

Q&A

Question: It is said that Preload can increase Rigidity.
Can KSS calculate Theoretical Static Rigidity?

Yes, we can. Let us explain with an example.

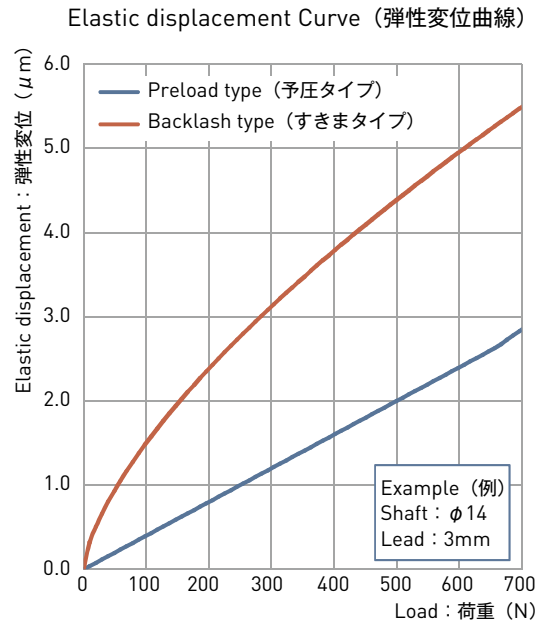
Graph right shows the comparison of Elastic displacement curve between Preload type and Backlash type.

This graph is theoretical calculation, so please consider it one of the reference.

As you can see from the chart, Elastic displacement against Load becomes small by Preloading the Ball Nut, which means Rigidity increases.

If you need this chart for your Ball Screw model, please ask KSS representative.

Theoretical Static Rigidity for each Ball Nut are described in KSS Master Catalogue on condition below.



Backlash type : Apply the Axial load equivalent to 30% of the Basic Dynamic Load Rating, Ca

Preload type : Apply the Preload equivalent to 5% (10% for Double Nut) of the Basic Dynamic Load Rating, Coa

If the condition differs from the above, please use the following formula.

Backlash type :
$$K'_2 = K_2 \times \left(\frac{Fa}{0.3Ca} \right)^{1/3} \quad N/\mu m \{kgf/\mu m\}$$

Preload type (Single Nut) :
$$K'_2 = K_2 \times \left(\frac{Ga}{0.05Ca} \right)^{1/3} \quad N/\mu m \{kgf/\mu m\}$$

Preload type (Double Nut) :
$$K'_2 = K_2 \times \left(\frac{Ga}{0.1Ca} \right)^{1/3} \quad N/\mu m \{kgf/\mu m\}$$

K_2 : Nut Rigidity in dimension table $N/\mu m \{kgf/\mu m\}$
 Fa : Axial load $N \{kgf\}$
 Ga : Preload $N \{kgf\}$
 Ca : Basic Dynamic Load Rating $N \{kgf\}$

Rigidity of pre-load type Ball Screw is higher than backlash type !!!