

# THE FUTURE OF SAFETY IS HERE

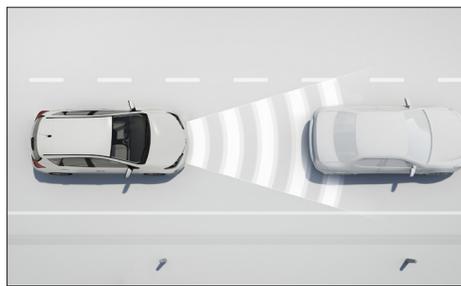
TOYOTA'S ADVANCED ACTIVE SAFETY PACKAGES: TSS-C AND TSS-P



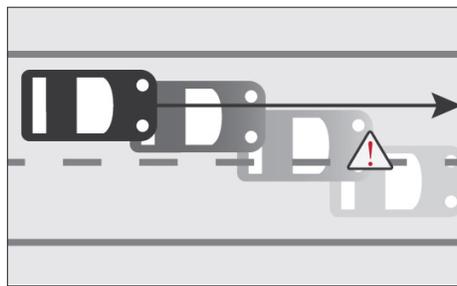
**Crash protection starts with crash prevention.** Collisions that result in injury may be caused by the delay in a driver's recognition of the situation and their ability to react accordingly. According to NHTSA<sup>1</sup>, there were almost 5.7 million reported crashes in 2014—many of which were avoidable.

Toyota Safety Sense™ (TSS)<sup>2</sup> is designed to help protect drivers, passengers and pedestrians (TSS-P only) from harm. TSS<sup>2</sup> is comprised of advanced active safety packages anchored by automated pre-collision warning<sup>3</sup> and braking. TSS<sup>2</sup> represents the latest milestone in our long history of creating advancements and innovations in safety that have helped prevent crashes and protect people.

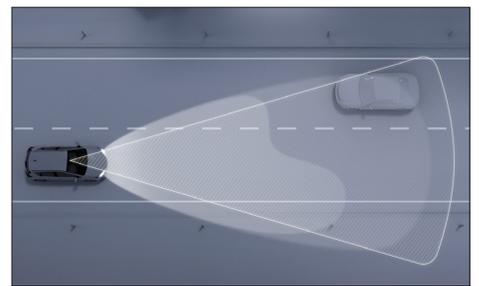
## TSS ADDRESSES THE THREE MOST COMMON ACCIDENT TYPES



Frontal Collisions



Unintended Lane Departures



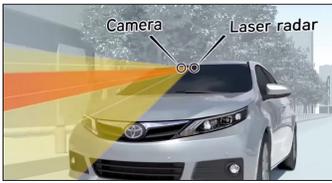
Nighttime Accidents

TSS<sup>2</sup> is designed to support driver awareness, decision making and vehicle operation over a wide range of speeds under certain conditions. Packaged together in an integrated system, TSS<sup>2</sup> features help address three key areas of accident protection: preventing or mitigating **frontal collisions**<sup>3</sup>, keeping drivers **within their lane**<sup>6</sup>, and enhancing road safety during **nighttime driving**<sup>7</sup>. Always drive safely, obey traffic speed limits and laws and focus on the road while driving.

TSS<sup>2</sup> will be offered on certain vehicles in the form of two packages:

- **Toyota Safety Sense™ C<sup>2</sup> [TSS-C]** for compact vehicles
- **Toyota Safety Sense™ P<sup>2</sup> [TSS-P]** for mid-sized, large and premium vehicles

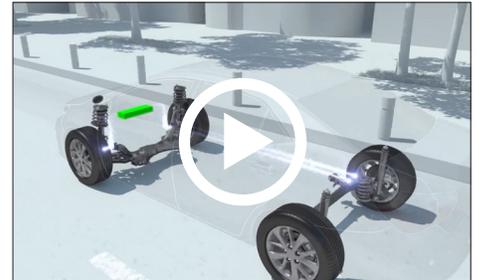
## TSS-C



Toyota Safety Sense™ C<sup>2</sup> features three proprietary active safety technologies: Pre-Collision System<sup>3</sup>, Lane Departure Alert<sup>6</sup>, Automatic High Beams<sup>7</sup>. TSS-C<sup>2</sup> combines an in-vehicle camera and laser for outstanding performance and reliability. The package can help prevent or mitigate collisions in a range of vehicle speeds.

### PRE-COLLISION SYSTEM (PCS) – VEHICLE DETECTION

With Toyota Safety Sense™ C<sup>2</sup>, PCS<sup>3</sup> uses an **in-vehicle camera and laser** to help detect the vehicle in front of your vehicle. As there is a limit to the degree of recognition accuracy and control performance that this system can provide, do not overly rely on this system. This system will not prevent collisions or lessen collision damage or injury in every situation. Do not use PCS<sup>3</sup> instead of normal braking operations under any circumstances. Do not attempt to test the operation of the pre-collision system<sup>3</sup> yourself, as the system may not operate or engage, possibly leading to an accident. In some situations such as when driving in inclement weather such as heavy rain, fog, snow or a sandstorm or while driving on a curve and for a few seconds after driving on a curve, a vehicle may not be detected by the laser and camera sensors, preventing the system from operating properly. Refer to your Owner's Manual for a list of additional situations in which the system may not operate properly.



- When the Pre-Collision System<sup>3</sup> determines that the possibility of a frontal collision with that vehicle is high, it prompts the driver to take evasive action and brake, by using an audio and visual alert
  - **These alerts operate when the vehicle speed is between approximately 7 to 85 miles-per-hour (MPH) for potential collisions with a vehicle** (Alerts are designed to function prior to auto brake function at speeds between approximately 10 to 85 MPH. Alert and brake functions may occur simultaneously for PCS operational speeds below 10 MPH.)
- If the driver notices the hazard and brakes, the system may provide additional braking force using Brake Assist<sup>4</sup>. This system may apply greater braking force in relation to how strongly the brake pedal is depressed
- If the driver does not brake in a set time and the system determines that the possibility of a frontal collision with another vehicle is extremely high, the system may automatically apply the brakes, reducing speed in order to help the driver reduce the impact and in certain cases avoid the collision
  - **The PCS<sup>3</sup> included with the TSS-C<sup>2</sup> package may operate auto braking feature at speeds between approximately 7 to 50 MPH<sup>5</sup> for potential collisions with a vehicle**
  - **May reduce vehicle speed by up to 19 MPH for potential collisions with a vehicle<sup>5</sup>**
- If the vehicle is stopped by the operation of the pre-collision brake function, the operation of the pre-collision brake hold will be canceled (brake will be released) after the vehicle has been stopped for approximately **two seconds** to allow the vehicle to move, if necessary. The driver of the vehicle must then determine whether brake or gas pedal application, or neither, is appropriate for the conditions

The pre-collision braking function may not operate if certain operations are performed by the driver. If the accelerator pedal is being depressed strongly or the steering wheel is being turned, the system may determine that the driver is taking evasive action and possibly prevent the pre-collision braking function from operating. In some situations, while the pre-collision braking function is operating, operation of the function may be canceled if the accelerator pedal is depressed strongly or the steering wheel is turned and the system determines that the driver is taking evasive action.

The following setting(s) can be adjusted (Varies by vehicle and type of TSS):

- PCS Alert Timing (Alert timing only, brake operation remains the same): Far – Mid (default) - Near
- Pre-Collision System: Turn function ON or OFF. If PCS<sup>2</sup> is turned off by the driver, PCS<sup>2</sup> will default back to ON with the Mid alert timing each time the ignition is cycled

Refer to a Toyota Owner's Manual for additional information on PCS operation, setting adjustments, limitations, and precautions.

### LANE DEPARTURE ALERT (LDA)

LDA<sup>6</sup> uses an in-vehicle camera designed to detect visible white and yellow lane markers in front of the vehicle and the vehicle's position on the road. If the system determines that the vehicle is starting to unintentionally deviate from its lane, the system alerts the driver with an audio and visual alert. When the alerts occur, the driver must check the surrounding road situation and carefully operate the steering wheel to move the vehicle back to the center part of their lane.

- **LDA<sup>6</sup> is designed to function at speeds of approximately 32 MPH or higher on relatively straight roadways**
- The vehicle's multi-information display indicates the system's operating status:
  - The inside of the displayed lines will be empty if the system is not able to detect the lane markings or if the system operation is temporarily disabled on one or both sides
  - The inside of the lines will be filled in (usually white) if the system is able to detect the lane markings
  - The inside of the lines will flash on the affected side (usually orange) when LDA<sup>6</sup> is operating. This is the Visual Alert



The following setting(s) can be adjusted (Varies by vehicle and type of TSS):

- LDA Audio and Visual Alert: Turn function ON or OFF & Adjust Alert Sensitivity

NOTE: Operation of the LDA<sup>6</sup> system and setting adjustments continues in the same condition regardless of ignition cycle until changed by the driver or system is reset

Refer to a Toyota Owner's Manual for additional information on LDA operation, setting adjustments, limitations, and precautions.

## **AUTOMATIC HIGH BEAMS (AHB)**

AHB<sup>7</sup> is a safety system designed to help drivers see more of what's ahead at nighttime without dazzling other drivers. When enabled, Automatic High Beams<sup>7</sup> uses an in-vehicle camera to help detect the headlights of oncoming vehicles and tail lights of preceding vehicles, then automatically switches between high and low beams as appropriate to provide the most light possible and enhance forward visibility. By using high beams more frequently, the system may allow earlier detection of pedestrians and obstacles.

- **AHB<sup>7</sup> is designed to function at speeds of approximately 25 MPH or higher. Minimum speed may vary by vehicle.**

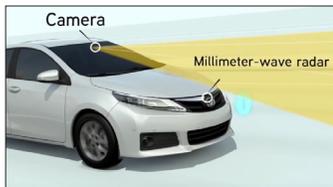
The following setting(s) can be adjusted:

- AHB: Turn function ON or OFF

Refer to a Toyota Owner's Manual for additional information on AHB operation, setting adjustments, limitations, and precautions.



## **TSS-P**



Toyota Safety Sense™ P<sup>2</sup> combines an in-vehicle camera and front-grill mounted millimeter-wave radar for enhanced performance and more functionality. In addition to the three active safety technologies featured in the TSS-C<sup>2</sup> package, TSS-P enhances the Pre-Collision System<sup>3</sup> by adding a Pedestrian Detection function<sup>9</sup>, enhances LDA<sup>6</sup> by adding a Steering Assist function<sup>8</sup> on certain models, and adds Dynamic Radar Cruise Control<sup>10</sup>.

## **LANE DEPARTURE ALERT (LDA) WITH STEERING ASSIST FUNCTION (ELECTRONIC POWER STEERING (EPS) EQUIPPED MODELS)**

The alert function of LDA<sup>6</sup> in TSS-P<sup>2</sup> operates the same as TSS-C<sup>2</sup> vehicles. LDA<sup>6</sup> uses an in-vehicle camera designed to detect visible white and yellow lane markers in front of the vehicle and the vehicle's position on the road. If the system determines that the vehicle is starting to unintentionally deviate from its lane, the system alerts the driver with an audio and visual alert. When the alerts occur, the driver must check the surrounding road situation and carefully operate the steering wheel to move the vehicle back to the center part of their lane.



In addition to the alert function of LDA, TSS-P equipped vehicles with EPS will feature a Steering Assist function<sup>8</sup>. When equipped and enabled, if the system determines that the vehicle is on a path to unintentionally depart from its lane, the system may provide small corrective steering inputs to the steering wheel for a short period of time to help the driver keep the vehicle in its lane.

- **LDA<sup>6</sup> is designed to function at speeds of approximately 32 MPH or higher on relatively straight roadways**
- The vehicle's multi-information display indicates the system's operating status:
  - The inside of the displayed lines will be empty if the system is not able to detect the lane markings or if the system operation is temporarily disabled on one or both sides
  - The inside of the lines will be filled in (usually white) if the system is able to detect the lane markings
  - The inside of the lines will flash on the affected side (usually orange) when LDA<sup>6</sup> is operating. This is the Visual Alert
  - Outside of the filled in lines will flash on the affected side (usually green) if Steering Assist function is operating

The following setting(s) can be adjusted (Varies by vehicle and type of TSS):

- LDA Audio and Visual Alert: Turn function ON or OFF & Adjust Alert Sensitivity
- Steering Assist function: Turn the Steering Assist function ON or OFF & Adjust Sensitivity
- Vehicle Sway Warning: Turn function ON or OFF & Adjust Alert Sensitivity

NOTE: Operation of the LDA<sup>6</sup> system and setting adjustments continues in the same condition regardless of ignition cycle until changed by the driver or system is reset

Refer to a Toyota Owner's Manual for additional information on LDA operation, setting adjustments, limitations, and precautions.

## PRE-COLLISION SYSTEM (PCS) WITH PEDESTRIAN DETECTION FUNCTION – VEHICLE AND PEDESTRIAN DETECTION

As there is a limit to the degree of recognition accuracy and control performance that this system can provide, do not overly rely on this system. This system will not prevent collisions or lessen collision damage or injury in every situation. Do not use PCS<sup>3</sup> instead of normal braking operations under any circumstances. Do not attempt to test the operation of the pre-collision system<sup>3</sup> yourself, as the system may not operate or engage, possibly leading to an accident. In some situations such as when driving in inclement weather such as heavy rain, fog, snow or a sandstorm or while driving on a curve and for a few seconds after driving on a curve, a vehicle/pedestrian may not be detected by the radar and camera sensors, preventing the system from operating properly. Refer to your Owner's Manual for a list of additional situations in which the system may not operate properly.



### VEHICLE DETECTION

With Toyota Safety Sense™ P<sup>2</sup>, PCS<sup>3</sup> uses an **in-vehicle camera and front-grill mounted millimeter-wave radar** to help detect the vehicle in front of your vehicle.

- When the PCS<sup>3</sup> determines that the possibility of a frontal collision with that vehicle is high, it prompts the driver to take evasive action and brake, by using an audio and visual alert
  - **These alerts operate when the vehicle speed is between approximately 7 to 110 MPH for potential collisions with a vehicle**
- If the driver notices the hazard and brakes, the system may provide additional braking force using Brake Assist<sup>4</sup>. This system may apply greater braking force in relation to how strongly the brake pedal is depressed
- If the driver does not brake in a set time and the system determines that the possibility of a frontal collision with another vehicle is extremely high, the system may automatically apply the brakes, reducing speed in order to help the driver reduce the impact and in certain cases avoid the collision
  - **The PCS<sup>3</sup> included with the TSS-P<sup>2</sup> package may operate automated braking for potential collisions with a vehicle when vehicle speeds are between approximately 7 to 110 MPH<sup>11</sup>**
  - **May reduce vehicle speed by up to 25 MPH for potential collisions with a vehicle<sup>11</sup>**

### PEDESTRIAN DETECTION

In certain conditions, the PCS<sup>3</sup> system included with the TSS-P package may also help to detect pedestrians<sup>9</sup>.

- The in-vehicle camera of PCS<sup>3</sup> detects a potential pedestrian based on size, profile, and motion of the detected pedestrian<sup>9</sup>. However, a pedestrian may not be detected depending on the conditions, including the surrounding brightness and the motion, posture, size, and angle of the potential detected pedestrian, preventing the system from operating (Refer to the Owner's Manual for additional information)
- If PCS<sup>3</sup> determines that the possibility of a frontal collision with a pedestrian is high under certain conditions, it prompts the driver to take evasive action and brake, by using an audio and visual alert, followed by brake assist<sup>4</sup>
  - **These alerts operate when the vehicle's speed is between approximately 7 to 50 MPH**
- If the driver does not brake in a set time and the system determines that the risk of collision with a pedestrian is extremely high, the system may automatically apply the brakes, reducing speed in order to help the driver avoid the collision or reducing the impact
  - **The PCS<sup>3</sup> included with the TSS-P<sup>2</sup> package may operate automated brake for potential collisions with a pedestrian<sup>5</sup> when vehicle speeds are between approximately 7 to 50 MPH**
  - **May reduce vehicle speed by up to 19 MPH for potential collisions with a pedestrian<sup>5</sup>**

Applicable to TSS-P PCS Vehicle and Pedestrian Detection: If the vehicle is stopped by the operation of the pre-collision brake function, the operation of the pre-collision brake hold will be canceled (brake will be released) after the vehicle has been stopped for approximately **two seconds** to allow the vehicle to move, if necessary. The driver of the vehicle must then determine whether brake or gas pedal application, or neither, is appropriate for the conditions

Applicable to TSS-P PCS Vehicle and Pedestrian Detection: The pre-collision braking function may not operate if certain operations are performed by the driver. If the accelerator pedal is being depressed strongly or the steering wheel is being turned, the system may determine that the driver is taking evasive action and possibly prevent the pre-collision braking function from operating. In some situations, while the pre-collision braking function is operating, operation of the function may be canceled if the accelerator pedal is depressed strongly or the steering wheel is turned and the system determines that the driver is taking evasive action.

The following setting(s) can be adjusted (Varies by vehicle and type of TSS). Adjustments made affect vehicle and pedestrian detection together, they cannot be independently adjusted:

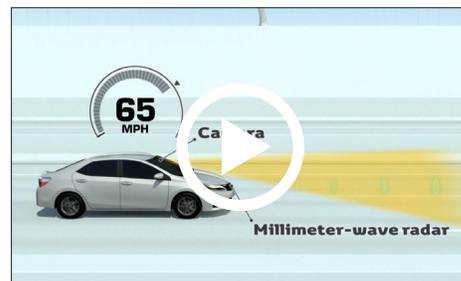
- Pre-Collision System: Turn function ON or OFF
- PCS Alert Timing (Alert timing only, brake operation remains the same): Far – Mid (default) - Near. If PCS<sup>3</sup> is turned off by the driver, PCS<sup>3</sup> will default back to ON with the Mid alert timing each time the IGN is cycled

Refer to a Toyota Owner's Manual for additional information on PCS operation, setting adjustments, limitations, and precautions.

## DYNAMIC RADAR CRUISE CONTROL (DRCC)

On highways, Dynamic Radar Cruise Control<sup>10</sup> functions similar to conventional “constant speed” cruise control in that it helps vehicles travel at a consistent speed set by the driver, but this system adds a vehicle-to-vehicle distance control mode which assists the driver by adjusting vehicle speed (within a set range) to help maintain a pre-set distance to a preceding vehicle when the preceding vehicle is traveling at a lower speed.

Once a vehicle speed is set by the driver, Dynamic Radar Cruise Control<sup>10</sup> uses a front-grill mounted millimeter-wave radar and an in-vehicle camera to detect a preceding vehicle and help determine its distance.



If the vehicle ahead is detected traveling at a speed slower than your set speed or within your distance range setting, the system is designed to automatically decelerate your vehicle without having to cancel the cruise control. When a greater reduction in vehicle speed is necessary, the system may apply the brakes and operate your vehicle brake lights. The system will then respond to changes in the speed of the vehicle ahead in order to help maintain the vehicle-to-vehicle distance set by the driver. When there is no longer a preceding vehicle driving slower than your vehicle's set speed, the system accelerates until the set speed is reached and returns to constant speed cruising.

The vehicle-to-vehicle distance, or distance between your vehicle and preceding vehicle, can be set by operating the vehicle-to-vehicle distance control. Pressing the button allows the driver to choose from three vehicle-to-vehicle distance settings: Long - Medium - Short.

- **DRCC<sup>10</sup> is designed to function at speeds of approximately 25 to 110 MPH. However, vehicle speed must be above approximately 28 MPH to initiate DRCC as that is the lowest set speed.**
- Starting with certain 2016 Prius models, select Toyota vehicles may also feature the new **Full-Speed Range DRCC<sup>10</sup>, which is designed to also cover speeds below 25 MPH. Full-Speed Range DRCC is designed to function at approximately 0 to 110 MPH.** Full-Speed Range DRCC<sup>10</sup> may enable low speed following, speed matching, stopping, and acceleration/deceleration to a preceding vehicle

The following setting(s) can be adjusted:

- Vehicle-to-vehicle distance settings: Long - Medium (default) - Short

Refer to a Toyota Owner's Manual for additional information on DRCC operation, setting adjustments, limitations, and precautions.

## ADDITIONAL RESOURCES FOR CUSTOMERS

For more information, please check out the following:

▶ [Toyota.com TSS Page](#)

▶ [Toyota Safety Sense™ Videos: YouTube](#)

▶ [Standard Automated Braking by 2017](#)

▶ [2013 Traffic Safety Facts](#)

▶ [DRCC Article](#)

1. United States Department of Transportation, National Highway Traffic Safety Administration (NHTSA). (2014). *TRAFFIC SAFETY FACTS 2013*. 2. Drivers should always be responsible for their own safe driving. Please always pay attention to your surroundings and drive safely. Depending on the conditions of roads, vehicles, and weather, etc., the system(s) may not work as intended. See Owner's Manual for details. 3. The TSS Pre-Collision System is designed to help avoid or reduce the crash speed and damage in certain frontal collisions only. It not a substitute for safe and attentive driving. System effectiveness depends on many factors, such as speed, driver input and road conditions. See Owner's Manual for detail. 4. Brake Assist is designed to help the driver take full advantage of the benefits of ABS. It is not a substitute for safe driving practices. Braking effectiveness also depends on proper brake-system maintenance, tire and road conditions. See Owner's Manual for details. 5. Results achieved during testing using a vehicle traveling at 19 mph and a stationary vehicle/pedestrian; system operation depends on driving environment (including road and weather) and vehicle circumstances. 6. Lane Departure Alert is designed to read lane markers under certain conditions, and provide visual and audible alerts when lane departure is detected. It is not a collision-avoidance system or a substitute for safe and attentive driving. Effectiveness depends on many factors. See Owner's Manual for details. 7. Automatic high beams operate at speeds above 25 mph. Factors such as dirty windshield, weather, lighting & terrain limit effectiveness requiring driver to manually operate the high beams. See Owner's Manual for details. 8. Lane Departure Alert with Steering Assist is designed to read lane markers under certain conditions. It provides a visual and audible alert and slight steering force when lane departure is detected. It is not a collision-avoidance system or a substitute for safe and attentive driving. Effectiveness depends on many factors. See Owner's Manual for details. 9. The Pedestrian Detection System is designed to detect a pedestrian ahead of the vehicle, determine if impact is imminent and help reduce impact speed. It is not a substitute for safe and attentive driving. System effectiveness depends on many factors, such as speed, size and position of pedestrians, driver input and weather, light and road conditions. See Owner's Manual for details. 10. Dynamic Radar Cruise Control is designed to assist the driver and is not a substitute for safe and attentive driving practices. System effectiveness depends on many factors, such as weather, traffic and road conditions. See your Owner's Manual for details. 11. Results achieved during testing using a vehicle traveling at 25 mph and a stationary vehicle. System operation depends on driving environment (including road and weather) and vehicle circumstances.