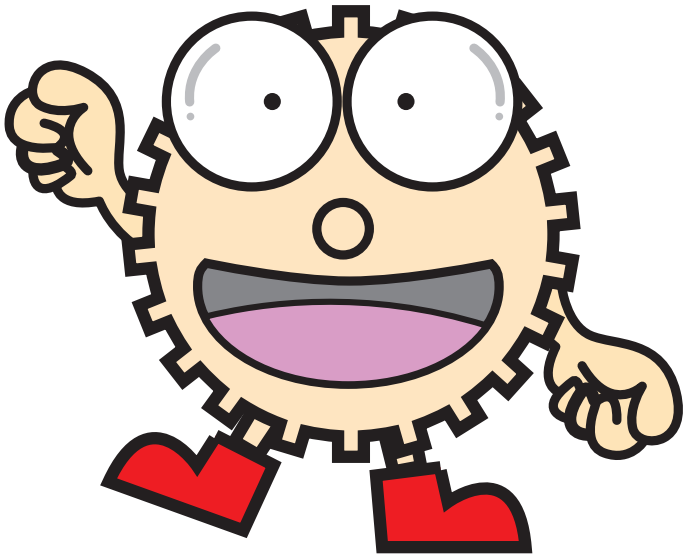
Helical Gears

KHG Ground Helical Gears	SH-H Hardened Helical Gears	SH Helical Gears
NEW JIS	NEW H	
		
Material: SCM440	Material: S45C	Material: S45C
*m*1~6 Page 196	*m*2, 3 Page 204	*m*2, 3 Page 204



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

K H G 1 - 20 R

- R — Direction of Helix (Right)
- 20 — No. of Teeth (20)
- 1 — Module (1)
- G — Other Products (Ground Gears)
- H — Type (Helical Gears)
- K — Material (SCM440)

Material

S	S45C
K	SCM440

Type

H	Helical Gears

Other Information

G	Ground Gears

Features

KHK stock helical gears are quiet, high-strength and easy to use. They are suitable wherever you require high-speed rotation including in machine tools, speed reducers, etc. The following table lists the main features.

Catalog Number	KHG	SH
Module	1~6	2~3
Reference section of gear	Rotating plane	Normal plane
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	It has excellent accuracy, strength, wear resistance and quietness, and allows secondary operations. Usable in the same center distance of the spur gear.	It has higher strength and quietness than the SS spur gears.

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

The KHK stock helical gears KHG series (transverse module) and SH series (normal module) are not interchangeable. Please keep this in mind when making your selection. Also, right hand and left hand helical mating gears operate as a set. See the photos below for reference and for help in making a proper selection.

■ Direction of Helix

Left (L) Right (R)

Pinion (L) & Rack (R)

Pinion (R) & Rack (L)

■ 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 the application environment in the table below. Therefore, they should be used as reference only. We recommend that each user computes their own values by applying the actual usage conditions.

■ 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 NOTE 2	100rpm
Design Life (Durability)	Over 10^7cycles	
Impact from motor	Uniform load	
Impact from load	Uniform load	
Direction of load	Bidirectional load (calculated with allowable bending stress of 2/3)	
Allowable bending stress at root σ_{Flim} (kgf/mm^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 σ_{Hlim} (kgf/mm^2)	112	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^2) are adjusted to the units needed in the formula.

[NOTE 2] For semi-custom gears, the rotation speed is based on 300rpm.

Product Precautions

Common Notes

[Caution on Product Characteristics]

(1) The allowable torque shown in the table are calculated values according to the assumed usage conditions. Please see page 192 for more details.
(2) The backlash values shown in the table are the theoretical values for the backlash in the normal direction of gears of the same series in mesh.
(3) A set of helical gears must be identical in module, but opposite in spiral hands.
(4) These gears produce axial thrust forces. Please see page 195 for more details.
(5) For the helical gear series combinations, see the Mating Gear Selection Chart on page 192.
(6) Keyways are made according to JIS B1301 standards, Js9 tolerance. Also note that keyway tooth position alignment is not performed.
(7) For products having a tapped hole, a set screw is included.
(8) See page 22 for more details on Hardened Plus (H Series and HJ Series).

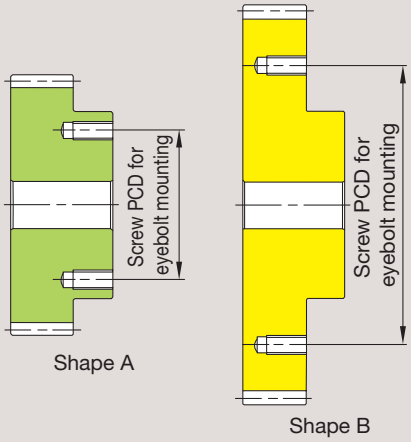
● KHK's Specifications for Heat Treatment
Hardened location: Tooth surface, or Tooth surface and Tooth root
Hardness: 50 to 60 HRC

* Hardness and Depth of Gear-teeth Induction Hardening
The hardening method and the state of the hardened teeth area vary depending on the size of gears.
Since different hardening treatment is applied in accordance with the module and number of teeth, the hardness level is referred to as the hardness of the reference diameter.
For some of our products, the hardness at tooth tip / root may not be equal to the hardness you designated.
As to the effective case depth, it is specified by JIS, as "The distance from the surface of the case to the area with hardness HV450." The case depth differs from area to area of a tooth, so the depth cannot be specified.
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).

[J Series]

(1) Certain products which would otherwise have a very long tapped hole are counterbored. For details, please see the KHK website.
(2) Black oxide is not re-applied to parts undergoing secondary operations.
(3) For bores over ϕ50, the bore tolerance is H8.

Tapped Holes in Semi-Custom Standard Products



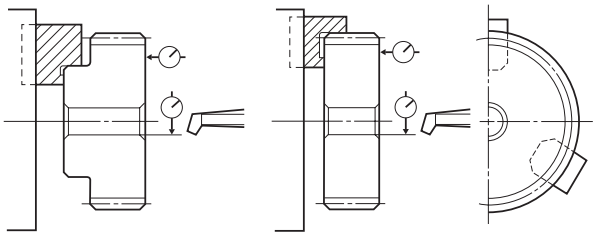
Catalog Number	Shape	Screw P.C.D. for eyebolt mounting
KHG5-50RS	A	125
KHG5-50LS	A	125
KHG5-60RS	B	215
KHG5-60LS	B	215
KHG6-36RS	A	135
KHG6-36LS	A	135
KHG6-40RS	A	145
KHG6-40LS	A	145
KHG6-50RS	A	155
KHG6-50LS	A	155
KHG6-60RS	B	245
KHG6-60LS	B	245

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. E-mail: info@khkgears.net
Please read “Cautions on Performing Secondary Operations” below when performing modifications and/or secondary operations for safety concerns.

1. Caution on Performing Secondary Operations

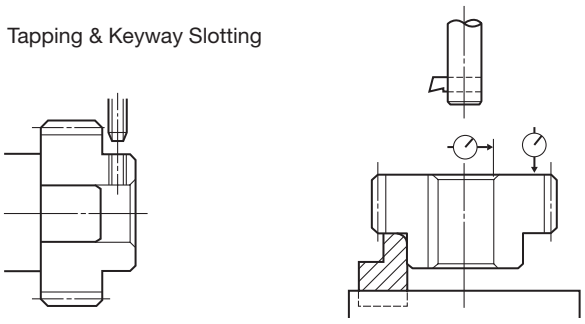
① If reboring, it is important to pay special attention to locating the center in order to avoid runout.
② The reference datum for gear machining is the bore. Therefore, use the bore for locating the center. If it is too difficult to do for small bores, the alternative is to use one spot on the bore and the runout of the side surface.
③ If reworking using scroll chucks, we recommend the use of new or rebored jaws for improved precision. Please exercise caution not to crush the teeth.



Lathe Operations

④ 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.
⑤ In order to avoid stress concentration, round the keyway corners.

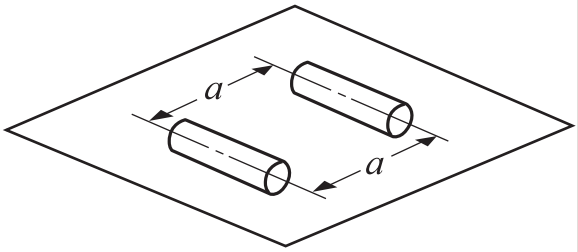
Tapping & Keyway Slotting



⑥ To avoid problems of reduced gear precision and other manufacturing difficulties, do not attempt to machine the gears to reduce face widths.
⑦ 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

① The recommended center distance tolerance of KHK stock helical gears is H7 for ground gears and H8 for cut gears.
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.



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

Where
a : Center distance
d_1 : Pitch diameter of pinion
d_2 : Pitch diameter of gear

② The table below indicates the tolerance on the total length of KHK stock spur gears. Please refer to this data when designing gearboxes or other components.

■ Total Length Tolerance for Spur and Helical Gears

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

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

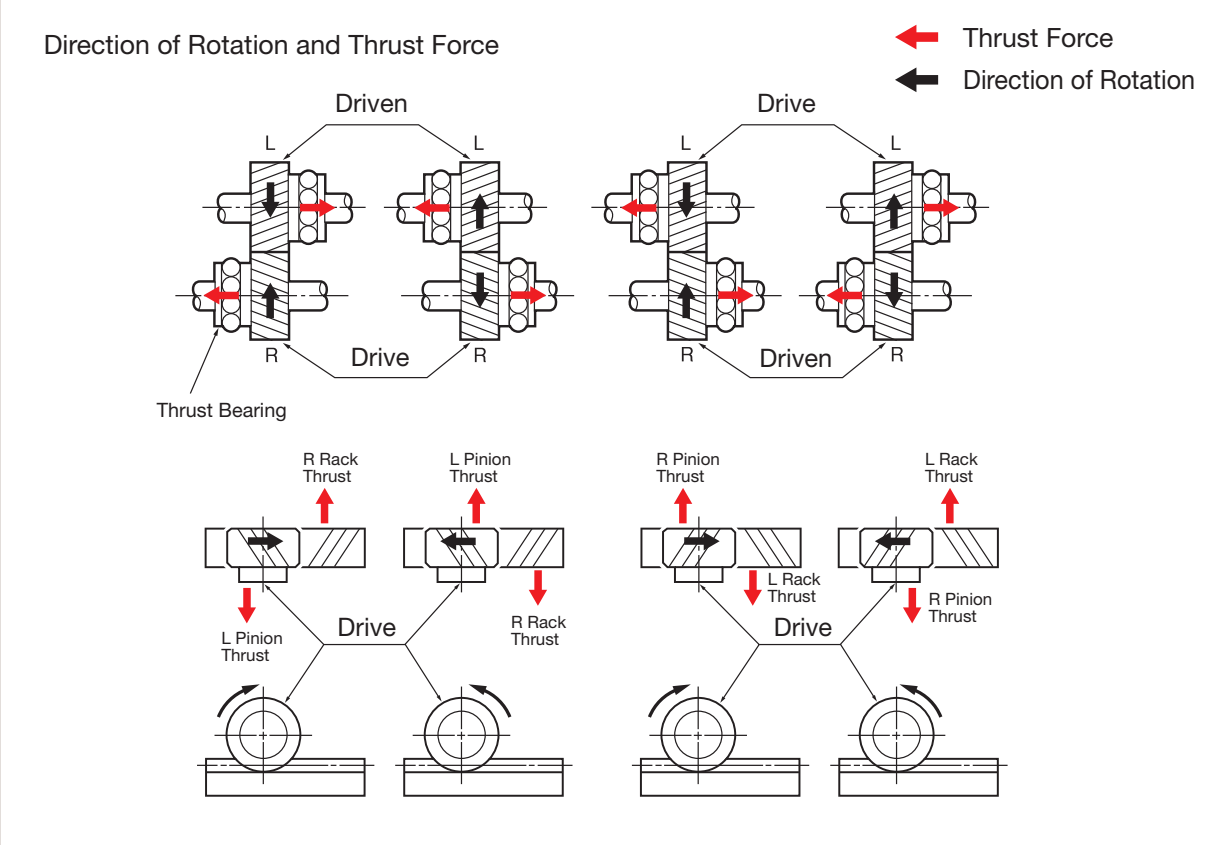
③ Verify that the two shafts are parallel. Incorrect assembly will lead to uneven teeth contact which will cause noise and wear. (After assembly, check the tooth contact by painting a thin layer of red lead primer or the like on the gear teeth, meshing them together and rotating them.)

■ 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.

④ Due to the helix of helical gears, they produce thrust force (axial). The bearings must be selected properly to be able to handle these thrust forces. The direction of the thrust forces depend on the helix direction and the direction of rotation as shown below.
For details, use gear calculation software GCSW.



3. Cautions on Starting

① 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?

② If gears are exposed, be sure to attach a safety cover to ensure safety. Also, be careful not to touch rotating gears.

③ If there is any abnormality such as noise or vibration during startup, stop the operation immediately and check the assembly condition such as tooth contact, eccentricity and looseness.

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

1. When using KHK products, follow relevant safety regulations (Occupational Safety and Health Regulations, etc.).
2. Pay attention to the following items when installing, removing, or performing maintenance and inspection of the product.
   ① Turn off the power switch.
   ② Do not reach or crawl under the product.
   ③ Wear appropriate clothing and protective equipment for the work.

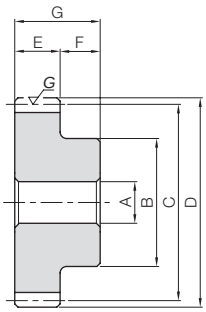
⚠ Caution Cautions in Preventing Accidents

1. Before using a KHK product, read the precautions in the catalog carefully in order to use it correctly.
2. Avoid use in environments that may adversely affect the product.
3. Our products are manufactured under a superior quality control system based on the ISO9001 quality management system; if you notice any malfunctions upon purchasing a product, please contact the supplier.

Ground Helical Gears

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, gear teeth induction hardened**
Tooth hardness	50 to 60HRC
Surface treatment	Black oxide coated except for teeth

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



S1

Catalog Number	Module	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	E	F	G	Bending strength	Surface durability	Bending strength	Surface durability		
KHG1-20R KHG1-20L	***m*1**	20	R L	S1	6	17	20	22	8	10	18	7.80	4.96	0.80	0.51	0.08~0.16	0.034
KHG1-24R KHG1-24L		24	R L		8	20	24	26				10.1	7.43	1.03	0.76		0.046
KHG1-30R KHG1-30L		30	R L		10	25	30	32				13.6	12.2	1.39	1.24		0.072
KHG1-40R KHG1-40L		40	R L			30	40	42				17.9	20.8	1.83	2.12		0.12
KHG1-50R KHG1-50L		50	R L		12	35	50	52				23.6	33.8	2.41	3.45		0.18
KHG1-60R KHG1-60L		60	R L			40	60	62				29.4	50.2	2.99	5.12		0.26
KHG1-70R KHG1-70L		70	R L			40	70	72				35.2	70.1	3.59	7.15		0.32
KHG1.5-20R KHG1.5-20L	***m*1.5**	20	R L	S1	12	24	30	33	12	12	24	26.3	17.2	2.68	1.75	0.08~0.16	0.088
KHG1.5-24R KHG1.5-24L		24	R L			28	36	39				30.9	23.4	3.16	2.39		0.13
KHG1.5-30R KHG1.5-30L		30	R L		15	38	45	48				41.8	38.4	4.26	3.92		0.22
KHG1.5-32R KHG1.5-32L		32	R L			40	48	51				45.5	44.3	4.64	4.52		0.26
KHG1.5-36R KHG1.5-36L		36	R L			45	54	57				53.0	57.4	5.40	5.85		0.33
KHG1.5-40R KHG1.5-40L		40	R L			50	60	63				60.5	72.3	6.17	7.38		0.42
KHG1.5-50R KHG1.5-50L		50	R L		18	60	75	78				79.7	118	8.13	12.0		0.63
KHG1.5-60R KHG1.5-60L		60	R L		20	60	90	93				99.1	175	10.1	17.9		0.81
KHG1.5-80R KHG1.5-80L		80	R L			70	120	123				132	313	13.5	32.0		1.37
KHG1.5-90R KHG1.5-90L		90	R L			70	135	138				151	404	15.4	41.2		1.65
KHG1.5-100R KHG1.5-100L		100	R L			70	150	153				170	508	17.4	51.8		1.97

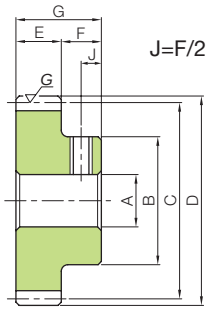
[Caution on Secondary Operations] ① Because of the influence of hardening residual stress, avoid removing the entire boss, as it may cause the gears to deform.

Product Precautions → Page 193
Precautions for Standard Machined Products → Pages 42~44

Usable in the assembly distance of the spur gear.

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.

J Series



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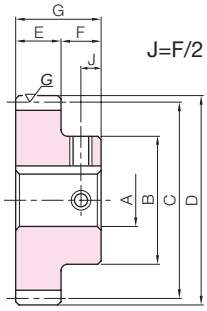

S1K

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.														
Keyway Js9	6	8	10	12	14	15	16	17	18	19	20	22	25	28	30
Screw size	—		4×1.8		5×2.3				6×2.8				8×3.3		
Catalog Number	M4	M5	M4						M5				M6		
KHG1-20R J BORE															
KHG1-20L J BORE															
KHG1-24R J BORE															
KHG1-24L J BORE															
KHG1-30R J BORE															
KHG1-30L J BORE															
KHG1-40R J BORE															
KHG1-40L J BORE															
KHG1-50R J BORE															
KHG1-50L J BORE															
KHG1-60R J BORE															
KHG1-60L J BORE															
KHG1-70R J BORE															
KHG1-70L J BORE															
KHG1.5-20R J BORE															
KHG1.5-20L J BORE															
KHG1.5-24R J BORE															
KHG1.5-24L J BORE															
KHG1.5-30R J BORE															
KHG1.5-30L J BORE															
KHG1.5-32R J BORE															
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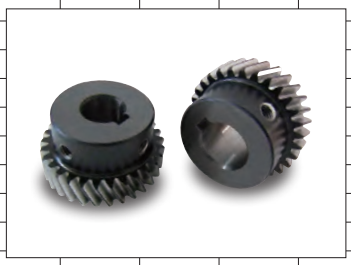
KHG1.5-40R J BORE															
KHG1.5-40L J BORE															
KHG1.5-50R J BORE															
KHG1.5-50L J BORE															
KHG1.5-60R J BORE															
KHG1.5-60L J BORE															
KHG1.5-80R J BORE															
KHG1.5-80L J BORE															
KHG1.5-90R J BORE															
KHG1.5-90L J BORE															
KHG1.5-100R J BORE															
KHG1.5-100L J BORE															



[Caution on J series] ① Cancellation is not possible for made-to-order products. See page 42 for lead times and allowable order quantities. See page 44 for other precautions.

Ground Helical Gears

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, gear teeth induction hardened**
Tooth hardness	50 to 60HRC
Surface treatment	Black oxide coated except for teeth

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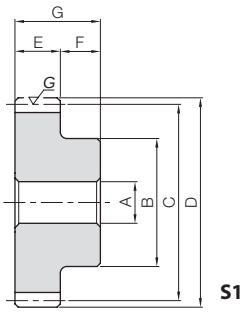


S1

Catalog Number	Module	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	E	F	G	Bending strength	Surface durability	Bending strength	Surface durability		
KHG2-15R **KHG2-15L**		15	R L		12	24	30	34				40.5	21.1	4.13	2.15		0.11
KHG2-18R **KHG2-18L**		18	R L			30	36	40				48.6	29.5	4.96	3.01		0.17
KHG2-20R **KHG2-20L**		20	R L		15	32	40	44				56.7	37.8	5.78	3.85		0.20
KHG2-25R **KHG2-25L**		25	R L			40	50	54				77.6	62.1	7.91	6.33		0.33
KHG2-26R **KHG2-26L**		26	R L			42	52	56				81.8	67.8	8.35	6.91		0.37
KHG2-30R **KHG2-30L**		30	R L		18	50	60	64				99.1	93.1	10.1	9.49		0.50
KHG2-32R **KHG2-32L**		32	R L			50	64	68				108	107	11.0	10.9		0.55
KHG2-35R **KHG2-35L**	***m*2**	35	R L	S1		50	70	74	16	13	29	121	131	12.4	13.3	0.10~0.20	0.63
KHG2-36R **KHG2-36L**		36	R L			50	72	76				126	139	12.8	14.2		0.65
KHG2-40R **KHG2-40L**		40	R L		20	60	80	84				143	176	14.6	17.9		0.85
KHG2-48R **KHG2-48L**		48	R L			60	96	100				172	251	17.5	25.6		1.13
KHG2-50R **KHG2-50L**		50	R L		25	60	100	104				181	274	18.4	28.0		1.16
KHG2-60R **KHG2-60L**		60	R L			65	120	124				225	408	22.9	41.7		1.65
KHG2-70R **KHG2-70L**		70	R L			70	140	144				269	572	27.4	58.3		2.21
KHG2-80R **KHG2-80L**		80	R L			80	160	164				301	732	30.7	74.7		2.93

[Caution on Secondary Operations] ① Because of the influence of hardening residual stress, avoid removing the entire boss, as it may cause the gears to deform.

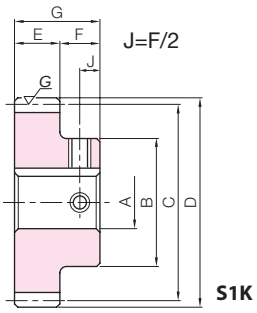
Spur Gears
Helical Gears
Internal Gears
Racks
CP Racks & Pinions
Miter Gears
Bevel Gears
Screw Gears
Worm Gears
Gearboxes
Other Products

Product Precautions → Page 193
Precautions for Standard Machined Products → Pages 42~44

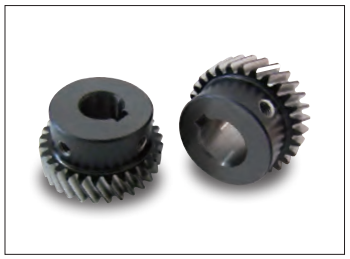
Usable in the assembly distance of the spur gear.

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.

J Series



S1K



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

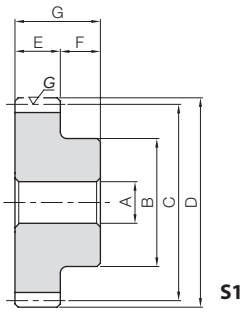
Bore H7	* The product shapes of J Series items are identified by background color.																
Keyway Js9	12	14	15	16	17	18	19	20	22	25	28	30	32	35	40	45	50
Screw size	4×1.8	5×2.3				6×2.8				8×3.3			10×3.3		12×3.3	14×3.8	
Catalog Number	M4					M5				M6			M8			M10	
KHG2-15R J BORE																	
KHG2-15L J BORE																	
KHG2-18R J BORE																	
KHG2-18L J BORE																	
KHG2-20R J BORE																	
KHG2-20L J BORE																	
KHG2-25R J BORE																	
KHG2-25L J BORE																	
KHG2-26R J BORE																	
KHG2-26L J BORE																	
KHG2-30R J BORE																	
KHG2-30L J BORE																	
KHG2-32R J BORE																	
KHG2-32L J BORE																	
KHG2-35R J BORE																	
KHG2-35L J BORE																	
KHG2-36R J BORE																	
KHG2-36L J BORE																	
KHG2-40R J BORE																	
KHG2-40L J BORE																	
KHG2-48R J BORE																	
KHG2-48L J BORE																	
KHG2-50R J BORE																	
KHG2-50L J BORE																	
KHG2-60R J BORE																	
KHG2-60L J BORE																	
KHG2-70R J BORE																	
KHG2-70L J BORE																	
KHG2-80R J BORE																	
KHG2-80L J BORE																	

[Caution on J series] ① Cancellation is not possible for made-to-order products. See page 42 for lead times and allowable order quantities. See page 44 for other precautions.

Ground Helical Gears

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, gear teeth induction hardened**
Tooth hardness	50 to 60HRC
Surface treatment	Black oxide coated except for teeth

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



Catalog Number	Module	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	E	F	G	Bending strength	Surface durability	Bending strength	Surface durability		
KHG2.5-18R KHG2.5-18L	***m*2.5**	18	R L	S1	15	38	45	50	20	14	34	94.9	58.6	9.68	5.97	0.10~0.20	0.33
KHG2.5-20R KHG2.5-20L		20	R L		18	40	50	55				111	75.0	11.3	7.65		0.38
KHG2.5-26R KHG2.5-26L		26	R L		20	50	65	70				160	135	16.3	13.7		0.65
KHG2.5-40R KHG2.5-40L		40	R L		25	70	100	105				268	335	27.3	34.1		1.53
KHG2.5-48R KHG2.5-48L		48	R L			75	120	125				336	500	34.2	51.0		2.13
KHG2.5-60R KHG2.5-60L		60	R L			80	150	155				439	815	44.8	83.2		3.20
KHG3-16R KHG3-16L	***m*3**	16	R L	S1	18	38	48	54	25	16	41	143	80.5	14.6	8.21	0.10~0.20	0.42
KHG3-18R KHG3-18L		18	R L			40	54	60				171	106	17.4	10.8		0.53
KHG3-20R KHG3-20L		20	R L		20	50	60	66				199	136	20.3	13.9		0.70
KHG3-24R KHG3-24L		24	R L			58	72	78				258	206	26.3	21.0		1.03
KHG3-28R KHG3-28L		28	R L			70	84	90				318	290	32.4	29.6		1.47
KHG3-30R KHG3-30L		30	R L		25	75	90	96				349	339	35.5	34.5		1.65
KHG3-35R KHG3-35L		35	R L			80	105	111				407	456	41.5	46.5		2.17
KHG3-36R KHG3-36L		36	R L			80	108	114				422	485	43.1	49.5		2.27
KHG3-40R KHG3-40L		40	R L			80	120	126				483	613	49.2	62.5		2.69
KHG3-45R KHG3-45L		45	R L			80	135	141				559	795	57.0	81.0		3.28
KHG3-48R KHG3-48L		48	R L			85	144	150				604	916	61.6	93.4		3.75
KHG3-50R KHG3-50L		50	R L		30	85	150	156				635	1000	64.8	102		3.95
KHG3-60R KHG3-60L		60	R L			90	180	186				757	1430	77.2	146		5.57

[Caution on Secondary Operations] ① Because of the influence of hardening residual stress, avoid removing the entire boss, as it may cause the gears to deform.

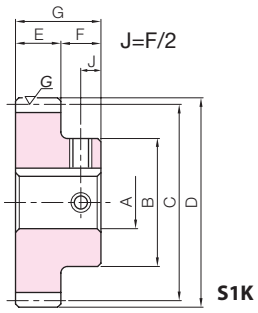
Spur Gears
Helical Gears
Internal Gears
Racks
CP Racks & Pinions
Miter Gears
Bevel Gears
Screw Gears
Worm Gears
Gearboxes
Other Products

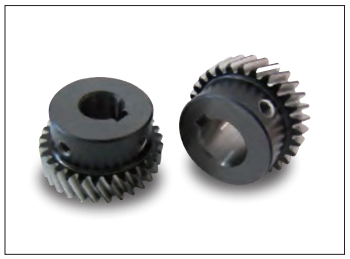
Product Precautions → Page 193
Precautions for Standard Machined Products → Pages 42~44

Usable in the assembly distance of the spur gear.

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.

J Series





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.															
Keyway Js9	15	16	17	18	19	20	22	25	28	30	32	35	40	45	50	
Screw size	5×2.3			6×2.8				8×3.3			10×3.3		12×3.3	14×3.8		
Catalog Number	M4			M5				M6			M8			M10		
KHG2.5-18R J BORE																
KHG2.5-18L J BORE																
KHG2.5-20R J BORE																
KHG2.5-20L J BORE																
KHG2.5-26R J BORE																
KHG2.5-26L J BORE																
KHG2.5-40R J BORE																
KHG2.5-40L J BORE																
KHG2.5-48R J BORE																
KHG2.5-48L J BORE																
KHG2.5-60R J BORE																
KHG2.5-60L J BORE																
KHG3-16R J BORE																
KHG3-16L J BORE																
KHG3-18R J BORE																
KHG3-18L J BORE																
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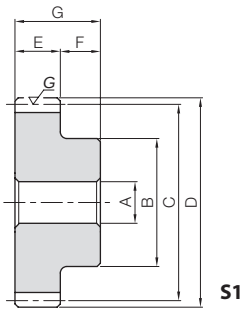
KHG3-48L J BORE																
KHG3-50R J BORE																
KHG3-50L J BORE																
KHG3-60R J BORE																
KHG3-60L J BORE																

[Caution on J series] ① Cancellation is not possible for made-to-order products. See page 42 for lead times and allowable order quantities. See page 44 for other precautions.

Ground Helical Gears NEW

Specifications	
Precision grade	JIS grade N6 (JIS B 1702-1: 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, gear teeth induction hardened**
Tooth hardness	50 to 60HRC
Surface treatment	—

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



S1

Catalog Number	Module	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	E	F	G	Bending strength	Surface durability	Bending strength	Surface durability		
KHG4-18RS S KHG4-18LS S	*m4*	18	R L	S1	20	60	72	80	32	25	57	389	244	39.7	24.9	0.10~0.20	1.44
KHG4-20RS S KHG4-20LS S		20	R L			65	80	88				454	312	46.3	31.8		1.77
KHG4-25RS S KHG4-25LS S		25	R L			80	100	108				621	513	63.3	52.3		2.82
KHG4-30RS S KHG4-30LS S		30	R L			90	120	128				793	769	80.9	78.4		3.95
KHG4-36RS S KHG4-36LS S		36	R L		25		144	152				1000	1150	102	117		5.12
KHG4-40RS S KHG4-40LS S		40	R L				160	168				1150	1450	117	148		6.08
KHG4-50RS S KHG4-50LS S		50	R L		30	100	200	208				1450	2270	147	231		9.12
KHG4-60RS S KHG4-60LS S		60	R L			110	240	248				1800	3380	183	344		12.9
KHG5-18RS S KHG5-18LS S	*m5*	18	R L	S1	25	70	90	100	40	25	65	759	484	77.4	49.3	0.10~0.22	2.50
KHG5-20RS S KHG5-20LS S		20	R L			82	100	110				886	620	90.3	63.2		3.25
KHG5-25RS S KHG5-25LS S		25	R L			105	125	135				1210	1020	124	104		5.30
KHG5-30RS S KHG5-30LS S		30	R L			120	150	160				1550	1530	158	156		7.52
KHG5-36RS S KHG5-36LS S		36	R L		30	130	180	190				1960	2290	200	234		10.2
KHG5-40RS S KHG5-40LS S		40	R L			140	200	210				2140	2770	219	282		12.5
KHG5-50RS S KHG5-50LS S		50	R L			150	250	260				2820	4520	288	461		18.5
KHG5-60RS S KHG5-60LS S		60	R L				300	310				3510	6740	358	687		25.3
KHG6-18RS S KHG6-18LS S	*m6*	18	R L	S1	25	80	108	120	48	28	76	1310	848	134	86.5	0.10~0.22	4.26
KHG6-20RS S KHG6-20LS S		20	R L			100	120	132				1530	1090	156	111		5.69
KHG6-25RS S KHG6-25LS S		25	R L		30	125	150	162				2090	1790	214	182		8.93
KHG6-30RS S KHG6-30LS S		30	R L			150	180	192				2680	2690	273	274		13.1
KHG6-36RS S KHG6-36LS S		36	R L			160	216	228				3240	3850	331	393		17.8
KHG6-40RS S KHG6-40LS S		40	R L			170	240	252				3710	4860	378	496		21.6
KHG6-50RS S KHG6-50LS S		50	R L		40	180	300	312				4880	7950	497	811		31.5
KHG6-60RS S KHG6-60LS S		60	R L				360	372				5810	11400	593	1160		43.2

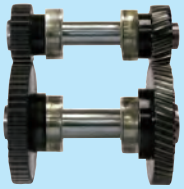
[Caution on Product Characteristics] ① Products with S at the end of the catalog number are semi-custom stock products. See page 42 for lead times and allowable order quantities. See page 44 for other precautions.
② For S semi-custom standard products weighing 15 kg or more, eyebolt screw threads (2-M12 depth 25 mm) are machined around the outside of the hub side surface. Details of the PCD of the screw threads are located on page 193.

[Caution on Secondary Operations] ① Because of the influence of hardening residual stress, avoid removing the entire boss, as it may cause the gears to deform.

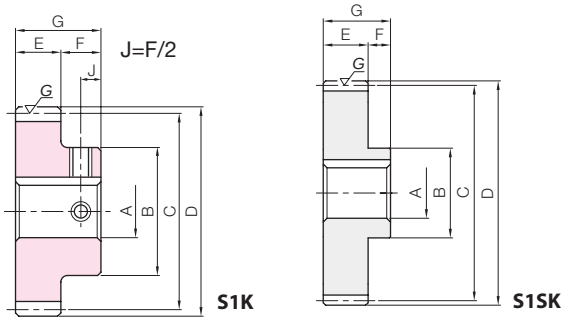
Product Precautions → Page 193
Precautions for Standard Machined Products → Pages 42~44

Usable in the assembly distance of the spur gear.

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.



J Series



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.																					
Keyway Js9	20	22	25	28	30	32	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110
Screw size	6×2.8		8×3.3			10×3.3		12×3.3	14×3.8		16×4.3	18×4.4		20×4.9		22×5.4		25×5.4		28×6.4		
Catalog Number	M5		M6			M8			M10		M12			M16				M20				
KHG4-18RS J BORE	Ask for Quote																					
KHG4-18LS J BORE	Ask for Quote																					
KHG4-20RS J BORE	Ask for Quote																					
KHG4-20LS J BORE	Ask for Quote																					
KHG4-25RS J BORE	Ask for Quote																					
KHG4-25LS J BORE	Ask for Quote																					
KHG4-30RS J BORE	Ask for Quote																					
KHG4-30LS J BORE	Ask for Quote																					
KHG4-36RS J BORE			Ask for Quote																			
KHG4-36LS J BORE			Ask for Quote																			
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KHG4-40LS J BORE			Ask for Quote																			
KHG4-50RS J BORE					Ask for Quote																	
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KHG4-60RS J BORE					Ask for Quote																	
KHG4-60LS J BORE					Ask for Quote																	
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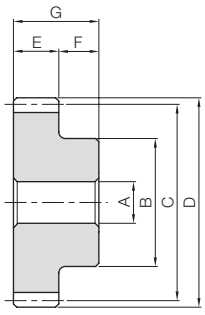
KHG6-60LS J BORE								Ask for Quote														

[Caution on J series] ① Cancellation is not possible for made-to-order products. See page 42 for lead times and allowable order quantities. See page 44 for other precautions.

Helical Gears NEW

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



S1

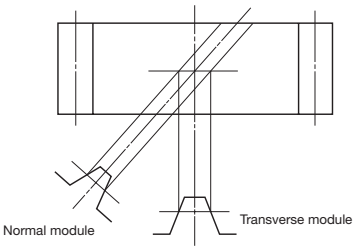
H To order Hardened Plus, please specify Catalog No. + H. **Example: SH2-15RH**

Catalog Number	Module	No. of teeth	Direction of helix	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total length
					A_{H7}	B	C	D	E	F	G
SH2-15R H SH2-15L H	*m*2	15	R L	S1	12	24	31.06	35.06	25	10	35
SH2-20R H SH2-20L H		20	R L		12	32	41.41	45.41			
SH2-30R H SH2-30L H		30	R L		12	50	62.12	66.12			
SH2-40R H SH2-40L H		40	R L		18	60	82.82	86.82			
SH2-60R H SH2-60L H		60	R L		18	70	124.23	128.23			
SH3-15R H SH3-15L H	*m*3	15	R L	S1	15	36	46.59	52.59	35	15	50
SH3-20R H SH3-20L H		20	R L		15	50	62.12	68.12			
SH3-30R H SH3-30L H		30	R L		20	70	93.17	99.17			
SH3-40R H SH3-40L H		40	R L		20	80	124.23	130.23			
SH3-60R H SH3-60L H		60	R L		20	140	186.35	192.35			

[Caution on Secondary Operations] ① See Page 22 for more details on Hardened Plus (H Series and HJ Series).

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 are not enterchangable.



* Above is for illustration purposes only and differs from actual tooth forms.

Allowable torque						Backlash (mm)	Weight (kg)	Catalog Number
Bending strength		Surface durability		Surface durability (H)				
N·m	kgf·m	N·m	kgf·m	N·m	kgf·m			
43.7	4.46	2.90	0.30	13.7	1.40	0.12~0.26	0.15	SH2-15R (H) SH2-15L (H)
67.1	6.84	5.85	0.60	27.2	2.78		0.30	SH2-20R (H) SH2-20L (H)
117	11.9	15.3	1.56	69.8	7.12		0.72	SH2-30R (H) SH2-30L (H)
169	17.2	28.9	2.95	130	13.3		1.21	SH2-40R (H) SH2-40L (H)
275	28.0	70.8	7.22	310	31.6		2.61	SH2-60R (H) SH2-60L (H)
138	14.0	9.67	0.99	44.8	4.57	0.14~0.32	0.52	SH3-15R (H) SH3-15L (H)
211	21.6	19.4	1.98	88.7	9.05		0.99	SH3-20R (H) SH3-20L (H)
368	37.5	50.2	5.12	225	22.9		2.20	SH3-30R (H) SH3-30L (H)
531	54.1	95.5	9.73	418	42.6		3.80	SH3-40R (H) SH3-40L (H)
866	88.3	236	24.0	993	101		9.18	SH3-60R (H) SH3-60L (H)

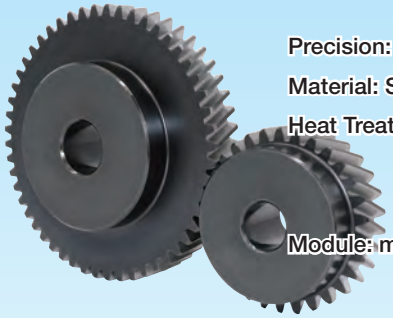
■ Center Distance Table of SH Helical Gears

Catalog Number	SH2-15 R/L	SH2-20 R/L	SH2-30 R/L	SH2-40 R/L	SH2-60 R/L
SH2-15 R/L	31.06	—	—	—	—
SH2-20 R/L	36.23	41.41	—	—	—
SH2-30 R/L	46.59	51.76	62.12	—	—
SH2-40 R/L	56.94	62.12	72.47	82.82	—
SH2-60 R/L	77.65	82.82	93.17	103.53	124.23

■ Center Distance Table of SH Helical Gears

Catalog Number	SH3-15 R/L	SH3-20 R/L	SH3-30 R/L	SH3-40 R/L	SH3-60 R/L
SH3-15 R/L	46.59	—	—	—	—
SH3-20 R/L	54.35	62.12	—	—	—
SH3-30 R/L	69.88	77.65	93.17	—	—
SH3-40 R/L	85.41	93.17	108.70	124.23	—
SH3-60 R/L	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 teeth induction hardened
Module: m1 to 6

Please see Page 196 for more details.

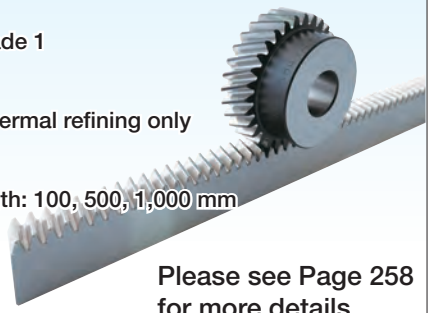
SH Helical Gears

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

Please see Page 204 for more details.

KRHG/KRHGF/KRHGFD Ground Helical Racks

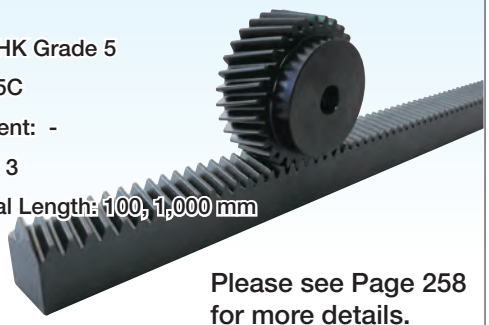
Precision: KHK Grade 1
Material: SCM440
Heat Treatment: Thermal refining only
Module: m1 to 3
Nominal Total Length: 100, 500, 1,000 mm



Please see Page 258 for more details.

SRH·SRHF·SRHFD Helical Racks

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



Please see Page 258 for more details.

ZSTP Ground Helical Gears

Dedicated for racks

Precision: JIS Grade N6
Material: SCM440
Heat Treatment: Thermal refined / gear teeth induction hardened
Module: m2 to 6

Please see Page 266 for more details.

SHE Helical Gears

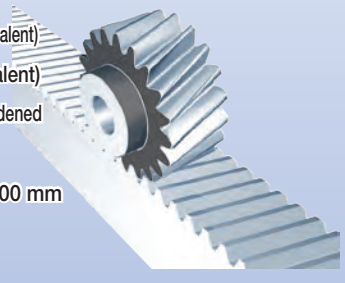
Dedicated for racks

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

Please see Page 264 for more details.

ZST/ZSTD Hardened Ground Helical Racks

Precision: DIN Grade 6 (KHK Grade 2 equivalent)
Material: DIN C45 (JIS S45C equivalent)
Heat Treatment: Gear teeth induction hardened
Module: m2 to 6
Nominal Total Length: 1,000, 2,000 mm



Please see Page 266 for more details.

SRHEF Helical Racks

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

Please see Page 264 for more details.