protection or fitting metallised badges, may also affect ACC operation.

The ACC system relies on its radar to detect objects and constantly scans ahead. If the radar detects no objects ahead in ACC or follow mode, then the ACC will be deactivated, the audible alarm sounds and the message DRIVER INTERVENE displays briefly. The message ACC SENSOR BLOCKED will then be displayed.

The same messages may also be displayed while driving on open roads with few roadside objects for the radar to detect or in heavy rain.

Clearing the obstruction allows the system to return to normal operation. If the obstruction is present when ACC is inactive, e.g. on initial starting or with the ACC system switched off, the message ACC SENSOR BLOCKED will be displayed.

Tires other than those recommended may have different sizes. This can affect the correct operation of the ACC.

Adverse weather conditions

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<td>![ ] Do not use on icy or slippery roads.</td>
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During adverse weather conditions such as heavy rain or snowfall, the sensitivity of radar blockage detection is increased, so that it can correctly detect any reduced performance caused by a blocked sensor.

During these conditions, the warning message ACC SENSOR BLOCKED may be displayed more frequently, especially in areas where there are few roadside objects for the radar to detect.
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FORWARD ALERT FUNCTION
Limited detection and warning of objects ahead is provided during ACC operation by the ACC FORWARD ALERT warning.

The enhanced Forward Alert feature additionally provides warnings when ACC is not engaged; if an object is detected close ahead, then the warning tone and message will be issued. The brakes will not be applied. The forward alert system does not initiate any action. The driver must take appropriate action when the FORWARD ALERT message is displayed. However, the system monitors driver actions (e.g. braking, steering or indicating) and may not initiate the warning display if the appropriate action has been taken early enough.

When the indicator in the message center is on, forward alert is active.

The sensitivity of the warning may be changed:
- Press the gap decrease button when ACC is disengaged to display and then decrease the sensitivity of the alert.
- Press the gap increase button to display and then increase the sensitivity of the alert.

Both of these alerts are accompanied by the message FORWARD ALERT in the message center.

The Forward Alert feature may be switched on or off using the forward alert switch located where shown.
## Adaptive cruise control (ACC)

### Message center information messages

<table>
<thead>
<tr>
<th>Message</th>
<th>Warning Indicator</th>
<th>Priority Indicator</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRUISE OVERRIDE</td>
<td>None</td>
<td>None</td>
<td>Driver is pressing the accelerator pedal overriding cruise control function. Message will disappear when accelerator pedal is released and cruise control speed is resumed.</td>
</tr>
<tr>
<td>CRUISE CANCELLED</td>
<td>None</td>
<td>None</td>
<td>Driver has cancelled cruise control or is braking.</td>
</tr>
<tr>
<td>CRUISE NOT AVAILABLE</td>
<td>None</td>
<td>Amber</td>
<td>Cruise control or Adaptive Cruise Control malfunction.</td>
</tr>
<tr>
<td>DRIVER INTERVENE</td>
<td>None</td>
<td>Red</td>
<td>Action by the driver to apply the brakes is required.</td>
</tr>
<tr>
<td>SETSPEED XXX KM/H</td>
<td>None</td>
<td>None</td>
<td>Speed set for Adaptive Cruise Control.</td>
</tr>
<tr>
<td>GAP</td>
<td>None</td>
<td>None</td>
<td>Set the distance (time gap).</td>
</tr>
</tbody>
</table>
| RADAR SENSOR BLOCKED   | None              | Amber             | Clean the front of the vehicle in the area of the radar unit (the radar is mounted centrally behind the bumper cover above the grille). This message may also appear under the following conditions:  
- If stone chip protection has been applied.  
- On rural roads with few roadside objects.  
- In heavy rain.  
- In snowy conditions. |
| FORWARD ALERT OFF      | None              | None              | Forward alert feature has been switched off. WARNING: A warning will not be given for objects detected in the vehicle’s path of travel. |
| FORWARD ALERT          | Yes               | None              | Forward alert feature has been switched on or the setting changed. A warning will be given for objects detected in the vehicle path of travel. A longer gap indicates that the system will warn when detected objects are further away than the previous setting. |