

How You Select Correct Motor for Your Robot?

Important consideration in a robot, the **motor torque** is conveyed to a wheel or a lever, which then causes the robot to move or the lever to lift, push, or pull something. Torque is measured in terms of force times the perpendicular distance between the force and the point of rotation.

DC motors run at speeds of thousands of RPMs with low torque, but most robots required less **speed** compare to this. The output torque is much too low to move the robot. So, this is not suitable for driving a robot. In order to use the motor, we add a gearbox to reduce the motor speed and increase the output torque.


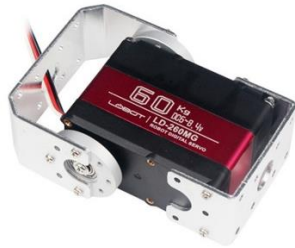
The same motor may produce different torque and speed ratings depending on the gearing used between the motor and the gearbox output shaft. If you need more torque and less speed, try to find the same motor with a gearbox with a higher reduction ratio. If you need more speed and less torque, try to find the same motor with a gearbox with a lower reduction ratio.

One main disadvantage is that gear head motors are not **precise**. Some applications have need of very precise movements and angles like robotic arms and model plane control surfaces. Stepper motors and servo motors are best suited to these sorts of applications.

Another important consideration is **operating voltage**. Most common electric motors used in robotics projects are the DC motors. Common preferred voltages for DC motors are 3, 6, 12 and 24 Volts. If to a motor is applied a voltage lower than the voltage listen in the data sheet, the torque will not overcome the internal friction – mostly from the brushes. Also, if a higher voltage than that supported is applied to the motor, it may heat up and can be damaged.

To sum up, to choose the electric motors that can fit for your project you should consider some important motor specifications: Torque, speed, precision and accuracy, voltage and cost.

The table below illustrate the difference between MG995 Servo Motor and LOBOT LD-260MG using the datasheet:

Motor type	MG995 Servo Motor	LOBOT LD-260MG
Product Weight	55 g	163g
Product Size	40.7×19.7×42.9mm	65*30*48mm
Working Voltage	4.8 V to 7.2 V	: 6.0-8.4V
Speed	0.2 s/60° (4.8 V), 0.16 s/60° (6 V)	0.17sec/60°(6.0V), 0.15sec/60°(7.4V), 0.13sec/60°(8.4V)
Rotational degree	180°	180°
Stall Torque	9.4kg/cm (4.8v); 11kg/cm (6v)	58kg.cm(6.0V), 65kg.cm(7.4V), 70kg.cm(8.4V)
Application	Robotics, solar tracking and positioning, door lock and safe locks and hobby projects	RC robot and RC car
Picture		

References:

<https://components101.com/motors/mg995-servo-motor>

https://www.teknistore.com/en/rc-helicopter-parts/52333-lobot-ld-260mg-180-60kg-large-torque-metal-gear-digital-servo-for-rc-robot.html?mobile_theme_ok

<https://www.instructables.com/id/Complete-Motor-Guide-for-Robotics/>