



# Helical Gears

Spur Gears

Helical Gears

Internal Gears

Racks

CP Racks & Pinions

Miter Gears

Bevel Gears

Screw Gears

Worm Gear Pairs

Bevel Gearboxes

Other Products

**KHG**  
Ground Helical Gears

*J Series*

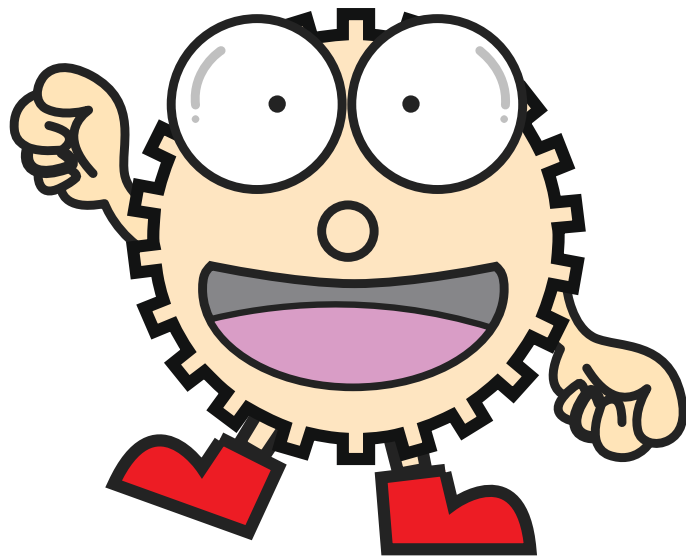
Precision: N6  
Material: SCM440  
Heat Treatment: Thermal refined / gear teeth induction hardened

m1 ~ 3      Page 168

**SH**  
Helical Gears

Precision: N8  
Material: S45C

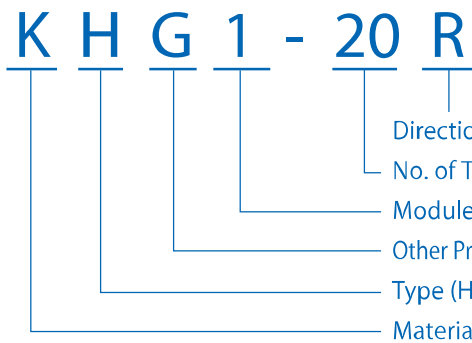
m2, 3      Page 178



## 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) Helical Gears



**Material**  
S S45C  
K SCM440

**Type**  
H Helical Gears

**Other Information**  
G Ground Gears

### Features

KHK stock helical gears are quiet, compact and economical. They are suitable wherever you require high-speed rotation including in machine tools, speed reducers and other industrial machinery. The following table lists the main features.

Catalog Number	KHG	SH
Module	1 to 3	2 to 3
Material	SCM440	S45C
Heat Treatment	Thermal refined, gear teeth induction hardened	—
Tooth Surface Finish	Ground	Cut
Precision JIS B 1702-1:1998	N6	N8
Secondary Operations	Possible except for tooth	Possible
Features	High strength, abrasion-resistant and compact. Finished J Series products are also available.	Having larger contact ratios compared to the SS spur gears, effective in reducing noise and vibration.

### Selection Hints

It is important to thoroughly understand the contents of the product tables as well as "CAUTION" notes before making the selection. You must specify the right or left hand by including the letter R or L in the catalog number when ordering.

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

We have two different types of KHK helical gear products: one is the KHG gear type, and the other is the SH gear type. Each type of gear has different module systems, pressure angle designations and helix angles. Since the KHG Gears are of the transverse module style, and the SH gears are of the normal module style, KHG and SH gears are not interchangeable. Please keep this in mind when making your selection. Also, right hand and left hand helical mating gears are packaged as a set. See the photos below for reference and for help in making a proper selection.

#### Direction of Helix



#### Mating Helical Gear Selection Chart (○ Allowable × Not allowable)

Catalog Number and Direction of Helix	KHG		SH		KRHG KRHGF		SRH	
	RH	LH	RH	LH	RH	LH	RH	LH
KHG	RH	×	○	×	×	○	×	×
	LH	○	×	×	×	○	×	×
SH	RH	×	×	○	×	×	×	○
	LH	×	×	○	×	×	○	×

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

The gear strength values shown in the product pages were computed by assuming a certain application environment. Therefore, they should be used as reference only. We recommend that each user computes their own values by applying the actual usage conditions. To learn more about gear strength calculations, please refer to our separate technical reference book, in the section "Bending Strength of Spur and Helical Gears" (Page 71) or "Surface Durability of Spur and Helical Gears" (Page 78).

#### Calculation of Bending Strength of Gears

Item	Catalog Number	KHG	SH
Formula NOTE 1		Formula of spur and helical gears on bending strength (JGMA401-01)	
No. of teeth of mating gears		Same no. of teeth	
Rotational speed		600rpm	100rpm
Design life (durability)		Over 10 <sup>7</sup> cycles	
Impact from motor		Uniform load	
Impact from load		Uniform load	
Direction of load		Bidirectional	
Allowable bending stress at root $\sigma_{Flim}$ (kgf/mm <sup>2</sup> ) NOTE 2		30	19
Safety factor $S_F$		1.2	

#### Calculation of Surface Durability (Except where it is common with bending strength)

Item	Catalog Number	KHG	SH
Formula NOTE 1		Formula of spur and helical gears on surface durability (JGMA402-01)	
Kinematic viscosity of lubricant		100cSt (50°C)	
Gear support		Symmetric support by bearings	
Allowable Hertz stress $\sigma_{Hlim}$ (kgf/mm <sup>2</sup> )		116	49
Safety factor $S_H$		1.15	

[NOTE 1] The gear strength formula is based on JGMA (Japanese Gear Manufacturers Association) specifications. The units for the rotational speed (rpm) and the stress (kgf/mm<sup>2</sup>) are adjusted to the units needed in the formula.

[NOTE 2] The allowable bending stress at the root  $\sigma_{Flim}$  is calculated from JGMA401-01, and set to 2/3 of the value in the consideration of the use of planetary-, idler-, or other gear systems, loaded in both directions.

## The most important factor in selecting gears is the gear strength.

### Step 1

Determine the actual load torque applied to the gear and the gear type suitable for the purpose.

#### Definition of Bending Strength of Gears

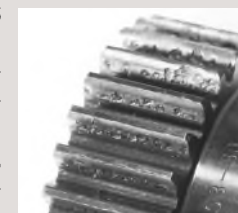
The allowable bending strength of a gear is defined as the allowable tangential force at the pitch circle based on the mutually allowable root stress of two meshing gears under load.



Example of failure due to insufficient bending strength

#### Definition of Surface Durability

The surface durability of a gear is defined as the allowable tangential force at the pitch circle, which permits the force to be transmitted safely without incurring surface failure. The allowable gear tooth load of a gear is defined as the allowable tangential force at the pitch circle based on the mutual gear tooth strength of two meshing gears under load.



Example of wear due to insufficient surface durability

### Step 2

Select provisionally from the allowable torque table of the Master Catalog based on the load torque.

#### For provisional selection from the Master Catalog

Catalog No.	No. of teeth	Speed (rpm)	Size (mm)	Mod. (mm)	Pressure Angle (°)	Material	Heat Treatment	Allowable Torque (N·m)	Allowable Torque (kgf·m)	Weight (kg)
KHG-20R	20	R	51	6	17	20	22	7.79	4.98	0.79
KHG-20L	20	L	51	6	17	20	22	7.79	4.98	0.79
KHG-22R	22	R	51	8	18	22	24	8.92	6.14	0.91
KHG-22L	22	L	51	8	18	22	24	8.92	6.14	0.91
KHG-24R	24	R	51	8	20	24	26	10.1	7.43	1.03
KHG-24L	24	L	51	8	20	24	26	10.1	7.43	1.03
KHG-28R	28	R	51	8	20	28	30	12.4	10.4	1.27
KHG-28L	28	L	51	8	20	28	30	12.4	10.4	1.27
KHG-30R	30	R	51	10	25	30	32	13.6	12.1	1.39
KHG-30L	30	L	51	10	25	30	32	13.6	12.1	1.39
KHG-32R	32	R	51	10	25	32	34	13.5	12.6	1.37
KHG-32L	32	L	51	10	25	32	34	13.5	12.6	1.37
KHG-35R	35	R	51	10	25	35	37	15.1	15.4	1.54
KHG-35L	35	L	51	10	25	35	37	15.1	15.4	1.54
KHG-36R	36	R	51	10	25	36	38	15.7	16.3	1.60
KHG-36L	36	L	51	10	25	36	38	15.7	16.3	1.60
KHG-40R	40	R	51	10	30	40	42	17.8	20.5	1.83
KHG-40L	40	L	51	10	30	40	42	17.8	20.5	1.83
KHG-48R	48	R	51	10	30	48	50	22.5	30.5	2.29
KHG-48L	48	L	51	10	30	48	50	22.5	30.5	2.29
KHG-50R	50	R	51	12	35	50	52	23.6	33.3	2.41
KHG-50L	50	L	51	12	35	50	52	23.6	33.3	2.41
KHG-60R	60	R	51	12	40	60	62	29.2	40.4	2.88
KHG-60L	60	L	51	12	40	60	62	29.2	40.4	2.88

### Step 3

We recommend that each user computes their own values by applying the actual usage conditions to determine the suitability of the gear strength.

Calculate the strength formally using the various gear strength formulas. Please see Page 71 of our technical reference book for more details.

(2) Bending strength formula

In order to satisfy the bending strength, the nominal circumferential force  $F_t$  on the meshing pitch circle must be less than or equal to the allowable circumferential force  $F_{lim}$  on the meshing pitch circle calculated by the permissible bending stress at root.

$$F_t \leq F_{lim} \quad (10.4)$$

Alternatively, the bending stress at root  $\sigma_F$  obtained from the nominal circumferential force  $F_t$  on the meshing pitch circle must be less than or equal to the permissible bending stress at root  $\sigma_{Flim}$ .

$$\sigma_F \leq \sigma_{Flim} \quad (10.5)$$

The permissible circumferential force  $F_{lim}$  (kgf) on the meshing pitch circle is obtained by the following equation.

$$F_{lim} = \sigma_{Flim} \frac{m_t b}{Y_F Y_{Fa} Y_{Fa} Y_{F\beta}} \left( \frac{K_t K_{\beta X}}{K_v K_o} \right) \frac{1}{S_F} \quad (10.6)$$

The bending stress at root (kgf/mm<sup>2</sup>) is obtained by the following equation.

$$\sigma_F = F_t \frac{Y_F Y_{Fa} Y_{Fa} Y_{F\beta}}{K_v K_o} \quad (10.7)$$

Strength confirmation is simple when using the website.

KHG-20R Strength calculation of gears

Meshing Gear:  Helical Gears  Racks  Internal Gears

Meshing number of teeth: 20

Meshing Face Width: 8

Meshing Surface Finish:  Cut  Ground

Rotating Speed: 600 rpm

Number of repetitions: Above 10,000,000

Dimension Factor of Root Stress: 1.00

Impact from Prime Mover:  Uniform Load  Medium impact  Heavy impact

Impact from Load Side of Machine:  Uniform Load  Light impact  Medium impact

Kinematic Viscosity of Lubricant: ISO VC 100

Safety Factor: 1.2

Method of Gear shaft Support:  Bearing on One End  Bearing on Both Ends

Direction of Load:  Unidirectional  Bidirectional

Unit:  kgf  N

When selecting KHK standard gears, glance over the Cautions on Product Characteristics and Cautions on Performing Secondary Operations in the respective dimension tables.

- Products not listed in this catalog or materials, modules, number of teeth and the like not listed in the dimensional tables can be manufactured as custom items. Please see Page 16 for more details about custom-made orders.
- The color and shape of the product images listed on the dimension table page of each product may differ from the actual product. Be sure to confirm the shape in the dimension table before selection.
- The details (specifications, dimensions, prices, etc.) listed in the catalog may be changed without prior notice. Changes are announced on the KHK website.

Website URL: <https://khkgears.net/>  
 Overseas Sales Department: TEL: 81-48-254-1744 FAX: 81-48-254-1765 E-mail: info@khkgears.net



### Application Hints

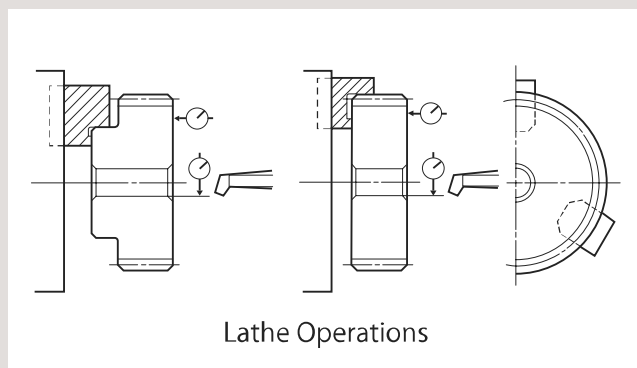


In order to use KHK stock gears safely, carefully read the Application Hints before proceeding. If there are questions or you require clarifications, please contact our technical department or your nearest distributor.

TEL: 81-48-254-1744 FAX: 81-48-254-1765 E-mail: info@khkgears.net

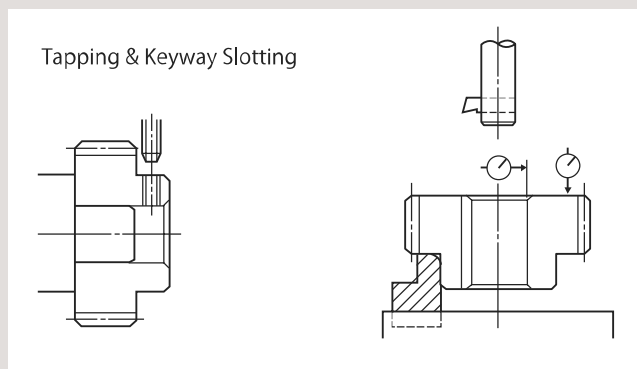
#### 1. Caution on Performing Secondary Operations

- If re boring, it is important to pay special attention to locating the center in order to avoid runout.
- The reference datum for gear cutting is the bore. Therefore, use the bore for locating the center. If it is too difficult to do for small bores, the alternative is to use one spot on the bore and the runout of the side surface.
- If reworking using scroll chucks, we recommend the use of new or re bored jaws for improved precision. Please exercise caution not to crush the teeth by applying too much pressure. Any scarring will cause noise during operation.



Lathe Operations

- The maximum bore size is dictated by the requirement that the strength of the hub is to be higher than that of the gear teeth. The maximum bore size should be 60% to 70% of the hub diameter (or tooth root diameter), and 50% to 60% for keyway applied modifications.
- In order to avoid stress concentration, round the keyway corners.

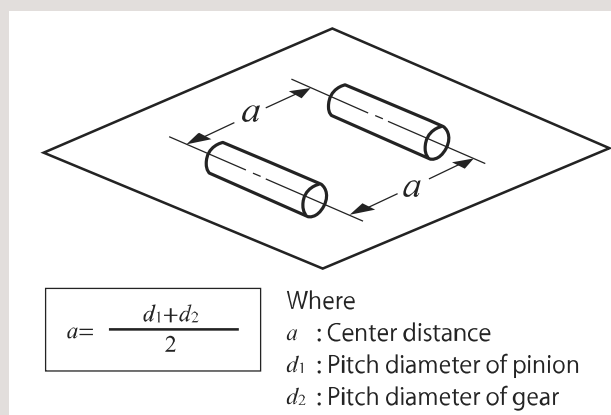


Tapping & Keyway Slotting

- To avoid problems of reduced gear precision and other manufacturing difficulties, do not attempt to machine the gears to reduce face widths.
- When induction-hardening S45C products, thermal stress cracks may appear. Also, note that the precision grade of the product declines by 1 or 2 grades, as deformation on material may occur. If you require tolerance for bore or other parts, machining is necessary after heat treatment.

#### 2. Points of Caution during Assembly

- KHK stock helical gears are designed to give the proper normal direction backlash when assembled using the center distance given by the formula on the right (center distance tolerance of H7 - H8). The amount of backlash is given in the product table for each gear. For the center distance of SH, refer to the dimensional table page.



- The table below indicates the tolerance on the total length of KHK stock spur gears. Please refer to this data when designing gear boxes or other components.

#### Total Length Tolerance for Spur and Helical Gears

Total Length (mm)	Tolerance
Up to 30	0 -0.10
31 to 100	0 -0.15
Over 100	0 -0.20

**[Note]** The following products are excluded from this table: Spur pinion shafts, Injection molded spur gears, F-loc hub spur gears, and MC nylon products.

- Verify that the two shafts are parallel. Incorrect assembly will lead to uneven teeth contact which will cause noise and wear. (Check the assembly by painting a thin layer of red lead primer or the like on the gear teeth, meshing them together and rotating them.)

#### Test example: Abrasion occurred on SSG3-30 due to poor edge contact (only 30% with proper contact).

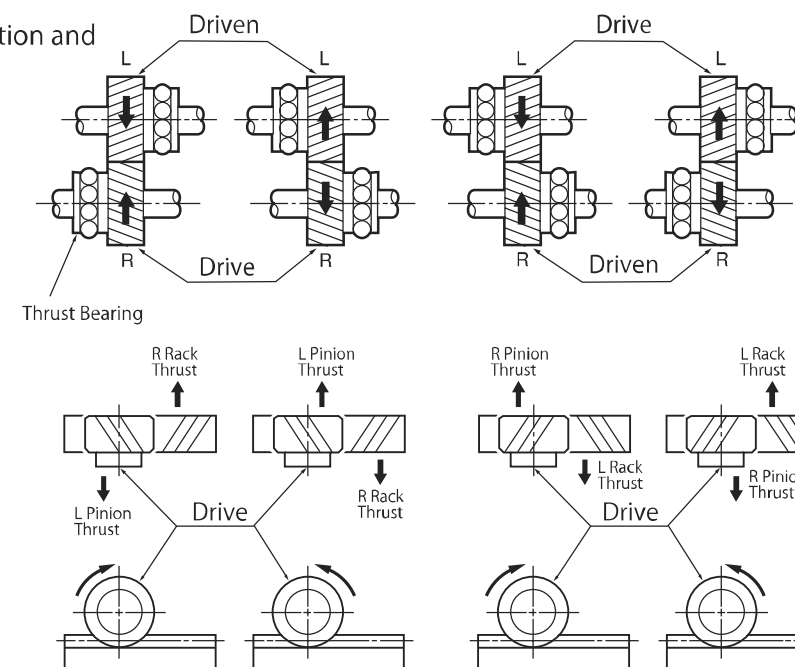


Poor tooth contact and pitting

Gear oil (equivalent to JIS gear oil category 2 No. 3)  
 The design conditions were load torque at 278 rpm, 42.5 kg/m (12 kW), 1.5 times the allowable bending strength, and 3 times the allowable surface durability torque.  
 The pitting occurred on the poor tooth contact area after 60 hours of continuous operation.

- Because of the helix of the gear teeth, helical gears in mesh produce thrust forces in the axial directions. The axial thrust bearings must be able to resist these forces. The direction of the thrust forces depend on the helix direction and the direction of rotation as shown below.  
 For details, please refer to our separate technical reference book, section of "Gear Forces" (Page 107).

#### Direction of Rotation and Thrust Force



#### 3. Cautions on Starting

- Check the following items before starting.
  - Are the gears installed securely?
  - Is there uneven tooth contact?
  - Is there adequate backlash?
  - Be sure to avoid zero-backlash.
  - Has proper lubrication been supplied?
- If gears are exposed, be sure to attach a safety cover to ensure safety. Also, be careful not to touch rotating gears.
- Gears can be lubricated with the "grease lubrication method", "splash lubrication method (oil bath method)", or "forced lubrication method (circulation lubrication method)".  
 For initial operation, the lubricant may deteriorate markedly, so check the condition of the lubricant after starting.

For more technical information, please see the section "Gear Lubrication" (Page 112) of our technical reference book.

- If there is any abnormality such as noise or vibration during startup, check the gears and assembly condition. "High gear accuracy", "smooth gear teeth surface" and "correct tooth contact" are some of the measures against gear noise. For more technical information, please see the section "Gear Noise and Countermeasures" (Page 119) of our technical reference book.

KHK considers safety a priority in the use of our products.

When handling, adding secondary operations, assembling, and operating KHK products, please be aware of the following issues in order to prevent accidents.



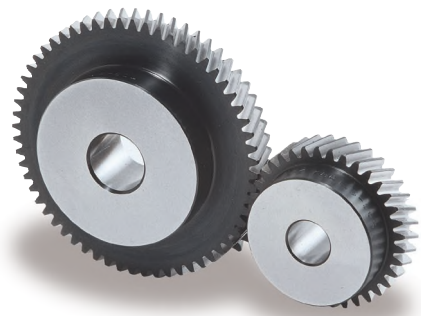
#### Warning: Precautions for preventing physical and property damage

- When using KHK products, follow relevant safety regulations (Occupational Safety and Health Regulations, etc.).
- Pay attention to the following items when installing, removing, or performing maintenance and inspection of the product.
  - Turn off the power switch.
  - Do not reach or crawl under the product.
  - Wear appropriate clothing and protective equipment for the work.



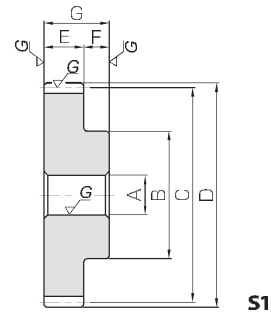
#### Caution Cautions in Preventing Accidents

- Before using a KHK product, read the precautions in the catalog carefully in order to use it correctly.
- Avoid use in environments that may adversely affect the product.
- Our products are manufactured under a superior quality control system based on the ISO9000 quality management system; if you notice any malfunctions upon purchasing a product, please contact the supplier.



Specifications	
Precision grade	JIS grade N6 (JIS B1702-1:1998) *
Reference section of gear	Rotating plane
Gear teeth	Standard full depth
Transverse pressure angle	20°
Helix angle	21°30'
Material	SCM440
Heat treatment	Thermal refined, tooth surface induction hardened
Tooth hardness	50 ~ 60HRC
Surface treatment	Black oxide coated except for ground part

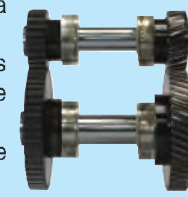
\* The precision grade of J Series products is equivalent to the value shown in the table.



S1

**Drop in Replacements for Spur Gears**

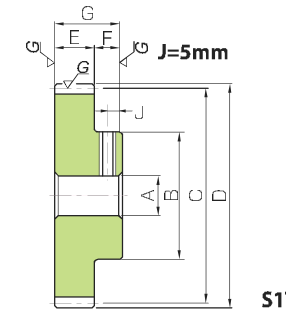
KHG ground helical gears use a "transverse" module. The assembly distance is the same as spur gear pairs with the same module and number of teeth. Improved strength and low noise: Take the next step up from spur gears.



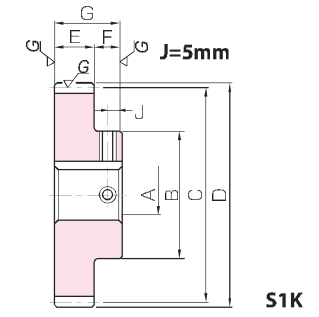
\* For details of transverse helical gears, please see Page 25 of our technical reference book.

**J Series**

**Ground Helical Gears**



S1T



S1K

**To order J Series products, please specify; Catalog No. + J + BORE**

Catalog No.	No. of teeth	Direction of helix	Shape	Bore				Face width	Hub width	Total Length	Allowable torque (N-m)		Allowable torque (kgf-m)		Backlash (mm)	Weight (kg)
				A-H7	B	C	D				Bending strength	Surface durability	Bending strength	Surface durability		
KHG1-20R KHG1-20L	20	R L	S1	6	17	20	22	8	10	18	7.79	4.98	0.79	0.51	0.08~0.16	0.034
KHG1-22R KHG1-22L	22	R L	S1	8	18	22	24				8.92	6.14	0.91	0.63	0.08~0.16	0.037
KHG1-24R KHG1-24L	24	R L	S1	8	20	24	26				10.1	7.43	1.03	0.76	0.08~0.16	0.046
KHG1-28R KHG1-28L	28	R L	S1	8	20	28	30				12.4	10.4	1.27	1.06	0.08~0.16	0.056
KHG1-30R KHG1-30L	30	R L	S1	10	25	30	32				13.6	12.1	1.39	1.23	0.08~0.16	0.072
KHG1-32R KHG1-32L	32	R L	S1	10	25	32	34				13.5	12.6	1.37	1.29	0.08~0.16	0.078
KHG1-35R KHG1-35L	35	R L	S1	10	25	35	37				15.1	15.4	1.54	1.57	0.08~0.16	0.088
KHG1-36R KHG1-36L	36	R L	S1	10	25	36	38				15.7	16.3	1.60	1.67	0.08~0.16	0.091
KHG1-40R KHG1-40L	40	R L	S1	10	30	40	42				17.9	20.5	1.83	2.10	0.08~0.16	0.12
KHG1-48R KHG1-48L	48	R L	S1	10	30	48	50				22.5	30.5	2.29	3.11	0.08~0.16	0.16
KHG1-50R KHG1-50L	50	R L	S1	12	35	50	52				23.6	33.3	2.41	3.40	0.08~0.16	0.18
KHG1-60R KHG1-60L	60	R L	S1	12	40	60	62				29.3	49.4	2.99	5.04	0.10~0.18	0.26
KHG1-70R KHG1-70L	70	R L	S1	12	40	70	72				35.2	68.9	3.58	7.02	0.10~0.18	0.32
KHG1-90R KHG1-90L	90	R L	S1	15	50	90	92				46.9	118	4.78	12.1	0.10~0.18	0.53
KHG1-100R KHG1-100L	100	R L	S1	15	50	100	102				50.4	142	5.14	14.5	0.10~0.18	0.62

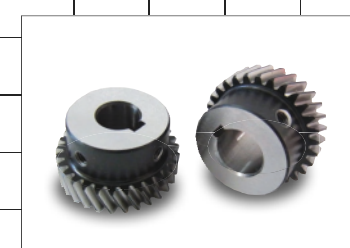
- [Caution on Product Characteristics]
- The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 164 for more details.
  - The backlash values shown in the table are the theoretical values for the backlash in the normal direction of a pair of identical gears in mesh.
  - These gears produce axial thrust forces. See Page 167 for more details.
  - Right handed and left handed helical gears in the same module are designed to mesh as a pair, but KHG gears are not interchangeable with SH type helical gears.

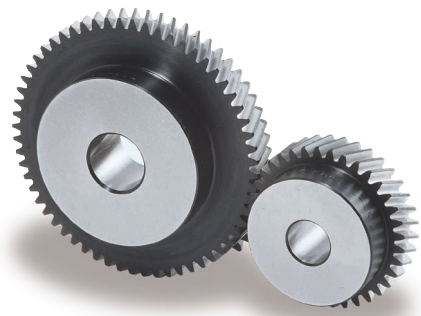
- [Caution on Secondary Operations]
- Please read "Caution on Performing Secondary Operations" (Page 166) when performing modifications and/or secondary operations for safety concerns. KHK Quick-Mod Gears, the KHK's system for quick modification of KHK stock gears is also available.
  - Due to the gear teeth being induction hardened, no secondary operations can be performed on tooth areas including the bottom land (approx. 2 to 3 mm).
  - While cutting off the entire hub may cause curvature deformation by residual stress, some products are straightened and annealed after refining the material.

\* The product shapes of J Series items are identified by background color.

Bore H7	* The product shapes of J Series items are identified by background color.															
Keyway Js9	6	8	10	12	14	15	16	17	18	19	20	22	25	28	30	
Screw size	-		4 x 1.8				5 x 2.3				6 x 2.8				8 x 3.3	
Catalog No.	M4	M5	M4				M5				M6					
KHG1-20R J BORE KHG1-20L J BORE	S1T															
KHG1-22R J BORE KHG1-22L J BORE		S1T														
KHG1-24R J BORE KHG1-24L J BORE		S1T														
KHG1-28R J BORE KHG1-28L J BORE		S1T														
KHG1-30R J BORE KHG1-30L J BORE			S1K	S1K												
KHG1-32R J BORE KHG1-32L J BORE			S1K	S1K												
KHG1-35R J BORE KHG1-35L J BORE			S1K	S1K												
KHG1-36R J BORE KHG1-36L J BORE			S1K	S1K												
KHG1-40R J BORE KHG1-40L J BORE			S1K	S1K	S1K	S1K	S1K	S1K								
KHG1-48R J BORE KHG1-48L J BORE			S1K	S1K	S1K	S1K	S1K	S1K								
KHG1-50R J BORE KHG1-50L J BORE				S1K	S1K	S1K	S1K	S1K	S1K	S1K						
KHG1-60R J BORE KHG1-60L J BORE				S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K					
KHG1-70R J BORE KHG1-70L J BORE				S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K				
KHG1-90R J BORE KHG1-90L J BORE					S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	
KHG1-100R J BORE KHG1-100L J BORE					S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	

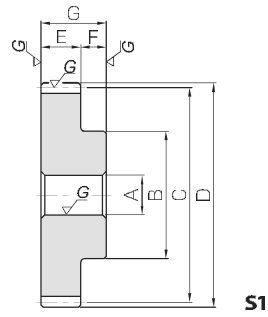
- [Caution on J series]
- As available-on-request products, requires a lead-time for shipping within 2 working-days (excludes the day ordered), after placing an order. Please allow additional shipping time to get to your local distributor.
  - Number of products we can process for one order is 1 to 20 units. For quantities of 21 or more pieces, we need to quote price and lead time.
  - Keyways are made according to JIS B1301 standards, Js 9 tolerance.
  - Certain products which would otherwise have a very long tapped hole are counterbored to reduce the length of the tap.
  - Areas of products which have been re-worked will not be black oxide coated.
  - For products having a tapped hole, a set screw is included.
  - When using S1T set screws for fastening gears to a shaft, only use this method for applications with light load usage. For secure fastening, please use dowel pins in combination.





Specifications	
Precision grade	JIS grade N6 (JIS B1702-1:1998) *
Reference section of gear	Rotating plane
Gear teeth	Standard full depth
Transverse pressure angle	20°
Helix angle	21°30'
Material	SCM440
Heat treatment	Thermal refined, tooth surface induction hardened
Tooth hardness	50 ~ 60HRC
Surface treatment	Black oxide coated except for ground part

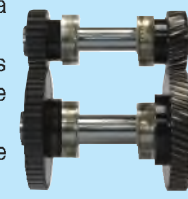
\* The precision grade of J Series products is equivalent to the value shown in the table.



S1

**Drop in Replacements for Spur Gears**

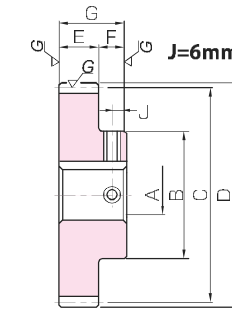
KHG ground helical gears use a "transverse" module. The assembly distance is the same as spur gear pairs with the same module and number of teeth. Improved strength and low noise: Take the next step up from spur gears.



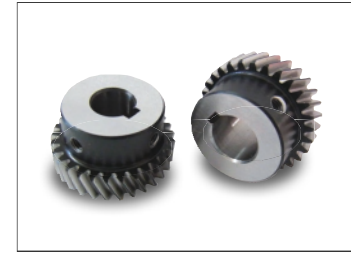
\* For details of transverse helical gears, please see Page 25 of our technical reference book.

**J Series**

**Ground Helical Gears**



S1K



**To order J Series products, please specify; Catalog No. + J + BORE**

Catalog No.	No. of teeth	Direction of helix	Shape	Bore			Pitch dia.	Outside dia.	Face width	Hub width	Total Length	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash (mm)	Weight (kg)							
				A-H7	B	C						Bending strength	Surface durability	Bending strength	Surface durability									
KHG1.5-20R KHG1.5-20L	20	R L	S1	12	24	30	33	12	12	24	0.08~0.16	26.3	18.5	2.68	1.89	0.088								
KHG1.5-22R KHG1.5-22L	22	R L															26	33	36	27.4	20.8	2.79	2.12	0.11
KHG1.5-24R KHG1.5-24L	24	R L															28	36	39	30.9	25.3	3.15	2.58	0.13
KHG1.5-25R KHG1.5-25L	25	R L															30	37.5	40.5	32.7	27.7	3.33	2.83	0.15
KHG1.5-26R KHG1.5-26L	26	R L															32	39	42	34.5	30.2	3.52	3.08	0.17
KHG1.5-28R KHG1.5-28L	28	R L															36	42	45	38.1	35.7	3.89	3.64	0.19
KHG1.5-30R KHG1.5-30L	30	R L															38	45	48	41.8	41.6	4.26	4.24	0.22
KHG1.5-32R KHG1.5-32L	32	R L															40	48	51	45.5	48.0	4.64	4.89	0.26
KHG1.5-36R KHG1.5-36L	36	R L															45	54	57	52.9	62.2	5.40	6.35	0.33
KHG1.5-40R KHG1.5-40L	40	R L															50	60	63	60.5	78.5	6.17	8.00	0.42
KHG1.5-48R KHG1.5-48L	48	R L															50	72	75	75.8	117	7.73	12.0	0.52
KHG1.5-50R KHG1.5-50L	50	R L															60	75	78	79.6	128	8.12	13.1	0.63
KHG1.5-52R KHG1.5-52L	52	R L	60	78	81	83.5	140	8.51	14.2	0.67														
KHG1.5-60R KHG1.5-60L	60	R L	60	90	93	99.1	191	10.1	19.5	0.81														
KHG1.5-70R KHG1.5-70L	70	R L	60	105	108	114	256	11.6	26.1	1.02														
KHG1.5-80R KHG1.5-80L	80	R L	70	120	123	132	343	13.5	35.0	1.37														
KHG1.5-90R KHG1.5-90L	90	R L	70	135	138	151	442	15.4	45.1	1.65														
KHG1.5-100R KHG1.5-100L	100	R L	70	150	153	170	554	17.4	56.5	1.97														

- [Caution on Product Characteristics]
- The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 164 for more details.
  - The backlash values shown in the table are the theoretical values for the backlash in the normal direction of a pair of identical gears in mesh.
  - These gears produce axial thrust forces. See Page 167 for more details.
  - Right handed and left handed helical gears in the same module are designed to mesh as a pair, but KHG gears are not interchangeable with SH type helical gears.

- [Caution on Secondary Operations]
- Please read "Caution on Performing Secondary Operations" (Page 166) when performing modifications and/or secondary operations for safety concerns. KHK Quick-Mod Gears, the KHK's system for quick modification of KHK stock gears is also available.
  - Due to the gear teeth being induction hardened, no secondary operations can be performed on tooth areas including the bottom land (approx. 2 to 3 mm).
  - While cutting off the entire hub may cause curvature deformation by residual stress, some products are straightened and annealed after refining the material.

\* The product shapes of J Series items are identified by background color.

Bore H7	* The product shapes of J Series items are identified by background color.															
Keyway Js9	12	14	15	16	17	18	19	20	22	25	28	30	32	35	40	
Screw size	4 x 1.8			5 x 2.3			6 x 2.8			8 x 3.3			10 x 3.3		12 x 3.3	
Catalog No.	M4				M5				M6				M8			
KHG1.5-20R J BORE KHG1.5-20L J BORE	S1K															
KHG1.5-22R J BORE KHG1.5-22L J BORE	S1K															
KHG1.5-24R J BORE KHG1.5-24L J BORE	S1K	S1K	S1K													
KHG1.5-25R J BORE KHG1.5-25L J BORE	S1K	S1K	S1K	S1K	S1K											
KHG1.5-26R J BORE KHG1.5-26L J BORE	S1K	S1K	S1K	S1K	S1K											
KHG1.5-28R J BORE KHG1.5-28L J BORE			S1K	S1K	S1K	S1K	S1K	S1K								
KHG1.5-30R J BORE KHG1.5-30L J BORE			S1K	S1K	S1K	S1K	S1K	S1K	S1K							
KHG1.5-32R J BORE KHG1.5-32L J BORE			S1K	S1K	S1K	S1K	S1K	S1K	S1K							
KHG1.5-36R J BORE KHG1.5-36L J BORE			S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K						
KHG1.5-40R J BORE KHG1.5-40L J BORE			S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K					
KHG1.5-48R J BORE KHG1.5-48L J BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K				
KHG1.5-50R J BORE KHG1.5-50L J BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K		
KHG1.5-52R J BORE KHG1.5-52L J BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K		
KHG1.5-60R J BORE KHG1.5-60L J BORE								S1K	S1K	S1K	S1K	S1K	S1K	S1K		
KHG1.5-70R J BORE KHG1.5-70L J BORE								S1K	S1K	S1K	S1K	S1K	S1K	S1K		
KHG1.5-80R J BORE KHG1.5-80L J BORE								S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	
KHG1.5-90R J BORE KHG1.5-90L J BORE								S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	
KHG1.5-100R J BORE KHG1.5-100L J BORE								S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	

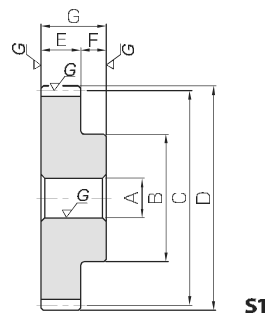
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  - Keyways are made according to JIS B1301 standards, Js 9 tolerance.
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  - For products having a tapped hole, a set screw is included.





Specifications	
Precision grade	JIS grade N6 (JIS B1702-1:1998) *
Reference section of gear	Rotating plane
Gear teeth	Standard full depth
Transverse pressure angle	20°
Helix angle	21°30'
Material	SCM440
Heat treatment	Thermal refined, tooth surface induction hardened
Tooth hardness	50 ~ 60HRC
Surface treatment	Black oxide coated except for ground part

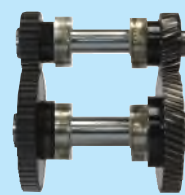
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S1

**Drop in Replacements for Spur Gears**

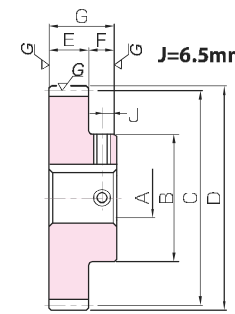
KHG ground helical gears use a "transverse" module. The assembly distance is the same as spur gear pairs with the same module and number of teeth. Improved strength and low noise: Take the next step up from spur gears.



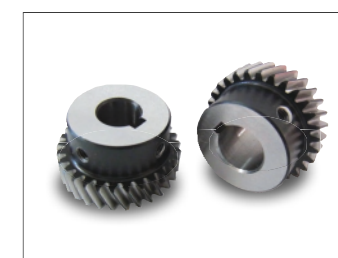
\* For details of transverse helical gears, please see Page 25 of our technical reference book.

**J Series**

**Ground Helical Gears**



S1K



Catalog No.	No. of teeth	Direction of helix	Shape	Bore				Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total Length	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash (mm)	Weight (kg)
				A-H7	B	C	D							Bending strength	Surface durability	Bending strength	Surface durability		
KHG2-15R KHG2-15L	15	R L	S1	12	24	30	34	16	13	29	16	13	29	40.5	22.8	4.13	2.32	0.10~0.20	0.11
KHG2-18R KHG2-18L	18	R L			30	36	40							48.5	31.9	4.95	3.25		
KHG2-20R KHG2-20L	20	R L			32	40	44							56.6	40.8	5.77	4.16		
KHG2-22R KHG2-22L	22	R L			36	44	48							64.9	50.6	6.62	5.16		
KHG2-24R KHG2-24L	24	R L			38	48	52							73.3	61.4	7.47	6.26		
KHG2-25R KHG2-25L	25	R L			40	50	54							77.5	67.3	7.90	6.86		
KHG2-26R KHG2-26L	26	R L		15	42	52	56	81.8	73.4	8.34	7.49	0.12~0.22	0.37						
KHG2-28R KHG2-28L	28	R L			45	56	60	90.4	86.6	9.21	8.83								
KHG2-30R KHG2-30L	30	R L			50	60	64	99.1	101	10.1	10.3								
KHG2-32R KHG2-32L	32	R L			50	64	68	108	117	11.0	11.9								
KHG2-35R KHG2-35L	35	R L			50	70	74	121	142	12.3	14.5								
KHG2-36R KHG2-36L	36	R L			50	72	76	126	151	12.8	15.4								
KHG2-40R KHG2-40L	40	R L	20	60	80	84	143	191	14.6	19.5	0.14~0.24	1.65							
KHG2-44R KHG2-44L	44	R L		60	88	92	161	236	16.5	24.0									
KHG2-45R KHG2-45L	45	R L		60	90	94	166	248	16.9	25.3									
KHG2-48R KHG2-48L	48	R L		60	96	100	172	273	17.5	27.9									
KHG2-50R KHG2-50L	50	R L		60	100	104	181	299	18.4	30.5									
KHG2-60R KHG2-60L	60	R L		65	120	124	225	447	22.9	45.6									
KHG2-70R KHG2-70L	70	R L	25	70	140	144	269	625	27.4	63.7	0.14~0.24	2.21							
KHG2-80R KHG2-80L	80	R L		80	160	164	301	799	30.7	81.4									
KHG2-90R KHG2-90L	90	R L		90	180	184	344	1030	35.0	105									
KHG2-100R KHG2-100L	100	R L		100	200	204	387	1290	39.4	132									

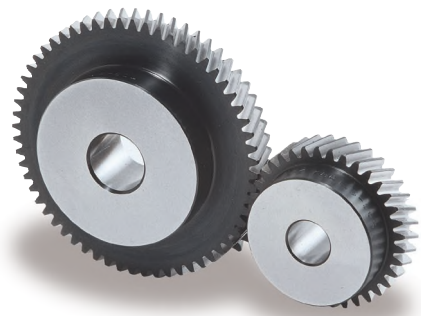
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**To order J Series products, please specify; Catalog No. + J + BORE**

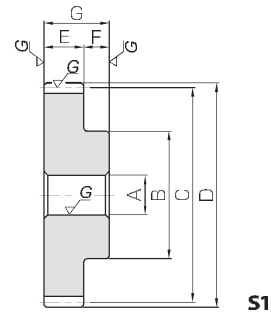
Bore H7	* The product shapes of J Series items are identified by background color.																					
	12	14	15	16	17	18	19	20	22	25	28	30	32	35	40	45	50					
Keyway Js9	4 x 1.8				5 x 2.3				6 x 2.8				8 x 3.3				10 x 3.3		12 x 3.3		14 x 3.8	
Screw size	M4				M5				M6				M8				M10					
Catalog No.	S1K																					
KHG2-15R J BORE	S1K																					
KHG2-15L J BORE	S1K																					
KHG2-18R J BORE	S1K	S1K	S1K	S1K	S1K																	
KHG2-18L J BORE	S1K	S1K	S1K	S1K	S1K																	
KHG2-20R J BORE			S1K	S1K	S1K																	
KHG2-20L J BORE			S1K	S1K	S1K																	
KHG2-22R J BORE			S1K	S1K	S1K	S1K	S1K	S1K														
KHG2-22L J BORE			S1K	S1K	S1K	S1K	S1K	S1K														
KHG2-24R J BORE			S1K	S1K	S1K	S1K	S1K	S1K	S1K													
KHG2-24L J BORE			S1K	S1K	S1K	S1K	S1K	S1K	S1K													
KHG2-25R J BORE			S1K	S1K	S1K	S1K	S1K	S1K	S1K													
KHG2-25L J BORE			S1K	S1K	S1K	S1K	S1K	S1K	S1K													
KHG2-26R J BORE			S1K	S1K	S1K	S1K	S1K	S1K	S1K													
KHG2-26L J BORE			S1K	S1K	S1K	S1K	S1K	S1K	S1K													
KHG2-28R J BORE			S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K												
KHG2-28L J BORE			S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K												
KHG2-30R J BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K										
KHG2-30L J BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K										
KHG2-32R J BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K									
KHG2-32L J BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K									
KHG2-35R J BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K									
KHG2-35L J BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K									
KHG2-36R J BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K									
KHG2-36L J BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K									
KHG2-40R J BORE									S1K	S1K	S1K	S1K	S1K	S1K	S1K							
KHG2-40L J BORE									S1K	S1K	S1K	S1K	S1K	S1K	S1K							
KHG2-44R J BORE									S1K	S1K	S1K	S1K	S1K	S1K	S1K							
KHG2-44L J BORE									S1K	S1K	S1K	S1K	S1K	S1K	S1K							
KHG2-45R J BORE									S1K	S1K	S1K	S1K	S1K	S1K	S1K							
KHG2-45L J BORE									S1K	S1K	S1K	S1K	S1K	S1K	S1K							
KHG2-48R J BORE									S1K	S1K	S1K	S1K	S1K	S1K	S1K							
KHG2-48L J BORE									S1K	S1K	S1K	S1K	S1K	S1K	S1K							
KHG2-50R J BORE											S1K	S1K	S1K	S1K	S1K							
KHG2-50L J BORE											S1K	S1K	S1K	S1K	S1K							
KHG2-60R J BORE											S1K	S1K	S1K	S1K	S1K							
KHG2-60L J BORE											S1K	S1K	S1K	S1K	S1K							
KHG2-70R J BORE											S1K	S1K	S1K	S1K	S1K	S1K						
KHG2-70L J BORE											S1K	S1K	S1K	S1K	S1K	S1K						
KHG2-80R J BORE											S1K	S1K	S1K	S1K	S1K	S1K	S1K					
KHG2-80L J BORE											S1K	S1K	S1K	S1K	S1K	S1K	S1K					
KHG2-90R J BORE											S1K	S1K	S1K	S1K	S1K	S1K	S1K					
KHG2-90L J BORE											S1K	S1K	S1K	S1K	S1K	S1K	S1K					
KHG2-100R J BORE											S1K	S1K	S1K	S1K	S1K	S1K	S1K					
KHG2-100L J BORE											S1K	S1K	S1K	S1K	S1K	S1K	S1K					

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Specifications	
Precision grade	JIS grade N6 (JIS B1702-1:1998) *
Reference section of gear	Rotating plane
Gear teeth	Standard full depth
Transverse pressure angle	20°
Helix angle	21°30'
Material	SCM440
Heat treatment	Thermal refined, tooth surface induction hardened
Tooth hardness	50 ~ 60HRC
Surface treatment	Black oxide coated except for ground part

\* The precision grade of J Series products is equivalent to the value shown in the table.



S1

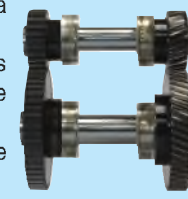
Catalog No.	No. of teeth	Direction of helix	Shape	Bore				Face width	Hub width	Total Length	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash (mm)	Weight (kg)				
				A-H7	B	C	D				Bending strength	Surface durability	Bending strength	Surface durability						
KHG2.5-18R KHG2.5-18L	18	R L	S1	15	38	45	50	20	14	34	94.8	63.4	9.67	6.47	0.10~0.20	0.33				
KHG2.5-20R KHG2.5-20L	20	R L			40	50	55										111	81.3	11.3	8.29
KHG2.5-22R KHG2.5-22L	22	R L			44	55	60													
KHG2.5-24R KHG2.5-24L	24	R L		48	60	65	143				122	14.6	12.5							
KHG2.5-25R KHG2.5-25L	25	R L		50	62.5	67.5								151	134	15.4	13.7			
KHG2.5-26R KHG2.5-26L	26	R L		50	65	70	160				146	16.3	14.9							
KHG2.5-28R KHG2.5-28L	28	R L		60	70	75								176	173	18.0	17.6			
KHG2.5-30R KHG2.5-30L	30	R L		65	75	80	193				201	19.7	20.5							
KHG2.5-32R KHG2.5-32L	32	R L		70	80	85								211	232	21.5	23.7			
KHG2.5-35R KHG2.5-35L	35	R L		70	87.5	92.5	236				284	24.1	28.9							
KHG2.5-40R KHG2.5-40L	40	R L		70	100	105								268	365	27.3	37.2			
KHG2.5-48R KHG2.5-48L	48	R L		75	120	125	336				547	34.2	55.8							
KHG2.5-50R KHG2.5-50L	50	R L		80	125	130								353	599	36.0	61.0			
KHG2.5-52R KHG2.5-52L	52	R L		80	130	135	370				652	37.7	66.5							
KHG2.5-60R KHG2.5-60L	60	R L		80	150	155								439	890	44.7	90.8			

- [Caution on Product Characteristics]
- The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 164 for more details.
  - The backlash values shown in the table are the theoretical values for the backlash in the normal direction of a pair of identical gears in mesh.
  - These gears produce axial thrust forces. See Page 167 for more details.
  - Right handed and left handed helical gears in the same module are designed to mesh as a pair, but KHG gears are not interchangeable with SH type helical gears.

- [Caution on Secondary Operations]
- Please read "Caution on Performing Secondary Operations" (Page 166) when performing modifications and/or secondary operations for safety concerns. KHK Quick-Mod Gears, the KHK's system for quick modification of KHK stock gears is also available.
  - Due to the gear teeth being induction hardened, no secondary operations can be performed on tooth areas including the bottom land (approx. 2 to 3 mm).
  - While cutting off the entire hub may cause curvature deformation by residual stress, some products are straightened and annealed after refining the material.

**Drop in Replacements for Spur Gears**

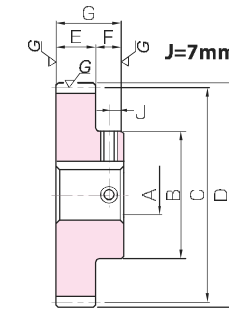
KHG ground helical gears use a "transverse" module. The assembly distance is the same as spur gear pairs with the same module and number of teeth. Improved strength and low noise: Take the next step up from spur gears.



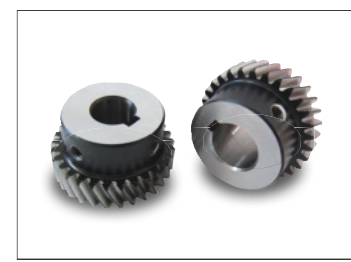
\* For details of transverse helical gears, please see Page 25 of our technical reference book.

**J Series**

**Ground Helical Gears**



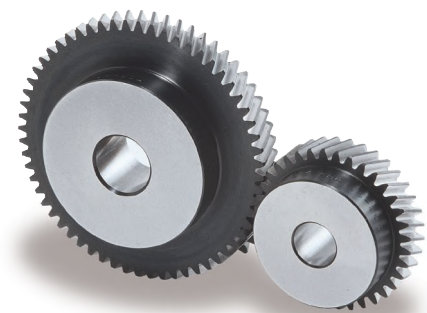
S1K



**To order J Series products, please specify; Catalog No. + J + BORE**

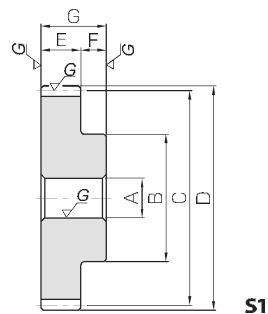
Bore H7	* The product shapes of J Series items are identified by background color.															
	15	16	17	18	19	20	22	25	28	30	32	35	40	45	50	
Keyway Js9	5 x 2.3			6 x 2.8				8 x 3.3			10 x 3.3		12 x 3.3		14 x 3.8	
Screw size	M4			M5				M6			M8		M10			
Catalog No.	S1K			S1K				S1K			S1K		S1K		S1K	
KHG2.5-18R J BORE	S1K	S1K	S1K	S1K	S1K	S1K	S1K									
KHG2.5-18L J BORE	S1K	S1K	S1K	S1K	S1K	S1K	S1K									
KHG2.5-20R J BORE				S1K	S1K	S1K	S1K									
KHG2.5-20L J BORE				S1K	S1K	S1K	S1K									
KHG2.5-22R J BORE				S1K	S1K	S1K	S1K	S1K								
KHG2.5-22L J BORE				S1K	S1K	S1K	S1K	S1K								
KHG2.5-24R J BORE				S1K	S1K	S1K	S1K	S1K	S1K							
KHG2.5-24L J BORE				S1K	S1K	S1K	S1K	S1K	S1K							
KHG2.5-25R J BORE						S1K	S1K	S1K	S1K	S1K						
KHG2.5-25L J BORE						S1K	S1K	S1K	S1K	S1K						
KHG2.5-26R J BORE						S1K	S1K	S1K	S1K	S1K	S1K					
KHG2.5-26L J BORE						S1K	S1K	S1K	S1K	S1K	S1K					
KHG2.5-28R J BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K				
KHG2.5-28L J BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K				
KHG2.5-30R J BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K			
KHG2.5-30L J BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K			
KHG2.5-32R J BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K		
KHG2.5-32L J BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K		
KHG2.5-35R J BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K		
KHG2.5-35L J BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K		
KHG2.5-40R J BORE								S1K	S1K	S1K	S1K	S1K	S1K	S1K		
KHG2.5-40L J BORE								S1K	S1K	S1K	S1K	S1K	S1K	S1K		
KHG2.5-48R J BORE								S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	
KHG2.5-48L J BORE								S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	
KHG2.5-50R J BORE								S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	
KHG2.5-50L J BORE								S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	
KHG2.5-52R J BORE								S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	
KHG2.5-52L J BORE								S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	
KHG2.5-60R J BORE								S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	
KHG2.5-60L J BORE								S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	

- [Caution on J series]
- As available-on-request products, requires a lead-time for shipping within 2 working-days (excludes the day ordered), after placing an order. Please allow additional shipping time to get to your local distributor.
  - Number of products we can process for one order is 1 to 20 units. For quantities of 21 or more pieces, we need to quote price and lead time.
  - Keyways are made according to JIS B1301 standards, Js 9 tolerance.
  - Certain products which would otherwise have a very long tapped hole are counterbored to reduce the length of the tap.
  - Areas of products which have been re-worked will not be black oxide coated.
  - For products having a tapped hole, a set screw is included.



Specifications	
Precision grade	JIS grade N6 (JIS B1702-1:1998) *
Reference section of gear	Rotating plane
Gear teeth	Standard full depth
Transverse pressure angle	20°
Helix angle	21°30'
Material	SCM440
Heat treatment	Thermal refined, tooth surface induction hardened
Tooth hardness	50 ~ 60HRC
Surface treatment	Black oxide coated except for ground part

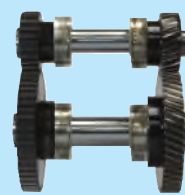
\* The precision grade of J Series products is equivalent to the value shown in the table.



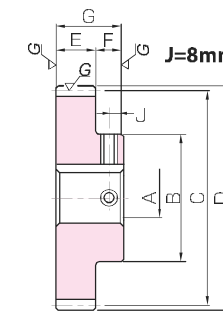
S1

**Drop in Replacements for Spur Gears**

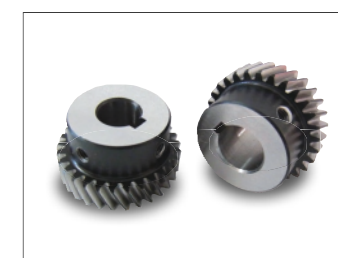
KHG ground helical gears use a "transverse" module. The assembly distance is the same as spur gear pairs with the same module and number of teeth. Improved strength and low noise: Take the next step up from spur gears.



\* For details of transverse helical gears, please see Page 25 of our technical reference book.



S1K



Catalog No.	No. of teeth	Direction of helix	Shape	Bore				Pitch dia.	Outside dia.	Face width	Hub width	Total Length	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash (mm)	Weight (kg)			
				A-H7	B	C	D						Bending strength	Surface durability	Bending strength	Surface durability					
KHG3-16R KHG3-16L	16	R L	S1	18	38	48	54	25	16	41	0.10~0.20	143	87.2	14.6	8.89	0.42					
KHG3-18R KHG3-18L	18	R L			40	54	60					171	115	17.4	11.8		0.53				
KHG3-20R KHG3-20L	20	R L			50	60	66					199	148	20.3	15.1			0.70			
KHG3-24R KHG3-24L	24	R L			58	72	78					258	224	26.3	22.8				1.03		
KHG3-25R KHG3-25L	25	R L			60	75	81					272	245	27.8	25.0					0.12~0.22	1.12
KHG3-28R KHG3-28L	28	R L			70	84	90					318	316	32.4	32.2						1.47
KHG3-30R KHG3-30L	30	R L		75	90	96	348				369	35.5	37.6	1.65							
KHG3-32R KHG3-32L	32	R L		75	96	102	363				407	37.0	41.5		1.82						
KHG3-35R KHG3-35L	35	R L		80	105	111	407				498	41.5	50.7			0.14~0.24	2.17				
KHG3-36R KHG3-36L	36	R L		80	108	114	422				530	43.0	54.0				2.27				
KHG3-40R KHG3-40L	40	R L		80	120	126	482				670	49.2	68.3					2.69			
KHG3-44R KHG3-44L	44	R L		80	132	138	543				828	55.4	84.4						3.16		
KHG3-45R KHG3-45L	45	R L	80	135	141	558	869	56.9	88.6	3.28											
KHG3-48R KHG3-48L	48	R L	85	144	150	604	1000	61.6	102		3.75										
KHG3-50R KHG3-50L	50	R L	85	150	156	635	1090	64.7	112			3.95									
KHG3-60R KHG3-60L	60	R L	90	180	186	757	1560	77.2	159				5.57								

- [Caution on Product Characteristics]
- The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 164 for more details.
  - The backlash values shown in the table are the theoretical values for the backlash in the normal direction of a pair of identical gears in mesh.
  - These gears produce axial thrust forces. See Page 167 for more details.
  - Right handed and left handed helical gears in the same module are designed to mesh as a pair, but KHG gears are not interchangeable with SH type helical gears.

- [Caution on Secondary Operations]
- Please read "Caution on Performing Secondary Operations" (Page 166) when performing modifications and/or secondary operations for safety concerns. KHK Quick-Mod Gears, the KHK's system for quick modification of KHK stock gears is also available.
  - Due to the gear teeth being induction hardened, no secondary operations can be performed on tooth areas including the bottom land (approx. 2 to 3 mm).
  - While cutting off the entire hub may cause curvature deformation by residual stress, some products are straightened and annealed after refining the material.

**To order J Series products, please specify; Catalog No. + J + BORE**

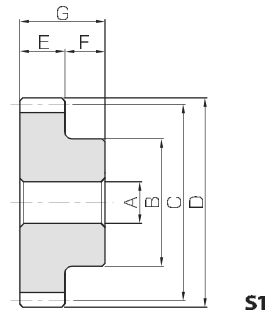
Bore H7	* The product shapes of J Series items are identified by background color.													
	18	19	20	22	25	28	30	32	35	40	45	50		
Keyway Js9	6 x 2.8			8 x 3.3			10 x 3.3			12 x 3.3			14 x 3.8	
Screw size	M5			M6			M8			M10				
Catalog No.	S1K		S1K		S1K		S1K		S1K		S1K		S1K	
KHG3-16R J BORE KHG3-16L J BORE	S1K	S1K	S1K	S1K										
KHG3-18R J BORE KHG3-18L J BORE	S1K	S1K	S1K	S1K										
KHG3-20R J BORE KHG3-20L J BORE			S1K	S1K	S1K	S1K	S1K							
KHG3-24R J BORE KHG3-24L J BORE			S1K	S1K	S1K	S1K	S1K	S1K						
KHG3-25R J BORE KHG3-25L J BORE			S1K	S1K	S1K	S1K	S1K	S1K	S1K					
KHG3-28R J BORE KHG3-28L J BORE			S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K				
KHG3-30R J BORE KHG3-30L J BORE					S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K		
KHG3-32R J BORE KHG3-32L J BORE					S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K		
KHG3-35R J BORE KHG3-35L J BORE					S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K		
KHG3-36R J BORE KHG3-36L J BORE					S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K		
KHG3-40R J BORE KHG3-40L J BORE					S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K		
KHG3-44R J BORE KHG3-44L J BORE					S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K		
KHG3-45R J BORE KHG3-45L J BORE					S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K		
KHG3-48R J BORE KHG3-48L J BORE					S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	
KHG3-50R J BORE KHG3-50L J BORE							S1K	S1K	S1K	S1K	S1K	S1K	S1K	
KHG3-60R J BORE KHG3-60L J BORE							S1K	S1K	S1K	S1K	S1K	S1K	S1K	

- [Caution on J series]
- As available-on-request products, requires a lead-time for shipping within 2 working-days (excludes the day ordered), after placing an order. Please allow additional shipping time to get to your local distributor.
  - Number of products we can process for one order is 1 to 20 units. For quantities of 21 or more pieces, we need to quote price and lead time.
  - Keyways are made according to JIS B1301 standards, Js 9 tolerance.
  - Certain products which would otherwise have a very long tapped hole are counterbored to reduce the length of the tap.
  - Areas of products which have been re-worked will not be black oxide coated.
  - For products having a tapped hole, a set screw is included.





Specifications	
Precision grade	JIS grade N8 (JIS B1702-1:1998)
Reference section of gear	Normal plane
Gear teeth	Standard full depth
Transverse pressure angle	20°
Helix angle	15°
Material	S45C
Heat treatment	—
Tooth hardness	(less than 194HB)
Surface treatment	Black oxide coating

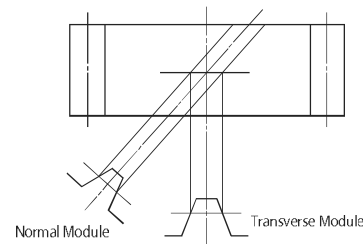


Catalog No.	Module	No. of teeth	Direction of helix	Shape	Bore		Pitch dia.	Outside dia.	Face width	Hub width	Total length
					A <sub>H7</sub>	B					
SH2-15R SH2-15L	m2	15	R L	S1	12	24	31.06	35.06	25	10	35
SH2-20R SH2-20L		20	R L	S1	12	32	41.41	45.41	25	10	35
SH2-30R SH2-30L		30	R L	S1	12	50	62.12	66.12	25	10	35
SH2-40R SH2-40L		40	R L	S1	18	60	82.82	86.82	25	10	35
SH2-60R SH2-60L		60	R L	S1	18	70	124.23	128.23	25	10	35
SH2-90R SH2-90L		90	R L	S1	18	120	186.35	190.35	25	10	35
SH3-15R SH3-15L	m3	15	R L	S1	15	36	46.59	52.59	35	15	50
SH3-20R SH3-20L		20	R L	S1	15	50	62.12	68.12	35	15	50
SH3-30R SH3-30L		30	R L	S1	20	70	93.17	99.17	35	15	50
SH3-40R SH3-40L		40	R L	S1	20	80	124.23	130.23	35	15	50
SH3-60R SH3-60L		60	R L	S1	20	140	186.35	192.35	35	15	50

- [Caution on Product Characteristics]
- The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 164 for more details.
  - The backlash values shown in the table are the theoretical values for the backlash in the normal direction of a pair of identical gears in mesh.
  - These gears produce axial thrust forces. See Page 167 for more details.
  - Right handed and left handed helical gears in the same module are designed to mesh as a pair, but SH gears are not interchangeable with KHG type helical gears.

### Reference Section of Gears

Transverse module (SH helical gears) and normal module (KHG ground helical gears) are available for the gear teeth according to the gear reference cross section. Even if products have the same helix angle and module, transverse and normal module gears have different gear teeth and thus cannot engage.



\* Above is for illustration purposes only and differs from actual tooth forms. To find more details, please see the section "4.3 Helical Gears" in separate technical reference book (Page 22).

Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash (mm)	Weight (kg)	Catalog No.
Bending strength	Surface durability	Bending strength	Surface durability			
43.7	2.90	4.46	0.30	0.12~0.26	0.15	SH2-15R SH2-15L
67.1	5.85	6.84	0.60	0.12~0.26	0.30	SH2-20R SH2-20L
117	15.3	11.9	1.56	0.14~0.30	0.72	SH2-30R SH2-30L
169	28.9	17.2	2.95	0.14~0.30	1.21	SH2-40R SH2-40L
275	70.8	28.0	7.22	0.18~0.36	2.61	SH2-60R SH2-60L
437	173	44.6	17.6	0.20~0.44	6.17	SH2-90R SH2-90L
138	9.67	14.0	0.99	0.14~0.32	0.52	SH3-15R SH3-15L
211	19.4	21.6	1.98	0.14~0.32	0.99	SH3-20R SH3-20L
368	50.2	37.5	5.12	0.18~0.38	2.20	SH3-30R SH3-30L
531	95.5	54.1	9.73	0.18~0.38	3.80	SH3-40R SH3-40L
866	236	88.3	24.0	0.20~0.44	9.18	SH3-60R SH3-60L

- [Caution on Secondary Operations]
- Please read "Caution on Performing Secondary Operations" (Page 166) when performing modifications and/or secondary operations for safety concerns. KHK Quick-Mod Gears, the KHK's system for quick modification of KHK stock gears is also available.
  - Avoid performing secondary operations that narrow the tooth width as it affects precision and strength.

### SH Helical Gear Center Distance

Catalog No.	SH2-15 <sup>R</sup> <sub>L</sub>	SH2-20 <sup>R</sup> <sub>L</sub>	SH2-30 <sup>R</sup> <sub>L</sub>	SH2-40 <sup>R</sup> <sub>L</sub>	SH2-60 <sup>R</sup> <sub>L</sub>	SH2-90 <sup>R</sup> <sub>L</sub>
SH2-15 <sup>R</sup> <sub>L</sub>	31.06	—	—	—	—	—
SH2-20 <sup>R</sup> <sub>L</sub>	36.23	41.41	—	—	—	—
SH2-30 <sup>R</sup> <sub>L</sub>	46.59	51.76	62.12	—	—	—
SH2-40 <sup>R</sup> <sub>L</sub>	56.94	62.12	72.47	82.82	—	—
SH2-60 <sup>R</sup> <sub>L</sub>	77.65	82.82	93.17	103.53	124.23	—
SH2-90 <sup>R</sup> <sub>L</sub>	108.70	113.88	124.23	134.59	155.29	186.35

### SH Helical Gear Center Distance

Catalog No.	SH3-15 <sup>R</sup> <sub>L</sub>	SH3-20 <sup>R</sup> <sub>L</sub>	SH3-30 <sup>R</sup> <sub>L</sub>	SH3-40 <sup>R</sup> <sub>L</sub>	SH3-60 <sup>R</sup> <sub>L</sub>
SH3-15 <sup>R</sup> <sub>L</sub>	46.59	—	—	—	—
SH3-20 <sup>R</sup> <sub>L</sub>	54.35	62.12	—	—	—
SH3-30 <sup>R</sup> <sub>L</sub>	69.88	77.65	93.17	—	—
SH3-40 <sup>R</sup> <sub>L</sub>	85.41	93.17	108.70	124.23	—
SH3-60 <sup>R</sup> <sub>L</sub>	116.47	124.23	139.76	155.29	186.35



## KHG Ground Helical Gears



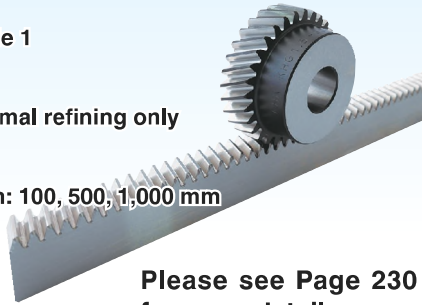
Precision: JIS Grade N6  
 Material: SCM440  
 Heat Treatment: Thermal refined /  
 gear tooth induction  
 hardened  
 Module: m1 to 3

Please see Page 168 for more details.

Recommendation

## KRHG·KRHGF·KRHGF D Ground Helical Racks

Precision: KHK Grade 1  
 Material: SCM440  
 Heat Treatment: Thermal refining only  
 Module: m1 to 3  
 Nominal Total Length: 100, 500, 1,000 mm



Please see Page 230 for more details.

## SH Steel Helical Gears



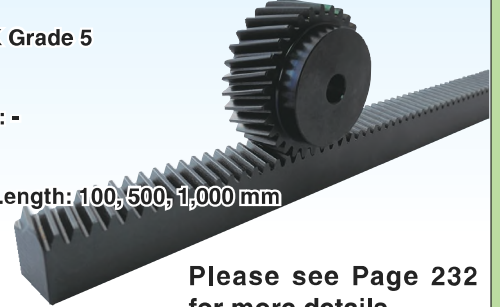
Precision: JIS Grade N8  
 Material: S45C  
 Heat Treatment: -  
 Module: m2, 3

Please see Page 178 for more details.

Recommendation

## SRH·SRHF·SRHFD Steel Helical Racks

Precision: KHK Grade 5  
 Material: S45C  
 Heat Treatment: -  
 Module: m2, 3  
 Nominal Total Length: 100, 500, 1,000 mm



Please see Page 232 for more details.

## SHE Steel Helical Gears

Dedicated for racks



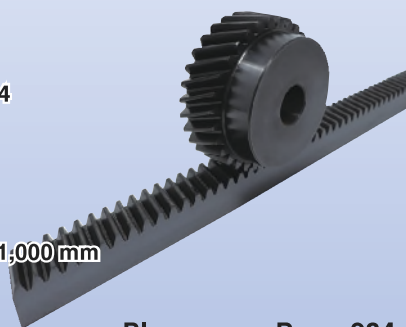
Precision: JIS Grade N8  
 Material: S45C  
 Heat Treatment: -  
 Module: m1.5 to 6

Please see Page 234 for more details.

Recommendation

## SRHEF Steel Helical Racks

Precision: KHK Grade 4  
 Material: S45C  
 Heat Treatment: -  
 Module: m1.5 to 6  
 Nominal Total Length: 1,000 mm



Please see Page 234 for more details.