Encoder Basics

Maximum Speed, Protection Class

SPEED

The maximum permissible speed of a shaft encoder is derived from:

- **the mechanically permissible r.p.m,**
- the minimum permissible **pulse-edge spacing** of the square-wave output signals of the shaft encoder for the subsequent circuitry, which depends on the tolerance of the phase offset,
- the **functional speed**, which is limited by the pulse frequency.

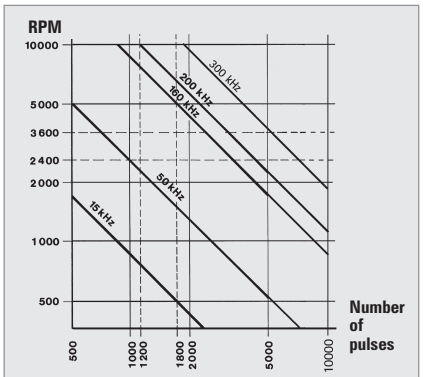
The mechanically permissible r.p.m. is specified for each shaft encoder among the mechanical characteristics.

In general, the control circuitry does not permit less than a certain **minimum edge spacing** between the square-wave output signal pulses. The minimum pulse-edge spacing is specified for each model of shaft encoder among the electrical characteristics.

The **functional speed** of an encoder is obtained by the equation:

$$n_{max} = f_{max} \cdot 10^3 \cdot 60 / Z$$

n_{max} = maximum functional speed [r.p.m.]
f_{max} = maximum pulse frequency of shaft encoder, or input frequency of downstream circuitry [kHz]
z = number of pulses of shaft encoder



Maximum permissible speed as a function of number of pulses and signal frequency of shaft encoder

PROTECTION CLASS

All encoders of the industrial types RI 30, RI 36, RI 58, RI 58-H, RI 58-D, RA 70-I as well as the absolute encoders ACURO, comply with protection class IP65 according to EN 60529 and IEC 529, unless otherwise stated.

These specifications are valid for the housing and the cable output and also for plugged in socket connectors. The shaft input complies with protection class IP64. If however the encoder is mounted vertically, there must be no standing water present at the shaft input and the ball bearings.

In case the standard protection class IP64 is not sufficient for the shaft input, e.g. with vertical mounting of the encoder, the encoders must be protected by additional labyrinth or pot-type seals.

On request our encoders are also available with protection class IP67 for the shaft input and for the housing.