

2010 Toyota Prius

Media Preview

Yountville, California
February 2009



 **PRIUS**

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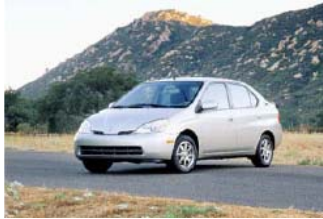
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01_Prius.jpg

I. TOYOTA PRIUS HISTORY

A. 1997 - Prius goes on sale in Japan

1. World's first mass-produced gas/electric hybrid vehicle
2. Embodiment of Toyota's environmental initiatives

B. 2000 - Prius is launched in the U.S market as a 2001 model year

1. Prius went on sale in the U.S. in August, 2000 with an MSRP of \$19,995
2. 70 hp (52 kw) engine plus 274 volt battery
3. EPA label fuel economy rating of 52 miles per gallon city and 45 highway (pre-2007 formula)
4. SULEV (super ultra low emission vehicle) certification
 - a. About 75 percent cleaner than ULEV and nearly 90 percent cleaner than LEV for smog forming exhaust gases
5. Recognition
 - a. 2001 - Society of Automotive Engineers named it "Best Engineered Car of 2001"
 - b. 2001 - Ward's Auto World magazine named the Prius gas/electric hybrid system one of the "10 Best Engines for 2001"



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recognition

C. 2004 - All-new, second-generation Prius is introduced

1. Significantly more power and performance
2. Best-in-class fuel economy
3. Best-in-market emissions performance
4. First Toyota product to employ Hybrid Synergy Drive
5. On sale in October, 2003 with an MSRP of \$19,995
6. 110 hp (system net)
7. EPA label fuel economy rating of 48 miles per gallon city and 45 highway (post-2007 EPA formula)
8. Recognition and Awards
 - a. Motor Trend Magazine "Car of the Year"
 - b. "North American Car of the Year"
 - c. "10 Best Cars," Car and Driver Magazine
 - d. "Ten Best Engines," Ward's Auto World
 - e. "Design of the Year," Automobile Magazine
 - f. Best Engineered Vehicle for 2004, Automotive Engineering International
 - g. Awarded a Gold in the 2004 Industrial Design Excellence Awards
 - h. "Most Significant Vehicle of the Year for 2004," Consumer Reports

D. Prius achievements

1. Prius nameplate has over 2000 patent applications filed across the world
2. More Prius sold than any other hybrid model
3. Best Selling hybrid in the world
4. 2008 Prius: Highest EPA rated combined fuel economy of any vehicle
5. 2008 Prius: 70% fewer smog-forming emissions than the average new vehicle
6. Americas most fuel-efficient car (EPA, 2008)
7. IntelliChoice, Inc. 2008
 - a. Best overall value of the year
 - b. An excellent value
 - c. Highest retained value
 - d. Lowest fuel costs
 - e. Lowest operating costs
 - f. Lowest ownership costs



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E. Lifecycle updates

1. 2005 - Minor changes to standard equipment
 - a. Number of option packages reduced to 6 from 9
 - b. Rear wiper made standard
2. 2007 - Touring Edition is introduced
3. 2008 - Standard Package replaces the Base Package



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II. 2010 TOYOTA PRIUS

A. Hybrid pioneer to hybrid icon

B. Core selling points

1. Hybrid performance
2. Innovative styling
3. Cutting-edge equipment and advanced features
4. Enhanced basic vehicle performance

C. Launch Date

1. May, 2009
2. Assembly at Tsutsumi Plant, Toyota City and Toyota Auto Body, Aichi, Japan



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D. Grade strategy

1. Single grade with four equipment levels
2. Focus is on Prius name
3. Simplicity – Reduce Complexity & Confusion
4. Easy Identification for Customers
 - a. Prius II – standard model
 - b. Prius III – Adds JBL® AM/FM/CD changer with integrated satellite radio, hands-free phone capability via Bluetooth® wireless technology and eight speakers
 - c. Prius IV – adds leather-trimmed interior; heated front seats with driver's power lumbar support; step lamp; water repellant glass; upgraded front and center pillar trim; plasma cluster; auto dimming mirror and HomeLink®; three-door Smart Key system
 - d. Prius V – adds 17-inch alloy wheels; LED headlamps and foglamps



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34 10 Prius.jpg



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E. Available Packages

1. Navigation Package – Voice-activated touch-screen DVD navigation system with XM NavTraffic® and Bluetooth® music streaming, backup camera and Safety Connect (available in model 1225, 1227 and 1229)
2. Solar Roof Package – Solar Powered Ventilation System, Remote Air-Conditioning System, and Navigation Package equipment (available in model 1225 and 1227)
3. Advanced Technology Package – Pre-Collision System (seatbelt pre-tensioner and brake assist), Dynamic Radar Cruise Control, Lane Keep Assist (LKA), Intelligent Park Assist and Navigation Package equipment (IPA) (available in model 1229)



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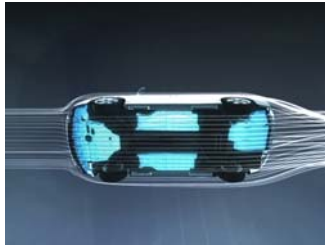


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III. INNOVATIVE AND FUNCTIONAL EXTERIOR

A. High quality and sophisticated

1. Triangular silhouette evolved to enhance the sense of dynamism and achieve cabin comfort
2. Apex of the roof shifted rearward for more rear seat head clearance
3. Front pillar brought forward and slanted further to connect to the headlamps in one fluid motion, creating a distinctively advanced proportion
4. Rear maintains the iconic vertical rear combination lamp and back door window configuration of the current model
5. Rear bumper Aero Corners mirror the front to enhance aerodynamic performance and to give the rear view a clean-cut, advanced image
6. Unique headlight design with blue tinted lens
 - a. Available LED headlamps reduce power consumption for improved fuel economy
 - 1) Power consumption is 17% less than comparable HID low beam
 - b. Standard halogen headlamps
7. Rear lamps now include LED taillamps in addition to brake lamp
 - a. Power consumption reduced 14.4 watts (88%) vs. previous model
8. Available fog lamps



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B. Aerodynamic features

1. Coefficient of Drag (Cd) of 0.25
 - a. One of the lowest in the world for a mass-produced vehicle
2. Upper grille opening minimized to help the air flow smoothly over the upper half of the body
3. Lower area below the bumper emphasized
 - a. Aero Corners – clean-cut bumper edges accentuated by flat wheel flare surfaces that improve air flow around the wheelhouse
 - b. Enlarged grille opening to reduce air flow resistance as well as for cooling efficiency
4. Exterior and underfloor Cd reduced
 - a. Reduced turbulence at A-pillar, rocker and front bumper
 - 1) A-pillar design
 - 2) Aero Squares
 - b. Controlled flow balance at rear body
 - 1) Aero Squares
 - 2) Tuned rocker molding
 - 3) Rear spoiler height
 - c. Extensive underbody covers
 - d. Reduced turbulence at front wheel
 - 1) Wheel design



011_wo_people



008_wo_people

C. Exterior dimensions

1. WB: 106.3 inches (+0) / 2700 mm (+0)
2. OAL: 175.6 inches (+ 0.60) / 4460 mm (+15)
3. OAW: 68.7 inches (+0.79) / 1745 mm (+20)
4. OAH: 58.7 inches (+0) / 1490 mm (+0)
5. Track
 - a. Front
 - 1) With 15 inch wheels: 60.0 inches / 1525 mm
 - 2) With 17 inch wheels: 59.6 inches / 1520 mm
 - b. Rear
 - 1) With 15 inch wheels: 59.8 inches / 1515 mm
 - 2) With 17 inch wheels: 59.4 inches / 1510 mm



011_w_people



008_w_people



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D. Interior room

1. Interior volume has been increased resulting in greater rear seat room and comfort
 - a. Front seat back is 1.38 inches (30 mm) thinner than the current model
 - b. Rear seat knee space increased by 0.79 inches (20 mm)
 - 1) despite reducing the couple distance by 0.60 inches (15 mm)

2. EPA passenger volume: 93.7 cubic feet

E. Interior Dimensions (Front//Rear, inches)

1. Head room: 38.3/37.6 (-0.3/+0.3)
2. Shoulder room: 56.1/53.1 (+5.1/+1.5)
3. Hip room: 52.7/51.2 (+1.7/-0.4)
4. Leg room: 42.5/36.0 (+0.6/-2.6)

F. Cargo Volume

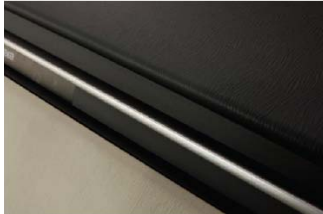
1. Rear seats up/down: 21.4 cubic feet /39.6 cubic feet
2. Under floor: 1.98 cubic feet (+.5 cu. Ft.)
3. Under tonneau cover: 10.24 cubic feet (+.5 cu. Ft.)

G. Exterior Colors

1. NEW - Blizzard Pearl (070)
2. Classic Silver Metallic (1F7)
3. Black (202)
4. Barcelona Red Metallic (3R3)
5. NEW - Sandy Beach Metallic (4T8)
6. NEW - Blue Ribbon Metallic (8T5)
7. NEW - Winter Gray Metallic (8V1)



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IV. SOPHISTICATED AND ROOMY INTERIOR

A. Unique and distinctive

1. Instrument panel, steering wheel and trim feature sleek lines for distinctive styling
2. Upper instrument panel graining and seat inserts feature a leaf vein pattern forming a distinctive motif

B. Color and trim

1. Interior Colors
 - a. Dark Gray
 - b. Bisque
 - c. Misty Gray
2. Interior Trim
 - a. Standard fabric
 - b. Available leather



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C. Seating

1. New front seat features a next-generation seat frame
 - a. Improved comfort
 - 1) Redesigned shape supports better to reduce fatigue and enhanced holding
 - b. Greater adjustability
 - 1) Increase seat slide travel
 - 2) Driver's manual seat height adjustment
 - 3) Driver's power lumbar support included with available leather trim
 - c. Active head restraint
2. Split/folding rear seat
 - a. 60/40 split
 - b. Folding armrest
 - c. FMVSS 202a compatible headrests standard
 - 1) Fold down for improved visibility



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V. HYBRID SYNERGY DRIVE

A. Improved hybrid system

1. More than 90% newly developed
 - a. New 1.8-liter engine
 - 1) Larger displacement
 - a) Up from 1.5-liters
 - 2) Greater torque provides good performance at low RPM for improved fuel economy
 - b. New transaxle
 - 1) The transaxle is lighter in weight and reduces torque losses by as much as 20 percent compared to the previous model
 - 2) New MG1 (motor generator 1)
 - a) More compact
 - 3) New MG2 (motor generator 2)
 - a) More compact
 - b) Operating voltage increased from 500V to 650V
 - 4) New chain drive replaced by gear drive with reduction gear
 - a) Allows for motor RPM increase from 6,400 rpm to 13,500 rpm
 - 5) Taken together, the inverter, motor and transaxle are smaller, and 20 percent lighter
 - c. Improved Power Control Unit
 - 1) More efficient
 - 2) More compact design
 - a) Direct transistor cooling
 - b) Smaller IGBT transistors
 - d. Improved Ni-MH high-voltage battery
 - 1) Increased output
 - 2) More compact battery pack
 - a) Allows for increased cargo volume
2. Total Output with hybrid system – 134 hp
3. 2010 EPA Fuel economy ratings
 - a. City: 50
 - b. Hwy: 49
 - c. Comb: 50
4. Emissions
 - a. California: SULEV (with AT-PZEV)
 - b. Federal: Tier 2 Bin 3



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B. 2ZR-FXE 1.8-liter DOHC 16-valve VVT-i

1. Horsepower and Torque

A. 98 horsepower (73 kw) @ 5,200 rpm

B. 105 ft.-lb. (142 N-m) @ 4,000 rpm

2. Main features

A. Atkinson combustion cycle

B. Electronic Throttle Control System with intelligence (ETCS-i)

3. New features

a. Accessory drive belts eliminated

- 1) Electrically driven air conditioning compressor and water pump reduce mechanical losses
- 2) Electrically driven water pump allows coolant flow rate to be controlled with greater precision based on vehicle conditions for better fuel efficiency
- 3) Cabin heating and air conditioning can continue operating with the engine stopped

b. Exhaust Heat Recirculation used to heat engine coolant

- 1) Reduces time for coolant to reach operating temperature
 - a) Shortens time until gas engine can stop
- 2) Improves heater performance
 - a) Reduces time to warm air by 1 minute

c. Cool Exhaust Gas Recirculation

- 1) Adoption of a Cool-EGR System reduced cooling loss and pumping loss
- 2) With lower exhaust heat, heat efficiency was enhanced, and consequently, fuel efficiency was enhanced as well



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C. Hybrid Transaxle

1. All new transaxle

- a. More compact
- b. Quieter
- c. Gear-drive replaces chain drive
- d. Adopts planetary reduction gear (as on Highlander and Camry)

2. Transaxle components

a. MG1

- 1) Air-cooled permanent magnet
- 2) 56 horsepower (42 kW)

b. MG2

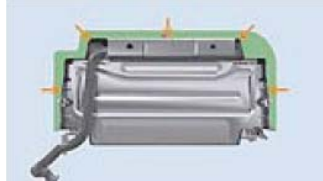
- 1) Air-cooled permanent magnet
- 2) 80 horsepower (60 kW)
 - a) Increased from 67 horsepower (50 kW)
- 3) 153 lb.-ft. (207 N-m)
 - a) Previously 295 lb.-ft. (400 N-m)
- 4) 13,500 rpm maximum
 - a) Increased from 6,400 rpm maximum

c. Multifunction gear

- 1) Combines Power Split Planetary Gear Set Ring with Speed Reduction Planetary Gear Set Ring
 - a) Incorporates parking gear and counter drive gear
 - b) Differential ratio is 3.267
- 2) Power split planetary gear set
 - a) Two sets of planetary gears
 - b) No clutches, bands, valves, hydraulics
 - c) Sun gear connected to MG1 (acts as the generator)
 - d) Planet carrier connected directly to engine
 - e) Ring gear connected to counter gear
- 3) Speed reduction planetary gear set
 - a) Sun gear connected to MG2 (acts as the motor)
 - b) Carrier grounded
 - c) Ring gear connected to counter gear



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D. Hybrid Battery Pack

1. Improved Ni-MH High-voltage battery
 - a. DC 201.6V
 - 1) Boosted to DC 650V maximum before converted to alternating current
 - b. Improved efficiency
 - c. More effective charge and discharge
2. Battery module assembly
 - a. 28 Ni-MH (Nickel-Metal Hydride) modules
 - b. Each module is 9.6 volts DC (1.2 volts X 6 cells)
 - c. Pack peak output is 27kW (28 hp)
3. Compact battery provides increased cargo volume and cabin comfort
 - a. Battery module and main relay were repositioned
 - 1) Includes battery, battery ECU, System Main Relays and service plug
 - b. Number of fasteners reduced to eliminate dead space in the battery pack
4. Cooling blower and control
 - a. Cooling air velocity and volume increased for increased cooling efficiency
 - 1) Improved overall battery efficiency and fuel economy
 - b. Smaller cool air intake
5. Hybrid battery warranted for 10 years/150,000 miles
6. At end of life, every part of the battery, from the precious metals to the plastic, plates, steel case and the wiring, are recycled or processed for disposal
 - a. High nickel prices are ensuring that used batteries get recycled



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E. Power Control Unit (Inverter)

1. New inverter design
 - a. More compact
 - b. Direct cooling of IGBT transistors
 - c. Reduced energy losses
2. Converts high-voltage DC to AC
 - a. Converts DC to 3-phase AC to drive MG1 and MG2
 - b. Controlled by hybrid ECU
 - c. Boost converter raises 201.6 volts DC up to 650 volts DC
 - d. DC/DC converter transforms 201.6 volts DC to 12 volts DC for auxiliary items and to charge the auxiliary battery
 - e. MG ECU is packaged within inverter assembly



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F. Fuel Tank

1. Low evaporative emission resin tank
 - a. No bladder
 - b. Complies with zero evaporation regulations
 - c. Carbon capture canister for AT-PZEV compliance
 - d. 11.9-gallon capacity

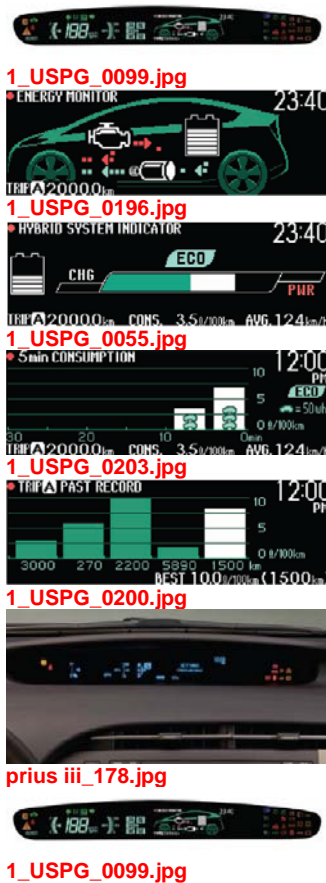


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VI. ADVANCED DISPLAYS AND CONTROLS

A. Combination meter

1. Reflective virtual image reduces eye refocusing
 - a. Display focus set at 3.45 feet
2. Driver information area
 - a. Telltale indicators (EV Mode, seatbelt, master warning indicator and READY light)
 - b. Fuel gauge
 - c. Speedometer
 - d. Instantaneous fuel consumption
 - e. Shift position indicator



3. Multi-information Display

- a. 5-inch wide Fully Integrated-Vacuum Fluorescent Display (VI-FD)
- b. Displays information that helps the driver maximize fuel economy and develop efficient driving habits
 - 1) Energy monitor
 - a) displays energy flow and battery charge in real time to support understanding of HV system
 - 2) Hybrid system indicator
 - a) Encourage smooth acceleration and braking for optimum fuel economy
 - b) Provides feedback on how driving style affects fuel efficiency
 - c) Encourages drivers to review fuel economy record
 - 3) Fuel consumption (1 min. and 5 min. increments)
 - 4) Past fuel consumption record
 - a) Displays best record of all previous trips
 - 5) Trip information
 - a) Odometer
 - b) Trip odometer (A/B)
 - c) Cruising range (range to empty)
 - 6) User customizable settings
 - a) Eco Indicator – On/Off
 - b) Steering Switch (Touch Tracer Display) – On/Off
 - c) Clock – 12 or 24 hour format
 - d) Language selection – English, French, Spanish
 - e) Multi-display screen – On/Off
 - 7) Caution message display
 - 8) Also displays Radar Cruise, Pre-Collision, and Lane Keep Assist control conditions
- c. Press “DISP” switch on steering wheel to change information being displayed
- d. Display is independent of navigation multi-display
 - 1) Information can be viewed while navigation system is running

4. Warnings and indicators area

- a. Vehicle system indicators and warning lights



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B. Driving Modes

1. Eco Mode

- a. Maximizes fuel savings across all driving conditions
- b. Modifies or smoothes out the electronic throttle control program to reduce throttle response
 - 1) Reduces throttle opening up to a max of 11.6%
- c. Modifies air conditioning operation
- d. Also improves acceleration performance in low-traction conditions like ice and snow as the reduced output helps to minimize wheel slippage
- e. EPA label calculations do not include Eco Mode and so does not affect label mpg

2. EV Mode

- a. Helps keep the vehicle in electric-only mode longer at low speeds
 - 1) Allows driver to operate the vehicle in a quiet mode
 - 2) Gives driver greater control over hybrid system operation
- b. In EV Mode HV ECU operates the vehicle using only MG2 if required conditions are satisfied
 - 1) Under certain operating conditions the vehicle can go approximately 25 mph for up to about ½ mile (possibly longer depending on vehicle and battery conditions)
 - 2) If conditions are met, push the EV button and the mode will be enabled
 - a) The SOC (state of charge) level display on the energy monitor must be four bars or more to operate EV mode
- c. Driver operation from start up:
 - 1) Press Power button with foot on brake to start vehicles then press the EV button
 - 2) Confirm conditions of defroster (OFF) and hybrid battery charge level display is 4 or more
 - 3) Indicator light in dash above the fuel gauge notifies driver when the EV drive mode is selected



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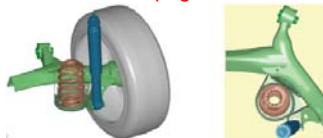
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Power_Performance_Driveability_Chart



Passing Acceleration Test


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3. Power Mode

- Increases throttle response
- Power management control ECU (HV CPU) optimizes acceleration performance by increasing throttle response in the middle range more than normal

VII. SUSPENSION

A. New Prius adopts Toyota MC platform

- Improved body rigidity
 - Improved suspension performance
 - Increased roll torsional rigidity
- Wider
 - increased wheel track

B. Front Suspension

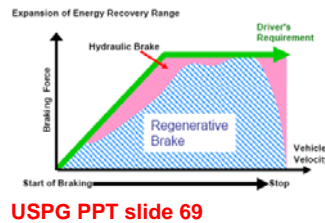
- MacPherson strut with L-shaped lower arms
- Aluminum knuckle and stabilizer link
- Hollow aluminum stabilizer used for reduced weight

C. Rear Suspension

- Torsion beam

D. Low rolling-resistance tires

- new tires developed with a high dimension of balance between low rolling resistance, low noise, and sufficient road grip



VIII. BRAKES

A. New, larger front and rear discs

1. Front Brakes: 10.09-inch x 0.98-inch (255 mm x 25 mm) ventilated rotor
2. Rear Brakes: 10.2-inch x 0.35-inch (259 mm x 9 mm) solid rotor
3. Aluminum calipers and cylinder for reduced weight
 - a. Resin piston

B. Regenerative braking

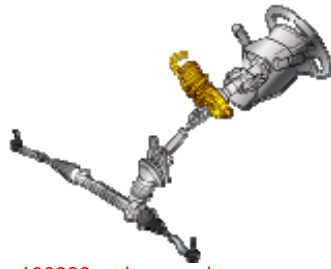
1. Braking force supplied by the motor (regenerative braking) is balanced with force supplied by the hydraulic system
2. Driver's brake demand is distributed between friction brake and the regenerative brake function by the Electronically Controlled Brake system
 - a. Biased towards regenerative braking to maximize energy recovery
 - b. Regenerative brake force is determined by vehicle speed and the battery state of charge
 - c. State of charge determines the energy receiving ability of the battery.
3. Fuel economy is enhanced through energy recovery
4. Life of brake components extended through reduced use and wear

C. Electronically Controlled Braking (ECB)

1. Brake-by-wire system
2. Friction brake and regenerative braking control are integrated by Electronic Brake Control
3. Improved over current Prius system
 - a. All system modules are integrated
 - 1) master cylinder
 - 2) sensor
 - 3) linear solenoid
 - 4) ECU
 - b. A hydraulic booster replaces the capacitor system as a mechanical back-up in case of a failure of the regenerative braking system
 - 1) Saves electric power and increases reliability
 - c. Weight is reduced by 18%
 - d. Volume is decreased by 31%
 - e. Electric current consumption is reduced by 18% to 29%
 - 1) Contributes to improved fuel consumption

D. Hill-start Assist Control (HAC)

1. Prevents vehicle from rolling backwards
2. Holds vehicle for approximately 2-3 sec.
3. Driver must depress the brake pedal with sufficient force and wait for a “beep” – which indicates system is operating



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IX. STEERING

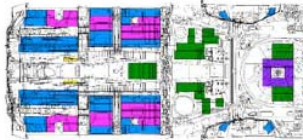
A. Column-Type Electric Power Steering (EPS)

1. Carryover with improvements
 - a. New control logic
 - b. High rigidity type intermediate shaft
 - c. High gear ratio and rigid mounting steering gear
2. Rack and pinion design for precise handling
3. Electric motor power assist
 - a. Ease of service – no pump, hoses, belts and p/s fluid
 - b. The assist motor is mounted on the steering column – assist is calculated by the EPS ECU, and is vehicle speed sensing
 - c. Electric motor only provides assist when needed – reducing power consumption
 - d. Torque sensor assembly detects torque applied by driver to a torsion bar, sends signal to EPS ECU
 - e. ECU receives signal from ECU for engine speed, Skid Control ECU for vehicle speed – calculates amount of steering assist and operates the assist motor with the appropriate current
4. Integrated with enhanced VSC system to provide greater control under acceleration, braking, and cornering

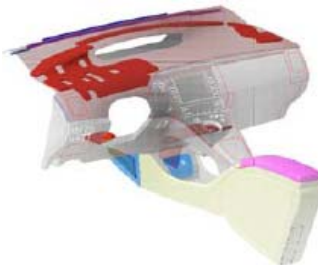
B. New manual Tilt and Telescopic Steering Column



Noise_Vibration_0009



Noise_Vibration_0008



Noise_Vibration_0011

C. NVH performance improved over current model

1. Interior quietness improved

a. Engine compartment insulation

- 1) Hood and dash silencers, engine undercover

b. Interior booming noise levels have decreased

- 1) New materials absorb sound instead of insulate against it

a) Dash inner silencer

b) Tunnel silencer

c) Carpeting

- 2) Instrument panel sound paths insulated

a) Lightweight, high-performance absorption material

b) Increased insulation, yet reduced weight

- 3) Thickness of sound absorbing coatings varied

a) Performance maximized while reducing weight

c. Overall weight of sound insulation material reduced 7.7 lb (3.5 kg)

2. Engine start shock has been reduced

a. Engine mount moved to shorten the roll axis of the powertrain to 0.71 inches (18mm) from 1.65 inches (42mm)

b. Vibration is reduced using Hybrid control system logic

D. Ecological plastics

1. World-first, plant-derived resin "Ecological Plastic" with excellent recycling characteristics

a. Front/rear inner/outer scuffs

b. Cowl side trim

c. Luggage space rear finish plate

d. Driver's seat cushion

2. In preliminary calculations using the LCA (Life Cycle Assessment) technique, the use of ecological plastic emits roughly 20% less CO₂ compared to the use of oil derived plastics



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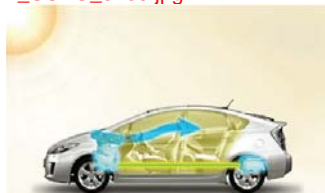
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3. Available Solar Roof

a. Solar Powered Ventilation System cools interior with outside air

- 1) The system is activated by turning on the Solar Ventilation Switch
- 2) One minute after the ignition is turned OFF, the air intake mode switches to Outside Air Ventilation, and the blower mode switches to the FACE Mode, in order to first increase the ventilation efficiency.
- 3) The system waits for ten minutes so that the air that was cooled while the vehicle was in operation is not discharged immediately after the car is parked.
- 4) Then, the system starts and continues its operation until either the ignition is turned ON, or the ventilation switch is turned off.

b. Solar panel cell is the same as used in home solar systems

- 1) Made of Poly-silicon
- 2) 36 solar cells in series generate about 59W of electricity

4. Available Remote Air Conditioning System

- a. Allows owner to pre-cool the interior
- b. Activated with button on key fob
- c. Draws power from the hybrid battery
- d. Will run for up to 3 minutes

- 1) Shuts off if battery charge level drops below level 3 or if a door is unlocked and opened

e. Included with Solar Roof Package



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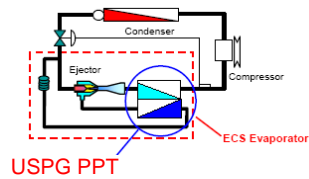


plasma_generator

X. COMFORT AND CONVENIENCE

A. Automatic climate control with pollen filter mode and Plasmacluster generator

1. Pollen filter mode activated with switch
 - a. Air vent is switched to FACE mode and recirculated pollen-free air flows to the driver and front passenger
2. Plasmacluster™ ion generator
 - a. In driver's side face-level vent
 - b. Operates whenever the air conditioner is on
 - c. Produces positive & negative ions thru high voltage discharge across water and oxygen molecules in the air
 - d. This produces "ion clusters"
 - 1) groups of H₂O molecules surrounding an H or an O₂ molecule
 - e. Ion clusters reduce airborne germs, growth of mold, and reduce odors
 - 1) airborne germs contacting ion clusters are deprived of hydrogen atoms
 - f. Resulting in a decrease in the overall quantity of germs
 - g. Standard on Prius IV and V



3. Ejector Cycle System

- Efficient evaporator for improved cooling performance
- Uses energy that is normally lost
- Recovering the expansion energy leads to pressure increase and reduced compressor workload
- The system adopts a 2-stage evaporator that cools the air more effectively
- Cooling performance improved 7%
- Compressor energy consumption is reduced 10.5%

4. Electric Compressor

- Air conditioning control is not dependent upon the engine
 - Helps with fuel economy
- Integrated DC/AC inverter in the compressor
- Electric motor is actuated by 288 volts AC supplied by the AC inverter
- A/C compressor speed is continuously variable in response to cooling load
- Parts left over from MG1 that would have been wasted are used in the motor core of the air conditioning compressor to reduce resource waste

5. Humidity Control Sensor

- Prevents excessive dehumidification to maintain comfort level



38 10 Prius

B. Smart Key System

1. Hands-free operation for
 - a. Unlocking for entry and rear door access
 - b. Locking on exit,
 - c. Keyless starting when inside
2. Standard system has lock and unlock sensors for the driver's door only
3. Available system has lock and unlock sensors for the driver, front passenger, and back door
4. Ultra-slim key fob design
5. Sensors at each front door, interior and dash panel detect presence of key fob within 3 feet (1 m)
 - a. Pre-lights interior dome light when registered key approaches vehicle
 - b. Unlocks a door or doors only when a door handle is touched
 - 1) New integrated sensor eliminates previous black lock button
 - c. Starting
 - 1) Remote must be within vehicle interior:



prius_070.jpg



prius iii_214_1.jpg

C. Steering wheel controls

1. Reduces need for driver to take hands off the steering wheel
 - a. Audio controls - standard
 - b. Climate controls - standard
 - c. Trip information display switch – standard
 - d. Cruise control stalk - standard
 - e. Telephone controls - available
 - f. Lane Keep Assist switch - available
 - g. Dynamic Radar Cruise distance switch - available

D. Touch Tracer Display

1. Displays steering wheel control operations in driver information area when the controls are touched
2. Switches touched by the driver turn amber
 - a. Reduces frequency of eye movement
 - b. Reduces driver fatigue



prius II_121.jpg

E. Audio Systems

1. AM/FM/CD

- a. AM/FM tuner, in-dash CD player
- b. Six-speakers
- c. Compatible with MP3 and WMA files
- d. AUX jack in rear console
- e. No Bluetooth® capability

2. JBL® Audio System

- a. AM/FM tuner, in-dash 6-disc CD changer
- b. 8-speakers
- c. Integrated satellite tuner with 90 days free service
 - 1) XM Satellite Radio
- d. AUX jack in rear console
- e. Hands-free Bluetooth® (phone only)
- f. Compatible with MP3 and WMA files



prius iii_136f.jpg

3. JBL® Audio system with navigation

- a. AM/FM tuner, in-dash 4-disc CD changer
- b. 8-speakers
- c. Integrated satellite tuner with 90 days free service
 - 1) XM Satellite Radio
 - 2) XM NavTraffic
- d. AUX jack in center console
- e. Hands-free Bluetooth® (phone and music)
- f. Compatible with MP3 and WMA files
- g. Gen 6 Navigation system
- h. Rearview Monitor
 - 1) Models with navigation - rearview is displayed through the navigation display

4. Integrated satellite antenna is standard



prius iii_136f_w_prius iii_215_1

F. Voice-activated DVD Navigation System

1. 6th generation by Denso
 - a. Improved voice command functions
 - 1) Simpler voice menus.
 - 2) Recognizes and provides commands in English, French and Spanish
 - b. POI search by company or chain names
 - 1) Can now search brand names and chain stores
 - c. XM NavTraffic ready
 - 1) Subscription service for live traffic information
 - d. Enhanced address and POI entry
 - 1) Simplified interface with intuitive word or name search
 - e. Microphone located in overhead console
 - f. Steering-wheel-mounted controls
2. Enhanced Bluetooth™ phone operation
 - a. Easier pairing and phone book synchronization
3. Includes JBL® Audio system with AM/FM tuner, in-dash 4-disc CD changer and Bluetooth audio streaming

G. Bluetooth® hands free telephone

1. Bluetooth hands free

a. Phonebook dialing

b. Voice dialing (name recognition)

- 1) Call can be made by saying a recorded voice tag name

c. Voice dialing (phone number recognition)

- 1) Call can be made by saying a phone number that the voice recognition system recognizes

d. Outgoing call log dialing

- 1) Hands-free function can be used to dial one of the last five phone numbers dialed
- 2) Previous number can be redialed by pressing the off-hook switch on the steering wheel

e. Incoming call log dialing

- 1) Hands-free function can be used to dial one of the last five phone numbers that called

f. Quick dialing

- 1) Up to six voice tags can be stored on switches 1-6 of the audio system
- 2) One of these numbers can be selected for dialing

g. Receiving calls

- 1) Incoming calls can be received using the hands-free function
- 2) Audio system LCD screen will display name and phone number info for contacts registered in the phonebook

h. Voice mute function



prius iii_136c.jpg



prius iii_136b.jpg

2. Bluetooth® telephone with navigation

a. Dialing function

- 1) Number is dialed through the display screen

b. Phonebook dial function

- 1) Driver can dial a number from the phonebook list sent from the mobile phone to the head unit and displayed on the display screen
- 2) Can accommodate up to 1,000 entries

c. Outgoing call log dialing

- 1) Hands-free function can be used to dial one of the last five phone numbers dialed

d. Incoming call log dialing

- 1) Hands-free function can be used to dial one of the last five phone numbers that called

e. One-touch dial

- 1) Maximum of 17 preset phone numbers can be dialed with a single touch

f. Voice dialing

- 1) Place calls by saying the name of one of 20 pre-recorded entries or a phone number

g. Navigation system info dialing

- 1) Call numbers registered in the navigation system's database of facilities and services

h. Receiving calls

- 1) Calls can be received hands-free by touching the switch on the display screen or steering wheel
- 2) Display screen shows name and phone number info for contacts registered in the phonebook



prius iii_136a.jpg



prius iii_259.jpg

H. Bluetooth™ audio streaming

1. Included with Navigation/JBL system
2. Wireless connection of iPod or other music devices with Bluetooth audio profile or appropriate adapter
3. Enables control of audio device using steering wheel or audio head unit controls
 - a. Certain devices and adapters
4. Detailed list of compatible devices at www.toyota.letstalk.com
5. Does not use USB interface



Safety Connect.2

I. Safety Connect™

1. Toyota telematics system
2. Factory-installed system
3. Activated by the dealer at purchase
4. Features
 - a. Automatic Collision Notification (ACN)
 - 1) Activated with airbag deployment or severe rear-end collision
 - 2) Vehicle ID and GPS location transmitted to call center
 - 3) Call center agent will contact the occupants and emergency response as necessary
 - b. Stolen Vehicle Location (SVL)
 - 1) Vehicle tracking via GPS
 - 2) Customer must file police report and report theft to Safety Connect call center
 - c. Emergency Assistance Button
 - 1) 24-hour emergency assistance
 - d. Roadside Assistance
 - 1) 24-hour roadside assistance
5. Availability in late summer 2009
6. One-year trial subscription included with new vehicle purchase
7. Dedicated response center operated by ATX Group
 - a. More than a decade providing auto telematics services



prius iii_236.jpg



prius iii_259.jpg



prius iii_255.jpg

J. Storage

1. Instrument panel storage
 - a. Upper glove box (3.0 liters)
 - b. Lower glove box (9.0 liters)
2. Center console storage
 - a. Rear console box (3.7 liters)
 - 1) Sliding armrest
 - 2) 12-volt power outlet
 - 3) Auxiliary audio input jack
 - 4) Removable tray with wire-management cutouts
 - 5) Removable cup holder
 - b. Front console tray
 - c. Cupholder
3. Front door panel storage
4. Cargo area storage
 - a. Tonneau cover
 - b. Under-floor storage



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XI. ADVANCED TECHNOLOGY FEATURES

A. Dynamic Radar Cruise Control

1. Interval-ranging and target-tracking of vehicle in front
 - a. Driver selects set speed and preferred interval to traffic ahead among three settings:
 - 1) Short
 - 2) Medium
 - 3) Long
2. If the distance to the target vehicle is less than desired, Dynamic Radar Cruise Control decelerates the vehicle:
 - a. Partially closes the throttle valve through ETCS-i:
 - 1) If gap is still closing, system can fully close the throttle
 - b. The skid control ECU can activate the brake actuator to apply light braking
 - 1) Distance control ECU requests braking from the skid control ECU
 - 2) Brake lamps illuminate
 - c. If further deceleration is required:
 - 1) VSC warning buzzer alerts driver to apply the brakes.
3. Reduces driver workload
 - a. Within the set speed the vehicle will automatically maintain a pre-set distance to the preceding vehicle
 - b. Driver no longer has to constantly adjust speed
4. Helps to reduce the risk of accidents
 - a. When a slower preceding vehicle is detected, the system will automatically decelerate the vehicle as necessary
 - b. In the event that rapid deceleration is necessary, the driver will be warned, urging them to take evasive action
5. Based on system debuted on the Lexus LS
6. Part of the Advanced Technology Package available on Prius V



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B. Lane Keep Assist

1. A driver assist system to alert and to assist the driver in staying in a lane
2. Intended for use on well-developed highways and roads
 - a. Requires lane marker detection
3. Two functions
 - a. Lane Departure Warning (LDW)
 - b. Lane Keep Assist (LKA)
4. Lane Departure Warning (LDW)
 - a. Alerts the driver of unintentional lane departure
 - b. Based on lane-marker detection, Lane Departure Warning detects the possibility of lane departure 1 second in advance
 - c. When it detects possible lane departure LDW will sound a buzzer and apply a small inward steering torque to warn the driver and encourage them to take action to avoid lane departure
5. Lane Keep Assist (LKA)
 - a. Designed to reduce driver steering effort
 - b. Generates steering torque to assist the driver in following the lane center
 - c. Driver assist only
 - 1) Driver must retain active steering control.
6. System components
 - a. Lane recognition camera
 - b. Lane Keep Assist switch
 - c. Integrates with Electronic Power Steering (EPS)
 - d. Displays system status on Multi-Information Display

7. Operation

- a. System must be activated each time the vehicle is started
 - 1) Resets to off when the vehicle is shut off
 - 2) System can be manually cancelled using the switch
- b. Lane Keep Assist operates when Dynamic Radar Cruise Control is set
 - 1) Operates between 50 mph and 112 mph
- c. Lane Departure Warning is operational when:
 - 1) Dynamic Radar Cruise Control is OFF
 - 2) Or outside the speed range of LKA
 - a) < 50 mph or >112 mph
- d. Temporarily self-cancels based on driver input
 - 1) Steering input (driver's intention to change course)
 - 2) Turn-signal lamp on (driver's intention to change lane)
 - 3) Brake pedal operation
- e. Driver feedback
 - 1) LKA indicator appears when the system is activated
 - 2) Lane markers and steering wheel images on the multi-display inform the driver of the system condition

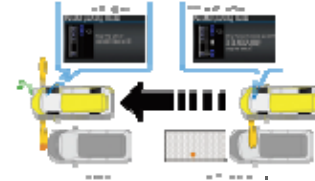
8. Part of the Advanced Technology Package available on Prius V



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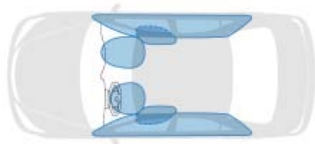
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bre1720

C. Intelligent Parking Assist

1. New, simplified system
2. Includes "Pre-Support" function
 - a. Provides step-by-step guidance
 - b. Activated with Pre-Support switch
3. Two color-keyed sonar distance-ranging sensors on front bumper sides
4. Operation
 - a. Utilized during reverse and parallel parking
 - 1) Pressing the Pre-Support button before selecting reverse, the sonar sensors identify and measure parking space and then prompt the driver through the parking guidance process
 - 2) Selecting reverse without Pre-Support, pressing one of the Park Assist mode buttons on the rear view display allows the driver to select a target parking space and initiate the parking guidance
 - 3) Displays position and distance on the navigation multi-display
 - b. The vehicle controls the steering and the driver controls the speed via the brake pedal
 - c. Sounds a buzzer from a slow to fast repetition to indicate proximity to objects
 - d. Guidance cancels:
 - 1) The steering wheel is moved
 - 2) Accelerator pedal is pressed
 - 3) Shift lever moved out of "R"
 - 4) Parking brake applied
 - 5) Navigation screen display is changed
 - e. Part of the Advanced Technology Package available on Prius V

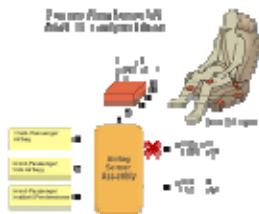


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XII. PASSIVE SAFETY

A. Comprehensive Advanced Airbag System

1. 7 standard airbags
 - a. Dual-stage front airbags
 - b. Standard side and two-row side-curtain airbags
 - 1) Head protection and reduced ejection
 - c. Standard driver's and front passenger's seat-mounted side-impact airbags
 - 1) Thorax, abdomen, and pelvis protection
 - d. Standard driver's knee airbag
2. Standard front seatbelt pretensioners with force limiters
3. High-voltage cut-off function
 - a. Disconnects the high-voltage battery with any airbag deployment



D13n57

B. Occupant Classification System

1. With driver-side position sensor and passenger-side occupant classification
 - a. Limits or prevents deployment of passenger-side airbag
2. Weight sensors in base of passenger seat detect size class of occupant
 - a. Less than lower weight value = handbag or no occupant
 - 1) Does not illuminate passenger-side seatbelt reminder
 - 2) Does not illuminate AIRBAG ON or AIRBAG OFF
 - b. Blocks deployment of passenger airbag, side, and side curtain airbags



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C. Active Headrests

1. Used for the front seats to reduce damage to the neck of passengers in the event of a rear collision
2. Consists of an upper unit, cable and lower unit
 - a. In the event of a rear collision, the whole seat is moved forward by the impact, causing the occupant's body to push on the lower unit
 - b. The cable connecting the lower and upper units is pulled downward
 - c. Due to the movement of this cable, the upper unit moves the whole headrest slightly up and forward to reduce neck damage



DSC01666

D. Tire Pressure Monitor System (TPMS)

1. Each wheel has a sensor/transmitter
 - a. Senses air pressure and temperature
2. If ECU reads a signal out of specified range, indicator light is illuminated



Enhanced_VSC

XIII. ACTIVE SAFETY

A. Brake Control Systems

1. Includes the full complement of Star Safety system features
 - a. Anti-lock Brake System (ABS): helps prevent the wheels from locking when the brakes are applied firmly or when braking on a slippery surface
 - b. Traction Control (TRAC): helps restrain the slippage of the drive wheels if the driver depresses the accelerator pedal excessively when starting off or accelerating on a slippery surface
 - c. Enhanced Vehicle Stability Control (VSC)
 - 1) Integrates engine output control and braking in coordination with steering control to ensure vehicle running, cornering and stopping performance for active safety
 - 2) Previous ABS, Brake Assist, TRAC and VSC acted independently, control starts at the limit of vehicle running, cornering and stopping performance
 - 3) Begins control earlier in order to ensure that the vehicle does not exceed limits
 - d. Brake Assist (BA): provides an auxiliary brake force to assist a driver who cannot generate a large brake force during emergency braking, thus helping ensure the vehicle's braking performance
 - e. Electronic Brake force Distribution (EBD) – provides proper brake force distribution between the front and rear wheels based on driving conditions and, while cornering, controls the brake forces of the right and left wheels, helping maintain vehicle behavior

B. VSC Cooperative Control

1. Straight-line braking on variable traction surface
 - a. Brake force applied to the side with good traction will create a yaw moment in that direction
 - b. VSC braking function will act to stabilize the condition
 - c. At the same time, power steering assist will be increased in a manner that aids the driver in making steering corrections to help stabilize the vehicle
2. Straight-line acceleration on variable traction surface
 - a. When the driver accelerates with sufficient force, the traction difference from the side of the vehicle with good traction and that of the side with poor traction will create a yaw moment in the direction of the low traction side
 - b. The TRAC system will act to reduce engine output and apply brake force to the spinning drive wheels to stabilize the condition
 - c. At the same time, the power steering assist will be increased in a manner that aids the driver in making steering corrections that will help stabilize the vehicle
3. Front-wheel skid
 - a. VSC braking will take place to stabilize the vehicle's posture
 - b. Power steering assist will be increased in the steering direction that aids the driver in making steering corrections that will help to correct the skid condition
4. Rear-wheel skid
 - a. VSC will apply braking force to the appropriate wheels to help stabilize the skid condition
 - b. Power steering assist is increased in the steering direction that will aid the driver in making steering corrections to reduce the skid condition



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C. Pre-collision system

1. Purpose

- a. Predicts frontal collisions with other vehicles or objects.
- b. Pre-Collision ECU:
 - 1) Uses same radar antenna as radar cruise system
 - 2) Tracks relative speed, distance and vector to targets ahead of the vehicle
 - 3) Determines whether crash is “unavoidable”

2. Operating Conditions

- a. Imminent collision detected by radar sensor
- b. Driver suddenly applies brakes
 - 1) Pressure rise rate indicates panic stop

3. Features

- a. Pre-Collision Seatbelt
 - 1) Retracts driver and front passenger seatbelts to a pre-set force level
 - 2) When collision is within 0.6 seconds
 - 3) Electric tension reducer solenoid
 - 4) Seatbelts may retract although there is no obstruction in the direct path of the vehicle
 - a) Panic braking
 - b) VSC operation
 - c) When entering curve or intersection
 - (i) Predictive path of vehicle has not been confirmed
 - (ii) Vector of target vehicles is too broad
- b. Pre-Collision Brake Assist
 - 1) Increases available hydraulic pressure at brake master cylinder in advance of pedal application
 - 2) Reduces vehicle reaction time
 - a) Does so, by anticipating the potential demand for maximum braking force when the driver brakes suddenly.
- c. Pre-Collision Brake
 - 1) Controls brake hydraulic pressure to automatically activate the brakes regardless of driver brake operation to reduce vehicle speed
 - 2) Can be deactivated using PCS Brake OFF switch
 - a) “PCS” light illuminates in meter