# FAST & FURIOUS™

76

## Build the Legendary DODGE CHARGER R/T



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# FAST & FURIOUS

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# RILEY HICKS, A WOMAN WITH TWO FACES

**The ranks of the female stars in *Fast & Furious* were significantly reinforced in the sixth movie in the franchise. Those who had up to then been the undisputed heroines of the series, Mia Toretto, Letty Ortiz and Gisele Yashar, were joined by Riley Hicks, an authentic hand-to-hand combat machine who would give fans more than one surprise.**

From what we learn in the movie, Riley built a career for herself as a soldier, serving in places like Cairo, Tunis and Afghanistan. She later joined the Diplomatic Security Service, and her references surprised Luke Hobbs, who recruited her into his team to pursue Owen Shaw and his mercenaries.

Resolute, bold and calculating, Riley never says no to action. She is ready to face any challenge, above all close-quarters combat, as she is an expert in fighting techniques like Muay Thai. Of course, it's not easy to impress her, not even when Hobbs exhibits his strength to interrogate one of Shaw's henchmen.

## CALM, BUT POWERFUL

The director Justin Lin knew right from the start who would successfully play the role of Riley: Mixed Martial Arts (MMA) American champion Gina Joy Carano. For her, the possibility of being part of the *Fast & Furious* crew was like manna from heaven. The fighter and actress immediately understood the kind of personality Lin was looking for.

**Gina Carano, an American Mixed Martial Arts champion, plays the part of Riley Hicks, a woman with solid military training.**

# Riley Hicks, a woman with two faces



**Accustomed to action, Riley works with agent Hobbs on tackling Owen Shaw's mercenaries. However, she is hiding her real motives.**

"Riley is very calm, but powerful and strong, and this is a type of role that fits me to a T," says Gina. "It's fun because she can sit and observe what's going on, but at the same time, even in her silence, she gives an impression of power and authority. It was great to have the chance to play that kind of character."

The actress had to go through an intensive training program along with the rest of the cast. The expert fight choreographer Olivier Schneider was in charge of getting the team ready, trying to polish everyone's skills. Gina, who had become known for the power of her right hand and her diabolical roundhouse kick, saw the chance to broaden her repertoire thanks to Schneider's knowledge.

"Before filming *Fast & Furious 6* I had done different fight training. Olivier was familiar with my history and knew some of the things I had done previously in the movies. His objective was to prepare me so that I could give a different picture of myself in this movie. Riley has solid military training; therefore, she goes into any situation in a clear position of power instead of placing herself in the situation of a mere receiver."

## FRIENDS AND RIVALS

Gina Carano, Luke Evans and the other new members of the cast were welcomed with open arms by the crew, who immediately made each of them feel like a member of the *Fast & Furious* family. During the four months of filming, travelling from the United Kingdom and Spain, a very close bond of friendship was forged among the members of the cast. The fans of the franchise were able to see this for themselves in the large number of



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# GINA CARANO

Born in Dallas, Texas, on April 16, 1982, Gina Joy Carano was hugely interested in sport when she was at school. She was a regular basketball, volleyball and softball player. After becoming a pioneer in women's Mixed Martial Arts, her face became popular later when she appeared as the intrepid fighter *Crush* in the program *American Gladiators*. Taking advantage of that moment of success, Gina began her career as an actress, appearing in *Blood and Bone* (2009) and *Haywire* (2011), where she confirmed that she was a perfect fit for action films. This is something that Justin Lin noticed, when he gave her the part of Riley Hicks in *Fast & Furious 6*. This movie's success allowed her to continue starring in several other projects, like *In the Blood* (2014), *Extraction* (2015), *Deadpool* (2016), *Kickboxer: Vengeance* (2016), and *Daughter of the Wolf* (2019). She also appeared in the TV series *The Mandalorian* (2019), playing Cara Dune.

fun videos, behind-the-scenes photos, and humorous comments full of good vibes that the cast shared online.

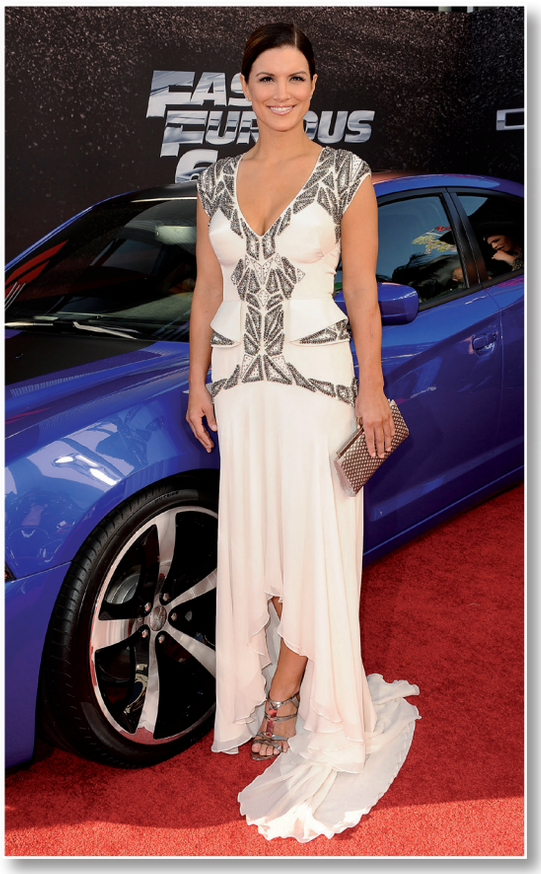
This atmosphere of friendship did not, however, stop the actors facing off against one another in spectacular fights in front of the cameras. And among the high points of the movie were not one but two ferocious fights between Riley Hicks and Letty Ortiz. Both of them prepared conscientiously for them. When production began, Gina anticipated that a stunt double would take part in the fight scenes as her opponent. But Michelle decided that she would take part in the fight herself, making use also of the experience she had gained in other films, such as *Girlfight* (2000), in which she played a female boxer.

## AN UNEXPECTED TWIST

Luke Hobbs's new assistant seemed destined to become a new heroine of the franchise. But wishing to surprise the audience, the plot of *Fast & Furious 6* had an unexpected twist at the end. After successfully arresting Owen Shaw at a NATO base in Spain, the mercenary asks to be freed immediately in return for not harming Mia Toretto, who had been kidnapped by his men. Despite the fact that the soldiers refuse to give in to blackmail, Dom, Brian and even Hobbs himself understand that they have no option but to go along with Shaw's ploy, since there's no way they would endanger Mia's life.

As soon as he is free, Owen Shaw goes over to the group that is observing him and he seems to ask Letty if she is prepared to go with him. But the big surprise is that the person he is asking is not Letty, but Riley. And right there and then we discover, absolutely dismayed, that she has been Shaw's accomplice from the start and that she has presumably been supplying him with information during the entire operation, in which she seemed to be on Hobbs and Toretto's side.

Shaw and Riley escape together and head for the plane that will finally take them to freedom. Before taking off, she tries to eliminate Mia, but Dominic's providential arrival in his Dodge Charger puts a stop to it. Finally, Letty and Riley fight each other again in one last definitive confrontation, in which the mercenary's henchwoman loses her life.



**Gina Carano, elegantly dressed for the premiere of the sixth edition of the *Fast & Furious* saga. This is a totally different look to the one she displays in the MMA ring.**



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# DODGE TOMAHAWK

**Design office modeller Bob Schroeder and dragster driver Dave Chyz, both employees of the Chrysler Corporation, imagined the possibility of creating a motorcycle with the engine that was fitted in the Dodge Viper. Their idea took shape and its construction was approved as a functional concept bike. The Dodge Tomahawk was finally presented in 2003.**

**The Dodge Tomahawk had a really impressive appearance. Its impeccable style was inspired by the elements of art-deco design.**

Those attending the press conference at the 2003 Detroit Auto Show were left open-mouthed when they saw the characteristics of the Dodge Tomahawk, one of the concept cars (or rather, a concept *bike*) that the American brand presented at the show. It was the materialisation of a crazy idea, conceived by two of its employees, which gained the approval of the company's bosses. The Dodge Tomahawk, a "sculpture on wheels", in the words of Mark Walters, in charge of design, was not meant to be mass-produced, but to demonstrate that the Chrysler Corporation was dynamic, capable of building any type of vehicle and devoting part of its time to making the fans' dreams come true – in short, a marketing coup.



**As double wheels were used, the swingarm and the disk brakes were set outside the wheel rim.**

The fact that the Dodge Tomahawk was a working vehicle, and not just a simple exhibition model, forced the prototype engineering team to work on it for six months. Its main features were the 8.3-liter V10 engine of the Dodge Viper sports car and the double front and rear wheels. The vehicle, which weighed 680kg, was driven like a motorcycle (it had handlebars instead of a steering wheel) and it allowed for a certain amount of lateral leaning.



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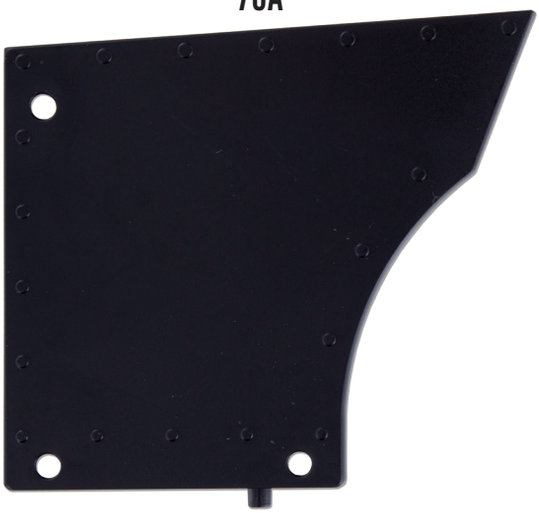


# REAR BODY PANELS

In this assembly session you will attach the rear left and right inner body panels. Follow our instructions carefully, using the illustrations to help you.

## PIECES FOR THIS STAGE

76A



76B



PP



76A Rear left inner panel

76B Rear right inner panel

PP Screws 2 x 4 x 5 mm (x 12)*

*Some of the parts are spares.

**Editor's note:** The parts shown here may differ slightly from the parts supplied with this issue. This does not affect the quality or the assembly instructions in any way.

## ASSEMBLY AREA



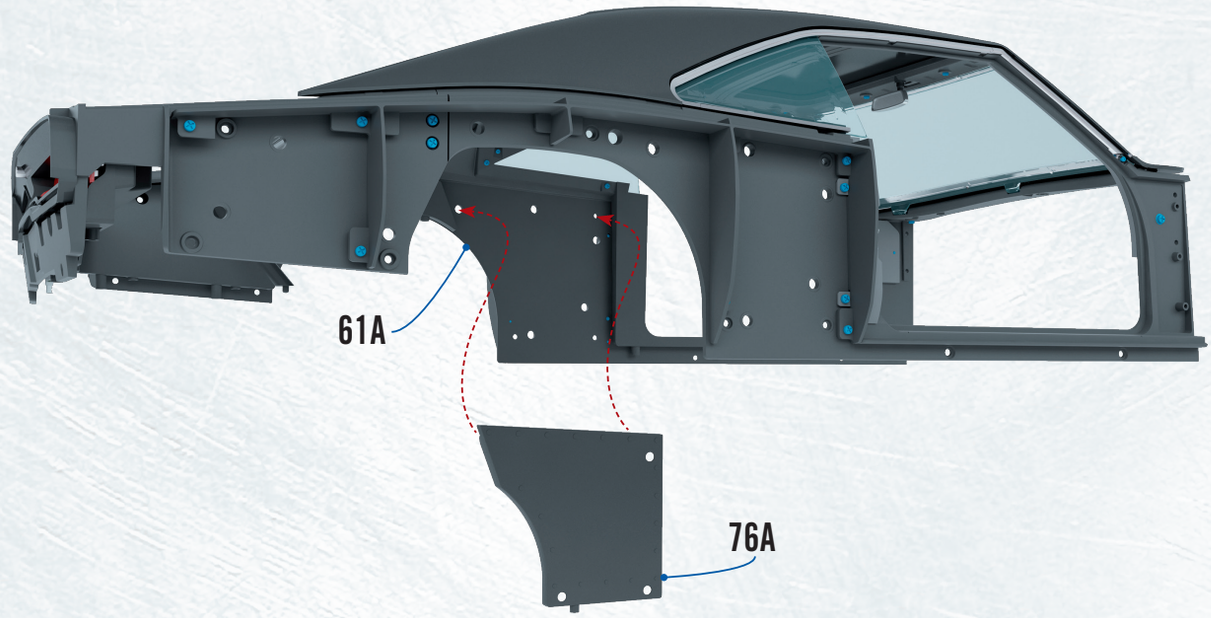
CAR BODY



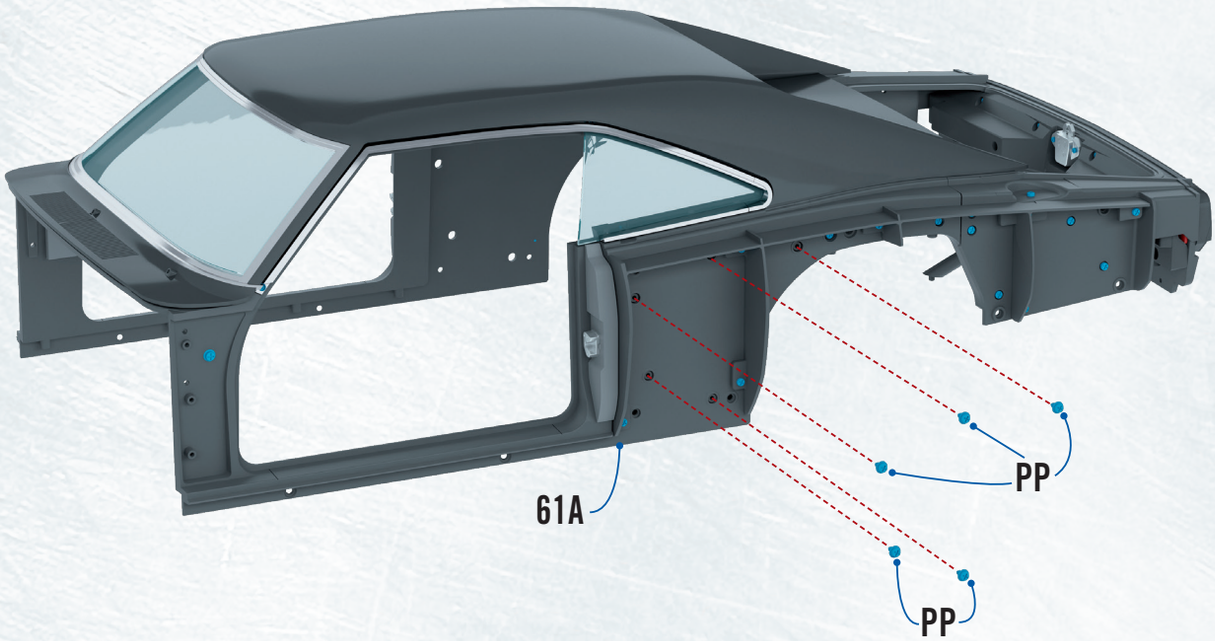
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# Rear body panels

**76.1** **PLACE** the rear left inner panel **76A** on the inside of the middle section of the car body **61A**, as shown in the illustration. ▼




**76.2** **SECURE** the panel with five **PP** screws, inserted from the outside of the body. ▼



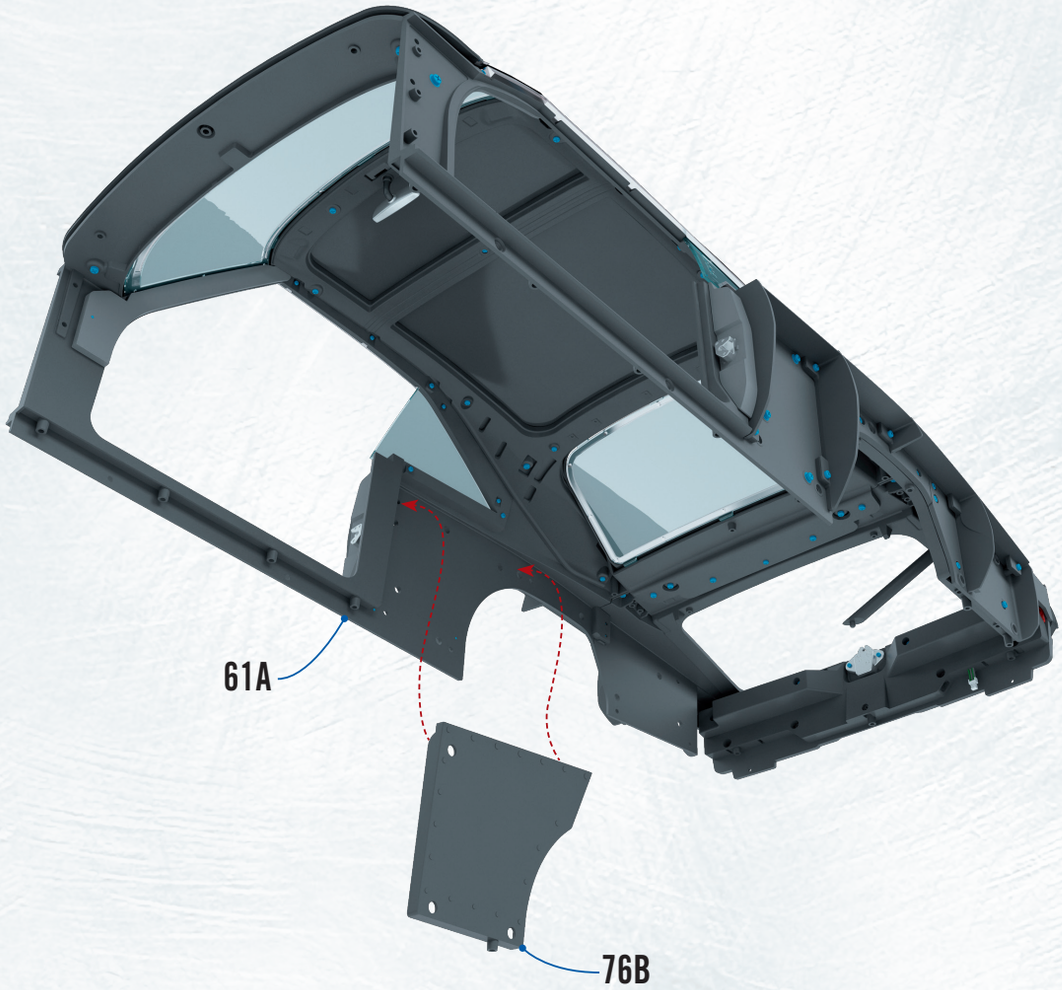



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# 76.3

**Now** place the rear right inner panel **76B** on the middle section of the car body **61A**.▼




## A USEFUL TIP

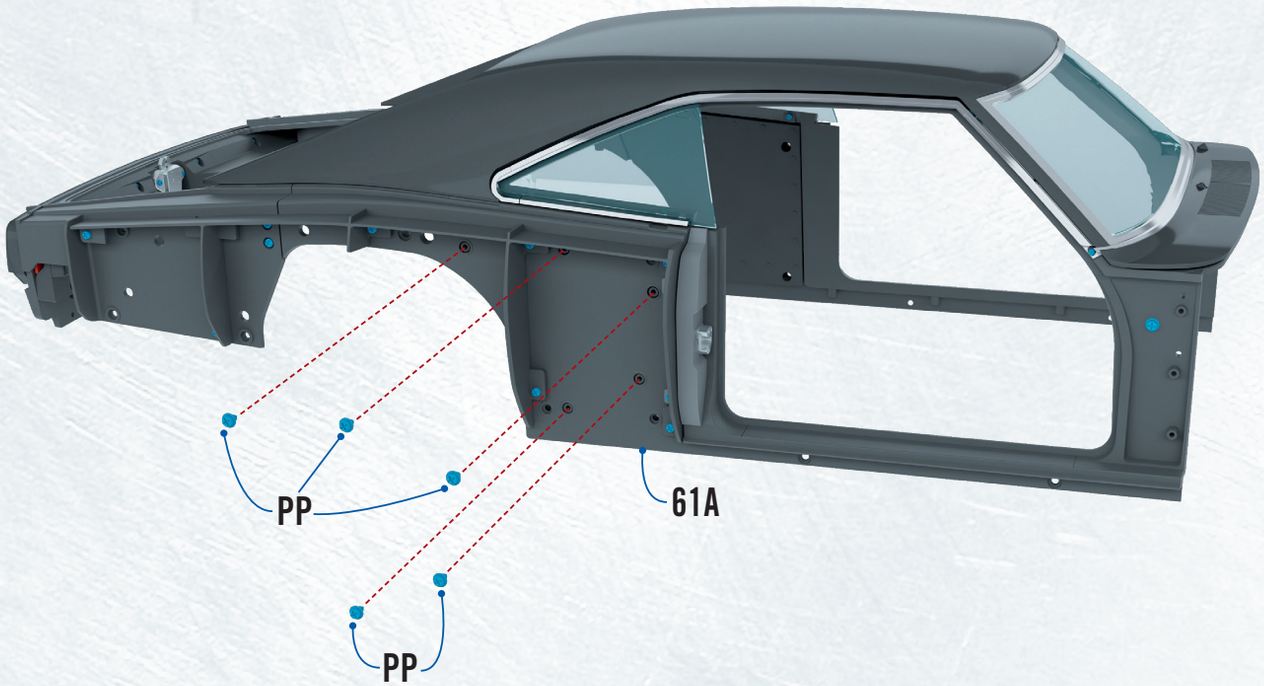
Remember that before permanently joining two or more pieces, it is advisable to put them close to each other and see just how they fit together, without forcing them unnecessarily.
This technique is also used by the best mechanics for real cars, as well as for the assembly of other products in general. It is a useful procedure for parts that are screwed together or that simply press together, as it can be difficult to separate them if they are not attached correctly.



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## 76.4

**FINALLY,** secure the right panel **76B** to the middle section of the car body **61A** with five **PP** screws. ▼




### RESULTS OF STAGE 76

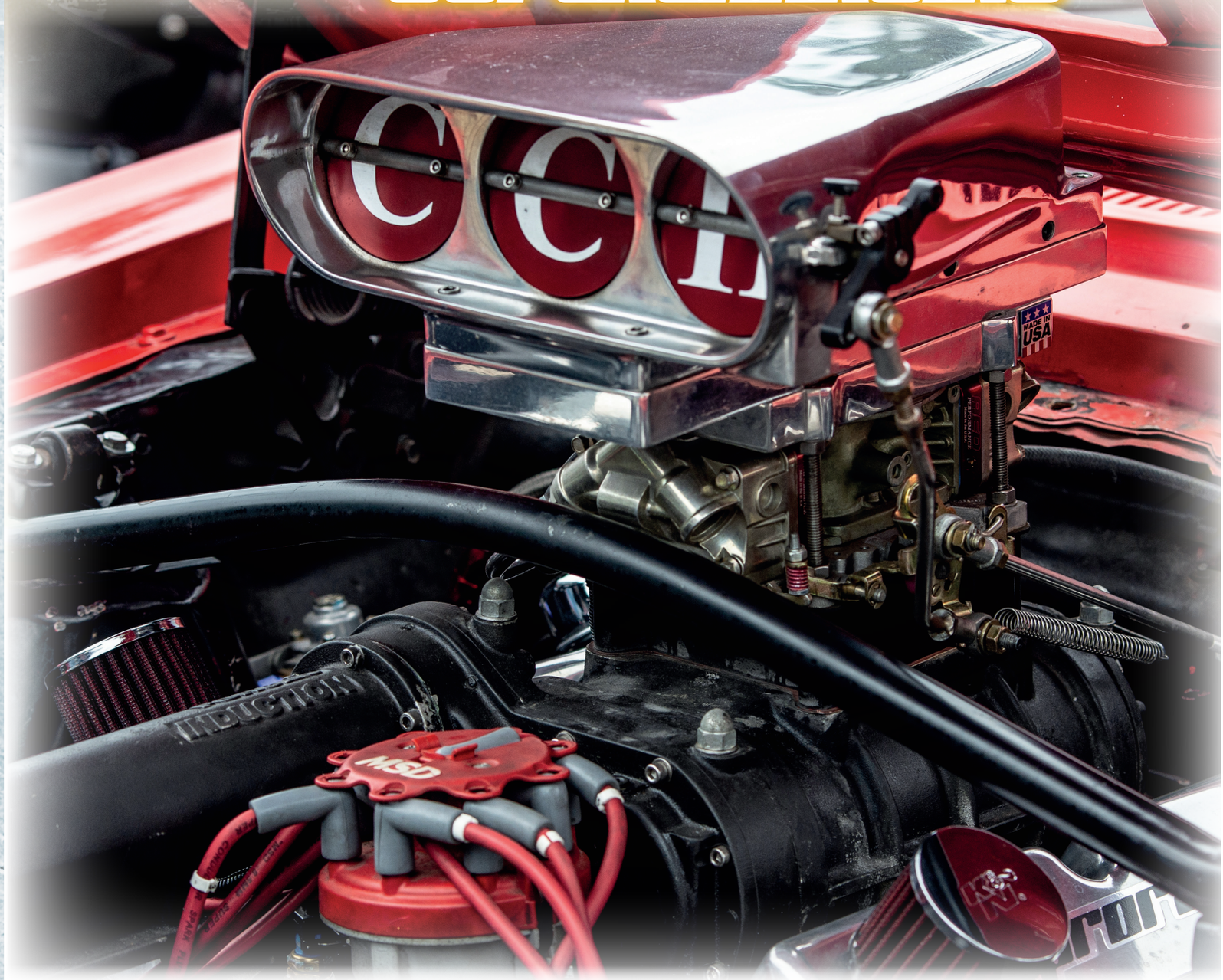
**You have now mounted the rear left and right inner body panels. Keep what you have built so far in a safe place.**





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# THE POWER OF SUPERCHARGING



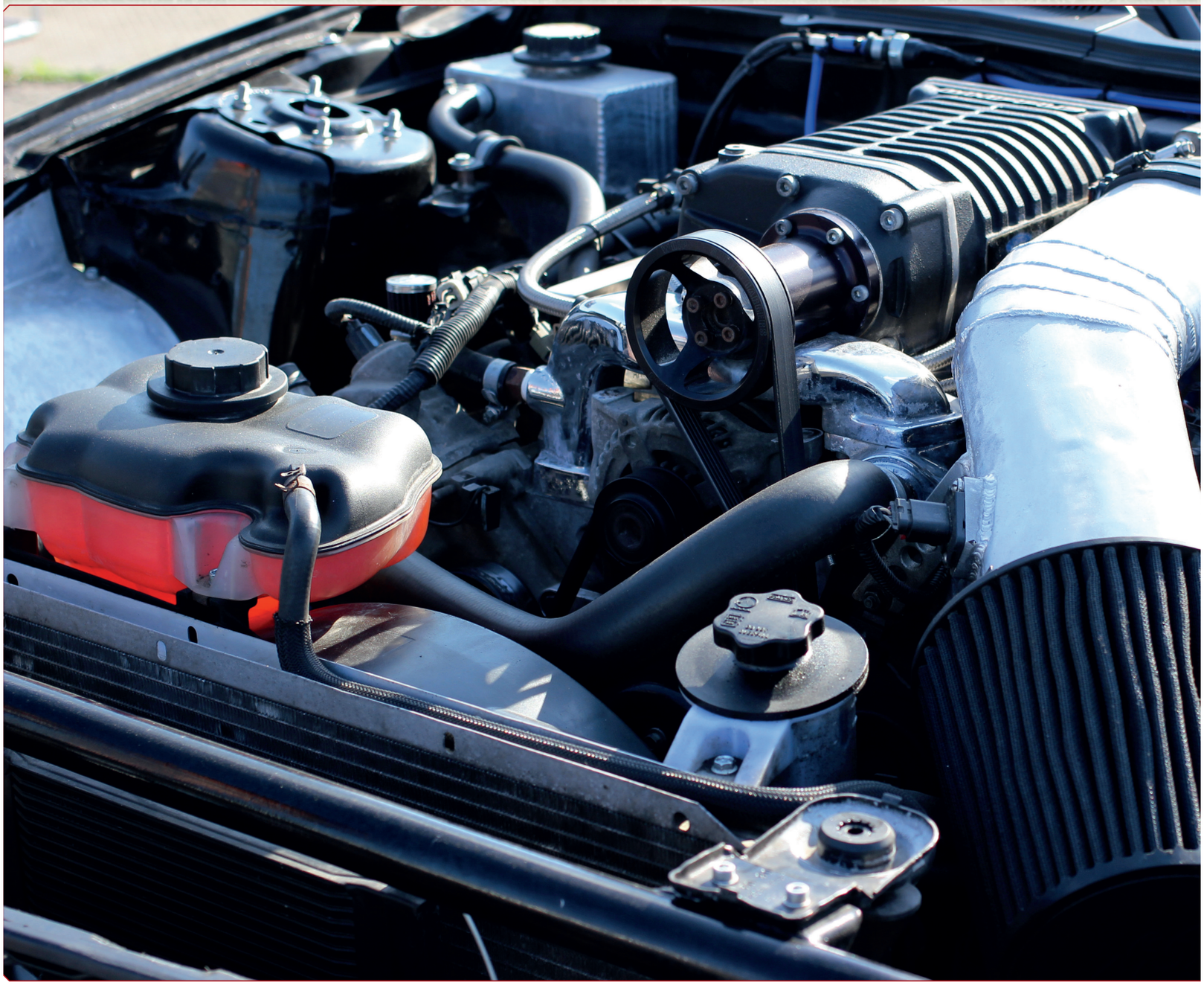

**After examining the different types of turbo, we will now look at mechanically driven compressors in detail. It is a solution that delivers outstanding performance and does not require complex engine modifications. Here is an overview of what is available today and how they work.**

Many people confuse supercharging with turbocharging. The latter is the most common system in production cars, except for some rare exceptions. It is also popular in tuning. There are several sectors where supercharging with mechanically driven compressors, both volumetric and centrifugal, dominate the scene, for example, in drag racing. As we know, supercharging increases engine torque and power



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# The power of Supercharging



**Several long-standing companies making specialist-tuning products offer excellent compressors of this type, with dimensions and characteristics to satisfy everyone's needs. Volumetric screw compressors are quite compact compared to the capacity they offer, and they are easily installed in the engine compartment.**

by introducing denser air into the cylinders. The same volume of air contains a greater number of molecules compared to normal ambient conditions. This allows more fuel to be burned at each cycle and increases the power delivered by the engine at constant rpm.

To supercharge an engine, that is, to introduce denser air into the cylinders, a compressor, or "blower", is used. It can be volumetric, moving a constant amount of air during each cycle, or centrifugal. In the first case, the drive is always mechanical, i.e. connected to the drive shaft. In the second case, it can be achieved using a turbine driven by the exhaust gases.

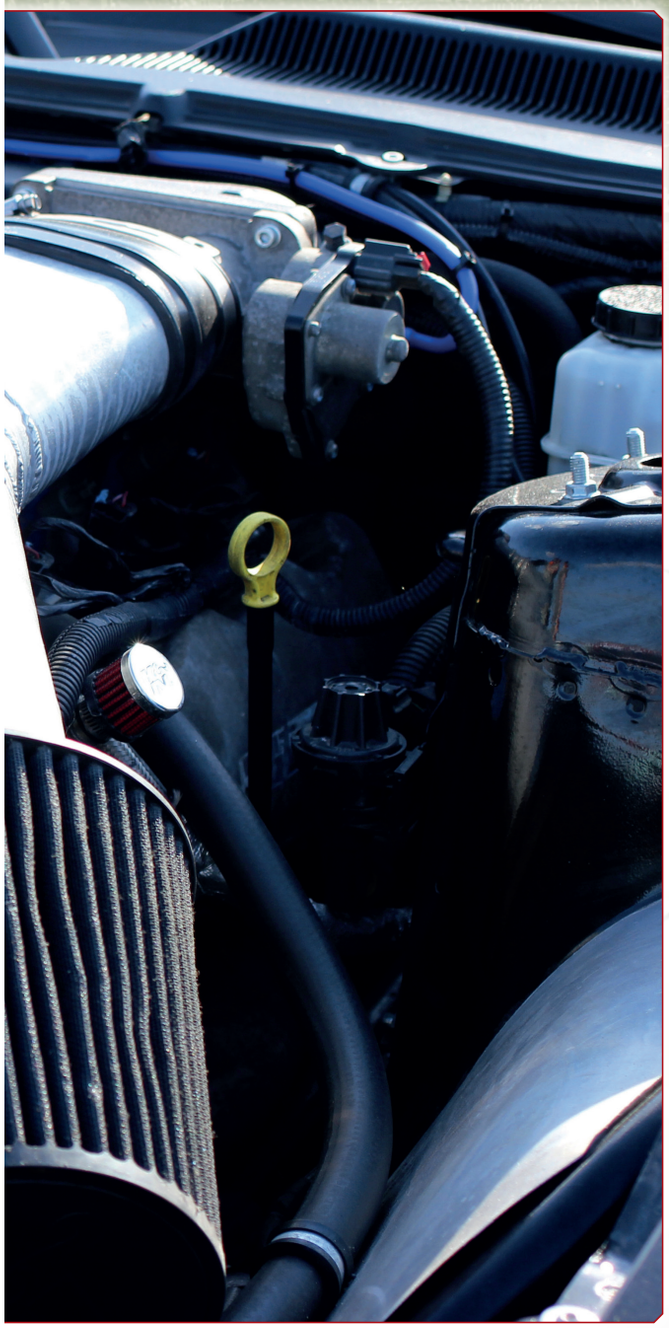
Although the market is now dominated by "turbos", it is possible to find a wide choice of mechanically driven compressors, with many specialised companies offering a range of quality products. The basic operating principles have been unchanged for decades. Back in the nineteenth century, they functioned as air pumps for use in industrial and mining fields. However, for the first automotive use, we must go back to 1907.

## LOBE COMPRESSORS

Lobe compressors, more commonly known as Roots compressors, are the simplest and least expensive of the volu-



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metric compressors. They have a transverse airflow and are not very efficient, usually between 40% and 60%. The efficiency drops as the boost pressure increases. They work best when the required pressure does not exceed about 0.8bar.

From the performance point of view, they provide boost very quickly, with no lag, right from lower engine speeds. However, as the revolutions increase, they start to lose effectiveness. This is firstly because of the mechanical heat they transfer to the air, and then, because they run directly off the crankshaft, they siphon power from the engine.

While GM and Volumex dominated the scene in the 1970s and 1980s, things changed with the arrival of Eaton compressors. The Roots blowers were redesigned, and the impellers became three-lobe rotors with a 60° twisting spiral pattern. Manufacturing tolerances were improved, and self-lubricating PTFE (Teflon® or Xylan®) coatings appeared. In addition, these compressors were equipped with a bypass valve to prevent mechanical energy absorption during idling or cruising at a constant speed with low fuel flow. As a result, the operation became quieter, efficiency significantly improved, and the flow was no longer purely transversal, but to a certain extent, it was also axial. The achievable boost pressure also grew significantly.

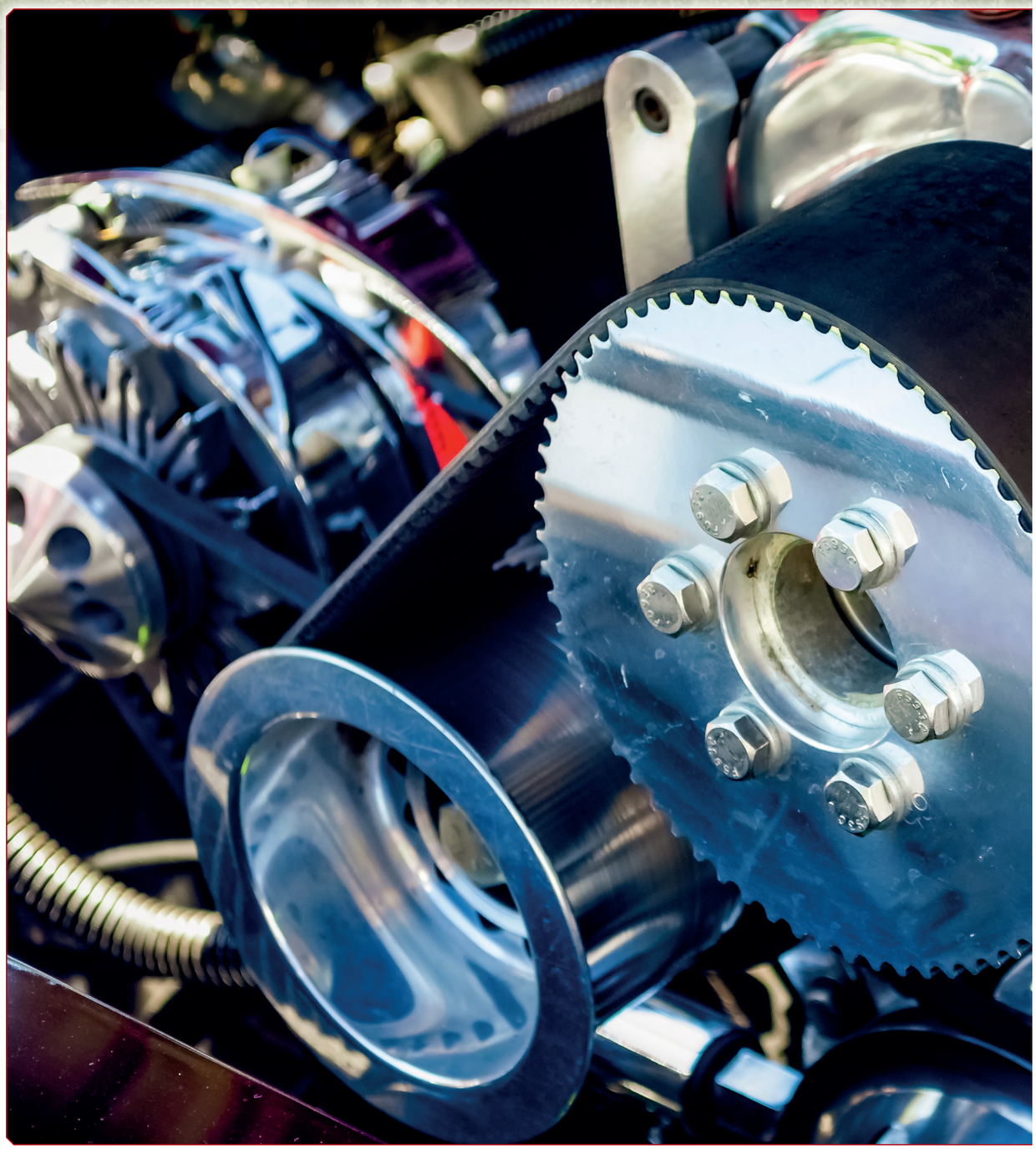
## LYSHOLM COMPRESSORS

An evolution of Roots blowers is the twin-screw compressor, also known as the Lysholm compressor. These operate by pushing air through a pair of meshing close-tolerance screws similar to a set of worm gears. They consist of two spiralled rotors, one equipped with "male" lobes that mesh with "female" lobes. They are quite extraordinary components, able to provide considerable boost pressure at low rpm, combined with excellent responsiveness. Unlike the Roots-type supercharger, the twin-screw compresses air within its housing as it moves through the device instead of relying upon resistance to flow downstream of the discharge. In current models, the male rotor usually has three lobes while the female rotor has five. The two rotors, which must almost touch each other but never come into contact (as in the case of the Roots), then turn at different speeds: this is achieved thanks to two external gears that provide a 5:3 ratio to the screws. The flow is axial and uniform; the efficiency can exceed 80%, and boost pressures of more than 2bar can be obtained. The only drawback of this type of compressor is the high cost, since they involve complex machining, given the rotors' complex geometry, which must respect extremely narrow dimensional and geometric tolerances.

## EXTERNAL AND INTERNAL COMPRESSION

How the air is compressed, and the amount of heat it produces with the pressure increase, depends on the type of device used. Lysholm and centrifugal blowers compress the air internally, while Roots-type lobe compressors do it externally.

The difference is simple to explain. In the first case, the air is compressed between the inlet and the outlet, inside the blower housing. Pressure varies according to the amount of intake air available. In Roots compressors, this does not happen. Instead, they behave like pumps and simply send the air to the intake manifold, where compression takes place because a considerable volume of air is forced to occupy a small space. It is a little like



when we pack clothes into a suitcase, forcing them to occupy a smaller space than they are used to.

**VERY HIGH SPEEDS**

In order to provide a high level of boost and thus produce power increases, centrifugal compressors must run very fast. In fact, the pressure they provide increases exponentially with the revolutions. These airflow accelerators increase the pressure by spinning air at high velocity and then modulating it with a diffuser. They are very efficient, and performance can be as high as 80%. Since the drive is mechanical, the device revs together with the engine. Therefore, there is no delay in response (lag). However, at low revs, it is not always able to significantly improve pressure. At high revs, however, it is fine, and those offered today on the tuning market can provide boost pressures of the order of 2.2bar. The cost is relatively low, and this is undoubtedly a strong point.

Currently, several specialised companies produce mechanically operated centrifugal compressors with rotation speeds that can reach up to 65,000rpm. Brands like Paxton,



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The fact that they are mechanically operated involves a slight penalty in terms of fuel consumption. However, that is not of much interest to anyone looking for maximum performance. In any case, it only becomes an issue with very high boost pressures.

Vortech, Procharger and Powerdyne are popular, both in Europe and in the United States. The Danish Rotrex blower is a very different type of compressor.

## THE ROTREX

Recent technological developments have led to the Rotrex centrifugal supercharger, a high-performance compressor with fascinating characteristics. Rotrex uses a control system that provides an exceptional transmission ratio, and therefore a very high increase in rotation speed. This compressor is very compact, with a crankcase diameter almost the same as that of a standard turbo. The impeller rotates at a speed that, on some models, can exceed 150,000rpm.

The drive system from the crankshaft uses a poly-V belt - a rubberised belt with ribs with a triangular section arranged lengthwise. This provides the initial increase in rotational speed. Then there is a patented Rotrex rotary drive system that, instead of using gears, employs friction wheels. The motion is transmitted through an elastohydrodynamic fluid film.



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