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CONCEPT, TYPES AND CLASSIFICATION OF AUTOTUNING

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ABSTARCT

The classification of car tuning is very extensive and multifaceted. Before improving your car, it is important to determine the purpose, direction and style of tuning, as well as take into account legislative requirements. This classification will give you an idea of the different areas of tuning and help you make the right decision on improving your car.

Keywords: Exterior tuning, parts, aesthetic tuning, exterior effect, polishing (polishing), window tinting, interior tuning, car electronics, suspension tuning, transmission tuning, brake system tuning, engine tuning, exhaust system tuning

INTRODUCTION

Autotuning (from the English "tuning" - adaptation, adjustment) is the process of changing the characteristics of a car, different from its factory state, in accordance with personal needs, tastes and goals. Autotuning is aimed at improving or changing the following aspects of a car: The main goal of tuning is to take a car beyond its standard factory state and make it unique and unique. To achieve this goal, various methods and modifications are used, including: Increasing the speed, power, handling and braking efficiency of the car. Giving it a personal and unique look by changing the body, wheels, lighting system and other external elements of the car. Improving the comfort, functionality and aesthetic appearance of the car interior. Installing additional features on the car, such as multimedia systems, navigation, cruise control and security systems. Creating uniqueness by adapting the car to the owner's personal tastes, desires and interests.

Car tuning is divided into the following types according to the parts.

Tuning is divided into technical, external, internal and their combined types. **External tuning is a change in the appearance of cars**. In most cases, external tuning leads to a deterioration in the aerodynamics of cars, but it becomes more beautiful and stylish. The simplest type of work in the tuning direction is repainting the car body, painting it in different colors, painting, tinting windows, using lighting equipment, installing an aerodynamic kit (a "skirt" - front and rear spoilers, inserts under the bumper and sill, rear spoiler and side moldings) and new wheels. However, the aerodynamic attributes of technical tuning are visible, but its aerodynamic performance is not improved.

Aesthetic tuning is work with the body of medium complexity. In this case, the general style and the entire design are reworked. For this purpose, the wings are "inflated" ("their" wings, sometimes door panels are cut out and replaced, depending on the material, welded, glued or glued), various stampings are made on the body, etc. The main feature of reworking is working with a metal (or plastic) body, during the work, the body details are The initial shape changes

to varying degrees. The most complex type of aesthetic tuning in the aesthetic direction is a radical change and booking of the body. Making a sedan from a limousine is not so difficult. Here, you can make a two-door coupe from a four-door sedan, and a two-door coupe from a two-door convertible. In general, whatever the customer wants. The complexity of this work is not in its large size and complexity, but in the fact that often the lifting part of the body has to be changed with power elements, which requires complex calculations to "zero" the car body. It should be noted that sometimes such changes cost the customer several times more than the price of the car.

External effect. A good car should also have a good appearance. The interior should be in harmony with the exterior. The form should correspond to the content. A separate page of external tuning is aerography, which can be called art. An alternative to aerography is vinyl. The image is printed on film and glued to the car body. You can order various images that are ten times cheaper. In addition, vinyl protects paintwork from scratches from small stone chips and can be easily replaced.

Polishing (Glossing). Looking at a shiny car is a good feeling. Paintwork dulls over time, and in order to slow down this process, it is necessary to polish it regularly. Polishing protects the body surface from urban and non-urban environments: from stones, salts, acids, and ultraviolet rays. The surface of the body can be restored to its original state by treating the body surface with a restorative abrasive polish and a polishing machine. "Polish cleaner" is sold in stores.

Tinting windows. A car with tinted windows looks more beautiful, more presentable and higher. There are opinions that tinted windows reduce safety, such opinions is unfounded. On the contrary: tinted windows absorb sunlight, eliminate the effect of autumn, and reduce the glare of headlights on oncoming and rear-facing vehicles. In addition, tinted windows have protective properties. When cars are in an accident, when stones are thrown at the windows from the side or directly, the windows can shatter, and the driver and passengers in the cabin can be injured by glass fragments.

Salon tuning can also be called salon styling. This includes: gearshift levers, various types of pedals with tuning, sports steering wheels with additional buttons, tuning dashboards, sports seats for cars. Salon tuning is not only for sports cars, but also for cars with comfort. The simplest work in this direction is to finish the interior and other panels with a finish (aluminum, granite, etc.), sew a seat cover, install the steering wheel, seats and gearbox, all the sunroofs and electric drives. The most common and expensive is a complete salon design, in which all panels are removed from the doors to the front panels. These include: upholstery of the car interior with leather, upholstery or other equipment, and installation of pillows for the driver. Choosing a tuning panel in a tone that matches the color of the interior
Electronics in a car. A modern car is not only a means of transportation, but also a multimedia hub on wheels. It combines the latest electronics, music and video industry achievements. This is not only car alarms and car alarms, but also video devices and gaming systems, on-board

computers and televisions. Car audio processing is most common in cars, where the interior is treated with a high-quality acoustic system: noise-absorbing materials are glued, acoustic devices are installed, and even the front panel is replaced with these devices.

Suspension tuning is changing the characteristics of the suspension in order to improve its properties. In many cases, work is done to improve the handling of cars, which can lead to a deterioration in the comfort of the car. For suspension tuning, a pair of "spring shock absorbers" and transverse stabilizers are sold. To improve the handling and stability of cars, wide discs and low-profile pads are installed. They prevent cars from sliding to the side when passing fast turns. Replacing the discs leads to strengthening the running gear, including the suspension support hinges and bushings. If this replacement is not carried out, for example, when replacing a 165/70 R13 wheel with a 205/50 R14 wheel, the above-mentioned details of the running gear, as well as ball joints and studs, may fail after 10-20 thousand km. Here, to increase the rigidity of the body (improve the stability of the car), a strut brace is used (a rigid beam is installed on the upper part of the shock absorber strut so that it protrudes above the engine compartment). For similar greater stability, a similar beam can be installed on the rear strut.

Transmission tuning. The gearbox plays a key role in the transmission, because even with a low-power engine, if the number of gears is correctly selected, it is possible to increase the speed. As everyone knows, sports cars differ from serial cars primarily in the gearbox, then in the body and suspension. First of all, the main pair is replaced with a higher gear ratio. Such a replacement increases the dynamics of the car. In addition, if a lightweight flywheel is used, the engine gains speed in a short time due to reduced inertia. The small downside of this is that it loses stability at idle. The last point in increasing the transmission tuning is the use of tuned transmission shafts, which increase the torque coming from the engine to the wheels. Self-locking differentials are used to prevent the wheels from slipping.

Brake system tuning. The purpose of tuning the brake system is to increase the braking efficiency of cars. The principle of "bigger is better" applies to brake system tuning. For example, the larger the brake disc, the better. A ventilated brake disc is better than a non-ventilated one. Any motorist can do brake system tuning. For this, you can buy a sufficient number of brake system parts in tuning stores: brake discs, brake supports and brake pads. Spare parts for the brake system in tuning stores ensure increased braking efficiency. To increase braking dynamics, large-diameter brake discs and ventilated and additional systems that change the brake force, such as ABS, are used. Nowadays, it is becoming more common to use disc brakes instead of rear drums. For "drifting" cars, the handbrake is connected not only to the rear wheels, but also to the front wheels.

Engine tuning is the process of improving the characteristics of an engine by making changes to its design. Due to such changes, the engine's power and torque are improved. An example is the V7/5 engine, which was modified from the standard BMW M30 V35 engine by installing the Alpina B10 Bi-turbo. Engineers installed two Garrett T25 turbochargers with intercoolers

on the Alpina M30 engine and installed a 4-layer metal GBTS gasket, thereby reducing the compression ratio, increasing the diameter of the exhaust valves and controlling the boost pressure, bringing the engine power to 360 hp (218 hp for the previous engine) and torque to 520 N*m. The engine is usually equipped with large-caliber camshafts, for which the inlet and outlet channels of the cylinder head are milled and polished.

Larger diameter valves, high-performance fuel pumps are installed, the exhaust system is replaced with a direct-flow system (the muffler is correct), the engine displacement and compression ratio are increased. The most extreme and effective is the installation of a turbocharger on the engines, which leads to an increase in engine power by up to two times. At the same time, “chip tuning” is used to effectively change the characteristics of the engine (increased engine power and torque, reduced fuel consumption, etc.). This is the replacement of the fuel injection controller itself.

Exhaust system tuning is usually replaced during engine tuning. This leads to a slight improvement in engine power, that is, an improvement of one tenth. Usually, irresponsible sellers recommend “sports mufflers”. Weight tuning is an improvement in the speed characteristics of a car by reducing its weight. Weight tuning is most often used in road racing. In this case, all unnecessary items are removed from the car: rear seats, spare tire. Lightweight alloy doors are installed. Main directions of tuning Currently, there are a huge number of directions for modifying a car, which depends on nationality, race and regional characteristics.

This action exists both independently and as a typical hot rod element. Its meaning is to reduce the roof height by simply reducing the length (10-20 cm), which gives the car a massive look and improves aerodynamics. Such cars look like hot rods, or rather, custom ones, but they differ from them technically.

There can be no talk of high speed and high dynamics here. Lowriders have powerful powertrains, more like factory-developed ones. The most necessary part of this direction is the installation of air suspensions. They change the clearance size (the distance from the bottom of the body to the ground) on all wheels and on individual wheels. In addition, if a pickup truck served as a support for the lowrider, a suspension is installed to raise the body in different directions.

From a theoretical point of view, the most useless is the Led Sled (lead sled), its literal meaning is “lead sled”. Its kinship with the Lowrider is that both in this case and in this case the suspension is adjusted. In this case, the ground clearance is reduced by several centimeters and there are no pneumatic elements in the suspension. For example, in the conditions of Uzbekistan, the car’s ground clearance is changed by putting additional rubber on gas-powered cars and putting shock absorber springs from another car. Kitcar (Kitcar) – means “building a car from a kit”. In other words, you take the constructor apart and assemble the car. “Kit” (i.e. “kit”) is purchased without a complete set, depending on the financial situation. For example, some of the components and assemblies (the most common ones are the engine, steering and gearbox) can be purchased independently, new or used.

Conclusion: In conclusion, car tuning is an interesting and creative process for improving a car, expressing personal style and enriching the driving experience. However, this process

requires a careful and professional approach. When planning car tuning, it is necessary to take into account all aspects and act in a purposeful manner. It is carried out with the aim of improving the performance of the car, changing its appearance or creating uniqueness.

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