

Belt & Screw Critical Speeds & Application Specifications



www.precisionactuator.com



Calculation of max. acceleration

$$a = \frac{F}{m}$$

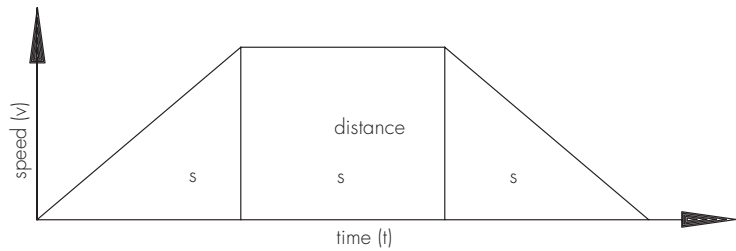
Calculation of max. acceleration distance

$$s = \frac{v \times t}{2}$$

Calculation of max. acceleration time

$$t = \frac{v}{a}$$

F= belt tension (N)
 a= acceleration (m/s²)
 m= mass (kg)
 v= velocity (m/s)
 s= distance (m)
 t= time (s)



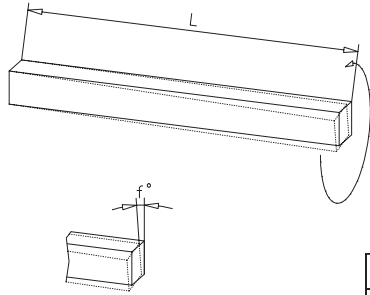
Type	$t_c > 0,2 \text{ s}$		$t_c < 0,2 \text{ s}$		Minimum length strength (N)	Belt size
	F_{max} (N)	safety factor 1,5 (N)	F_{max} (N)	safety factor 1,5 (N)		
ELZ 30	200	133	280	187		3 M 12
ELZZ 60	298	199	333	222	3690	5 M 09
ELZ, ELZT, ELSZ, ELZU, ELZG 40, ELSZ 30/40	390	266	480	320	6478	5 M 15
ELZ, ELZT, ELSZ, ELSZ, ELZU, ELZG 60, ELHZ, ELVZ 60 /80 DLZ 120 QLZ, QSZ 80 / QLSZ, QSSZ 80	894	596	1000	666	12013	5 M 25
ELZZ 80	679	452	746	498	3888	8 M 12
ELZZ 100	1210	801	1331	887	9700	8 M 20
ELZ, ELZT, ELSZ, ELSZ, ELZU, ELZG 80, DLZ, DSZ 160 / DLZT, DSZT, DLSZ 120 QLZ, QSZ 80	1900	1266	2090	1393	15400	8 M 30
ELHZ, ELVZ, ELZW 100	3840	2559	4128	2751	25632	8 M 48
ELZ, ELZT, ELSZ, ELSZ, ELZG 100, QLZ, QSZ 100 DLZ 200 / DLSZ, DSSZ 160	4000	2666	4300	2866	26700	8 M 50
ELZ 125	5900	3933	6350	4233	37380	8 M 70

Weights

Sizes	Guide-body profile	Internal profile	guide rod	Belt	per pulley	Toothed rack	Standard carriage	Carriage profile	Coupling
30	1,07 kg/m	-	0,15 kg/m	0,037 kg/m	0,06 kg	-	0,176 kg	1,78 kg/m	0,007 kg
40	1,89 kg/m	-	0,22 kg/m	0,074 kg/m	0,14 kg	0,70 kg/m	0,520 kg	3,49 kg/m	0,010 kg
60	3,83 kg/m	-	0,61 kg/m	0,123 Kg/m	0,39 kg	0,81 kg/m	1,565 kg	7,49 kg/m	0,040 kg
80	7,40 kg/m	-	0,88 kg/m	0,256 kg/m	1,04 kg	1,13 kg/m	2,644 kg	12,79 kg/m	0,085 kg
80S	7,40 kg/m	-	0,88 kg/m	0,256 kg/m	1,04 kg	1,13 kg/m	3,520 kg	13,95 kg/m	0,085 kg
100	11,3 kg/m	-	1,58 kg/m	0,355 Kg/m	0,48 kg	2,75 kg/m	6,550 kg	19,98 kg/m	0,200 kg
125	15,54 kg/m	-	2,47 kg/m	0,480 kg/m	1,62 kg	-	12,100 kg	28,05 kg/m	0,395 kg
DL 120	5,61 kg/m	1,52 kg/m	0,22 kg/m	0,123 Kg/m	0,39 kg	-	1,100 kg	4,15 kg/m	0,040 kg
DL 160	10,34 kg/m	3,73 kg/m	0,61 kg/m	0,256 kg/m	0,86 kg	-	3,280 kg	7,99 kg/m	0,085 kg
DL 200	19,55 kg/m	3,48 kg/m	0,61 kg/m	0,355 Kg/m	0,688 kg	-	4,950 kg	10,99 kg/m	0,200 kg
DS 160	10,52 kg/m	3,48 kg/m	1,40 kg/m	0,256 kg/m	0,86 kg	-	2,250 kg	7,99 kg/m	0,085 kg
QL 60	3,29 kg/m	-	0,22 kg/m	0,123 Kg/m	0,39 kg	-	0,456 kg	2,05 kg/m	0,040 kg
QL 80	7,05 kg/m	-	0,61 kg/m	0,256 kg/m	1,04 kg	-	1,229 kg	3,85 kg/m	0,085 kg
QL 100	10,45 kg/m	-	0,61 kg/m	0,355 Kg/m	0,688 kg	-	2,920 kg	5,49 kg/m	0,200 kg
QS 60	3,79 kg/m	-	1,40 kg/m	0,123 Kg/m	0,39 kg	-	0,860 Kg	2,05 kg/m	0,040 kg
QS 80	6,82 kg/m	-	2,40 kg/m	0,256 kg/m	1,04 kg	-	2,339 kg	3,85 kg/m	0,085 kg
QS 100	10,55 kg/m	-	3,20 kg/m	0,355 Kg/m	0,688 kg	-	4,320 kg	5,49 kg/m	0,200 kg



Calculation of torsional twist



$$f^\circ = L \times M_{t,max} \times I_p \left[\frac{^\circ \times Nm \times m}{Nm \times m} \right]$$

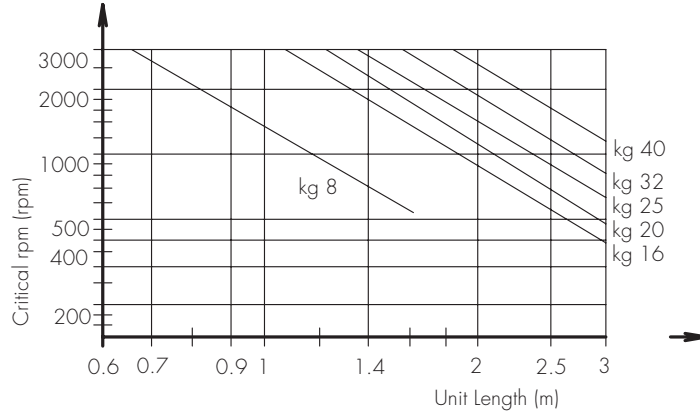
f° = max. twisting angle (°)
 L = unit length
 $M_{t,max}$ = max. torque (Nm)
 I_p = see table (°/Nm²)

Aluminium profiles
 Stiffness F25 (250 N/mm²)
 Thickness of anodizing coat 20 to 30 mm

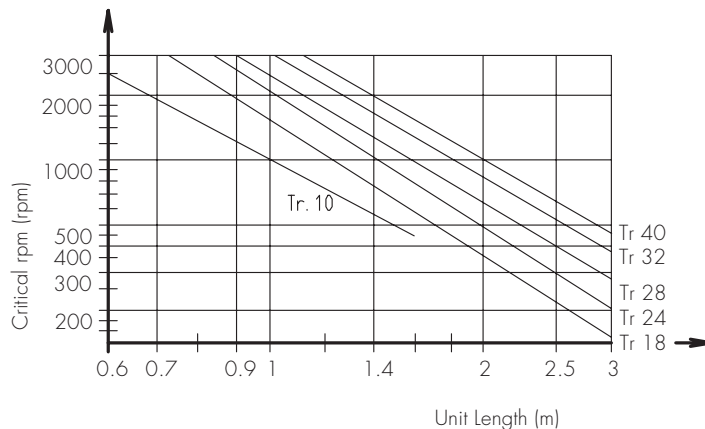
Size	I _p Faktor	Size	I _p Faktor	Size	I _p Faktor
EL 30	0,49000 °/Nm x m	DL 120	0,03282 °/Nm x m	QL 60	0,02995 °/Nm x m
EL 40	0,18000 °/Nm x m	DL 160	0,01286 °/Nm x m	QL 80	0,01257 °/Nm x m
EG 40	0,14000 °/Nm x m	DL 200	0,00787 °/Nm x m	QL 100	0,00705 °/Nm x m
EL 60	0,05765 °/Nm x m	DS 160	0,01336 °/Nm x m	QS 60	0,03797 °/Nm x m
EG 60	0,04387 °/Nm x m			QS 80	0,01563 °/Nm x m
EL 80	0,01463 °/Nm x m			QS 100	0,00644 °/Nm x m
EG 80	0,01511 °/Nm x m				
EL 100	0,00492 °/Nm x m				
EL 125	0,00616 °/Nm x m				

Diagram for maximum rpm of screw units

Ball Screw units



Acme Screw units



$n_{max} = \text{table value} \times 0,8$



