

The main functions that the system is capable of performing, in addition to those of the ABS, are as follows:

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Hill Holder: this function aids hill starts.

When the driver is on a gradient steeper than 5% and they engage first gear and depress the clutch, the system keeps the vehicle braked. When the driver moves their foot from the brake pedal to the accelerator pedal, the vehicle remains braked and the system automatically releases the braking pressure during the vehicle take off thereby preventing the vehicle from slipping backward at any time. This function is also activated downhill with reverse gear engaged.

HBA: this is the emergency braking assistance function.

In the case of emergency braking, detected by measuring the application speed of the brake pedal, the system automatically and rapidly provides an increase in the braking pressure. This function increases the deceleration in the case of emergency braking and reduces the braking system response times. The system is classified as BAS (Brake assist) in accordance with international nomenclature.

VDC: this is the vehicle dynamic control function.

The system is capable of recognizing potentially dangerous situations in terms of the vehicle's stability and intervenes automatically on the brakes in a differentiated manner for the four wheels in order to provide a statilizing torque for the vehicle.

ASR: this is the vehicle traction control function.

It reduces drive wheel slip on slippery surfaces by acting on the brakes and drive torque.

MSR: this is an engine brake control function during over-run.

On particularly slippery surfaces, when the accelerator is released. the engine braking could cause the drive wheels to lock with serious consequences for the control and stability of the vehicle. Under these circumstances the system increases the engine torque to reduce engine braking and prevent the wheels from locking.

CBC: when braking with ABS active on bends.

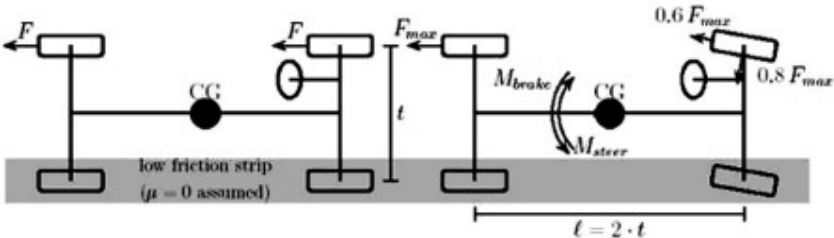
This function improves the distribution of the braking pressure to the four wheels to fully exploit the grip available on the ground. This improves stopping distances and above all vehicle stability when cornering.

DST: this function integrates the electric steering with VDC functions.

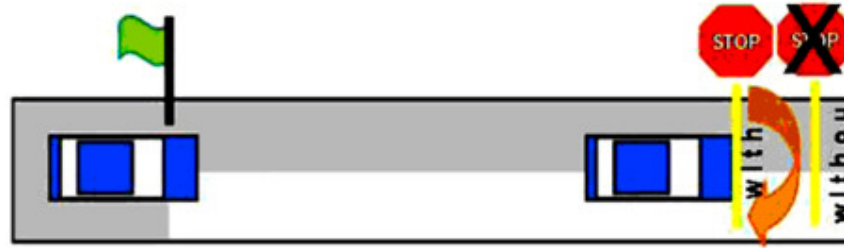
During specific manoeuvres, the VDC orders the steering system to implement a steering torque (limited to 3 Nm max.) to invite the driver to perform the manoeuvre in the best way. The function involves the co-ordinated action of brakes and steering with the aim of increasing the handling and safety level of the entire vehicle. The steering imposes an additional torque increment on the steering wheel, calculated by algorithms within the NFR.

RAB (Ready Alert Brakes): (only with "Dynamic" mode engaged).

By pre-approaching the brake pads (front and rear) after rapid accelerator release, this function provides prompter braking and reduces stopping distance. The NFR activates the hydraulic unit for 300 mseconds only, to increase the oil pressure on the calipers to about 2.5 bar and allows to the pads to approach the brake discs making the braking more responsive after a fast accelerator release. Action of the DST is apparent in the following manoeuvres:
Mu split: compensation for yaw interference caused by aggressive ABS tuning;

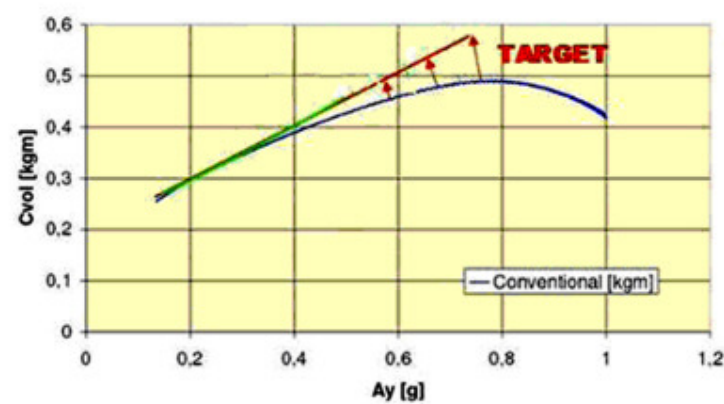


Due to the combined action of the steering with the ABS, a counter-steering action may be applied to the steering wheel it order to compensate for drift caused by the braking action. Stopping distances may be reduced by as much as 10% through this action.

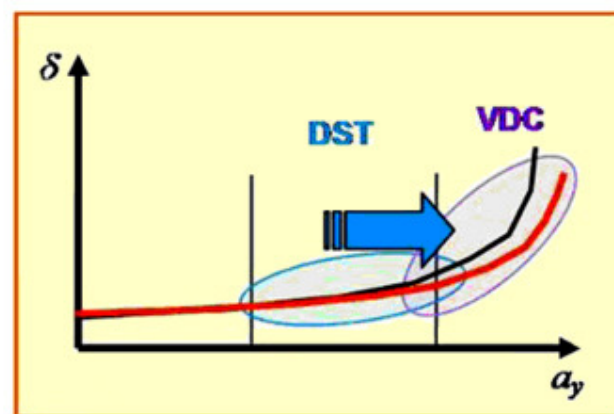


Manoeuvres with high A_y (lateral acceleration) and low dynamics: determination of limit feeling (increase in resistant torque).

The LTF (linear torque function) built into the DST assures the driver a sensation of increasing torque resistance (steering feel) to ensure greater safety and confidence in vehicle response as the grip limit approaches.



Oversteer compensation: notifies the driver as the stability limit approaches (predictive) and suggests the correct manoeuvre during vehicle stabilisation. Although the driver remains responsible for control of the vehicle, they are nevertheless advised to tackle more demanding manoeuvres through dynamic modification of the steering power assistance to render the action of the VDC less probable and intrusive.



- δ (steering wheel angle)

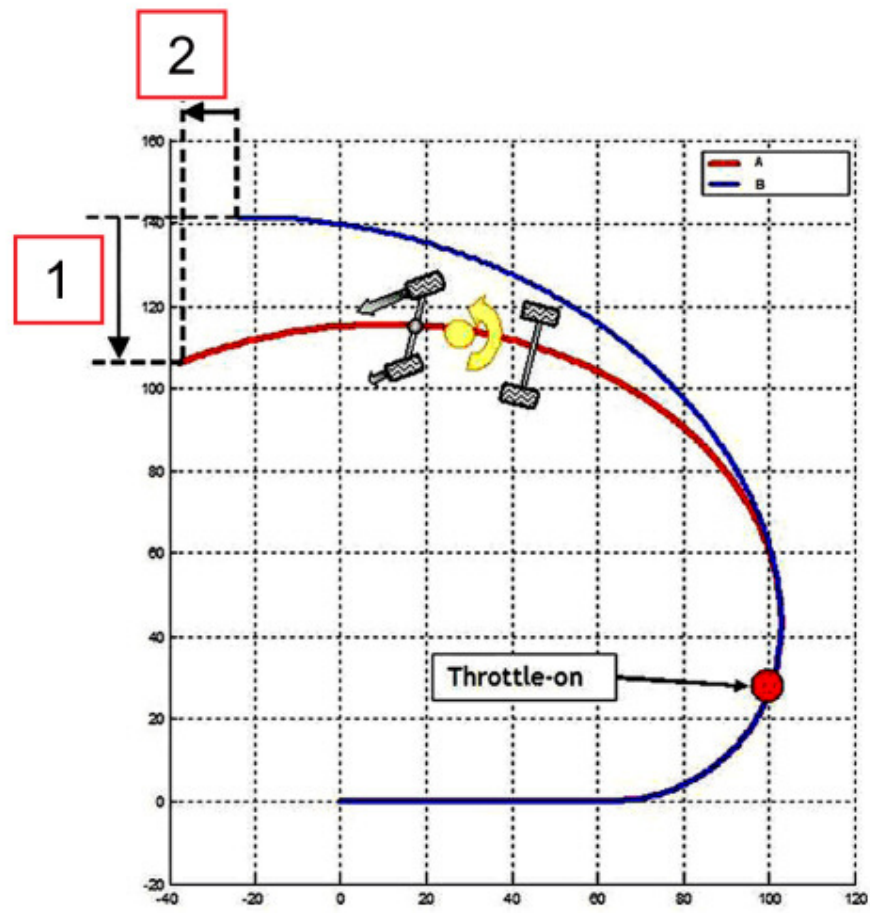
- a_y (lateral acceleration)

Electronic Q2: this software function makes it possible to simulate the action of a self-locking differential very similar to a Q2 solely by acting on the brakes. The intervention of the electronic Q2 is especially noticeable during extreme "pull" and "release" manoeuvres when cornering. Responsiveness when cornering is improved thanks to the improved drive.

(For a front wheel drive vehicle) the function represents a development of traction control optimised for cornering (e.g. restored engine torque when coming out of a hairpin bend in a low gear).

During the "pull" stage, without Electronic Q2, the inner wheel, with less load, slides more and, where an ordinary differential is fitted, there is a reduction in the traction capacity on the entire axle. At the same time, a reduction in the lateral forces is produced through the traction effect, causing the extension of the trajectory.

When the Electronic Q2 intervenes on the other hand, the VDC control unit brakes the inner wheel producing a load for the drive torque on the corresponding driveshaft which allows a similar torque to be transferred to the outer wheel in grip conditions. This action is aimed at improving movement when cornering and containing understeer.



- A. Path with Electronic Q2 (red)
- B. Paths without Electronic Q2 (blue)
- 1. Lower understeer
- 2. Longer distance travelled