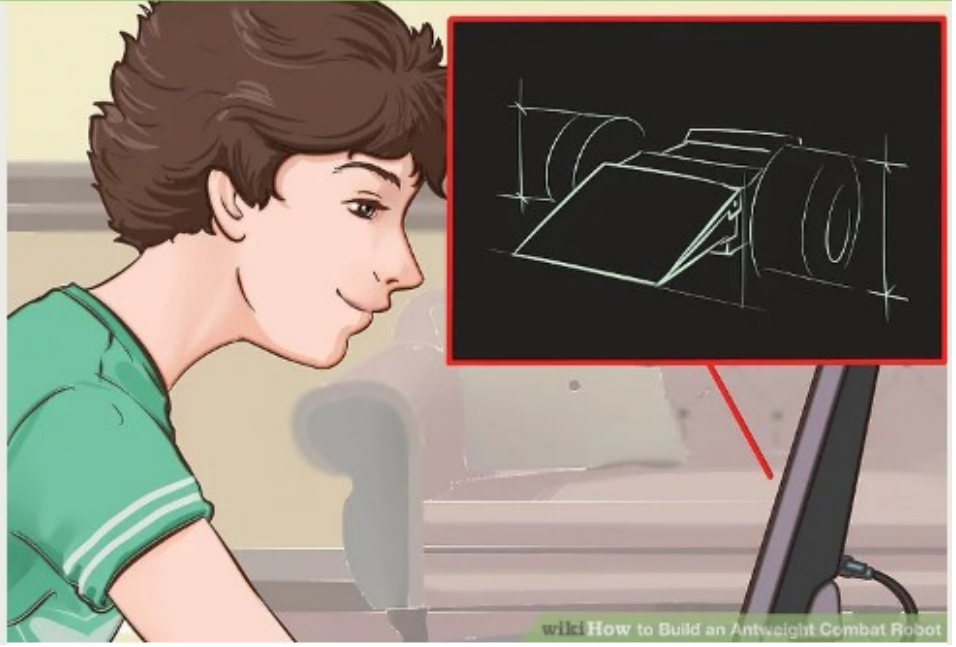
Motor CC

Prof. Daniel Soares de Alcântara
Depto de Mecatrônica


wikiHow to Build an Antweight Combat Robot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AVISO

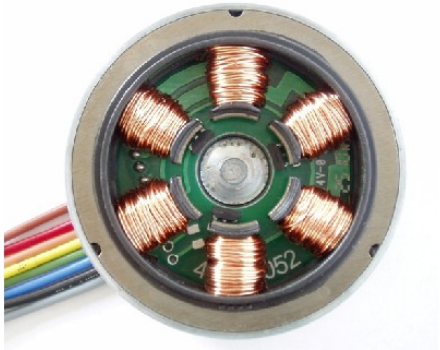
MUITA CALMA NESSA HORA

Motor cc

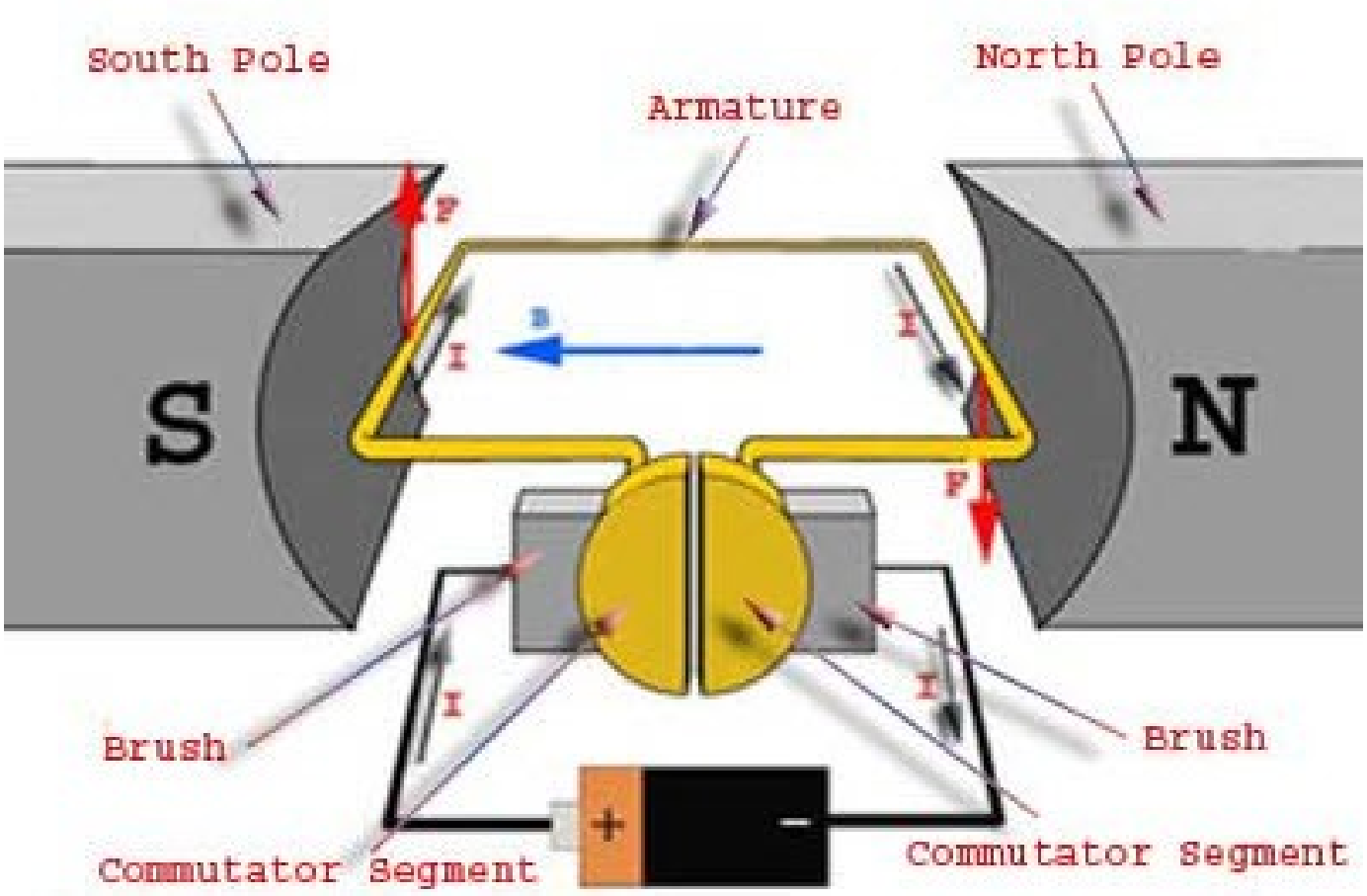
Motor de passo

Servomotor

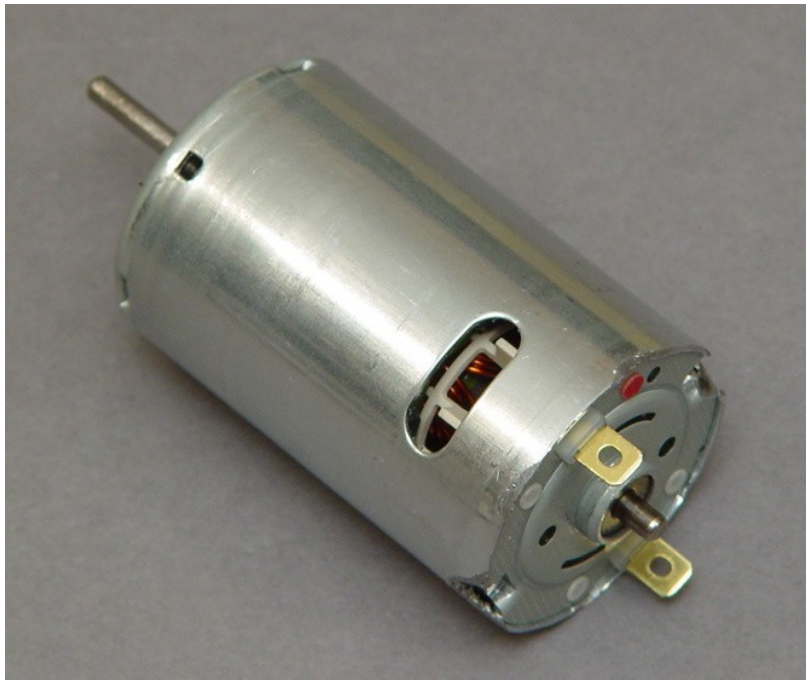
Motor BLDC

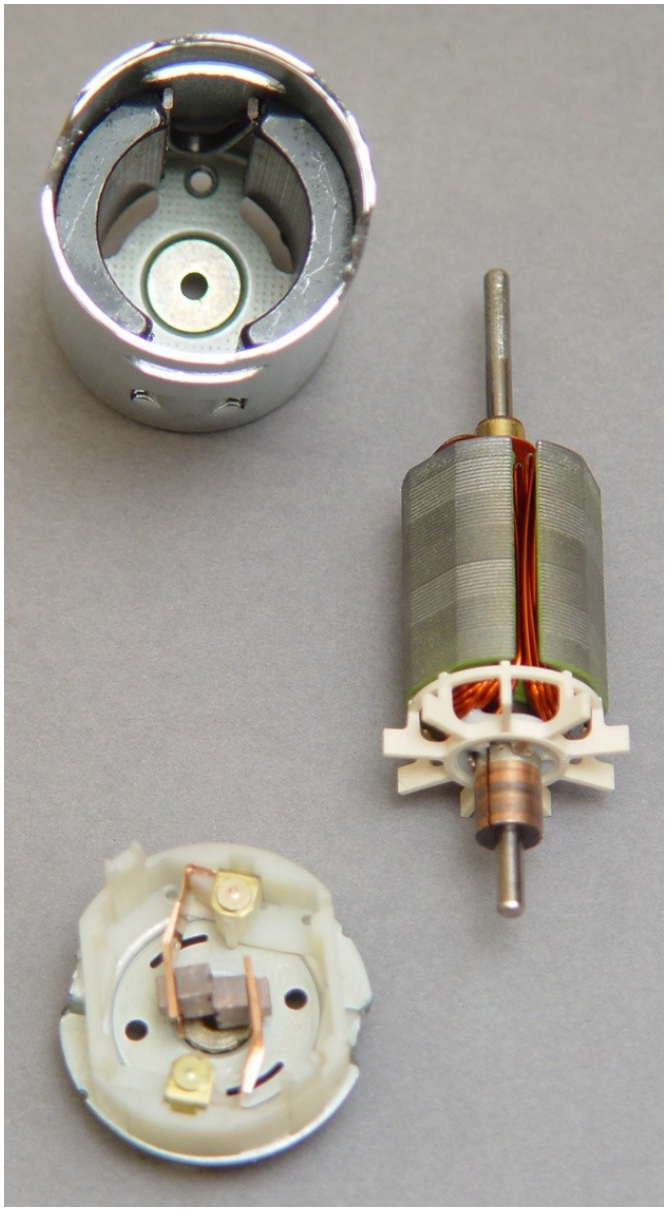


Motor CC

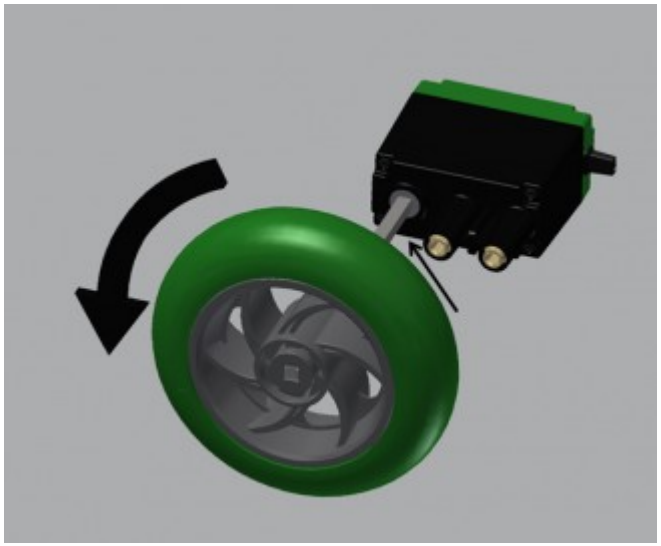

South Pole
Armature
North Pole
S
N
F
I
B
I
F
I
I
Brush
Brush
+
−
Commutator Segment
Commutator Segment

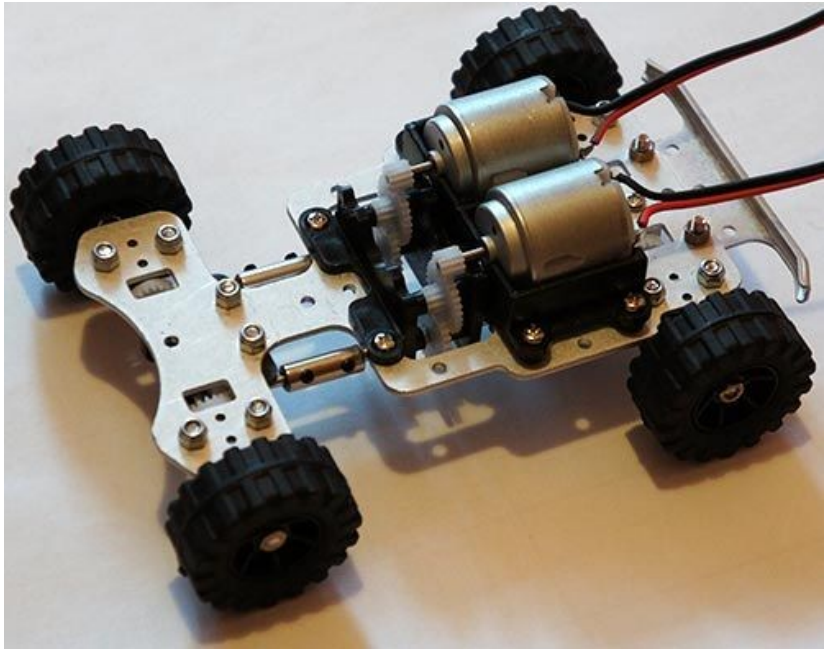
Motor CC



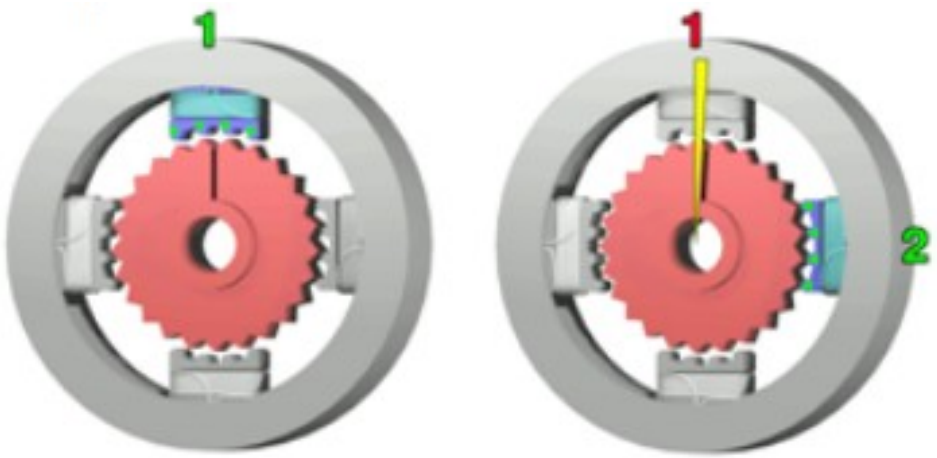


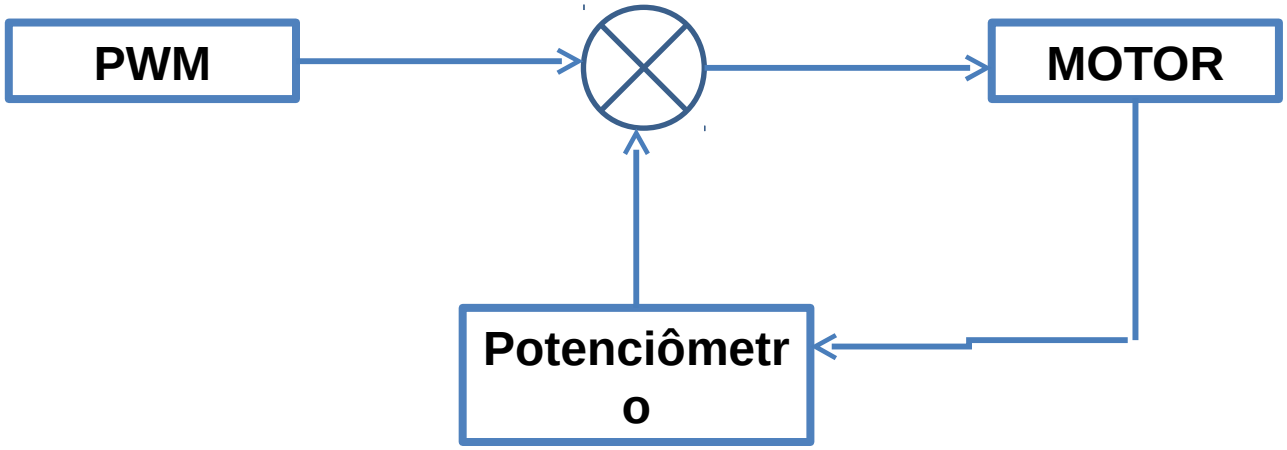
Motor CC: aplicação

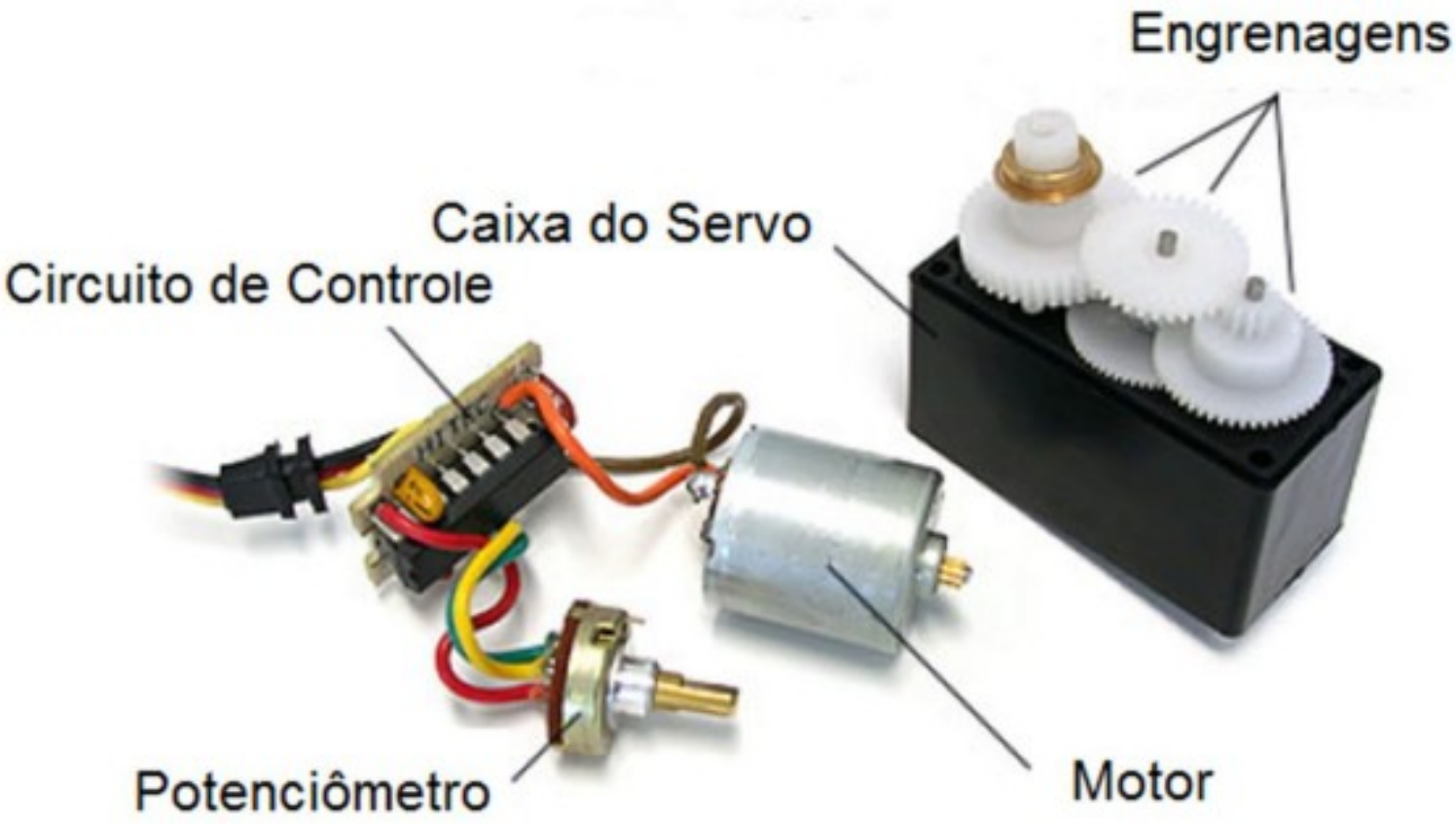


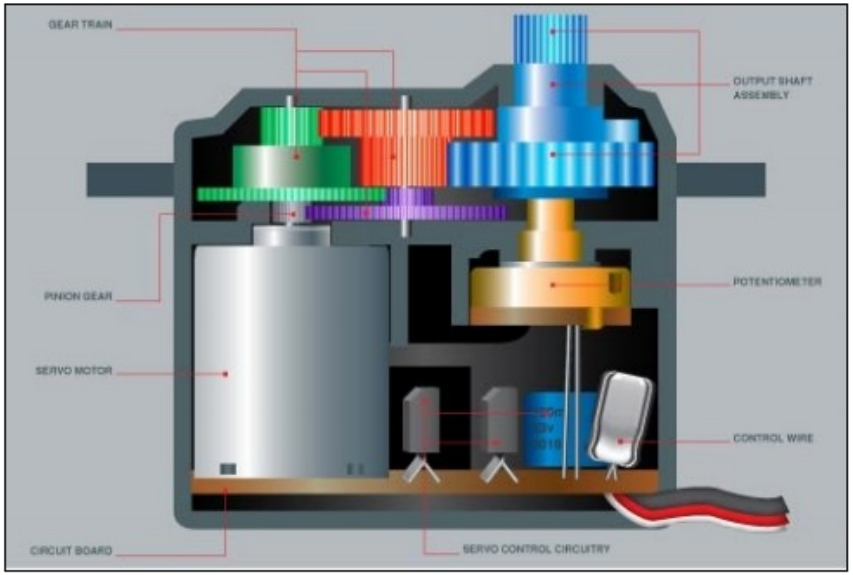


Servomotor CC





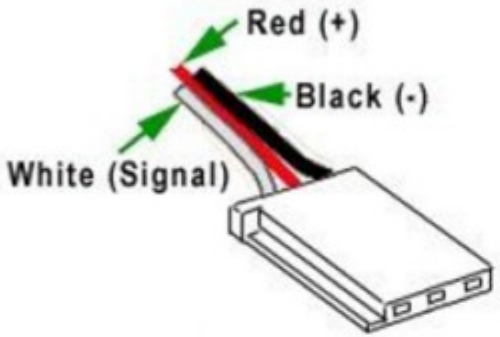

Engrenagens
Caixa do Servo
Circuito de Controle
Potenciômetro
Motor


GEAR TRAIN
OUTPUT SHAFT ASSEMBLY
POTENTIOMETER
PINION GEAR
SERVO MOTOR
CONTROL WIRE
CIRCUIT BOARD
SERVO CONTROL CIRCUITRY

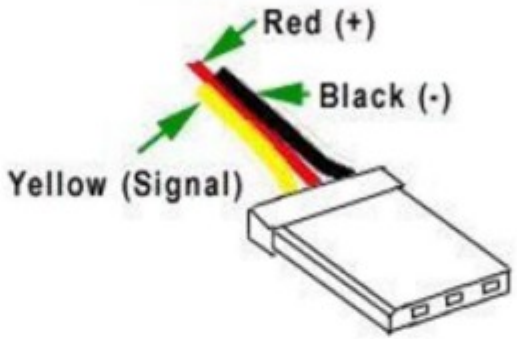

HS-81
HS-75BB

Futaba

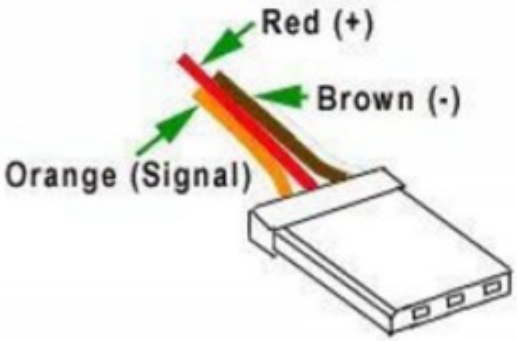
"J" Connector



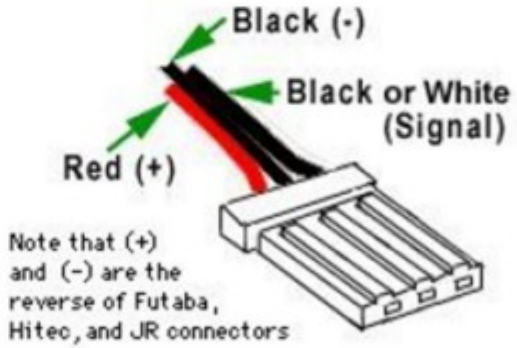
hitec



JR Radios

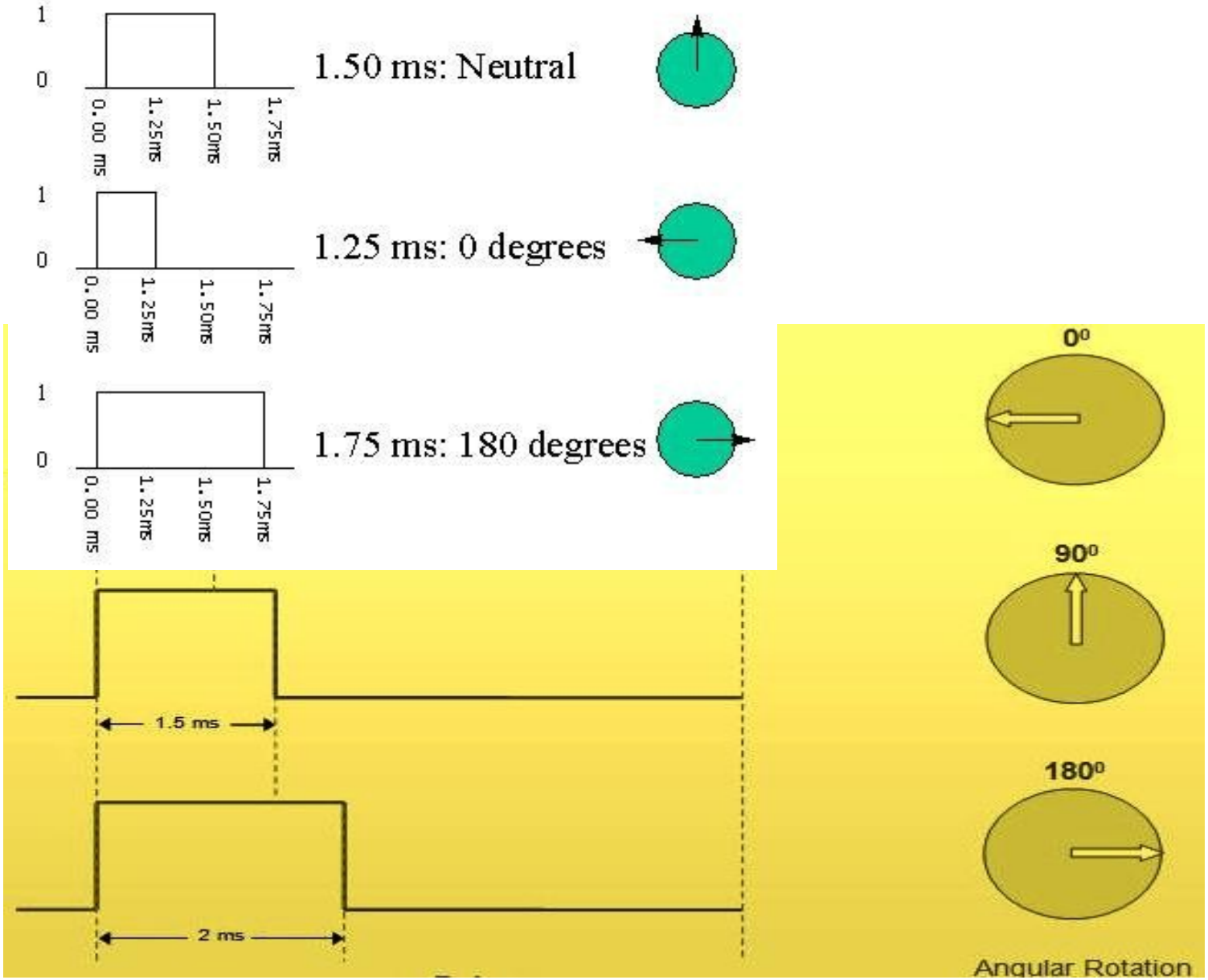


AIRTRONICS

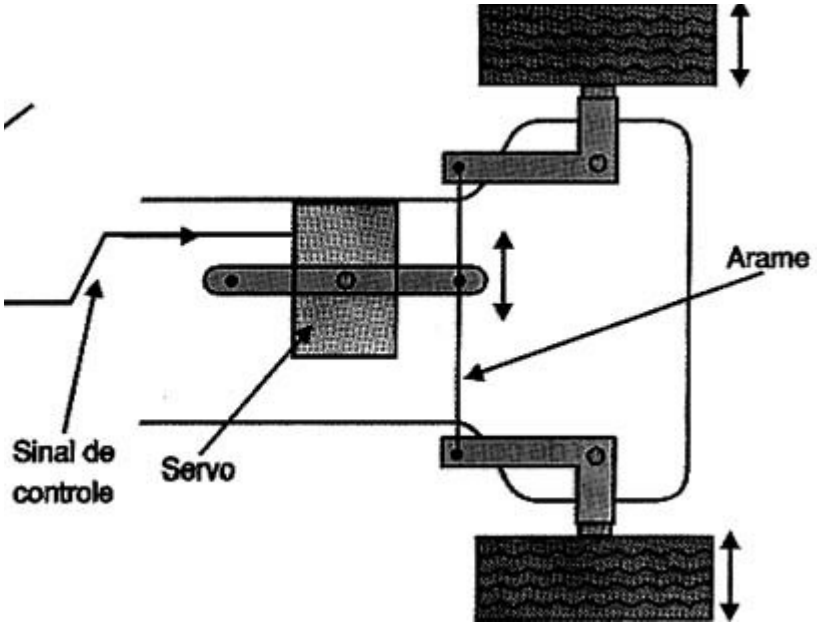


Note that (+) and (-) are the reverse of Futaba, Hitec, and JR connectors

CEFET-MG


1
0
0.00 ms
1.25ms
1.50ms
1.75ms
1.50 ms: Neutral
1.25 ms: 0 degrees
1.75 ms: 180 degrees
1.5 ms
2 ms
0⁰
90⁰
180⁰
Angular Rotation

Servomotor: aplicação



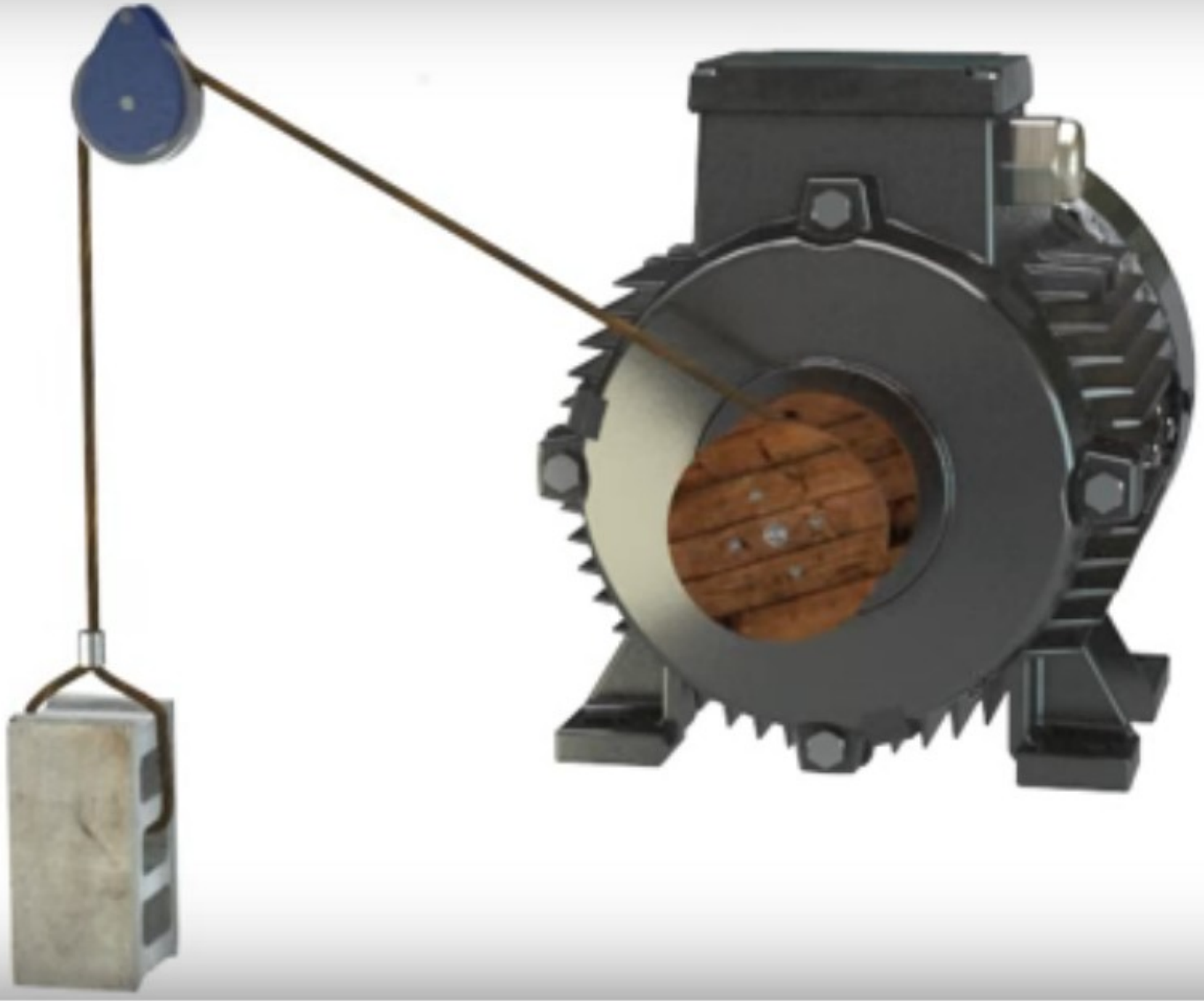
Especificação:

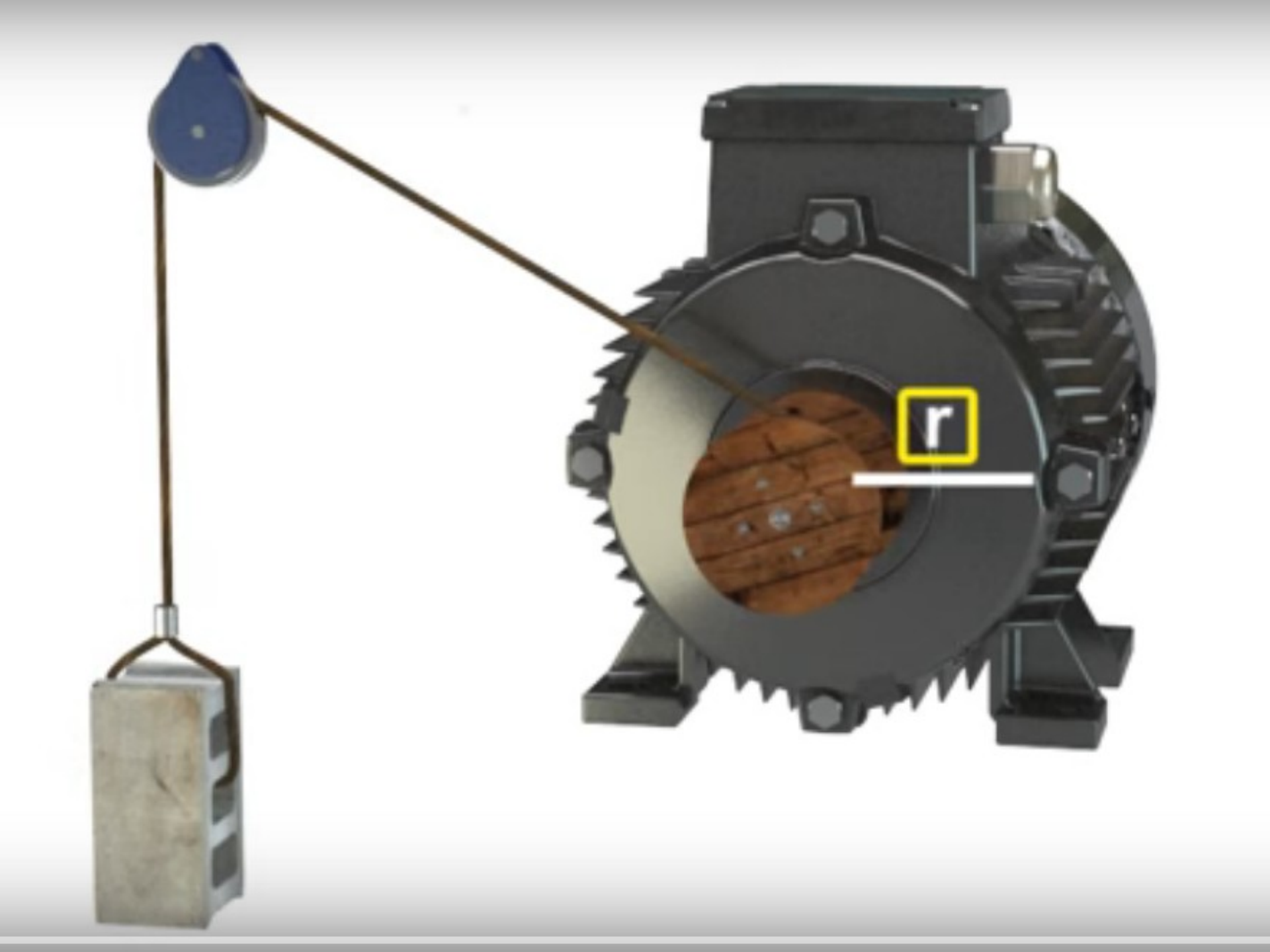
- ✓ *Tensão de alimentação*
- ✓ *RPM*
- ✓ *Torque*

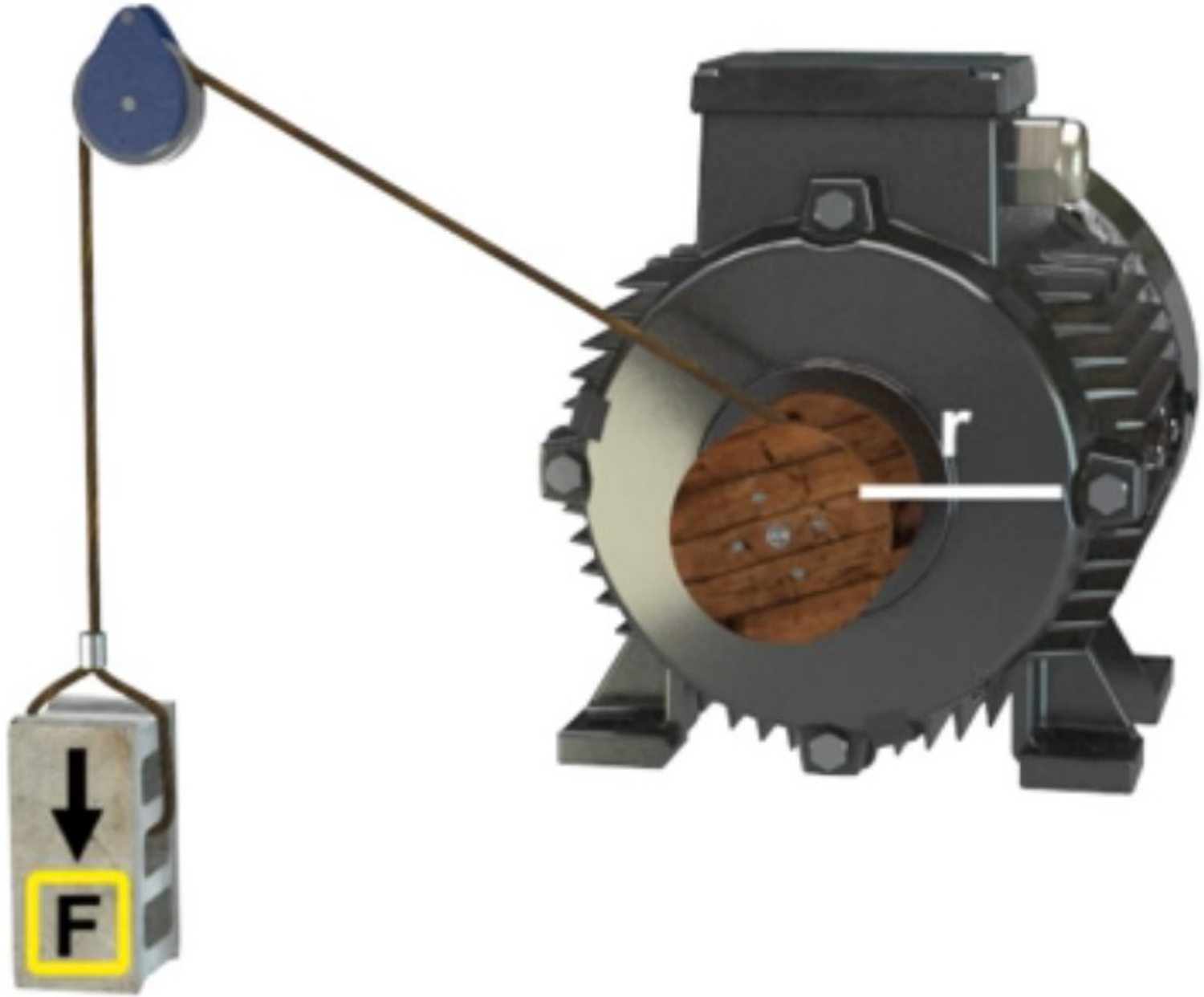
Potência?????
Corrente???????

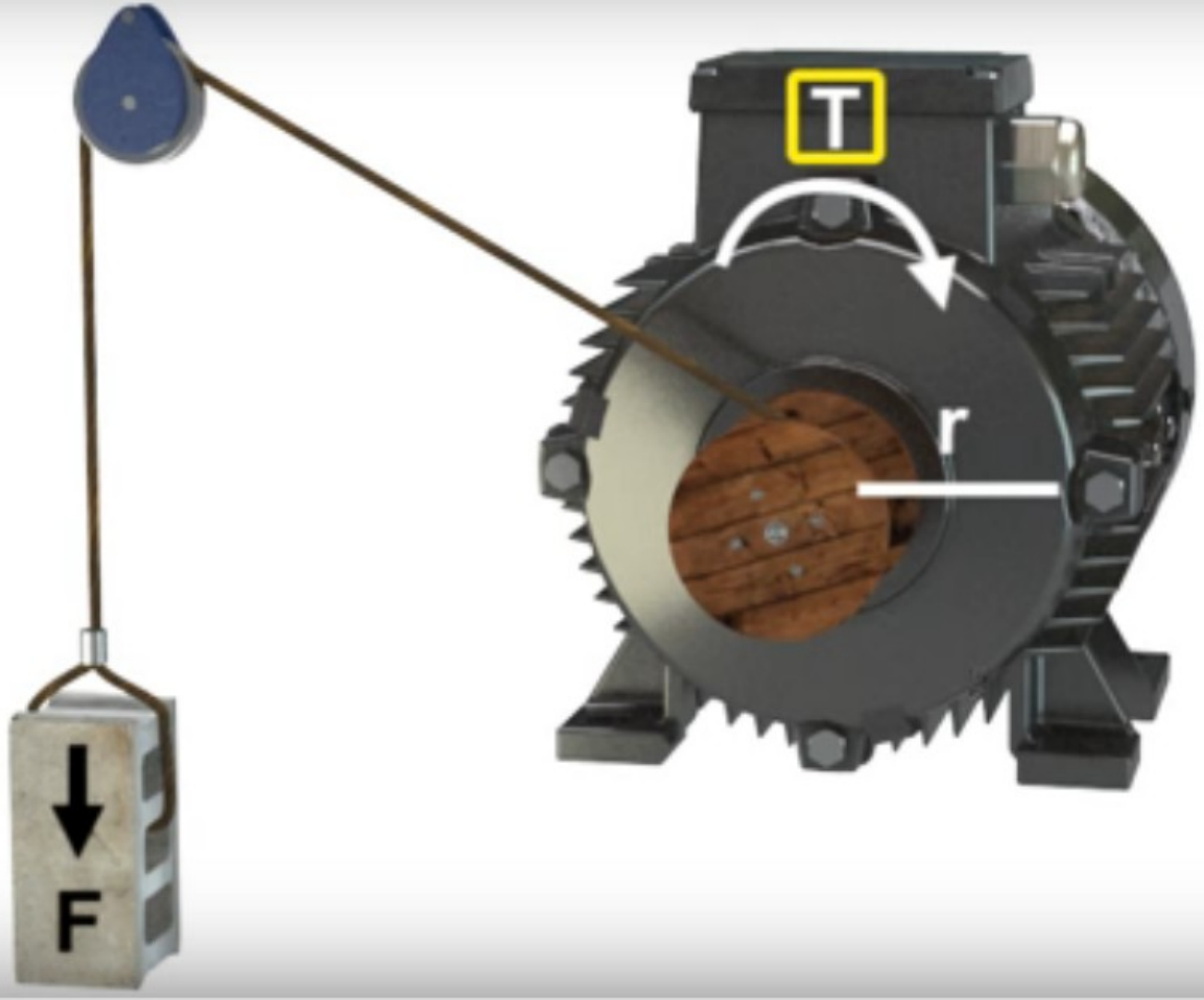
Controle de velocidade:

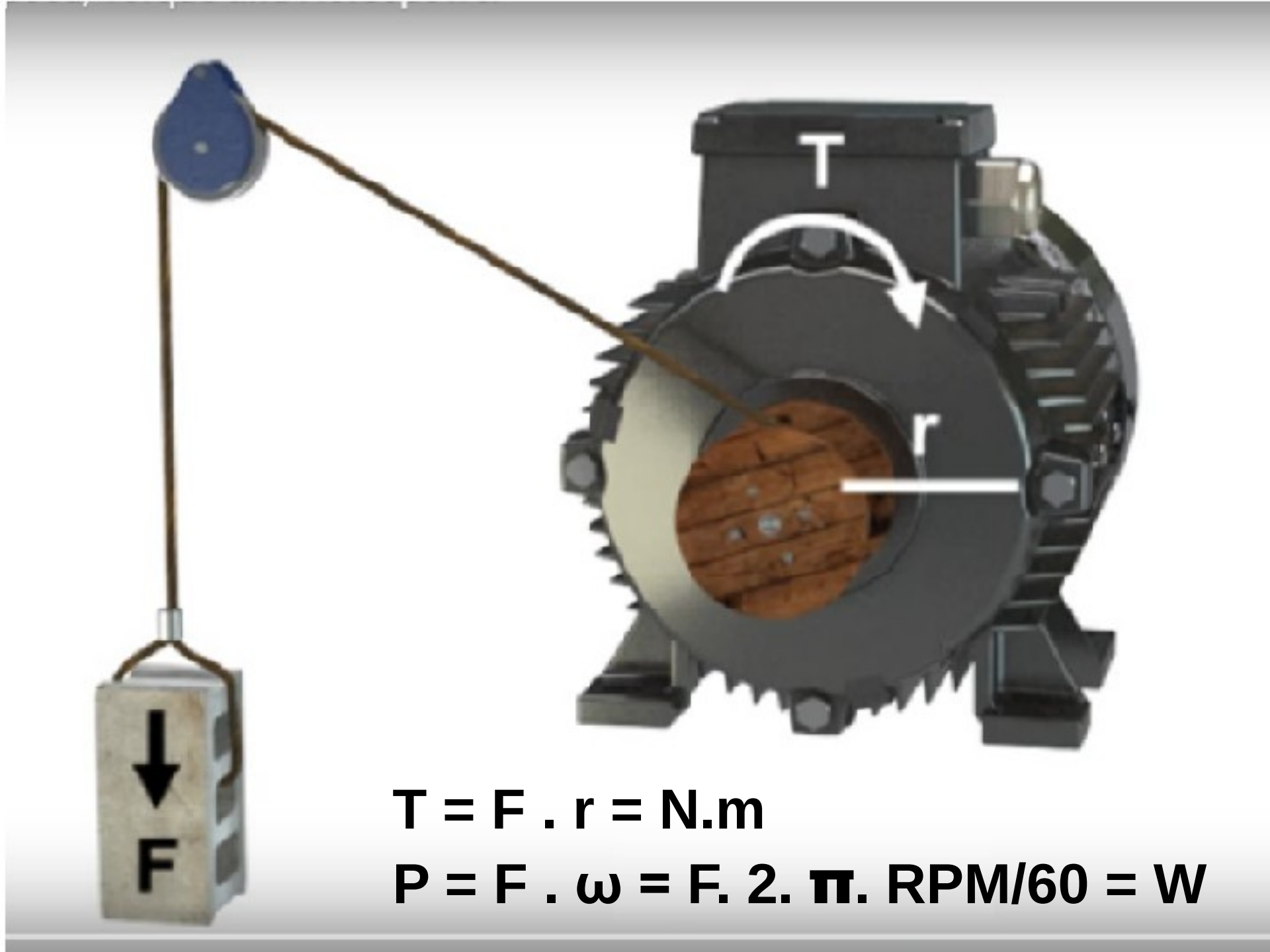
- ✓ *Variando a tensão de alimentação*
- ✓ *Variando o fluxo,*
- ✓ *Variando a tensão da armadura,*




r


r
F


T
r
F



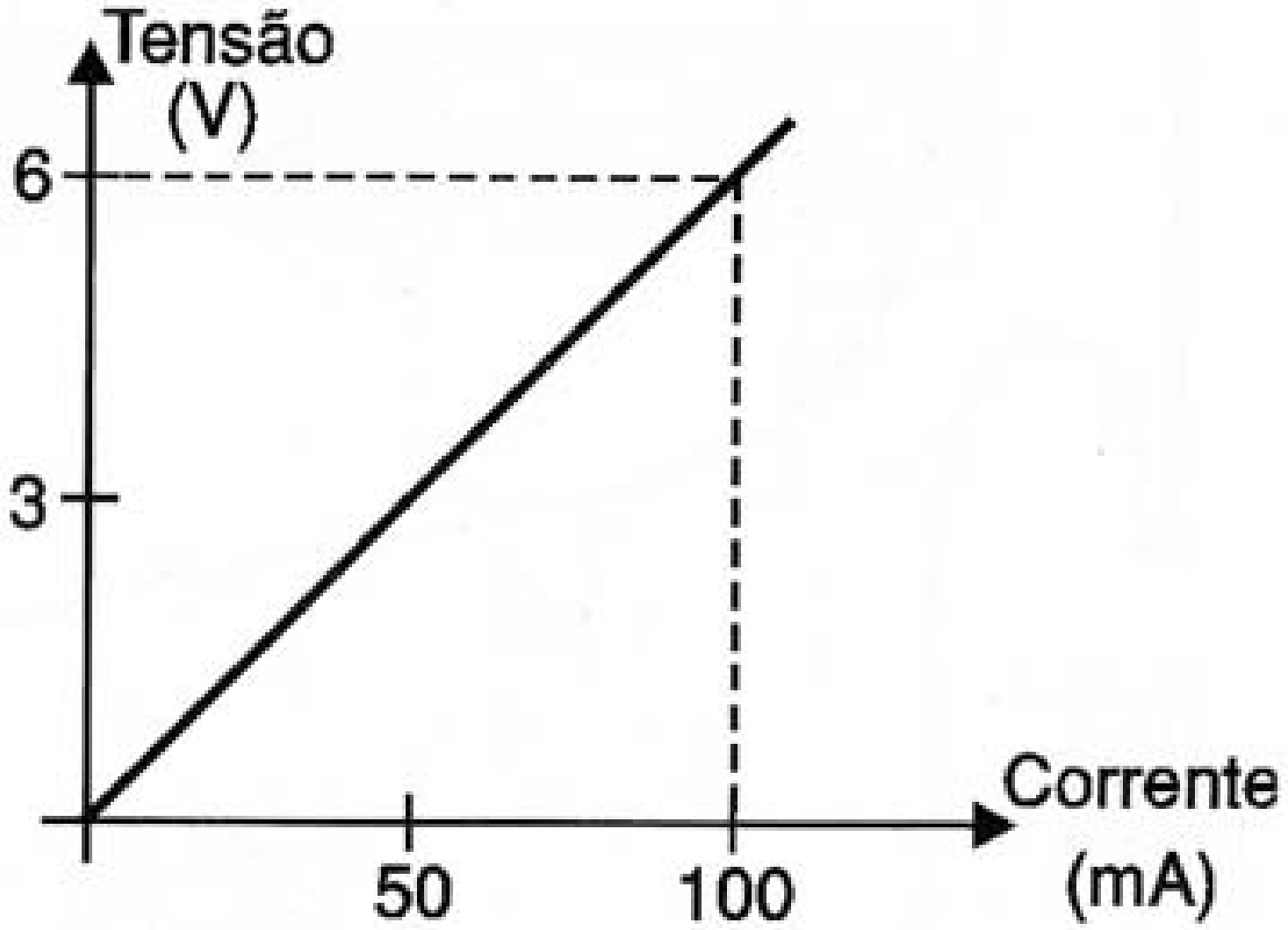
$$T = F \cdot r = N.m$$

$$P = F \cdot \omega = F.\ 2.\ \pi.\ RPM/60 = W$$

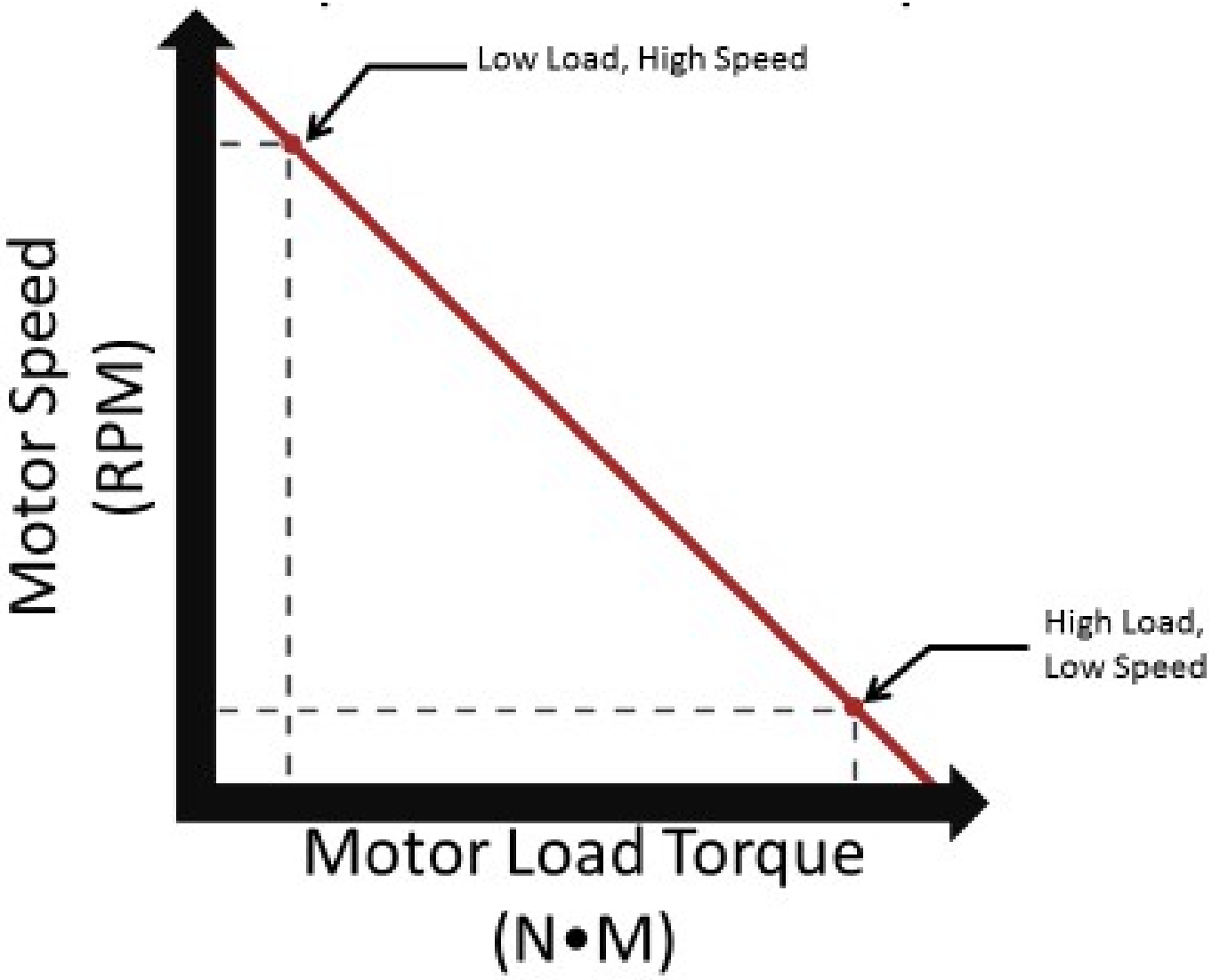
UNIDADES DE POTÊNCIA

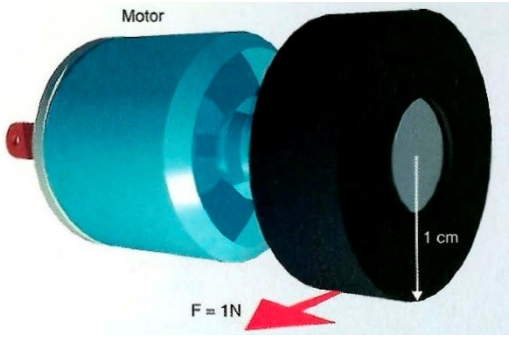
SI	Inglês
Watts {W} Newton-metros por segundo {N · m / s} 1 W = 1 N · m / s 1 W = 0,738 ft · lb / s 1 W = 1.341E-03 cv	Pé-libras por segundo {ft · lb / s} Cavalo-vapor {hp} 1 ft · lb / s = 1.818E-03 cv 1 ft · lb / s = 1,356 W

Torque X Tensão X Corrente

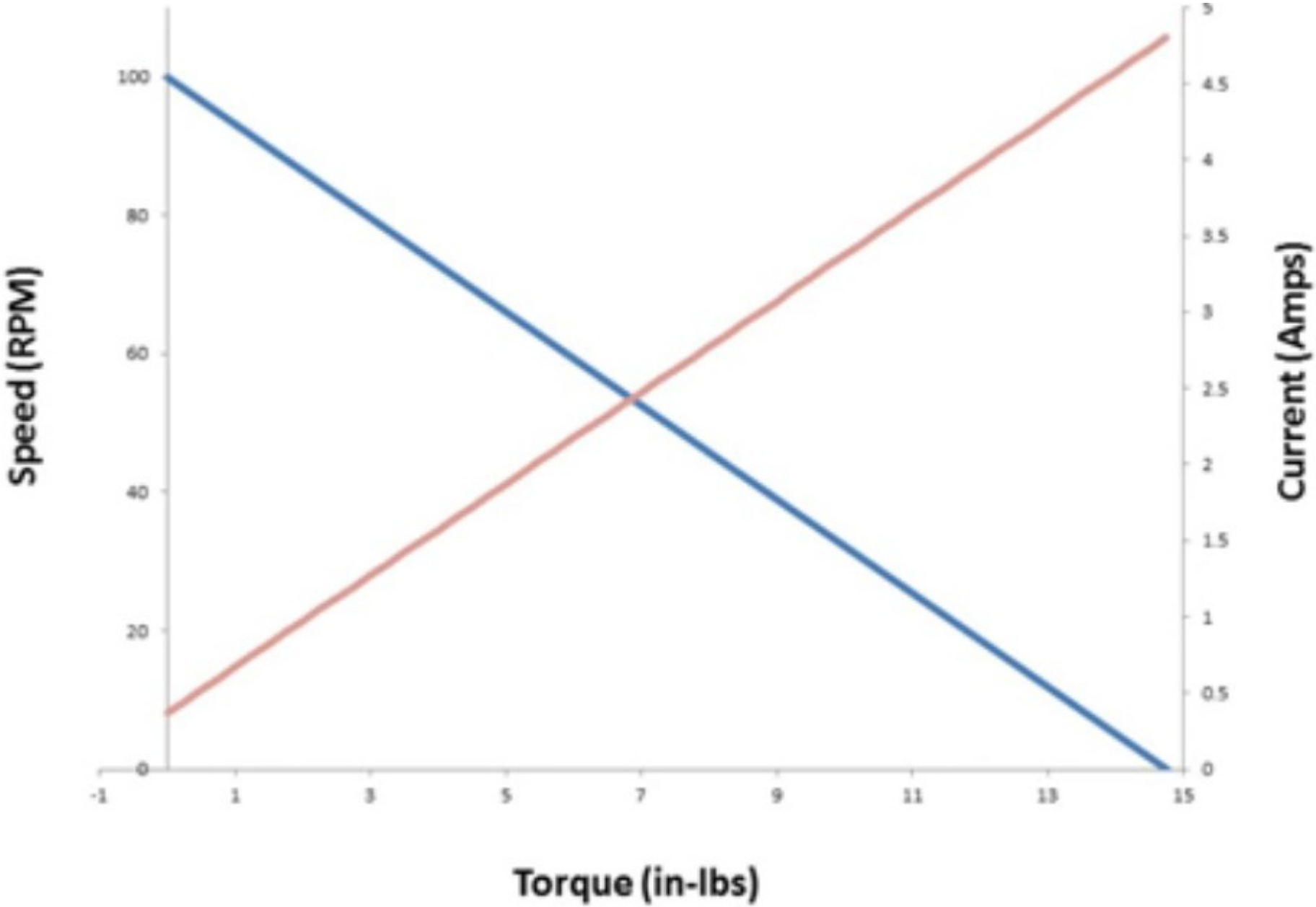


Torque X Velocidade

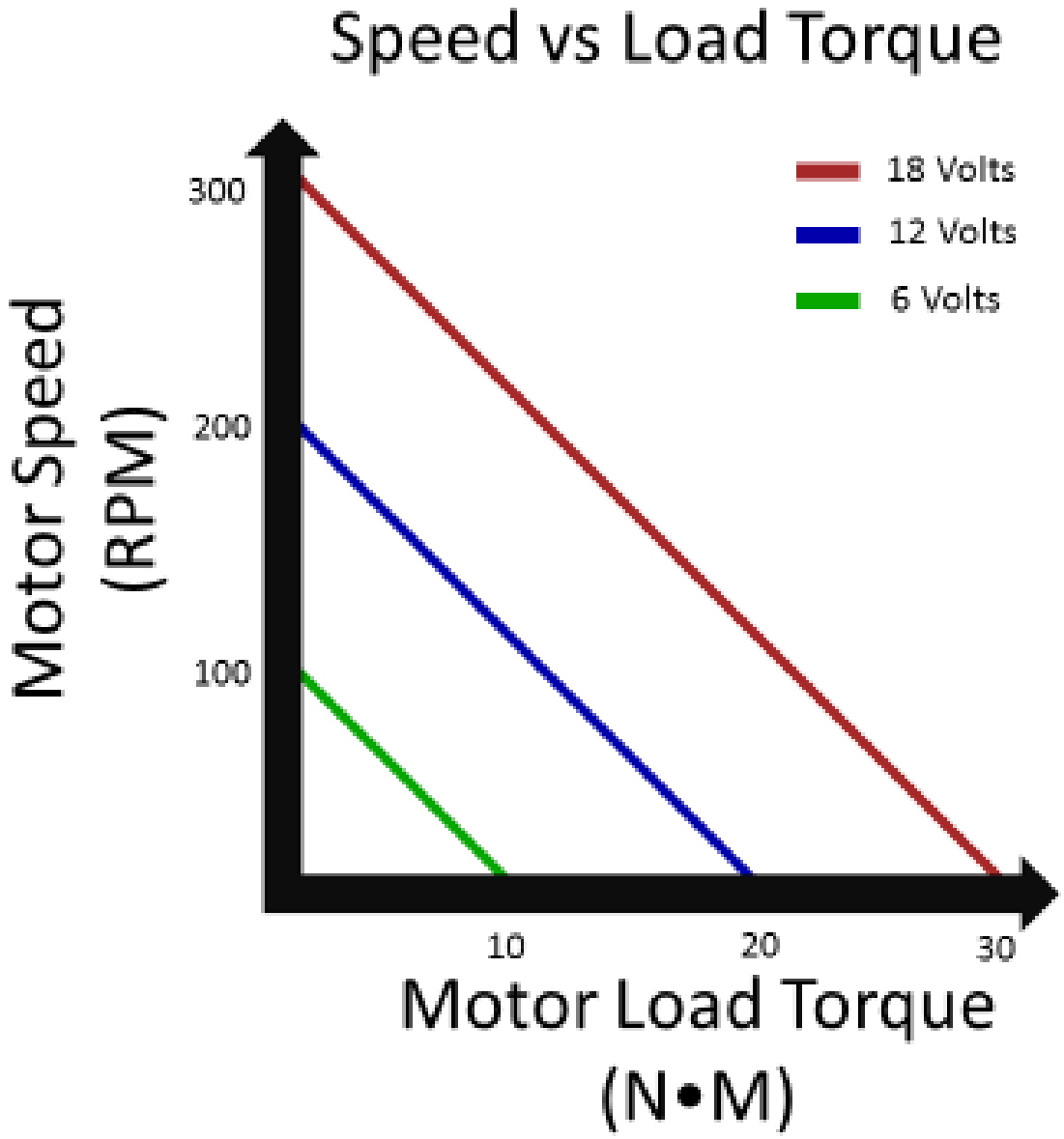


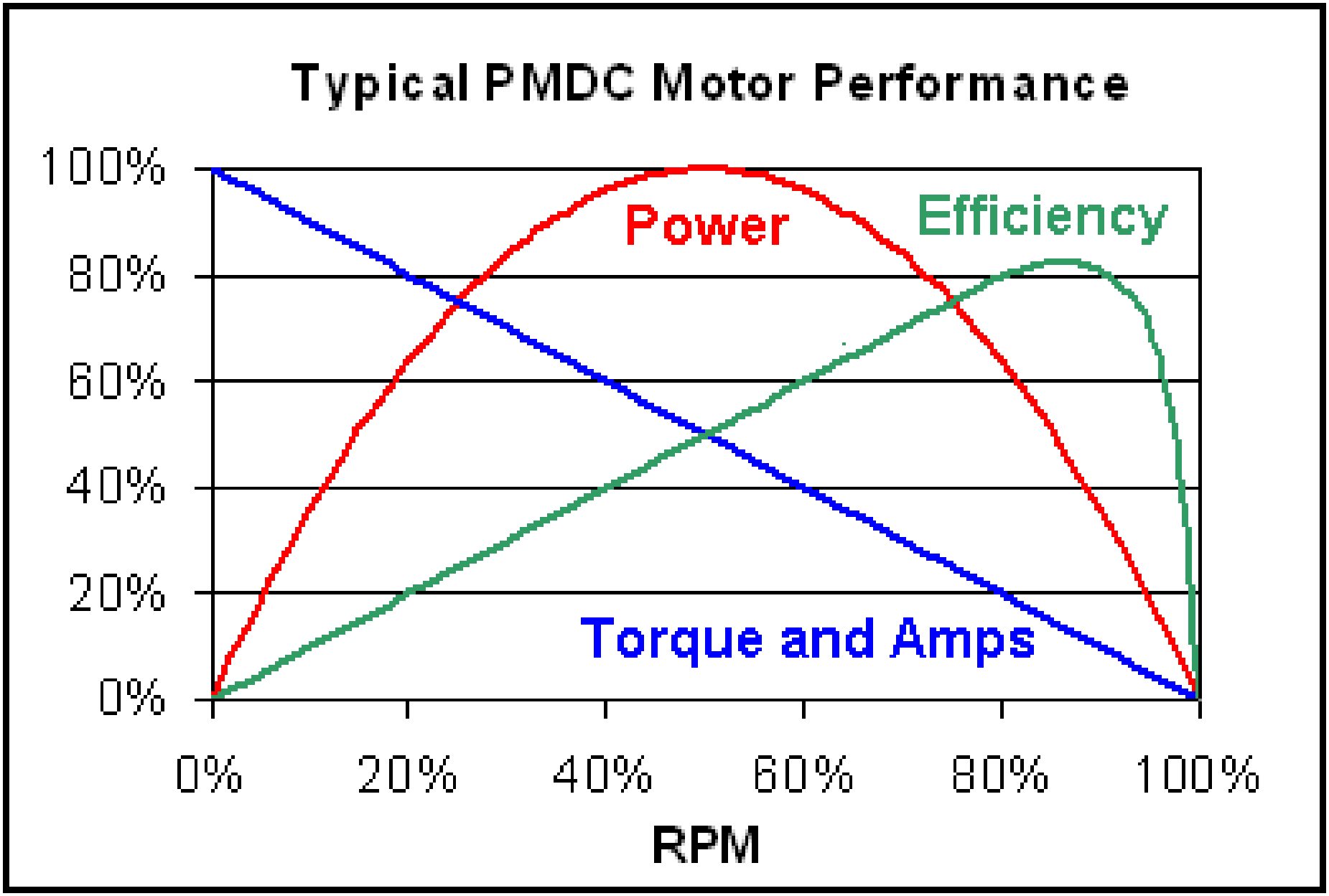


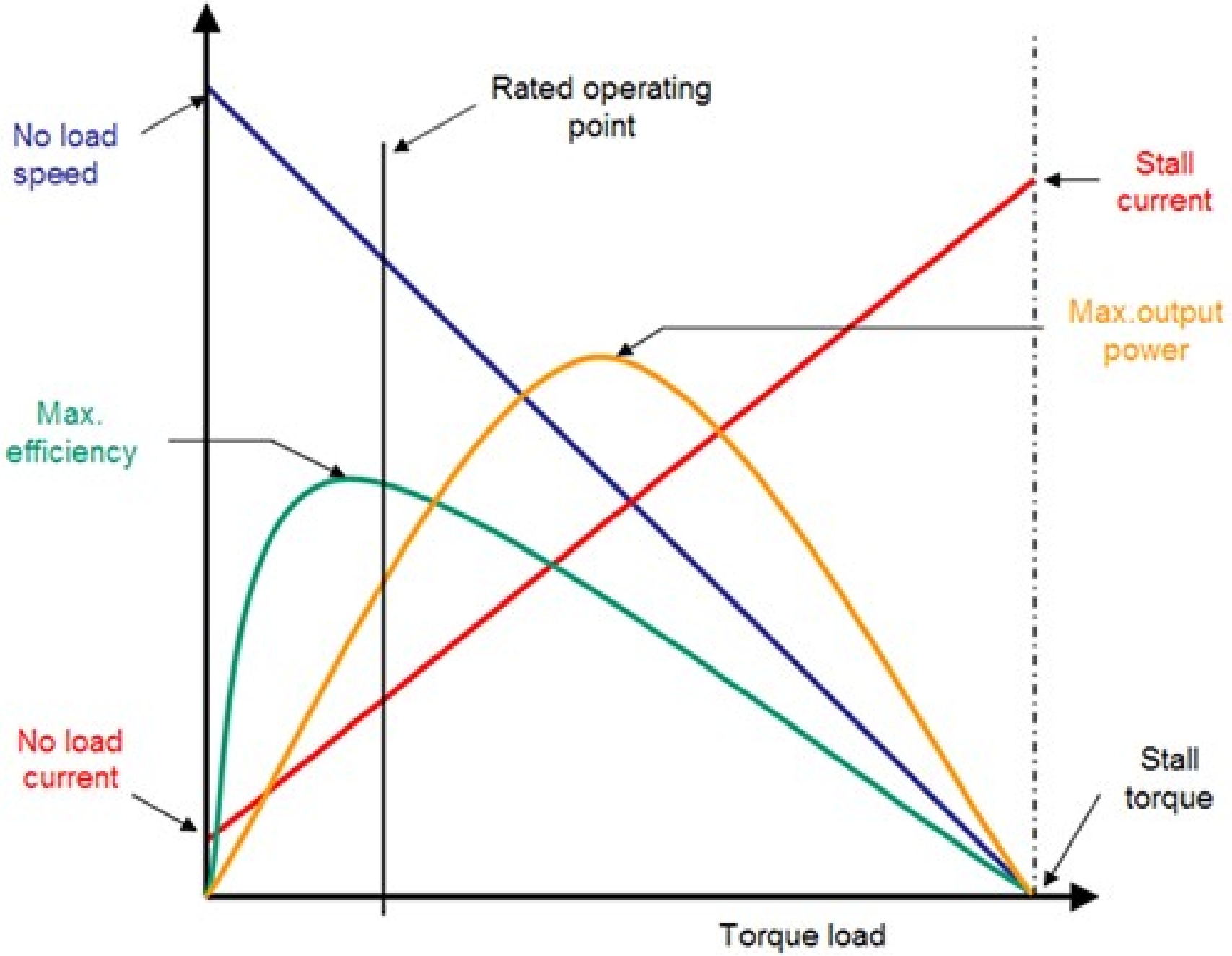
Torque X Velocidade X Corrente



Torque X Velocidade X Corrente




Typical PMDC Motor Performance
100%
80%
60%
40%
20%
0%
Power
Efficiency
Torque and Amps
0%
20%
40%
60%
80%
100%
RPM


No load speed
Rated operating point
Stall current
Max.output power
Max. efficiency
No load current
Stall torque
Torque load

Zoom

Micro Motor DC 12V / 1250Orpm

★★★★☆ (2 Avaliações)

O MICRO MOTOR DC AK360/53PL12S12500S consiste numa forma simples e barata de se obter movimentação mecânica para dispositivos eletromecânicos. Motores compactos e potentes para qualquer aplicação. Com rotação aproximada de 12500 RPM.

- Corrente: 190,00 mA
- Potência: 4,85 W
- RPM: 12500 RPM
- Tensão: 12,00 Vdc
- Torque: 53,00 gf.cm
- Velocidade: 12500 RPM

P = V . I = 12 . 0,19 = 2,28 W

~~R$16,90~~

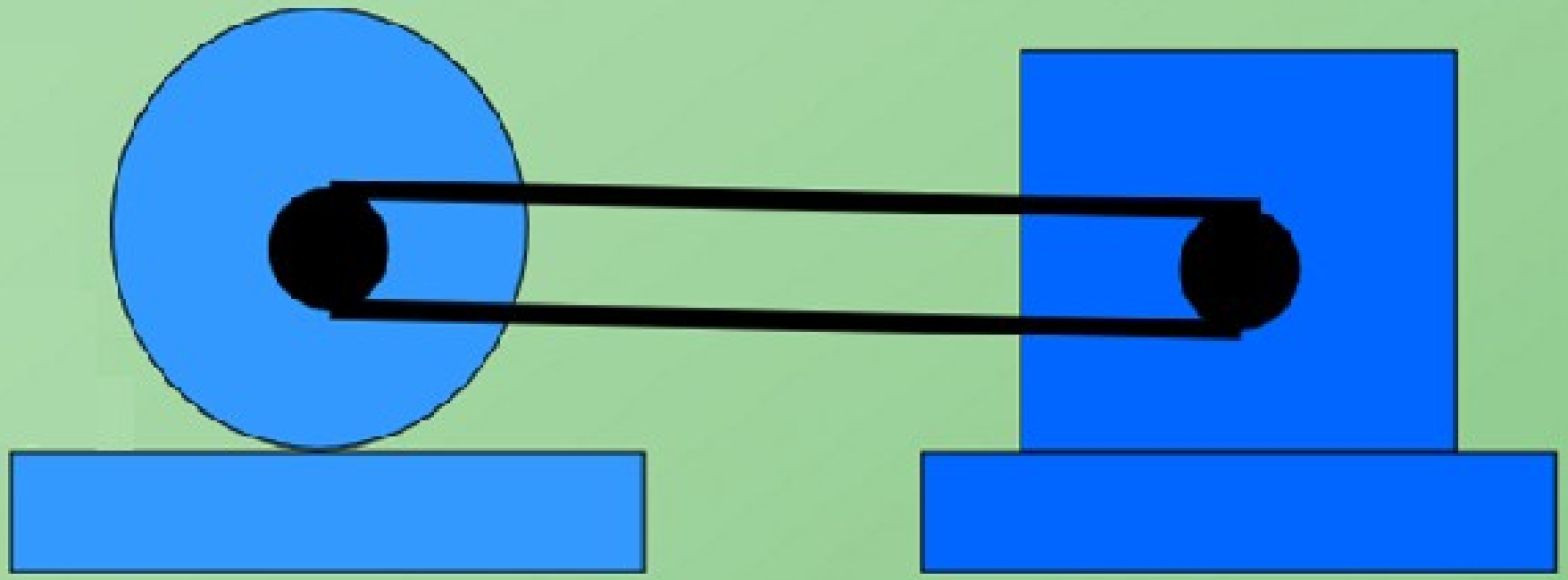
Por R$10,12 já com **15% de Desconto** no Boleto Bancário

Em 1x de R$11,90

P = T . ω = 53 . 9,8 . 2 . π . 12500/1000. 100 . 60 = 6,76 W


CUIDADO
PROPAGANDA
ENGANOSA

Potência e Torque



MOTOR

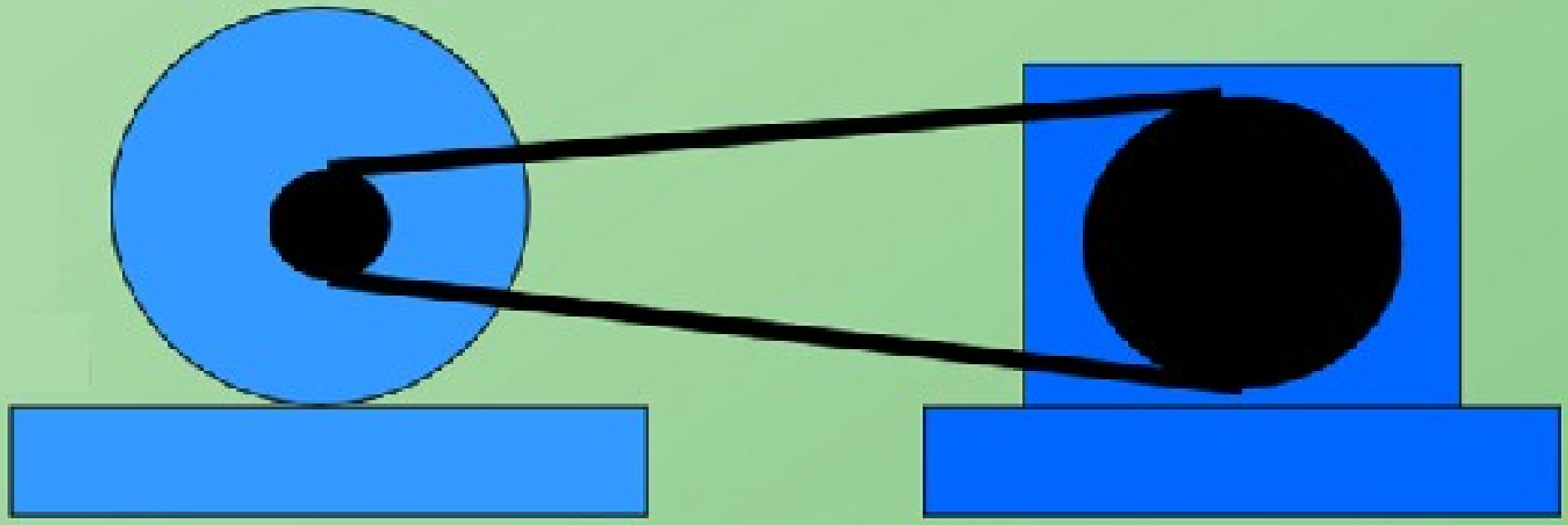
CARGA

1 : 1

P = 1375 W
RPM = 1910,82
T = 6,875 N.m

P = 1375 W
RPM = 1910,82
T = 6,875 N.m

Potência e Torque



MOTOR

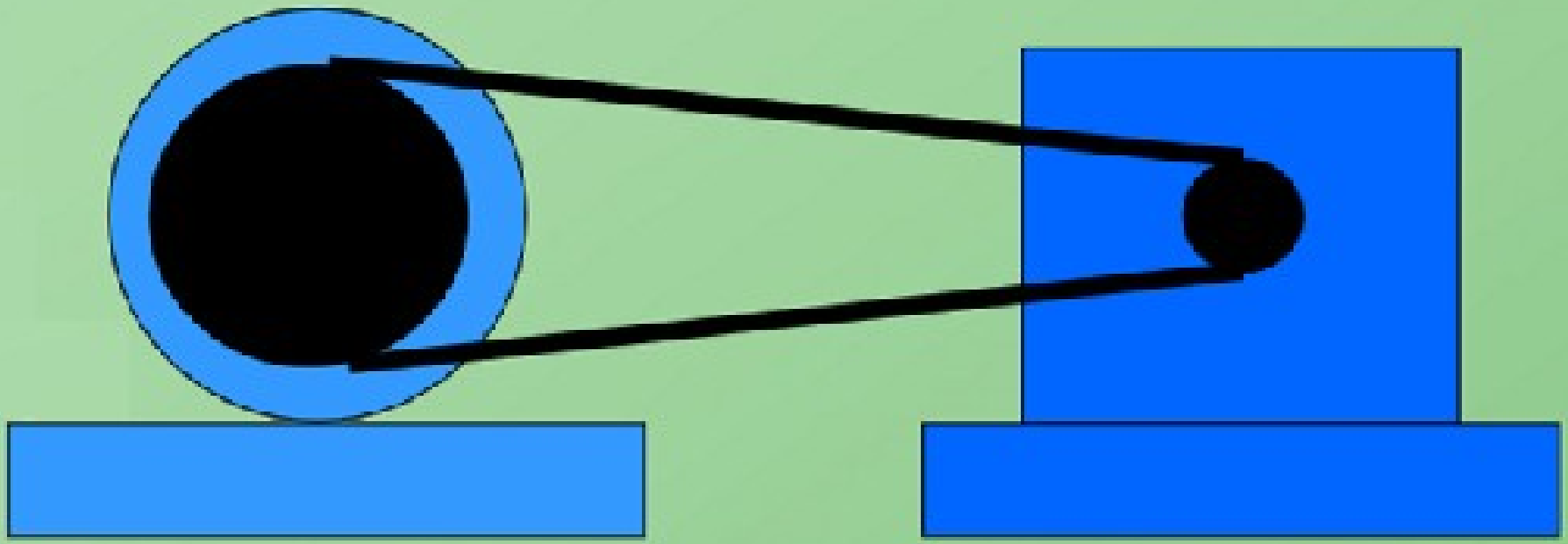
CARGA

P = 1375 W
RPM = 1910,82
T = 6,875 N.m

4 : 1

P = 1375 W
RPM = 477,70
T = 27,5 N.m

Potência e Torque



MOTOR

CARGA

1 : 4

P = 1375 W
RPM = 1910,82
T = 6,875 N.m

P = 1375 W
RPM = 7643,28
T = 1,71N.m

Dados Técnicos:

Tensão de alimentação dos motores	3 ~ 6VDC
Corrente máxima	120mA
Relação da redução	48:1
Rotação do motor a 6VDC	260 rpm
Velocidade do carro a 6VDC	1 m/s
Dimensões do chassi	22 x 14,7 cm
Dimensões da roda	7 x 7 x 2,6 cm
Perímetro da roda	22cm

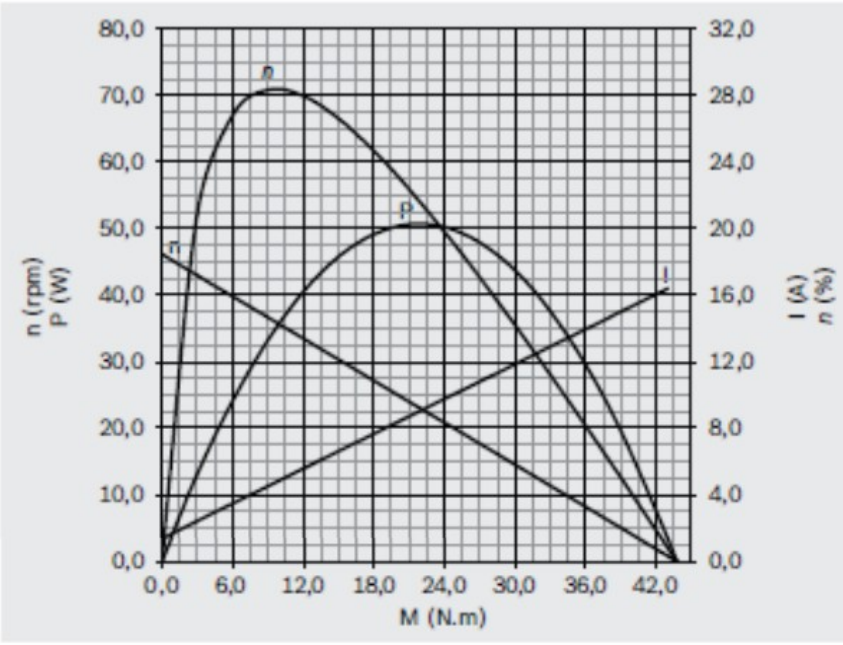
$$P = V \cdot I = 6 \cdot 0{,}12 = 0{,}72\ W$$

$$T = P / \omega = 0{,}72 \cdot 60 / 2 \cdot \pi \cdot 260 = 0{,}0264\ N.m$$ (no motor)

$$T = 0{,}0264 \cdot 48 = 1{,}26\ N.m = 0{,}12\ Kg \cdot m$$ (c/ redução)

24 V 46 W

U_N	24 V
P_N	46 W
n_N	45 rpm
I_N	5,0 A
$I_{MAX.}$	18,6 A
M_N	10 N.m
M_A	48 N.m
i	63:1
Rot.	L / R
S	S1
IP	IP 44
kg	1,100 kg
	F 006 WM0 310



Dimensionamento de motor C.C. para seguidor de luz/linha

Dados:

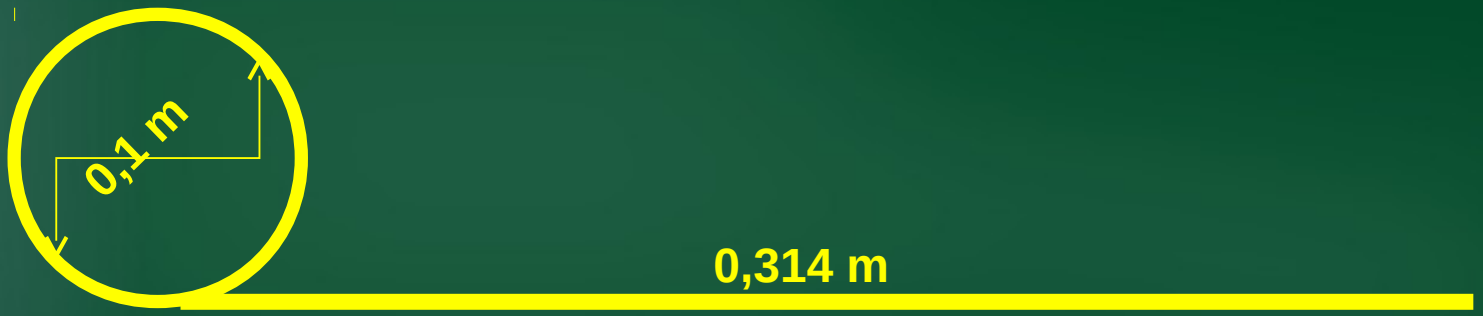
Massa = 55 Kg

Ø da roda = 100mm = 10cm = 0,1m

Velocidade = 5m/s

Tempo p/ atingir a Velocidade = 1s

Cálculo do perímetro da roda

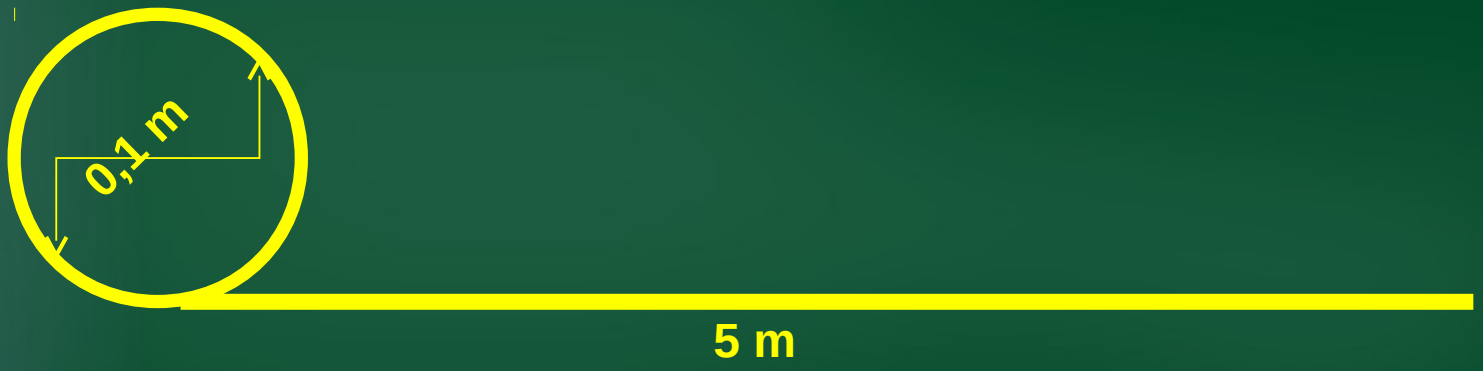


$$Perímetro = \pi . D$$

$$Perímetro = 3,14 . 0,1$$

$$Perímetro = 0,314m$$

Cálculo da RPM do motor C.C.



$$RPM = \frac{Velocidade}{Perímetro\ da\ roda} = \frac{5 \cdot 60}{0{,}314} = 955{,}41\ RPM$$

Cálculo da força necessária p/ atingir a velocidade

$$F = m\ (Kg) \cdot a\ (m/s2)$$

$$A = \frac{\Delta Velocidade}{\Delta Tempo}$$

$$F = \frac{m \cdot \Delta velocidade}{\Delta Tempo} = \frac{55 \cdot 5}{1}$$

$$F = 275\ N$$

Cálculo da potência do motor C.C.

$$P = \frac{Trabalho}{\Delta Tempo}$$

$$Trabalho = Força \ . \ \Delta Deslocamento$$

$$P = \frac{Força \ . \ \Delta Deslocamento}{\Delta Tempo}$$

$$P = Força \ . \ Velocidade$$

Cálculo da potência do motor C.C.

$$P = Força \ . \ Velocidade$$

$$P = 275 \ . \ 5 = 1375 \ N.m = W$$

Cálculo do torque do motor C.C.

$$T = Força \ . \ Raio\ da\ roda$$

$$T = 275 \ . \ 0{,}05 = 13{,}75 \ N \ . \ m$$

$$T = \frac{P \ . \ 60}{2 \ . \ \pi \ . \ RPM} = \frac{1375 \ . \ 60}{2 \ . \ \pi \ . \ 955{,}41}$$

$$T = 13{,}74 \ N \ . \ m$$

Especificação do motor C.C.

RPM = 955,41

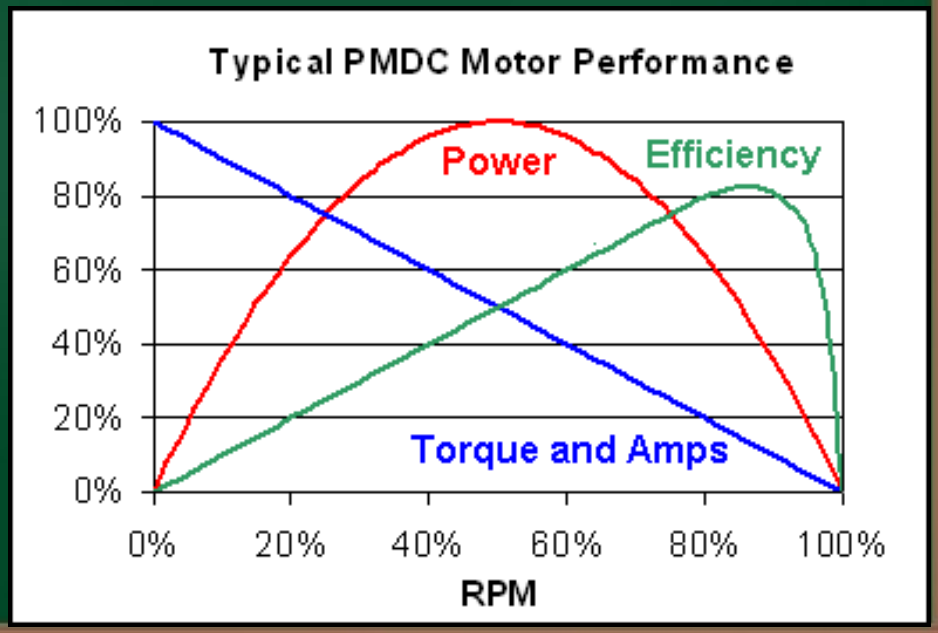
RPM = 955,41 . 2 = 1910,82

T = 13,74 N . m

T = 13,75 . 2 = 27,5 N . m

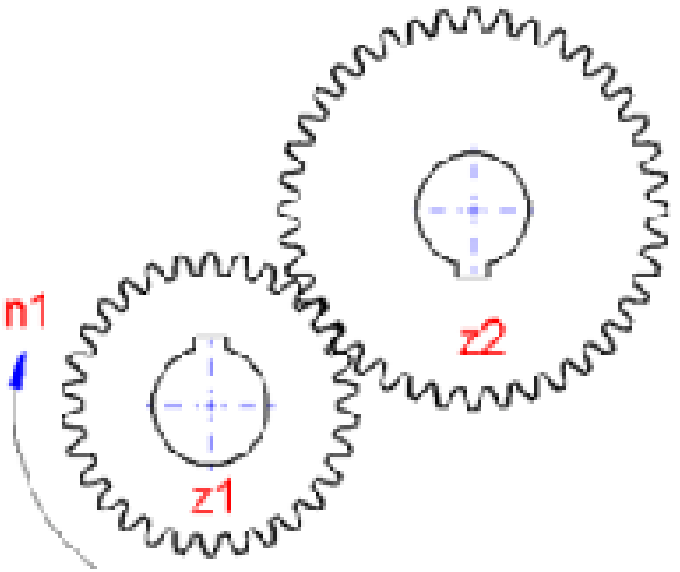
Para 2 motores:

T = 13,75 / 2 = 6,875 N . m



AVISO

USO OBRIGATÓRIO



Dimensionamento da carga p/ um motor C.C.

Dados do motor:

Torque = 10 N.m

Ø da roda = 0,1m ... Per – 0,314 m

RPM = 45

Tempo p/ atingir a Velocidade = 1s

Cálculo da força

T = Força . Raio da roda

Força = T / Raio da roda

Força = 10 / 0,05 = 200 N

Cálculo da velocidade

$$RPM = Velocidade \cdot 60 / Perímetro$$

$$Velocidade = RPM \cdot Perímetro / 60$$

$$Velocidade = 45 \cdot 0{,}314 / 60 = 0{,}23\ m/s$$

Cálculo da massa

$F = m \cdot a$

$M = F / a$

$a = v / t$

$m = F \cdot v / t = 200 / (0{,}23 / 1) = 869\ N = 8{,}69\ Kg$

Dica:

Escolha uma bateria tensão que é muito maior do que a tensão do motor.

Digamos, bateria de 7.4V para um motor de 6V.

Drive Motor Sizing Tool

Posted on March 7, 2013 by RB1 & filed under Dynamic Tools .

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. 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:	1	Kg
Number of drive motors:	2	[#]
Radius of drive wheel:	0.03	m

- DESENHO DO PROJETO
- MEMÓRIA DE CÁLCULO
- RELAÇÃO DE MATERIAIS
- RESPONSABILIDADES
- ENSAIOS, TESTES

SUCESSO