Sporty, beautiful, and innovative: the NSU/Wankel Spider

- **The world's first production car with a single-rotor Wankel engine**
- **2,375 Bertone-designed sports cars produced at Neckarsulm plant**
- **150 years of the historic brand NSU:**
  series with classics and one-of-a-kinds from NSU's model history – Episode 7

Neckarsulm, September 27, 2023 – It was one of the stars at the 1963 IAA in Frankfurt: the NSU/Wankel Spider. The real sensation of the open two-seater was not its beautiful design; instead its inner qualities really excited the public. The heart of the sports car was the world's first single-rotor wankel engine ever used in a production car. In this seventh episode on the history of NSU, Audi Tradition presents the NSU/Wankel Spider and its innovative drive concept.

In the early 1950s, NSU was working on a completely unprecedented engine concept, with the help of Felix Wankel. Born in Lahr, Baden, in 1902, the engineer started his professional career with an apprenticeship as a publishing house clerk. Initially self-taught, Wankel began experimenting with rotary valve control for a motorcycle engine in the late 1920s. In 1934, the first rotary engine fired up. Felix Wankel worked on his brainchild for the rest of his life. During the Second World War, Wankel met Walter Froede at the German Aeronautical Research Institute. Froede, who held a doctorate in engineering, devoted all his energy to the NSU company and embarked on a stellar career: Having joined the company as manager in the testing department in 1941, he retired in 1975 as head of development at NSU. He and Felix Wankel shared a passion for innovation, and their favorite project was the rotary engine. In 1951, the two acquaintances quickly reached an agreement; a contract was signed, and joint development work began.

Innovation and daring: Advancing the rotary engine

The first result the cooperation between NSU and Wankel yielded was a rotary-valve-controlled 250cc motorcycle engine based on the NSU Lux and Max models. With the strong trend towards automobiles that emerged in the mid-1950s, the company soon concentrated on developing car engines. In the meantime, Wankel had advanced the engine concept, designating it a rotary piston engine (Drehkolbenmotor). In this type of engine, a three-pointed oval piston, also known as the rotor, rotates within a nearly circular housing that also rotates. NSU extended its contract with Felix Wankel with the new goal of developing these rotary piston engines, commonly referred to by the abbreviation "DKM". February 1, 1957 was a big day at NSU in Neckarsulm: It marked the first time the DKM 54, the world's first rotary piston engine, started up on a test bench. The rotary piston engine ran smoothly, impressing the development engineers. However, after 15 hours on the test bench, the first sealing problems began to appear.

And so, NSU's development engineers decided to rework the engine concept from square one. To reduce its complexity and increase the chances of using the engine in a production model, the piston in the following engine's piston would rotate inside a fixed housing. In early 1959, this circuitous piston engine (Kreiskolbenmotor), the KKM 250, fired up on the test bench for the first time. The engineers continued to advance, refine, and improve the KKM 250. After years of development work, the engine was finally installed in a test vehicle for the first time: an NSU Prinz. At the time, the inconspicuous ivy green Prinz did not make the biggest splash at the Neckarsulm plant; only a few insiders knew which engine was in the engine bay at the rear. And so, in the summer of 1959, the car with its new engine went on a test drive in and around Neckarsulm. A short time later, the engineers installed the KKM 250's successor, the KKM 400, in an NSU Sport Prinz.

NSU enjoys good licensing business: the Wankel engine is exported worldwide

In September 1963, just before the International Motor Show in Frankfurt, everything at the Neckarsulm plant stood still for an hour. Dr. Gerd Stieler von Heydekampf, then Chairman of the Board of Management at NSU, unveiled the "NSU Spider", the car's official name at the time, to employees. The applause was great, as were the expectations. The new sports car was a real eye-catcher: The monocoque body was based on a design by Giuseppe "Nuccio" Bertone. At the IAA, the car was received with enthusiasm, especially because of its revolutionary engine. With the transmission, the alternator, and the starter, the engine weighed just 125 kilograms. It took up so little space that it could be installed under the floor in the rear. The design meant that the sporty Spider had both a front and a rear trunk. Finally, the new engine was extremely low-vibration, and NSU advertised that it ran as quietly as a six-cylinder. To many, the new engine would become commonly known as the Wankel engine. Word of its advantages spread quickly, and soon well-known car and engine manufacturers were turning to Neckarsulm for licenses for the new rotary engine technology – including General Motors, Daimler-Benz, Porsche, Nissan, Toyota, and Toyo Kogyo – today known as Mazda.

The licensing business was profitable for NSU, but sales of the NSU/Wankel Spider were sluggish. From the fall of 1964, the snazzy sports car came in the colors Alfa Red or Lily White and cost around 8,500 German Marks. By July 1967, exactly 2,375 units of the first Wankel car had been built. With a reworked engine based on the Wankel principle, the twin-rotor Wankel engine in the NSU Ro 80, NSU made another attempt to establish this engine technology in 1967 – but again without the hoped-for market success. Today, however, NSU cars with Wankel engines are cherished classics, not least because of their rarity. And they still tell the story of the innovative spirit of the traditional NSU brand. This legacy of innovation, research and development, and technical progress is also reflected in the ongoing special exhibition "Innovation. Wagemut. Transformation. 150 Jahre NSU" (in English: "Innovation. Audacity. Transformation. 150 Years of NSU") at the Audi Forum Neckarsulm and the German Bicycle and NSU Museum in Neckarsulm; the exhibition will be open to the public until May 5, 2024.

Each month until December, Audi Tradition presents a different NSU model, including classics on both two and four wheels, prototypes, and one-of-a-kind models. If you want to delve deeper into the complex product history of the historic NSU brand, we recommend the Audi Tradition Edition book “NSU-Automobile. Typen – Technik – Modelle”, written by Klaus Arth and published by Delius Klasing Verlag.

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The Audi logo consisting of four rings symbolizes the Audi, DKW, Horch, and Wanderer brands, which were merged into Auto Union in 1932. Auto Union and NSU merged in 1969 and played a major role in shaping the development of the automobile. Finally, in 1985, Audi NSU Auto Union AG became AUDI AG. Since 1998, Audi Tradition/Auto Union GmbH, together with NSU GmbH, has been maintaining and presenting Audi’s extensive and wide-ranging history. The Audi museum mobile at the Audi Forum Ingolstadt is open Monday to Friday between 9:00 a.m. and 5:00 p.m. and from 10:00 a.m. to 4:00 p.m. on Saturdays, Sundays, and public holidays. The August Horch Museum Zwickau is open Tuesday through Sunday from 9:30 a.m. to 5:00 p.m. AUDI AG and the city of Zwickau each hold a 50 percent stake in August Horch Museum Zwickau gGmbH. www.audi.de/tradition

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