



DAIHATSU



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Daihatsu Announces New Technology for the Updated COPEN Convertible Sports Mini Vehicle

Daihatsu Motor Co., Ltd. (Daihatsu) announces details of the new technology in the COPEN convertible sports mini vehicle available June 2014.

The new COPEN, developed to build a fresh relationship between customers and vehicles based on new value and form, adding to the high driving performance expected of a lightweight sports car. This execution is achieved through a new automobile structure composed of an advanced framework with resin outer body panels.

This new framework structure, called *D-Frame*, serves as a foundation for the COPEN equipped with all new technologies. The frame itself provides the body rigidity required in sports cars and dramatically increases the freedom of outer body panel materials and designs.

The *DRESSFORMATION* changeable regards an outer body panel of a vehicle as components so that customers can choose a design according to their preferences.

Also, each components' tunings are dedicated for a sports car, developing the potential of lightweight sports cars.

Daihatsu will continue to explore the possibilities of mini vehicles in an effort to expand the potential of these automobiles in different directions.

The following outlines major new technology incorporated into the new COPEN.

D-Frame new framework structure

- ◆ New-concept chassis based on a framework structure and a monocoque body
- ◆ Attains a higher level of body rigidity than the first-generation COPEN with the vertical flexural rigidity increased nearly three folds*¹ and the torsional rigidity increased to about 1.5 folds*¹, to upgrade steering stability and passenger comfort

The *DRESSFORMATION* changeable interior and exterior structures

- ◆ New structure allows customers to select the interior and exterior design of the car according to preference.
- ◆ Outer body panel components are fastened with bolts.

Tunings in the new COPEN

- ◆ Dedicated suspension providing amazing steering stability and high quality passenger comfort
- ◆ Sports car tuning power-train unit to increase driving pleasure
- ◆ A better sounding exhaust producing sporty notes typical of convertibles
- ◆ Weight reduced by adopting a resin outer body panel and Daihatsu's first resin fuel tanks

*1: Measured by Daihatsu

Outline of New Technologies

The new *D-Frame* structure

- ◆ A new-concept chassis based on a chassis frame structure and a monocoque body structure
 - Different from the traditional chassis, the new structure has the rigidity level expected from the frame of a sports car without dependency on the surface strength of the vehicle. The combination of a new framework and the resin outer body panels, creates new value and form.
- ◆ The body has three times higher vertical flexural rigidity*² and 1.5 times higher torsional rigidity*² to improve steering stability and passenger comfort.
 - The whole vehicle body, consisting of the front, side, rear and floor parts, is seamlessly joined, also reinforced by the sub-floor tunnel system and cross-members to considerably increase the body's vertical flexural rigidity by three folds and its torsional rigidity by 1.5 folds.
- ◆ Dedicated team for the new COPEN
 - A team was set up to create new value and form for the *D-Frame* and *DRESSFORMATION*. For developing the *D-Frame*, the team came up with a structure on the basis of the framework of the first-generation COPEN. While identifying a few problems, the team developed its ideas into drawings to realize a new structure that secures a high level of rigidity with the framework alone while shortening the conventional development lead time.

The *DRESSFORMATION* changeable interior and exterior structure

- ◆ The changeable structure allows customers to choose the design and other aspects according to their own preferences.
 - An outer body panel is regarded as a group of 13 separate resin components. This concept overturns the fixed idea that it is difficult to change the car design after purchase and enables customers to change the design and color even after the purchase.
 - What is changeable are 11 different resin components: the front hood, luggage panel, front and rear bumpers, front and rear fenders, the locks and fuel cap.
 - Outer body panel components are fastened with bolts.
- ◆ The interior can also be changed.
 - The *DRESSFORMATION* structure is also applied to interior components such as decorative panels for driver seats, front passenger seats and audio clusters, so that after purchase the interior design can be switched.

Tunings in the new COPEN

<Steering Stability and Passenger Comfort>

- ◆ Provides amazing steering stability and high quality passenger comfort that surpasses others in the same vehicle class
 - The front suspension adopts the MacPherson strut system while the rear adopts the torsion beam system. The suspensions are tuned in a manner particular to the new COPEN, including an increase in rigidity of the suspensions including suspension joints and optimization of the roll rigidity balance. This considerably improves the passenger comfort and provides impressive steering stability including rear grip.
- ◆ For aerodynamic performance, an optimal balance between the front and rear lifts has been achieved to dramatically enhance stability at high speeds.
 - Concerning aerodynamic performance, the rear lift is smaller by 60%*² than that of the first-generation COPEN to optimize the balance between the front and rear lifts. This ensures the same running stability regardless of speed.

*2: Measured by Daihatsu in comparison with those of the first-generation COPEN

<Driving Performance>

- ◆ Equipped with a light-touch and easy-to-operate power-train to increase driving pleasure
 - A 660cc turbo engine with a DVVT (Dynamic Variable Valve Timing) system to produce high torque in low revolution areas
Enhanced response to accelerator operations which enables driving performance similar to a sports car
 - For the transmission system, a seven-speed super-active shift CVT (Continuously Variable Transmission) and a five speed MT (Manual Transmission) are available. The CVT is under coordinated control with the engine to improve gear change response. The MT is finely tuned to provide an easy shifting experience matched with the lightweight sports car.

<Sports Car Sound>

- ◆ A robust exhaust which produces a sporty driving experience typical of convertibles
 - A powerful sound at ignition and a comfortable humming in high revolution achieved through the resonance of the main muffler in the dual tail pipe exhaust system.

<Shift to Resins>

- ◆ Weight reduced by adopting a resin outer body panel and Daihatsu's first resin fuel tank
 - For the resin outer body panel, the requirements of individual parts were studied to choose the correct materials. All outer body panel components, excluding doors, consist of resins to achieve a lightweight outer body.
 - Daihatsu's first resin fuel tank adopts diamond beads with a shock absorbing structure while weighing less by ensuring uniformity in wall thickness.

<Vehicle Weight>

- ◆ A vehicle weight of 850 kg*³ suitable for a lightweight sports vehicle, is achieved while the product appeal is considerably increased.
 - The product appeal is considerably increased by developing the *D-Frame* and *DRESSFORMATION* technologies and by improving steering stability and passenger comfort. At the same time a vehicle weight suitable for lightweight sports cars was achieved by adopting a resin outer body panel and extending the e:S (Energy Saving) technology.

<Safety>

- ◆ The Total Advanced Function (TAF) shock absorbing body is also introduced for pedestrian protection.
 - In a collision the high rigidity cabin and a crushable structure effectively absorbs and disperses the impact on passengers.

<Fuel Efficiency>

- ◆ The CVT model achieves a fuel efficiency of 25.2 km per liter^{*4} according to internal measurement. This high fuel efficiency is expected to be subject to tax exemption under the eco-car tax reduction system.
 - While fully possessing the driving pleasure of a sports car, the CVT model achieves a fuel efficiency of 25.2 km per liter according to Daihatsu's internal measurement. This means that the model will enjoy tax exemption under the eco-car tax reduction system. The MT model has a fuel efficiency of 22.2 km per liter, also measured by Daihatsu, and is subject to a 50% tax reduction under the same system.

<Convertible Roof>

- ◆ The car has a motorized convertible (open/close) roof, which is a symbol of the COPEN.
 - Opening in about 20 seconds, the motor-driven convertible roof is activated with a single switch, which gives a sense of openness available only from convertible autos.

*3: Measured by Daihatsu with a manual transmission vehicle

*4: In the JC08 (Japanese test cycle) mode