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Drive Motor Sizing Tool

Posted on 07/03/2013 by
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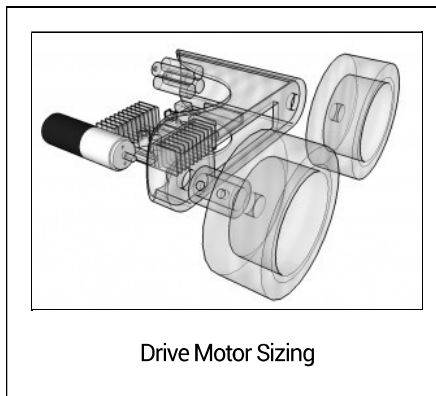Tags: Drive, Motors, tools

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Drive Motor Sizing

The Drive Motor Sizing Tool is intended to give an idea of the type of drive motor required for your specific robot by taking known values and calculating values required when searching for a motor. DC motors are generally used for continuous rotation drive systems, though can be used for partial (angle to angle) rotation as well. They come in an almost infinite variety of speeds and torques to suite any need. Without a geardown, DC motors turn very fast (thousands of revolutions per minute (rpm)), but have little torque. To get feedback of the angle or the speed of the motor, consider a motor with an encoder option. Gear motors are essentially DC motors with an added geardown. Adding a geardown both reduces the speed and increases the torque. For example, an unloaded DC motor might spin at 12000 rpm and provide 0.1 kg-cm of torque. A 225:1 geardown is added to proportionally reduce the speed and increase the torque: 12000 rpm / 225 = 53.3 rpm and 0.1 x 225 = 22.5 kg-cm. The motor will now be able to move significantly more weight at a more reasonable speed. If you are not certain about what value to enter, try to make a good "educated" guess. Click each link for more explanation about the effect of each input value.

Integration Riverdi modules with Arduino
14/02/2019 by AleksandraDemko

Drive Motor Sizing Tutorial
01/02/2014 by cbenson

You are also encouraged to look at the Drive Motor Sizing Tutorial, where you will find all the equations used in this tool complete with explanations.

Input

Total mass:

30

Kg

Number of drive motors:

6

[#]

Radius of drive wheel:

0.135

m

Robot Velocity:

0,1

m/s

Maximum incline:

30

[deg]

Supply voltage:

12

[V]

Desired acceleration:

0.2

m/s2

Desired operating time:

1

hs

Total efficiency:

65

[%]

Output (for each drive motor)

Angular Velocity:

NaN

rad/s

Torque*:

5.3013

Nm

Total Power:

NaN

W

Maximum current:

NaN

[A]

Battery Pack

NaN

[Ah]

Note: Although kg-cm is used throughout the RobotShop site, it is actually kgf-cm. Similarly, oz-in should actually read ozf-in throughout the site.

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