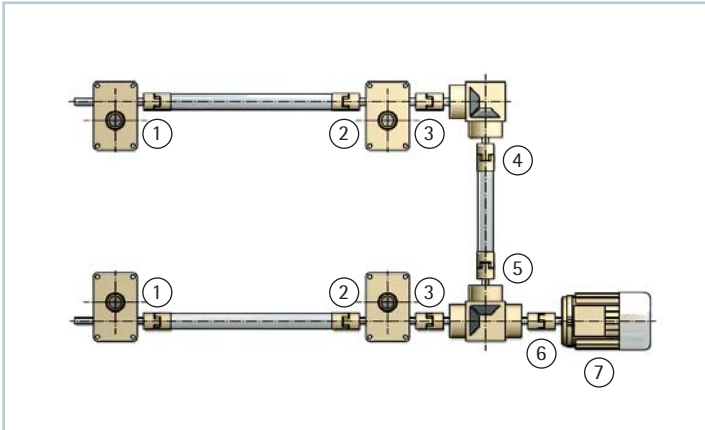


Drive torque for screw jacks – precise calculation



The following calculation example takes account of the efficiency of the connecting shafts (η 0.95) and bevel gearboxes (η 0.9).

Formula for the gearbox::

$$\text{Drive torque: } M_G = \frac{F \text{ [kN]} \cdot P \text{ [mm]}}{2 \cdot \pi \cdot \eta_{\text{gearbox}} \cdot \eta_{\text{screw}} \cdot i} + M_L \text{ [Nm]}$$

Efficiencies:

Connecting shafts:	η 0.95
Bevel gearbox:	η 0.90

Example:

$$1) \quad M_G = \frac{12 \text{ kN} \cdot 6 \text{ mm}}{2 \cdot \pi \cdot 0.87 \cdot 0.391 \cdot 6} + 0.36 \text{ Nm} = 5.97 \text{ Nm}$$

$$2) \quad \frac{5.97 \text{ Nm}}{0.95} = 6.28 \text{ Nm}$$

(efficiency of the connecting shaft)

$$3) \quad 5.97 \text{ Nm} + 6.28 \text{ Nm} = 12.25 \text{ Nm}$$

$$4) \quad \frac{12.25 \text{ Nm}}{0.9} = 13.61 \text{ Nm}$$

(efficiency of the bevel gearbox)

$$5) \quad \frac{13.61 \text{ Nm}}{0.95} = 14.33 \text{ Nm}$$

$$6) \quad 12.25 \text{ Nm} + 14.33 \text{ Nm}/0.9 = 29.53 \text{ Nm}$$

$$7) \quad 29.53 \text{ Nm} \cdot 1.4 = 41.34 \text{ Nm}$$

We recommend multiplying the calculated value by a safety factor of 1.3 to 1.5 (up to 2 for small systems and for low speeds).



Z-25-SN

F = 12 kN (dynamic lift load per gearbox)

$\eta_{\text{gearbox}} = 0.87$ $\eta_{\text{screw}} = 0.391$

P = 6 i = 6

$12.25 \text{ Nm} \cdot 1.5 = 18.38 \text{ Nm}$
 -> so KSZ-25-L is OK (see Section 5)

41.34 Nm -> we need a KSZ-50-L
 (see Section 5)

Motor selection: 132M-P4-7.5 kW (50 Nm)
 (for motors see Section 4)