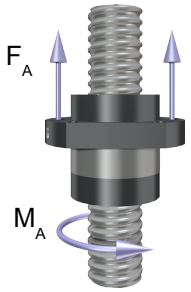
Efficiency and torque

The efficiency depends on many operating influences, as well as the geometrical values. In practice therefore the actual values may vary by ±5 % from the theoretically determined values.

Conversion of a rotary movement into a longitudinal movement:

Efficiency η

$$\eta = \frac{\tan\phi}{\tan(\phi+\rho)} \quad \text{with} \quad \tan\phi = \frac{P_0}{d_0 \cdot \pi}$$



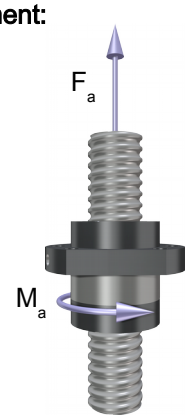
Drive torque M_A

$$M_A = \frac{F_A \cdot P_0}{2000 \cdot \pi \cdot \eta}$$

Conversion of a longitudinal movement into a rotary movement:

Efficiency η'

$$\eta' = \frac{\tan(\phi-\rho)}{\tan\phi} \quad \text{with} \quad \tan\phi = \frac{P_0}{d_0 \cdot \pi}$$



Output torque M_a

$$M_a = \frac{F_a \cdot P_0 \cdot \eta'}{2000 \cdot \pi}$$

η, η'	...	Efficiency of the ball screw	[]
ρ	...	Friction angle (0.34° for tolerance classes T5 + T7)	[°]
Φ	...	Pitch angle	[°]
P_0	…	Nominal pitch of the ball screw	[mm]
d_0	…	Nominal diameter of the ball screw	[mm]
M_A	…	Drive torque	[Nm]
M_a	…	Output torque	[Nm]
F_A	…	Result axial force	[N]
F_a	…	Effective axial force	[N]