

TYPES OF TRANSMISSION WITHIN THE OPERATING PRINCIPLE, ADVANTAGES AND DISADVANTAGES

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An automotive transmission is a system that transfers power from the engine to the wheels [1]. The transmission includes components that perform the following functions: transmission and distribution of power, changing the direction of movement, compensation for the difference in wheel speeds. The main tasks of the transmission are to ensure maximum energy efficiency; to maintain stability and control of the vehicle; and to ensure the durability of vehicle components [2].

Mentioning the main elements of the transmission, it should be noted the clutch, the function of which is to ensure a smooth connection of the engine with the gearbox; the gearbox, the function of which is to change the gear ratio to adapt the speed and load; the driveshaft, the function of which is to transfer the torque to the rear axle; the main gear and the differential, which distribute the torque between wheels, as well as hinges of equal angular velocities, the task of which is to ensure the transmission of torque to the steered wheels [1]. It should be noted that the principle of operation of the transmission is as follows: the engine creates torque, the clutch transmits torque to the gearbox, which, in turn, changes the gear ratio and changes the torque. The gimbal and the joints transmit the torque to the wheels, and the differential distributes the torque between the wheels of the same axle [2].

Consider the following 5 types of transmission within the operating principle, advantages and disadvantages:

– In a manual transmission, the driver manually switches gears through the gearshift lever. The advantage of such a transmission is high efficiency, reliability, and cost-effectiveness, while the disadvantage is the need for shifting skills and congestion [3].

– In an automatic transmission, the torque converter and planetary gears automatically change stages. The advantage of such a transmission

is convenience and smooth running, but the disadvantage is higher fuel consumption and expensive maintenance.

– The robotic gearshift box has a manual transmission with automatic clutch and shift. The advantage of such a transmission is cost-effectiveness and fast switching, while the disadvantage is jerky switching and low reliability of budget options.

– The principle of operation of the variator is a continuously variable transmission with a belt and cones. The advantage of such a transmission is the smoothness and optimal engine speed. The disadvantage of such a transmission is the limited resource and high cost of repairs.

– A hydromechanical transmission combines a torque converter and a mechanical part, used in trucks and special equipment [4]. The advantage of such a transmission is easier driving, lower emission of toxic substances into the atmosphere, the absence of bumps and jerks while driving, the ability of the car to move at very low speeds without fear of engine stall, and the disadvantage is the high complexity of repairs and sensitivity to oil quality.

There are several perspectives in the development of the transmission, such as: electrification (continuously variable transmissions in electric vehicles (i.e. single speed mode)), hybrid systems (combination of internal combustion engine and electric motors with intelligent control), smart gearboxes (adaptive shifting algorithms based on AI) [2].

The transmission is a key element of a car that determines its driving performance. Modern technologies allow us to choose between the reliability of the manual transmission, the comfort of the automatic transmission and the efficiency of the variators. In the future, the development of transmissions will be related to electrification and control automation.

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