

Lexus CT 200h Safety

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CHAPTER 5: SAFETY

- Available Pre-Collision Safety System with Adaptive Cruise Control
- Electronically Controlled Braking-Regeneration system (ECB-R) incorporating Brake Assist (BA), Traction Control (TRAC) and Vehicle Stability Control (VSC)
- Standard eight airbags, including side-curtain and driver and front passenger knee airbags
- Whiplash Injury Lessening (WIL) front seats for reduced whiplash injuries

As with every Lexus, the CT 200h's highly advanced safety features are structured around an 'Integrated Safety Management Concept', which is designed to provide exceptional safety performance in most driving scenarios.

Within a highly rigid, impact-absorbing body shell, the new premium compact full hybrid is equipped with a range of active and passive safety.

The CT 200h may be equipped with a pre-emptive, Pre-Collision System incorporating Adaptive Cruise Control. Eight airbags and Whiplash Injury Lessening (WIL) front seats are fitted as standard, and an upgraded Electronically Controlled Braking-Regeneration system (ECB-R) incorporates Anti-Lock brakes (ABS), Brake Assist (BA), Traction Control (TRAC) and Vehicle Stability Control (VSC).

ACTIVE SAFETY

Pre-Collision Safety (PCS)

The new CT 200h may be equipped with a sophisticated Pre-Collision System (PCS) that can help reduce collision damage and injury. The PCS system features a millimeter-wave radar sensor, operating within a 20 degree scanning radius to detect obstacles in front of the car, even during cornering. Via numerous sensors, a pre-collision system computer monitors vehicle speed, steering angle and yaw rate inputs to help determine in advance whether an impending frontal collision is unavoidable.

If there is a high possibility of a collision, PCS will alert the driver via both a buzzer and a warning on the multi-information display, activate the Pre-Collision Seatbelt pretensioners to retract the front belts and, when the driver begins to brake, provide Pre-Collision Brake Assist to supplement the braking effort. If the driver does not brake and a collision is inevitable, Pre-Collision Brake will automatically apply the brakes to reduce impact speed.

Dynamic Radar Cruise Control (DRCC)

Complementary to the PCS system, the new Lexus premium compact full hybrid also offers a Dynamic Radar Cruise Control (DRCC) system. The system offers two modes: constant speed control, and vehicle-to-vehicle distance control. The constant speed control functions in the manner of a conventional cruise control system.

Capable of differentiating between vehicles traveling directly ahead of the Lexus and those in an adjacent lane, the vehicle-to-vehicle distance control system employs the PCS millimeter-wave radar sensor, allied to constant speed, decelerator, follow-up and accelerator controls, is designed to automatically slow the CT 200h, match the speed of the vehicle in front and, once the road is clear ahead, accelerate to the previously selected cruising speed. The driver can select long, middle or short vehicle-to-vehicle distances. The system control settings are indicated on the CT 200h's multi-function display.

Electronically Controlled Braking-Regeneration System (ECB-R)

The CT 200h is equipped with an Electronically Controlled Braking-Regeneration system (ECB-R) which coordinates the control of both hydraulic and regenerative braking. This cooperative control system achieves excellent fuel economy by proactively using braking force from the hybrid drive system's electric motor to recover as much electrical energy as possible.

Large, 10-inch ventilated disc brakes featuring lightweight, aluminum calipers with a resin piston and high friction brake pads are fitted in front. The retract mechanism of the caliper piston seal has been optimized to reduce brake drag, enhancing fuel economy. Eleven-inch solid discs to the rear feature aluminum calipers and a V-spring to reduce brake drag and further improve fuel economy.

The brake pedal ratio and efficiency have been optimized, reducing initial pedal effort and achieving a pedal stroke that enhances the driver's ability to modulate braking force. The brake pedal itself is hollow saving weight.

Additional Active Safety Features

ECB-R incorporates the full range of active safety systems, including a latest generation Anti-lock Brake System (ABS) with Brake Assist (BA), Traction Control (TRAC) and Vehicle Stability Control (VSC).

BA monitors brake pedal depression speed to help determine whether an emergency-braking maneuver is intended. If the driver applies insufficient braking force yet the system interprets the driver's action as emergency braking, it will automatically increase the hydraulic pressure in the system to optimize braking efficiency.

TRAC monitors and controls the amount of power that is applied to the road through the car's wheels. If the system detects that one or more wheels is about to lose traction it instantly determines the best way to restore traction to that wheel, either by decreasing the power being sent to the wheel that is about to spin or, in more extreme cases, momentarily braking the wheel until it regains traction.

VSC is designed to help prevent loss of car control when entering a corner too fast or in slippery conditions which might lead to wheelspin. Via sensors monitoring car body rotation, wheel speed and brake pressure, the system assesses vehicle stability and a wheelslip situation. The system helps restore stability by applying smoothly modulated braking to the appropriate wheel individually.

PASSIVE SAFETY

Body Structure

The CT 200h has been engineered with the express aim of pursuing excellent safety performance in terms of full-frontal, offset, side and rear collisions.

The high strength body has been designed to distribute collision loads through multiple energy-absorbing paths, helping to limit cabin deformation. In the case of frontal impact, high tensile sheet steel has been adopted for the front side members, and the inclusion of an under member allows for the distribution of impact load from the radiator support. The strength of the door belt line reinforcement has been optimized to allow the structure to distribute collision load effectively between the A pillars, door belt line and rockers.

The dash panel incorporates a cross member which helps distribute impact load from the front side member to the floor member and upper body. And the inclusion of floor tunnel side member not only enhances floor tunnel strength, but also further distributes impact load from the front side member.

Side collision performance is enhanced through the use of high tensile steel reinforcement to the outer B pillar and hinge, inner and outer rocker, front door belt line and roof center. Bulkheads placed at the ends of several floor cross members effectively transmit side impact load to the cross members, and a side impact support box has been positioned in the front floor tunnel between the front seats to further absorb side impact load.

The rear body structure has been designed to comply with revised U.S. regulations (FMVSS 301/305) regarding 50 mph high speed collisions, with high strength, rear floor side members incorporated to suppress body deformation under rear impact load.

Within the cabin construction, occupant protection is further improved through the introduction of energy absorbing padding under the dash panel to help reduce leg injuries, and within the front and rear door trims around the occupants' waist and abdomens. Within the roof structure, energy absorbing materials have been built into the roof trim and each pillar, helping to reduce head injuries.

Pedestrian Impact Safety

The front of new CT 200h incorporates measures to help reduce pedestrian injury in the event of an impacts. Within a bumper structure designed to help minimize leg injury in some situations, impact absorbing materials have been installed within the front bumper and under the radiator support to help minimize the risk of a pedestrian's legs from sliding under the vehicle.

The hood structure incorporates an impact absorbing cavity to maximize the impact distance. In addition, the cowl and cowl louvers feature an easily crushable, energy-absorbing open cross-section structure to absorb impacts from above, which may help to reduce head injury in certain situations.

Airbags and Seatbelts

The new CT 200h is fitted with eight Supplemental Restraint System (SRS) airbags, as standard: driver and front seat passenger front, knee and side airbags, and side curtain airbags.

All front and rear seats feature three-point, Emergency Locking Retractor (ELR) seatbelts. The driver, front passenger and rear outer seatbelts are also equipped with a pre-tensioner and force limiter function. The ELR is designed to lock up the seatbelt when excessive load is applied over a preset value. During a collision, the force limiter fractionally reduces seatbelt tension to lower occupant chest impact forces.

Whiplash Injury Lessening (WIL) Seats

The new Lexus CT 200h also features the second-generation Whiplash Injury Lessening (WIL) seat concept. The revised system features a new seat back structure and headrest design. The new headrest is designed to sit as close as possible to the passenger's head during normal use, while, in the event of a rear impact, the lower seat back pushes backwards, helping to close the gap between occupant head and headrest, and reducing the risk of whiplash-type injury through excessive head movement.