

## General technical specification

### Manufacturing processes

HSB ball screw spindles are made by the cold rolling process, then heat treated and polished.  
 HSB ball screw nuts are first machined in the soft condition, then heat treated and finish machined in a modern hard turning process. Both spindles and nuts are finished to a gothic arch profile. The ball contact angle is 45° (±5°).

### Speeds

The generally permitted speed limit is 3000 rpm. On request, for certain sizes and installation situations, speeds up to 4500 rpm are permissible. The speed limits are the maximum speeds, achievable only under ideal operating conditions.  
 The critical speed must always be taken into account.  
 The achievable speed is calculated as follows:

$$\frac{\text{Permissible speed} \cdot \text{Pitch}}{60000} \left[ \frac{\text{m}}{\text{s}} \right]$$

### Installed length

The installed length of a ball screws is generally freely selectable. Ball screws transmit only axial forces. All radial forces that arise must be accepted by external guides, otherwise they may cause the ball screw to fail prematurely.

### Accuracy

HSB ball screw spindles are available in the following accuracy classes:  
 T5 = Pitch accuracy 23 µm/300 mm  
 T7 = Pitch accuracy 52 µm/300 mm  
 Unless specified otherwise, we supply class T7.

### Self-locking

Due to their low rolling resistance, ball screws do not self-lock.  
 Therefore it is necessary, particularly when the ball screw shaft is mounted vertically, to employ a suitable motor with a restraining brake.

### Efficiency

For trapezoidal screws, the mechanical efficiency is generally below 50 %;  
 for ball screws however it is up to 98 %.

### Duty cycle

The ball screw is capable of maintaining a duty cycle of up to 100 %. It is best to avoid extremely high loadings in combination with high duty cycles.

### Temperatures

All ball screws are designed for ambient temperatures from 0 °C to 80 °C. Temperatures of a minimum of -20 °C and maximum of 110 °C are also permissible for brief periods. Ball screws are subject to certain restrictions when used at temperatures below freezing. In addition, the specifications provided by the lubricant supplier must be complied with.

### Positioning accuracy, repetition accuracy, backlash

Positioning accuracy is the maximum deviation between instructed position and actual position.  
 Repetition accuracy is defined as the capability of the system, under the same conditions, to return to a position it had previously taken up.  
 Backlash describes the “dead space” between the parts that are moved.

### Aggressive operating conditions

Under very large amounts of dirt and/or fine dust/chips, the customer is advised to take measures to shield the ball screw.

### Technical Data

#### Ball screw spindle KGS

- Thread: Gothic arch profile
- Nominal diameter: 12 – 40 mm
- Pitch: 5 – 60 mm
- Number of starts: 1 – 6
- Direction of rotation: right-hand
- max. length: 5600 mm
- Material: 1.1213 (Cf 53)
- Bearing track induction hardened and polished
- Spindle end and spindle core are soft
- Straightness: L < 500 mm: 0.05 mm/m  
 L = 500 – 1000 mm: 0.08 mm/m  
 L > 1000 mm: 0.1 mm/m
- End machining: to customer’s specification