隔週刊『日本の名車コレクション』第5号

［発行日］2022年12月6日
［発　行］株式会社デアゴスティーニ・ジャパン
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画像提供
いすゞ自動車、スズキ、SUBARU、ダイハツ工業、トヨタ自動車、トヨタ博物館、
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5

MAZDA COSMO SPORT 1967-1972

Cosmo Sport

Model	L10B
Engine Name	10A
Displacement	491cc × 2
Maximum Output	128ps/7000rpm
Maximum Torque	14.2kg-m/5000rpm
Overall Length	4130mm
Overall Width	1590mm
Overall Height	1165mm
Wheelbase	2350mm
Vehicle Weight	960kg

The Cosmo Sport was known for its compact size and low ride height. Its innovative design also drew attention, creating a futuristic atmosphere.

The Cosmo Sport, with its distinctive UFO-like proportions, was also known as the "Flying Saucer Cosmo."

The photo shows an early model, recognizable by the smaller air intake located below the bumper.


NEW
COSMO SPORT

A new engine development plan launched in post-war Hiroshima

The Cosmo Sport was released in 1967, back when Mazda was still known as Toyo Kogyo. To discuss the Cosmo Sport, we must first delve into the origins of the Japanese rotary engine.

In 1955, ten years after the end of World War II and the devastating atomic bombing of Hiroshima, the Ministry of International Trade and Industry (now the Ministry of Economy, Trade, and Industry) introduced the "National Car Concept." Five years later, in 1960, Prime Minister Hayato Ikeda's cabinet unveiled the "Income Doubling Plan," marking the era of rapid motorization in Japan. Faced with these major shifts, Toyo Kogyo's president, Tsuneji Matsuda, decided to pursue the commercialization of the rotary engine.

Unlike the conventional 4-stroke reciprocating engine, which requires a valve system and converts the piston's reciprocating motion into rotary motion through a complex mechanism, the rotary engine is simpler. It operates without a valve system, extracting rotational energy directly from the rotor's continuous rotary motion. Due to its compact size, lightweight design, and high power output, the rotary engine was seen as a "dream engine" and drew the attention of many automobile manufacturers.

Numerous manufacturers explored various rotary engine designs, striving for practicality. Toyo Kogyo focused on the Wankel rotary engine, invented in Germany, and in 1961, the company partnered with NSU, which was developing the Wankel engine, sending a research team to Germany.

What the engineers from Toyo Kogyo witnessed at NSU was alarming: the infamous "chatter marks" that would later be dubbed "the devil's claw marks." The Wankel rotary engine involves a triangular rotor rotating within a housing shaped like a cocoon. The rotor has three apexes, each fitted with an apex seal that maintains airtightness as it constantly contacts the inner walls of the housing. However, during development, the apex seals were causing the housing's interior surface to become deeply scarred, resembling a washboard. Preventing these "devil's claw marks" became the most critical challenge in developing a functional rotary engine.

Overcoming the new engine's drawbacks while advancing development

At the same time, Toyo Kogyo in Hiroshima gathered a team of young engineers to begin developing the rotary engine. Due to the team's number of 47, they were referred to as the "Rotary Forty-Seven," drawing a parallel to the famous Forty-Seven Ronin. Kenichi Yamamoto, the newly appointed head of the Rotary Engine Development Department, is said to have told the "Rotary Forty-Seven" to "think about the rotary engine whether awake or asleep."

A breakthrough came in 1963 when the development team found a glimmer of hope in their ongoing battle against chatter marks. They developed the "cross-hole seal," which featured cross-shaped holes at the tip of the apex seal. The following year, the introduction of a composite seal, which filled the gaps in the aluminum parts of the apex seal with carbon, brought the engine closer to practical use. The final development was the "aluminum-impregnated carbon apex seal," made of high-strength carbon material infused with aluminum.
This seal showed minimal wear of just 0.8 mm after 100,000 km of use, eliminating chatter marks and

This is the later model. Unlike the earlier version shown on the previous page, the air intake below the bumper has been enlarged.

The dashboard area of the Cosmo Sport. By adjusting the dial located on the right side of the steering column, the steering wheel can be moved forward or backward.

completely overcoming the “devil's claw marks.”

Meanwhile, vehicle development to house the rotary engine was also underway. Toyo Kogyo was focused on deciding how to showcase their rotary engine in a vehicle. The design was led by Heiji Kobayashi, the company's first in-house designer who was in his second year at Toyo Kogyo. Kobayashi aimed to create an elegant form that highlighted the compactness of the rotary engine, resulting in a design reminiscent of an Adamski-style UFO with a sleek, forward-looking appearance. It was remarkable that such innovative design emerged in Japan over half a century ago and successfully made it to the public.

The stunning reveal and the president’s performance stuns the crowd.

In 1963, Toyo Kogyo showcased prototype rotary engines, including both single-rotor and twin-rotor models, at the 10th All-Japan Automobile Show (which would later become the Tokyo Motor Show). Simultaneously, they revealed a two-door, two-seater coupe model under the name "Rotary Engine Test Vehicle" in photographs. This was the official unveiling of what would become known as the Cosmo Sport before its name was finalized.

Despite being shown only in photographs, the futuristic design must have left a significant impression on attendees. The surprise, however, didn't stop there. A test vehicle with temporary plates appeared at the motor show. Behind the wheel was Toyo Kogyo's president, Tsuneji Matsuda. While it's common today for automotive company presidents to present cars at motor shows, it was a bold and impactful step at the time.

In 1964, at the 11th Tokyo Motor Show, the actual Mazda Cosmo was exhibited for the first time. The car was named "MAZDA COSMO," and it was also showcased at the following year's 12th Tokyo Motor Show. During this event, an unprecedented announcement was made: Mazda planned to conduct real-world testing with the help of dealers across the country. This idea was proposed by Tsuneji Matsuda, who believed that cooperation from dealerships would provide practical and valuable data. He was concerned that if they stumbled at the stage of practical use, it would lead to the unfortunate conclusion that "rotary engines are not viable."

The test vehicles distributed to dealerships numbered 47, and were reportedly spread from Hokkaido in the north to Kagoshima in the south. At that time, Okinawa had not yet been returned to Japan, so there were 46 domestic prefectures. Whether each prefecture received one vehicle or if some prefectures did not receive any is unclear, but it is certain that the scale was large. Conducting a market test with pre-production models was a rare and extensive approach. It is said that the total mileage covered during these tests reached up to 3 million kilometers.

The low height and distinctive overhangs gave birth to a car with a futuristic appeal.

At the 13th Tokyo Motor Show in 1966, the Cosmo Sport was exhibited for the third time. Although the specifications and price had not yet been announced, this marked the moment when the possibility of its commercial release became a reality, three years after the "Rotary Engine Test Vehicle" was first shown in photo panels.

In May 1967, the car was officially unveiled under the name "COSMO SPORT." The launch event was a grand affair held at a hotel in Tokyo, with 1,700 prominent figures from various fields invited.

In 1964 NSU launched the world's first rotary-engine vehicle, the Wankel Spider, featuring a single-

The seats feature a design with black vinyl leather combined with a white checkered pattern.

The center console is arranged with the radio on the upper part and the heater controls on the lower part. The triple gauge cluster features, from left to right, a clock, a fuel gauge, and an ammeter.

rotor engine. In contrast, the Cosmo Sport became the world's first model equipped with a two-rotor rotary engine and the first rotary-engine vehicle produced in Japan. It's worth noting that the Wankel Spider's rotary engine struggled with the chattering marks issue, which led to its commercial failure and significant financial damage to NSU.

The first-generation Cosmo Sport was extremely compact, with dimensions of 4,140 mm in length, 1,595 mm in width, and a remarkably low height of 1,165 mm, the same height as the Lamborghini Huracán. The wheelbase was only 2,200 mm, significantly shorter than the approximately 2,500 mm of modern Kei cars. Additionally, as can be seen in the photos, the rearoverhang was exceptionally pronounced, creating a unique balance that contributed to the car's futuristic vibe at the time.

Astonishing performance demonstrated in endurance races. Performance enhanced through minor updates.

The engine installed in the Cosmo Sport was the 10A model, a two-rotor engine with a unit displacement of 491cc per chamber, achieving a maximum output of 110ps at 7,000 rpm and a maximum torque of 13.3 kg-m at 3,500 rpm. Notably, the engine was positioned behind the front axle, making it a front mid-ship layout, a characteristic still valued in modern Mazda vehicles. To enhance front/rear weight balance, the battery was strategically placed in the trunk. The car was equipped with a 4- speed transmission and fitted with bias tires sized 6.45-4PR14. It boasted a top speed of 185 km/h and could accelerate from 0 to 400 meters in 16.3 seconds, which was top-tier performance for Japanese cars at the time.

The suspension system featured a double-wishbone setup with coil springs at the front, while the rear utilized a De Dion axle design, where the differential case was fixed to the body, and a steel tube connected both sides, suspended by leaf springs. The front double-wishbone suspension allowed for flexible alignment adjustments, and the spring rate could be adjusted using the lever ratio. In the rear, the De Dion tube acted like an anti-roll bar, providing high roll stiffness as the drive shafts moved independently. The car's new price was set at 1.48 million yen.

In May 1968, Toyo Kogyo (now Mazda) entered two Cosmo Sports in the "Marathon de la Route," an 84-hour endurance race held at the Nürburgring in Germany. One car retired with less than two hours remaining, but the other completed the full 84 hours and achieved 4th place, behind Porsche and Lancia. Out of 59 participating vehicles, only 26 finished the race. The finishing Cosmo Sport covered an impressive 9,700 km over the 84 hours, maintaining a steady speed throughout. This translates to an average speed of over 115 km/h, including pit stops.

In July 1968, the Cosmo Sport underwent a minor update, transitioning from the "L10A" to the "L10B" model. The most significant change was an extension of the wheelbase by 150 mm, increasing it to 2,350 mm, aimed at improving straight-line stability. The rear suspension mounting position was also adjusted. Additionally, the updated model featured radial tires sized 155HR15 and a new 5-speed gearbox with an overdrive.

While the engine remained the same 10A model, improvements in port timing and the carburetor raised its output to 128 ps at 7,000 rpm and 14.2 kg-m at 5,000 rpm. Performance enhancements included a top speed of 200 km/h and a 0-400 m acceleration time of 15.8 seconds. The price increased by 100,000 yen to 1,580,000 yen.

Compared to a reciprocating engine, the compact rotary engine is installed in such a way that it is almost hidden beneath the auxiliary components. The photo shows a later model, which includes an added air conditioner.

The small hood opens and closes with a front hinge.

Since this was before the safety standards required turn signal lenses to be orange, the lenses are uniformly red.

The emblem at the tip of the hood features a "rice ball shape," representing the rotary engine it houses.

Evolution of the Rotary Engine for Production Models

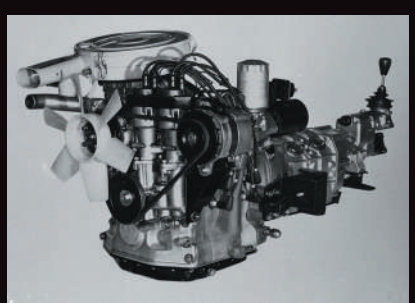
The "10A" rotary engine, first installed in the Cosmo Sport in 1967, was a naturally aspirated unit and was also used in the Savannah (RX-3).

In 1969, a "13A" engine, designed specifically for front-wheel-drive (FF) applications, was developed for the Luce Rotary Coupe. However, due to various issues, production of the Luce Rotary Coupe was limited to less than 1,000 units and was eventually discontinued. The 13A engine similarly ended its service.

In 1970, the rotary engine evolved into the "12A" model. Initially intended for the Capella Rotary, the 12A also had a turbocharged version and was installed in the first-generation Savannah RX-7 (SA22).

In 1973, the "13B" engine appeared, powering the Luce GT and also used in the export version of the Savannah RX-7 (SA22). For the domestic market, the 13B was primarily available as a turbo model, while the North American version was offered in naturally aspirated (NA) form. As a result, the hood of the North American Savannah RX-7 (FC3S) did not have an air bulge. The 13B, which was also used in the RX-8, continued production until 2012 and became the last rotary engine.

Additionally, in 1990, the "20B" three-rotor engine was installed in the Eunos Cosmo. Although rotary engines have disappeared from the market, Mazda is exploring new forms of rotary engines, such as the range extender unit for the MX-30, its first electric vehicle (EV).



The rotary engine installed in the early model Cosmo Sport "L10A."