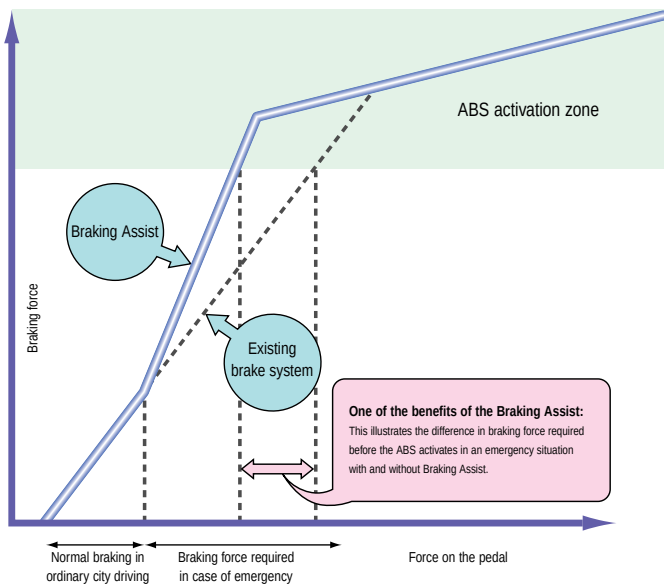
Control Safety – Safety Technologies for Assisting the Driver in Avoiding Accidents

An important factor in avoiding potentially dangerous situations and preventing accidents from happening is for the vehicle to respond faithfully to the driver's operations. The aim of Control Safety is to improve safety by translating the driver's accident avoidance maneuvers into accurate vehicle control so as to avoid potentially hazardous situations.

Braking Assist

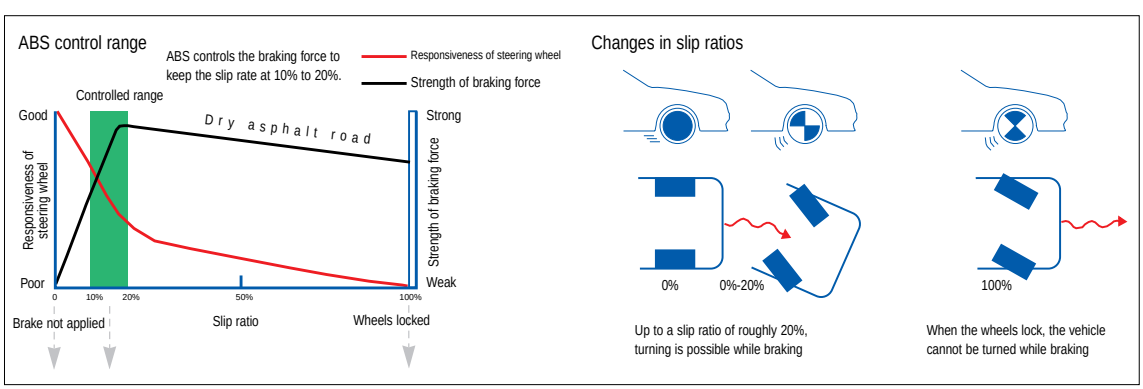
Braking Assist comprises ABS and a newly developed brake booster incorporating a two-stage mechanical assist mechanism. When a large braking force is needed, such as in an emergency situation, this system generates a greater braking force than that of a conventional brake booster even with light pedal force.

Braking Assist is activated when the force applied to the brake pedal exceeds a certain level. Thus, braking characteristics are nat-ural during ordinary driving, while a larger braking force comes into play with less pedal force in emergency situations. This, combined with effective operation of the ABS, further enhances the capability to help avoid accidents.



ABS (Anti-lock Braking System)

A system that electronically controls brake fluid pressure to help keep the wheels from locking in sudden braking on slippery road surfaces, such as snow-covered or rain-soaked roads. This improves a vehicle's stability in braking, and makes it easier to steer to avoid obstacles.

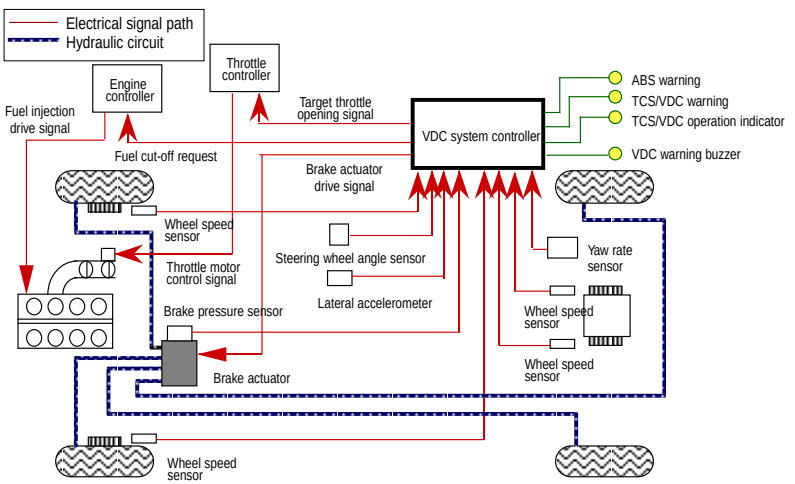


VDC (Vehicle Dynamics Control)

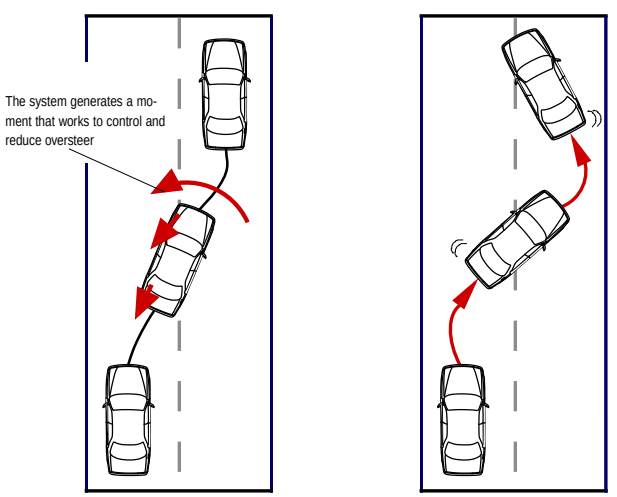
When turning on a slippery road surface or steering suddenly to avoid an obstacle, VDC automatically controls the braking force and engine power to reduce sideslip that can occur in such situations, thereby improving stability and evasive maneuvering capabilities.

Nissan has already adopted an antilock braking system (ABS) and a traction control system (TCS) to improve vehicle stability by restraining wheel-lock at braking or wheel-spin during the accelerating phase. The new VDC system provides an even higher level of driving stability by automatically correcting a vehicle's lateral behavior based on detection of sideslip. This is accomplished by using various sensors to monitor the driver's steering and braking operations as well as the vehicle's dynamic state. In addition to enhancing vehicle stability during evasive maneuvers, the VDC system also contributes to an optimum balance of total performance by assuring excellent steering control and braking performances as well. Moreover, because it delivers these capabilities even at very low vehicle speeds, the VDC system is effective in improving overall driving stability.

Nonetheless, VDC does not increase friction between tires and road surfaces, nor does it enhance a vehicle's maximum performance. When VDC is activated and the preset VDC buzzer sounds or the slip indicator lamp comes on, this indicates that the vehicle is close to its performance limits and that an accident could occur. Accordingly, the driver must still take the proper precautions, such as slowing down and steering cautiously.



Example of VDC effectiveness



Vehicle with VDC

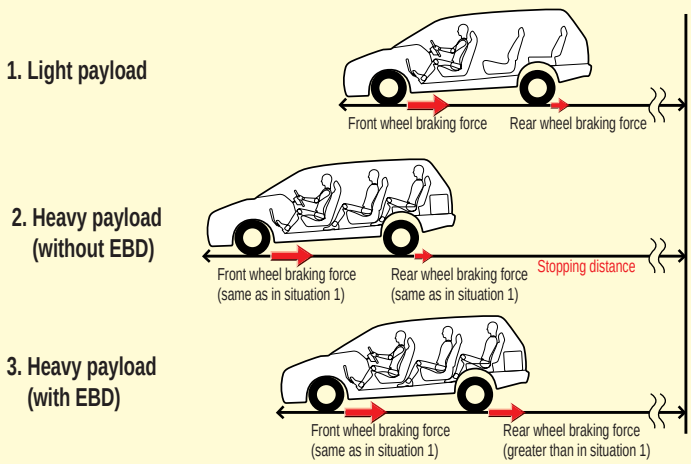
Vehicle without VDC

The VDC system prevents a vehicle from spinning when large incipient oversteer occurs during a lane change on a slippery road surface. It does this by regulating the engine output according to the degree of oversteer detected and also by controlling the braking force at all four wheels so as to reduce oversteer and maintain driving stability.

EBD (Electronic Braking Force Distribution) System

The Electronic Braking Force Distribution (EBD) system uses electronic control to optimally distribute braking force to the front and rear wheels according to changes in the payload being carried. This system works in tandem with the Braking Assist system to achieve synergies between effective utilization of front and rear braking force (EBD) and reduced pedal pressure (Braking Assist). As a result, more powerful braking performance is obtained with less pedal pressure in emergency braking situations even when carrying a large payload.

Benefit of EBD Comparison of stopping distance for the same brake pedal pressure



EBD can increase the distribution of braking force to the rear wheels when there is a heavy payload.