

Styling Design of CR-Z

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ABSTRACT

Using hybrid technology, the CR-Z realized a balance between addressing the environmental issues associated with fossil fuel consumption and offering the natural “joy of driving” an automobile. It was developed as a new-generation compact sports car based on the ground concept of a “Hybrid Café Racer.”

The exterior design with a theme of “Advanced Sensual Bullet” expresses compactness, strength and an advanced feel. The interior design with a theme of “Smart Cockpit” expresses an advanced feel and sportiness that lets the driver concentrate on driving.

1. Introduction

Since Honda entered the automobile market full-scale in 1963, it has always sold passenger vehicles developed with the concepts of “joy of driving” and “joy of using.” A core goal of Honda’s automobile development is enhancing fuel efficiency and low emissions performance to address the global environmental issues that stem from the consumption of fossil fuels.

In the category of sports cars, however, the increasing weight and emissions that come with higher functionality are likely to have an opposite impact on such environmental issues. In addition, the compact sports car market in particular is declining steadily.

Faced with these environmental issues and the desire to offer vehicles that are fun in ways that suit the times, Honda designers started development that would give more customers of a new generation access to the ‘fun of operating’ experience of the sports category.

2. Design Goals

Honda began by defining a sports car as a vehicle the driver can operate as he or she pleases, while making driving more fun. Also, an important part of the sports car was the form expression which enables the customer to imagine and feel uplifted by the sense of fun that comes with owning and using the vehicle.

Honda developed the CR-Z as a new-generation hybrid

sports car on the ground concept of a “Hybrid Café Racer,” meaning a sports car just the right size for many customers to operate as they please, with a style that proclaims at a glance that this is a new-generation sports car, with an interior that lets the driver concentrate on driving, and a design that lets the driver enjoy all these features with everyday comfort (Fig. 1).

The expression “Café Racer” comes from England’s “Ace Cafe London,” a popular spot for motorcycle aficionados. The concept expresses the desire for a sports car that is grounded in everyday life but which is fun and satisfying to drive and makes one proud to show it off to one’s companions.



Fig. 1 Ground concept

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3. Package Layout

The package layout was based on a sports package concept to achieve the low vehicle height essential for a sports car. The short body enables the driver to operate the car as he or she pleases, and the wide stance enhances cornering performance and expresses the bearing of a sports car – all leading to selection of the keywords “Low, Short and Wide.”

A package was chosen offering excellent everyday user friendliness while providing conditions expected of a sports car, such as a low, short and wide form, a driving position offering accurate operation, and a wide field of vision.

The low, short and wide form was based on the platform of the 2009 model year INSIGHT. The layout was refined to optimize the engine height, arrangement of supplementary equipment and layout of the suspension, and a full range of fine adjustments to the forward field of vision and comfort factors resulting in a low overall height of just 1350 mm (exclusive of antenna) and a short overall length of 4080 mm (Fig. 2).

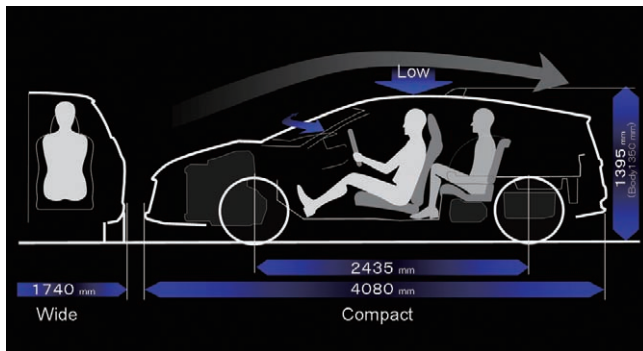


Fig. 2 Package design

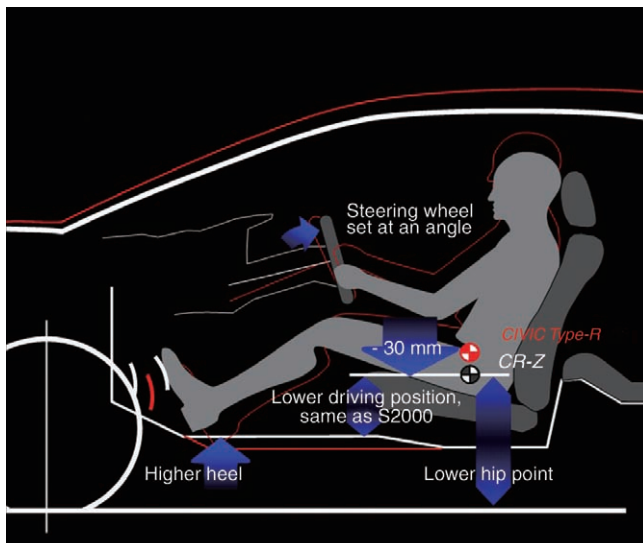


Fig. 3 Driver's position

A low driving position was chosen to suit sports cruising. The driver's hips are held firmly in the seat and the driver can accurately perceive the car's behavior. In addition, the steering wheel is set at an angle and arranged so that even at high cornering G force the driver's shoulder is unlikely to lift off the seat and the driver can operate the car correctly (Fig. 3).

The advanced one-motion silhouette and traditional long nose were successfully fused to each other with a deeply curving front glass by press working. As a result, the lower end of the front pillar is pulled back and its cross-section is more slender, enabling wide horizontal visibility (Fig. 4).

The broadly rounded front window contributes to a sense of the glass area being a single piece with the side windows.

For Europe and Japan, seating is 2+2 style, with the front two seats for main use and the rear two seats for supplementary use. The rear seats are designed to accommodate an ISOFIX universal child seat (Fig. 5). For

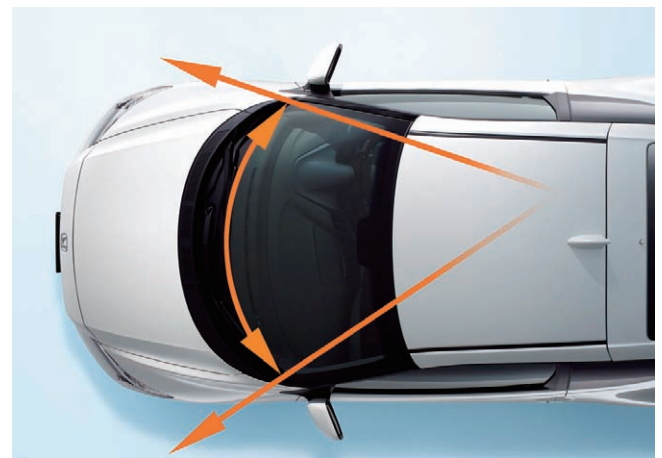


Fig. 4 Front window



Fig. 5 Child seat



Fig. 6 Luggage compartment

the North American market, only the two front seats are provided, with the rear space being used as a “mid-ship console.”

To enhance everyday ease of use the trunk room aims to offer the volume necessary for day-to-day use. With the rear seat in use position it can hold two small B suitcases (655 x 480 x 255 mm), and when the rear seat back is folded to make a large flat area it can also hold two popular 9.5-inch golf bags, and depending on size and shape, one mountain bike with the front wheel removed, or four tires (Fig. 6).

4. Exterior Design

The exterior, built on a concept of an “Advanced Sensual Bullet,” aims to express the unique bearing of a sports car that makes the owner feel an uplifting sense of joy (Fig. 7).

Starting with a strong, compact mass that projects a sense of presence, the exterior expresses the advanced feel of a hybrid and liveliness of a sports car.

The one-motion silhouette extending from the engine hood to the cabin, the front window with its dynamic curvature, and the low offset black front pillar increase the sense of continuity with the side windows so that the body looks strong and dense while remaining compact.

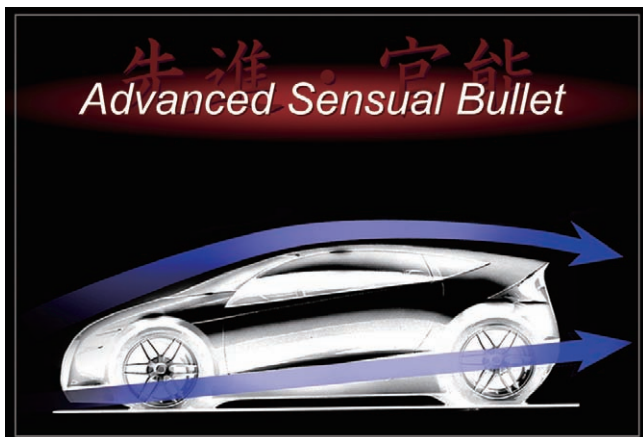


Fig. 7 Exterior design concept

In addition, pulling the lower end of the front pillar rearward fuses the advanced look of the one-motion silhouette with the traditional sports car expression of a long nose (Fig. 8).

The fender area features a low-lying protruding front grill and tires that transmit power to the ground, wrapped in dynamic surfaces that make abundant use of curves giving CR-Z a sports car’s bearing and lively expression (Fig. 9).

The lower side of the front bumper is wing-shaped to create a nimble and speedy expression (Fig. 10), while the main motif of the rear bumper is a diffuser form that contributes to aerodynamic performance (Fig. 11). These features are symbolic of a sports car for a new generation,



Fig. 8 Side view of 2010 model year CR-Z



Fig. 9 Overhead view of 2010 model year CR-Z



Fig. 10 Front bumper



Fig. 11 Rear bumper



Fig. 12 "Cubic crystal" image

namely one that takes a sporty approach while also addressing environmental concerns.

The lighting, including the headlights and rear combination lamps, were designed with a "cubic crystal" theme to project an image of the car's advanced qualities contained in a body full of liveliness much like a living organism. The lights are unified in their design with geometric forms, including rectangular projectors, hexagonal LED unit forms and layered turn signals, expressing the subtleness and clean feel of a hybrid (Fig. 12).

The door mirrors were made smaller, their projected area as seen from the front was reduced, and their form was optimized aerodynamically, thereby enhancing aerodynamic performance without compromising visibility (Fig. 13).

The outer door handle has a bullet motif to maintain the theme of the exterior. Taking aerodynamic performance and ease of use into account, the handle was given a concave hollow for the fingers to enter on the outer panel side, and a vertical flap-type handle was used to limit protrusion and keep the handle compact (Fig. 14).

The "Advanced Dynamic" themed 16-inch aluminum wheels express an energetic spoke form while reducing overall weight by 5 kg compared to the wheels used on the INSIGHT thus help enhance fuel efficiency (Fig. 15).

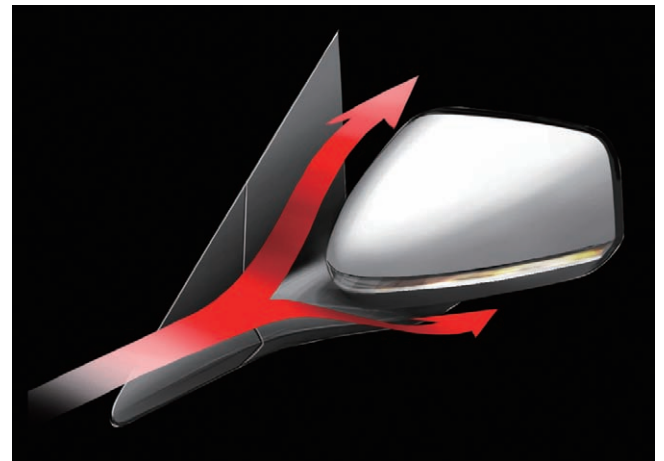


Fig. 13 Door mirror



Fig. 14 Door handle



Fig. 15 Aluminum alloy wheel

5. Interior Design

The interior design features styling based on the concept of a “Smart Cockpit.”

As a hybrid sports car, the CR-Z offers an interior space with a sporty cockpit that allows the driver to concentrate on driving, along with the advanced look of a hybrid car and a design for everyday ease of use.

The instrument panel is based on a form spreading out from side to side, and positions the information display and meters needed for driving in front of the driver as a meter cluster panel. There is just the right amount of snugness in the driver space so that the driver can concentrate on accurate driving. The passenger seat side, in contrast, has a simple structure that gives it a refreshing look (Fig. 16).

The upper part of the instrument panel is called a “floating upper pad.” The audio components are formed to integrate with the motif of spreading wings, and the light gray color of the lower part makes the upper part appear to float giving it a nimble expression.

The upper part has a center upper box while the lower part has, among other features, a glove box that connects to the air conditioner for warm or cold storage and a center lower box, together providing utility that considers everyday ease of use (Fig. 17).



Fig. 16 Interior design concept

To further enable the driver to concentrate on driving through enhanced visibility and operability, the meter cluster panel layout positions the steering wheel in the center surrounded by frequently used switches and information displays essential to cruising.

The climate control is compactly arranged on the left side of the panel. The activation of each switch was unified so that all operations could be easily controlled with the fingertips. The dial to adjust cabin temperature is thin with a wide diameter.

On the right side of the panel, a three-mode drive switch controls one of the major characteristics of the CR-Z. The three modes from the top, are “SPORT,” “NORMAL” and “ECON.” Changing the mode changes the cruising characteristics as well as the color of the interior lighting of the tachometer, making the driver instantly aware of the driving mode (Fig. 18).

The crystal-like scales and blue illumination of the meters express a “futuristic” look at a glance. The centrally placed speedometer and tachometer provide essential information for cruising. The speedometer uses a tele-focus digital display to enhance visibility so that the eyes’ focal



Fig. 17 Floating upper pad



Fig. 18 Meter cluster panel

length does not have to change very much when changing between views of the speedometer and exterior. Because the readings of the tachometer change frequently, an analog display was chosen so that rather than reading it the driver senses it directly. Additionally, to the left and right of the meter are horizontal displays of the fuel gauge, battery level, etc. Thus the meters have been clearly zoned to enhance visibility (Fig. 19).

An MID (multi-information display) shows an “eco-drive bar,” advising the driver about accelerator and brake pedal operation when driving in ECON mode. Cars with a manual transmission come with a shift indicator which tells the driver the optimum time to shift to further enhance fuel economy.

On the door lining the armrest was formed so that, like the instrument panel, it appears to float, and its light gray color gives it an airy look. Soft material was used to form the black upper part of the interior door panel giving it a high-quality feel since the shoulder and hand often touch it.

The sense of confidence and quality are further enhanced by the solid metallic look of the ornamental panel and center console, and the look and feel of the door grip, which also offers the passenger added support during sports cruising (Fig. 20).

Based on the concept of a “smart sport seat,” the front seat combines cruising performance with safety functions at a high level. The bucket’s silhouette is integrated with a

garnish that connects the headrest and seat back. It provides two levels of side support to accommodate different body types and holds the driver and passenger in place during sports cruising. The seat is also deeply contoured so that it does not touch the elbow or interfere with shifting, and the headrest functions to help mitigate neck injuries in a rear collision, further enhancing safety.

The seat sides use cloth with high elasticity to accommodate deeply contoured shaping so that driver and passenger are enveloped, while the seat cushions use cloth woven in a checked pattern, which helps keep the hips from slipping on the seat. The cloth is glossy silver, which gives a futuristic, high-quality look (Fig. 21).

The rear seats and trunk were made into a compact space packed with functionality to meet the needs for a compact sports car and a car for everyday ease of use.

The rear seats provide sufficient space for a child or other person of small stature, while the seat backs can be folded forward with just a touch from a front seat to form a soft box with soft cushioning to protect cameras, laptop computers and other precision devices. This also helps prevent theft, because items can be hidden from view from the outside (Fig. 22).

For the North American market, the car has only two seats and the rear space is used as a mid-ship console. The rear surface is a tray with a bulkhead separating the cabin from the trunk. The tray has increased space enabling the area to accommodate more of the goods needed for daily life.

The bulkhead folds forward with just a touch, but also can be used to help prevent cargo from intruding into the front area in the event of a collision. A damper has also been incorporated to reduce the noise of impact with the tray adding to the high-grade operating experience (Fig. 23).



Fig. 19 Meter



Fig. 20 Center console and door ornament panel



Fig. 21 Smart sport seat

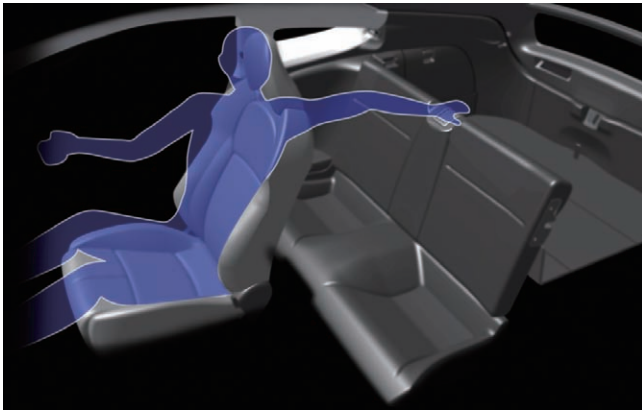


Fig. 22 Rear seat



Fig. 23 Mid-ship console

6. Color Design

Following a theme of “advanced sporty color” (Fig. 24), a lineup of refined, dignified sporty colors was chosen for the exterior to appeal to adult sensibilities.

Of these, new colors exclusive to the CR-Z strongly announce the futurism and high quality of this hybrid.

The two exclusive colors are “Dark Pewter Metallic” and “Horizon Turquoise Pearl.”

Dark Pewter Metallic refers to a gray that is metallic with a touch of color. It mixes an astringent green with gun-metal color for a color with presence and chic style, while eliciting feelings of the strength of sports.

Horizon Turquoise Pearl gives the viewer an elegant, premium impression. While a calm color, blue lends it freshness and agility and elicits a sporty feel; a flip-flop visual effect is used to bring out the richness of form.

The rest of the lineup includes the clean and fresh Premium White Pearl; Milano Red - a standard choice for a sports car; the lively looking Brilliant Orange Metallic; Deep Sapphire Blue - bright without being too showy; Crystal Black Pearl for a high-class, high-quality look, and the widely popular Storm Silver Metallic.

Close attention was also paid to the original coloration

of the rear diffuser in which fine aluminum flakes are mixed into dark gray resin to give metallic sparkle to emphasize the three-dimensional character of the form and elicit a sense of high quality.

The interior color theme is “Exciting & Tense” (Fig. 25) as the interior creates an image of a “sports space brimming with excitement and tension.” Instead of using a combination of black and primary colors as conventionally seen in sports cars, the CR-Z has a bold, high-contrast interior combining black and light gray. With its tension-filled modern and futuristic space, one feels the interior’s expression of the elation of sports along with a sense of futurism the very moment they open the door.

The interior lining consists of monotone colors throughout based on the two bold tones of black and gray. The “Gloss on Gloss” combination of different glossy materials elicits a fresh expression, while the “Tone on Tone” combination of similar colors evokes a cool and solid image of the near future.

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Fig. 24 Exterior color design

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Fig. 25 Interior color design

Much attention was given to providing a high-quality, premium expression in the upper part of the instrument panel. For the first time, Honda used a RIM (reaction injection molding) process to create a texture pleasing to the touch. Newly designed leather-like material reproduces even very fine pores to create an authentic-looking material and to appeal to Europeans with their traditional appreciation of material feel.

For seat fabric, checkered textile was used as the main material for the area where the occupant sits. The silver gray portion brings out a thorough gloss, and the seat, while comfortable, holds the hips firmly in place because the weave pattern suppresses slip. The side material is a glossy gray mesh jersey. By using elastic jersey material, the fabric can easily adapt to the shape of the seat and properly support the body. The shiny white stitching evokes an even more premium and sporty look, and the highest-gloss jersey material was used as support material. Visually, the seat itself projects a three-dimensional form, which is a major accent.

High-luster aluminum film was used for the first time to give the door grips, ornamental panel, and center console a futuristic, high-class look. The mirror-like metallic luster jumps out at the eye the moment the door is opened making a huge impact.

7. Conclusion

High performance and high output - two important elements of the “joy of driving” a sports car - have an impact on the global environment. Therefore, in times like these, to develop sports cars, manufacturers will have to address these environmental issues to maintain the very existence of the sports car category or it could be in jeopardy.

With its name “CR-Z” standing for “Compact Renaissance Zero,” this car definitely suggests a new direction for sports cars, and is certainly a major step forward in bringing the “joy of driving” an automobile to the next era.

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