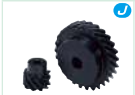
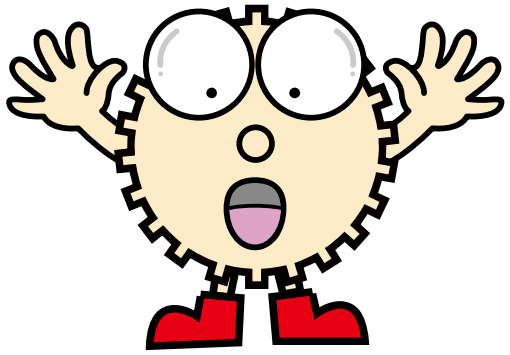
Screw Gears

SN Screw Gears	SUN Stainless Steel Screw Gears	AN Screw Gears	PN Plastic Screw Gears
	NEW 	NEW 	NEW 
Material: S45C	Material: SUS303	Material: CAC702 (A & BC2)	Material: MC901
*m*1~4 Page 372	*m*1~3 Page 376	*m*1~3 Page 378	*m*1~3 Page 380



Catalog Number of KHK Stock Gears

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

(Example) Screw Gears

S N 1 - 13 R

- R — Direction of Helix (Right)
- 13 — No. of Teeth (13)
- 1 — Module (1)
- N — Type (Screw Gears)
- S — Material (S45C)

Material		Type	
S	S45C	N	Screw Gears
SU	Stainless Steel		
A	CAC702		
P	MC901		

Features

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

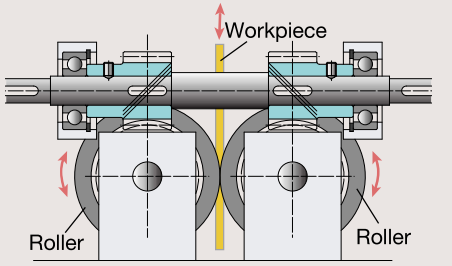
Catalog Number	Module	Material	Heat Treatment	Tooth Surface Finish	Precision JIS B 1702-1:1998	Secondary Operations	Features
SN	1~4	S45C	—	Cut	N9	○	Many lineups are available at a low price. The teeth can be additionally hardened.
SUN	1~3	SUS303	—	Cut	N9	○	Stainless steel gears with rust resistance.
AN	1~3	CAC702 (A ℓ BC2)	—	Cut	N9	○	Aluminum bronze made gears with excellent wear resistance.
PN	1~3	MC901	—	Cut	N10	○	Nylon gears can be used with no lubrication.

○ Possible △ Partly possible × Not possible

Application Examples

KHK stock screw gears are used in various labor-saving machines including conveyor machine and transport.

■ Design example of feeding device (not a design for machinery or a device in actual use)



Rotate the roller in reverse with one input shaft and move the pinched workpiece vertically

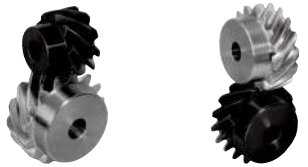
Selection Hints

Please select the most suitable products by carefully considering the characteristics of items and contents of the product tables. Since screw gears come in right- or left-hand helix, make sure to include the letter “R” or “L” in the catalog number when you order.

1. Caution in Selecting the Mating Gears

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

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



Right (R) Left (L)

Arrangements of helix directions of screw gears

2. Caution in Selecting Gears Based on Gear Strength

The allowable surface strengths listed in the product pages were derived using the Niemann formula as reference values. (Used with skewed shafts) There is a paucity of data on the strength of screw gears. The values of constant K_0 used in the calculations, which depend on the material of the mating gears, are our estimates. The mathematic expression below shows the Niemann formula to determine allowable tangential force Ft (kgf) and allowable torque T (kgf·m) on a basic circle.

$$Ft = 1.43 d_1^2 fz Ks$$

$$T = \frac{Ft d_1}{2000}$$

Here, d_1 : standard pitch diameter of pinion (mm)
fz : coefficient based on no. of teeth combination
Ks : coefficient based on materials and sliding speed

$$Ks = K_0 \frac{2}{2+Vs}$$

Here, K_0 : coefficient based on material selection
Vs : sliding speed (m/s)

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

Here, n : rotational speed (rpm)
β : helix angle (45°)

■ fz value

Z_2 \ Z_1	10	13	15	20	26	30
10	1.538					
13	2.005	1.538				
15	2.279	1.786	1.538			
20	2.963	2.329	2.053	1.538		
26	3.695	2.963	2.588	2.005	1.538	
30	4.161	3.350	2.963	2.279	1.786	1.538

■ Setting values depending on usage conditions

Catalog Number	Mating gear	K0 value	Maximum allowable sliding speed m/s	No. of teeth of mating gears	Rotational Speed
SN	SN	0.0030	2.5	Same no. of teeth	100rpm
SUN	SN	0.0030 Note 1	2.5 Note 1		
AN	SN	0.0050	5		
PN	SN	0.0030 Note 1 (0.0021)	2.5 Note 1 (1.0)		

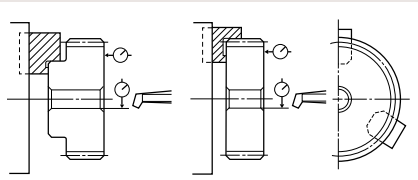
[NOTE 1] K0 values and the maximum allowable sliding speed of SUN & PN products are set by KHK. Screw gears are basically used with lubrication. In case of using PN products without lubrication, the parenthetical values shown in the table are applied.

Application Hints

In order to use KHK stock screw gears safely, read the Application Hints carefully before proceeding.
Please refer to Page 40 for “Cautions on Handling” and Page 41 for “Cautions on Starting”.

1. Caution on Performing Secondary Operations

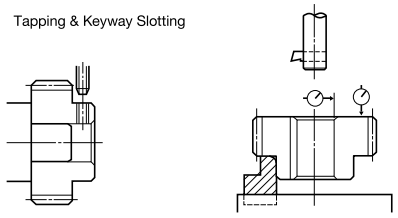
① If reboring, it is important to pay special attention to locating the center in order to avoid runout.
② The reference datum for gear machining is the bore. Therefore, use the bore for locating the center. If it is too difficult to do for small bores, the alternative is to use one spot on the bore 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

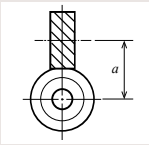


2. Points of Caution during Assembly

① The recommended center distance tolerance of KHK stock screw gears is H7 for ground gears and H8 for cut gears. The amount of backlash is given in the product table for each gear.

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

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



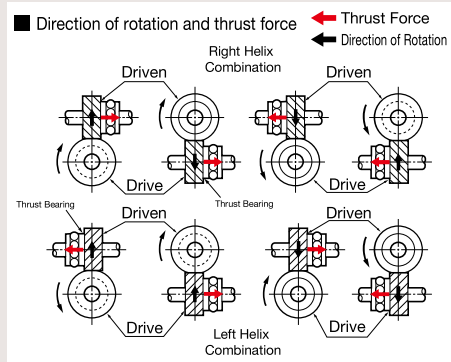
② Total Length Tolerance for Screw Gears

Total Length (mm)	Tolerance
30 or less	0 −0.10
31 to 100	0 −0.15

[NOTE] PN Plastic Screw Gears are excluded.

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

■ Direction of rotation and thrust force



[NOTE] For parallel shaft applications, see the Application Hints for KHK Helical Gears (Page 193).

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

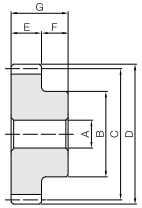
1. When using KHK products, follow relevant safety regulations (Occupational Safety and Health Regulations, etc.).
2. Pay attention to the following items when installing, removing, or performing maintenance and inspection of the product.
   ① Turn off the power switch.
   ② Do not reach or crawl under 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 ISO9000 quality management system; if you notice any malfunctions upon purchasing a product, please contact the supplier.

Specifications	
Precision grade	JIS grade N9 (JIS B1702-1: 1998)*
Reference section of gear	Normal plane
Gear teeth	Standard full depth
Normal pressure angle	20°
Helix angle	45°
Material	S45C
Heat treatment	–
Surface treatment	Black oxide coating

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



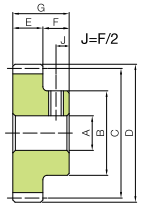
S1

Catalog Number	Module	No. of teeth	Direction of helix	Shape	Bore A_{H7}	Hub dia. B	Pitch dia. C	Outside dia. D	Face width E	Hub width F	Total length G	Allowable torque (N·m) Surface durability	Allowable torque (kgf·m) Surface durability	Backlash (mm)	Weight (kg)
SN1-13R SN1-13L	*m*1	13	R L	S1	6	15	18.38	20.38	10	10	20	0.19	0.019	0.08~0.18	0.030
SN1-15R SN1-15L		15	R L			18	21.21	23.21				0.29	0.029		0.043
SN1-20R SN1-20L		20	R L		8	25	28.28	30.28				0.66	0.068		0.080
SN1-26R SN1-26L		26	R L		10	30	36.77	38.77				1.42	0.14		0.13
SN1-30R SN1-30L		30	R L			35	42.43	44.43				2.14	0.22		0.17
SN1.5-10R SN1.5-10L	*m*1.5	10	R L	S1	8	16	21.21	24.21	15	10	25	0.29	0.029	0.10~0.22	0.048
SN1.5-13R SN1.5-13L		13	R L		10	23	27.58	30.58				0.62	0.063		0.088
SN1.5-15R SN1.5-15L		15	R L			25	31.82	34.82				0.93	0.095		0.12
SN1.5-20R SN1.5-20L		20	R L		12	30	42.43	45.43				2.14	0.22		0.20
SN1.5-26R SN1.5-26L		26	R L			40	55.15	58.15				4.51	0.46		0.36
SN1.5-30R SN1.5-30L		30	R L			45	63.64	66.64				6.75	0.69		0.48
SN2-10R SN2-10L	*m*2	10	R L	S1	12	22	28.28	32.28	20	15	35	0.66	0.068	0.12~0.26	0.11
SN2-13R SN2-13L		13	R L			30	36.77	40.77				1.42	0.14		0.22
SN2-15R SN2-15L		15	R L			35	42.43	46.43				2.14	0.22		0.30
SN2-20R SN2-20L		20	R L		15	45	56.57	60.57				4.84	0.49		0.53
SN2-26R SN2-26L		26	R L		20	60	73.54	77.54				10.1	1.03		0.91
SN2-30R SN2-30L		30	R L			65	84.85	88.85				15.0	1.53		1.19

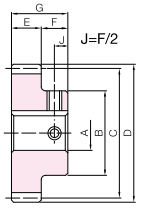
[Caution on Product Characteristics]
① When mating screw gears are made of the same material, they may cause abrasion and scoring. It is recommended to mate screw gears composed of different materials.
② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 370 for more details.
③ 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.
④ For offset shaft applications, match a RH with a RH, or LH with a LH, to make a set of screw gears. For parallel shaft applications, mesh opposite hands (RH and LH) of helical gear sets. Please see Page 370 for more details.
⑤ If the bore diameter is less than ϕ4, the bore tolerance class is H8. If the bore diameter is ϕ5 or ϕ6, and the hole length (total length) exceeds 3 times the diameter, then the class is also H8.

[Caution on Secondary Operations]
① Please read "Cautions on Performing Secondary Operations" (Page 371) when performing modifications and/or secondary operations for safety concerns.
KHK Quick-Mod Gears, the KHK system for quick modification of KHK stock gears, is also available.
② Avoid performing secondary operations that narrow the tooth width, as it affects precision and strength.

J Series



S1T



S1K

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

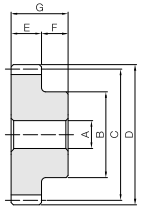
Bore $_{H7}$	* The product shapes of J Series items are identified by background color.																
Keyway $_{Js9}$	6	8	10	12	14	15	16	17	18	19	20	22	25	28	30	32	35
Screw size	–		4×1.8		5×2.3				6×2.8				8×3.3			10×3.3	
Catalog Number	M4	M5	M4						M5				M6			M8	
SN1-13R J BORE	S1T																
SN1-13L J BORE	S1T																
SN1-15R J BORE	S1T	S1T															
SN1-15L J BORE	S1T	S1T															
SN1-20R J BORE		S1T	S1K	S1K													
SN1-20L J BORE		S1T	S1K	S1K													
SN1-26R J BORE			S1K	S1K	S1K	S1K	S1K	S1K									
SN1-26L J BORE			S1K	S1K	S1K	S1K	S1K	S1K									
SN1-30R J BORE			S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K							
SN1-30L J BORE			S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K							
SN1.5-10R J BORE		S1T															
SN1.5-10L J BORE		S1T															
SN1.5-13R J BORE			S1K														
SN1.5-13L J BORE			S1K														
SN1.5-15R J BORE			S1K	S1K													
SN1.5-15L J BORE			S1K	S1K													
SN1.5-20R J BORE				S1K	S1K	S1K	S1K	S1K									
SN1.5-20L J BORE				S1K	S1K	S1K	S1K	S1K									
SN1.5-26R J BORE				S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K					
SN1.5-26L J BORE				S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K					
SN1.5-30R J BORE				S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K				
SN1.5-30L J BORE				S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K				
SN2-10R J BORE				S1K													
SN2-10L J BORE				S1K													
SN2-13R J BORE				S1K	S1K	S1K	S1K	S1K									
SN2-13L J BORE				S1K	S1K	S1K	S1K	S1K									
SN2-15R J BORE				S1K	S1K	S1K	S1K	S1K	S1K	S1K							
SN2-15L J BORE				S1K	S1K	S1K	S1K	S1K	S1K	S1K							
SN2-20R J BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K				
SN2-20L J BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K				
SN2-26R J BORE											S1K	S1K	S1K	S1K	S1K	S1K	S1K
SN2-26L J BORE											S1K	S1K	S1K	S1K	S1K	S1K	S1K
SN2-30R J BORE											S1K	S1K	S1K	S1K	S1K	S1K	S1K
SN2-30L J BORE											S1K	S1K	S1K	S1K	S1K	S1K	S1K

[Caution on J series]
① As available-on-request products, these require a lead-time for shipping of 2 working days (excludes the day ordered), after placing an order. Because the machining starts immediately, we cannot accept cancellations. Please see Page 34 for more details.
② Number of pieces we can process for one order is 1 to 20 units. For larger quantities, please request price and delivery quotes.
③ Keyways are made according to JIS B1301 standards, Js9 tolerance.
④ Certain products which would otherwise have a very long tapped hole are counterbored to reduce the length of the tap. For details, please see the KHK Web Catalog.
⑤ Areas of products which have been re-worked will not be black oxide coated.
⑥ For products having a tapped hole, a set screw is included.
⑦ 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.

SN Module 2.5, 3, 4
Screw gear (helical gear)

Specifications	
Precision grade	JIS grade N9 (JIS B1702-1: 1998)*
Reference section of gear	Normal plane
Gear teeth	Standard full depth
Normal pressure angle	20°
Helix angle	45°
Material	S45C
Heat treatment	–
Surface treatment	Black oxide coating

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



S1

Catalog Number	Module	No. of teeth	Direction of helix	Shape	Bore A_{H7}	Hub dia. B	Pitch dia. C	Outside dia. D	Face width E	Hub width F	Total length G	Allowable torque (N·m) Surface durability	Allowable torque (kgf·m) Surface durability	Backlash (mm)	Weight (kg)
SN2.5-10R **SN2.5-10L**	***m*2.5**	10	R L	S1	12	26	35.36	40.36	22	16	38	1.27	0.13	0.14~0.28	0.20
SN2.5-13R **SN2.5-13L**		13	R L		15	35	45.96	50.96				2.68	0.27		0.35
SN2.5-15R **SN2.5-15L**		15	R L			40	53.03	58.03				4.03	0.41		0.49
SN2.5-20R **SN2.5-20L**		20	R L		20	60	70.71	75.71				9.07	0.92		0.94
SN2.5-26R **SN2.5-26L**		26	R L			70	91.92	96.92				18.8	1.91		1.54
SN2.5-30R **SN2.5-30L**		30	R L			80	106.07	111.07				27.7	2.83		2.06
SN3-10R **SN3-10L**	***m*3**	10	R L	S1	15	34	42.43	48.43	25	18	43	2.14	0.22	0.14~0.32	0.35
SN3-13R **SN3-13L**		13	R L		20	45	55.15	61.15				4.51	0.46		0.59
SN3-15R **SN3-15L**		15	R L			50	63.64	69.64				6.75	0.69		0.80
SN3-20R **SN3-20L**		20	R L			60	84.85	90.85				15.0	1.53		1.40
SN3-26R **SN3-26L**		26	R L			80	110.31	116.31				30.8	3.14		2.48
SN3-30R **SN3-30L**		30	R L			90	127.28	133.28				45.4	4.62		3.29
SN4-10R **SN4-10L**	***m*4**	10	R L	S1	20	45	56.57	64.57	30	20	50	4.84	0.49	0.18~0.38	0.72
SN4-13R **SN4-13L**		13	R L			60	73.54	81.54				10.1	1.03		1.32
SN4-15R **SN4-15L**		15	R L			70	84.85	92.85				15.0	1.53		1.81
SN4-20R **SN4-20L**		20	R L			90	113.14	121.14				33.0	3.37		3.24
SN4-26R **SN4-26L**		26	R L			100	147.08	155.08				66.7	6.80		5.11
SN4-30R **SN4-30L**		30	R L			110	169.71	177.71				97.1	9.91		6.70

[Caution on Product Characteristics]
① When mating screw gears are made of the same material, they may cause abrasion and scoring. It is recommended to mate screw gears composed of different materials.
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[Caution on Secondary Operations]
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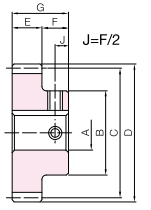
KHK Quick-Mod Gears, the KHK system for quick modification of KHK stock gears, is also available.
② Avoid performing secondary operations that narrow the tooth width, as it affects precision and strength.

J Series



S1K

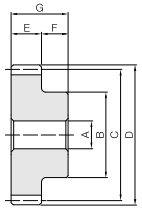
To order J Series products, please specify: Catalog No. + J + BORE.

Bore $_{H7}$	* The product shapes of J Series items are identified by background color.															
Keyway $_{Js9}$	12	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	
SN2.5-10R J BORE	S1K															
SN2.5-10L J BORE	S1K															
SN2.5-13R J BORE		S1K	S1K	S1K	S1K	S1K										
SN2.5-13L J BORE		S1K	S1K	S1K	S1K	S1K										
SN2.5-15R J BORE		S1K	S1K	S1K	S1K	S1K	S1K	S1K								
SN2.5-15L J BORE		S1K	S1K	S1K	S1K	S1K	S1K	S1K								
SN2.5-20R J BORE							S1K	S1K	S1K	S1K	S1K	S1K	S1K			
SN2.5-20L J BORE							S1K	S1K	S1K	S1K	S1K	S1K	S1K			
SN2.5-26R J BORE							S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K		
SN2.5-26L J BORE							S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K		
SN2.5-30R J BORE							S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	
SN2.5-30L J BORE							S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	
SN3-10R J BORE		S1K	S1K	S1K												
SN3-10L J BORE		S1K	S1K	S1K												
SN3-13R J BORE							S1K	S1K	S1K							
SN3-13L J BORE							S1K	S1K	S1K							
SN3-15R J BORE							S1K	S1K	S1K	S1K	S1K					
SN3-15L J BORE							S1K	S1K	S1K	S1K	S1K					
SN3-20R J BORE							S1K	S1K	S1K	S1K	S1K	S1K	S1K			
SN3-20L J BORE							S1K	S1K	S1K	S1K	S1K	S1K	S1K			
SN3-26R J BORE							S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	
SN3-26L J BORE							S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	
SN3-30R J BORE							S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K
SN3-30L J BORE							S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K
SN4-10R J BORE							S1K	S1K								
SN4-10L J BORE							S1K	S1K								
SN4-13R J BORE							S1K	S1K	S1K	S1K	S1K	S1K	S1K			
SN4-13L J BORE							S1K	S1K	S1K	S1K	S1K	S1K	S1K			
SN4-15R J BORE							S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K		
SN4-15L J BORE							S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K		
SN4-20R J BORE							S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K
SN4-20L J BORE							S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K
SN4-26R J BORE							S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K
SN4-26L J BORE							S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K
SN4-30R J BORE							S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K
SN4-30L J BORE							S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K

[Caution on J series]
① As available-on-request products, these require a lead-time for shipping of 2 working days (excludes the day ordered), after placing an order. Because the machining starts immediately, we cannot accept cancellations. Please see Page 34 for more details.
② Number of pieces we can process for one order is 1 to 20 units. For larger quantities, please request price and delivery quotes.
③ Keyways are made according to JIS B1301 standards, Js9 tolerance.
④ Certain products which would otherwise have a very long tapped hole are counterbored to reduce the length of the tap. For details, please see the KHK Web Catalog.
⑤ Areas of products which have been re-worked will not be black oxide coated.
⑥ For products having a tapped hole, a set screw is included.

Specifications	
Precision grade	JIS grade N9 (JIS B1702-1: 1998)
Reference section of gear	Normal plane
Gear teeth	Standard full depth
Normal pressure angle	20°
Helix angle	45°
Material	SUS303
Heat treatment	—

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



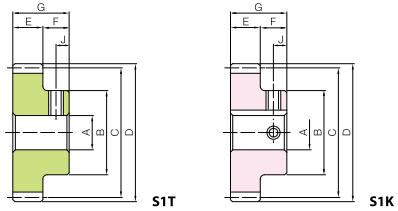
S1

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	Surface durability	Surface durability		
SUN1-13R SUN1-13L	*m*1	13	R L	S1	6	15	18.38	20.38	10	10	20	0.19	0.019	0.08~0.18	0.030
SUN1-15R SUN1-15L		15	R L			18	21.21	23.21				0.29	0.029		0.043
SUN1-20R SUN1-20L		20	R L		8	25	28.28	30.28				0.66	0.068		0.079
SUN1.5-10R SUN1.5-10L	*m*1.5	10	R L	S1	8	16	21.21	24.21	15	10	25	0.29	0.029	0.10~0.22	0.047
SUN1.5-13R SUN1.5-13L		13	R L		10	23	27.58	30.58				0.62	0.063		0.087
SUN1.5-15R SUN1.5-15L		15	R L			25	31.82	34.82				0.93	0.095		0.12
SUN1.5-20R SUN1.5-20L		20	R L		12	30	42.43	45.43				2.14	0.22		0.20
SUN2-10R SUN2-10L	*m*2	10	R L	S1	12	22	28.28	32.28	20	15	35	0.66	0.068	0.12~0.26	0.11
SUN2-13R SUN2-13L		13	R L			30	36.77	40.77				1.42	0.14		0.22
SUN2-15R SUN2-15L		15	R L			35	42.43	46.43				2.14	0.22		0.30
SUN2-20R SUN2-20L		20	R L		15	45	56.57	60.57				4.84	0.49		0.53
SUN2.5-10R SUN2.5-10L	*m*2.5	10	R L	S1	12	26	35.36	40.36	22	16	38	1.27	0.13	0.14~0.28	0.20
SUN2.5-13R SUN2.5-13L		13	R L		15	35	45.96	50.96				2.68	0.27		0.35
SUN2.5-15R SUN2.5-15L		15	R L			40	53.03	58.03				4.03	0.41		0.48
SUN2.5-20R SUN2.5-20L		20	R L		20	60	70.71	75.71				9.07	0.92		0.93
SUN3-10R SUN3-10L	*m*3	10	R L	S1	15	34	42.43	48.43	25	18	43	2.14	0.22	0.14~0.32	0.34
SUN3-13R SUN3-13L		13	R L		20	45	55.15	61.15				4.51	0.46		0.58
SUN3-15R SUN3-15L		15	R L			50	63.64	69.64				6.75	0.69		0.79
SUN3-20R SUN3-20L		20	R L			60	84.85	90.85				15.04	1.53		1.39

[Caution on Product Characteristics]
① When mating screw gears are made of the same material, they may cause abrasion and scoring. It is recommended to mate screw gears composed of different materials.
② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 370 for more details.
③ 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.
④ For offset shaft applications, match a RH with a RH, or LH with a LH, to make a set of screw gears. For parallel shaft applications, mesh opposite hands (RH and LH) of helical gear sets. Please see Page 370 for more details.
⑤ If the bore diameter is less than ϕ4, the bore tolerance class is H8. If the bore diameter is ϕ5 or ϕ6, and the hole length (total length) exceeds 3 times the diameter, then the class is also H8.

[Caution on Secondary Operations]
① Please read "Cautions on Performing Secondary Operations" (Page 371) when performing modifications and/or secondary operations for safety concerns.
KHK Quick-Mod Gears, the KHK system for quick modification of KHK stock gears, is also available.
② Avoid performing secondary operations that narrow the tooth width, as it affects precision and strength.

J Series



S1T

S1K

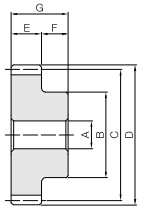
To order J Series products, please specify: **Catalog No. + J + BORE.**

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	32	35
Screw size	—		4×1.8		5×2.3				6×2.8				8×3.3			10×3.3	
Catalog Number	M4	M5	M4						M5				M6			M8	
SUN1-13RJ BORE	S1T																
SUN1-13LJ BORE	S1T																
SUN1-15RJ BORE	S1T	S1T															
SUN1-15LJ BORE	S1T	S1T															
SUN1-20RJ BORE		S1T	S1K	S1K													
SUN1-20LJ BORE		S1T	S1K	S1K													
SUN1.5-10RJ BORE		S1T															
SUN1.5-10LJ BORE		S1T															
SUN1.5-13RJ BORE			S1K														
SUN1.5-13LJ BORE			S1K														
SUN1.5-15RJ BORE			S1K	S1K													
SUN1.5-15LJ BORE			S1K	S1K													
SUN1.5-20RJ BORE				S1K	S1K	S1K	S1K	S1K									
SUN1.5-20LJ BORE				S1K	S1K	S1K	S1K	S1K									
SUN2-10RJ BORE				S1K													
SUN2-10LJ BORE				S1K													
SUN2-13RJ BORE				S1K	S1K	S1K	S1K	S1K									
SUN2-13LJ BORE				S1K	S1K	S1K	S1K	S1K									
SUN2-15RJ BORE				S1K	S1K	S1K	S1K	S1K	S1K	S1K							
SUN2-15LJ BORE				S1K	S1K	S1K	S1K	S1K	S1K	S1K							
SUN2-20RJ BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K				
SUN2-20LJ BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K				
SUN2.5-10RJ BORE				S1K													
SUN2.5-10LJ BORE				S1K													
SUN2.5-13RJ BORE						S1K	S1K	S1K	S1K	S1K							
SUN2.5-13LJ BORE						S1K	S1K	S1K	S1K	S1K							
SUN2.5-15RJ BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K					
SUN2.5-15LJ BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K					
SUN2.5-20RJ BORE											S1K	S1K	S1K	S1K	S1K	S1K	S1K
SUN2.5-20LJ BORE											S1K	S1K	S1K	S1K	S1K	S1K	S1K
SUN3-10RJ BORE						S1K	S1K	S1K									
SUN3-10LJ BORE						S1K	S1K	S1K									
SUN3-13RJ BORE											S1K	S1K	S1K				
SUN3-13LJ BORE											S1K	S1K	S1K				
SUN3-15RJ BORE											S1K	S1K	S1K	S1K	S1K		
SUN3-15LJ BORE											S1K	S1K	S1K	S1K	S1K		
SUN3-20RJ BORE											S1K	S1K	S1K	S1K	S1K	S1K	S1K
SUN3-20LJ BORE											S1K	S1K	S1K	S1K	S1K	S1K	S1K

[Caution on J series]
① As available-on-request products, these require a lead-time for shipping of 2 working days (excludes the day ordered), after placing an order. Because the machining starts immediately, we cannot accept cancellations. Please see Page 34 for more details.
② Number of pieces we can process for one order is 1 to 20 units. For larger quantities, please request price and delivery quotes.
③ Keyways are made according to JIS B1301 standards, Js9 tolerance.
④ Certain products which would otherwise have a very long tapped hole are counterbored to reduce the length of the tap. For details, please see the KHK Web Catalog.
⑤ For products having a tapped hole, a set screw is included.
⑥ 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 N9 (JIS B1702-1: 1998)
Reference section of gear	Normal plane
Gear teeth	Standard full depth
Normal pressure angle	20°
Helix angle	45°
Material	CAC702 (old JIS A ℓ BC2)
Heat Treatment	–

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



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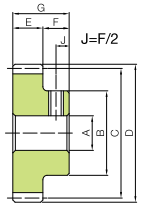
Catalog Number	Module	No. of teeth	Direction of helix	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total length	Allowable torque (N·m)	Allowable torque (kgf·m)	Backlash (mm)	Weight (kg)
					A_{H7}	B	C	D	E	F	G	Surface durability	Surface durability		
AN1-13R **AN1-13L**	*m*1	13	R L	S1	6	15	18.38	20.38	10	10	20	0.31	0.032	0.08~0.18	0.029
AN1-15R **AN1-15L**		15	R L			18	21.21	23.21				0.48	0.049		0.042
AN1.5-10R **AN1.5-10L**	*m*1.5	10	R L	S1	8	16	21.21	24.21	15	10	25	0.48	0.049	0.10~0.22	0.046
AN1.5-13R **AN1.5-13L**		13	R L		10	23	27.58	30.58				1.03	0.10		0.085
AN1.5-15R **AN1.5-15L**		15	R L			25	31.82	34.82				1.55	0.16		0.11
AN2-10R **AN2-10L**	*m*2	10	R L	S1	12	22	28.28	32.28	20	15	35	1.10	0.11	0.12~0.26	0.11
AN2-13R **AN2-13L**		13	R L			30	36.77	40.77				2.36	0.24		0.21
AN2-15R **AN2-15L**		15	R L			35	42.43	46.43				3.56	0.36		0.29
AN2.5-10R **AN2.5-10L**	*m*2.5	10	R L	S1	12	26	35.36	40.36	22	16	38	2.11	0.22	0.14~0.28	0.20
AN2.5-13R **AN2.5-13L**		13	R L		15	35	45.96	50.96				4.47	0.46		0.34
AN2.5-15R **AN2.5-15L**		15	R L			40	53.03	58.03				6.72	0.69		0.47
AN3-10R **AN3-10L**	*m*3	10	R L	S1	15	34	42.43	48.43	25	18	43	3.56	0.36	0.14~0.32	0.34
AN3-13R **AN3-13L**		13	R L		20	45	55.15	61.15				7.51	0.77		0.57
AN3-15R **AN3-15L**		15	R L			50	63.64	69.64				11.3	1.15		0.77

[Caution on Product Characteristics]
① When mating screw gears are made of the same material, they may cause abrasion and scoring. It is recommended to mate screw gears composed of different materials.
② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 370 for more details.
③ 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.
④ For offset shaft applications, match a RH with a RH, or LH with a LH, to make a set of screw gears. For parallel shaft applications, mesh opposite hands (RH and LH) of helical gear sets. Please see Page 370 for more details.
⑤ If the bore diameter is less than ϕ4, the bore tolerance class is H8. If the bore diameter is ϕ5 or ϕ6, and the hole length (total length) exceeds 3 times the diameter, then the class is also H8.

[Caution on Secondary Operations]
① Please read "Cautions on Performing Secondary Operations" (Page 371) when performing modifications and/or secondary operations for safety concerns.
KHK Quick-Mod Gears, the KHK system for quick modification of KHK stock gears, is also available.
② Avoid performing secondary operations that narrow the tooth width, as it affects precision and strength.

J Series



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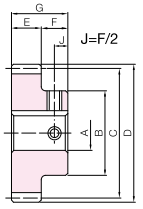


S1K

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

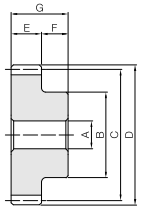
Bore H7	* The product shapes of J Series items are identified by background color.														
Keyway Js9	6	8	10	12	14	15	16	17	18	19	20	22	25	28	30
Screw size	–		4×1.8			5×2.3			6×2.8				8×3.3		
Catalog Number	M4	M5	M4						M5				M6		
AN1-13RJ BORE	S1T														
AN1-13LJ BORE	S1T														
AN1-15RJ BORE	S1T	S1T													
AN1-15LJ BORE	S1T	S1T													
AN1.5-10RJ BORE		S1T													
AN1.5-10LJ BORE		S1T													
AN1.5-13RJ BORE			S1K												
AN1.5-13LJ BORE			S1K												
AN1.5-15RJ BORE			S1K	S1K											
AN1.5-15LJ BORE			S1K	S1K											
AN2-10RJ BORE				S1K											
AN2-10LJ BORE				S1K											
AN2-13RJ BORE				S1K	S1K	S1K	S1K	S1K							
AN2-13LJ BORE				S1K	S1K	S1K	S1K	S1K							
AN2-15RJ BORE				S1K	S1K	S1K	S1K	S1K	S1K	S1K					
AN2-15LJ BORE				S1K	S1K	S1K	S1K	S1K	S1K	S1K					
AN2.5-10RJ BORE				S1K											
AN2.5-10LJ BORE				S1K											
AN2.5-13RJ BORE						S1K	S1K	S1K	S1K	S1K					
AN2.5-13LJ BORE						S1K	S1K	S1K	S1K	S1K					
AN2.5-15RJ BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K			
AN2.5-15LJ BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K			
AN3-10RJ BORE						S1K	S1K	S1K							
AN3-10LJ BORE						S1K	S1K	S1K							
AN3-13RJ BORE											S1K	S1K	S1K		
AN3-13LJ BORE											S1K	S1K	S1K		
AN3-15RJ BORE											S1K	S1K	S1K	S1K	S1K
AN3-15LJ BORE											S1K	S1K	S1K	S1K	S1K

[Caution on J series]
① As available-on-request products, these require a lead-time for shipping of 2 working days (excludes the day ordered), after placing an order. Because the machining starts immediately, we cannot accept cancellations. Please see Page 34 for more details.
② Number of pieces we can process for one order is 1 to 20 units. For larger quantities, please request price and delivery quotes.
③ Keyways are made according to JIS B1301 standards, Js9 tolerance.
④ Certain products which would otherwise have a very long tapped hole are counterbored to reduce the length of the tap. For details, please see the KHK Web Catalog.
⑤ For products having a tapped hole, a set screw is included.
⑥ 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.

PN Module 1~3 NEW
Plastic screw gear (helical gear)

Specifications	
Precision grade	JIS grade N10 (JIS B1702-1: 1998)*
Reference section of gear	Normal plane
Gear teeth	Standard full depth
Normal pressure angle	20°
Helix angle	45°
Material	MC901
Heat treatment	–

* The precision grade is equivalent to the value shown in the table.



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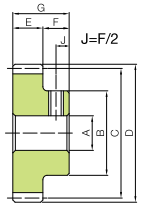
Catalog Number	Module	No. of teeth	Direction of helix	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total length	Allowable torque (N·m)	Allowable torque (kgf·m)	Backlash (mm)	Weight (kg)
					A	B	C	D	E	F	G	Surface durability	Surface durability		
PN1-13R PN1-13L	*m*1	13	R L	S1	6	15	18.38	20.38	10	10	20	0.19	0.019	0.18~0.32	0.0045
PN1-15R PN1-15L		15	R L			18	21.21	23.21				0.29	0.029	0.20~0.34	0.0064
PN1-20R PN1-20L		20	R L		8	25	28.28	30.28				0.66	0.068		0.012
PN1.5-10R PN1.5-10L	*m*1.5	10	R L	S1	6	16	21.21	24.21	15	10	25	0.29	0.029	0~0.38	0.0077
PN1.5-13R PN1.5-13L		13	R L		8	23	27.58	30.58				0.62	0.063		0.014
PN1.5-15R PN1.5-15L		15	R L			25	31.82	34.82				0.93	0.095		0.018
PN1.5-20R PN1.5-20L		20	R L		10	30	42.43	45.43				2.14	0.22		0.031
PN2-10R PN2-10L	*m*2	10	R L	S1	10	22	28.28	32.28	20	15	35	0.66	0.068	0~0.42	0.018
PN2-13R PN2-13L		13	R L			30	36.77	40.77				1.42	0.14		0.034
PN2-15R PN2-15L		15	R L			35	42.43	46.43				2.14	0.22		0.046
PN2-20R PN2-20L		20	R L		12	45	56.57	60.57				4.84	0.49	0~0.44	0.081
PN2.5-10R PN2.5-10L	*m*2.5	10	R L	S1	10	26	35.36	40.36	22	16	38	1.27	0.13	0~0.44	0.031
PN2.5-13R PN2.5-13L		13	R L		12	35	45.96	50.96				2.68	0.27		0.055
PN2.5-15R PN2.5-15L		15	R L			40	53.03	58.03				4.03	0.41	0~0.46	0.075
PN2.5-20R PN2.5-20L		20	R L			60	70.71	75.71				9.07	0.92		0.15
PN3-10R PN3-10L	*m*3	10	R L	S1	12	34	42.43	48.43	25	18	43	2.14	0.22	0~0.52	0.054
PN3-13R PN3-13L		13	R L		15	45	55.15	61.15				4.51	0.46	0~0.54	0.094
PN3-15R PN3-15L		15	R L			50	63.64	69.64				6.75	0.69		0.12
PN3-20R PN3-20L		20	R L			60	84.85	90.85				15.0	1.53		0.21

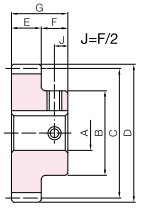
[Caution on Product Characteristics]
① Significant variations in temperature or humidity can cause dimensional changes in plastic gears, including bore size (H8 when produced), tooth diameter, and backlash. Please see the section "Design of Plastic Gears" in our separate technical reference book.
② When mating screw gears are made of the same material, they may cause abrasion and scoring. It is recommended to mate screw gears composed of different materials.
③ The allowable torque shown in the table are calculated values according to the assumed usage conditions. Please see Page 370 for more details.
④ 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.
⑤ For offset shaft applications, match a RH with a RH, or LH with a LH, to make a set of screw gears. For parallel shaft applications, mesh opposite hands (RH and LH) of helical gear sets. Please see Page 370 for more details.

[Caution on Secondary Operations]
① Please read "Cautions on Performing Secondary Operations" (Page 371) when performing modifications and/or secondary operations for safety concerns. KHK Quick-Mod Gears, the KHK system for quick modification of KHK stock gears, is also available.
② Avoid performing secondary operations that narrow the tooth width, as it affects precision and strength.
③ Plastic gears are susceptible to the effects of temperature and moisture. Dimensional changes may occur while performing secondary operations and during post-machining operations.

J Series



S1T



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	32	35
Screw size	–		4×1.8		5×2.3				6×2.8				8×3.3			10×3.3	
Catalog Number	M4	M5	M4						M5				M6			M8	
PN1-13RJ BORE	S1T																
PN1-13LJ BORE	S1T																
PN1-15RJ BORE	S1T	S1T															
PN1-15LJ BORE	S1T	S1T															
PN1-20RJ BORE		S1T	S1K	S1K													
PN1-20LJ BORE		S1T	S1K	S1K													
PN1.5-10RJ BORE	S1T																
PN1.5-10LJ BORE	S1T																
PN1.5-13RJ BORE		S1T	S1K														
PN1.5-13LJ BORE		S1T	S1K														
PN1.5-15RJ BORE		S1T	S1K	S1K													
PN1.5-15LJ BORE		S1T	S1K	S1K													
PN1.5-20RJ BORE			S1K	S1K	S1K	S1K	S1K	S1K									
PN1.5-20LJ BORE			S1K	S1K	S1K	S1K	S1K	S1K									
PN2-10RJ BORE			S1K														
PN2-10LJ BORE			S1K														
PN2-13RJ BORE			S1K	S1K	S1K	S1K	S1K	S1K									
PN2-13LJ BORE			S1K	S1K	S1K	S1K	S1K	S1K									
PN2-15RJ BORE			S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K							
PN2-15LJ BORE			S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K							
PN2-20RJ BORE				S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K				
PN2-20LJ BORE				S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K				
PN2.5-10RJ BORE			S1K	S1K													
PN2.5-10LJ BORE			S1K	S1K													
PN2.5-13RJ BORE				S1K	S1K	S1K	S1K	S1K	S1K	S1K							
PN2.5-13LJ BORE				S1K	S1K	S1K	S1K	S1K	S1K	S1K							
PN2.5-15RJ BORE				S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K					
PN2.5-15LJ BORE				S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K					
PN2.5-20RJ BORE				S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K
PN2.5-20LJ BORE				S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K
PN3-10RJ BORE				S1K	S1K	S1K	S1K	S1K									
PN3-10LJ BORE				S1K	S1K	S1K	S1K	S1K									
PN3-13RJ BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K				
PN3-13LJ BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K				
PN3-15RJ BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K		
PN3-15LJ BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K		
PN3-20RJ BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K
PN3-20LJ BORE						S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K	S1K

[Caution on Secondary Operations]
① As available-on-request products, these require a lead-time for shipping of 2 working days (excludes the day ordered), after placing an order. Because the machining starts immediately, we cannot accept cancellations. Please see Page 34 for more details.
② Number of pieces we can process for one order is 1 to 20 units. For larger quantities, please request price and delivery quotes.
③ Keyways are made according to JIS B1301 standards, Js9 tolerance.
④ Certain products which would otherwise have a very long tapped hole are counterbored to reduce the length of the tap. For details, please see the KHK Web Catalog.
⑤ For products having a tapped hole, a set screw is included.
⑥ 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.

* In regard to MC Nylon gears, other materials are available for plastic gears, including Ultra High Molecular Weight Polyethylene (U-PE), which has excellent abrasion resistance and resin conforming to the Plastic Implementation Measure (PIM). A single piece order is acceptable and will be produced as a custom-made gear. Please see Page 24 for more details on quotations and orders.

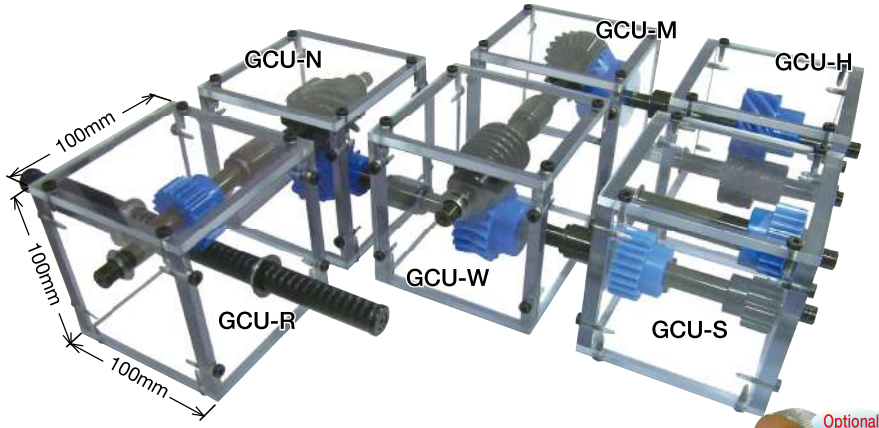
You can download CAD data (DXF format) of KHK Products from the Web Catalog.

GCU-N Screw Gear Kit

Installation : Nonparallel and nonintersecting gears
Gear Type : Screw Gears
Gears : SN2.5-10R
PN2.5-10R
Gear Ratio : 1
Weight : Approx. 1kg

Screw Gears are helical gears used in nonparallel and nonintersecting situations. Applications include devices like conveyers with light loads.

* This is not a gear box for actual use to transmit power. Please use only as representations of gear systems.



Please see Page 468 for more details.

GCU-H45 Hand Wheel