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.

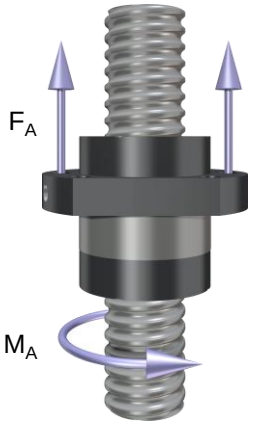
Conversion of a rotary movement into a longitudinal movement:

Efficiency η

$$\eta = \frac{\tan \varphi}{\tan (\varphi + \rho)} \qquad \text{mit} \qquad \tan \varphi = \frac{P_0}{d_0 \cdot \pi}$$

Drive torque M_A

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



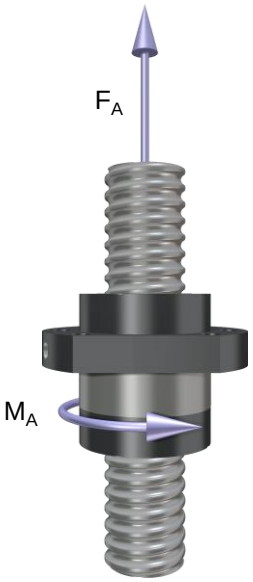
Conversion of a longitudinal movement into a rotary movement:

Efficiency η‘

$$\eta' = \frac{\tan (\varphi - \rho)}{\tan \varphi} \qquad \text{mit} \qquad \tan \varphi = \frac{P_0}{d_0 \cdot \pi}$$

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	[mm]	Nominal pitch of the ball screw
d_0	[mm]	Nominal diameter of the ball screw
M_A	[Nm]	Drive torque
M_a	[Nm]	Output torque
F_A	[N]	Result axial force
F_a	[N]	Effective axial force