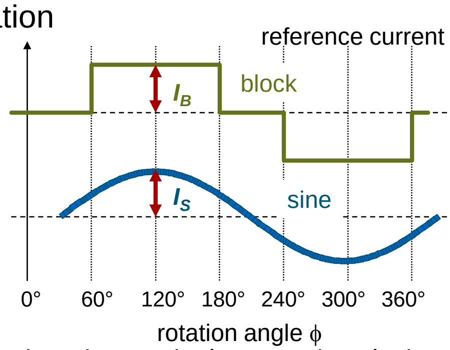
Sinusoidal commutation: Motor data

– Motor data in the catalog for block commutation
– Reference current amplitude
  • for block commutation: I_B.
  • for sine commutation: I_S. (amplitude)



– Power losses in winding

$$P_{loss} = 2 \cdot R \cdot I_B^2 = \frac{3}{2} \cdot R \cdot I_S^2$$

  • the nominal current amplitude (sinusoidal) is higher than the nominal current (catalog)

$$I_{N,S} = \frac{2}{\sqrt{3}} \cdot I_{N,B} \cong 1.15 I_{N,B}$$

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Sinusoidal commutation: Operation range

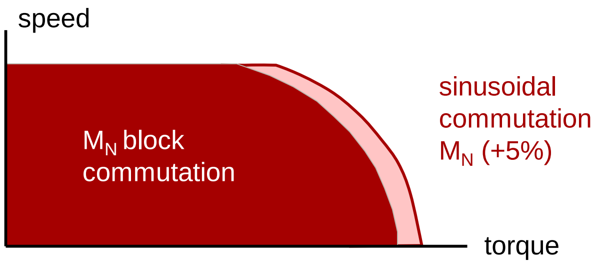
– Torque constants
  • block commutation in catalog $k_{M,B} = \frac{\bar{M}}{I_B}$
  • sinusoidal commutation $k_{M,S} = \frac{M}{I_S}$

$$k_{M,S} = \frac{\pi}{2\sqrt{3}} k_{M,B} \cong 0.9\, k_{M,B}$$

Torque constant is «smaller» with sinusoidal commutation.
➔ «More» current needed for the same torque.

– Continuous operation range
  • slightly larger
  • max. cont. torque higher

$$M_{N,S} = k_{M,S} \cdot I_{N,S}$$
$$M_{N,S} = \frac{\pi}{2\sqrt{3}} k_{M,B} \cdot \frac{2}{\sqrt{3}} I_{N,B} \cong 1.05\, M_{N,B}$$



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