

## Mazda Senku

### OVERVIEW

#### **Senku: a four-seater rotary-engine sports car**

The Mazda Senku design concept, which made its world premiere at the 2005 Tokyo Motor Show, reflects a new direction for 4-seater rotary sports cars designed with mature drivers in mind.

Mazda Senku's overarching design concept is "sharpness and mellowness," and these contradictory factors are cleverly integrated to create a next generation design standard. The features include:

- an ultra long wheelbase
- minimal overhangs
- a unique "floating" appearance supported by large tires
- a smoothly dignified shape devoid of all ornamentation
- large "flying wing" electric powered sliding doors

These elements come together in a revolutionary coupe form that is both dynamic and supremely elegant.

In the cabin, personal space was designed to give priority to the people seated in the front seats, and interior trim was executed in supple, high quality leather.

Located between the front and rear axles is the next generation 13B DI direct injection gasoline rotary engine with a hybrid unit. This direct injection RE hybrid achieves high power output and lower fuel consumption along with the ideal 50:50 front/rear weight distribution and a low center of gravity, characteristic of Mazda sports cars, providing fun and dynamic driving.

The name "Senku" is a Japanese term meaning "pioneer", depicting Mazda's spirit of pursuing unique and exciting ventures - such as the rotary engine.



## EXTERIOR

### **Next-generation aesthetic values: sharpness and mellowness**

Following Mazda's success in combining pairs of conflicting visual elements in car designs, the design of the Mazda Senku reflects the fusion of sharpness and mellowness—elements chosen for unprecedented rich visual expression. The overall goal was creating a high-quality next-generation look and feel.



### **New proportions based on RE Hybrid architecture**

In the Senku, Mazda's innovative RE Hybrid architecture permits a long wheelbase and taut-looking, minimal overhangs. Meanwhile, large tires help to give the Senku a 'floating' look that is complemented by a sleek, boldly chiseled form to create unique proportions embodying dynamism and elegance.

### **Sharpness, litheness, and gracefulness**

As can be seen most clearly in the shapes of the body sides and rear end, sharp edges and soft curves are combined to give the Senku a kind of beauty with deep emotional appeal. The graphic makeup of the body has just three key elements for a look of purity:

- simple body surfaces
- a glass canopy
- a five-point front grille

The door mirrors and other functional body parts (these include high-intensity light-emitting-diode headlamps and tail lamps) are harmonized with the main graphic elements in a way that expresses graceful simplicity.

### **Ingot Silver body color**

A body color called Ingot Silver gives the Senku a look that is evocative of freshly cast steel. It expresses tension and elegance, in line with the 'sharpness and mellowness' design concept.

### **Lighting effects**

The front grille is made of a see-through material. It gives a view of illuminated rotary graphics that are evocative of a beating heart. This lighting effect occurs while the ignition is on.

### **Large-aperture 'flying wing' sliding doors**

Highlight features, combining emotionally appealing beauty and high functionality, include left- and right-hand large-aperture, electrically powered sliding doors.

Dubbed 'flying wings' by Mazda, these doors each have an 800mm-wide aperture but do not compromise the beauty of the Senku's body-side contours. The wide apertures combine with high front-seat hip points to allow smooth ingress and egress. Also, the sliding (as opposed to hinged) nature of the doors enables the doors to be opened when there is limited space on either side of the car.



### **Two powered rear gates**

To permit the luggage area to be used like that of a station wagon within the body's unique proportions, the Senku has a newly conceived rear-gate arrangement consisting of two powered rear gates: an upper gate that slides forward over the roof and a lower gate that slides downward. Either or both of the gates can be opened as necessitated by the size of luggage items. Also, the sliding nature of the gates permits opening and closing under low ceilings.



## INTERIOR

### A stylish, comfortable space

In the cabin, the 'sharpness and mellowness' design concept is manifested through the fusion of conflicting elements that simultaneously communicate carefree relaxation and sporty tension, refined elegance and high-performance dynamism. A personal space is formed by original design elements including sporty front seats that are mounted on an elegantly shaped base in an arrangement that makes them appear to float in the air. A broad, seamless glass canopy gives the cabin an airy look and feel.



### Asymmetrical instrument panel

The dashboard is designed such that it curves forward toward the passenger side. Consequently, the driver enjoys a sense of snugness that engenders a feeling of oneness with the car and can easily effect control over the vehicle by means of an advanced-interface cockpit in which the controls are concentrated in the steering-wheel area. And the front passenger enjoys the comfort of an open space in which he or she can sit with crossed legs while accessing passenger-dedicated interface functions.



### **Jet-black and crimson color scheme**

The interior color scheme is based on vividly contrasting jet black and crimson (colors that play an important part in traditional Japanese art). The jet black, which conveys quietness and forcefulness, and the crimson, which conveys passion and gorgeousness, complement steel-coloured metallic materials on the center tunnel and seat frames to create an environment in which refinement and contemporary sportiness are harmonized.

### **Top-quality materials**

The dashboard, seats, door trims, and center console are finished with leather and trim of the highest quality. The leather was tannin-tanned and aniline-dyed, so it retains its naturally attractive look and feel and its breathability. It was hand-stitched by a master craftsman.

### **Sophisticated seat arrangeability**

The standard seat positioning in the Senku is based on a two-seater mode that promotes enjoyment for one or two people. With this feature, space is prioritized for the front-seat occupant(s); the area immediately behind the front seats can be used for personal effects such as a jacket or briefcase. By tipping forward the top part of each rear seatback, it is possible to create a full luggage mode that accommodates more luggage. And by repositioning a panel, it is possible to realize a 2+2 mode that accommodates four people.





## PERFORMANCE

Powered by a next generation 13B DI direct injection gasoline rotary engine with a hybrid unit, the Mazda Senku achieves high power output and lower fuel consumption.

The Senku's ideal 50:50 front/rear weight distribution and a low center of gravity, characteristic of Mazda sports cars, provide fun and dynamic driving.

### **Powerful, clean performance delivered by a next-generation RE Hybrid system**

The Mazda Senku is powered by a totally new RE Hybrid system in which a 13B-DI next-generation gasoline-fuelled direct-injection rotary engine is combined with a hybrid unit consisting of a generator, a motor, and a battery. The RE Hybrid system is located within the wheelbase.

The 13B-DI rotary engine was developed specifically for direct gasoline injection. Direct injection realizes optimal combustion, thereby enabling high power and superior fuel economy.

The Mazda-developed hybrid motor system has an idle-stop function that further enhances fuel economy and emission performance.

### **Sporty, refined handling**

Whereas a conventional hybrid system has its battery mounted below the floor or near the rear of the body, the Senku's hybrid system has its battery mounted between the engine and toeboard. The battery position combines with a front-midship layout (the light, compact, rotary engine is located behind the front axle) to realize the ideal 50:50 front/rear weight distribution and low center of gravity that characterize Mazda sports cars. The unique powertrain packaging is the basis of sporty, refined handling.

### **Driving-assistance functions employing information technology**

To promote safety and comfort through minimization of the effort required of the driver, the dashboard incorporates a system that delivers information and warnings by means of two lines of displays (upper and lower).

The upper display line consists of three panels that show images of the car's



surroundings captured by onboard cameras. It enables the driver to confirm safety around the car at a glance during standing starts, during on-road operation, and during parking maneuvers. It also has a Night Drive Aid function that promotes night-time forward visibility and a Lane Drive Aid function that helps the driver stay in lane and perform lane-change maneuvers.

The lower display is an information-display that incorporates a large panel showing the settings and operating status of the navigation, audio, and climate-control systems. These systems can be controlled by devices designed separately for the driver and front passenger. Notably, the devices provide steering-wheel-mounted switches that the driver can use while the car is moving and a control panel within the steering wheel that the driver can use when the car is stationary. Consequently, the driver does not need to move out of his or her driving position.

Most importantly, the displays, by providing relevant information to the driver in a timely, appropriate manner, minimize the burden borne by the driver.

### **See-through solar-cell system**

The rearmost portion of the Senku's glass roof incorporates a solar-cell system in which pigment-sensitized solar cells, which allow light to pass through them, are located between laminated sheets of glass. The pigment-sensitized solar cells used in this system represent a next-generation technology offering low cost together with a high degree of design freedom in terms of light transmittance and color tone. The system itself is an evolution of the solar sunroof (the first of its kind) used by Mazda on the Sentia in 1991. It supplies supplementary electric power to the RE Hybrid system to promote fuel economy. While the car is parked or otherwise stationary, it serves as a power source that promotes convenience for the driver and passengers.

### **Unique, advanced, safety-oriented body**

The front of the Senku reflects a totally new 'multi-frame structure' concept. With a conventional frame, the front side members alone are used to meet demands for impact-force absorption, rigidity, suppression of noise, vibration and harshness (NVH), and powertrain support. This arrangement imposes restrictions on the cross-sectional structures and materials used for the front side frames. With a multi-frame structure, by contrast, each of multiple frames is used for a specific role, meaning that the frame layout can be optimized for various performance requirements. The multi-frame structure





of the Senku is intended to meet the following requirements:

- **Lightness:** The use of multiple frames in a three-dimensional layout permits weight reduction together with high levels of impact-force absorption, rigidity, and NVH suppression.
- **Impact safety:** In the event of an offset or full-wrap frontal impact, frames that are designated for impact performance multi-directionally disperse and effectively absorb the impact energy. At the same time, they optimally control the behaviour of the powertrain and cabin. In the event of a side impact, they help to protect the battery.
- **Rigidity:** Frames that are designated for maintenance of rigidity, link the front and rear points of the lower suspension arms and the center points of the suspension towers in a three-dimensional arrangement that ensures ample suspension rigidity.

### **Measures to promote overall body rigidity**

Virtual B-pillars (one inside each sliding door) and rollover C-pillars (located at the rear of the cabin) ensure high overall body rigidity despite the large apertures in the sides and rear of the body.

## SPECIFICATIONS

### Mazda Senku major specifications

Dimensions	Overall length	4,650 mm
	Overall width	1,850 mm
	Overall height	1,400 mm
	Wheelbase	3,100 mm
	Seating capacity	4 people
Engine	Type	13B-DI rotary engine (gasoline direct injection) + Mazda hybrid system
Transmission	Type	7-speed power shift (dry twin clutch)
Suspension (front/ rear)	Type	Double wishbone/multilink
Tires	Type	235/40 R22 Yokohama ADVAN PROTOTYPE 005