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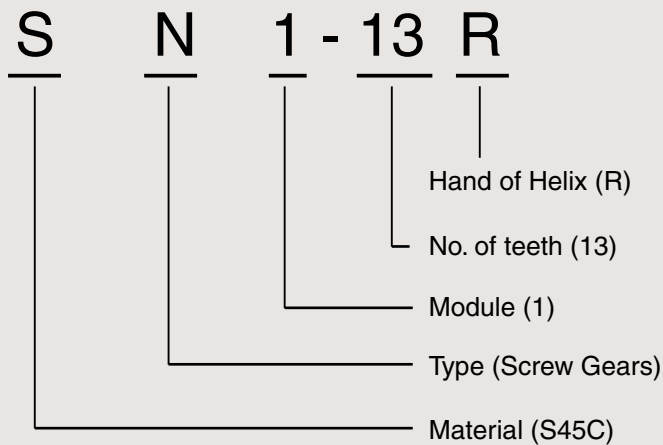
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## Catalog Number of KHK Stock Gears

The Catalog Number for KHK stock gears is based on the simple formula listed below.  
Please order KHK gears by specifying the Catalog Numbers.

(Example)

Screw Gears



Material  
S S45C  
SU SUS303  
A CAC702  
P MC901

Type  
N Screw Gears

# 8

# Screw Gears





# Screw Gears

## Many Types Are Offered for Changing Gear Train Directions.



### Characteristics

KHK stock screw gears come in four materials, S45C, SUS303, CAC702 (formerly Al BC2) and MC nylon, in modules 1~4 and numbers of teeth from 10 to 30.

#### Main Features of Types of Screw Gears Offered

- ① In terms of materials, we offer high abrasion-resistant aluminum bronze (CAC702) AN series, chemical-resistant MC nylon (MC901) PN screw gears, superior antirust stainless steel (SUS303) SUN series and commonly used machine carbon steel (S45C) SN series.
- ② The helix angle of 45° is used with both right- hand and left-hand helixes so that any direction of rotation and axial thrusts can be selected. When the same helix hand is used as a set (right with right or left with left) they can be used as a skewed shaft drive, while the opposite hand set (right with left) can be used as a parallel shaft drive.
- ③ The efficiency depends on the application, but is approximately 80 to 90%. Because they have high friction, it is essential that lubrication. (gear oil JIS type 2, No. 5~7) is used.



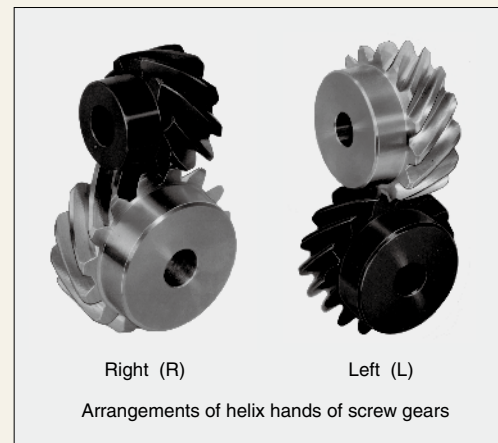
### Selection Hints

Please select the most suitable products by carefully considering the characteristics of items and contents of the product tables. It is also important to read all applicable “CAUTION” notes shown below before the final selection. Since screw gears come in right- or left-hand helix, make sure to include the letter “R” or “L” in the catalog number when you order.

#### 1. Caution in Selecting the Mating Gears

Screw gears are used for offset shafts. Whether the shafts are paralleled offset or skewed offset depends on the helix hands of the mating gears.

Direction of shaft	Arrangement of helix hands
Skewed shafts	RH-RH or LH-LH
Parallel shafts	RH-LH



#### 2. Caution with Regard to Special Characteristics of Screw Gears

- ① SN steel screw gears made of S45C with black oxide finish are somewhat effective in preventing rust but are not rustproof.
- ② SUN stainless steel screw gears have high degrees of antirust property, but are not totally rustproof.
- ③ Due to the characteristics of MC nylon, PN plastic screw gears’ product quality may be affected by heat or moisture absorption.
- ④ AN aluminum-bronze screw gears’ material (CAC702) has the tendency to abrade and scuff when mated together. KHK recommends mating AN screw gears with those of different material for the best results.



### 3. Caution in Selecting Gears Based on Gear Strength

The allowable surface strength listed in the product pages were derived using the Niemann formula as reference values (for the case of skewed offset shafts). There is paucity of data on the strength of screw gears. The values of constant  $K_0$  used in the calculations, which depend on the material of the mating gears, are our estimates. The following are the equations used. (NOTE 1)

$$U_1 = 1.43d_1^2 f_z K_s \times 9.80665$$

Where

- $U_1$  : allowable tangential force (n)
- $d_1$  : standard pitch diameter of pinion (mm)
- $f_z$  : coefficient based on no. of teeth combination (see table below)
- $K_s$  : coefficient based on materials and sliding

$$K_s = K_0 \frac{2}{2 + v_s}$$

Where

- $K_0$  : coefficient based on materials combination (see table below)
- $v_s$  : sliding speed (m/s)

$$v_s = \frac{\pi n d_1}{60000 \cos \beta}$$

Where

- $n$  : rotational speed ( $\text{min}^{-1}$ )
- $\beta$  : helix angle ( $45^\circ$ )

**NOTE 1:** The equations in Niemann Elements of "Mechanical Transmission" have been converted to SI units.

#### Value of $f_z$

$Z_2 \backslash Z_1$	10	13	15	20	26	30
10	1.557					
13	2.029	1.557				
15	2.287	1.823	1.557			
20	3.000	2.333	2.074	1.557		
26	3.755	3.000	2.658	2.029	1.557	
30	4.141	3.355	3.000	2.287	1.823	1.557

#### $K_0$ values depending on material combination

Catalog No.	Mating gear	$K_0$	The maximum allowable sliding speed	No. of teeth of mating gears	Rotation
SN	SN	0.0030	2.5	Same no. of teeth	100 $\text{min}^{-1}$
SUN	SN	0.0030 <small>NOTE 2</small>			
AN	SN	0.0050	5		
PN	SN	0.0030 <small>NOTE 2</small>			

**NOTE 2:**  $K_0$  values of SUN and PN are set by KHK.

### 4. Other Points to Consider in the Selection Process

Please see the similarly titled section for spur gears.



## Application Hints

In order to use KHK stock screw gears safely, read the Application Hints carefully before proceeding. Also "1. Caution on Performing Secondary Operations", "3. Notes on Starting Operations", "4. Other Points to Consider in Applications" in the spur gear section should be consulted.

### 1. Points of Caution in Assembling

① KHK stock screw gears are designed to give the proper backlash when assembled using the center distance given by the formula below with a tolerance of H7~H8. The amount of backlash is given in the product table for each gear.

$$a = \frac{d_1 + d_2}{2}$$

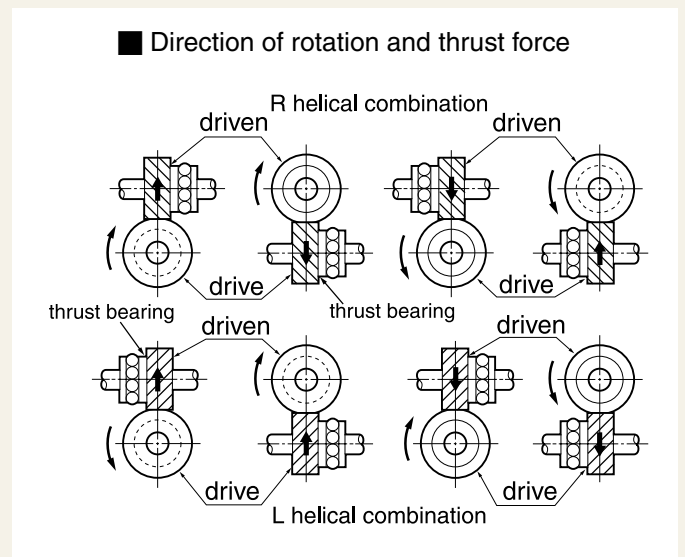
Where

- $a$  = center distance
- $d_1$  = pitch diameter of pinion
- $d_2$  = pitch diameter of gear

② Overall length tolerance of Screw Gears

Total Length (mm)		Tolerance
Above	Below	
	30	0 -0.10
30	100	0 -0.15

③ Due to the helix of screw gears, they produce axial thrust forces. The bearings must be selected properly to be able to handle these thrust forces. The directions of thrust change with the hand of helix and the direction of rotation as illustrated below.



**CAUTION:** For parallel shaft applications, see the Application Hints for KHK Helical Gears.