

# Symbols and S.I. units

## Conversion table

Symbol	Description	Unit
a	linear acceleration	m/s <sup>2</sup>
d	linear displacement	m
f	frequency	Hz
k	torque constant	Nm/A
k <sub>m</sub>	motor constant	Nm/√W
m	mass	kg
n	rotational speed	rpm
t	time	s
v	linear speed	m/s
B	magnetic induction	T
E	electromotive force	V
F	force	N
H	magnetic field	A/m
I	current	A
J	moment of inertia	kgm <sup>2</sup>

Symbol	Description	Unit
L	inductance	H
M	torque	Nm
P	power	W
R	resistance	Ω
R <sub>th</sub>	thermal resistance	°C/W
T	temperature	°C
U	voltage	V
W	work, energy	Nm
α	angular acceleration	rad/s <sup>2</sup>
η	efficiency	-
θ	angular displacement	rad
τ	time constant	s
Φ	magnetic flux	Wb
ω	angular speed	rad/s

Length:	1 in	= 25.4	mm	1 mm	= 0.0393	in
	1 ft	= 0.3048	m	1 m	= 3.281	ft
Mass:	1 oz	= 0.0283	kg	1 kg	= 35.3	oz
	1 lb	= 0.454	kg	1 kg	= 2.205	lb
Force:	1 kp	= 9.81	N	1 N	= 0.102	kp
	1 oz	= 0.278	N	1 N	= 3.597	oz
	1 lb	= 4.45	N	1 N	= 0.225	lb
Temperature:	T [°F]	= 9/5 T <sub>°C</sub> +32	°C	T [°C]	= 5/9 (T <sub>°F</sub> -32)	K
	0 K	= -273.15		0 °C	= 273.15	
Torque:	1 kpcm	= 0.0981	Nm	1 Nm	= 10.2	kpcm
	1 oz-in	= 7.06	mNm	1 mNm	= 0.1416	oz-in
	1 lb-in	= 0.113	Nm	1 Nm	= 8.849	lb-in
	1 lb-ft	= 1.356	Nm	1 Nm	= 0.7376	lb-ft
Inertia:	1 gcm <sup>2</sup>	= 1 x 10 <sup>-7</sup>	kgm <sup>2</sup>	1 kgm <sup>2</sup>	= 1 x 10 <sup>7</sup>	gcm <sup>2</sup>
	1 oz-in <sup>2</sup>	= 1.83 x 10 <sup>-5</sup>	kgm <sup>2</sup>	1 kgm <sup>2</sup>	= 5.46 x 10 <sup>4</sup>	oz-in <sup>2</sup>
	1 oz-in s <sup>2</sup>	= 0.00706	kgm <sup>2</sup>	1 kgm <sup>2</sup>	= 141.6	oz-in s <sup>2</sup>
	1 moiss	= 7.06 x 10 <sup>-6</sup>	kgm <sup>2</sup>	1 kgm <sup>2</sup>	= 141643	moiss
	1 lb-in <sup>2</sup>	= 0.000293	kgm <sup>2</sup>	1 kgm <sup>2</sup>	= 3418	lb-in <sup>2</sup>
	1 lb-in s <sup>2</sup>	= 0.113	kgm <sup>2</sup>	1 kgm <sup>2</sup>	= 8.85	lb-in s <sup>2</sup>
Energy:	1 kcal	= 4187	J	1 J	= 0.239	cal
	1 Btu	= 1055	J	1 J	= 9.48 x 10 <sup>-4</sup>	Btu
Power:	1 CV	= 735	W	1 kW	= 1.36	CV
	1 HP	= 746	W	1 kW	= 1.34	HP