



## What is a Gearbox?

A gearbox is a mechanical method of transferring energy from one device to another and is used to increase torque while reducing speed. Torque is the power generated through the bending or twisting of a solid material. This term is used interchangeably with transmission.

Located at the junction point of a power shaft, the gearbox is often used to create a right angle change in direction, as is seen in a rotary mower or a helicopter. Each unit is manufactured with a specific purpose in mind and the gear ratio used is designed to provide the level of force required. This ratio is fixed and cannot be changed once the box is constructed. The only possible modification after the fact is an adjustment that allows the shaft speed to increase, along with a corresponding reduction in torque.

In a situation where multiple gear speeds are needed, a transmission with multiple gears can be used to increase torque while slowing down the output speed. This design is commonly found in automobile transmissions. The same principle can be used to create an overdrive gear that increases output speed while decreasing torque.

A wind turbine is an example of a very large gearbox. The turbine moves at a slow rate of rotation with a great deal of torque. The gearbox translates this power into the faster, but lower torque rotational speed of the electricity generator. Due to the sheer size and the amount of power they can generate, wind turbines have multiple gears and stages. This feature is required to ensure that the electricity generator can provide a consistent output even as the turbine rate of rotation fluctuates.