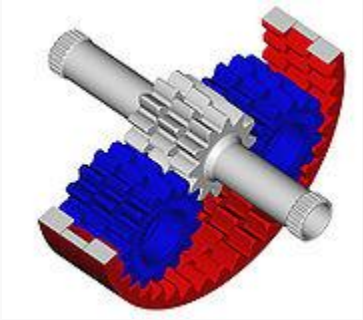
GEAR DRIVES AND GEAR MOTORS



Gear Drives

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Gear Drive transmission of motion or torque from one shaft to another by means of direct contact between toothed wheels or a mechanism consisting of toothed wheels that engage and transmit rotary motion, usually transforming angular velocity and torques. Gear drive is a rotating machine having cut teeth, or cogs, which mesh with another toothed part in order to transmit torque. Two or more gear drive working in tandem are called a transmission and can produce a mechanical advantage through a gear ratio and thus may be considered a simple machine. Gear drives can change the speed, torque, and direction of a power source.

The most common situation is for a gear to mesh with another gear, however a gear can also mesh with a non-rotating toothed part, called a rack, thereby producing translation instead of rotation.

The gear drives in a transmission are analogous to the wheels in a pulley. An advantage of gear drive is that the teeth of a gear prevent slipping. When two gears of unequal number of teeth are combined a mechanical advantage is produced, with both the rotational speeds and the torques of the two gears differing in a simple relationship. In transmissions which offer multiple gear ratios, such as bicycles and cars, the term gear, as in first gear, refers to a gear ratio rather than an actual physical gear. The term is used to describe similar devices even when gear ratio is continuous rather than discrete, or when the device does not actually contain any gears, as in a continuously variable transmission.

Advanced materials science and higher computing power are driving improvements in all stages of gear drive development and production – leading to significantly smaller gear drive sizes.

Gear Motors

20mm gear motor

Gear Motor is a commonly used term that designates a hoist that derives its lifting and lowering power from a mechanical setup involving a gear set and pneumatic or electric motor. As the name implies a gear motor or geared motor is a motor having an attached gear assembly. The gear assembly or gear train enable the gear motor to provide greater torque at a lower RPM than the motor alone would be capable of providing.

That is, gear motor refers to a combination of a motor plus a reduction gear train. These are often conveniently packaged together in one unit. The gear reduction or gear train reduces the speed of the motor, with a corresponding increase in torque. Gear ratios range from just a few to huge. A small ratio can be accomplished with a single gear pair, while a large ratio requires a series of gear reduction steps and thus more gears. There are a lot of different kinds of gear reduction.

In the case of a small transmission ratio N, the unit may be back drivable, meaning you can turn the output shaft, perhaps by hand, at angular velocity w and cause the motor to rotate at angular velocity Nw. A larger transmission ratio N may make the unit non-back drivable. Each has advantages for different circumstances. Back drivability depends not just on N, but on many other factors. For large N, often the maximum output torque is limited by the strength of the final gears, rather than by N times the motor's torque.

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