

Design Parameters

Coefficient of Friction for PLA	0.49	
Robot Mass	1.24	kg
Robot Weight	12.14	N
Force _{Friction}	5.97	N
Design Speed	0.25	m/s
Time	5.00	s
Acceleration	0.05	m/s ²
Force _{Acceleration}	0.61	N
Force _{Total}	6.58	N

Wheel Parameter

Diameter	60.00	mm
Radius	30.00	mm
Radius (meters)	0.03	m

Motor Parameters

Torque	0.10	Nm
Rated Speed of Motor	79.62	rpm
Safety Factor	2.00	
Torque w/Safety Factor	0.20	Nm

Power Requirements

Suggest Rated Speed of Motor	100.00	rpm
Angular Velocity (w)	10.47	rad/s
Power	2.07	W
Number of Motors	2.00	
Power _{Total}	4.13	W
Voltage	6.00	V
Current	0.69	A

$$\text{Force}_{\text{Friction}} = \mu N$$

$$\text{Force}_{\text{Acceleration}} = ma$$

$$F = F_{\text{friction}} + F_{\text{acceleration}}$$

$$\tau = Fr$$
 Direct-drive system with two wheels, each motor only needs to provide a half of the total torque.

ES-MOTOR 6V 150:1 Micro Metal Gearmotor LP, 100RPM SKU: RM-ESMO-00E

$$P = \tau\omega$$



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