



Audi braking guard

Audi braking guard

No.	Event	Topic	Type/model
1.		Audi braking guard	All

Audi braking guard

- ▶ The braking guard is an additional function of the ACC, and works in conjunction with the radar sensor(s). The braking guard becomes active in situations where a vehicle in front brakes suddenly, or where the car approaches a slower-moving object at high speed.
- ▶ The braking guard is active when the ACC is switched off.
 - ▶ The function can be deactivated via the MMI; the message “braking guard: off” then appears in the instrument cluster
- ▶ There are different versions of braking guard. The function of braking guard 1, originally introduced with the A6 (4F), has been gradually enhanced with additional functions.

Audi braking guard

Braking guard 1

- ▶ Used in: A6 (4F) from MY 06 (ACC 2)
- ▶ In the event of an impending collision, the ABS hydraulic unit is pre-filled to allow the brake to be actuated more quickly. In the ABS/ESP control unit, the hydraulic braking assistant is set to a higher sensitivity level
- ▶ No warning is issued, neither an audible warning nor a warning jolt or braking intervention
- ▶ The driver cannot directly feel the function of braking guard 1. The altered braking behaviour only becomes apparent in the event of an emergency braking manoeuvre.

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Braking guard 2

- ▶ Used in:

Q7 (4L)	from MY 07 (ACC 2)
A4 (8K)	from MY 09 (ACC 2)
A5 (8T, 8F)	from MY 08 (ACC 2)
Q5 (8R)	from MY 09 (ACC 2)
- ▶ In the event of an impending collision, the ABS hydraulic unit is pre-filled to allow the brake to be actuated more quickly. In the ABS/ESP control unit, the hydraulic braking assistant is set to a higher sensitivity level
- ▶ A warning is also issued to the driver:
 - ▶ A visual and audible warning is given in the form of a display and warning sound
 - ▶ A haptic warning is given in the form of a warning jolt (brakes are not applied)
- ▶ **Two types of warning are issued during this process:**
 - ▶ **Distance warning**

If the driver drives too closely behind a vehicle in front for an extended period of time, the ACC display starts flashing red. This action is intended to alert the driver to the present danger

Audi braking guard

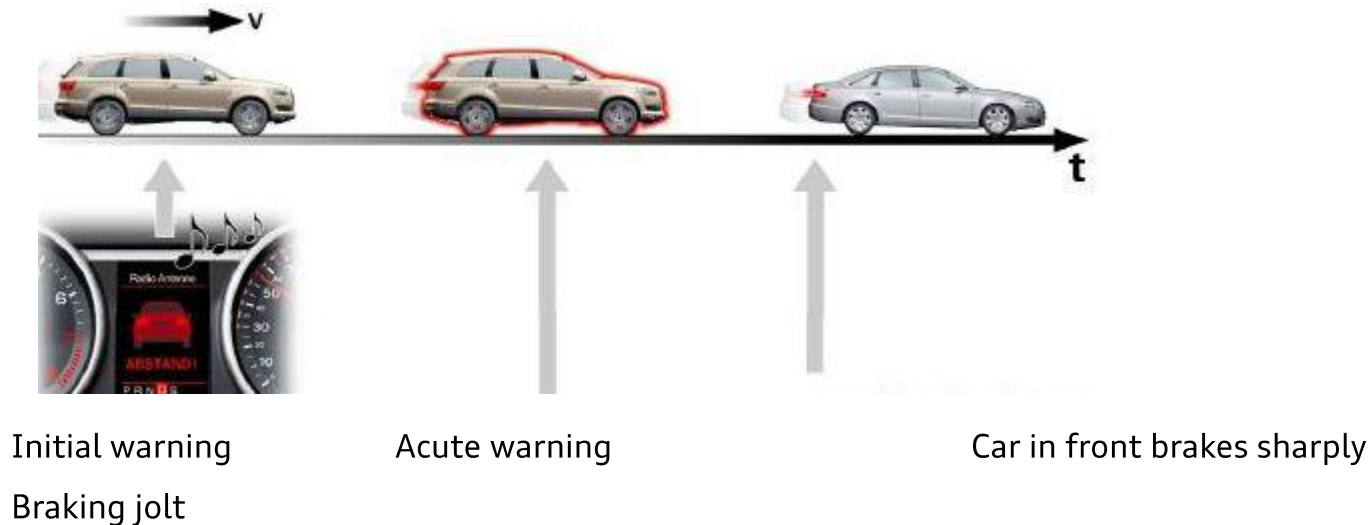
Braking guard 2

► Rapid-approach warning:

If a clearly slower vehicle is travelling in front, or if a vehicle travelling in front brakes sharply, the car issues a rapid-approach warning. In this case, it may only be possible to avoid a collision if the driver is forced to respond out of his or her comfort zone — by braking or swerving.

The warning is first issued as a display and an audible warning. If the driver still does not brake following these warnings, a brief warning jolt is initiated.

► Furthermore, there is no braking intervention



Audi braking guard

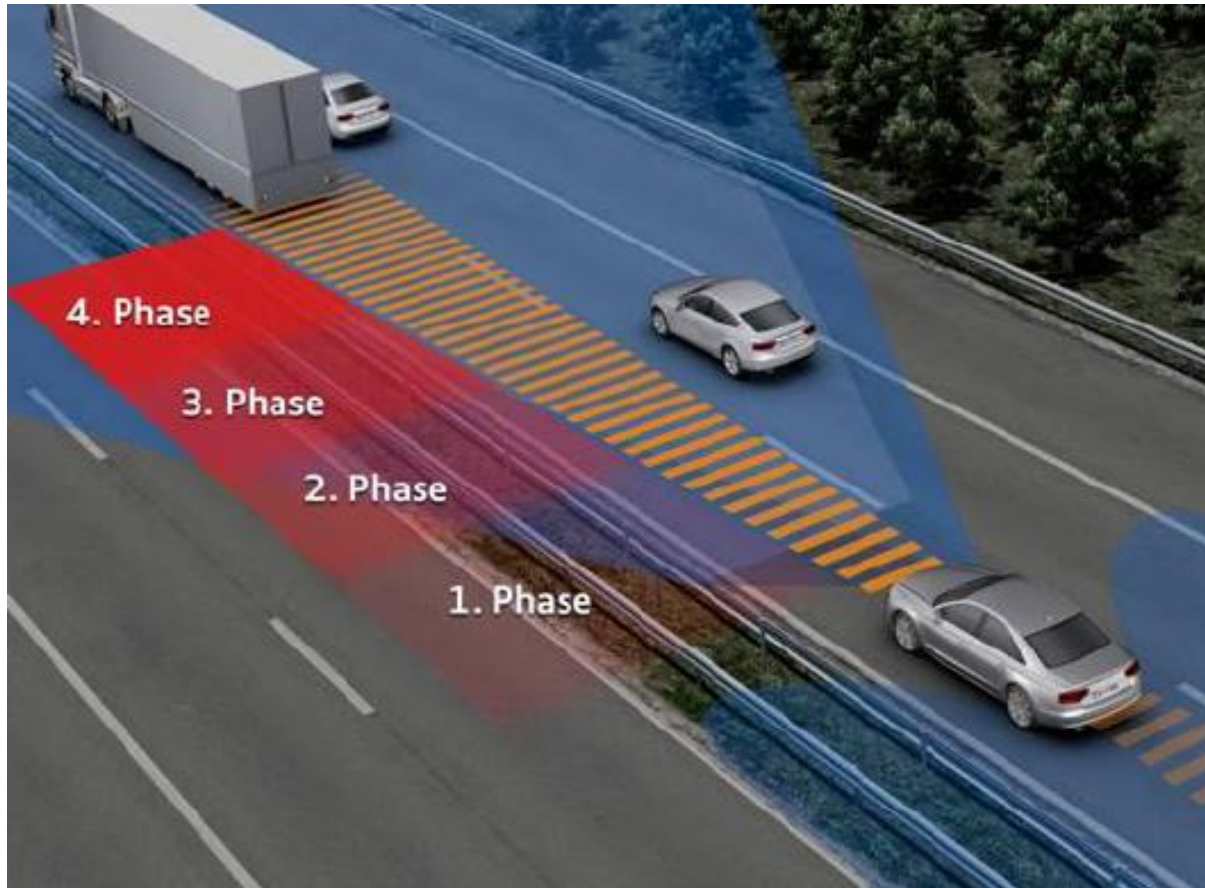
Braking guard 2 plus pre sense front

- ▶ Used on: A6, A7 (4G) from MY 12 (ACC 3 with software up to 160)
 A8 (4H) from MY 11 (ACC 3 with software up to 160)
- ▶ Same functions as described for braking guard 2
- ▶ Additionally, if the driver does not respond following a rapid-approach warning, a braking intervention is initiated. Partial braking is introduced, initially at 3 m/s^2 ; if there is still no response from the driver, the car brakes with increased braking force in an attempt to reduce the speed of the vehicle. If the driver still does not respond, the car is fully braked shortly before impact to minimise the effects of the collision. This full-braking action is only active for a brief period, no longer than 500 ms (= $\frac{1}{2}$ second).

If the driver does not brake strongly enough during this sequence, the system supports him or her by supplying increased braking force in an attempt to avoid the collision

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Braking guard 2 plus pre sense front, visual representation



1. Phase 1:

Visual and audible warning

2. Phase 2:

Warning jolt, followed by partial braking (3 m/s^2)

3. Phase 3:

Stronger partial braking (up to 5 m/s^2)

4. Phase 4:

Full braking (500 ms)

Audi braking guard

Braking guard 2 plus pre sense front with full deceleration in the lower speed range

- ▶ Used on:

A4 PI (8K)	from MY 13 (ACC 3)
A5 PI (8T, 8F)	from MY 13 (ACC 3)
Q5 PI (8R)	from MY 13 (ACC 3)
A6, A7 (4G)	from MY 13 (ACC 3 with software from 400)
A8 (4H)	from MY 13 (ACC 3 with software from 400)
- ▶ Same functions as described for braking guard 2 plus pre-sense front
- ▶ Additionally, if the vehicle is travelling at a speed under 30 km/h and the driver does not respond following the rapid-approach warning, a braking intervention is initiated, as described previously for braking guard 2 plus pre sense front

Audi braking guard

Braking guard 2 plus pre sense front with full deceleration in the lower speed range

- ▶ If the vehicle is travelling at a speed below 30 km/h and only a full-braking action can avoid the collision, the system deploys automatic emergency braking, decelerating the vehicle up to 8 m/s^2 (shortly before ABS control). The maximum deceleration is 20 km/h.
At speeds below 20 km/h, braking is possible to bring the vehicle to a stop. The system responds to other vehicles which are moving, standing or have come to a stop.
- ▶ The braking guard is a support system, and cannot prevent an accident on its own. The driver remains solely responsible for ensuring a timely response and for keeping the vehicle under control.
- ▶ The braking guard can only function within the limits of the system. If it is not possible to detect hazards, the braking guard will not respond – see Owners manual for further information.

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Application matrix

	Braking guard 1	Braking guard 2	Braking guard 2 plus pre sense front	Braking guard 2 plus pre sense with full deceleration
Audi A6 (4F)	X			
Audi Q7 (4L)	X	X		
Audi A4 (8K), A5 (8T, 8F) ACC 2	X	X		
Audi Q5 (8R) ACC 2	X	X		
Audi A6, A7 (4G) ACC 3 software up to 160	X	X	X	
Audi A8 (4H) ACC 3 software up to 160	X	X	X	
Audi A4 PI (8K), A5 PI (8T, 8F) ACC 3	X	X	X	X
Audi Q5 PI (8R) ACC 3	X	X	X	X
Audi A6, A7 (4G) ACC 3 software > 400	X	X	X	X
Audi A8 (4H) ACC 3 software > 400	X	X	X	X

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Possible customer complaint “braking guard does not work”

- ▶ The braking guard is designed so that a rapid-approach warning is only issued where there is immediate risk of a collision. As such, this function is not noticeable in normal traffic conditions. Even if the customer subjectively believes he or she drives very close to the vehicle in front, this may not objectively constitute a critical situation that would require an intervention from the braking guard.
- ▶ There are no additional components for the braking guard function that would not also be required by the ACC. It is not possible for the braking guard to have a function restriction without adversely affecting the ACC function, in which case a warning would be displayed in the instrument cluster.
- ▶ It is not permitted to test the function of the braking guard during a test drive on public roads. To test this function, a traffic situation posing the risk of a collision would have to be deliberately set up. This would constitute a wilful posing of a risk to traffic safety and is strongly discouraged.



Thank you.