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Build

BRIAN'S NISSAN SKYLINE GT-R

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BRIAN'S NISSAN SKYLINE GT-R

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Formula 1 cars are also equipped with Brembo brakes from Italy, achieving stopping performance commensurate with their high power.

THE BREMBO BRAKE SYSTEM

The Skyline GT-R (R34) incorporated parts from the world's leading specialized components manufacturers, including Getrag for the six-speed manual transmission and LuK for the flywheel dampers. As on the Skyline GT-R (R33), the brakes were made by the Italian company, Brembo.

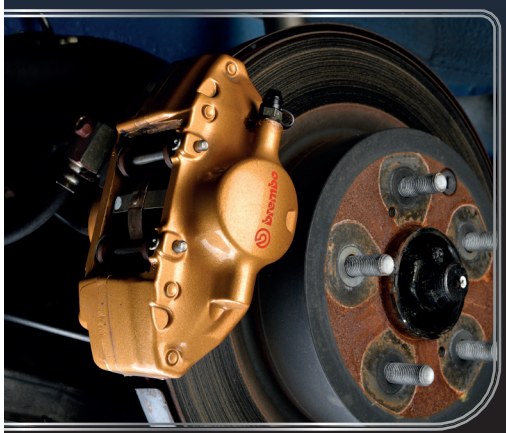
The Skyline GT-R (R34) is equipped with brake calipers and rotors manufactured by Brembo, with braking performance in proportion with the model's high power output. Brembo is an Italian manufacturer specializing in brake systems and is highly regarded for its outstanding development capabilities and reliability. The company still supplies brakes for many racing cars, including those in F1, and has historically been used for sports cars such as Porsche and Ferrari.

Nissan first adopted Brembo's brake calipers and rotors in February 1993 for the Skyline GT-R (R32) V·spec. It was configured as a commemorative model for the Skyline GT-R that won the All Japan Touring Car Championship for the third consecutive year. In addition to Brembo brakes, it also featured BBS forged aluminum wheels and 255/50R17 tires. Incidentally, this was the first time that Brembo brakes had been used in a domestic car.

Launched in May 1989, the Skyline GT-R (R32) had earned a reputation for driving per-

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The black Brembo brake calipers used in the Skyline GT-R (R33) were painted gold in the Skyline GT-R (R34). The N1 Endurance Race, with its limited range of modifications, has become the main battlefield for the GT-R, and the brakes have evolved accordingly.

formance that far surpassed domestic cars up until that point, but there was some criticism about its brakes. The Skyline GT-R (R32) was equipped as standard with Sumitomo Electric's aluminum-facing piston calipers and rotors, which were sized to fit 225/55R16 tires on 16-inch aluminum wheels. The outer rotor was 296mm in diameter at the front and 297mm at the rear, making them the largest rotors on a domestic model at the time. The lightweight aluminum opposing-piston caliper was a combination of four opposing pistons, with a piston diameter of 40.2mm for the pair at the front, while the two opposing pistons at the rear were 38.1mm in diameter.

This didn't present any difficulties during normal use as a road car, but it did become a problem in situations such as continuous driving on a circuit. That was apparent at the N1 Endurance Race, which began in 1990 and became the "N1 Endurance Round Series" from 1991. Competing N1 category machines are closer to production vehicles than those in Group A. Safety equipment such as roll cages were added to the base production car, but the engine and brakes were basically not allowed to be modified, and only a limited range of modifications – such as shock absorbers and springs – could be replaced. Although the Skyline GT-R (R32) had debuted with much excitement, it was not anticipated that it would run in N1 endurance races, which require long-distance driving using a normal brake system.

Development of the brake pads had ensured braking force and wear resistance, but in fact it was thermal damage – caused by the high temperatures generated by friction – that became a major problem during the N1 Endurance Race. Repeated heating and cooling caused the cast-iron rotor to keep stretching, resulting in a crack called a heat crack, which rapidly deteriorated the oil seals and rubber boots of the caliper pistons at high temperatures. Damage to the oil seal can lead to leaking brake fluid in some cases.

In addition, high-temperature radiant heat accelerated the deterioration of the hub bearing supporting the wheel. During the race, the driver was forced to observe extreme caution in order to get the brakes to the finish line. The parts suffered severe wear and tear, and the calipers and rotors were essentially disposable in N1 endurance races; they were so worn that they had to be discarded after the race.

BREMBO BRAKES WERE THE SOLUTION

What helped to resolve the issue was the adoption of Brembo brakes, which were used by the Skyline GT-R V·spec. The outer di-

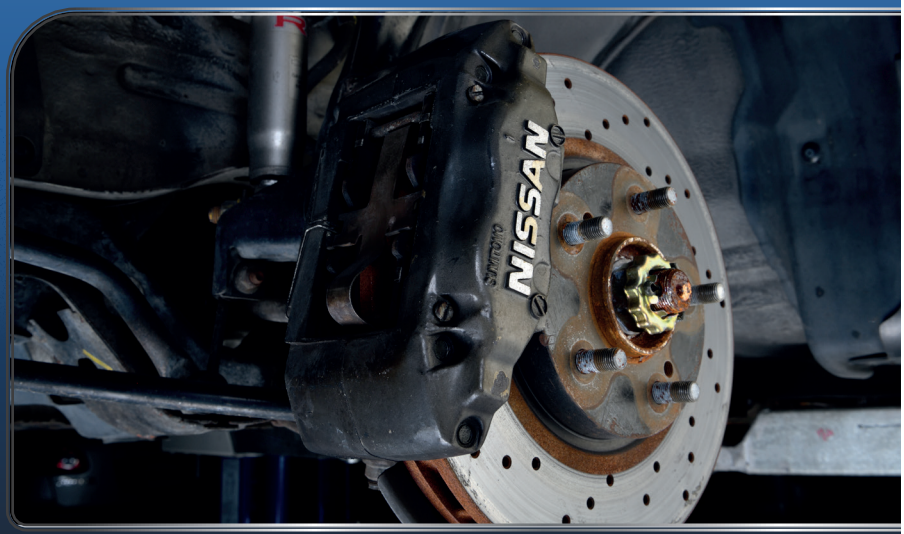


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ameter of the rotor was increased to 324mm (an increase of 28mm) in the front and 300mm (+3mm) in the rear. The rotor has a characteristic ventilation formation called a diamond rib, which delivers an above-average cooling effect. The large aluminum caliper is an opposing four-piston configuration with differing diameter pistons of 44mm and 38mm to equalize the surface pressure of the brake pad on the front, and opposing two-piston, 40mm calipers on the rear. This greatly improved braking performance.

The effectiveness of the Brembo brakes was impressive, improving durability in the N1 Endurance Race, and was highly rated by drivers for "now being able to compete with lightweight Honda Civics". Even so, it was routine to replace the brakes early on before they became a problem due to overuse in endurance races. However, as genuine Brembo brake parts are very expensive – the price for the caliper and rotor components for one car amounted to about 750,000 yen at the time – using them was a large financial burden on the team.

The Brembo brakes adopted in the Skyline GT-R V·spec were highly regarded, so they became standard equipment in the Skyline GT-R (R33) model launched in January 1995.



When the Skyline GT-R (R32) debuted, it used Sumitomo Electric's Japanese aluminum opposed piston caliper and drilled rotor combination. Performance was adequate for everyday use, but it was an Achilles heel in N1 endurance races that did not allow brake changes.



They were also inherited by the Skyline GT-R (R34) launched in January 1999. The caliper, which was painted in black gloss in the R33, was changed to gold paint, while the brake pads were a high-friction co-efficient pad manufactured by Jurid Co. Ltd of Germany. In addition, the GT-R V·spec N1, a motorsports-based model for participating in N1 races, was equipped with a large-diameter rotor with an outer diameter of 322mm at the rear. This rotor was adopted in all GT-Rs when a minor change was implemented in August 2000.



In 1990, the Skyline GT-R (R32) debuted in N1 endurance races. A limited range of modifications were permitted in comparison with the Group A specification, and in the braking system only the pads were allowed to be changed.

In addition to Brembo brakes, the brake auxiliary equipment also continued to evolve. In the Skyline GT-R (R34), the pedal bracket was reinforced and the brake boost plate was thickened to enhance rigidity. Also, a new, more highly responsive ABS system was introduced that provided a greater sense of security.

IMPROVED BRAKE COOLING EFFICIENCY

The biggest evolution came with the brake cooling system. A disk brake is a heat exchange that converts the kinetic energy of a car into heat generated by friction between the

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rotor and the brake pads, which dissipates into the atmosphere. However, there is a fade phenomenon when continuous hard braking leads to the brake pads overheating and a drop in frictional force. There is also a vapor lock phenomenon, when the heat of the high-temperature brake pad is transmitted to the brake fluid, the water in the fluid boils, bubbles are generated, and pressure is not transmitted. Cooling of the brake system is thus critical to avoid both these dangerous scenarios where the brakes will not work.

The Skyline GT-R (R34) incorporates a cooling system that makes more active use of the movement of air around the car. Cooling air flowing from the air duct on the front spoiler is directed to the brake to cool the caliper and rotor. By comparison, the air that travels around the front bumper bounces when it hits the lip-shaped part of the bumper side. Some of the air moves down under the car – since the pressure of this airflow is lower than the pressure inside the wheel, the captured cooling air is efficiently discharged. This effect is similar to smoking in a car while driving, and when the window is opened slightly, the smoke is quickly sucked out.





As Group A races ended, the main competition for the Skyline (R32) became the N1 Endurance Race. Although the Brembo brakes used in the Skyline GT-R (R32) V·spec were not really adequate, they did evolve significantly. In the pictures, the brakes of the Skyline GT-R (R33).

During development testing, wind tunnel experiments were repeatedly conducted to measure the effect of repeatedly turning the wheels in order to determine the optimal shape for the front bumper lip. The result was that in circuit driving tests, the brake temperature was up to 122°F (50°C) lower than in the previous Skyline GT-R (R33).

To drive faster and safer, you need a brake that stops more reliably and is more controllable. The Skyline GT-R has been refining its braking system for three generations. ♦



Brembo's brake system was also adopted in the Skyline GT-R (R34), and its supreme performance was demonstrated in N1 endurance races.

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VERONE'S MANSION

Carter Verone lives in an opulent mansion in one of the most exclusive parts of Miami. In this place full of lush vegetation and luxury, he has the opportunity to keep all of his operations under strict control.



Verone's mansion is a real two-story palace decorated with great luxury and ostentation. As soon as you step into the entrance hall, an enormous monitor sits on a trestle table full of decorative gilt features. Although for a few moments *Banderillas*, the 1987 painting by Fernando Botero, appears on the screen, in reality it conceals the miniature screens that keep the entire estate under surveillance. This is because security is one of its owner's chief obsessions.

If the interior of the house, with its high ceilings, marble columns, and immense picture windows, makes people envious, the Mediterranean-style garden surrounding the building takes their breath away.

Miami's spectacular mansions are only affordable to a few buyers. A property such as this is a demonstration of wealth and the status that a businessman like Carter Verone wants to display.

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VERONE'S MANSION

Despite living in a luxury palace with extraordinary views of Biscayne Bay, Verone always has to be on his guard – he suspects that surveillance devices have been hidden in his own home.

Under the shade of an impressive group of palm trees and other leafy evergreens, the terrazzo paths make their way between a perfectly mown lawn and countless exotic plants; they lead to a swimming pool that brings to mind ancient Roman baths, and a pond that even has an artificial waterfall.

A MEAL WITH VERONE

After assuring themselves a place in Verone's organization, Brian and Roman have the chance to finally enter the fabulous estate where the businessman lives. Next to the pool, they have an informal lunch. Just the furniture and the crockery they are using are enough to demonstrate Carter's high net worth; only a chosen few can enjoy this standard of living.

In spite of so much beauty, Verone is weary of his many enemies. He therefore never relaxes and admits to his guests that "the house has ears in it."

Verone's mansion was recreated for *2 Fast 2 Furious* in an authentic dream mansion that, for a few weeks, opened its doors to the film crew. The spectacular dwelling is on Brickell Avenue, one of the most exclusive roads in Coconut Grove. This neighborhood in south Miami, near the luxurious Coral Gables, is a pleasant place where the lush vegetation mixes with the blue waters of Biscayne Bay. The original mansion was a 14-acre estate built in 1971. With spectacular views of the bay, the mansion has passed through the hands of more than one celebrity, such as the actor Sylvester Stallone. ♦



THE ADVENTURES OF BRIAN O'CONNER

Saving Toretto

After preventing the truck heist on the Los Angeles highway from ending in tragedy, Brian understands that his mission has come to an end: his cover is blown, his true identity has been revealed, and he has no choice but to arrest Dom Toretto. However, the sudden murder of Jesse by Johnny Tran throws all plans into disarray. Brian sets off in hot pursuit of the criminal to prevent a fatal encounter between him and Dom.

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NISMO AND GROUP A RACING

Part 1: Entering with the Skyline Turbo RS

One of NISMO's main activities was the racing of prototype, or Group C, cars. At the same time, Group A touring cars that were based on production cars also played a significant part in NISMO's racing ventures.



The 6th-generation Skyline (R30), which debuted in 1981 and was the base model for NISMO's Group A racing, featured a four-cylinder, four-valve DOHC engine.

In 1985, the All Japan Touring Car Championship began under the FIA's Group A vehicle regulations. This series was Japan's premier race series for touring cars. At the time, the shift to racing with Group A-specification cars was a worldwide trend. Group A cars were based on production cars, and the scope of modification was limited.

Engine displacement and turbochargers could not be changed, nor could special exhaust manifolds be used. In terms of the chassis, no major modifications, such as changes to the suspension system, were allowed. The replacement of springs and shock absorbers, and the use of reinforced suspension links were permitted, but the links had to be installed at the same points as those of the production cars. In other words, this was a racing category where the capabilities of production cars played a major role in success on the track.

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Even though the Skyline was a top-of-the-range touring car, it still had the feel of a production car at the time.

"NISMO displayed its strength with production-based touring cars."

For this reason, it was an excellent opportunity for automakers to showcase their models. Foreign brands were keen to introduce homologation models with performance components pre-installed to give them an advantage in the race.

For the new race series, NISMO entered the Skyline Turbo RS (DR30), the 6th-generation of the Skyline RS. Although the engine had four rather than six cylinders, it was a model that Skyline fans welcomed with open arms. However, at that time, it was not a homologation vehicle with race-specific parts that would give it an advantage in races, but a standard model.♦



The Skyline had to compete against the powerful BMW 635CSi model in the debut year of the All Japan Touring Car Championship, with the German car winning the Title in 1985.

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THE SECOND-GENERATION LAUREL

April 1972 saw the introduction of the second-generation Laurel, launched with the tagline, “Drive Slowly, Live Slowly”. The concept of a car for “high-class owners” without a commercial model in the lineup was retained, but the body was enlarged to reflect “a car that can boast of luxury and high quality”.

Compared to the first-generation Laurel with its four-cylinder inline engine, the wheelbase on the updated model was 2in (50mm) longer – at 105in (2,670mm) – to accommodate the six-cylinder inline engine. Two body types were available: a four-door sedan and a two-door hardtop without a center pillar. While the strut front suspension was the same for all models, the rear suspension differed between the sedan and the hardtop – the sedan featured rigid leaf suspension for superior durability, while the hardtop was equipped with a semi-trailing arm with independent suspension for excellent maneuverability. Incidentally, from the second generation, the Skyline (C110 series) shared the same platform, suspension, and other parts.



Aimed at high-class buyers, the sedan was the little brother of the Cedric and Gloria, and the big brother of the Kenmeri Skyline.

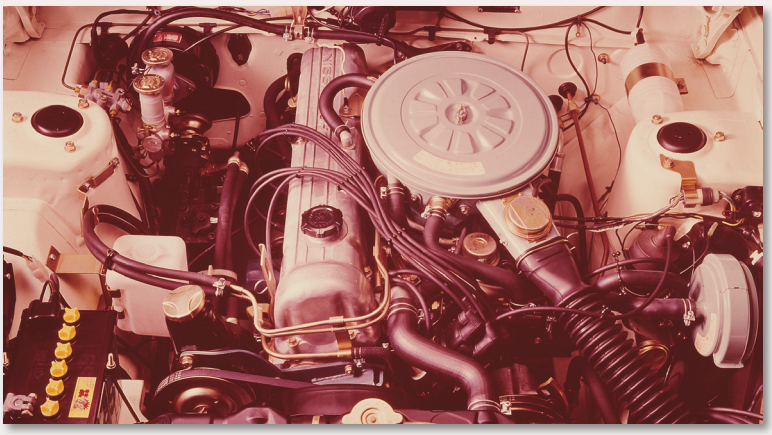
The hardtop model has similar styling to the C110 Skyline (a.k.a. Kenmeri), which was released around the same time. The taillights embedded in the chrome bumper gave it an American feel.



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The sedan and the hardtop were equipped with the G18 and G20 four-cylinder inline engines, which were carryovers from the first generation, while the 2000GX featured a new L20 six-cylinder inline engine with a G20 SU twin carburetor. The sporty-grade 2000SGX was equipped with a L20 SU twin carburetor and offered with either a high-octane (130ps) or a regular (125ps) engine.

In October 1973, a minor change was made, while September 1975 saw the L26 replaced by the 2.8L L28 in order to comply with the 1975 exhaust gas regulations. In October of the following year, a model equipped with the L20E type electronically controlled fuel injection (EGI) was added to the lineup. At the same time, the twin-carb and the four-cylinder G20 type engines – which had difficulty meeting emission regulations – were discontinued, leaving the 1.8L L18 type as the only four-cylinder model.



The engine mounted on the car was finally expanded and developed to a 2.8-liter L28 type. The twin carburetors were removed due to emission regulations, but performance was maintained by increasing the displacement.

The sharp "Thunderstreak" bulges on the sides of the body are a common design feature of the second-generation Laurel. The hard-top rear of the car was characterized by its huge chrome bumper and built-in rear combination lamps. In the late 1970s, the Laurel Hardtop 2000SGX, tuned with a Solex triple carburetor, tacho foot, and dual mufflers, was extremely popular among young car enthusiasts along with the Kenmeri 2000GT. ♦

TECHNICAL DATA

LAUREL HARDTOP 2000SGX KHC130 TYPE (1972)

Length:	177.2in (4,500mm)
Width:	63.2in (1,680mm)
Height:	66.1in (1,415mm)
Wheelbase:	105in (2,670mm)
Tread (front):	53.1in (1,350mm)
Tread (rear):	52.4in (1,330mm)
Engine:	L20 (straight six, OHC SU twin carb)
Maximum torque:	17.5kgm / 4,400rpm
Maximum output:	130ps / 6,000rpm
Total displacement:	1,998cc
Vehicle weight:	2,657lb (1,205kg)
Suspension (front/rear):	strut / semi-trailing arm
Brakes (front/rear):	disk / drum
Tires:	6.45S-14-4PR



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STAGE 16
FRONT LEFT WHEEL (2)

In this issue, we will assemble the wheel hub on the front left wheel ensemble.

PARTS

16A



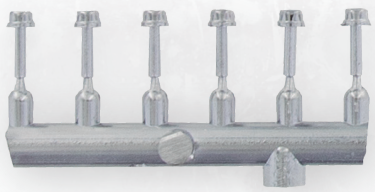
16B



16D



16C



ABM



16A Front left wheel hub
16B Front left wheel cover
16C Wheel bolts (×6*)
16D Gasket
ABM Screws 1.7 × 6mm (×4*)

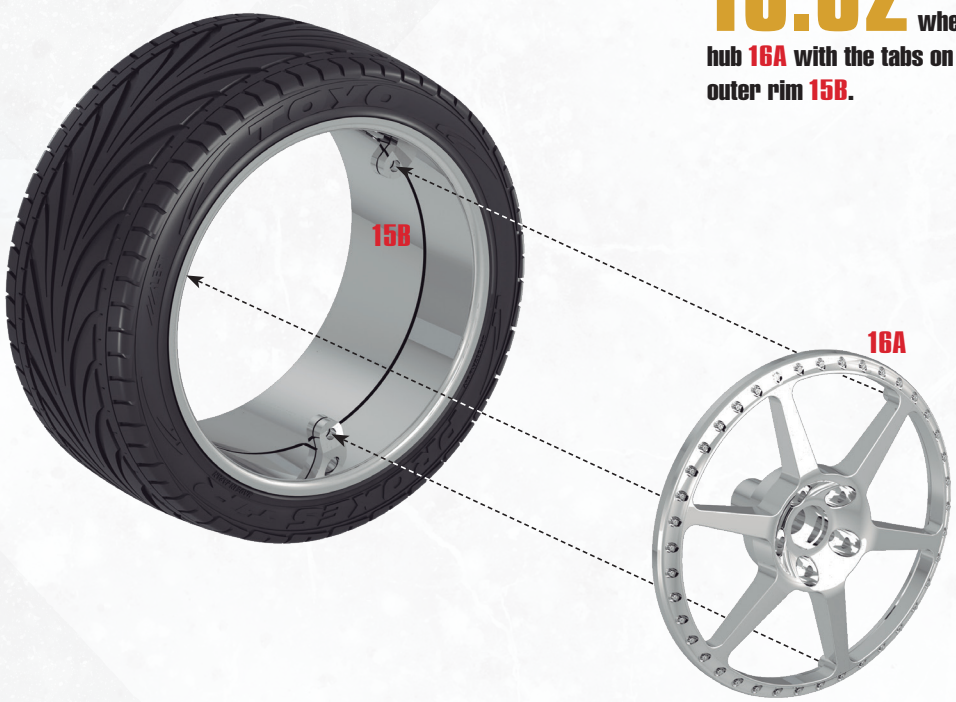
*Including spares

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16.01 Take the front left wheel assembly prepared in the previous issue. Find its exterior ("Left") side.

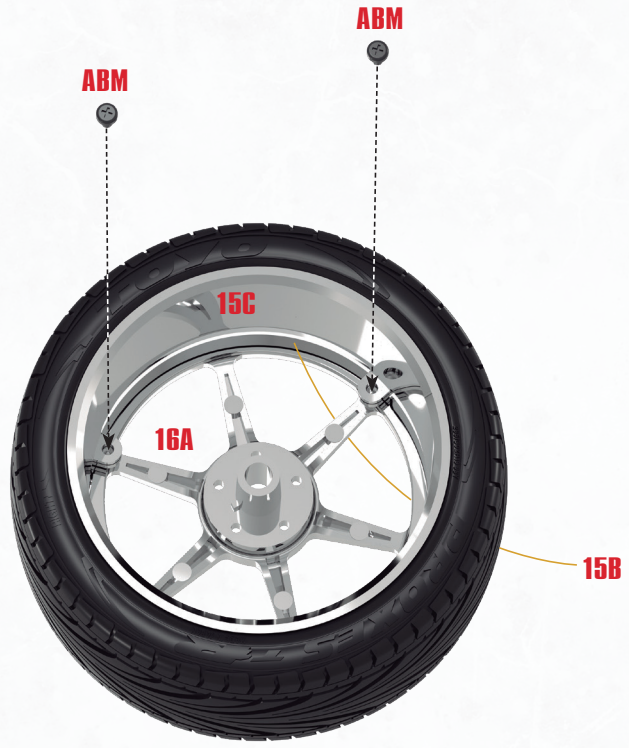


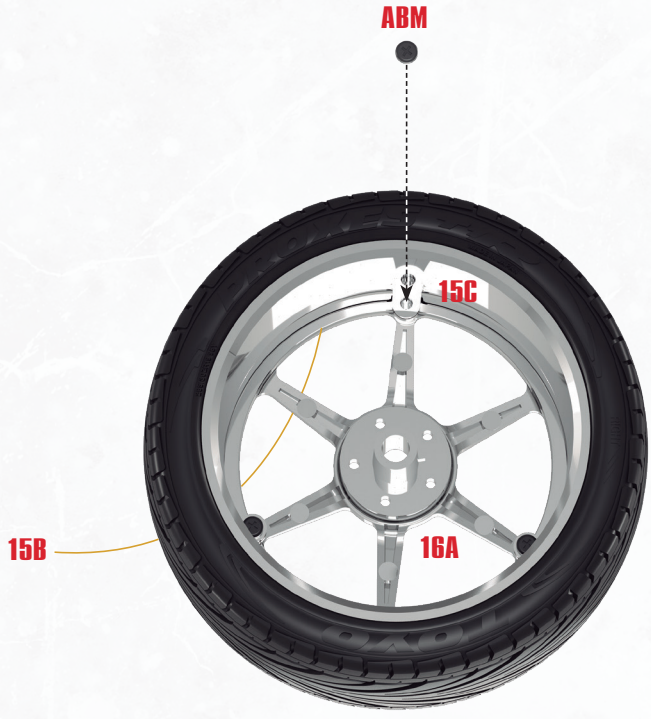
16.02 Align the front left wheel hub **16A** with the tabs on the outer rim **15B**.



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16.03 Turn the front left wheel assembly over and attach the front left wheel hub 16A to the rims 15B and 15C with two ABM screws.





16.04 Finish the stage by inserting another ABM screw to connect all the parts of the front left wheel.

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Final assembly

Keep the front left wheel cover **16B**, the wheel bolts **16C**, and the gasket **16D** for later stages of assembly.







LEFT AND RIGHT SIDE OF THE CAR

When building a scale model of a car, we often refer to the left and right side. Each side is determined from the position of the driver inside the car. On some symmetrical parts, you will see the letters L and R (left and right) that will help you to identify which side corresponds to the assembly.

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