HDC

HDC uses brake intervention to control vehicle speed and acceleration during low speed descents in off-road and low grip on-road conditions. Generally, equal pressure is applied to all four brakes, but pressure to individual brakes can be modified by the ABS (anti-lock brake system) and DSC functions to retain stability. Selection of the HDC function is controlled by the HDC switch on the center console. HDC operates in both high and low ranges, at vehicle speeds up to 50 km/h (31.3 mph).

HDC may be used in D, R and CommandShift 1 in high range, and in D, R and all CommandShift gears in low range. When in D, the transmission control module will automatically select the most appropriate gear. The vehicle should not be driven with HDC active and the transmission in N.

HDC can be selected at speeds up to 80 km/h (50 mph), but will only be enabled at speeds below 50 km/h (31.3 mph). When HDC is selected:

- At speeds up to 50 km/h (31.3 mph), the HDC information indicator is permanently illuminated if a valid gear is selected.
- At speeds from >50 to 80 km/h (>31.3 to 50 mph) the HDC information indicator flashes and a message advising that the speed is too high is displayed in the message center.
  If the HDC switch is pressed while vehicle speed is more than 80 km/h (50 mph), the HDC information indicator will not illuminate and HDC will not be selected.
- If the speed reaches 80 km/h (50 mph) or more, a warning chime sounds, the HDC function is switched off, the information indicator goes off and a message advising that HDC has been switched off is displayed in the message center.

When HDC is enabled, the ABS (anti-lock brake system) module calculates a target speed and compares this with the actual vehicle speed. The ABS (anti-lock brake system) module then operates the HCU (hydraulic control unit) , in the active braking mode, as required to achieve and maintain the target speed. During active braking for HDC, the ABS (anti-lock brake system) module also energizes the HDC relay to operate the stoplamps. Applying the foot brakes during active braking may result in a pulse through the brake pedal, which is normal.

The target speed varies, between minimum and maximum values for each gear and transmission range, depending on driver inputs through the foot pedals. If the foot pedals are not operated, the ABS (anti-lock brake system) module adopts a default target speed.

Low Range Target Speeds

Limit	Speed, km/h (mph)	
	Gear	
	1, R	D, 2 to 6
Default	3.5 (2.19)	6 (3.75)
Minimum	3.5 (2.19)	3.5 (2.19)
Maximum	20 (12.5)	20 (12.5)

High Range Target Speeds

Limit	Speed, km/h (mph)	
	Gear	
	1, R	D
Default	6 (3.75)	10 (6.25)
Minimum	6 (3.75)	6 (3.75)
Maximum	20 (12.5)	20 (12.5)

The target speed is varied between the minimum and maximum values using the accelerator pedal.

The target speed can also be varied by pressing the speed control '+' and '-' buttons (where fitted).

During changes of target speed, the ABS (anti-lock brake system) module limits deceleration and acceleration to -0.5 m/s^2 (-1.65 ft/s^2) and +0.5 m/s^2 (+1.65 ft/s^2) respectively.

To provide a safe transition from active braking to brakes off, the ABS (anti-lock brake system) module invokes a fade out strategy, which gradually discontinues the braking effort, if it detects any of the following during active braking:

- HDC selected off with the HDC switch.
- Failure of a component used by HDC, but not critical to fade out function.
- Accelerator pedal pressed when transmission is in neutral.
- Brake overheat.

If fade out is invoked because of deselection or component failure, the HDC function is cancelled by the ABS (anti-lock brake system) module. If fade out is invoked because the accelerator pedal is pressed with the transmission in neutral, or because of brake overheat, the HDC function remains in standby and resumes operation when the accelerator pedal is released or the brakes have cooled.

The fade out strategy increases the target speed, at a constant acceleration rate of 0.5 m/s^2 (1.65 ft/s^2), until the maximum target speed is reached or until no active braking is required for 0.5 s. If the accelerator pedal is positioned within the range

that influences target speed, the acceleration rate is increased to 1.0 m/s^2 (3.3 ft/s^2).

When fade out is invoked because of component failure, a warning chime sounds, the HDC information indicator is extinguished and a message advising there is a fault is displayed in the message center.

When fade out is invoked because of brake overheat, a message advising that HDC is temporarily unavailable is displayed. At the end of fade out, the HDC information indicator flashes. The message is displayed, while HDC remains selected, until the brakes have cooled.

To monitor for brake overheat, the ABS (anti-lock brake system) module monitors the amount of braking activity and, from this, estimates the temperature of each brake. If the estimated temperature of any brake exceeds a preset limit, the ABS (anti-lock brake system) module invokes the fade out strategy. After the fade out cycle, the HDC function is re-enabled when the ABS (anti-lock brake system) module estimates that all of the brake temperatures are at less than 64% of the temperature limit.

If there is a fault that affects the HDC function, or if the HDC function is temporarily unavailable because of brake overheat, an appropriate message is displayed in the message center.