Spur Gears

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) Spur Gears

S S G 1 - 15

- 15 — No. of Teeth (15)
- 1 — Module (1)
- G — Others (Ground Gear)
- S — Type (Spur Gear)
- S — Material (S45C)

Material

S	S45C
M	SCM415
SU	SUS303
P	MC901
N	MC602-ST
D	DURACON
BS	Free-Cutting Brass C3604
L	SMF5040

Type

S	Spur Gears

Other Information

A	Hubless Gears
G	Ground Gears
L	Fairloc Hub Gears
R	Ring Gears
S	Pinion Shafts
U	Plastic Gears with Steel Core
Y	Thin Face Gears

■ Feature Icons

- RoHS Compliant Product
- Finished Product
- Ground Gear
- Resin Product
- Injection Molded Product
- Re-machinable Product
- Heat Treated Product
- Stainless Product
- Copper Alloy Product
- Black Oxide coated Product

Characteristics

To meet your requirements, KHK stock gears are made in a variety of types, materials, configurations, modules and numbers of teeth. We also offer products that allow secondary operations to be performed on the bores, shafts, outside diameters, keyways and set screws. The following table lists the main features.

Catalog No.	Module	Material	Heat Treatment	Tooth Surface Finish	Precision JIS B 1702-1:1998	Secondary Operations	Features
MSGA・MSGB	1～4	SCM415	Carburized	Ground	N5	×	High strength, abrasion-resistant and compact.
SSGS	1.5～3	S45C	Thermal refined・Gear teeth induction hardened	Ground	N7	△	Ground shaft pinions that allow modification of shafts to fit your bearings.
SSG	0.5～6	S45C	Gear teeth induction hardened NOTE 1	Ground	N7	△	Although heat treatment is applied to tooth area, secondary operation can be added. Finished products for J Series are also available.
SSS	0.5～3	S45C	Thermal refined NOTE 2	Cut	N8 NOTE 3	○	For the SS series, Shaft-Pinions with a small number of teeth (10 to 13 teeth) are available.
SS	0.5～10	S45C	—	Cut	N8 NOTE 3	○	A low priced, general usage gear with a large selection of modules and number of teeth, finished products for J Series are also available.
SSA	1～5	S45C	—	Cut	N8	○	Hubless gears for lighter and more compact applications. Finished products for J Series are also available.
SSY	0.8、1	S45C	—	Cut	N8 NOTE 3	○	Narrower face gears for light-duty applications.
SSAY	1	S45C	—	Cut	N8	○	Hubless and narrow faces for even lighter and more compact gears.
SSAY/K	0.8、1	S45C	—	Cut	N8 NOTE 3	△	Compact sized gears can be clamped to the shafts without a hub.
LS	0.5、0.8	SMF5040 (Equiv. to S45C)	—	Sintered	N8 NOTE 3	○	Low cost due to elimination of machining and reduction in wasted material.
SUS・SUSA	1～4	SUS303	—	Cut	N8	○	Stainless steel gears for more rust-resistant gears. Finished products for J Series are also available.
SUSL	0.5～1	SUS303	—	Cut	N8 NOTE 3	△	Fine-pitch gears with rust resistance, enabled to clamp to shafts without any keys or set screws.
DSL	0.5～1	Acetal (SUS303)	—	Cut	N10 NOTE 3	△	Fine-pitch gears can be used without lubrication, easily clamped to shafts without any keys or set screws.
NSU	1～3	MC602ST (S45C)	—	Cut	N9	○	Nylon teeth with steel hubs that can have keyways and set screws added. Finished products for J Series are also available.
PU	1～2	MC901 (SUS303)	—	Cut	N9	○	Nylon teeth with stainless steel hubs for rust-resistance. Finished products for J Series are also available.
PS・PSA	1～3	MC901	—	Cut	N9	○	Possible to operate without lubrication. Suitable for food processing machines. Finished products for J Series are also available.
DS	0.5～1	Duracon (M90-44)	—	Injection Molded	Equiv. to N12	△	Low cost, mass-produced products suitable for light duty office machines.
BSS	0.5～1	Free-cutting Brass (C3604)	—	Cut	N8 NOTE 3	○	Small module brass spur gears suitable for mating with DS gears.
SSR	2～3	S45C	—	Cut	N9	○	Allows large gear ratios. Can also be used as segment gears and corner racks.

〔**NOTE 1**〕Products with module less than 0.8 are thermal refined, without gear teeth hardened.
〔**NOTE 2**〕SA-shaped products with module less than 1 have no material thermal refinement treatment.
〔**NOTE 3**〕For products which are smaller than module 0.8, the accuracy grade is equivalent to the value shown.

○ Possible △ Partly possible × Not possible

- **By chamfering the corners of the top land, gear noise is reduced, and the chances of damage due to handling and transportation are decreased. All KHK gears larger than m1.5 have their teeth chamfered.**
- **Black colored products are KHK stock gears that have black oxide coating for rust resistance; this 'blackness' is a product characteristic of KHK stock gears.**

Selection Hints

Please select the most suitable products by carefully considering the characteristics of items and contents of the product tables. It is also important to read all applicable "CAUTION" notes before the final selection. Use of catalog numbers when ordering will simplify and expedite the processing of your order.

1. Caution in selecting the mating Gears

① Basically, all spur gears, internal gears and racks can be paired as long as the module matches. Products with different materials, tooth widths, or methods of cutting the teeth can be mated.

② When using a pinion with an internal gear with a small difference in the numbers of teeth, there are possibilities for involute interference, trochoid interference and trimming interference. See the internal gear interference portion of the technical section to avoid problems in assembling these items. (Page 182)

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 his own values by applying the actual usage conditions. Also, SUSL Fairloc hub spur gears, DSL Fairloc hub spur gears and SSAY/K spur gears with built-in clamps need additional considerations of the starting torque.

The table below contains the assumptions established for various products in order to compute gear strengths.

■ Calculation of Bending Strength of Gears

Item \ Catalog No.	MSGA MSGB	SSGS	SSG	SSS,SS,SSA SSY,SSAY SSAY/K SSR	SUS SUSA SUSL LS	BSS	NSU	PU PS PSA	DSL DS
Formula NOTE 1	Formula of spur and helical gears on bending strength (JGMA401-01)						The Lewis formula		
No. of teeth of mating gears	Same number of teeth (30 for SSGS、SSS、SSR)						——		
Rotation	600rpm			100rpm			100rpm		
Durability	Over 10^7 cycles						——		
Impact from motor	Uniform load						Allowable Bending Stress(kgf/mm^2)		
Impact from load	Uniform load						1.38 (40℃ with No Lubrication)	1.15 (40℃ with No Lubrication)	*m* 0.5 4.0 *m* 0.8 4.0 *m* 1.0 3.5 (40℃ with Grease Lubrication)
Direction of load	Bidirectional								
Allowable bending stresss at root σ_{Flim} (kgf/mm^2) NOTE 1	47	24.5	19 (24.5) Note 3	19 (24.5) Note 4	10.5	4			
Safety factor S_F	1.2								

■ Calculation of Surface Durability (Except where it is common with Bending Strength)

Formula NOTE 1	Formula of spur and helical gears on surface durability(JGMA402-01)					
Kinematic viscosity of lubricant	100cSt (50℃)					
Gear support	Symmetric support by bearings Note 5					
Allowable Hertz stress σ_{Hlim} (kgf/mm^2)	166	99	90 (62.5) NOTE 3	49 (62.5) NOTE 4	41.3	——
Safety factor S_H	1.15					

〔**NOTE 1**〕 JGMA (Japanese Manufacturers' Association), "MC Nylon Technical Data" of Nippon Polypenco Limited and "Duracon Gear" of Polyplastic Co. The units for rotational speed (rpm) and the load (kgf/mm2) were matched to the units needed in the equation.

〔**NOTE 2**〕 The allowable bending stress at the root σ_{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.

〔**NOTE 3**〕 For SSG Ground Spur Gears, with module 0.8 or lesser, thermal refining is applied. Allowable bending stress and allowable hertz stress are referred to as the value shown in the parentheses.

〔**NOTE 4**〕 For SSS Spur Pinion Shafts, with module over 1.5, tooth induction hardening is not applied. Allowable bending stress and allowable hertz stress are referred to the value shown in the parentheses.

〔**NOTE 5**〕 SSS Spur Pinion Shafts with module 1.0 or lesser (SA configuration) are set to cantilever support as it is a single shaft type.

■ Definition of bending strength by JGMA 401-01(1974)

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 the failure due to insufficient bending strength.

■ Definition of surface durability by JGMA 402-01(1975)

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.

Example of the defacement due to insufficient surface durability.

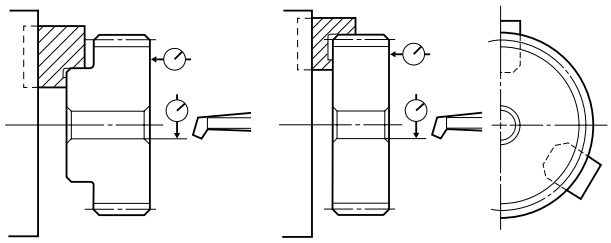
Application Hints

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

KHK CO., LTD. TECHNICAL DEPARTMENT
PHONE: 81-48-254-1744 FAX: 81-48-254-1765
E-mail export@khkgears.co.jp

1.Caution on Performing Secondary Operations

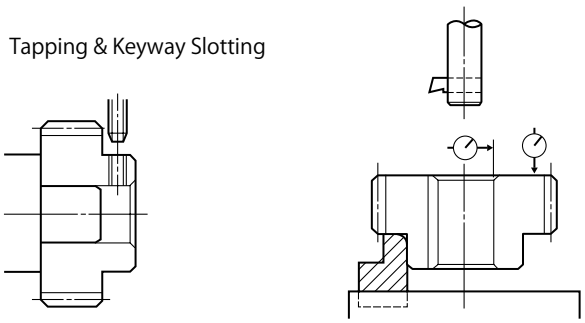
① If you are reboring, it is important to pay special attention to locating the center in order to avoid runout.
② The reference datum for gear cutting is the bore. Therefore, use the bore for locating the center. If it is too difficult to do for small bores, the alternative is to use one spot on the bore and the runout of the side surface.
③ If the rework requires using scroll chucks, we recommend the use of new or rebored jaws for improved precision. If chucking by the teeth, please apply the pressure carefully to avoid crushing the teeth which will lead to noisy gears.



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 teeth root diameter), and 50% to 60% for keyway applied modifications.
⑤ In order to avoid stress concentration, leave radii on 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 If you apply induction hardening on gear teeth, please be aware of potential thermal stress cracks. 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.

Heat Treatment

If you apply induction hardening to the gear teeth of S45C products, you need to designate the hardness and where to apply the heat treatment. Below is an example of common specifications and KHK's specifications for hardening:

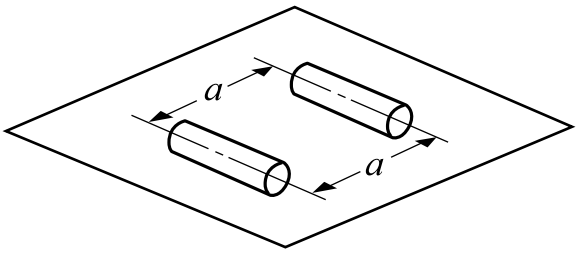
● Common Specifications for Heat Treatment
Area: Tooth surface, or, Tooth surface and Tooth root
Hardness: Within 10 HRC in the range from 45 to 60 HRC. (e.g. 48 - 58 HRC)

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

＊Hardness and Depth of Gear-teeth Induction Hardening
The hardening method and the state of hardened teeth area are varied depending on the size of gears. Since different hardening treatment is applied in accordance with the module and number of teeth, the hardness level you designate is referred to as the hardness of the reference diameter. For some of our products, there may be a case that the hardness at tooth tip / root may not be equal to the hardness you designated.
As to the effective case depth for S45C, 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.

2. Points of Caution in Assembling

① KHK stock spur gears are designed to give the proper backlash when assembled using the center distance given by the formula below (center distance tolerance of H7 – H8).
Backlash may be adjusted by changing the center distance of mating gears. For more information, please consult the technical section on gear backlash (page 56) in separate technical reference book.



$a = m(Z_1+Z_2)/2$

where
a : Center Distance
m : Module
Z_1 : No. of teeth of pinion
Z_2 : No. of teeth 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 gear boxes or other components.

■ Overall Length Tolerance for Spur and Helical Gears

Overall Length(mm)	Tolerance
Under 30	0 − 0.10
Over 30 Under 100	0 − 0.15
Over 100	0 − 0.20

〔**Note**〕 Following products are excluded from this table: Spur pinion shafts, Injection molded spur gears, Fairloc hub spur gears, and MC nylon products.

③ Spur gears produce no thrust forces, however, be sure to fasten them firmly with stepped shafts, or collars, to prevent shifting toward the shaft. Keyways are generally used in fastening gears to a shaft, and they should be secured by applying drilled holes for set screws, or applying flats to the shaft, in case of fastening only with set screws. There are also methods of secure settings using a MACHALOCK, a Posi-Lock, or a Shupanring, which are parts for the engaging the hole and the axis.

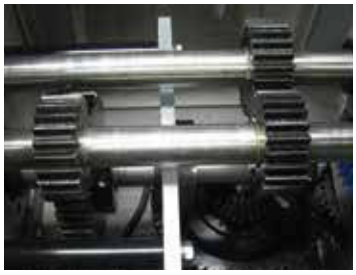
④ Verify that the two shafts are parallel. Incorrect assembly will lead to uneven teeth contact which will cause noise and wear. (After assembly, the gear mesh can be checked by applying a contact pattern compound and rotating the gears.)

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

Poor tooth contact and pitting

In this example, the gear oil used is equivalent to the 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.

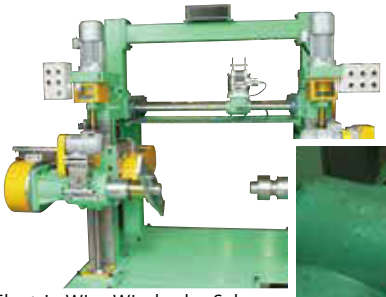
Application Examples



Full-automatic Forming Machine by Jey Machine Co.
SSA and SS Spur Gears are used for stirring devices.

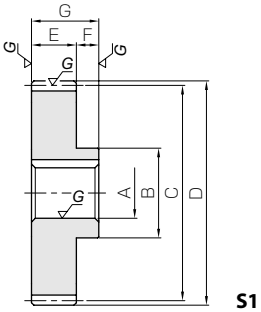
Takashima High-Speed Wire Straightening & Cutting Machines by Takashima Sangyo Co., Ltd.
SS Spur Gears are used at the feeder.

Automatic Packing Machine by New Max
SS Spur Gears, segment shaped by secondary operation, are used at the crimping device.



Electric Wire Winder by Sakuma Tekko KK.
SS Spur Gears are used at the stopper of handgrip.

Specifications	
Precision grade	JIS grade N5 (JIS B1702-1: 1998) JIS grade 1 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	SCM415
Heat treatment	Overall carburizing
Tooth hardness	55 ～ 60HRC



S1

Catalog No.	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total length	Web thickness	Web O.D.
				A_{H7}	B	C	D	E	F	G	H	I
MSGA1-18		18	S1	8	15	18	20	10	5	15	—	—
MSGA1-20 **MSGB1-20****		20	S1	8 10	17	20	22	10	5	15	—	—
MSGA1-24 **MSGB1-24**		24	S1	10 12	20	24	26	10	5	15	—	—
MSGA1-25 **MSGB1-25**		25	S1	10 12	20	25	27	10	5	15	—	—
MSGA1-30 **MSGB1-30**		30	S1	10 12	25	30	32	10	5	15	—	—
MSGA1-35 **MSGB1-35**		35	S1	10 15	25	35	37	10	5	15	—	—
MSGA1-36 **MSGB1-36**		36	S1	12 15	25	36	38	10	5	15	—	—
MSGA1-40 **MSGB1-40**		40	S1	12 15	30	40	42	10	5	15	—	—
MSGA1-45 **MSGB1-45**	***m*1**	45	S1	12 15	30	45	47	10	5	15	—	—
MSGA1-48 **MSGB1-48**		48	S1	12 15	30	48	50	10	5	15	—	—
MSGA1-50 **MSGB1-50**		50	S1	12 15	35	50	52	10	5	15	—	—
MSGA1-55 **MSGB1-55**		55	S1	15 20	40	55	57	10	10	20	—	—
MSGA1-60 **MSGB1-60**		60	S1	15 20	40	60	62	10	10	20	—	—
MSGA1-70 **MSGB1-70**		70	S1	20 25	45	70	72	10	10	20	—	—
MSGA1-80 **MSGB1-80**		80	S1	20 25	45	80	82	10	10	20	—	—
MSGA1-100 **MSGB1-100**		100	S1	20 25	45	100	102	10	10	20	—	—

[Caution on Product Characteristics]

① Although the dimensions of the keyway are made to the JIS (Js9) tolerance, there may be some deviations due to the effects of the heat treatment.
②The allowable torques shown in the table are the calculated values according to the assumed usage conditions. Please see page 31 for more details.
③ The backlash values shown in the table are the theoretical values for the backlash in the normal direction for a pair of identical gears in mesh.
④ Products marked with "**" have a small amount of material between the corner of the keyway and the tooth root. This mode of failure must be considered when selecting these gears. For details, please see our web site.

＊ For products not categorized in our KHK Stock Gear series, custom gear production services with short lead times is available. For details see Page 8.

Keyway	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight	Catalog No.
Width×Depth	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)	
3 x 1.4	12.1	6.37	1.24	0.65	0.08~0.16	0.020	**MSGA1-18**
3 x 1.4 4 x 1.8	14.2	8.04	1.45	0.82	0.08~0.16	0.027 0.023	**MSGA1-20** **MSGB1-20****
4 x 1.8 4 x 1.8	18.5	12.0	1.88	1.22	0.08~0.16	0.038 0.034	**MSGA1-24** **MSGB1-24**
4 x 1.8 4 x 1.8	19.6	13.1	2.00	1.33	0.08~0.16	0.041 0.037	**MSGA1-25** **MSGB1-25**
4 x 1.8 4 x 1.8	25.1	19.0	2.56	1.94	0.08~0.16	0.065 0.061	**MSGA1-30** **MSGB1-30**
4 x 1.8 5 x 2.3	30.7	26.2	3.13	2.67	0.08~0.16	0.085 0.073	**MSGA1-35** **MSGB1-35**
4 x 1.8 5 x 2.3	31.9	27.8	3.25	2.84	0.08~0.16	0.085 0.077	**MSGA1-36** **MSGB1-36**
4 x 1.8 5 x 2.3	36.5	34.6	3.72	3.53	0.08~0.16	0.11 0.10	**MSGA1-40** **MSGB1-40**
4 x 1.8 5 x 2.3	42.3	44.3	4.31	4.51	0.08~0.16	0.14 0.13	**MSGA1-45** **MSGB1-45**
4 x 1.8 5 x 2.3	45.8	50.6	4.67	5.16	0.08~0.16	0.16 0.15	**MSGA1-48** **MSGB1-48**
4 x 1.8 5 x 2.3	48.1	55.1	4.91	5.62	0.08~0.16	0.18 0.17	**MSGA1-50** **MSGB1-50**
5 x 2.3 6 x 2.8	54.0	67.3	5.51	6.86	0.10~0.18	0.26 0.23	**MSGA1-55** **MSGB1-55**
5 x 2.3 6 x 2.8	59.9	80.6	6.11	8.22	0.10~0.18	0.29 0.27	**MSGA1-60** **MSGB1-60**
6 x 2.8 8 x 3.3	71.9	111	7.33	11.4	0.10~0.18	0.37 0.35	**MSGA1-70** **MSGB1-70**
6 x 2.8 8 x 3.3	83.9	147	8.55	15.0	0.10~0.18	0.47 0.44	**MSGA1-80** **MSGB1-80**
6 x 2.8 8 x 3.3	103	224	10.5	22.8	0.10~0.18	0.69 0.66	**MSGA1-100** **MSGB1-100**

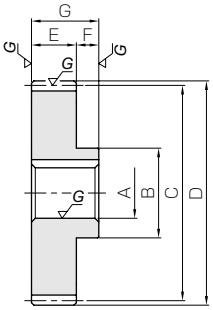
[Caution on Secondary Operations] ① No secondary operations can be performed on these precision finished gears due to the applied carburizing process.
For products which are different in specifications, such as bore size, we accept custom-made gear orders and provide a price quote.

GCU-S Spur Gear Kit

Installment : Parallel axes gears (Two-stage)
Gear Type : Spur Gears
Gears : 2 units of SS1.5-16
2 units of PS1.5-22
Gear Ratio : 1.89
Weight : Approx. 1kg

The Gear Kit contains two-stage spur gears and allows speed increases / reductions, and includes the most commonly used combinations of gears.

Specifications	
Precision grade	JIS grade N5 (JIS B1702-1: 1998) JIS grade 1 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	SCM415
Heat treatment	Overall carburizing
Tooth hardness	55 ～ 60HRC



S1

Catalog No.	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total length	Web thickness	Web O.D.
				A_{H7}	B	C	D	E	F	G	H	I
MSGA1.5-15**		15	S1	10	18	22.5	25.5	15	10	25	—	—
MSGA1.5-18 **MSGB1.5-18**		18	S1	10 12	22	27	30	15	10	25	—	—
MSGA1.5-20 **MSGB1.5-20**		20	S1	12 15	25	30	33	15	10	25	—	—
MSGA1.5-24 **MSGB1.5-24**		24	S1	12 15	28	36	39	15	10	25	—	—
MSGA1.5-25 **MSGB1.5-25**		25	S1	14 16	30	37.5	40.5	15	10	25	—	—
MSGA1.5-30 **MSGB1.5-30**		30	S1	15 18	30	45	48	15	10	25	—	—
MSGA1.5-35 **MSGB1.5-35**		35	S1	15 18	32	52.5	55.5	15	10	25	—	—
MSGA1.5-36 **MSGB1.5-36**		36	S1	15 18	32	54	57	15	10	25	—	—
MSGA1.5-40 **MSGB1.5-40**	***m*1.5**	40	S1	16 20	35	60	63	15	10	25	—	—
MSGA1.5-45 **MSGB1.5-45**		45	S1	16 20	40	67.5	70.5	15	10	25	—	—
MSGA1.5-48 **MSGB1.5-48**		48	S1	16 20	40	72	75	15	10	25	—	—
MSGA1.5-50 **MSGB1.5-50**		50	S1	18 22	40	75	78	15	10	25	—	—
MSGA1.5-55 **MSGB1.5-55**		55	S1	20 25	45	82.5	85.5	15	10	25	—	—
MSGA1.5-60 **MSGB1.5-60**		60	S1	20 25	45	90	93	15	10	25	—	—
MSGA1.5-70 **MSGB1.5-70**		70	S1	20 25	45	105	108	15	10	25	—	—
MSGA1.5-80 **MSGB1.5-80**		80	S1	20 25	45	120	123	15	10	25	—	—
MSGA1.5-100 **MSGB1.5-100**		100	S1	25 30	50	150	153	15	10	25	—	—

[Caution on Product Characteristics]

① Although the dimensions of the keyway are made to the JIS (Js9) tolerance, there may be some deviations due to the effects of the heat treatment.
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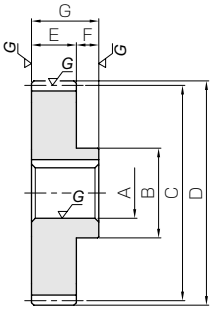
Keyway	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight	Catalog No.
Width×Depth	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)	
4 x 1.8	30.8	14.8	3.15	1.51	0.08~0.16	0.050	**MSGA1.5-15****
4 x 1.8 4 x 1.8	41.0	22.1	4.18	2.26	0.08~0.16	0.080 0.074	**MSGA1.5-18** **MSGB1.5-18**
4 x 1.8 5 x 2.3	48.0	27.9	4.89	2.84	0.08~0.16	0.098 0.085	**MSGA1.5-20** **MSGB1.5-20**
4 x 1.8 5 x 2.3	62.4	41.5	6.36	4.24	0.08~0.16	0.14 0.13	**MSGA1.5-24** **MSGB1.5-24**
5 x 2.3 5 x 2.3	66.0	45.4	6.73	4.63	0.08~0.16	0.15 0.14	**MSGA1.5-25** **MSGB1.5-25**
5 x 2.3 6 x 2.8	84.7	66.4	8.63	6.77	0.08~0.16	0.21 0.19	**MSGA1.5-30** **MSGB1.5-30**
5 x 2.3 6 x 2.8	104	91.5	10.6	9.34	0.10~0.18	0.28 0.26	**MSGA1.5-35** **MSGB1.5-35**
5 x 2.3 6 x 2.8	108	97.1	11.0	9.90	0.10~0.18	0.30 0.28	**MSGA1.5-36** **MSGB1.5-36**
5 x 2.3 6 x 2.8	123	121	12.6	12.3	0.10~0.18	0.37 0.34	**MSGA1.5-40** **MSGB1.5-40**
5 x 2.3 6 x 2.8	143	155	14.5	15.8	0.10~0.18	0.48 0.46	**MSGA1.5-45** **MSGB1.5-45**
5 x 2.3 6 x 2.8	155	177	15.8	18.1	0.10~0.18	0.54 0.51	**MSGA1.5-48** **MSGB1.5-48**
6 x 2.8 6 x 2.8	162	193	16.6	19.7	0.10~0.18	0.57 0.54	**MSGA1.5-50** **MSGB1.5-50**
6 x 2.8 8 x 3.3	182	236	18.6	24.0	0.10~0.18	0.69 0.65	**MSGA1.5-55** **MSGB1.5-55**
6 x 2.8 8 x 3.3	202	283	20.6	28.8	0.10~0.18	0.81 0.77	**MSGA1.5-60** **MSGB1.5-60**
6 x 2.8 8 x 3.3	231	372	23.6	38.0	0.12~0.20	1.08 1.04	**MSGA1.5-70** **MSGB1.5-70**
6 x 2.8 8 x 3.3	270	494	27.5	50.3	0.12~0.20	1.39 1.36	**MSGA1.5-80** **MSGB1.5-80**
8 x 3.3 8 x 3.3	347	787	35.4	80.2	0.12~0.20	2.13 2.09	**MSGA1.5-100** **MSGB1.5-100**

[Caution on Secondary Operations] ① No secondary operations can be performed on these precision finished gears due to the applied carburizing process.
For products which are different in specifications, such as bore size, we accept custom-made gear orders and provide a price quote.

Specifications	
Precision grade	JIS grade N5 (JIS B1702-1: 1998) JIS grade 1 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	SCM415
Heat treatment	Overall carburizing
Tooth hardness	55 ～ 60HRC



S1

Catalog No.	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total length	Web thickness	Web O.D.
				A_{H7}	B	C	D	E	F	G	H	I
MSGA2-15 **MSGB2-15****	*m*2	15	S1	12 15	24	30	34	20	10	30	—	—
MSGA2-18 **MSGB2-18**		18	S1	12 15	30	36	40	20	10	30	—	—
MSGA2-20 **MSGB2-20**		20	S1	15 18	32	40	44	20	10	30	—	—
MSGA2-24 **MSGB2-24**		24	S1	15 18	35	48	52	20	10	30	—	—
MSGA2-25 **MSGB2-25**		25	S1	16 20	35	50	54	20	10	30	—	—
MSGA2-30 **MSGB2-30**		30	S1	18 22	40	60	64	20	10	30	—	—
MSGA2-35 **MSGB2-35**		35	S1	18 22	40	70	74	20	10	30	—	—
MSGA2-36 **MSGB2-36**		36	S1	18 22	40	72	76	20	10	30	—	—
MSGA2-40 **MSGB2-40**		40	S1	20 25	45	80	84	20	10	30	—	—
MSGA2-45 **MSGB2-45**		45	S1	20 25	45	90	94	20	10	30	—	—
MSGA2-48 **MSGB2-48**		48	S1	22 28	50	96	100	20	10	30	—	—
MSGA2-50 **MSGB2-50**		50	S1	22 28	50	100	104	20	10	30	—	—
MSGA2-55 **MSGB2-55**		55	S1	25 30	55	110	114	20	10	30	—	—
MSGA2-60 **MSGB2-60**		60	S1	25 30	55	120	124	20	10	30	—	—
MSGA2-70 **MSGB2-70**		70	S1	25 30	55	140	144	20	10	30	—	—
MSGA2-80 **MSGB2-80**		80	S2	30 35	60	160	164	20	10	30	13	144
MSGA2-100 **MSGB2-100**		100	S2	35 40	80	200	204	20	10	30	13	174

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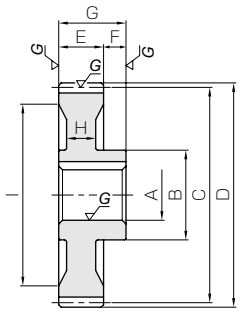

S2

Keyway	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight	Catalog No.
Width×Depth	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)	
4 x 1.8 5 x 2.3	73.1	35.7	7.46	3.64	0.10~0.20	0.12 0.10	**MSGA2-15** **MSGB2-15****
4 x 1.8 5 x 2.3	97.2	53.5	9.91	5.46	0.10~0.20	0.19 0.17	**MSGA2-18** **MSGB2-18**
5 x 2.3 6 x 2.8	114	67.6	11.6	6.89	0.10~0.20	0.22 0.20	**MSGA2-20** **MSGB2-20**
5 x 2.3 6 x 2.8	148	101	15.1	10.3	0.10~0.20	0.32 0.30	**MSGA2-24** **MSGB2-24**
5 x 2.3 6 x 2.8	157	110	16.0	11.2	0.10~0.20	0.33 0.31	**MSGA2-25** **MSGB2-25**
6 x 2.8 6 x 2.8	201	161	20.5	16.5	0.12~0.22	0.48 0.45	**MSGA2-30** **MSGB2-30**
6 x 2.8 6 x 2.8	246	223	25.1	22.7	0.12~0.22	0.64 0.61	**MSGA2-35** **MSGB2-35**
6 x 2.8 6 x 2.8	255	236	26.0	24.1	0.12~0.22	0.67 0.64	**MSGA2-36** **MSGB2-36**
6 x 2.8 8 x 3.3	292	294	29.7	30.0	0.12~0.22	0.84 0.79	**MSGA2-40** **MSGB2-40**
6 x 2.8 8 x 3.3	338	377	34.5	38.4	0.12~0.22	1.05 1.00	**MSGA2-45** **MSGB2-45**
6 x 2.8 8 x 3.3	349	411	35.6	41.9	0.12~0.22	1.20 1.14	**MSGA2-48** **MSGB2-48**
6 x 2.8 8 x 3.3	367	448	37.4	45.7	0.12~0.22	1.29 1.24	**MSGA2-50** **MSGB2-50**
8 x 3.3 8 x 3.3	412	548	42.0	55.8	0.14~0.24	1.56 1.51	**MSGA2-55** **MSGB2-55**
8 x 3.3 8 x 3.3	457	658	46.6	67.1	0.14~0.24	1.84 1.79	**MSGA2-60** **MSGB2-60**
8 x 3.3 8 x 3.3	547	909	55.8	92.7	0.14~0.24	2.48 2.43	**MSGA2-70** **MSGB2-70**
8 x 3.3 10 x 3.3	610	1150	62.2	117	0.14~0.24	2.55 2.49	**MSGA2-80** **MSGB2-80**
10 x 3.3 12 x 3.3	785	1820	80.1	186	0.14~0.24	4.16 4.09	**MSGA2-100** **MSGB2-100**

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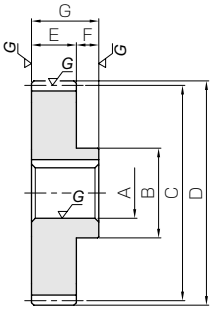
Ground Spur Gears

Specifications	
Precision grade	JIS grade N5 (JIS B1702-1: 1998) JIS grade 1 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	SCM415
Heat treatment	Overall carburizing
Tooth hardness	55 ～ 60HRC



S1

Catalog No.	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total length	Web thickness	Web O.D.
				A_{H7}	B	C	D	E	F	G	H	I
MSGA2.5-15 **MSGB2.5-15****	***m*2.5**	15	S1	15 18	30	37.5	42.5	25	12	37	—	—
MSGA2.5-18 **MSGB2.5-18**		18	S1	18 20	38	45	50	25	12	37	—	—
MSGA2.5-20 **MSGB2.5-20**		20	S1	18 22	40	50	55	25	12	37	—	—
MSGA2.5-24 **MSGB2.5-24**		24	S1	18 22	40	60	65	25	12	37	—	—
MSGA2.5-25 **MSGB2.5-25**		25	S1	20 25	45	62.5	67.5	25	12	37	—	—
MSGA2.5-30 **MSGB2.5-30**		30	S1	22 28	50	75	80	25	12	37	—	—
MSGA2.5-35 **MSGB2.5-35**		35	S1	25 30	55	87.5	92.5	25	12	37	—	—
MSGA2.5-36 **MSGB2.5-36**		36	S1	25 30	55	90	95	25	12	37	—	—
MSGA2.5-40 **MSGB2.5-40**		40	S1	25 32	55	100	105	25	12	37	—	—
MSGA2.5-45 **MSGB2.5-45**		45	S1	30 35	60	112.5	117.5	25	12	37	—	—
MSGA2.5-48 **MSGB2.5-48**		48	S1	30 35	60	120	125	25	12	37	—	—
MSGA2.5-50 **MSGB2.5-50**		50	S1	30 35	60	125	130	25	12	37	—	—
MSGA2.5-55 **MSGB2.5-55**		55	S1	30 40	70	137.5	142.5	25	12	37	—	—
MSGA2.5-60 **MSGB2.5-60**		60	S1	30 40	70	150	155	25	12	37	—	—
MSGA2.5-70 **MSGB2.5-70**		70	S2	40 50	85	175	180	25	12	37	17	150

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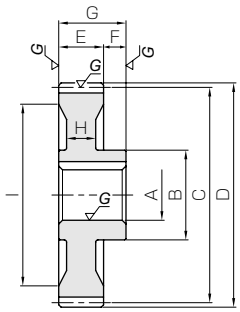

S2

Keyway	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight	Catalog No.
Width×Depth	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)	
5 x 2.3 6 x 2.8	143	71.0	14.6	7.24	0.10~0.20	0.23 0.20	**MSGA2.5-15** **MSGB2.5-15****
6 x 2.8 6 x 2.8	190	107	19.4	10.9	0.10~0.20	0.34 0.32	**MSGA2.5-18** **MSGB2.5-18**
6 x 2.8 6 x 2.8	222	134	22.7	13.7	0.10~0.20	0.42 0.39	**MSGA2.5-20** **MSGB2.5-20**
6 x 2.8 6 x 2.8	289	201	29.4	20.5	0.12~0.22	0.59 0.56	**MSGA2.5-24** **MSGB2.5-24**
6 x 2.8 8 x 3.3	306	220	31.2	22.4	0.12~0.22	0.66 0.60	**MSGA2.5-25** **MSGB2.5-25**
6 x 2.8 8 x 3.3	392	322	40.0	32.8	0.12~0.22	0.94 0.87	**MSGA2.5-30** **MSGB2.5-30**
8 x 3.3 8 x 3.3	480	444	49.0	45.3	0.12~0.22	1.25 1.19	**MSGA2.5-35** **MSGB2.5-35**
8 x 3.3 8 x 3.3	498	471	50.8	48.0	0.12~0.22	1.32 1.26	**MSGA2.5-36** **MSGB2.5-36**
8 x 3.3 10 x 3.3	543	560	55.3	57.1	0.12~0.22	1.61 1.52	**MSGA2.5-40** **MSGB2.5-40**
8 x 3.3 10 x 3.3	629	718	64.1	73.2	0.14~0.24	2.00 1.93	**MSGA2.5-45** **MSGB2.5-45**
8 x 3.3 10 x 3.3	681	823	69.5	83.9	0.14~0.24	2.27 2.20	**MSGA2.5-48** **MSGB2.5-48**
8 x 3.3 10 x 3.3	716	897	73.0	91.5	0.14~0.24	2.46 2.39	**MSGA2.5-50** **MSGB2.5-50**
8 x 3.3 12 x 3.3	804	1090	82.0	112	0.14~0.24	3.06 2.90	**MSGA2.5-55** **MSGB2.5-55**
8 x 3.3 12 x 3.3	892	1310	90.9	134	0.14~0.24	3.62 3.45	**MSGA2.5-60** **MSGB2.5-60**
12 x 3.3 14 x 3.8	1020	1730	104	176	0.14~0.24	4.24 4.03	**MSGA2.5-70** **MSGB2.5-70**

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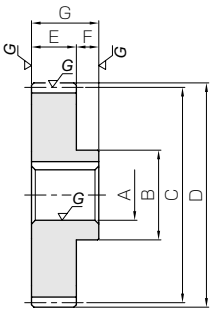
GCU-S Spur Gear Kit

Installment : Parallel axes gears (Two-stage)
Gear Type : Spur Gears
Gears : 2 units of SS1.5-16
2 units of PS1.5-22
Gear Ratio : 1.89
Weight : Approx. 1kg

The Gear Kit contains two-stage spur gears and allows speed increases / reductions, and includes the most commonly used combinations of gears.

Specifications	
Precision grade	JIS grade N5 (JIS B1702-1: 1998) JIS grade 1 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	SCM415
Heat treatment	Overall carburizing
Tooth hardness	55 ～ 60HRC



S1

Catalog No.	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total length	Web thickness	Web O.D.
				A_{H7}	B	C	D	E	F	G	H	I
MSGA3-15 **MSGB3-15****	*m*3	15	S1	18 22	36	45	51	30	15	45	—	—
MSGA3-18 **MSGB3-18**		18	S1	20 25	45	54	60	30	15	45	—	—
MSGA3-20 **MSGB3-20**		20	S1	20 25	45	60	66	30	15	45	—	—
MSGA3-24 **MSGB3-24**		24	S1	20 25	45	72	78	30	15	45	—	—
MSGA3-25 **MSGB3-25**		25	S1	25 30	55	75	81	30	15	45	—	—
MSGA3-30 **MSGB3-30**		30	S1	28 35	60	90	96	30	15	45	—	—
MSGA3-35 **MSGB3-35**		35	S1	30 35	60	105	111	30	15	45	—	—
MSGA3-36 **MSGB3-36**		36	S1	30 35	60	108	114	30	15	45	—	—
MSGA3-40 **MSGB3-40**		40	S1	30 40	70	120	126	30	15	45	—	—
MSGA3-45 **MSGB3-45**		45	S1	30 40	70	135	141	30	15	45	—	—
MSGA3-48 **MSGB3-48**		48	S1	35 40	70	144	150	30	15	45	—	—
MSGA3-50 **MSGB3-50**		50	S2	32 40	70	150	156	30	15	45	20	126
MSGA3-55 **MSGB3-55**		55	S2	35 40	70	165	171	30	15	45	20	140
MSGA3-60 **MSGB3-60**		60	S2	35 45	80	180	186	30	15	45	20	156

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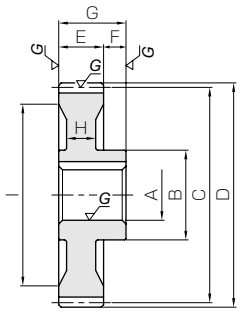
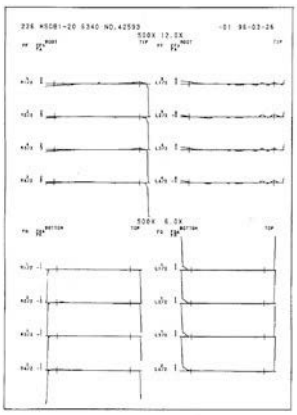


S2

Keyway	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight	Catalog No.
Width×Depth	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)	
6 x 2.8 6 x 2.8	247	124	25.2	12.7	0.10~0.20	0.40 0.35	**MSGA3-15** **MSGB3-15****
6 x 2.8 8 x 3.3	328	187	33.4	19.1	0.12~0.22	0.61 0.54	**MSGA3-18** **MSGB3-18**
6 x 2.8 8 x 3.3	384	236	39.1	24.1	0.12~0.22	0.74 0.67	**MSGA3-20** **MSGB3-20**
6 x 2.8 8 x 3.3	499	353	50.9	36.0	0.12~0.22	1.03 0.96	**MSGA3-24** **MSGB3-24**
8 x 3.3 10 x 3.3	528	386	53.9	39.3	0.12~0.22	1.14 1.06	**MSGA3-25** **MSGB3-25**
8 x 3.3 10 x 3.3	677	565	69.1	57.7	0.12~0.22	1.60 1.48	**MSGA3-30** **MSGB3-30**
8 x 3.3 10 x 3.3	790	745	80.6	75.9	0.14~0.24	2.11 2.02	**MSGA3-35** **MSGB3-35**
8 x 3.3 10 x 3.3	820	790	83.6	80.6	0.14~0.24	2.23 2.14	**MSGA3-36** **MSGB3-36**
8 x 3.3 12 x 3.3	938	988	95.6	101	0.14~0.24	2.86 2.66	**MSGA3-40** **MSGB3-40**
8 x 3.3 12 x 3.3	1090	1260	111	129	0.14~0.24	3.57 3.37	**MSGA3-45** **MSGB3-45**
10 x 3.3 12 x 3.3	1180	1450	120	147	0.14~0.24	3.94 3.83	**MSGA3-48** **MSGB3-48**
10 x 3.3 12 x 3.3	1240	1570	126	161	0.14~0.24	3.79 3.62	**MSGA3-50** **MSGB3-50**
10 x 3.3 12 x 3.3	1330	1830	135	187	0.14~0.24	4.39 4.29	**MSGA3-55** **MSGB3-55**
10 x 3.3 14 x 3.8	1470	2200	150	224	0.14~0.24	5.31 5.08	**MSGA3-60** **MSGB3-60**

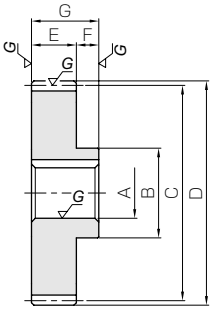
[Caution on Secondary Operations] ① No secondary operations can be performed on these precision finished gears due to the applied carburizing process.
For products which are different in specifications, such as bore size, we accept custom-made gear orders and provide a price quote.



An example of KHK's inspection report on tooth profile and lead errors.

The precision grade of a spur gear (JIS B 1702-1:1998 and JIS B 1702-2:1998) is determined by factors such as single pitch error, pitch variation error, accumulated pitch error, tooth profile error, run out error, load error etc. For more details, please refer to the section “Accuracy of Spur and Helical Gears” in separate technical reference book.

Specifications	
Precision grade	JIS grade N5 (JIS B1702-1: 1998) JIS grade 1 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	SCM415
Heat treatment	Overall carburizing
Tooth hardness	55 ～ 60HRC



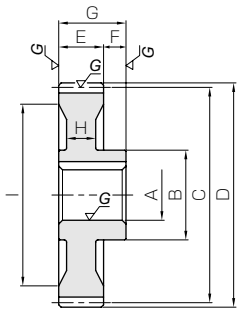
S1

Catalog No.	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total length	Web thickness	Web O.D.
				A_{H7}	B	C	D	E	F	G	H	I
MSGA4-15 **MSGB4-15****	*m*4	15	S1	25 30	48	60	68	40	20	60	—	—
MSGA4-18 **MSGB4-18**		18	S1	25 30	50	72	80	40	20	60	—	—
MSGA4-20 **MSGB4-20**		20	S1	28 32	60	80	88	40	20	60	—	—
MSGA4-24 **MSGB4-24**		24	S1	28 32	60	96	104	40	20	60	—	—
MSGA4-25 **MSGB4-25**		25	S1	30 35	60	100	108	40	20	60	—	—
MSGA4-30 **MSGB4-30**		30	S1	35 40	70	120	128	40	20	60	—	—
MSGA4-35 **MSGB4-35**		35	S1	35 40	70	140	148	40	20	60	—	—
MSGA4-36 **MSGB4-36**		36	S1	35 40	70	144	152	40	20	60	—	—
MSGA4-40 **MSGB4-40**		40	S1	40 45	80	160	168	40	20	60	—	—
MSGA4-45 **MSGB4-45**		45	S1	40 45	80	180	188	40	20	60	—	—
MSGA4-48 **MSGB4-48**		48	S2	40 45	80	192	200	40	20	60	26	160
MSGA4-50 **MSGB4-50**		50	S2	40 50	85	200	208	40	20	60	26	168

[Caution on Product Characteristics]

① Although the dimensions of the keyway are made to the JIS (Js9) tolerance, there may be some deviations due to the effects of the heat treatment.
②The allowable torques shown in the table are the calculated values according to the assumed usage conditions. Please see Page 31 for more details.
③ The backlash values shown in the table are the theoretical values for the backlash in the normal direction for a pair of identical gears in mesh.
④ Products marked with "**" have a small amount of material between the corner of the keyway and the tooth root. This mode of failure must be considered when selecting these gears. For details, please see our web site.

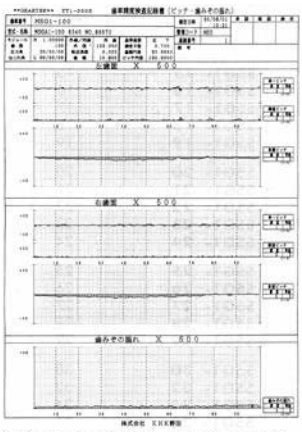
＊ For products not categorized in our KHK Stock Gear series, custom gear production services with short lead times is available. For details see Page 8.



S2

Keyway	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight	Catalog No.
Width×Depth	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)	
8 x 3.3 8 x 3.3	585	302	59.7	30.8	0.14~0.24	0.93 0.83	**MSGA4-15** **MSGB4-15****
8 x 3.3 8 x 3.3	777	455	79.3	46.4	0.14~0.24	1.34 1.24	**MSGA4-18** **MSGB4-18**
8 x 3.3 10 x 3.3	910	574	92.8	58.6	0.14~0.24	1.72 1.63	**MSGA4-20** **MSGB4-20**
8 x 3.3 10 x 3.3	1130	819	115	83.5	0.14~0.24	2.41 2.32	**MSGA4-24** **MSGB4-24**
8 x 3.3 10 x 3.3	1190	896	122	91.4	0.14~0.24	2.56 2.44	**MSGA4-25** **MSGB4-25**
10 x 3.3 12 x 3.3	1530	1320	156	134	0.16~0.26	3.69 3.54	**MSGA4-30** **MSGB4-30**
10 x 3.3 12 x 3.3	1870	1820	191	185	0.16~0.26	4.97 4.83	**MSGA4-35** **MSGB4-35**
10 x 3.3 12 x 3.3	1940	1930	198	197	0.16~0.26	5.25 5.11	**MSGA4-36** **MSGB4-36**
12 x 3.3 14 x 3.8	2120	2290	216	234	0.16~0.26	6.49 6.33	**MSGA4-40** **MSGB4-40**
12 x 3.3 14 x 3.8	2460	2930	251	299	0.16~0.26	8.17 8.01	**MSGA4-45** **MSGB4-45**
12 x 3.3 14 x 3.8	2660	3350	272	342	0.16~0.26	7.97 7.81	**MSGA4-48** **MSGB4-48**
12 x 3.3 14 x 3.8	2800	3650	285	372	0.16~0.26	8.71 8.37	**MSGA4-50** **MSGB4-50**

[Caution on Secondary Operations] ① No secondary operations can be performed on these precision finished gears due to the applied carburizing process.
For products which are different in specifications, such as bore size, we accept custom-made gear orders and provide a price quote.

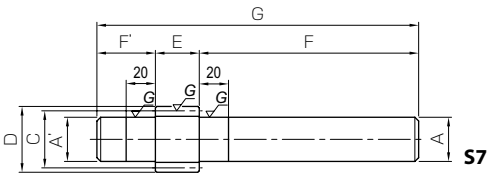


An example of KHK's inspection report on various pitch errors.

The precision grade of a spur gear (JIS B 1702-1:1998 and JIS B 1702-2:1998) is determined by factors such as single pitch error, pitch variation error, accumulated pitch error, tooth profile error, run out error, load error etc. For more details, please refer to the section "Accuracy of Spur and Helical Gears" in separate technical reference book.

Ground Spur Pinion Shafts

Specifications	
Precision grade	JIS grade N7 (JIS B1702-1: 1998) JIS grade 3 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	Thermal refinined, tooth surfaces induction hardened
Tooth hardness	50 ～ 60HRC



S7

Catalog No.	Module	No. of teeth	Profile shift coefficient	Shape	Shaft dia. (L)	Shaft length (L)	Pitch dia.	Outside dia.	Face width	Shaft dia. (R)	Shaft length (R)	Total length
					A'	F'	C	D	E	A	F	G
SSGS1.5-10	***m*1.5**	10	+0.5	S7	12.2	25	15	19.35	15	12.2	100	140
SSGS1.5-11		11	+0.5	S7	13.7	25	16.5	20.85	15	13.7	100	140
SSGS1.5-12		12	0	S7	13.7	25	18	21	15	13.7	100	140
SSGS1.5-13		13	0	S7	15.2	25	19.5	22.5	15	15.2	100	140
SSGS2-10	***m*2**	10	+0.5	S7	16.2	30	20	25.8	20	16.2	120	170
SSGS2-11		11	+0.5	S7	18.2	30	22	27.8	20	18.2	120	170
SSGS2-12		12	0	S7	18.2	30	24	28	20	18.2	120	170
SSGS2-13		13	0	S7	20.2	30	26	30	20	20.2	120	170
SSGS2.5-10	***m*2.5**	10	+0.5	S7	20.2	35	25	32.25	25	20.2	135	195
SSGS2.5-11		11	+0.5	S7	22.7	35	27.5	34.75	25	22.7	135	195
SSGS2.5-12		12	0	S7	22.7	35	30	35	25	22.7	135	195
SSGS2.5-13		13	0	S7	25.2	35	32.5	37.5	25	25.2	135	195
SSGS3-10	***m*3**	10	+0.5	S7	24.2	40	30	38.7	30	24.2	150	220
SSGS3-11		11	+0.5	S7	27.2	40	33	41.7	30	27.2	150	220
SSGS3-12		12	0	S7	27.2	40	36	42	30	27.2	150	220
SSGS3-13		13	0	S7	30.2	40	39	45	30	30.2	150	220

[Caution on Product Characteristics]

① The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.

② 10- and 11-tooth gears with a pitch of module 1.5 or greater are profile shifted gears (x = +0.5). Please refer to the below tables for calculating the center distance when assembled.

③ The backlash values shown in the table are the theoretical values for the normal direction for a pair of identical SSG Spur Gears with 30 teeth in mesh.

■ Center distance of Stock Spur Gears Meshing with Profile Shifted Spur Gears

The table on the right shows the center distance of the spur gears (x=0) which can be meshed with profile shifted spur gears (x=+0.5) with module 1. Multiply by the actual module to determine your center distance.

■ Center distance when gear has 12 to 30 teeth (unit : mm)

No. of teeth(x=0) \ No. of teeth(x=+0.5)	10	11
12	11.4410	11.9428
13	11.9428	12.4446
14	12.4446	12.9462
15	12.9462	13.4477
16	13.4477	13.9492
17	13.9492	14.4505
18	14.4505	14.9518
19	14.9518	15.4530
20	15.4530	15.9542
21	15.9542	16.4553
22	16.4553	16.9564
23	16.9564	17.4574
24	17.4574	17.9583
25	17.9583	18.4592
26	18.4592	18.9601
27	18.9601	19.4610
28	19.4610	19.9618
29	19.9618	20.4625
30	20.4625	20.9633

■ Center distance when gear has 32 to 62 teeth (unit : mm)

No. of teeth(x=0) \ No. of teeth(x=+0.5)	10	11
32	21.4640	21.9647
34	22.4653	22.9660
35	22.9660	23.4666
36	23.4666	23.9671
38	24.4677	24.9683
40	25.4688	25.9693
42	26.4698	26.9703
44	27.4707	27.9712
45	27.9712	28.4716
46	28.4716	28.9721
48	29.4725	29.9729
50	30.4733	30.9736
52	31.4740	31.9744
54	32.4747	32.9750
55	32.9750	33.4754
56	33.4754	33.9757
58	34.4760	34.9763
60	35.4766	35.9769
62	36.4772	36.9774

Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash (mm)	Weight (kg)	Catalog No.
Bending strength	Surface durability	Bending strength	Surface durability			
12.7	3.76	1.30	0.38	0.08~0.16	0.14	**SSGS1.5-10**
14.5	4.61	1.48	0.47	0.08~0.16	0.17	**SSGS1.5-11**
9.97	4.70	1.02	0.48	0.08~0.16	0.17	**SSGS1.5-12**
12.1	5.51	1.23	0.56	0.08~0.16	0.21	**SSGS1.5-13**
30.2	9.07	3.08	0.93	0.11~0.21	0.30	**SSGS2-10**
34.3	11.0	3.50	1.12	0.11~0.21	0.38	**SSGS2-11**
23.6	11.3	2.41	1.15	0.11~0.21	0.38	**SSGS2-12**
28.6	13.3	2.92	1.35	0.11~0.21	0.46	**SSGS2-13**
58.9	17.9	6.01	1.83	0.11~0.21	0.54	**SSGS2.5-10**
67.1	22.0	6.84	2.24	0.11~0.21	0.68	**SSGS2.5-11**
46.2	22.4	4.71	2.28	0.11~0.21	0.68	**SSGS2.5-12**
46.6	21.9	4.75	2.23	0.11~0.21	0.83	**SSGS2.5-13**
102	31.3	10.4	3.19	0.11~0.21	0.89	**SSGS3-10**
96.6	31.9	9.85	3.26	0.11~0.21	1.11	**SSGS3-11**
66.5	32.6	6.78	3.32	0.11~0.21	1.11	**SSGS3-12**
80.4	38.3	8.20	3.91	0.11~0.21	1.35	**SSGS3-13**

[Caution on Secondary Operations]

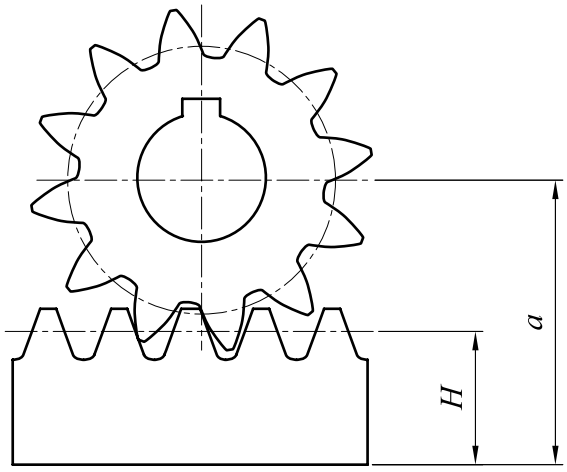
① Please read "Caution on Performing Secondary Operations" (Page 32) when performing modifications and/or secondary operations for safety concerns. KHK Quick-Mod Gears, the KHK's system for quick modification of KHK stock gears is also available.

② 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). Use carbide tools for the modification of the shaft area near the bottom land.

■ Center distance when gear has 64 to 200 teeth (unit : mm)

No. of teeth(x=+0.5) / No. of teeth(x=0)	10	11
64	37.4777	37.9780
65	37.9780	38.4782
66	38.4782	38.9785
68	39.4787	39.9790
70	40.4792	40.9794
72	41.4796	41.9799
75	42.9803	43.4805
76	43.4805	43.9807
80	45.4813	45.9814
84	47.4820	47.9822
85	47.9822	48.4823
88	49.4826	49.9828
90	50.4830	50.9831
95	52.9837	53.4838
100	55.4844	55.9845
120	65.4866	65.9867
150	80.4890	80.9890
200	105.4915	105.9915

■ Assembly distance of a profile shifted gear and the meshing rack



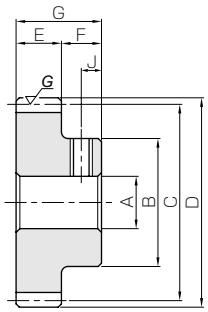
$$a = \frac{zm}{2} + H + xm$$

Where

a : Assembly Distance
H : Height of pitch line of rack
m : Module
z : No. of Teeth
x : Profile Shift Coefficient

Specifications	
Precision grade	JIS grade N7 (JIS B1702-1: 1998) JIS grade 3 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C ＊
Heat treatment	— ＊
Tooth hardness	200 ～ 270HB

＊ Tooth areas, where size is less than 0.8 module, without quenching treatment.



S1T

Catalog No.	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total length	Keyway
				A_{H7}	B	C	D	E	F	G	Width×Depth
SSG0.5-30A	*m*0.5	30	S1T	5	13	15	16	5	7	12	—
SSG0.5-30B			S1T	6							—
SSG0.5-32A		32	S1T	5	14	16	17	5	7	12	—
SSG0.5-34A		34	S1T	5	15	17	18	5	7	12	—
SSG0.5-35A		35	S1T	5	15	17.5	18.5	5	7	12	—
SSG0.5-36A		36	S1T	5	16	18	19	5	7	12	—
SSG0.5-38A		38	S1T	5	16	19	20	5	7	12	—
SSG0.5-40A		40	S1T	5	18	20	21	5	7	12	—
SSG0.5-40B			S1T	6							—
SSG0.5-50A		50	S1T	5	22	25	26	5	7	12	—
SSG0.5-50B			S1T	6							—
SSG0.5-60A		60	S1T	6	28	30	31	5	7	12	—
SSG0.5-60B			S1T	8							—
SSG0.5-70A		70	S1T	6	28	35	36	5	7	12	—
SSG0.5-70B			S1T	8							—
SSG0.5-80A		80	S1T	6	28	40	41	5	7	12	—
SSG0.5-80B			S1T	8							—
SSG0.8-20A	*m*0.8	20	S1T	5	13	16	17.6	8	8	16	—
SSG0.8-20B			S1T	6							—
SSG0.8-21A		21	S1T	6	14	16.8	18.4	8	8	16	—
SSG0.8-22A		22	S1T	6	15	17.6	19.2	8	8	16	—
SSG0.8-23A		23	S1T	6	15	18.4	20	8	8	16	—
SSG0.8-24A		24	S1T	5	16	19.2	20.8	8	8	16	—
SSG0.8-24B			S1T	6							—
SSG0.8-25A		25	S1T	5	16	20	21.6	8	8	16	—
SSG0.8-25B			S1T	6							—
SSG0.8-26A		26	S1T	6	18	20.8	22.4	8	8	16	—
SSG0.8-27A		27	S1T	6	18	21.6	23.2	8	8	16	—
SSG0.8-28A		28	S1T	6	18	22.4	24	8	8	16	—
SSG0.8-29A		29	S1T	6	20	23.2	24.8	8	8	16	—
SSG0.8-30A		30	S1T	5	20	24	25.6	8	8	16	—
SSG0.8-30B			S1T	6							—
SSG0.8-30C			S1T	8							—
SSG0.8-32A		32	S1T	6	22	25.6	27.2	8	8	16	—
SSG0.8-34A		34	S1T	6	22	27.2	28.8	8	8	16	—
SSG0.8-35A		35	S1T	6	25	28	29.6	8	8	16	—
SSG0.8-36A		36	S1T	6	25	28.8	30.4	8	8	16	—
SSG0.8-38A		38	S1T	6	25	30.4	32	8	8	16	—
SSG0.8-40A		40	S1T	6	28	32	33.6	8	8	16	—
SSG0.8-40B			S1T	8							—
SSG0.8-50A		50	S1T	6	28	40	41.6	8	8	16	—
SSG0.8-50B			S1T	8							—
SSG0.8-60A		60	S1T	6	28	48	49.6	8	8	16	—
SSG0.8-60B			S1T	8							—
SSG0.8-70A		70	S1T	6	28	56	57.6	8	8	16	—
SSG0.8-70B			S1T	8							—
SSG0.8-80A		80	S1T	6	28	64	65.6	8	8	16	—
SSG0.8-80B			S1T	8							—

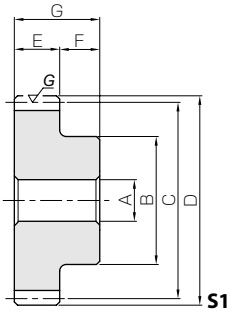
[Caution on Product Characteristics]
① For products with a tapped hole, a set screw is included.
② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
③ The backlash values shown in the table are the theoretical values for the backlash in the normal direction of a pair of identical gears in mesh.
④ The use of S1T shaped set screws for fastening gears to a shaft, is a method only applicable to light load usage. For secure fastening, please use dowel pins, in combination.

Set Screw		Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight	Catalog No.
Size	J	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)	
M4 M4	3.5 3.5	1.63	0.29	0.17	0.030	0~0.08	0.012 0.011	**SSG0.5-30A** **SSG0.5-30B**
M4	3.5	1.78	0.34	0.18	0.035	0~0.08	0.014	**SSG0.5-32A**
M4	3.5	1.93	0.39	0.20	0.039	0~0.08	0.016	**SSG0.5-34A**
M4	3.5	2.00	0.41	0.20	0.042	0~0.08	0.017	**SSG0.5-35A**
M4	3.5	2.08	0.44	0.21	0.045	0~0.08	0.019	**SSG0.5-36A**
M4	3.5	2.23	0.49	0.23	0.050	0~0.08	0.020	**SSG0.5-38A**
M4 M4	3.5 3.5	2.38	0.55	0.24	0.056	0~0.08	0.024 0.023	**SSG0.5-40A** **SSG0.5-40B**
M4 M4	3.5 3.5	3.14	0.89	0.32	0.091	0~0.08	0.038 0.037	**SSG0.5-50A** **SSG0.5-50B**
M4 M5	3.5 3.5	3.91	1.32	0.40	0.13	0~0.08	0.058 0.056	**SSG0.5-60A** **SSG0.5-60B**
M4 M5	3.5 3.5	3.90	1.53	0.40	0.16	0~0.08	0.068 0.066	**SSG0.5-70A** **SSG0.5-70B**
M4 M5	3.5 3.5	4.55	2.04	0.46	0.21	0~0.08	0.080 0.077	**SSG0.5-80A** **SSG0.5-80B**
M4 M4	4 4	3.79	0.53	0.39	0.054	0~0.08	0.018 0.017	**SSG0.8-20A** **SSG0.8-20B**
M4	4	4.08	0.59	0.42	0.060	0~0.08	0.020	**SSG0.8-21A**
M4	4	4.36	0.66	0.44	0.067	0~0.08	0.022	**SSG0.8-22A**
M4	4	4.64	0.73	0.47	0.074	0~0.08	0.024	**SSG0.8-23A**
M4 M4	4 4	4.93	0.80	0.50	0.082	0~0.08	0.028 0.027	**SSG0.8-24A** **SSG0.8-24B**
M4 M4	4 4	5.22	0.88	0.53	0.090	0~0.08	0.029 0.028	**SSG0.8-25A** **SSG0.8-25B**
M4	4	5.51	0.96	0.56	0.098	0~0.08	0.033	**SSG0.8-26A**
M4	4	5.81	1.04	0.59	0.11	0~0.08	0.035	**SSG0.8-27A**
M4	4	6.10	1.12	0.62	0.11	0~0.08	0.037	**SSG0.8-28A**
M4	4	6.40	1.21	0.65	0.12	0~0.08	0.042	**SSG0.8-29A**
M4 M4 M5	4 4 4	6.70	1.30	0.68	0.13	0~0.08	0.045 0.044 0.041	**SSG0.8-30A** **SSG0.8-30B** **SSG0.8-30C**
M4	4	7.29	1.50	0.74	0.15	0~0.08	0.052	**SSG0.8-32A**
M4	4	7.90	1.71	0.81	0.17	0~0.08	0.056	**SSG0.8-34A**
M4	4	8.20	1.82	0.84	0.19	0~0.08	0.065	**SSG0.8-35A**
M4	4	8.51	1.93	0.87	0.20	0~0.08	0.067	**SSG0.8-36A**
M4	4	9.12	2.17	0.93	0.22	0~0.08	0.072	**SSG0.8-38A**
M4 M5	4 4	8.11	2.02	0.83	0.21	0~0.08	0.085 0.082	**SSG0.8-40A** **SSG0.8-40B**
M4 M5	4 4	10.7	3.26	1.09	0.33	0~0.08	0.11 0.11	**SSG0.8-50A** **SSG0.8-50B**
M4 M5	4 4	13.3	4.83	1.36	0.49	0~0.08	0.15 0.14	**SSG0.8-60A** **SSG0.8-60B**
M4 M5	4 4	16.0	6.73	1.63	0.69	0~0.08	0.19 0.19	**SSG0.8-70A** **SSG0.8-70B**
M4 M5	4 4	18.7	8.97	1.90	0.91	0~0.08	0.24 0.23	**SSG0.8-80A** **SSG0.8-80B**

[Caution on Secondary Operations] ①Please read "Caution on Performing Secondary Operations" (Page 32) 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.

Specifications	
Precision grade	JIS grade N7 (JIS B1702-1: 1998) * JIS grade 3 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	Tooth surface induction hardened
Tooth hardness	50 ~ 60HRC
Face width (E)	8
Hub width (F)	10
Total length (G)	18
Screw offset (J)	5

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



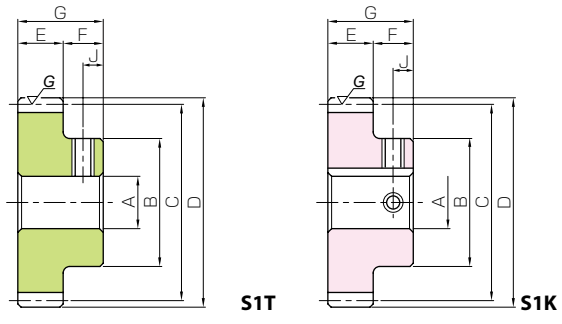
Catalog No.	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight
			A_{H7}	B	C	D	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)
SSG1-15	15	S1	6	12	15	17	2.96	1.03	0.30	0.11	0.08~0.16	0.016
SSG1-16	16			13	16	18	3.28	1.19	0.33	0.12		0.019
SSG1-17	17			14	17	19	3.60	1.36	0.37	0.14		0.022
SSG1-18	18			15	18	20	3.93	1.54	0.40	0.16		0.026
SSG1-19	19			16	19	21	4.26	1.73	0.43	0.18		0.030
SSG1-20	20		8	17	20	22	4.60	1.94	0.47	0.20		0.034
SSG1-21	21			18	21	23	4.94	2.14	0.50	0.22		0.035
SSG1-22	22			18	22	24	5.28	2.36	0.54	0.24		0.037
SSG1-23	23			20	23	25	5.63	2.59	0.57	0.26		0.044
SSG1-24	24			20	24	26	5.98	2.83	0.61	0.29		0.046
SSG1-25	25			20	25	27	6.33	3.07	0.65	0.31		0.048
SSG1-26	26			20	26	28	6.68	3.33	0.68	0.34		0.051
SSG1-27	27			20	27	29	7.04	3.60	0.72	0.37		0.054
SSG1-28	28			20	28	30	7.39	3.89	0.75	0.40		0.056
SSG1-29	29			25	29	31	7.75	4.18	0.79	0.43		0.073
SSG1-30	30		10	25	30	32	8.11	4.48	0.83	0.46		0.072
SSG1-32	32			25	32	34	7.37	4.27	0.75	0.43		0.078
SSG1-34	34			25	34	36	7.98	4.84	0.81	0.49		0.084
SSG1-35	35			25	35	37	8.28	5.14	0.84	0.52		0.088
SSG1-36	36			25	36	38	8.59	5.45	0.88	0.56		0.091
SSG1-38	38			30	38	40	9.21	6.10	0.94	0.62		0.12
SSG1-40	40			30	40	42	9.83	6.79	1.00	0.69		0.12
SSG1-42	42			30	42	44	10.5	7.51	1.07	0.77		0.13
SSG1-44	44			30	44	46	11.1	8.28	1.13	0.84		0.14
SSG1-45	45			30	45	47	11.4	8.67	1.16	0.88		0.14
SSG1-48	48			30	48	50	12.3	9.92	1.26	1.01		0.16
SSG1-50	50		12	35	50	52	13.0	10.8	1.32	1.10		0.18
SSG1-55	55			35	55	57	14.6	13.2	1.48	1.34	0.10~0.18	0.21
SSG1-56	56			35	56	58	14.9	13.7	1.52	1.40		0.21
SSG1-60	60			40	60	62	16.2	15.8	1.65	1.61		0.26
SSG1-64	64			40	64	66	17.4	18.1	1.78	1.84		0.28
SSG1-70	70			40	70	72	19.4	21.8	1.97	2.22		0.32
SSG1-75	75			40	75	77	21.0	25.2	2.14	2.57		0.36
SSG1-80	80		15	50	80	82	22.6	28.8	2.30	2.94		0.44
SSG1-90	90			50	90	92	25.8	36.9	2.64	3.77		0.53
SSG1-100	100			50	100	102	26.9	42.5	2.74	4.34		0.62
SSG1-120	120			50	120	122	32.9	62.5	3.36	6.37	0.12~0.20	0.84

[Caution on Product Characteristics]
① The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
② 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.

[Caution on Secondary Operations]
①Please read "Caution on Performing Secondary Operations" (Page 32) 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.
② 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

Ground Spur Gears



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 No.	M4	M5	M4						M5				M6		
SSG1-15 J BORE															
SSG1-16 J BORE															
SSG1-17 J BORE															
SSG1-18 J BORE															
SSG1-19 J BORE															
SSG1-20 J BORE															
SSG1-21 J BORE															
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SSG1-40 J BORE															
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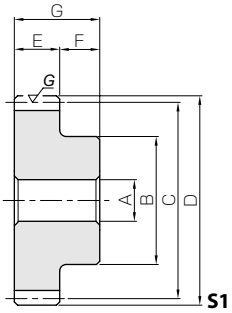
SSG1-45 J BORE															
SSG1-48 J BORE															
SSG1-50 J BORE															
SSG1-55 J BORE															
SSG1-56 J BORE															
SSG1-60 J BORE															
SSG1-64 J BORE															
SSG1-70 J BORE															
SSG1-75 J BORE															
SSG1-80 J BORE															
SSG1-90 J BORE															
SSG1-100 J BORE															
SSG1-120 J BORE															

[Caution on J series]

① 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.
② 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.
③ Keyways are made according to JIS B1301 standards, Js9 tolerance.
④ Certain products which would otherwise have a very long tapped hole are conterbored to reduce the length of the tap.
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 The use of S1T shaped set screws for fastening gears to a shaft, is a method only applicable to light load usage. For secure fastening, please use dowel pins, in combination.

Specifications	
Precision grade	JIS grade N7 (JIS B1702-1: 1998) * JIS grade 3 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	Tooth surface induction hardened
Tooth hardness	50 ~ 60HRC
Face width (E)	15
Hub width (F)	14
Total length (G)	29
Screw offset (J)	7

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



Catalog No.	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight
			A_{H7}	B	C	D	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)
SSG1.5-14	14	S1	10	17	21	24	11.1	3.73	1.13	0.38	0.08~0.16	0.048
SSG1.5-15	15			18	22.5	25.5	12.5	4.35	1.27	0.44		0.057
SSG1.5-16	16			20	24	27	13.8	5.02	1.41	0.51		0.070
SSG1.5-17	17			21	25.5	28.5	15.2	5.74	1.55	0.58		0.080
SSG1.5-18	18			22	27	30	16.6	6.51	1.69	0.66		0.091
SSG1.5-19	19		12	23	28.5	31.5	18.0	7.33	1.83	0.75		0.10
SSG1.5-20	20			24	30	33	19.4	8.20	1.98	0.84		0.12
SSG1.5-21	21			25	31.5	34.5	20.8	9.12	2.12	0.93		0.13
SSG1.5-22	22			26	33	36	18.6	8.41	1.89	0.86		0.13
SSG1.5-23	23			27	34.5	37.5	19.8	9.27	2.02	0.95		0.15
SSG1.5-24	24		15	28	36	39	21.0	10.2	2.14	1.04		0.16
SSG1.5-25	25			30	37.5	40.5	22.2	11.1	2.27	1.13		0.18
SSG1.5-26	26			32	39	42	23.5	12.1	2.39	1.23		0.20
SSG1.5-27	27			34	40.5	43.5	24.7	13.1	2.52	1.33		0.21
SSG1.5-28	28			36	42	45	26.0	14.1	2.65	1.44		0.23
SSG1.5-29	29			37	43.5	46.5	27.3	15.2	2.78	1.55		0.25
SSG1.5-30	30			38	45	48	28.5	16.3	2.91	1.66		0.27
SSG1.5-32	32			40	48	51	31.1	18.6	3.17	1.90		0.31
SSG1.5-34	34			42	51	54	33.6	21.1	3.43	2.15	0.10~0.18	0.35
SSG1.5-35	35			42	52.5	55.5	34.9	22.4	3.56	2.29		0.37
SSG1.5-36	36			45	54	57	36.2	23.8	3.70	2.43		0.40
SSG1.5-38	38			45	57	60	38.8	26.6	3.96	2.71		0.44
SSG1.5-40	40			50	60	63	41.5	29.6	4.23	3.02		0.51
SSG1.5-42	42			50	63	66	44.1	32.8	4.50	3.35		0.54
SSG1.5-44	44			50	66	69	46.7	36.2	4.77	3.69		0.58
SSG1.5-45	45		18	50	67.5	70.5	48.1	37.9	4.90	3.86		0.58
SSG1.5-48	48			50	72	75	52.0	43.4	5.31	4.42		0.64
SSG1.5-50	50			60	75	78	54.7	47.2	5.58	4.82		0.77
SSG1.5-55	55			60	82.5	85.5	61.4	57.7	6.26	5.88		0.88
SSG1.5-56	56			60	84	87	62.8	59.9	6.40	6.11		0.91
SSG1.5-60	60		20	60	90	93	68.1	69.2	6.95	7.06		0.99
SSG1.5-64	64			60	96	99	67.9	73.2	6.92	7.46		1.09
SSG1.5-70	70			60	105	108	75.4	88.4	7.69	9.01	0.12~0.20	1.26
SSG1.5-75	75			60	112.5	115.5	81.7	102	8.33	10.4		1.41
SSG1.5-80	80			70	120	123	88.0	117	8.97	12.0		1.68
SSG1.5-90	90			70	135	138	101	150	10.3	15.3		2.04
SSG1.5-100	100			70	150	153	113	187	11.6	19.1		2.43

[Caution on Product Characteristics] ① The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
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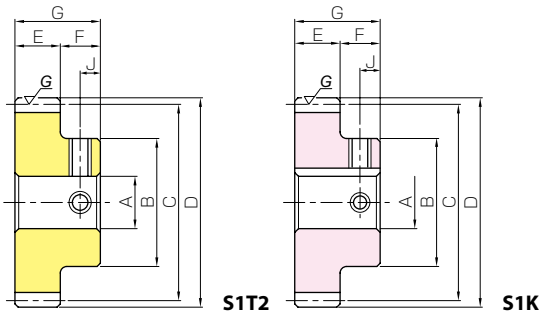
J Series



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	10	12	14	15	16	17	18	19	20	22	25	28	30	32	35	40
Screw size	4 × 1.8		5 × 2.3				6 × 2.8				8 × 3.3			10 × 3.3		12 × 3.3
Catalog No.	M4						M5				M6			M8		
SSG1.5-14 J BORE																
SSG1.5-15 J BORE																
SSG1.5-16 J BORE																
SSG1.5-17 J BORE																
SSG1.5-18 J BORE																
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SSG1.5-70 J BORE																
SSG1.5-75 J BORE																
SSG1.5-80 J BORE																
SSG1.5-90 J BORE																
SSG1.5-100 J BORE																

[Caution on J series]

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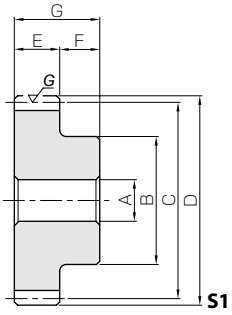
② Number of products we can process for one order is 1 to 20 units. For quantities of 21 or more pieces, we need to quote price and lead time.
③ Keyways are made according to JIS B1301 standards, Js9 tolerance.
④ Certain products which would otherwise have a very long tapped hole are conterbored to reduce the length of the tap.
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 The use of S1T2 shaped set screws for fastening gears to a shaft, is a method only applicable to light load usage. For secure fastening, please use dowel pins, in combination.

Specifications	
Precision grade	JIS grade N7 (JIS B1702-1: 1998) * JIS grade 3 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	Tooth surface induction hardened
Tooth hardness	50 ~ 60HRC
Face width (E)	20
Hub width (F)	16
Total length (G)	36
Screw offset (J)	8

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



Catalog No.	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight
			A_{H7}	B	C	D	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)
SSG2-14	14	S1	12	22	28	32	26.3	9.01	2.69	0.92	0.10~0.20	0.11
SSG2-15	15			24	30	34	29.6	10.5	3.01	1.07		0.14
SSG2-16	16			26	32	36	27.3	10.1	2.78	1.03		0.16
SSG2-17	17			28	34	38	30.0	11.6	3.06	1.18		0.19
SSG2-18	18			30	36	40	32.7	13.1	3.34	1.34		0.22
SSG2-19	19		15	31	38	42	35.5	14.8	3.62	1.51		0.24
SSG2-20	20			32	40	44	38.3	16.6	3.91	1.69		0.25
SSG2-21	21			34	42	46	41.1	18.4	4.20	1.88		0.28
SSG2-22	22			36	44	48	44.0	20.4	4.49	2.08		0.32
SSG2-23	23			37	46	50	46.9	22.5	4.78	2.30		0.35
SSG2-24	24			38	48	52	49.8	24.7	5.08	2.52		0.38
SSG2-25	25			40	50	54	52.7	27.0	5.38	2.75		0.42
SSG2-26	26			42	52	56	55.7	29.3	5.68	2.99	0.12~0.22	0.46
SSG2-27	27			44	54	58	58.6	31.7	5.98	3.23		0.50
SSG2-28	28			45	56	60	61.6	34.2	6.28	3.49		0.54
SSG2-29	29		18	48	58	62	64.6	36.8	6.59	3.75		0.59
SSG2-30	30			50	60	64	67.6	39.5	6.89	4.03		0.62
SSG2-32	32			50	64	68	73.7	45.2	7.51	4.61		0.68
SSG2-34	34			50	68	72	79.8	51.3	8.13	5.23		0.74
SSG2-35	35			50	70	74	82.8	54.5	8.45	5.56		0.78
SSG2-36	36			50	72	76	85.9	57.8	8.76	5.90		0.81
SSG2-38	38			50	76	80	92.1	64.8	9.39	6.60		0.89
SSG2-40	40		20	60	80	84	98.3	72.1	10.0	7.35		1.06
SSG2-42	42			60	84	88	105	79.9	10.7	8.15		1.14
SSG2-44	44			60	88	92	111	88.1	11.3	8.98		1.22
SSG2-45	45			60	90	94	114	92.3	11.6	9.41		1.27
SSG2-48	48			60	96	100	114	97.6	11.6	9.95		1.40
SSG2-50	50		25	60	100	104	120	106	12.2	10.8		1.45
SSG2-55	55			60	110	114	134	130	13.7	13.3	0.14~0.24	1.71
SSG2-56	56			60	112	116	137	135	14.0	13.8		1.76
SSG2-60	60			65	120	124	149	156	15.2	15.9		2.05
SSG2-64	64			65	128	132	161	179	16.4	18.3		2.30
SSG2-70	70			70	140	144	179	216	18.2	22.0		2.76
SSG2-75	75			70	150	154	194	249	19.7	25.4		3.12
SSG2-80	80			80	160	164	194	265	19.8	27.0		3.65
SSG2-90	90			80	180	184	222	338	22.6	34.5		4.49
SSG2-100	100			80	200	204	250	421	25.4	43.0		5.42

[Caution on Product Characteristics]
① The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
② 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.

[Caution on Secondary Operations]
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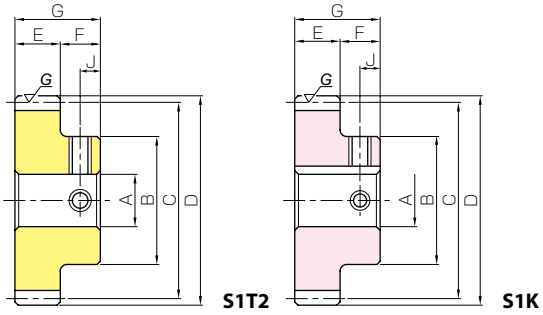
② Due to the gear teeth being induction hardened, no secondary operations can be performed on tooth areas including the bottom land (approx. 2 to 3 mm).

J Series

Ground Spur Gears



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
Screw size	4 × 1.8	5 × 2.3				6 × 2.8				8 × 3.3			10 × 3.3		12 × 3.3	14 × 3.8
Catalog No.	M4					M5				M6			M8			M10
SSG2-14 J BORE																
SSG2-15 J BORE																
SSG2-16 J BORE																
SSG2-17 J BORE																
SSG2-18 J BORE																
SSG2-19 J BORE																
SSG2-20 J BORE																
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SSG2-64 J BORE																
SSG2-70 J BORE																
SSG2-75 J BORE																
SSG2-80 J BORE																
SSG2-90 J BORE																
SSG2-100 J BORE																

[Caution on J series]

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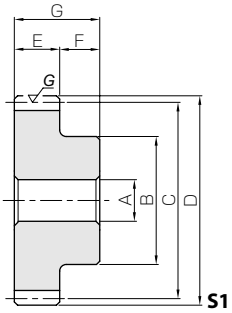
② Number of products we can process for one order is 1 to 20 units. For quantities of 21 or more pieces, we need to quote price and lead time.
③ Keyways are made according to JIS B1301 standards, Js9 tolerance.
④ Certain products which would otherwise have a very long tapped hole are conterbored to reduce the length of the tap.
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 The use of S1T2 shaped set screws for fastening gears to a shaft, is a method only applicable to light load usage. For secure fastening, please use dowel pins, in combination.

Ground Spur Gears

Specifications	
Precision grade	JIS grade N7 (JIS B1702-1: 1998) * JIS grade 3 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	Tooth surface induction hardened
Tooth hardness	50 ~ 60HRC
Face width (E)	25
Hub width (F)	18
Total length (G)	43
Screw offset (J)	9

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



Catalog No.	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight
			A_{H7}	B	C	D	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)
SSG2.5-14	14	S1	15	28	35	40	42.9	14.9	4.37	1.52	0.10~0.20	0.22
SSG2.5-15	15			30	37.5	42.5	48.1	17.4	4.91	1.77		0.26
SSG2.5-16	16			32	40	45	53.3	20.1	5.44	2.05		0.30
SSG2.5-17	17			35	42.5	47.5	58.6	23.0	5.97	2.34		0.35
SSG2.5-18	18			38	45	50	63.9	26.1	6.52	2.66		0.41
SSG2.5-19	19		18	39	47.5	52.5	69.4	29.4	7.07	3.00		0.46
SSG2.5-20	20			40	50	55	74.8	32.9	7.63	3.36		0.48
SSG2.5-21	21			42	52.5	57.5	80.4	36.7	8.20	3.74	0.12~0.22	0.53
SSG2.5-22	22			44	55	60	86.0	40.6	8.77	4.14		0.60
SSG2.5-23	23			46	57.5	62.5	91.6	44.8	9.34	4.57		0.66
SSG2.5-24	24		20	48	60	65	97.3	49.2	9.92	5.02		0.72
SSG2.5-25	25			50	62.5	67.5	103	53.8	10.5	5.48		0.77
SSG2.5-26	26			54	65	70	109	58.4	11.1	5.95		0.87
SSG2.5-27	27			56	67.5	72.5	115	63.2	11.7	6.44		0.94
SSG2.5-28	28			60	70	75	120	68.2	12.3	6.95		1.05
SSG2.5-29	29			60	72.5	77.5	126	73.3	12.9	7.48		1.10
SSG2.5-30	30			65	75	80	132	78.7	13.5	8.03		1.23
SSG2.5-32	32			70	80	85	144	90.1	14.7	9.19		1.42
SSG2.5-34	34			70	85	90	156	102	15.9	10.4		1.55
SSG2.5-35	35			70	87.5	92.5	162	109	16.5	11.1		1.62
SSG2.5-36	36		25	70	90	95	168	115	17.1	11.8		1.69
SSG2.5-38	38			70	95	100	180	129	18.3	13.2		1.83
SSG2.5-40	40			70	100	105	177	133	18.1	13.6		1.92
SSG2.5-42	42			75	105	110	188	147	19.2	15.0	0.14~0.24	2.16
SSG2.5-44	44			75	110	115	200	163	20.4	16.6		2.32
SSG2.5-45	45			75	112.5	117.5	205	170	20.9	17.4		2.41
SSG2.5-48	48			75	120	125	222	195	22.7	19.9		2.68
SSG2.5-50	50			80	125	130	234	213	23.8	21.7		2.95
SSG2.5-55	55			80	137.5	142.5	262	260	26.8	26.5		3.46
SSG2.5-56	56			80	140	145	268	270	27.3	27.5		3.57
SSG2.5-60	60			80	150	155	291	311	29.7	31.8		4.01
SSG2.5-70	70			80	175	180	324	399	33.1	40.7		5.26
SSG2.5-75	75			90	187.5	192.5	351	461	35.8	47.0		6.15
SSG2.5-80	80			90	200	205	378	527	38.6	53.7		6.90

[Caution on Product Characteristics] ① The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
② 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.

[Caution on Secondary Operations] ①Please read "Caution on Performing Secondary Operations" (Page 32) 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.
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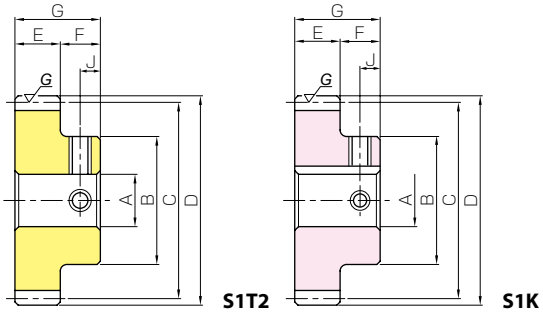
J Series

Ground Spur Gears



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 No.	M4			M5				M6			M8			M10	
SSG2.5-14 J BORE															
SSG2.5-15 J BORE															
SSG2.5-16 J BORE															
SSG2.5-17 J BORE															
SSG2.5-18 J BORE															
SSG2.5-19 J BORE															
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SSG2.5-60 J BORE															
SSG2.5-70 J BORE															
SSG2.5-75 J BORE															
SSG2.5-80 J BORE															

[Caution on J series]

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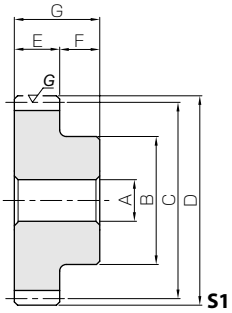
Specifications	
Precision grade	JIS grade N7 (JIS B1702-1: 1998) * JIS grade 3 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	Tooth surface induction hardened
Tooth hardness	50 ~ 60HRC
Face width (E)	30
Hub width (F)	20
Total length (G)	50
Screw offset (J)	10

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



Catalog No.	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight
			A_{H7}	B	C	D	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)
SSG3-14	14	S1	16	34	42	48	74.1	26.1	7.55	2.66	0.10~0.20	0.39
SSG3-15	15			36	45	51	83.1	30.5	8.48	3.11		0.46
SSG3-16	16			38	48	54	92.1	35.2	9.39	3.59		0.53
SSG3-17	17			37	51	57	101	40.3	10.3	4.11	0.12~0.22	0.57
SSG3-18	18			40	54	60	110	45.8	11.3	4.67		0.66
SSG3-19	19		20	45	57	63	120	51.6	12.2	5.26		0.77
SSG3-20	20			50	60	66	129	57.8	13.2	5.90		0.85
SSG3-21	21			52	63	69	139	64.4	14.2	6.57		0.94
SSG3-22	22			54	66	72	149	71.3	15.1	7.28		1.04
SSG3-23	23			56	69	75	158	78.7	16.1	8.02		1.14
SSG3-24	24			58	72	78	168	86.4	17.1	8.81		1.25
SSG3-25	25			60	75	81	178	94.5	18.1	9.64		1.36
SSG3-26	26			62	78	84	188	103	19.2	10.5		1.48
SSG3-27	27			65	81	87	198	111	20.2	11.3		1.61
SSG3-28	28			70	84	90	208	120	21.2	12.2		1.79
SSG3-29	29		25	70	87	93	218	129	22.2	13.2		1.88
SSG3-30	30			75	90	96	228	138	23.3	14.1		2.00
SSG3-32	32			75	96	102	229	146	23.4	14.9		2.21
SSG3-34	34			75	102	108	248	166	25.3	17.0	0.14~0.24	2.43
SSG3-35	35			80	105	111	258	177	26.3	18.0		2.64
SSG3-36	36			80	108	114	268	188	27.3	19.1		2.75
SSG3-38	38			80	114	120	287	210	29.2	21.4		3.00
SSG3-40	40			80	120	126	306	234	31.2	23.9		3.26
SSG3-42	42			80	126	132	326	260	33.2	26.5		3.53
SSG3-44	44			80	132	138	345	286	35.2	29.2		3.82
SSG3-45	45			80	135	141	355	300	36.2	30.6		3.97
SSG3-48	48			85	144	150	384	343	39.2	35.0		4.53
SSG3-50	50		30	85	150	156	404	374	41.2	38.1		4.78
SSG3-55	55			90	165	171	421	423	42.9	43.2		5.76
SSG3-56	56			90	168	174	430	439	43.9	44.8		5.94
SSG3-60	60			100	180	186	467	508	47.6	51.8		6.95
SSG3-70	70			100	210	216	560	699	57.1	71.3		9.11
SSG3-75	75			100	225	231	607	806	61.9	82.2		10.3
SSG3-80	80			100	240	246	654	921	66.7	93.9		11.6

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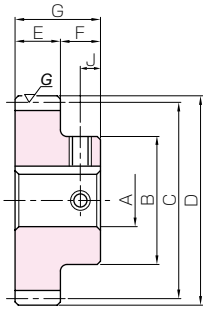
J Series

Ground Spur Gears



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	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 No.	M4		M5				M6			M8			M10	
SSG3-14 J BORE														
SSG3-15 J BORE														
SSG3-16 J BORE														
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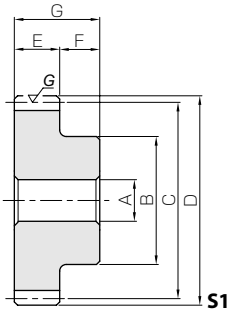
⑥ For products having a tapped hole, a set screw is included.

Specifications	
Precision grade	JIS grade N7 (JIS B1702-1: 1998) JIS grade 3 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	Tooth surface induction hardened
Tooth hardness	50 ～ 60HRC



Catalog No.	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total length
				A_{H7}	B	C	D	E	F	G
SSG4-14	***m4***	14	S1	20	40	56	64	40	25	65
SSG4-15		15	S1	20	45	60	68	40	25	65
SSG4-16		16	S1	20	50	64	72	40	25	65
SSG4-18		18	S1	20	60	72	80	40	25	65
SSG4-20		20	S1	20	65	80	88	40	25	65
SSG4-22		22	S1	20	70	88	96	40	25	65
SSG4-24		24	S1	20	75	96	104	40	25	65
SSG4-25		25	S1	20	80	100	108	40	25	65
SSG4-28		28	S1	20	85	112	120	40	25	65
SSG4-30		30	S1	20	90	120	128	40	25	65
SSG4-32		32	S1	25	90	128	136	40	25	65
SSG4-35		35	S1	25	90	140	148	40	25	65
SSG4-36		36	S1	25	90	144	152	40	25	65
SSG4-40		40	S1	25	90	160	168	40	25	65
SSG4-42		42	S1	25	90	168	176	40	25	65
SSG4-44		44	S1	30	90	176	184	40	25	65
SSG4-45		45	S1	30	90	180	188	40	25	65
SSG4-48		48	S1	30	100	192	200	40	25	65
SSG4-50		50	S1	30	100	200	208	40	25	65
SSG4-55		55	S1	30	100	220	228	40	25	65
SSG4-56		56	S1	30	110	224	232	40	25	65
SSG4-60		60	S1	30	110	240	248	40	25	65
SSG5-20	***m5***	20	S1	25	82	100	110	50	25	75
SSG5-25		25	S1	25	105	125	135	50	25	75
SSG5-30		30	S1	25	120	150	160	50	25	75
SSG6-20	***m6***	20	S1	25	100	120	132	60	28	88
SSG6-25		25	S1	30	125	150	162	60	28	88
SSG6-30		30	S1	30	150	180	192	60	28	88

[Caution on Product Characteristics] ① The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
② 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.

＊ For products not categorized in our KHK Stock Gear series, custom gear production services with short lead times is available. For details see Page 8.

Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash (mm)	Weight (kg)	Catalog No.
Bending strength	Surface durability	Bending strength	Surface durability			
176	63.4	17.9	6.47	0.14~0.24	0.86	**SSG4-14**
197	74.1	20.1	7.55	0.14~0.24	1.04	**SSG4-15**
218	85.6	22.3	8.73	0.14~0.24	1.24	**SSG4-16**
262	111	26.7	11.4	0.14~0.24	1.67	**SSG4-18**
307	141	31.3	14.3	0.14~0.24	2.07	**SSG4-20**
352	174	35.9	17.7	0.14~0.24	2.50	**SSG4-22**
368	194	37.5	19.8	0.14~0.24	2.98	**SSG4-24**
389	213	39.7	21.7	0.14~0.24	3.29	**SSG4-25**
455	270	46.4	27.5	0.16~0.26	4.05	**SSG4-28**
499	313	50.9	31.9	0.16~0.26	4.64	**SSG4-30**
544	358	55.5	36.5	0.16~0.26	5.04	**SSG4-32**
612	432	62.4	44.0	0.16~0.26	5.83	**SSG4-35**
634	458	64.7	46.7	0.16~0.26	6.11	**SSG4-36**
674	529	68.7	54.0	0.16~0.26	7.31	**SSG4-40**
717	586	73.1	59.7	0.16~0.26	7.96	**SSG4-42**
760	646	77.5	65.8	0.16~0.26	8.53	**SSG4-44**
781	677	79.6	69.0	0.16~0.26	8.88	**SSG4-45**
846	774	86.3	79.0	0.16~0.26	10.3	**SSG4-48**
889	842	90.7	85.9	0.16~0.26	11.0	**SSG4-50**
998	1030	102	105	0.16~0.26	13.1	**SSG4-55**
1020	1060	104	109	0.16~0.26	13.9	**SSG4-56**
1110	1230	113	125	0.16~0.26	15.7	**SSG4-60**
553	259	56.4	26.5	0.14~0.26	3.83	**SSG5-20**
760	426	77.5	43.4	0.18~0.30	6.23	**SSG5-25**
975	623	99.4	63.5	0.18~0.30	8.87	**SSG5-30**
955	457	97.4	46.6	0.18~0.30	6.71	**SSG6-20**
1310	747	134	76.2	0.18~0.30	10.5	**SSG6-25**
1560	1020	160	104	0.18~0.30	15.4	**SSG6-30**

[Caution on Secondary Operations]

① Please read "Caution on Performing Secondary Operations" (Page 32) 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.

② 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).

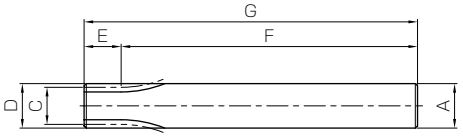
■ Poor tooth contact occurred on SSG3-30 (Approx. 30% of the proper gear contact)

Gear Oil (Equivalent to JIS gear oil category 2 and No. 3)

The design conditions are load torque at 278 rpm, of 417N·m (12 kW), 1.5 times the allowable bending strength, and 3 times the allowable surface durability torque. The pitting occurs on the poor tooth contact area after only 60 hours of continuous operation.

Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) ＊ JIS grade 4 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	Thermal refined ＊＊
Tooth hardness	200 ~ 270HB ＊＊

＊ The precision grade of products with a module less than 0.8 is equivalent to the value shown in the table.
＊＊ Items with the shape SA are not thermally refined and have a hardness of less than (194HB).



SA

Catalog No.	Module	No. of teeth	Profile shift coefficient	Shape	Shaft dia. (L)	Shaft length (L)	Pitch dia.	Outside dia.	Face width	Shaft dia. (R)	Shaft length (R)	Total length
					A'	F'	C	D	E	A	F	G
SSS0.5-10	***m*0.5**	10	0	SA	—	—	5	6	7	6	38	45
SSS0.5-11		11	0	SA	—	—	5.5	6.5	7	6.5	38	45
SSS0.5-12		12	0	SA	—	—	6	7	7	7	38	45
SSS0.5-13		13	0	SA	—	—	6.5	7.5	7	7.5	38	45
SSS0.8-10	***m*0.8**	10	0	SA	—	—	8	9.6	10	9.6	60	70
SSS0.8-11		11	0	SA	—	—	8.8	10.4	10	10.4	60	70
SSS0.8-12		12	0	SA	—	—	9.6	11.2	10	11.2	60	70
SSS0.8-13		13	0	SA	—	—	10.4	12	10	12	60	70
SSS1-10	***m*1**	10	0	SA	—	—	10	12	12	12	78	90
SSS1-11		11	0	SA	—	—	11	13	12	13	78	90
SSS1-12		12	0	SA	—	—	12	14	12	14	78	90
SSS1-13		13	0	SA	—	—	13	15	12	15	78	90
SSS1.5-10	***m*1.5**	10	+0.5	SB	12.2	25	15	19.35	15	12.2	100	140
SSS1.5-11		11	+0.5	SB	13.7	25	16.5	20.85	15	13.7	100	140
SSS1.5-12		12	0	SB	13.7	25	18	21	15	13.7	100	140
SSS1.5-13		13	0	SB	15.2	25	19.5	22.5	15	15.2	100	140
SSS2-10	***m*2**	10	+0.5	SB	16.2	30	20	25.8	20	16.2	120	170
SSS2-11		11	+0.5	SB	18.2	30	22	27.8	20	18.2	120	170
SSS2-12		12	0	SB	18.2	30	24	28	20	18.2	120	170
SSS2-13		13	0	SB	20.2	30	26	30	20	20.2	120	170
SSS2.5-10	***m*2.5**	10	+0.5	SB	20.2	35	25	32.25	25	20.2	135	195
SSS2.5-11		11	+0.5	SB	22.7	35	27.5	34.75	25	22.7	135	195
SSS2.5-12		12	0	SB	22.7	35	30	35	25	22.7	135	195
SSS2.5-13		13	0	SB	25.2	35	32.5	37.5	25	25.2	135	195
SSS3-10	***m*3**	10	+0.5	SB	24.2	40	30	38.7	30	24.2	150	220
SSS3-11		11	+0.5	SB	27.2	40	33	41.7	30	27.2	150	220
SSS3-12		12	0	SB	27.2	40	36	42	30	27.2	150	220
SSS3-13		13	0	SB	30.2	40	39	45	30	30.2	150	220

[Caution on Product Characteristics]
① The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
② 10- and 11-tooth gears with a pitch of module 1.5 or greater are profile shifted gears (x = +0.5). Please refer to the tables below for calculating the center distance when assembled.
③ The backlash values shown in the table are the theoretical values for the normal direction for a pair of identical SS Spur Gears with 30 teeth in mesh.

■ Center distance of Stock Spur Gears Meshing with Profile Shifted Spur Gears

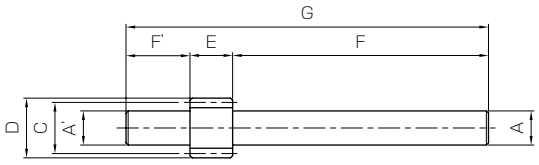
The table on the right shows the center distance of the spur gears (x=0) which can be meshed with profile shifted spur gears (x=+0.5) with module 1. Multiply by the actual module to determine your center distance.

■ Center distance when gear has 12 to 30 teeth (unit : mm)

No. of teeth(x=+0.5) / No. of teeth(x=0)	10	11
12	11.4410	11.9428
13	11.9428	12.4446
14	12.4446	12.9462
15	12.9462	13.4477
16	13.4477	13.9492
17	13.9492	14.4505
18	14.4505	14.9518
19	14.9518	15.4530
20	15.4530	15.9542
21	15.9542	16.4553
22	16.4553	16.9564
23	16.9564	17.4574
24	17.4574	17.9583
25	17.9583	18.4592
26	18.4592	18.9601
27	18.9601	19.4610
28	19.4610	19.9618
29	19.9618	20.4625
30	20.4625	20.9633

■ Center distance when gear has 32 to 62 teeth (unit : mm)

No. of teeth(x=+0.5) / No. of teeth(x=0)	10	11
32	21.4640	21.9647
34	22.4653	22.9660
35	22.9660	23.4666
36	23.4666	23.9671
38	24.4677	24.9683
40	25.4688	25.9693
42	26.4698	26.9703
44	27.4707	27.9712
45	27.9712	28.4716
46	28.4716	28.9721
48	29.4725	29.9729
50	30.4733	30.9736
52	31.4740	31.9744
54	32.4747	32.9750
55	32.9750	33.4754
56	33.4754	33.9757
58	34.4760	34.9763
60	35.4766	35.9769
62	36.4772	36.9774



SB

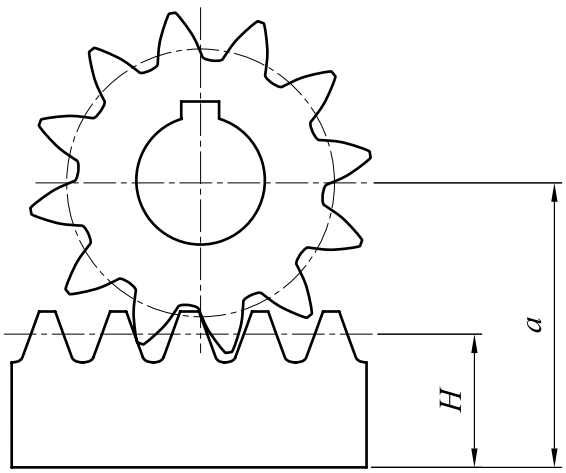
Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash (mm)	Weight (kg)	Catalog No.
Bending strength	Surface durability	Bending strength	Surface durability			
0.20	0.0077	0.021	0.0008	0 ~0.10	0.0095	**SSS0.5-10**
0.26	0.0094	0.026	0.0010	0 ~0.10	0.011	**SSS0.5-11**
0.32	0.011	0.032	0.0011	0 ~0.10	0.013	**SSS0.5-12**
0.38	0.013	0.039	0.0014	0 ~0.10	0.015	**SSS0.5-13**
0.83	0.032	0.084	0.0032	0 ~0.10	0.038	**SSS0.8-10**
1.05	0.039	0.11	0.0040	0 ~0.10	0.045	**SSS0.8-11**
1.29	0.047	0.13	0.0048	0 ~0.10	0.052	**SSS0.8-12**
1.56	0.055	0.16	0.0056	0 ~0.10	0.060	**SSS0.8-13**
1.62	0.063	0.16	0.0064	0.09~0.20	0.077	**SSS1-10**
2.04	0.077	0.21	0.0078	0.09~0.20	0.090	**SSS1-11**
2.52	0.092	0.26	0.0094	0.09~0.20	0.10	**SSS1-12**
3.05	0.11	0.31	0.011	0.09~0.20	0.12	**SSS1-13**
12.7	0.71	1.30	0.073	0.10~0.23	0.14	**SSS1.5-10**
14.5	0.88	1.48	0.089	0.11~0.24	0.17	**SSS1.5-11**
9.97	0.89	1.02	0.091	0.11~0.24	0.17	**SSS1.5-12**
12.1	1.05	1.23	0.11	0.11~0.24	0.21	**SSS1.5-13**
30.2	1.75	3.08	0.18	0.12~0.26	0.30	**SSS2-10**
34.3	2.14	3.50	0.22	0.13~0.28	0.38	**SSS2-11**
23.6	2.18	2.41	0.22	0.13~0.28	0.38	**SSS2-12**
28.6	2.57	2.92	0.26	0.13~0.28	0.46	**SSS2-13**
58.9	3.50	6.01	0.36	0.14~0.29	0.54	**SSS2.5-10**
67.1	4.29	6.84	0.44	0.15~0.31	0.68	**SSS2.5-11**
46.2	4.37	4.71	0.45	0.15~0.31	0.68	**SSS2.5-12**
55.9	5.13	5.70	0.52	0.15~0.31	0.83	**SSS2.5-13**
102	6.15	10.4	0.63	0.15~0.32	0.89	**SSS3-10**
116	7.54	11.8	0.77	0.16~0.35	1.11	**SSS3-11**
79.8	7.68	8.14	0.78	0.16~0.35	1.11	**SSS3-12**
96.5	9.02	9.84	0.92	0.16~0.35	1.35	**SSS3-13**

[Caution on Secondary Operations] ①Please read "Caution on Performing Secondary Operations" (Page 32) 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.
② Avoid performing secondary operations that narrow the tooth width as it affects precision and strength.

■ **Center distance when gear has 64 to 200 teeth (unit : mm)**

No. of teeth(x=+0.5) / No. of teeth(x=0)	10	11
64	37.4777	37.9780
65	37.9780	38.4782
66	38.4782	38.9785
68	39.4787	39.9790
70	40.4792	40.9794
72	41.4796	41.9799
75	42.9803	43.4805
76	43.4805	43.9807
80	45.4813	45.9814
84	47.4820	47.9822
85	47.9822	48.4823
88	49.4826	49.9828
90	50.4830	50.9831
95	52.9837	53.4838
100	55.4844	55.9845
120	65.4866	65.9867
150	80.4890	80.9890
200	105.4915	105.9915

■ Assembly distance of profile shifted gear and the meshing rack

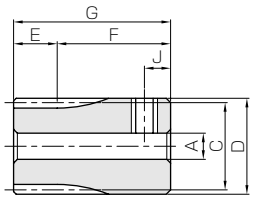


$$a = \frac{zm}{2} + H + xm$$

Where
a : Assembly Distance
H : Height of pitch line of rack
m : Module
z : No. of Teeth
x : Profile Shift Coefficient

Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) * JIS grade 4 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	—
Tooth hardness	(less than 194HB)

* The precision grade of products with a module of less than 0.8 is equivalent to the value shown in the table.

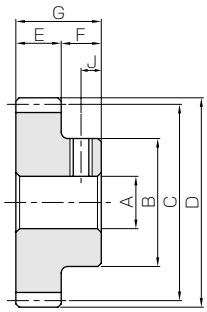


S3T

Catalog No.	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total length	Keyway
				A_{H7}	B	C	D	E	F	G	Width×Depth
SS0.5-15A	m0.5	15	S3T	3	8.5	7.5	8.5	5	11	16	—
SS0.5-16A		16	S3T	3	9	8	9	5	11	16	—
SS0.5-17A		17	S3T	3	9.5	8.5	9.5	5	11	16	—
SS0.5-18A		18	S3T	4	10	9	10	5	11	16	—
SS0.5-19A		19	S3T	4	10.5	9.5	10.5	5	11	16	—
SS0.5-20A SS0.5-20B		20	S3T S3T	3 4	11	10	11	5	11	16	— —
SS0.5-21A		21	S3T	4	11.5	10.5	11.5	5	11	16	—
SS0.5-22A		22	S3T	4	12	11	12	5	11	16	—
SS0.5-23A		23	S3T	4	12.5	11.5	12.5	5	11	16	—
SS0.5-24A SS0.5-24B		24	S3T S3T	4 5	13	12	13	5	11	16	— —
SS0.5-25A SS0.5-25B		25	S3T S3T	4 5	13.5	12.5	13.5	5	11	16	— —
SS0.5-26A		26	S3T	4	14	13	14	5	11	16	—
SS0.5-27A		27	S3T	4	14.5	13.5	14.5	5	11	16	—
SS0.5-28A		28	S1T	4	12	14	15	5	7	12	—
SS0.5-29A		29	S1T	4	12	14.5	15.5	5	7	12	—
SS0.5-30A SS0.5-30B SS0.5-30C		30	S1T S1T S1T	4 5 6	13	15	16	5	7	12	— — —
SS0.5-32A		32	S1T	5	14	16	17	5	7	12	—
SS0.5-34A		34	S1T	5	15	17	18	5	7	12	—
SS0.5-35A		35	S1T	5	15	17.5	18.5	5	7	12	—
SS0.5-36A		36	S1T	5	16	18	19	5	7	12	—
SS0.5-38A		38	S1T	5	16	19	20	5	7	12	—
SS0.5-40A SS0.5-40B		40	S1T S1T	5 6	18	20	21	5	7	12	— —
SS0.5-42A		42	S1T	5	18	21	22	5	7	12	—
SS0.5-44A		44	S1T	5	20	22	23	5	7	12	—
SS0.5-45A		45	S1T	5	20	22.5	23.5	5	7	12	—
SS0.5-46A		46	S1T	5	20	23	24	5	7	12	—
SS0.5-48A		48	S1T	5	22	24	25	5	7	12	—
SS0.5-50A SS0.5-50B		50	S1T S1T	5 6	22	25	26	5	7	12	— —
SS0.5-52A		52	S1T	5	22	26	27	5	7	12	—
SS0.5-54A		54	S1T	5	25	27	28	5	7	12	—
SS0.5-55A		55	S1T	5	25	27.5	28.5	5	7	12	—
SS0.5-56A		56	S1T	5	25	28	29	5	7	12	—
SS0.5-58A		58	S1T	5	25	29	30	5	7	12	—
SS0.5-60A SS0.5-60B		60	S1T S1T	6 8	28	30	31	5	7	12	— —
SS0.5-62A		62	S1T	6	28	31	32	5	7	12	—
SS0.5-64A		64	S1T	6	28	32	33	5	7	12	—
SS0.5-65A		65	S1T	6	28	32.5	33.5	5	7	12	—
SS0.5-66A		66	S1T	6	28	33	34	5	7	12	—
SS0.5-68A		68	S1T	6	28	34	35	5	7	12	—
SS0.5-70A SS0.5-70B		70	S1T S1T	6 8	28	35	36	5	7	12	— —
SS0.5-72A		72	S1T	6	28	36	37	5	7	12	—

[Caution on Product Characteristics]

① For products with a tapped hole, a set screw is included.
② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 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 If the bore size is less than φ 4, the tolerance is H8. If the bore size is φ 5 or φ 6, and the hole length exceeds 3 times of the bore size, the tolerance is also H8.
⑤ The use of S3T and S1T shaped set screws for fastening gears to a shaft are only applicable to light load usage. For secure fastening, please use dowel pins, in combination.



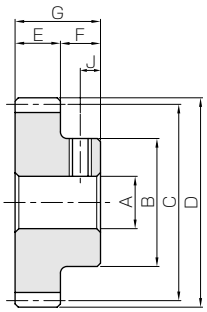
S1T

Set Screw		Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight	Catalog No.
Size	J	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)	
M3	2.5	0.46	0.022	0.047	0.0022	0~0.10	0.0056	**SS0.5-15A**
M3	2.5	0.51	0.025	0.052	0.0025	0~0.10	0.0064	**SS0.5-16A**
M3	2.5	0.56	0.028	0.057	0.0029	0~0.10	0.0073	**SS0.5-17A**
M3	2.5	0.61	0.032	0.063	0.0033	0~0.10	0.0076	**SS0.5-18A**
M3	2.5	0.67	0.036	0.068	0.0036	0~0.10	0.0085	**SS0.5-19A**
M3 M3	2.5 2.5	0.72	0.040	0.073	0.0041	0~0.10	0.010 0.0095	**SS0.5-20A** **SS0.5-20B**
M3	2.5	0.77	0.044	0.079	0.0045	0~0.10	0.011	**SS0.5-21A**
M3	2.5	0.83	0.049	0.084	0.0050	0~0.10	0.012	**SS0.5-22A**
M3	2.5	0.88	0.054	0.090	0.0055	0~0.10	0.013	**SS0.5-23A**
M3 M4	2.5 3	0.93	0.059	0.095	0.0060	0~0.10	0.014 0.013	**SS0.5-24A** **SS0.5-24B**
M3 M4	2.5 3	0.99	0.064	0.10	0.0065	0~0.10	0.015 0.014	**SS0.5-25A** **SS0.5-25B**
M3	2.5	1.04	0.069	0.11	0.0071	0~0.10	0.017	**SS0.5-26A**
M3	2.5	1.10	0.075	0.11	0.0076	0~0.10	0.018	**SS0.5-27A**
M3	3.5	1.16	0.081	0.12	0.0082	0~0.10	0.011	**SS0.5-28A**
M3	3.5	1.21	0.087	0.12	0.0088	0~0.10	0.011	**SS0.5-29A**
M3 M4 M4	3.5 3.5 3.5	1.27	0.093	0.13	0.0095	0~0.10	0.013 0.012 0.011	**SS0.5-30A** **SS0.5-30B** **SS0.5-30C**
M4	3.5	1.38	0.11	0.14	0.011	0~0.10	0.014	**SS0.5-32A**
M4	3.5	1.50	0.12	0.15	0.012	0~0.10	0.016	**SS0.5-34A**
M4	3.5	1.55	0.13	0.16	0.013	0~0.10	0.017	**SS0.5-35A**
M4	3.5	1.61	0.14	0.16	0.014	0~0.10	0.019	**SS0.5-36A**
M4	3.5	1.73	0.15	0.18	0.015	0~0.10	0.020	**SS0.5-38A**
M4 M4	3.5 3.5	1.84	0.17	0.19	0.017	0~0.10	0.024 0.023	**SS0.5-40A** **SS0.5-40B**
M4	3.5	1.96	0.19	0.20	0.019	0~0.10	0.025	**SS0.5-42A**
M4	3.5	2.08	0.20	0.21	0.021	0~0.10	0.030	**SS0.5-44A**
M4	3.5	2.14	0.21	0.22	0.022	0~0.10	0.030	**SS0.5-45A**
M4	3.5	2.19	0.22	0.22	0.023	0~0.10	0.031	**SS0.5-46A**
M4	3.5	2.31	0.25	0.24	0.025	0~0.10	0.036	**SS0.5-48A**
M4 M4	3.5 3.5	2.43	0.27	0.25	0.027	0~0.10	0.038 0.037	**SS0.5-50A** **SS0.5-50B**
M4	3.5	2.55	0.29	0.26	0.030	0~0.10	0.039	**SS0.5-52A**
M4	3.5	2.67	0.32	0.27	0.032	0~0.10	0.047	**SS0.5-54A**
M4	3.5	2.73	0.33	0.28	0.033	0~0.10	0.048	**SS0.5-55A**
M4	3.5	2.79	0.34	0.28	0.035	0~0.10	0.048	**SS0.5-56A**
M4	3.5	2.91	0.37	0.30	0.037	0~0.10	0.050	**SS0.5-58A**
M4 M5	3.5 3.5	3.03	0.39	0.31	0.040	0~0.10	0.058 0.055	**SS0.5-60A** **SS0.5-60B**
M4	3.5	3.15	0.42	0.32	0.043	0~0.10	0.060	**SS0.5-62A**
M4	3.5	3.27	0.45	0.33	0.046	0~0.10	0.062	**SS0.5-64A**
M4	3.5	3.33	0.47	0.34	0.048	0~0.10	0.063	**SS0.5-65A**
M4	3.5	3.39	0.48	0.35	0.049	0~0.10	0.064	**SS0.5-66A**
M4	3.5	3.51	0.51	0.36	0.052	0~0.10	0.066	**SS0.5-68A**
M4 M5	3.5 3.5	3.63	0.55	0.37	0.056	0~0.10	0.068 0.065	**SS0.5-70A** **SS0.5-70B**
M4	3.5	3.75	0.58	0.38	0.059	0~0.10	0.070	**SS0.5-72A**

[Caution on Secondary Operations] ①Please read "Caution on Performing Secondary Operations" (Page 32) 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.
② Avoid performing secondary operations that narrow the tooth width as it affects precision and strength.

Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) ＊ JIS grade 4 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	—
Tooth hardness	(less than 194HB)

＊ The precision grade of products with a module of less than 0.8 is equivalent to the value shown in the table.



S1T

Catalog No.	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total length	Keyway
				A_{H7}	B	C	D	E	F	G	Width×Depth
SS0.5-75A	***m*0.5**	75	S1T	6	28	37.5	38.5	5	7	12	—
SS0.5-76A		76	S1T	6	28	38	39	5	7	12	—
SS0.5-80A		80	S1T	6	28	40	41	5	7	12	—
SS0.5-80B			S1T	8							—
SS0.5-84A		84	S1T	8	28	42	43	5	7	12	—
SS0.5-85A		85	S1T	8	28	42.5	43.5	5	7	12	—
SS0.5-88A		88	S1T	8	28	44	45	5	7	12	—
SS0.5-90A		90	S1T	8	28	45	46	5	7	12	—
SS0.5-95A		95	S1T	8	28	47.5	48.5	5	7	12	—
SS0.5-96A		96	S1T	8	28	48	49	5	7	12	—
SS0.5-100A		100	S1T	8	28	50	51	5	7	12	—
SS0.5-105A		105	S1T	8	28	52.5	53.5	5	7	12	—
SS0.5-110A		110	S1T	8	28	55	56	5	7	12	—
SS0.5-115A		115	S1T	8	28	57.5	58.5	5	7	12	—
SS0.5-120A		120	S1T	8	28	60	61	5	7	12	—

[Caution on Product Characteristics]

① For products with a tapped hole, a set screw is included.
② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 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 If the bore size is less than φ 4, the tolerance is H8. If the bore size is φ 5 or φ 6, and the hole length exceeds 3 times of the bore size, the tolerance is also H8.
⑤ The use of S1T shaped set screws for fastening gears to a shaft, is a method only applicable to light load usage. For secure fastening, please use dowel pins, in combination.

＊ For products not categorized in our KHK Stock Gear series, custom gear production services with short lead times is available. For details see Page 8.

Set Screw		Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight	Catalog No.
Size	J	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)	
M4	3.5	3.93	0.63	0.40	0.064	0~0.10	0.074	**SS0.5-75A**
M4	3.5	3.99	0.65	0.41	0.066	0~0.10	0.075	**SS0.5-76A**
M4	3.5	4.24	0.72	0.43	0.074	0~0.10	0.079	**SS0.5-80A**
M5	3.5						0.077	**SS0.5-80B**
M5	3.5	4.48	0.80	0.46	0.082	0~0.10	0.082	**SS0.5-84A**
M5	3.5	4.54	0.82	0.46	0.084	0~0.10	0.083	**SS0.5-85A**
M5	3.5	4.72	0.89	0.48	0.090	0~0.10	0.087	**SS0.5-88A**
M5	3.5	4.85	0.93	0.49	0.095	0~0.10	0.090	**SS0.5-90A**
M5	3.5	5.15	1.04	0.53	0.11	0~0.10	0.097	**SS0.5-95A**
M5	3.5	5.21	1.06	0.53	0.11	0~0.10	0.099	**SS0.5-96A**
M5	3.5	5.46	1.16	0.56	0.12	0~0.10	0.10	**SS0.5-100A**
M5	3.5	5.76	1.28	0.59	0.13	0~0.10	0.11	**SS0.5-105A**
M5	3.5	6.07	1.42	0.62	0.14	0~0.10	0.12	**SS0.5-110A**
M5	3.5	6.38	1.56	0.65	0.16	0~0.10	0.13	**SS0.5-115A**
M5	3.5	6.68	1.70	0.68	0.17	0~0.10	0.14	**SS0.5-120A**

[Caution on Secondary Operations] ①Please read "Caution on Performing Secondary Operations" (Page 32) 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.
② Avoid performing secondary operations that narrow the tooth width as it affects precision and strength.

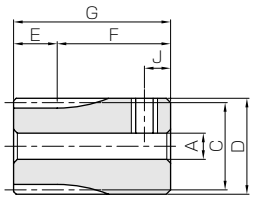
GCU-S Spur Gear Kit

Installment : Parallel axes gears (Two-stage)
Gear Type : Spur Gears
Gears : 2 units of SS1.5-16
2 units of PS1.5-22
Gear Ratio : 1.89
Weight : Approx. 1kg

The Gear Kit contains two-stage spur gears and allows speed increases / reductions, and includes the most commonly used combinations of gears.

Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) ＊ JIS grade 4 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	—
Tooth hardness	(less than 194HB)

＊ The precision grade of products with a module of less than 0.8 is equivalent to the value shown in the table.

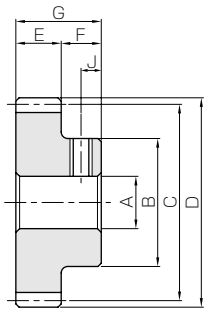


S3T

Catalog No.	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total length	Keyway
				A_{H7}	B	C	D	E	F	G	Width×Depth
SS0.8-15A		15	S3T	5	13.6	12	13.6	8	14	22	—
SS0.8-16A		16	S3T	5	14.4	12.8	14.4	8	14	22	—
SS0.8-17A		17	S3T	5	15.2	13.6	15.2	8	14	22	—
SS0.8-18A		18	S3T	5	16	14.4	16	8	14	22	—
SS0.8-19A		19	S1T	5	12	15.2	16.8	8	8	16	—
SS0.8-20A		20	S1T	5	13	16	17.6	8	8	16	—
SS0.8-20B			S1T	6							—
SS0.8-21A		21	S1T	6	14	16.8	18.4	8	8	16	—
SS0.8-22A		22	S1T	6	15	17.6	19.2	8	8	16	—
SS0.8-23A		23	S1T	6	15	18.4	20	8	8	16	—
SS0.8-24A		24	S1T	5	16	19.2	20.8	8	8	16	—
SS0.8-24B			S1T	6							—
SS0.8-25A		25	S1T	5	16	20	21.6	8	8	16	—
SS0.8-25B			S1T	6							—
SS0.8-26A		26	S1T	6	18	20.8	22.4	8	8	16	—
SS0.8-27A		27	S1T	6	18	21.6	23.2	8	8	16	—
SS0.8-28A		28	S1T	6	18	22.4	24	8	8	16	—
SS0.8-29A		29	S1T	6	20	23.2	24.8	8	8	16	—
SS0.8-30A		30	S1T	5	20	24	25.6	8	8	16	—
SS0.8-30B			S1T	6							—
SS0.8-30C			S1T	8							—
SS0.8-32A		32	S1T	6	22	25.6	27.2	8	8	16	—
SS0.8-34A		34	S1T	6	22	27.2	28.8	8	8	16	—
SS0.8-35A		35	S1T	6	25	28	29.6	8	8	16	—
SS0.8-36A		36	S1T	6	25	28.8	30.4	8	8	16	—
SS0.8-38A	*m*0.8	38	S1T	6	25	30.4	32	8	8	16	—
SS0.8-40A		40	S1T	6	28	32	33.6	8	8	16	—
SS0.8-40B			S1T	8							—
SS0.8-42A		42	S1T	6	28	33.6	35.2	8	8	16	—
SS0.8-44A		44	S1T	6	28	35.2	36.8	8	8	16	—
SS0.8-45A		45	S1T	6	28	36	37.6	8	8	16	—
SS0.8-46A		46	S1T	6	28	36.8	38.4	8	8	16	—
SS0.8-48A		48	S1T	6	28	38.4	40	8	8	16	—
SS0.8-50A		50	S1T	6	28	40	41.6	8	8	16	—
SS0.8-50B			S1T	8							—
SS0.8-52A		52	S1T	6	28	41.6	43.2	8	8	16	—
SS0.8-54A		54	S1T	6	28	43.2	44.8	8	8	16	—
SS0.8-55A		55	S1T	6	28	44	45.6	8	8	16	—
SS0.8-56A		56	S1T	6	28	44.8	46.4	8	8	16	—
SS0.8-58A		58	S1T	6	28	46.4	48	8	8	16	—
SS0.8-60A		60	S1T	6	28	48	49.6	8	8	16	—
SS0.8-60B			S1T	8							—
SS0.8-62A		62	S1T	6	28	49.6	51.2	8	8	16	—
SS0.8-64A		64	S1T	6	28	51.2	52.8	8	8	16	—
SS0.8-65A		65	S1T	6	28	52	53.6	8	8	16	—
SS0.8-66A		66	S1T	6	28	52.8	54.4	8	8	16	—
SS0.8-68A		68	S1T	6	28	54.4	56	8	8	16	—
SS0.8-70A		70	S1T	6	28	56	57.6	8	8	16	—
SS0.8-70B			S1T	8							—
SS0.8-72A		72	S1T	6	28	57.6	59.2	8	8	16	—

[Caution on Product Characteristics]

① For products with a tapped hole, a set screw is included.
② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 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 If the bore size is less than φ 4, the tolerance is H8. If the bore size is φ 5 or φ 6, and the hole length exceeds 3 times of the bore size, the tolerance is also H8.
⑤ The use of S3T and S1T shaped set screws for fastening gears to a shaft are only applicable to light load usage. For secure fastening, please use dowel pins, in combination.



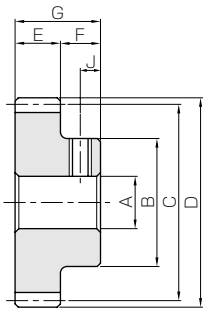
S1T

Set Screw		Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight	Catalog No.
Size	J	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)	
M4	3.5	1.89	0.088	0.19	0.0090	0~0.10	0.019	**SS0.8-15A**
M4	3.5	2.10	0.10	0.21	0.010	0~0.10	0.022	**SS0.8-16A**
M4	3.5	2.30	0.12	0.23	0.012	0~0.10	0.025	**SS0.8-17A**
M4	3.5	2.51	0.13	0.26	0.013	0~0.10	0.028	**SS0.8-18A**
M4	4	2.73	0.15	0.28	0.015	0~0.10	0.016	**SS0.8-19A**
M4 M4	4 4	2.94	0.17	0.30	0.017	0~0.10	0.018 0.017	**SS0.8-20A** **SS0.8-20B**
M4	4	3.16	0.18	0.32	0.019	0~0.10	0.020	**SS0.8-21A**
M4	4	3.38	0.20	0.34	0.021	0~0.10	0.022	**SS0.8-22A**
M4	4	3.60	0.22	0.37	0.023	0~0.10	0.024	**SS0.8-23A**
M4 M4	4 4	3.82	0.25	0.39	0.025	0~0.10	0.028 0.027	**SS0.8-24A** **SS0.8-24B**
M4 M4	4 4	4.05	0.27	0.41	0.027	0~0.10	0.029 0.028	**SS0.8-25A** **SS0.8-25B**
M4	4	4.28	0.29	0.44	0.030	0~0.10	0.033	**SS0.8-26A**
M4	4	4.50	0.31	0.46	0.032	0~0.10	0.035	**SS0.8-27A**
M4	4	4.73	0.34	0.48	0.035	0~0.10	0.037	**SS0.8-28A**
M4	4	4.96	0.37	0.51	0.037	0~0.10	0.042	**SS0.8-29A**
M4 M4 M5	4 4 4	5.19	0.39	0.53	0.040	0~0.10	0.045 0.044 0.041	**SS0.8-30A** **SS0.8-30B** **SS0.8-30C**
M4	4	5.66	0.45	0.58	0.046	0~0.10	0.052	**SS0.8-32A**
M4	4	6.13	0.51	0.62	0.052	0~0.10	0.056	**SS0.8-34A**
M4	4	6.36	0.55	0.65	0.056	0~0.10	0.065	**SS0.8-35A**
M4	4	6.60	0.58	0.67	0.059	0~0.10	0.067	**SS0.8-36A**
M4	4	7.07	0.65	0.72	0.066	0~0.10	0.072	**SS0.8-38A**
M4 M5	4 4	7.55	0.72	0.77	0.074	0~0.10	0.085 0.081	**SS0.8-40A** **SS0.8-40B**
M4	4	8.03	0.80	0.82	0.082	0~0.10	0.090	**SS0.8-42A**
M4	4	8.51	0.88	0.87	0.090	0~0.10	0.095	**SS0.8-44A**
M4	4	8.75	0.93	0.89	0.095	0~0.10	0.098	**SS0.8-45A**
M4	4	8.99	0.97	0.92	0.099	0~0.10	0.10	**SS0.8-46A**
M4	4	9.47	1.06	0.97	0.11	0~0.10	0.11	**SS0.8-48A**
M4 M5	4 4	9.96	1.16	1.02	0.12	0~0.10	0.11 0.11	**SS0.8-50A** **SS0.8-50B**
M4	4	10.4	1.26	1.07	0.13	0~0.10	0.12	**SS0.8-52A**
M4	4	10.9	1.36	1.12	0.14	0~0.10	0.13	**SS0.8-54A**
M4	4	11.2	1.42	1.14	0.14	0~0.10	0.13	**SS0.8-55A**
M4	4	11.4	1.47	1.16	0.15	0~0.10	0.13	**SS0.8-56A**
M4	4	11.9	1.59	1.21	0.16	0~0.10	0.14	**SS0.8-58A**
M4 M5	4 4	12.4	1.70	1.26	0.17	0~0.10	0.15 0.14	**SS0.8-60A** **SS0.8-60B**
M4	4	12.9	1.82	1.32	0.19	0~0.10	0.16	**SS0.8-62A**
M4	4	13.4	1.95	1.37	0.20	0~0.10	0.16	**SS0.8-64A**
M4	4	13.6	2.01	1.39	0.21	0~0.10	0.17	**SS0.8-65A**
M4	4	13.9	2.08	1.42	0.21	0~0.10	0.17	**SS0.8-66A**
M4	4	14.4	2.22	1.47	0.23	0~0.10	0.18	**SS0.8-68A**
M4 M5	4 4	14.9	2.35	1.52	0.24	0~0.10	0.19 0.19	**SS0.8-70A** **SS0.8-70B**
M4	4	15.4	2.50	1.57	0.25	0~0.10	0.20	**SS0.8-72A**

[Caution on Secondary Operations] ①Please read "Caution on Performing Secondary Operations" (Page 32) 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.
② Avoid performing secondary operations that narrow the tooth width as it affects precision and strength.

Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) ＊ JIS grade 4 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	—
Tooth hardness	(less than) 194HB

＊ The precision grade of products with a module of less than 0.8 is equivalent to the value shown in the table.



S1T

Catalog No.	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total length	Keyway
				A_{H7}	B	C	D	E	F	G	Width×Depth
SS0.8-75A		75	S1T	6	28	60	61.6	8	8	16	—
SS0.8-76A		76	S1T	6	28	60.8	62.4	8	8	16	—
SS0.8-80A		80	S1T	6	28	64	65.6	8	8	16	—
SS0.8-80B			S1T	8							—
SS0.8-84A		84	S1T	8	28	67.2	68.8	8	8	16	—
SS0.8-85A		85	S1T	8	28	68	69.6	8	8	16	—
SS0.8-88A		88	S1T	8	28	70.4	72	8	8	16	—
SS0.8-90A	***m*0.8**	90	S1T	8	28	72	73.6	8	8	16	—
SS0.8-95A		95	S1T	8	28	76	77.6	8	8	16	—
SS0.8-96A		96	S1T	8	28	76.8	78.4	8	8	16	—
SS0.8-100A		100	S1T	8	28	80	81.6	8	8	16	—
SS0.8-105A		105	S1T	8	28	84	85.6	8	8	16	—
SS0.8-110A		110	S1T	8	28	88	89.6	8	8	16	—
SS0.8-115A		115	S1T	8	28	92	93.6	8	8	16	—
SS0.8-120A		120	S1T	8	28	96	97.6	8	8	16	—

[Caution on Product Characteristics]

① For products with a tapped hole, a set screw is included.
② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 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 If the bore size is less than φ 4, the tolerance is H8. If the bore size is φ 5 or φ 6, and the hole length exceeds 3 times of the bore size, the tolerance is also H8.
⑤ The use of S1T shaped set screws for fastening gears to a shaft, is a method only applicable to light load usage. For secure fastening, please use dowel pins, in combination.

＊ For products not categorized in our KHK Stock Gear series, custom gear production services with short lead times is available. For details see Page 8.

Set Screw		Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight	Catalog No.
Size	J	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)	
M4	4	16.1	2.72	1.64	0.28	0~0.10	0.21	**SS0.8-75A**
M4	4	16.4	2.80	1.67	0.29	0~0.10	0.22	**SS0.8-76A**
M4	4	17.4	3.11	1.77	0.32	0~0.10	0.24	**SS0.8-80A**
M5	4						0.23	**SS0.8-80B**
M5	4	18.4	3.45	1.87	0.35	0~0.10	0.25	**SS0.8-84A**
M5	4	18.6	3.54	1.90	0.36	0~0.10	0.26	**SS0.8-85A**
M5	4	19.4	3.80	1.97	0.39	0~0.10	0.28	**SS0.8-88A**
M5	4	19.9	3.99	2.02	0.41	0~0.10	0.29	**SS0.8-90A**
M5	4	21.1	4.47	2.15	0.46	0~0.10	0.32	**SS0.8-95A**
M5	4	21.4	4.57	2.18	0.47	0~0.10	0.32	**SS0.8-96A**
M5	4	22.4	4.98	2.28	0.51	0~0.10	0.35	**SS0.8-100A**
M5	4	23.6	5.52	2.41	0.56	0~0.10	0.38	**SS0.8-105A**
M5	4	24.9	6.09	2.54	0.62	0~0.10	0.41	**SS0.8-110A**
M5	4	26.1	6.69	2.66	0.68	0~0.10	0.45	**SS0.8-115A**
M5	4	27.4	7.32	2.79	0.75	0~0.10	0.49	**SS0.8-120A**

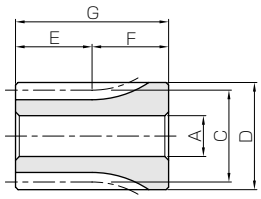
[Caution on Secondary Operations] ①Please read "Caution on Performing Secondary Operations" (Page 32) when performing modifications and/or secondary operations for safety concerns. KHK Quick-Mod Gears, the KHK's system for quick modification of KHK stock gears is also available.
② Avoid performing secondary operations that narrow the tooth width as it affects precision and strength.

GCU-S Spur Gear Kit

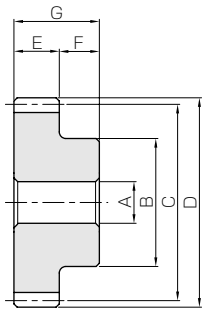
Installment : Parallel axes gears (Two-stage)
Gear Type : Spur Gears
Gears : 2 units of SS1.5-16
2 units of PS1.5-22
Gear Ratio : 1.89
Weight : Approx. 1kg

The Gear Kit contains two-stage spur gears and allows speed increases / reductions, and includes the most commonly used combinations of gears.

Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) JIS grade 4 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	—
Tooth hardness	(less than 194HB)



S3

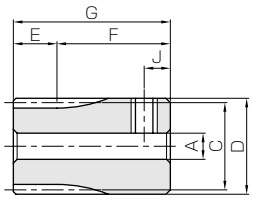


S1

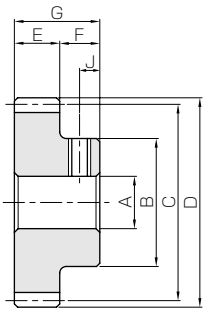
Catalog No.	Module	No. of teeth	Shape	Bore A_{H7}	Hub dia. B	Pitch dia. C	Outside dia. D	Face width E	Hub width F	Total length G	Keyway Width×Depth
SS1-15	***m*1**	15	S3	8	17	15	17	10	20	30	—
SS1-15A			S3T	5							—
SS1-15B			S3T	6							—
SS1-16		16	S3	8	18	16	18	10	20	30	—
SS1-16A			S3T	5							—
SS1-16B			S3T	6							—
SS1-17		17	S3	8	19	17	19	10	20	30	—
SS1-17A			S3T	8							—
SS1-18		18	S3	8	20	18	20	10	20	30	—
SS1-18A			S3T	6							—
SS1-18B			S3T	8							—
SS1-19		19	S3	8	21	19	21	10	20	30	—
SS1-19A			S3T	8							—
SS1-20		20	S1	8	16	20	22	10	10	20	—
SS1-20A			S1T	5							—
SS1-20B			S1T	6							—
SS1-20C			S1T	8							—
SS1-21		21	S1	8	17	21	23	10	10	20	—
SS1-21A			S1T	8							—
SS1-22		22	S1	8	18	22	24	10	10	20	—
SS1-22A			S1T	8							—
SS1-23		23	S1	8	18	23	25	10	10	20	—
SS1-23A			S1T	8							—
SS1-24		24	S1	8	20	24	26	10	10	20	—
SS1-24A			S1T	6							—
SS1-24B			S1T	8							—
SS1-24C			S1K	10							4 x 1.8
SS1-25		25	S1	8	20	25	27	10	10	20	—
SS1-25A			S1T	6							—
SS1-25B			S1T	8							—
SS1-25C			S1K	10							4 x 1.8
SS1-26		26	S1	8	22	26	28	10	10	20	—
SS1-26A			S1T	8							—
SS1-26B			S1K	10							4 x 1.8
SS1-27		27	S1	8	22	27	29	10	10	20	—
SS1-27A			S1T	8							—
SS1-28		28	S1	8	22	28	30	10	10	20	—
SS1-28A			S1T	8							—
SS1-28B			S1K	10							4 x 1.8
SS1-29		29	S1	8	24	29	31	10	10	20	—
SS1-29A			S1T	8							—
SS1-30		30	S1	10	25	30	32	10	10	20	—
SS1-30A			S1T	6							—
SS1-30B			S1T	8							—
SS1-30C			S1K	10							4 x 1.8
SS1-30D			S1K	12							4 x 1.8
SS1-32		32	S1	10	26	32	34	10	10	20	—
SS1-32A			S1T	8							—
SS1-32B			S1K	10							4 x 1.8
SS1-32C			S1K	12							4 x 1.8

[Caution on Product Characteristics]

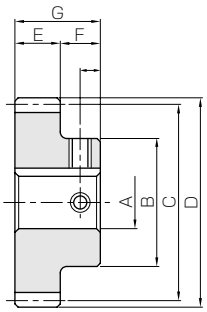
① For products with a tapped hole, a set screw is included.
② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
③ The backlash values shown in the table are the theoretical values for the backlash in the normal direction of a pair of identical gears in mesh.
④ If the bore size is less than φ 4, the tolerance is H8. If the bore size is φ 5 or φ 6, and the hole length exceeds 3 times of the bore size, the tolerance is also H8.
⑤ The use of S3T and S1T shaped set screws for fastening gears to a shaft are only applicable to light load usage. For secure fastening, please use dowel pins, in combination.



S3T



S1T

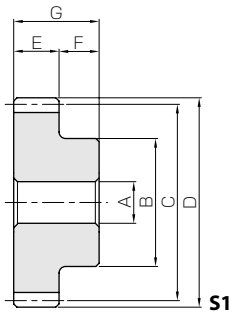


S1K

Set Screw		Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight	Catalog No.
Size	J	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)	
—	—	3.69	0.17	0.38	0.018	0.08~0.18	0.038	**SS1-15**
M4	4						0.044	**SS1-15A**
M4	4						0.042	**SS1-15B**
—	—	4.09	0.2	0.42	0.021	0.08~0.18	0.044	**SS1-16**
M4	4						0.051	**SS1-16A**
M4	4						0.049	**SS1-16B**
—	—	4.5	0.23	0.46	0.023	0.08~0.18	0.050	**SS1-17**
M5	4						0.050	**SS1-17A**
—	—	4.91	0.26	0.5	0.027	0.08~0.18	0.057	**SS1-18**
M4	4						0.062	**SS1-18A**
M5	4						0.057	**SS1-18B**
—	—	5.33	0.29	0.54	0.030	0.08~0.18	0.065	**SS1-19**
M5	4						0.064	**SS1-19A**
—	—	5.75	0.33	0.59	0.033	0.08~0.18	0.033	**SS1-20**
M4	5						0.037	**SS1-20A**
M4	5						0.036	**SS1-20B**
M5	5						0.032	**SS1-20C**
—	—	6.17	0.36	0.63	0.037	0.08~0.18	0.037	**SS1-21**
M5	5						0.036	**SS1-21A**
—	—	6.6	0.4	0.67	0.041	0.08~0.18	0.042	**SS1-22**
M5	5						0.041	**SS1-22A**
—	—	7.03	0.45	0.72	0.045	0.08~0.18	0.045	**SS1-23**
M5	5						0.044	**SS1-23A**
—	—	7.47	0.49	0.76	0.050	0.08~0.18	0.052	**SS1-24**
M4	5						0.055	**SS1-24A**
M5	5						0.051	**SS1-24B**
M4	5						0.046	**SS1-24C**
—	—	7.91	0.54	0.81	0.055	0.08~0.18	0.055	**SS1-25**
M4	5						0.058	**SS1-25A**
M5	5						0.054	**SS1-25B**
M4	5						0.049	**SS1-25C**
—	—	8.35	0.58	0.85	0.059	0.08~0.18	0.064	**SS1-26**
M5	5						0.063	**SS1-26A**
M4	5						0.057	**SS1-26B**
—	—	8.79	0.63	0.9	0.064	0.08~0.18	0.067	**SS1-27**
M5	5						0.066	**SS1-27A**
—	—	9.24	0.68	0.94	0.070	0.08~0.18	0.070	**SS1-28**
M5	5						0.069	**SS1-28A**
M4	5						0.064	**SS1-28B**
—	—	9.69	0.73	0.99	0.075	0.08~0.18	0.079	**SS1-29**
M5	5						0.078	**SS1-29A**
—	—	10.1	0.79	1.03	0.081	0.08~0.18	0.082	**SS1-30**
M4	5						0.089	**SS1-30A**
M5	5						0.085	**SS1-30B**
M4	5						0.080	**SS1-30C**
M4	5						0.075	**SS1-30D**
—	—	11.1	0.90	1.13	0.092	0.08~0.18	0.092	**SS1-32**
M5	5						0.096	**SS1-32A**
M4	5						0.091	**SS1-32B**
M4	5						0.085	**SS1-32C**

[Caution on Secondary Operations] ①Please read "Caution on Performing Secondary Operations" (Page 32) 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.
② Avoid performing secondary operations that narrow the tooth width as it affects precision and strength.

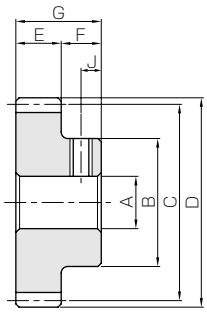
Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) JIS grade 4 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	—
Tooth hardness	(less than 194HB)



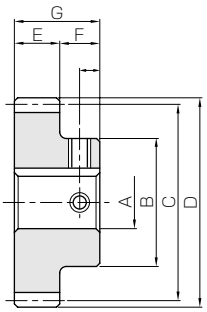
S1

Catalog No.	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total length	Keyway
				A_{H7}	B	C	D	E	F	G	Width×Depth
SS1-34		34	S1	10	26	34	36	10	10	20	—
SS1-34A			S1K	10							4 x 1.8
SS1-35		35	S1	10	26	35	37	10	10	20	—
SS1-35A			S1K	10							4 x 1.8
SS1-35B			S1K	12							4 x 1.8
SS1-36		36	S1	10	28	36	38	10	10	20	—
SS1-36A			S1K	10							4 x 1.8
SS1-36B			S1K	12							4 x 1.8
SS1-38		38	S1	10	32	38	40	10	10	20	—
SS1-38A			S1K	10							4 x 1.8
SS1-40		40	S1	10	35	40	42	10	10	20	—
SS1-40A			S1T	8							—
SS1-40B			S1K	10							4 x 1.8
SS1-40C			S1K	12							4 x 1.8
SS1-42		42	S1	10	35	42	44	10	10	20	—
SS1-42A			S1K	10							4 x 1.8
SS1-44		44	S1	10	35	44	46	10	10	20	—
SS1-44A			S1K	10							4 x 1.8
SS1-45		45	S1	10	35	45	47	10	10	20	—
SS1-45A			S1T	8							—
SS1-45B			S1K	10							4 x 1.8
SS1-45C			S1K	12							4 x 1.8
SS1-46		46	S1	10	35	46	48	10	10	20	—
SS1-46A			S1K	10							4 x 1.8
SS1-48	***m*1**	48	S1	10	35	48	50	10	10	20	—
SS1-48A			S1K	10							4 x 1.8
SS1-48B			S1K	12							4 x 1.8
SS1-50		50	S1	10	35	50	52	10	10	20	—
SS1-50A			S1T	8							—
SS1-50B			S1K	10							4 x 1.8
SS1-50C			S1K	12							4 x 1.8
SS1-52		52	S1	10	35	52	54	10	10	20	—
SS1-52A			S1K	10							4 x 1.8
SS1-54		54	S1	10	35	54	56	10	10	20	—
SS1-54A			S1K	10							4 x 1.8
SS1-55		55	S1	10	35	55	57	10	10	20	—
SS1-55A			S1K	10							4 x 1.8
SS1-56		56	S1	10	35	56	58	10	10	20	—
SS1-56A			S1K	10							4 x 1.8
SS1-56B			S1K	12							4 x 1.8
SS1-58		58	S1	10	35	58	60	10	10	20	—
SS1-58A			S1K	10							4 x 1.8
SS1-60		60	S1	10	35	60	62	10	10	20	—
SS1-60A			S1K	10							4 x 1.8
SS1-60B			S1K	12							4 x 1.8
SS1-60C			S1K	15							5 x 2.3
SS1-62		62	S1	10	40	62	64	10	10	20	—
SS1-62A			S1K	12							4 x 1.8
SS1-64		64	S1	10	40	64	66	10	10	20	—
SS1-64A			S1K	12							4 x 1.8

[Caution on Product Characteristics]
① For products with a tapped hole, a set screw is included.
② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 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 The use of S1T shaped set screws for fastening gears to a shaft, is a method only applicable to light load usage. For secure fastening, please use dowel pins, in combination.



S1T

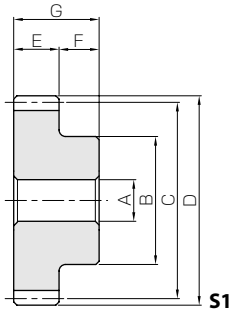


S1K

Set Screw		Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight	Catalog No.
Size	J	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)	
—	—	12.0	1.03	1.22	0.10	0.08~0.18	0.10	**SS1-34**
M4	5						0.099	**SS1-34A**
—	—	12.4	1.09	1.27	0.11	0.08~0.18	0.10	**SS1-35**
M4	5						0.10	**SS1-35A**
M4	5						0.098	**SS1-35B**
—	—	12.9	1.16	1.31	0.12	0.08~0.18	0.12	**SS1-36**
M4	5						0.11	**SS1-36A**
M4	5						0.11	**SS1-36B**
—	—	13.8	1.30	1.41	0.13	0.08~0.18	0.14	**SS1-38**
M4	5						0.14	**SS1-38A**
—	—	14.7	1.45	1.50	0.15	0.08~0.18	0.16	**SS1-40**
M5	5						0.16	**SS1-40A**
M4	5						0.16	**SS1-40B**
M4	5						0.15	**SS1-40C**
—	—	15.7	1.61	1.60	0.16	0.08~0.18	0.17	**SS1-42**
M4	5						0.17	**SS1-42A**
—	—	16.6	1.77	1.69	0.18	0.08~0.18	0.18	**SS1-44**
M4	5						0.18	**SS1-44A**
—	—	17.1	1.86	1.74	0.19	0.08~0.18	0.19	**SS1-45**
M5	5						0.19	**SS1-45A**
M4	5						0.19	**SS1-45B**
M4	5						0.18	**SS1-45C**
—	—	17.6	1.95	1.79	0.20	0.08~0.18	0.19	**SS1-46**
M4	5						0.19	**SS1-46A**
—	—	18.5	2.13	1.89	0.22	0.08~0.18	0.21	**SS1-48**
M4	5						0.20	**SS1-48A**
M4	5						0.20	**SS1-48B**
—	—	19.5	2.32	1.98	0.24	0.08~0.18	0.22	**SS1-50**
M5	5						0.22	**SS1-50A**
M4	5						0.21	**SS1-50B**
M4	5						0.21	**SS1-50C**
—	—	20.4	2.52	2.08	0.26	0.08~0.18	0.23	**SS1-52**
M4	5						0.23	**SS1-52A**
—	—	21.4	2.73	2.18	0.28	0.08~0.18	0.24	**SS1-54**
M4	5						0.24	**SS1-54A**
—	—	21.8	2.83	2.23	0.29	0.08~0.18	0.25	**SS1-55**
M4	5						0.25	**SS1-55A**
—	—	22.3	2.94	2.28	0.30	0.08~0.18	0.26	**SS1-56**
M4	5						0.25	**SS1-56A**
M4	5						0.25	**SS1-56B**
—	—	23.3	3.17	2.37	0.32	0.08~0.18	0.27	**SS1-58**
M4	5						0.27	**SS1-58A**
—	—	24.2	3.40	2.47	0.35	0.08~0.18	0.29	**SS1-60**
M4	5						0.28	**SS1-60A**
M4	5						0.28	**SS1-60B**
M4	5						0.27	**SS1-60C**
—	—	25.2	3.64	2.57	0.37	0.08~0.18	0.32	**SS1-62**
M4	5						0.32	**SS1-62A**
—	—	26.2	3.89	2.67	0.40	0.08~0.18	0.34	**SS1-64**
M4	5						0.33	**SS1-64A**

[Caution on Secondary Operations] ①Please read "Caution on Performing Secondary Operations" (Page 32) 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.
② Avoid performing secondary operations that narrow the tooth width as it affects precision and strength.

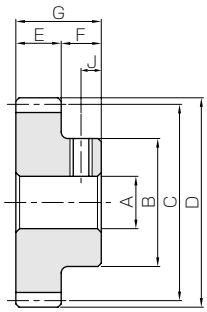
Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) JIS grade 4 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	—
Tooth hardness	(less than 194HB)



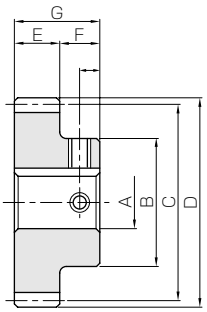
Catalog No.	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total length	Keyway
				A_{H7}	B	C	D	E	F	G	Width×Depth
SS1-65 **SS1-65A**		65	S1 S1K	10 12	40	65	67	10	10	20	— 4 x 1.8
SS1-66 **SS1-66A**		66	S1 S1K	10 12	40	66	68	10	10	20	— 4 x 1.8
SS1-68 **SS1-68A**		68	S1 S1K	10 12	40	68	70	10	10	20	— 4 x 1.8
SS1-70 **SS1-70A** **SS1-70B** **SS1-70C**		70	S1 S1K S1K S1K	10 12 15 18	40	70	72	10	10	20	— 4 x 1.8 5 x 2.3 6 x 2.8
SS1-72 **SS1-72A** **SS1-72B** **SS1-72C**		72	S1 S1K S1K S1K	10 12 15 18	40	72	74	10	10	20	— 4 x 1.8 5 x 2.3 6 x 2.8
SS1-75 **SS1-75A**		75	S1 S1K	10 12	40	75	77	10	10	20	— 4 x 1.8
SS1-76 **SS1-76A**		76	S1 S1K	10 12	40	76	78	10	10	20	— 4 x 1.8
SS1-80 **SS1-80A** **SS1-80B** **SS1-80C**		80	S1 S1K S1K S1K	10 12 15 18	40	80	82	10	10	20	— 4 x 1.8 5 x 2.3 6 x 2.8
SS1-84 **SS1-84A**	***m*1**	84	S1 S1K	10 12	40	84	86	10	10	20	— 4 x 1.8
SS1-85 **SS1-85A**		85	S1 S1K	10 12	40	85	87	10	10	20	— 4 x 1.8
SS1-88 **SS1-88A**		88	S1 S1K	10 12	40	88	90	10	10	20	— 4 x 1.8
SS1-90 **SS1-90A** **SS1-90B** **SS1-90C**		90	S1 S1K S1K S1K	10 12 15 18	40	90	92	10	10	20	— 4 x 1.8 5 x 2.3 6 x 2.8
SS1-95 **SS1-95A**		95	S1 S1K	10 12	40	95	97	10	10	20	— 4 x 1.8
SS1-96 **SS1-96A**		96	S1 S1K	10 12	40	96	98	10	10	20	— 4 x 1.8
SS1-100 **SS1-100A** **SS1-100B** **SS1-100C**		100	S1 S1K S1K S1K	10 12 15 18	40	100	102	10	10	20	— 4 x 1.8 5 x 2.3 6 x 2.8
SS1-110 **SS1-110A**		110	S1 S1K	15 15	50 40	110	112	10	10	20	— 5 x 2.3
SS1-120 **SS1-120A** **SS1-120B**		120	S1 S1K S1K	15 15 18	50 40	120	122	10	10	20	— 5 x 2.3 6 x 2.8
SS1-150		150	S1	20	120	150	152	10	10	20	—
SS1-200		200	S1	20	160	200	202	10	10	20	—

[Caution on Product Characteristics]

① For products with a tapped hole, a set screw is included.
② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 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 The use of S1T shaped set screws for fastening gears to a shaft, is a method only applicable to light load usage. For secure fastening, please use dowel pins, in combination.



S1T

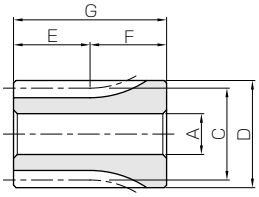


S1K

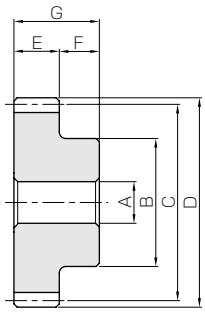
Set Screw		Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight	Catalog No.
Size	J	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)	
—	—	26.6	4.02	2.72	0.41	0.08~0.18	0.35	**SS1-65**
M4	5						0.34	**SS1-65A**
—	—	27.1	4.15	2.77	0.42	0.08~0.18	0.35	**SS1-66**
M4	5						0.35	**SS1-66A**
—	—	28.1	4.42	2.86	0.45	0.08~0.18	0.37	**SS1-68**
M4	5						0.36	**SS1-68A**
—	—	29.1	4.70	2.96	0.48	0.08~0.18	0.39	**SS1-70**
M4	5						0.38	**SS1-70A**
M4	5						0.37	**SS1-70B**
M5	5						0.36	**SS1-70C**
—	—	30.0	4.98	3.06	0.51	0.08~0.18	0.41	**SS1-72**
M4	5						0.40	**SS1-72A**
M4	5						0.39	**SS1-72B**
M5	5						0.37	**SS1-72C**
—	—	31.5	5.43	3.21	0.55	0.08~0.18	0.43	**SS1-75**
M4	5						0.42	**SS1-75A**
—	—	32.0	5.59	3.26	0.57	0.08~0.18	0.44	**SS1-76**
M4	5						0.43	**SS1-76A**
—	—	33.9	6.23	3.46	0.63	0.08~0.18	0.48	**SS1-80**
M4	5						0.47	**SS1-80A**
M4	5						0.46	**SS1-80B**
M5	5						0.45	**SS1-80C**
—	—	35.8	6.90	3.66	0.7	0.08~0.18	0.52	**SS1-84**
M4	5						0.51	**SS1-84A**
—	—	36.3	7.08	3.71	0.72	0.08~0.18	0.53	**SS1-85**
M4	5						0.52	**SS1-85A**
—	—	37.8	7.62	3.85	0.78	0.08~0.18	0.56	**SS1-88**
M4	5						0.56	**SS1-88A**
—	—	38.8	7.98	3.95	0.81	0.08~0.18	0.59	**SS1-90**
M4	5						0.58	**SS1-90A**
M4	5						0.57	**SS1-90B**
M5	5						0.55	**SS1-90C**
—	—	41.2	8.95	4.20	0.91	0.08~0.18	0.64	**SS1-95**
M4	5						0.63	**SS1-95A**
—	—	41.7	9.15	4.25	0.93	0.08~0.18	0.65	**SS1-96**
M4	5						0.65	**SS1-96A**
—	—	43.7	9.97	4.45	1.02	0.08~0.18	0.70	**SS1-100**
M4	5						0.69	**SS1-100A**
M4	5						0.68	**SS1-100B**
M5	5						0.67	**SS1-100C**
—	—	48.6	12.2	4.95	1.24	0.08~0.18	0.87	**SS1-110**
M4	5						0.81	**SS1-110A**
—	—	53.5	14.7	5.45	1.50	0.08~0.18	1.01	**SS1-120**
M4	5						0.95	**SS1-120A**
M5	5						0.94	**SS1-120B**
—	—	68.2	23.6	6.96	2.41	0.08~0.18	2.23	**SS1-150**
—	—	71.5	33.6	7.29	3.42	0.08~0.18	4.00	**SS1-200**

[Caution on Secondary Operations] ①Please read "Caution on Performing Secondary Operations" (Page 32) 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.
② Avoid performing secondary operations that narrow the tooth width as it affects precision and strength.

Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) JIS grade 4 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	—
Tooth hardness	(less than 194HB)



S3

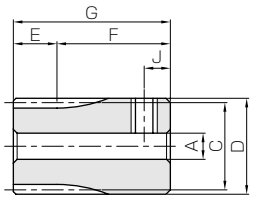


S1

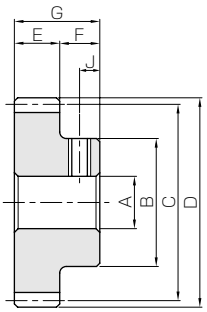
Catalog No.	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total length	Web thickness	Web O.D.	Keyway
				A_{H7}	B	C	D	E	F	G	H	I	Width×Depth
SS1.5-12	*m*1.5	12	S3	8	21	18	21	15	15	30	—	—	—
SS1.5-12A			S3T	6									—
SS1.5-13		13	S3	8	22.5	19.5	22.5	15	15	30	—	—	—
SS1.5-13A			S3T	6									—
SS1.5-14		14	S1	8	16	21	24	15	10	25	—	—	—
SS1.5-14A			S1T	6									—
SS1.5-14B			S1T	8									—
SS1.5-15		15	S1	8	18	22.5	25.5	15	10	25	—	—	—
SS1.5-15A			S1T	6									—
SS1.5-15B			S1T	8									—
SS1.5-16		16	S1	8	20	24	27	15	10	25	—	—	—
SS1.5-16A			S1T	6									—
SS1.5-16B			S1T	8									—
SS1.5-17		17	S1	8	21	25.5	28.5	15	10	25	—	—	—
SS1.5-17A			S1T	8									—
SS1.5-18		18	S1	8	22	27	30	15	10	25	—	—	—
SS1.5-18A			S1T	8									—
SS1.5-18B			S1K	10									4 x 1.8
SS1.5-19		19	S1	8	23	28.5	31.5	15	10	25	—	—	—
SS1.5-19A			S1T	8									—
SS1.5-20		20	S1	8	24	30	33	15	10	25	—	—	—
SS1.5-20A			S1T	6									—
SS1.5-20B			S1T	8									—
SS1.5-20C			S1K	10									4 x 1.8
SS1.5-21		21	S1	8	25	31.5	34.5	15	10	25	—	—	—
SS1.5-21A			S1T	8									—
SS1.5-21B			S1K	10									4 x 1.8
SS1.5-22		22	S1	8	26	33	36	15	10	25	—	—	—
SS1.5-22A			S1K	10									4 x 1.8
SS1.5-23		23	S1	8	27	34.5	37.5	15	10	25	—	—	—
SS1.5-23A			S1K	10									4 x 1.8
SS1.5-24		24	S1	8	28	36	39	15	10	25	—	—	—
SS1.5-24A			S1T	8									—
SS1.5-24B			S1K	10									4 x 1.8
SS1.5-24C			S1K	12									4 x 1.8
SS1.5-25		25	S1	8	30	37.5	40.5	15	10	25	—	—	—
SS1.5-25A			S1T	8									—
SS1.5-25B			S1K	10									4 x 1.8
SS1.5-25C			S1K	12									4 x 1.8
SS1.5-26		26	S1	10	32	39	42	15	10	25	—	—	—
SS1.5-26A			S1K	12									4 x 1.8
SS1.5-27		27	S1	10	34	40.5	43.5	15	10	25	—	—	—
SS1.5-27A			S1K	12									4 x 1.8
SS1.5-28		28	S1	10	36	42	45	15	10	25	—	—	—
SS1.5-28A			S1K	12									4 x 1.8
SS1.5-29		29	S1	10	37	43.5	46.5	15	10	25	—	—	—
SS1.5-29A			S1K	12									4 x 1.8
SS1.5-30		30	S1	10	38	45	48	15	10	25	—	—	—
SS1.5-30A			S1K	10									4 x 1.8
SS1.5-30B			S1K	12									4 x 1.8
SS1.5-30C			S1K	15									5 x 2.3
SS1.5-30D			S1K	16									5 x 2.3

[Caution on Product Characteristics]

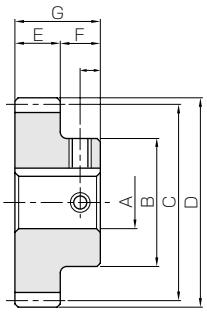
① For products with a tapped hole, a set screw is included.
② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
③ The backlash values shown in the table are the theoretical values for the backlash in the normal direction of a pair of identical gears in mesh.
④ The use of S3T and S1T shaped set screws for fastening gears to a shaft are only applicable to light load usage. For secure fastening, please use dowel pins, in combination.



S3T



S1T



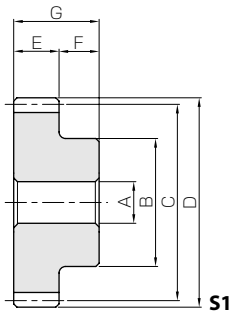
S1K

Set Screw		Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight	Catalog No.
Size	J	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)	
—	—	6.86	0.36	0.70	0.037	0.10~0.22	0.059	**SS1.5-12**
M4	4						0.063	**SS1.5-12A**
—	—	8.84	0.44	0.90	0.045	0.10~0.22	0.070	**SS1.5-13**
M4	4						0.075	**SS1.5-13A**
—	—	11.1	0.52	1.13	0.053	0.10~0.22	0.047	**SS1.5-14**
M4	5						0.051	**SS1.5-14A**
M5	5						0.046	**SS1.5-14B**
—	—	12.5	0.60	1.27	0.062	0.10~0.22	0.057	**SS1.5-15**
M4	5						0.061	**SS1.5-15A**
M5	5						0.056	**SS1.5-15B**
—	—	13.8	0.70	1.41	0.071	0.10~0.22	0.068	**SS1.5-16**
M4	5						0.072	**SS1.5-16A**
M5	5						0.067	**SS1.5-16B**
—	—	15.2	0.80	1.55	0.082	0.10~0.22	0.077	**SS1.5-17**
M5	5						0.077	**SS1.5-17A**
—	—	16.6	0.91	1.69	0.093	0.10~0.22	0.087	**SS1.5-18**
M5	5						0.086	**SS1.5-18A**
M4	5						0.080	**SS1.5-18B**
—	—	18.0	1.03	1.83	0.11	0.10~0.22	0.098	**SS1.5-19**
M5	5						0.097	**SS1.5-19A**
—	—	19.4	1.15	1.98	0.12	0.10~0.22	0.11	**SS1.5-20**
M4	5						0.11	**SS1.5-20A**
M5	5						0.11	**SS1.5-20B**
M4	5						0.10	**SS1.5-20C**
—	—	20.8	1.29	2.12	0.13	0.12~0.26	0.12	**SS1.5-21**
M5	5						0.12	**SS1.5-21A**
M4	5						0.11	**SS1.5-21B**
—	—	22.3	1.43	2.27	0.15	0.12~0.26	0.13	**SS1.5-22**
M4	5						0.12	**SS1.5-22A**
—	—	23.7	1.58	2.42	0.16	0.12~0.26	0.15	**SS1.5-23**
M4	5						0.14	**SS1.5-23A**
—	—	25.2	1.73	2.57	0.18	0.12~0.26	0.16	**SS1.5-24**
M5	5						0.16	**SS1.5-24A**
M4	5						0.15	**SS1.5-24B**
M4	5						0.14	**SS1.5-24C**
—	—	26.7	1.90	2.72	0.19	0.12~0.26	0.18	**SS1.5-25**
M5	5						0.17	**SS1.5-25A**
M4	5						0.17	**SS1.5-25B**
M4	5						0.16	**SS1.5-25C**
—	—	28.2	2.06	2.87	0.21	0.12~0.26	0.19	**SS1.5-26**
M4	5						0.18	**SS1.5-26A**
—	—	29.7	2.23	3.03	0.23	0.12~0.26	0.21	**SS1.5-27**
M4	5						0.20	**SS1.5-27A**
—	—	31.2	2.41	3.18	0.25	0.12~0.26	0.23	**SS1.5-28**
M4	5						0.22	**SS1.5-28A**
—	—	32.7	2.60	3.34	0.26	0.12~0.26	0.24	**SS1.5-29**
M4	5						0.23	**SS1.5-29A**
—	—	34.2	2.79	3.49	0.28	0.12~0.26	0.26	**SS1.5-30**
M4	5						0.26	**SS1.5-30A**
M4	5						0.25	**SS1.5-30B**
M4	5						0.24	**SS1.5-30C**
M4	5						0.23	**SS1.5-30D**

[Caution on Secondary Operations] ①Please read "Caution on Performing Secondary Operations" (Page 32) 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.
② Avoid performing secondary operations that narrow the tooth width as it affects precision and strength.

Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) ∗ JIS grade 4 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	—
Tooth hardness	(less than 194HB)

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

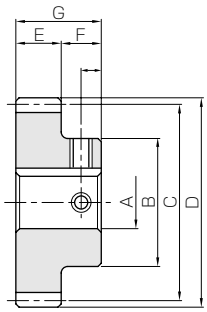


S1

Catalog No.	Module	No. of teeth	Shape	Bore A_{H7}	Hub dia. B	Pitch dia. C	Outside dia. D	Face width E	Hub width F	Total length G	Web thickness H	Web O.D. I	Keyway Width×Depth
SS1.5-32	***m*1.5**	32	S1	10	40	48	51	15	10	25	—	—	—
SS1.5-32A			S1K	10	38								4 x 1.8
SS1.5-32B			S1K	12	38								4 x 1.8
SS1.5-32C			S1K	15	38								5 x 2.3
SS1.5-32D			S1K	16	38								5 x 2.3
SS1.5-34		34	S1	10	40	51	54	15	10	25	—	—	—
SS1.5-34A			S1K	12	38								4 x 1.8
SS1.5-35		35	S1	10	42	52.5	55.5	15	10	25	—	—	—
SS1.5-35A			S1K	12	40								4 x 1.8
SS1.5-36		36	S1	10	45	54	57	15	10	25	—	—	—
SS1.5-36A			S1K	12	40								4 x 1.8
SS1.5-38		38	S1	12	45	57	60	15	10	25	—	—	—
SS1.5-38A			S1K	15	40								5 x 2.3
SS1.5-40		40	S1	12	45	60	63	15	10	25	—	—	—
SS1.5-40A			S1K	12	40								4 x 1.8
SS1.5-40B			S1K	15	40								5 x 2.3
SS1.5-40C			S1K	16	40								5 x 2.3

[Caution on Product Characteristics]
① For products with a tapped hole, a set screw is included.
② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 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.

[Caution on Secondary Operations]
①Please read "Caution on Performing Secondary Operations" (Page 32) 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.
② Avoid performing secondary operations that narrow the tooth width. as it affects precision and strength.



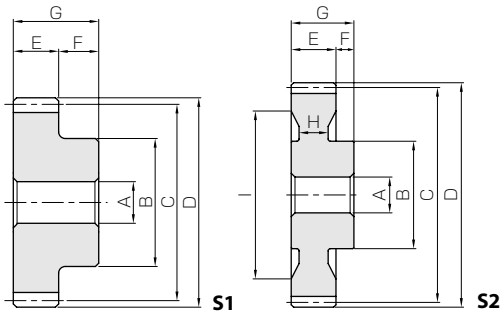
S1K

Set Screw		Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight	Catalog No.
Size	J	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)	
—	—	37.3	3.19	3.80	0.33	0.12~0.26	0.30	**SS1.5-32**
M4	5						0.28	**SS1.5-32A**
M4	5						0.28	**SS1.5-32B**
M4	5						0.26	**SS1.5-32C**
M4	5						0.26	**SS1.5-32D**
—	—	40.4	3.63	4.12	0.37	0.12~0.26	0.32	**SS1.5-34**
M4	5						0.30	**SS1.5-34A**
—	—	41.9	3.85	4.28	0.39	0.12~0.26	0.35	**SS1.5-35**
M4	5						0.33	**SS1.5-35A**
—	—	43.5	4.09	4.43	0.42	0.12~0.26	0.38	**SS1.5-36**
M4	5						0.34	**SS1.5-36A**
—	—	46.6	4.58	4.75	0.47	0.12~0.26	0.40	**SS1.5-38**
M4	5						0.36	**SS1.5-38A**
—	—	49.8	5.10	5.07	0.52	0.12~0.26	0.44	**SS1.5-40**
M4	5						0.41	**SS1.5-40A**
M4	5						0.39	**SS1.5-40B**
M4	5						0.39	**SS1.5-40C**

[Caution on J series]
① 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.
② 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.
③ Keyways are made according to JIS B1301 standards, Js9 tolerance.
④ Certain products which would otherwise have a very long tapped hole are conterbored to reduce the length of the tap.
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 N8 (JIS B1702-1: 1998) * JIS grade 4 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	—
Tooth hardness	(less than 194HB)
Face width (E)	15
Hub width (F)	10
Total length (G)	25
Screw offset (J)	10

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



Catalog No.	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Web thickness	Web O.D.	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight
			A_{H7}	B	C	D	(H)	(I)	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)
SS1.5-42	42	S1	12	45	63	66	—	—	52.9	5.65	5.40	0.58	0.14~0.32	0.47
SS1.5-44	44				66	69			56.1	6.23	5.72	0.64		0.51
SS1.5-45	45				67.5	70.5			57.7	6.53	5.88	0.67		0.52
SS1.5-46	46				69	72			59.3	6.83	6.04	0.70		0.54
SS1.5-48	48				72	75			62.4	7.47	6.37	0.76		0.58
SS1.5-50	50		15	50	75	78			65.7	8.15	6.69	0.83		0.62
SS1.5-52	52				78	81			68.9	8.85	7.02	0.90		0.68
SS1.5-54	54				81	84			72.1	9.59	7.35	0.98		0.73
SS1.5-55	55				82.5	85.5			73.7	9.96	7.51	1.02		0.75
SS1.5-56	56				84	87			75.3	10.4	7.68	1.06		0.77
SS1.5-58	58				87	90			78.5	11.2	8.01	1.14		0.82
SS1.5-60	60				90	93			81.8	12.0	8.34	1.22		0.87
SS1.5-62	62			55	93	96			85.0	12.8	8.67	1.31		0.95
SS1.5-64	64				96	99			88.3	13.7	9.00	1.40		1.00
SS1.5-65	65				97.5	100.5			89.9	14.2	9.17	1.45		1.03
SS1.5-66	66				99	102			91.5	14.6	9.33	1.49		1.06
SS1.5-68	68				102	105			94.8	15.6	9.66	1.59		1.11
SS1.5-70	70				105	108			98.0	16.6	10.0	1.69		1.17
SS1.5-72	72				108	111			101	17.6	10.3	1.79		1.23
SS1.5-75	75			60	112.5	115.5			106	19.2	10.8	1.95		1.36
SS1.5-76	76				114	117			108	19.7	11.0	2.01		1.39
SS1.5-80	80				120	123			114	22.0	11.7	2.24		1.52
SS1.5-84	84				126	129			121	24.4	12.3	2.49	0.18~0.38	1.66
SS1.5-85	85				127.5	130.5			123	25.1	12.5	2.56		1.69
SS1.5-88	88				132	135			128	27.0	13.0	2.75		1.80
SS1.5-90	90				135	138			131	28.3	13.3	2.89		1.87
SS1.5-95	95				142.5	145.5			139	31.8	14.2	3.24		2.07
SS1.5-100	100	S2			150	153	9	125	147	35.5	15.0	3.62		1.88
SS1.5-120	120			70	180	183	10	153	180	52.3	18.4	5.33		2.74
SS1.5-150	150	S1	20	180	225	228	—	—	192	70.3	19.6	7.17		6.62
SS1.5-200	200		25	240	300	303			261	131	26.7	13.3	0.22~0.46	11.8

[Caution on Product Characteristics]
① For products with a tapped hole, a set screw is included.
② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 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.

[Caution on Secondary Operations]
①Please read "Caution on Performing Secondary Operations" (Page 32) 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.
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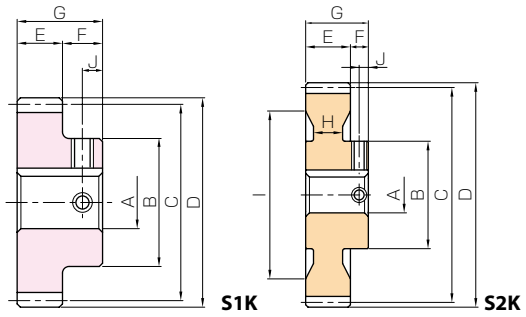
J Series

Steel Spur Gears



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	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 No.	M4						M5				M6			M8	
SS1.5-42 J BORE															
SS1.5-44 J BORE															
SS1.5-45 J BORE															
SS1.5-46 J BORE															
SS1.5-48 J BORE															
SS1.5-50 J BORE															
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SS1.5-80 J BORE															
SS1.5-84 J BORE															
SS1.5-85 J BORE															
SS1.5-88 J BORE															
SS1.5-90 J BORE															
SS1.5-95 J BORE															
SS1.5-100 J BORE															
SS1.5-120 J BORE															

[Caution on J series]

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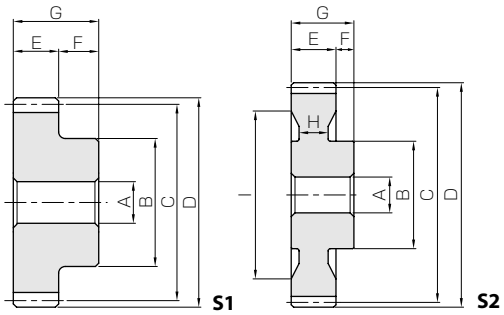
③ Keyways are made according to JIS B1301 standards, Js9 tolerance.
④ Certain products which would otherwise have a very long tapped hole are conterbored to reduce the length of the tap.
⑤ Areas of products which have been re-worked will not be black oxide coated.
⑥ For products having a tapped hole, a set screw is included.

Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) * JIS grade 4 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	—
Tooth hardness	(less than 194HB)
Face width (E)	20
Hub width (F)	10
Total length (G)	30
Screw offset (J)	5

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



Catalog No.	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Web thickness	Web O.D.	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight
			A_{H7}	B	C	D	(H)	(I)	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)
SS2-12	12	S1	10	18	24	28	—	—	16.3	0.88	1.66	0.090	0.12~0.26	0.073
SS2-13	13			20	26	30			21.0	1.07	2.14	0.11		0.090
SS2-14	14			20	28	32			26.3	1.26	2.69	0.13		0.10
SS2-15	15		12	24	30	34			29.6	1.48	3.01	0.15		0.12
SS2-16	16			26	32	36			32.7	1.71	3.34	0.17		0.14
SS2-17	17			28	34	38			36.0	1.96	3.67	0.20		0.16
SS2-18	18			30	36	40			39.3	2.23	4.01	0.23		0.19
SS2-19	19			31	38	42			42.6	2.52	4.35	0.26		0.21
SS2-20	20			32	40	44			46.0	2.83	4.69	0.29		0.23
SS2-21	21			34	42	46			49.4	3.15	5.04	0.32	0.14~0.30	0.26
SS2-22	22			36	44	48			52.8	3.50	5.39	0.36		0.29
SS2-23	23			37	46	50			56.3	3.86	5.74	0.39		0.32
SS2-24	24			38	48	52			59.8	4.24	6.09	0.43		0.35
SS2-25	25			40	50	54			63.3	4.64	6.45	0.47		0.38
SS2-26	26			42	52	56			66.8	5.04	6.81	0.51		0.42
SS2-27	27			45	54	58			70.4	5.45	7.17	0.56		0.46
SS2-28	28			45	56	60			73.9	5.89	7.54	0.60		0.48
SS2-29	29			47	58	62			77.5	6.33	7.91	0.65		0.52
SS2-30	30			50	60	64			81.1	6.80	8.27	0.69		0.57
SS2-32	32			50	64	68			88.4	7.78	9.01	0.79		0.63
SS2-34	34			50	68	72			95.7	8.84	9.76	0.90		0.70
SS2-35	35			52	70	74			99.3	9.39	10.1	0.96		0.74
SS2-36	36			55	72	76			103	9.96	10.5	1.02		0.80
SS2-38	38			55	76	80			111	11.2	11.3	1.14		0.87
SS2-40	40		15	55	80	84			118	12.5	12.0	1.27		0.93
SS2-42	42				84	88			125	13.8	12.8	1.41	0.18~0.36	1.01
SS2-44	44				88	92			133	15.2	13.6	1.55		1.10
SS2-45	45			55	90	94			137	16.0	13.9	1.63		1.14
SS2-46	46				92	96			140	16.7	14.3	1.71		1.19
SS2-48	48				96	100			148	18.3	15.1	1.87		1.28
SS2-50	50				100	104			156	19.9	15.9	2.03		1.38
SS2-52	52				104	108			163	21.7	16.6	2.21		1.48
SS2-54	54			55	108	112			171	23.4	17.4	2.39		1.58
SS2-55	55				110	114			175	24.4	17.8	2.48		1.64
SS2-56	56				112	116			179	25.3	18.2	2.58		1.69
SS2-58	58				116	120			186	27.3	19.0	2.78		1.84
SS2-60	60				120	124			194	29.3	19.8	2.99		1.96
SS2-62	62			60	124	128			202	31.5	20.6	3.21		2.08
SS2-64	64				128	132			209	33.7	21.3	3.44		2.20
SS2-65	65				130	134			213	34.8	21.7	3.55		2.26
SS2-66	66				132	136			217	36.0	22.1	3.67		2.33
SS2-68	68				136	140			225	38.4	22.9	3.91		2.46
SS2-70	70			60	140	144			232	40.8	23.7	4.16		2.60
SS2-72	72				144	148			240	43.3	24.5	4.42		2.74
SS2-75	75		20		150	154			252	47.3	25.7	4.82		2.92
SS2-76	76			60	152	156			256	48.6	26.1	4.96		3.00
SS2-80	80	S2		60	160	164	12	136	271	54.3	27.7	5.53		2.67
SS2-84	84			70	168	172		140	287	60.2	29.2	6.14	0.20~0.44	3.09
SS2-85	85			70	170	174		146	291	61.7	29.6	6.30		3.09
SS2-88	88			70	176	180		150	302	66.5	30.8	6.78		3.29
SS2-90	90			70	180	184		156	310	69.7	31.6	7.11		3.38
SS2-95	95			70	190	194		166	330	78.2	33.6	7.97		3.69
SS2-100	100			70	200	204		176	291	72.7	29.7	7.42		4.01
SS2-120	120			90	240	244		210	357	108	36.4	11.0		5.91
SS2-150	150	S1	25	240	300	304	—	—	455	174	46.4	17.7		14.5

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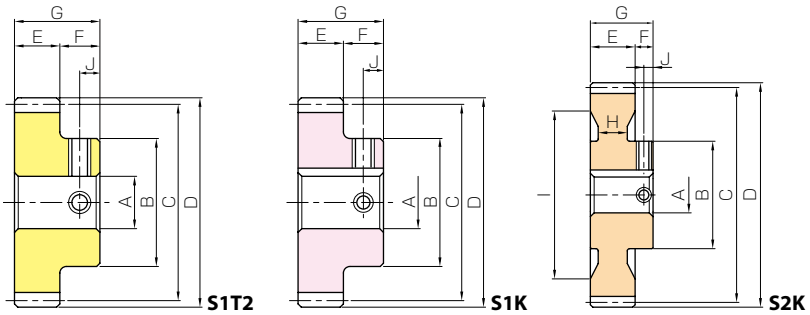
[Caution on Secondary Operations]
①Please read "Caution on Performing Secondary Operations" (Page 32) when performing modifications and/or secondary operations for safety concerns. KHK Quick-Mod Gears, the KHK's system for quick modification of KHK stock gears is also available.
② Avoid performing secondary operations that narrow the tooth width as it affects precision and strength.

J Series

Steel Spur Gears



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	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 No.	M4						M5				M6			M8	
SS2-12 J BORE															
SS2-13 J BORE															
SS2-14 J BORE															
SS2-15 J BORE															
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SS2-66 J BORE															
SS2-68 J BORE															
SS2-70 J BORE															
SS2-72 J BORE															
SS2-75 J BORE															
SS2-76 JBORE															
SS2-80 JBORE															
SS2-84 JBORE															
SS2-85 JBORE															
SS2-88 J BORE															
SS2-90 J BORE															
SS2-95 J BORE															
SS2-100 J BORE															
SS2-120 J BORE															

[Caution on J series]

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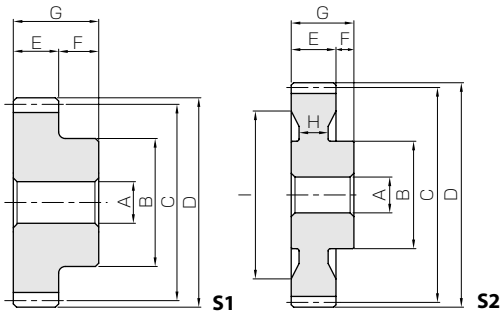
② Number of products we can process for one order is 1 to 20 units. For quantities of 21 or more pieces, we need to quote price and lead time.
③ Keyways are made according to JIS B1301 standards, Js9 tolerance.
④ Certain products which would otherwise have a very long tapped hole are conterbored to reduce the length of the tap.
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 The use of S1T2 shaped set screws for fastening gears to a shaft, is a method only applicable to light load usage. For secure fastening, please use dowel pins, in combination.

Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) * JIS grade 4 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	—
Tooth hardness	(less than 194HB)
Face width (E)	25
Hub width (F)	12
Total length (G)	37
Screw offset (J)	6

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



Catalog No.	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Web thickness	Web O.D.	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight
			A_{H7}	B	C	D	(H)	(I)	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)
SS2.5-12	12		12	23	30	35			31.8	1.77	3.24	0.18		0.15
SS2.5-13	13			25	32.5	37.5			40.9	2.14	4.17	0.22		0.18
SS2.5-14	14			25	35	40			51.5	2.53	5.25	0.26		0.20
SS2.5-15	15		15	30	37.5	42.5			57.7	2.96	5.89	0.30		0.23
SS2.5-16	16			32	40	45			64	3.43	6.52	0.35	0.14~0.28	0.27
SS2.5-17	17			35	42.5	47.5			70.3	3.93	7.17	0.40		0.32
SS2.5-18	18			38	45	50			76.7	4.47	7.82	0.46		0.37
SS2.5-19	19			39	47.5	52.5			83.2	5.05	8.49	0.51		0.41
SS2.5-20	20			40	50	55			89.8	5.66	9.16	0.58		0.45
SS2.5-21	21			42	52.5	57.5			96.4	6.30	9.83	0.64		0.50
SS2.5-22	22			44	55	60			103	6.99	10.5	0.71		0.56
SS2.5-23	23			46	57.5	62.5			110	7.71	11.2	0.79		0.61
SS2.5-24	24			48	60	65			117	8.47	11.9	0.86		0.67
SS2.5-25	25			50	62.5	67.5			124	9.26	12.6	0.94		0.74
SS2.5-26	26			55	65	70			130	10.1	13.3	1.03		0.82
SS2.5-27	27			60	67.5	72.5			137	10.9	14.0	1.11		0.92
SS2.5-28	28			60	70	75			144	11.7	14.7	1.20		0.97
SS2.5-29	29			62	72.5	77.5			151	12.6	15.4	1.29	0.16~0.34	1.04
SS2.5-30	30	S1		65	75	80	—	—	159	13.6	16.2	1.39		1.13
SS2.5-32	32			70	80	85			173	15.6	17.6	1.59		1.30
SS2.5-34	34				85	90			187	17.7	19.1	1.80		1.42
SS2.5-35	35				87.5	92.5			194	18.8	19.8	1.92		1.49
SS2.5-36	36			70	90	95			201	20.0	20.5	2.04		1.56
SS2.5-38	38		20		95	100			216	22.4	22.0	2.28		1.66
SS2.5-40	40				100	105			230	24.9	23.5	2.54		1.81
SS2.5-42	42				105	110			245	27.6	25.0	2.82		1.97
SS2.5-44	44				110	115			260	30.5	26.5	3.11		2.14
SS2.5-45	45			70	112.5	117.5			267	31.9	27.2	3.26		2.22
SS2.5-46	46				115	120			274	33.5	28.0	3.41		2.31
SS2.5-48	48				120	125			289	36.7	29.5	3.74		2.49
SS2.5-50	50				125	130			304	40.0	31.0	4.08		2.68
SS2.5-52	52				130	135			319	43.5	32.5	4.44		2.88
SS2.5-54	54			70	135	140			334	47.2	34.0	4.81		3.08
SS2.5-55	55				137.5	142.5			341	49.1	34.8	5.01		3.19
SS2.5-56	56				140	145			349	51.0	35.6	5.20		3.29
SS2.5-58	58			70	145	150			364	55.0	37.1	5.61	0.18~0.40	3.51
SS2.5-60	60	S4		70	150	155	(10)	(127)	379	59.1	38.6	6.03		2.80
SS2.5-62	62			80	155	160		130	394	63.4	40.1	6.46		3.54
SS2.5-64	64			80	160	165		131	409	67.8	41.7	6.92		3.76
SS2.5-65	65			80	162.5	167.5		134	416	70.1	42.4	7.15		3.84
SS2.5-66	66				165	170		140	424	72.4	43.2	7.39		3.87
SS2.5-68	68	S2	25		170	175	15	140	439	77.2	44.7	7.87		4.13
SS2.5-70	70			80	175	180		146	454	82.1	46.3	8.37		4.30
SS2.5-72	72				180	185		151	469	87.1	47.8	8.89		4.49
SS2.5-75	75				187.5	192.5		159	492	95.0	50.1	9.69		4.77
SS2.5-76	76			80	190	195		160	499	97.7	50.9	9.97		4.90
SS2.5-80	80			80	200	205		(177)	441	90.9	45.0	9.27		4.42
SS2.5-90	90	S4		90	225	230	(10)	(202)	505	117	51.5	12.0		5.64
SS2.5-100	100		30	90	250	255		(227)	569	147	58.0	15.0	0.22~0.48	6.78
SS2.5-120	120			100	300	305		(277)	696	218	71.0	22.2		9.38

[Caution on Product Characteristics]
① The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
② 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.

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①Please read "Caution on Performing Secondary Operations" (Page 32) 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.
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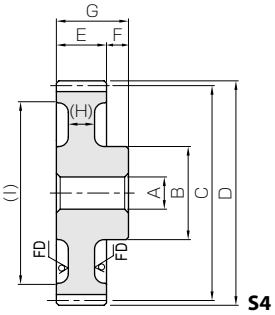
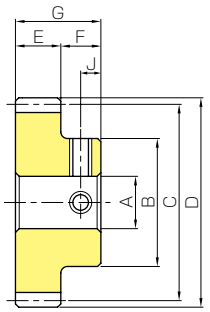
Steel Spur Gears

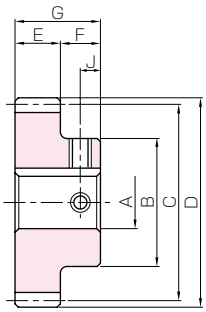
J Series



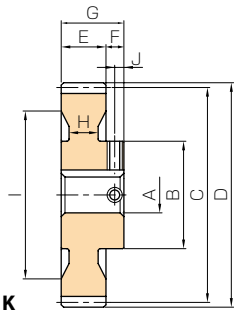
S4



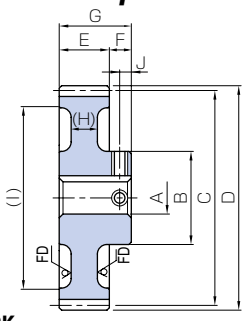
S1T2



S1K



S2K



S4K

* FD has die-forged finish.

* FD has die-forged finish.

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
Screw size	4 × 1.8	5 × 2.3				6 × 2.8				8 × 3.3			10 × 3.3		12 × 3.3
Catalog No.	M4					M5				M6			M8		
SS2.5-12 J BORE															
SS2.5-13 J BORE															
SS2.5-14 J BORE															
SS2.5-15 J BORE															
SS2.5-16 J BORE															
SS2.5-17 J BORE															
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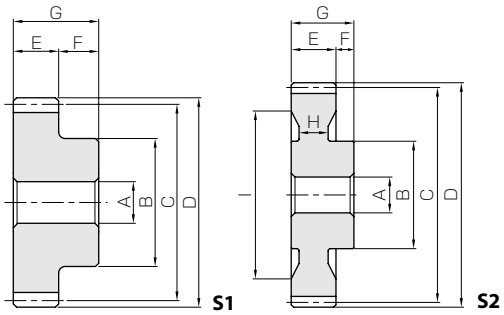
SS2.5-70 J BORE															
SS2.5-72 J BORE															
SS2.5-75 J BORE															
SS2.5-76 J BORE															
SS2.5-80 J BORE															
SS2.5-90 J BORE															
SS2.5-100 J BORE															
SS2.5-120 J BORE															

[Caution on J series]

① 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.
② 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.
③ Keyways are made according to JIS B1301 standards, Js9 tolerance.
④ Certain products which would otherwise have a very long tapped hole are conterbored to reduce the length of the tap.
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 The use of S1T2 shaped set screws for fastening gears to a shaft, is a method only applicable to light load usage. For secure fastening, please use dowel pins, in combination.

Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) * JIS grade (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	—
Tooth hardness	(less than 194HB)
Face width (E)	30
Hub width (F)	15
Total length (G)	45
Screw offset (J)	7.5

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



Catalog No.	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Web thickness	Web O.D.	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight
			A_{H7}	B	C	D	(H)	(I)	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)
SS3-12	12			28	36	42			54.9	3.12	5.59	0.32		0.25
SS3-13	13			30	39	45			70.7	3.77	7.21	0.38		0.30
SS3-14	14			32	42	48			88.9	4.47	9.07	0.46		0.36
SS3-15	15			36	45	51			99.7	5.23	10.2	0.53		0.43
SS3-16	16			38	48	54			111	6.05	11.3	0.62	0.14~0.32	0.50
SS3-17	17			39	51	57			122	6.93	12.4	0.71		0.56
SS3-18	18		15	40	54	60			133	7.87	13.5	0.80		0.62
SS3-19	19			45	57	63			144	8.88	14.7	0.91		0.73
SS3-20	20			50	60	66			155	9.95	15.8	1.02		0.83
SS3-21	21			52	63	69			167	11.1	17.0	1.13		0.92
SS3-22	22			54	66	72			178	12.3	18.2	1.25		1.01
SS3-23	23			56	69	75			190	13.6	19.4	1.38		1.11
SS3-24	24			58	72	78			202	14.9	20.6	1.52		1.21
SS3-25	25			60	75	81			214	16.3	21.8	1.66		1.26
SS3-26	26	S1		65	78	84	—	—	226	17.7	23.0	1.81		1.41
SS3-27	27			65	81	87			237	19.2	24.2	1.96		1.49
SS3-28	28			70	84	90			250	20.7	25.4	2.11		1.65
SS3-29	29		20	70	87	93			262	22.3	26.7	2.27	0.18~0.38	1.74
SS3-30	30			75	90	96			274	24.0	27.9	2.44		1.91
SS3-32	32			75	96	102			298	27.4	30.4	2.80		2.11
SS3-34	34				102	108			323	31.2	32.9	3.18		2.41
SS3-35	35				105	111			335	33.1	34.2	3.38		2.52
SS3-36	36			80	108	114			348	35.2	35.5	3.59		2.64
SS3-38	38				114	120			373	39.4	38.0	4.02		2.82
SS3-40	40				120	126			398	44.0	40.6	4.49		3.08
SS3-42	42				126	132			423	48.9	43.2	4.98		3.35
SS3-44	44				132	138			449	54.0	45.7	5.50		3.64
SS3-45	45			80	135	141			461	56.6	47.0	5.78		3.79
SS3-46	46				138	144			474	59.4	48.3	6.05		3.94
SS3-48	48				144	150			500	65.0	50.9	6.63		4.25
SS3-50	50	S4			150	156	(10)	(123)	525	70.9	53.6	7.23		3.72
SS3-52	52				156	162		126	551	77.1	56.2	7.86		4.38
SS3-54	54			80	162	168		132	577	83.6	58.8	8.52		4.61
SS3-55	55	S2			165	171	16	131	590	86.9	60.1	8.86		4.81
SS3-56	56		25		168	174		134	602	90.3	61.4	9.21		4.94
SS3-58	58				174	180		144	628	97.3	64.1	9.92	0.20~0.44	5.10
SS3-60	60	S4			180	186	(10)	(153)	654	105	66.7	10.7		4.60
SS3-62	62			80	186	192		150	680	112	69.4	11.4		5.76
SS3-64	64				192	198		158	588	99.9	60.0	10.2		5.99
SS3-65	65				195	201		161	599	103	61.1	10.5		6.13
SS3-66	66				198	204		160	610	107	62.2	10.9		6.67
SS3-68	68	S2			204	210	16	170	632	114	64.4	11.6		6.86
SS3-70	70			90	210	216		176	654	121	66.6	12.4		7.15
SS3-72	72				216	222		182	675	129	68.9	13.1		7.46
SS3-75	75				225	231		190	708	141	72.2	14.3		7.95
SS3-76	76			90	228	234		190	719	145	73.3	14.8		8.20
SS3-80	80	S4		90	240	246	(10)	(213)	763	162	77.8	16.5		6.92
SS3-90	90	S2	30	100	270	276	16	240	872	208	89.0	21.2		10.6
SS3-100	100	S4		100	300	306	(10)	(273)	983	261	100	26.6	0.26~0.52	10.78
SS3-120	120			130	360	366		(333)	1200	386	123	39.4		15.7

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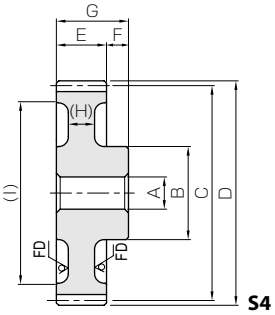
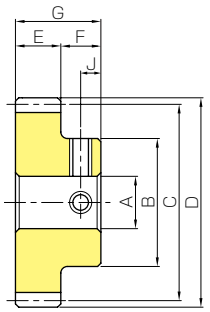
Steel Spur Gears

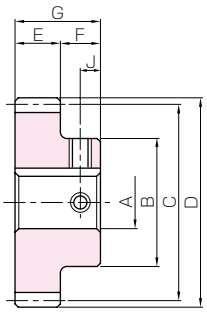
J Series



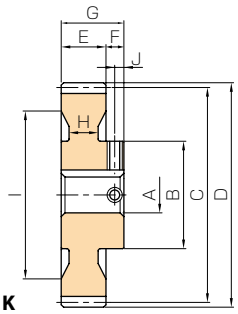
S4



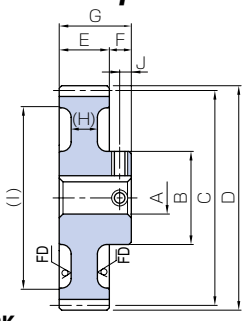
S1T2



S1K



S2K



S4K

* FD has die-forged finish.

* FD has die-forged finish.

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 No.	M4			M5				M6			M8			M10		
SS3-12 J BORE																
SS3-13 J BORE																
SS3-14 J BORE																
SS3-15 J BORE																
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[Caution on J series]

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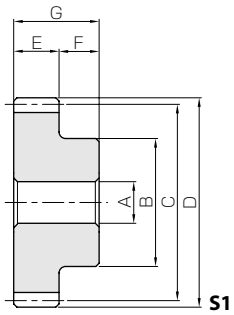
③ Keyways are made according to JIS B1301 standards, Js9 tolerance.
④ Certain products which would otherwise have a very long tapped hole are conterbored to reduce the length of the tap.
⑤ Areas of products which have been re-worked will not be black oxide coated.
⑥ For products having a tapped hole, a set screw is included.
⑦ The use of S1T2 shaped set screws for fastening gears to a shaft, is a method only applicable to light load usage. For secure fastening, please use dowel pins, in combination.

Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) JIS grade 4 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	—
Tooth hardness	(less than 194HB)

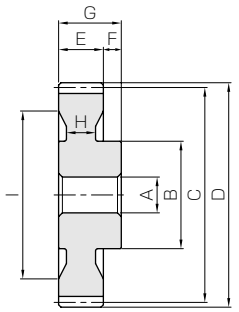


S1

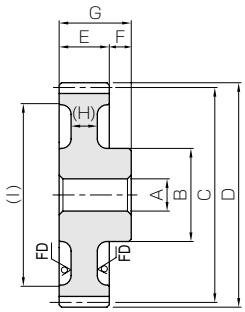
Catalog No.	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total length	Web thickness	Web O.D.
				A_{H7}	B	C	D	E	F	G	(H)	(I)
SS4-12		12	S1	20	35	48	56	40	20	60	—	—
SS4-13		13	S1	20	38	52	60	40	20	60	—	—
SS4-14		14	S1	20	40	56	64	40	20	60	—	—
SS4-15		15	S1	20	45	60	68	40	20	60	—	—
SS4-16		16	S1	20	50	64	72	40	20	60	—	—
SS4-17		17	S1	20	53	68	76	40	20	60	—	—
SS4-18		18	S1	20	55	72	80	40	20	60	—	—
SS4-19		19	S1	20	60	76	84	40	20	60	—	—
SS4-20		20	S1	20	65	80	88	40	20	60	—	—
SS4-21		21	S1	20	69	84	92	40	20	60	—	—
SS4-22		22	S1	20	73	88	96	40	20	60	—	—
SS4-23		23	S1	20	77	92	100	40	20	60	—	—
SS4-24		24	S1	20	80	96	104	40	20	60	—	—
SS4-25		25	S1	20	84	100	108	40	20	60	—	—
SS4-26		26	S1	20	87	104	112	40	20	60	—	—
SS4-27		27	S1	20	90	108	116	40	20	60	—	—
SS4-28		28	S1	20	95	112	120	40	20	60	—	—
SS4-29		29	S1	20	95	116	124	40	20	60	—	—
SS4-30		30	S1	20	100	120	128	40	20	60	—	—
SS4-32		32	S1	22	100	128	136	40	16	56	—	—
SS4-34		34	S1	22	100	136	144	40	16	56	—	—
SS4-35		35	S1	22	100	140	148	40	16	56	—	—
SS4-36	***m4***	36	S1	22	100	144	152	40	16	56	—	—
SS4-38		38	S1	22	100	152	160	40	16	56	—	—
SS4-40		40	S1	25	100	160	168	40	16	56	—	—
SS4-42		42	S1	25	100	168	176	40	16	56	—	—
SS4-44		44	S1	25	100	176	184	40	16	56	—	—
SS4-45		45	S1	25	100	180	188	40	16	56	—	—
SS4-46		46	S1	25	100	184	192	40	16	56	—	—
SS4-48		48	S2	25	100	192	200	40	16	56	26	150
SS4-50		50	S4	30	100	200	208	40	16	56	(12)	(168)
SS4-52		52	S2	30	100	208	216	40	16	56	26	165
SS4-54		54	S2	30	100	216	224	40	16	56	26	175
SS4-55		55	S2	30	100	220	228	40	16	56	26	178
SS4-56		56	S2	30	100	224	232	40	16	56	26	182
SS4-58		58	S2	30	110	232	240	40	16	56	26	190
SS4-60 *		60	S4	30	110	240	248	40	16	56	(12)	(208)
SS4-62		62	S2	30	110	248	256	40	16	56	20	210
SS4-64		64	S2	30	110	256	264	40	16	56	16	214
SS4-65		65	S2	30	110	260	268	40	16	56	16	218
SS4-66		66	S2	30	120	264	272	40	16	56	16	220
SS4-68		68	S2	30	120	272	280	40	16	56	16	225
SS4-70		70	S4	30	120	280	288	40	16	56	(12)	(248)
SS4-80		80	S4	30	120	320	328	40	16	56	(12)	(288)

[Caution on Product Characteristics] ① The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
② 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.

◎ As of March 2015, the products which have a mark on the catalog number will be modified to an S2-shape. For details, please see our web site.



S2



S4

∗ FD has die-forged finish.

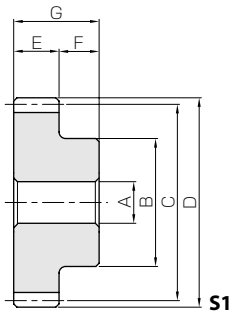
Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash (mm)	Weight (kg)	Catalog No.
Bending strength	Surface durability	Bending strength	Surface durability			
130	7.62	13.3	0.78	0.18~0.38	0.57	**SS4-12**
168	9.22	17.1	0.94	0.18~0.38	0.70	**SS4-13**
211	10.9	21.5	1.11	0.18~0.38	0.82	**SS4-14**
236	12.8	24.1	1.30	0.18~0.38	0.99	**SS4-15**
262	14.7	26.7	1.50	0.18~0.38	1.17	**SS4-16**
288	16.9	29.4	1.72	0.18~0.38	1.34	**SS4-17**
314	19.2	32.0	1.96	0.18~0.38	1.50	**SS4-18**
341	21.7	34.8	2.21	0.18~0.38	1.72	**SS4-19**
368	24.3	37.5	2.48	0.18~0.38	1.95	**SS4-20**
395	27.1	40.3	2.76	0.20~0.44	2.18	**SS4-21**
423	30.1	43.1	3.06	0.20~0.44	2.42	**SS4-22**
450	33.2	45.9	3.38	0.20~0.44	2.67	**SS4-23**
478	36.4	48.8	3.72	0.20~0.44	2.91	**SS4-24**
506	39.9	51.6	4.07	0.20~0.44	3.19	**SS4-25**
534	43.3	54.5	4.42	0.20~0.44	3.45	**SS4-26**
563	46.9	57.4	4.78	0.20~0.44	3.73	**SS4-27**
591	50.6	60.3	5.16	0.20~0.44	4.06	**SS4-28**
620	54.5	63.2	5.56	0.20~0.44	4.28	**SS4-29**
649	58.7	66.2	5.98	0.20~0.44	4.64	**SS4-30**
707	67.4	72.1	6.87	0.20~0.44	4.86	**SS4-32**
766	76.7	78.1	7.82	0.20~0.44	5.38	**SS4-34**
795	81.6	81.1	8.32	0.20~0.44	5.65	**SS4-35**
825	86.7	84.1	8.84	0.20~0.44	5.93	**SS4-36**
884	97.3	90.1	9.92	0.20~0.44	6.52	**SS4-38**
943	109	96.2	11.1	0.20~0.44	7.08	**SS4-40**
1000	120	102	12.3	0.24~0.52	7.73	**SS4-42**
1060	133	108	13.6	0.24~0.52	8.41	**SS4-44**
1090	139	112	14.2	0.24~0.52	8.76	**SS4-45**
1120	146	115	14.9	0.24~0.52	9.12	**SS4-46**
987	133	101	13.6	0.24~0.52	9.12	**SS4-48**
1040	146	106	14.8	0.24~0.52	8.00	**SS4-50**
1090	158	111	16.1	0.24~0.52	10.2	**SS4-52**
1140	172	116	17.5	0.24~0.52	10.8	**SS4-54**
1160	179	119	18.2	0.24~0.52	11.1	**SS4-55**
1190	186	121	18.9	0.24~0.52	11.5	**SS4-56**
1240	200	127	20.4	0.24~0.52	12.5	**SS4-58**
1290	215	132	22	0.24~0.52	10.7	**SS4-60**
1340	231	137	23.6	0.24~0.52	13.1	**SS4-62**
1390	248	142	25.2	0.24~0.52	13.4	**SS4-64**
1420	256	145	26.1	0.24~0.52	13.7	**SS4-65**
1450	265	148	27	0.24~0.52	14.7	**SS4-66**
1500	282	153	28.8	0.24~0.52	15.5	**SS4-68**
1550	300	158	30.6	0.24~0.52	13.6	**SS4-70**
1810	400	184	40.8	0.24~0.52	16.3	**SS4-80**

[Caution on Secondary Operations]

① Please read "Caution on Performing Secondary Operations" (Page 32) 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.

②Avoid performing secondary operations that narrow the tooth width as it affects precision and strength.

Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) JIS grade 4 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	—
Tooth hardness	(less than 194HB)



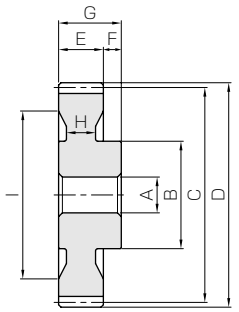
S1

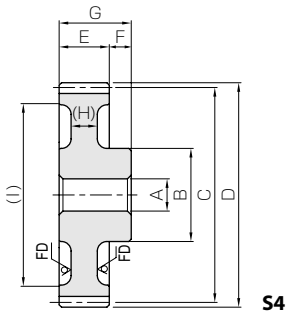
Catalog No.	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total length	Web thickness	Web O.D.
				A_{H7}	B	C	D	E	F	G	(H)	(I)
SS5-12		12	S1	22	46	60	70	50	25	75	—	—
SS5-13		13	S1	22	50	65	75	50	25	75	—	—
SS5-14		14	S1	22	52	70	80	50	25	75	—	—
SS5-15		15	S1	22	60	75	85	50	25	75	—	—
SS5-16		16	S1	22	65	80	90	50	25	75	—	—
SS5-17		17	S1	22	68	85	95	50	25	75	—	—
SS5-18		18	S1	22	70	90	100	50	25	75	—	—
SS5-19		19	S1	22	76	95	105	50	25	75	—	—
SS5-20		20	S1	22	82	100	110	50	25	75	—	—
SS5-21		21	S1	25	90	105	115	50	25	75	—	—
SS5-22		22	S1	25	95	110	120	50	25	75	—	—
SS5-23		23	S1	25	100	115	125	50	25	75	—	—
SS5-24		24	S1	25	100	120	130	50	25	75	—	—
SS5-25		25	S1	25	105	125	135	50	25	75	—	—
SS5-26		26	S1	25	110	130	140	50	25	75	—	—
SS5-27		27	S1	25	110	135	145	50	25	75	—	—
SS5-28		28	S1	25	110	140	150	50	25	75	—	—
SS5-29		29	S1	25	115	145	155	50	25	75	—	—
SS5-30	***m5***	30	S1	25	120	150	160	50	25	75	—	—
SS5-32		32	S1	30	120	160	170	50	21	71	—	—
SS5-34		34	S1	30	120	170	180	50	21	71	—	—
SS5-35		35	S1	30	120	175	185	50	21	71	—	—
SS5-36		36	S1	30	120	180	190	50	21	71	—	—
SS5-38		38	S1	30	120	190	200	50	21	71	—	—
SS5-40		40	S2	30	120	200	210	50	21	71	36	160
SS5-42		42	S2	30	120	210	220	50	21	71	36	170
SS5-44		44	S2	30	120	220	230	50	21	71	36	175
SS5-45		45	S2	30	120	225	235	50	21	71	36	185
SS5-46		46	S2	30	120	230	240	50	21	71	30	185
SS5-48		48	S2	30	120	240	250	50	21	71	30	200
SS5-50		50	S4	30	120	250	260	50	21	71	(16)	(212)
SS5-52		52	S2	30	130	260	270	50	21	71	30	220
SS5-54		54	S2	30	130	270	280	50	21	71	30	230
SS5-55		55	S2	30	130	275	285	50	21	71	30	235
SS5-56		56	S2	30	130	280	290	50	21	71	30	240
SS5-58		58	S2	30	130	290	300	50	21	71	30	240
SS5-60		60	S4	30	130	300	310	50	21	71	(20)	(260)

[Caution on Product Characteristics] ① The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
② 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.

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

∗ For products not categorized in our KHK Stock Gear series, custom gear production services with short lead times is available. For details see Page 8.





∗ FD has die-forged finish.

Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash (mm)	Weight (kg)	Catalog No.
Bending strength	Surface durability	Bending strength	Surface durability			
254	15.2	25.9	1.55	0.20~0.44	1.21	**SS5-12**
327	18.4	33.4	1.88	0.20~0.44	1.46	**SS5-13**
412	21.8	42.0	2.22	0.20~0.44	1.70	**SS5-14**
462	25.5	47.1	2.60	0.20~0.44	2.07	**SS5-15**
512	29.5	52.2	3.01	0.20~0.44	2.40	**SS5-16**
562	33.8	57.3	3.45	0.20~0.44	2.72	**SS5-17**
614	38.4	62.6	3.92	0.20~0.44	3.03	**SS5-18**
666	43.4	67.9	4.42	0.20~0.44	3.45	**SS5-19**
718	48.6	73.3	4.96	0.20~0.44	3.90	**SS5-20**
772	54.2	78.7	5.53	0.24~0.50	4.36	**SS5-21**
825	60.1	84.1	6.13	0.24~0.50	4.83	**SS5-22**
879	66.3	89.7	6.77	0.24~0.50	5.33	**SS5-23**
934	73.0	95.2	7.45	0.24~0.50	5.69	**SS5-24**
989	80.0	101	8.16	0.24~0.50	6.23	**SS5-25**
1040	87.1	106	8.88	0.24~0.50	6.79	**SS5-26**
1100	94.4	112	9.62	0.24~0.50	7.19	**SS5-27**
1160	102	118	10.4	0.24~0.50	7.62	**SS5-28**
1210	110	124	11.2	0.24~0.50	8.23	**SS5-29**
1270	118	129	12.1	0.24~0.50	8.87	**SS5-30**
1380	136	141	13.8	0.24~0.50	9.36	**SS5-32**
1500	154	153	15.7	0.24~0.50	10.4	**SS5-34**
1550	164	158	16.7	0.24~0.50	10.9	**SS5-35**
1610	174	164	17.8	0.24~0.50	11.5	**SS5-36**
1730	195	176	19.9	0.24~0.50	12.6	**SS5-38**
1540	182	157	18.5	0.24~0.50	13.2	**SS5-40**
1630	202	167	20.6	0.28~0.58	14.2	**SS5-42**
1730	223	177	22.8	0.28~0.58	15.4	**SS5-44**
1780	234	182	23.9	0.28~0.58	15.8	**SS5-45**
1830	246	187	25.1	0.28~0.58	16.2	**SS5-46**
1930	269	197	27.5	0.28~0.58	17.0	**SS5-48**
2030	294	207	30.0	0.28~0.58	15.0	**SS5-50**
2130	320	217	32.6	0.28~0.58	19.8	**SS5-52**
2220	347	227	35.4	0.28~0.58	20.9	**SS5-54**
2270	361	232	36.8	0.28~0.58	21.5	**SS5-55**
2320	375	237	38.3	0.28~0.58	22.0	**SS5-56**
2420	405	247	41.3	0.28~0.58	23.8	**SS5-58**
2520	435	257	44.4	0.28~0.58	21.4	**SS5-60**

[Caution on Secondary Operations]

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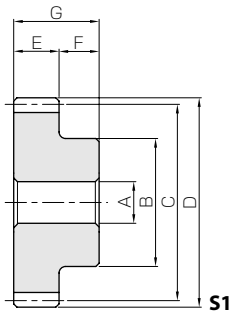
②Avoid performing secondary operations that narrow the tooth width as it affects precision and strength.

GCU-S Spur Gear Kit

Installment : Parallel axes gears (Two-stage)
Gear Type : Spur Gears
Gears : 2 units of SS1.5-16
2 units of PS1.5-22
Gear Ratio : 1.89
Weight : Approx. 1kg

The Gear Kit contains two-stage spur gears and allows speed increases / reductions, and includes the most commonly used combinations of gears.

Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) JIS grade 4 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	—
Tooth hardness	(less than 194HB)



Catalog No.	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total length	Web thickness	Web O.D.
				A_{H7}	B	C	D	E	F	G	H	I
SS6-12	***m*6**	12	S1	25	55	72	84	60	28	88	—	—
SS6-13		13	S1	25	58	78	90	60	28	88	—	—
SS6-14		14	S1	25	60	84	96	60	28	88	—	—
SS6-15		15	S1	25	70	90	102	60	28	88	—	—
SS6-16		16	S1	25	75	96	108	60	28	88	—	—
SS6-17		17	S1	25	78	102	114	60	28	88	—	—
SS6-18		18	S1	25	80	108	120	60	28	88	—	—
SS6-19		19	S1	25	90	114	126	60	28	88	—	—
SS6-20		20	S1	25	100	120	132	60	28	88	—	—
SS6-21		21	S1	28	105	126	138	60	28	88	—	—
SS6-22		22	S1	28	110	132	144	60	28	88	—	—
SS6-23		23	S1	28	115	138	150	60	28	88	—	—
SS6-24		24	S1	28	120	144	156	60	28	88	—	—
SS6-25		25	S1	28	125	150	162	60	28	88	—	—
SS6-26		26	S1	28	130	156	168	60	28	88	—	—
SS6-27		27	S1	28	135	162	174	60	28	88	—	—
SS6-28		28	S1	28	140	168	180	60	28	88	—	—
SS6-30		30	S1	30	150	180	192	60	28	88	—	—
SS6-32		32	S1	30	150	192	204	60	23	83	—	—
SS6-34		34	S1	30	150	204	216	60	23	83	—	—
SS6-35		35	S1	30	150	210	222	60	23	83	—	—
SS6-36		36	S1	30	150	216	228	60	23	83	—	—
SS6-38		38	S1	30	150	228	240	60	23	83	—	—
SS6-40		40	S1	30	150	240	252	60	23	83	—	—
SS6-42		42	S1	40	150	252	264	60	23	83	—	—
SS6-44		44	S1	40	150	264	276	60	23	83	—	—
SS6-45		45	S1	40	180	270	282	60	23	83	—	—
SS6-46		46	S1	40	180	276	288	60	23	83	—	—
SS6-48		48	S1	40	180	288	300	60	23	83	—	—
SS6-50		50	S1	40	180	300	312	60	23	83	—	—
SS8-12	***m*8**	12	S1	28	75	96	112	75	35	110	—	—
SS8-13		13	S1	28	80	104	120	75	35	110	—	—
SS8-14		14	S1	28	85	112	128	75	35	110	—	—
SS8-15		15	S1	28	90	120	136	75	35	110	—	—
SS8-16		16	S1	28	100	128	144	75	35	110	—	—
SS8-17		17	S1	28	105	136	152	75	35	110	—	—
SS8-18		18	S1	28	110	144	160	75	35	110	—	—
SS8-19		19	S1	28	120	152	168	75	35	110	—	—
SS8-20		20	S1	28	130	160	176	75	35	110	—	—
SS8-21		21	S1	30	140	168	184	75	35	110	—	—
SS8-22		22	S1	30	150	176	192	75	35	110	—	—
SS8-23		23	S1	30	155	184	200	75	35	110	—	—
SS8-24		24	S1	30	160	192	208	75	35	110	—	—
SS8-25		25	S1	30	170	200	216	75	35	110	—	—
SS8-26		26	S1	30	170	208	224	75	35	110	—	—
SS8-27		27	S1	30	170	216	232	75	35	110	—	—
SS8-28		28	S1	30	180	224	240	75	35	110	—	—
SS8-30		30	S1	30	180	240	256	75	35	110	—	—
SS10-15	***m*10**	15	S1	30	115	150	170	90	40	130	—	—
SS10-20		20	S1	30	165	200	220	90	40	130	—	—
SS10-25		25	S1	40	200	250	270	90	40	130	—	—

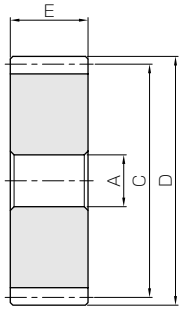
[Caution on Product Characteristics] ① The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
② The backlash values shown in the table are the theoretical values for the backlash in the normal direction of a pair of identical gears in mesh.

Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash (mm)	Weight (kg)	Catalog No.
Bending strength	Surface durability	Bending strength	Surface durability			
439	26.8	44.8	2.73	0.22~0.48	2.10	**SS6-12**
566	32.4	57.7	3.31	0.22~0.48	2.49	**SS6-13**
711	38.4	72.5	3.92	0.22~0.48	2.89	**SS6-14**
798	44.9	81.4	4.58	0.22~0.48	3.50	**SS6-15**
884	52	90.2	5.3	0.22~0.48	4.04	**SS6-16**
972	59.6	99.1	6.07	0.22~0.48	4.56	**SS6-17**
1060	67.7	108	6.9	0.22~0.48	5.08	**SS6-18**
1150	76.4	117	7.79	0.22~0.48	5.87	**SS6-19**
1240	85.9	127	8.75	0.22~0.48	6.71	**SS6-20**
1330	95.9	136	9.78	0.26~0.56	7.35	**SS6-21**
1430	107	145	10.9	0.26~0.56	8.11	**SS6-22**
1520	118	155	12	0.26~0.56	8.90	**SS6-23**
1610	129	165	13.2	0.26~0.56	9.73	**SS6-24**
1710	142	174	14.5	0.26~0.56	10.6	**SS6-25**
1800	154	184	15.7	0.26~0.56	11.5	**SS6-26**
1900	167	194	17	0.26~0.56	12.4	**SS6-27**
2000	181	204	18.4	0.26~0.56	13.4	**SS6-28**
2190	209	223	21.3	0.26~0.56	15.4	**SS6-30**
1990	200	203	20.4	0.26~0.56	16.4	**SS6-32**
2150	228	220	23.2	0.26~0.56	18.1	**SS6-34**
2240	242	228	24.7	0.26~0.56	19.0	**SS6-35**
2320	258	237	26.3	0.26~0.56	20.0	**SS6-36**
2490	289	254	29.5	0.26~0.56	22.0	**SS6-38**
2650	323	271	33	0.26~0.56	24.0	**SS6-40**
2820	359	288	36.6	0.30~0.64	25.9	**SS6-42**
2990	397	305	40.5	0.30~0.64	28.2	**SS6-44**
3080	416	314	42.5	0.30~0.64	30.7	**SS6-45**
3160	436	322	44.5	0.30~0.64	32.0	**SS6-46**
3330	478	340	48.8	0.30~0.64	34.5	**SS6-48**
3500	522	357	53.2	0.30~0.64	37.1	**SS6-50**
975	62.6	99.5	6.39	0.28~0.58	4.94	**SS8-12**
1260	75.2	128	7.66	0.28~0.58	5.85	**SS8-13**
1580	88.9	161	9.06	0.28~0.58	6.83	**SS8-14**
1770	104	181	10.6	0.28~0.58	7.87	**SS8-15**
1970	121	200	12.3	0.28~0.58	9.20	**SS8-16**
2160	139	220	14.1	0.28~0.58	10.4	**SS8-17**
2360	158	240	16.1	0.28~0.58	11.7	**SS8-18**
2560	178	261	18.2	0.28~0.58	13.3	**SS8-19**
2760	200	281	20.4	0.28~0.58	15.0	**SS8-20**
2960	223	302	22.8	0.32~0.66	16.7	**SS8-21**
3170	248	323	25.3	0.32~0.66	18.6	**SS8-22**
3380	273	344	27.9	0.32~0.66	20.2	**SS8-23**
2990	250	305	25.5	0.32~0.66	22.0	**SS8-24**
3160	273	323	27.8	0.32~0.66	24.1	**SS8-25**
3340	297	341	30.3	0.32~0.66	25.6	**SS8-26**
3520	322	359	32.8	0.32~0.66	27.2	**SS8-27**
3700	348	377	35.5	0.32~0.66	29.6	**SS8-28**
4060	404	414	41.2	0.32~0.66	33.0	**SS8-30**
3330	203	339	20.7	0.34~0.68	15.0	**SS10-15**
4310	323	440	33	0.34~0.68	28.2	**SS10-20**
5930	529	605	54	0.36~0.76	43.3	**SS10-25**

[Caution on Secondary Operations] ① Please read "Caution on Performing Secondary Operations" (Page 32) 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.
②Avoid performing secondary operations that narrow the tooth width as it affects precision and strength.

Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) JIS grade 4 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	—
Tooth hardness	(less than 194HB)

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



S5

Catalog No.	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Web thickness	Web O.D.	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight
			A_{H7}	B	C	D	E	(H)	(I)	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)
SSA1-20	20	S5	8	—	20	22	10	—	—	5.75	0.33	0.59	0.033	0.08~0.18	0.021
SSA1-24	24				24	26				7.47	0.49	0.76	0.050		0.032
SSA1-25	25				25	27				7.91	0.54	0.81	0.055		0.035
SSA1-28	28				28	30				9.24	0.68	0.94	0.070		0.044
SSA1-30	30				30	32				10.1	0.79	1.03	0.081		0.052
SSA1-32	32				32	34				11.1	0.90	1.13	0.092		0.059
SSA1-35	35				35	37				12.4	1.09	1.27	0.11		0.072
SSA1-36	36				36	38				12.9	1.16	1.31	0.12		0.076
SSA1-40	40				40	42				14.7	1.45	1.50	0.15		0.095
SSA1-45	45				45	47				17.1	1.86	1.74	0.19		0.12
SSA1-48	48		10		48	50				18.5	2.13	1.89	0.22		0.14
SSA1-50	50				50	52				19.5	2.32	1.98	0.24		0.15
SSA1-55	55				55	57				21.8	2.83	2.23	0.29		0.18
SSA1-56	56				56	58				22.3	2.94	2.28	0.30		0.19
SSA1-60	60				60	62				24.2	3.40	2.47	0.35		0.22
SSA1-70	70				70	72				29.1	4.70	2.96	0.48		0.30
SSA1-80	80				80	82				33.9	6.23	3.46	0.63		0.39
SSA1-100	100				100	102				43.7	9.97	4.45	1.02		0.61
SSA1-120	120				120	122				53.5	14.7	5.45	1.50		0.88
SSA1.5-20	20		8		30	33	15			19.4	1.15	1.98	0.12	0.10~0.22	0.074
SSA1.5-24	24				36	39				25.2	1.73	2.57	0.18		0.11
SSA1.5-25	25				37.5	40.5				26.7	1.90	2.72	0.19		0.12
SSA1.5-28	28				42	45				31.2	2.41	3.18	0.25		0.15
SSA1.5-30	30				45	48				34.2	2.79	3.49	0.28	0.12~0.26	0.18
SSA1.5-32	32				48	51				37.3	3.19	3.80	0.33		0.20
SSA1.5-35	35				52.5	55.5				41.9	3.85	4.28	0.39		0.25
SSA1.5-36	36				54	57				43.5	4.09	4.43	0.42		0.26
SSA1.5-40	40		15		60	63				49.8	5.10	5.07	0.52		0.31
SSA1.5-45	45				67.5	70.5				57.7	6.53	5.88	0.67		0.40
SSA1.5-48	48				72	75				62.4	7.47	6.37	0.76		0.46
SSA1.5-50	50				75	78				65.7	8.15	6.69	0.83		0.50
SSA1.5-55	55				82.5	85.5				73.7	9.96	7.51	1.02	0.14~0.32	0.61
SSA1.5-56	56				84	87				75.3	10.4	7.68	1.06		0.63
SSA1.5-60	60				90	93				81.8	12.0	8.34	1.22		0.73
SSA1.5-70	70				105	108				98.0	16.6	10.0	1.69		1.00
SSA1.5-80	80				120	123				114	22.0	11.7	2.24		1.31
SSA1.5-100	100	S6		70	150	153		9	125	147	35.5	15.0	3.62	0.18~0.38	1.72

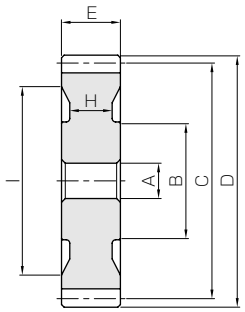
[Caution on Product Characteristics]
① The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
② The backlash values shown in the table are the theoretical values for the backlash in the normal direction of a pair of identical gears in mesh.

[Caution on Secondary Operations]
①Please read "Caution on Performing Secondary Operations" (Page 32) 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.
② Avoid performing secondary operations that narrow the tooth width as it affects precision and strength.

J Series

Steel Hubless Spur Gears

Newly added



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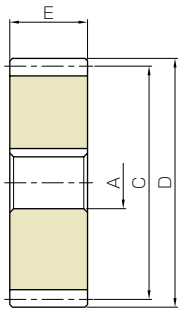

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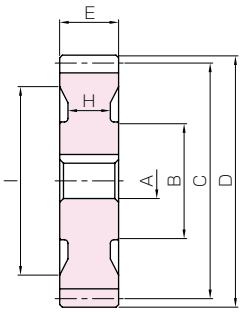

S6K

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	8	10	12	14	15	16	17	18	19	20	22	25	28	30	32	35	40	45	50
Screw size	3 x 1.4	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	
Catalog No.	—																		
SSA1-20 J BORE																			
SSA1-24 J BORE																			
SSA1-25 J BORE																			
SSA1-28 J BORE																			
SSA1-30 J BORE																			
SSA1-32 J BORE																			
SSA1-35 J BORE																			
SSA1-36 J BORE																			
SSA1-40 J BORE																			
SSA1-45 J BORE																			
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SSA1-60 J BORE																			
SSA1-70 J BORE																			
SSA1-80 J BORE																			
SSA1-100 J BORE																			
SSA1-120 J BORE																			
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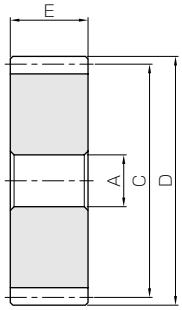
SSA1.5-70 J BORE																			
SSA1.5-80 J BORE																			
SSA1.5-100 J BORE																			

[Caution on J series]

① 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.
② 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.
③ Keyways are made according to JIS B1301 standards, Js9 tolerance.
④ Areas of products which have been re-worked will not be black oxide coated.

Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) JIS grade 4 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	—
Tooth hardness	(less than 194HB)

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



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Catalog No.	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Web thickness	Web O.D.	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight
			A_{H7}	B	C	D	E	(H)	(I)	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)
SSA2-20	20	S5	12	—	40	44	20	—	—	46.0	2.83	4.69	0.29	0.12~0.26	0.18
SSA2-24	24				48	52				59.8	4.24	6.09	0.43	0.14~0.30	0.27
SSA2-25	25				50	54				63.3	4.64	6.45	0.47		0.29
SSA2-28	28		15		56	60				73.9	5.89	7.54	0.60		0.36
SSA2-30	30				60	64				81.1	6.80	8.27	0.69		0.42
SSA2-32	32				64	68				88.4	7.78	9.01	0.79		0.48
SSA2-35	35				70	74				99.3	9.39	10.1	0.96		0.58
SSA2-36	36				72	76				103	9.96	10.5	1.02		0.61
SSA2-40	40		18		80	84				118	12.5	12.0	1.27		0.75
SSA2-45	45				90	94				137	16.0	13.9	1.63	0.18~0.36	0.96
SSA2-48	48				96	100				148	18.3	15.1	1.87		1.10
SSA2-50	50				100	104				156	19.9	15.9	2.03		1.19
SSA2-55	55				110	114				175	24.4	17.8	2.48		1.45
SSA2-56	56				112	116				179	25.3	18.2	2.58		1.51
SSA2-60	60				120	124				194	29.3	19.8	2.99		1.74
SSA2-70	70				140	144				232	40.8	23.7	4.16		2.38
SSA2-80	80	S6		70	160	164		12	136	271	54.3	27.7	5.53		2.55
SSA2-100	100			90	200	204			176	291	72.7	29.7	7.42	0.20~0.44	3.90
SSA2.5-20	20	S5	15	—	50	55	25	—	—	89.8	5.66	9.16	0.58	0.14~0.28	0.35
SSA2.5-24	24				60	65				117	8.47	11.9	0.86	0.16~0.34	0.52
SSA2.5-25	25				62.5	67.5				124	9.26	12.6	0.94		0.57
SSA2.5-28	28		18		70	75				144	11.7	14.7	1.20		0.71
SSA2.5-30	30				75	80				159	13.6	16.2	1.39		0.82
SSA2.5-32	32				80	85				173	15.6	17.6	1.59		0.94
SSA2.5-35	35				87.5	92.5				194	18.8	19.8	1.92		1.13
SSA2.5-36	36				90	95				201	20.0	20.5	2.04		1.20
SSA2.5-40	40		22		100	105				230	24.9	23.5	2.54		1.47
SSA2.5-45	45				112.5	117.5				267	31.9	27.2	3.26	0.18~0.40	1.88
SSA2.5-48	48				120	125				289	36.7	29.5	3.74		2.14
SSA2.5-50	50				125	130				304	40.0	31.0	4.08		2.33
SSA2.5-55	55				137.5	142.5				341	49.1	34.8	5.01		2.84
SSA2.5-56	56				140	145				349	51.0	35.6	5.20		2.95
SSA2.5-60	60	S6		70	150	155		15	121	379	59.1	38.6	6.03		2.93
SSA2.5-70	70			80	175	180			146	454	82.1	46.3	8.37		3.89
SSA2.5-80	80			90	200	205			171	441	90.9	45.0	9.27		4.99

[Caution on Product Characteristics]
① The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
② 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.

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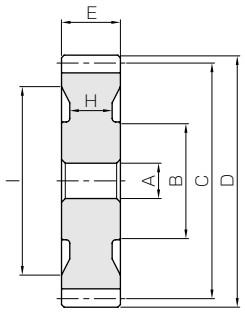
J Series

Steel Hubless Spur Gears

Newly added



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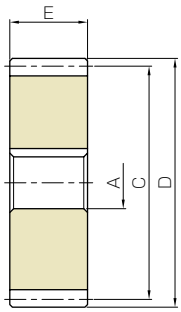

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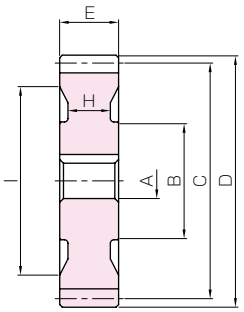

S6K

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	10	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 No.	—																	
SSA2-20 J BORE																		
SSA2-24 J BORE																		
SSA2-25 J BORE																		
SSA2-28 J BORE																		
SSA2-30 J BORE																		
SSA2-32 J BORE																		
SSA2-35 J BORE																		
SSA2-36 J BORE																		
SSA2-40 J BORE																		
SSA2-45 J BORE																		
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SSA2-56 J BORE																		
SSA2-60 J BORE																		
SSA2-70 J BORE																		
SSA2-80 J BORE																		
SSA2-100 J BORE																		
SSA2.5-20 J BORE																		
SSA2.5-24 J BORE																		
SSA2.5-25 J BORE																		
SSA2.5-28 J BORE																		
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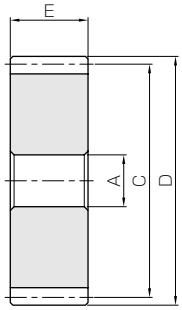
SSA2.5-35 J BORE																		
SSA2.5-36 J BORE																		
SSA2.5-40 J BORE																		
SSA2.5-45 J BORE																		
SSA2.5-48 J BORE																		
SSA2.5-50 J BORE																		
SSA2.5-55 J BORE																		
SSA2.5-56 J BORE																		
SSA2.5-60 J BORE																		
SSA2.5-70 J BORE																		
SSA2.5-80 J BORE																		

[Caution on J series]

① 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.
② 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.
③ Keyways are made according to JIS B1301 standards, Js9 tolerance.
④ Areas of products which have been re-worked will not be black oxide coated.

Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) JIS grade 4 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	—
Tooth hardness	(less than 194HB)

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



S5

Catalog No.	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Web thickness	Web O.D.	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight
			A_{H7}	B	C	D	E	(H)	(I)	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)
SSA3-20	20	S5	15	—	60	66	30	—	—	155	9.95	15.8	1.02	0.14~0.32	0.62
SSA3-24	24				72	78				202	14.9	20.6	1.52	0.18~0.38	0.92
SSA3-25	25				75	81				214	16.3	21.8	1.66		1.00
SSA3-28	28		20		84	90				250	20.7	25.4	2.11		1.23
SSA3-30	30				90	96				274	24.0	27.9	2.44		1.42
SSA3-32	32				96	102				298	27.4	30.4	2.80		1.63
SSA3-35	35				105	111				335	33.1	34.2	3.38		1.97
SSA3-36	36			—	108	114			—	348	35.2	35.5	3.59		2.08
SSA3-40	40		25		120	126				398	44.0	40.6	4.49		2.55
SSA3-45	45				135	141				461	56.6	47.0	5.78	0.20~0.44	3.26
SSA3-48	48			—	144	150			—	500	65.0	50.9	6.63		3.72
SSA3-50	50	S6		70	150	156		18	116	525	70.9	53.6	7.23		3.60
SSA3-55	55			80	165	171			131	590	86.9	60.1	8.86		4.34
SSA3-56	56			80	168	174			134	602	90.3	61.4	9.21		4.47
SSA3-60	60			90	180	186			146	654	105	66.7	10.7		5.14
SSA3-70	70			90	210	216			176	654	121	66.6	12.4		6.64
SSA3-80	80			90	240	246			205	763	162	77.8	16.5		8.37
SSA4-20	20	S5	20		80	88	40	—		368	24.3	37.5	2.48	0.18~0.38	1.48
SSA4-24	24				96	104				478	36.4	48.8	3.72	0.20~0.44	2.17
SSA4-25	25			—	100	108			—	506	39.9	51.6	4.07		2.37
SSA4-28	28		25		112	120				591	50.6	60.3	5.16		2.94
SSA4-30	30				120	128				649	58.7	66.2	5.98		3.40
SSA4-32	32			—	128	136			—	707	67.4	72.1	6.87		3.89
SSA4-35	35			—	140	148			—	795	81.6	81.1	8.32		4.68
SSA4-36	36			—	144	152			—	825	86.7	84.1	8.84		4.96
SSA4-40	40	S6	30	80	160	168		26	118	943	109	96.2	11.1		5.70
SSA4-45	45			100	180	188			138	1090	139	112	14.2	0.24~0.52	7.29
SSA4-48	48			100	192	200			150	987	133	101	13.6		8.12
SSA4-50	50			100	200	208			158	1040	146	106	14.8		8.70
SSA4-55	55			110	220	228			178	1160	179	119	18.2		10.4
SSA4-56	56			110	224	232			182	1190	186	121	18.9		10.7
SSA4-60	60			120	240	248			198	1290	215	132	22.0		12.3
SSA5-20	20	S5	22		100	110	50	—		718	48.6	73.3	4.96	0.20~0.44	2.93
SSA5-24	24				120	130				934	73.0	95.2	7.45		4.29
SSA5-25	25			—	125	135			—	989	80.0	101	8.16		4.67
SSA5-28	28		25		140	150				1160	102	118	10.4		5.85
SSA5-30	30				150	160				1270	118	129	12.1	0.24~0.50	6.74
SSA5-32	32			—	160	170			—	1380	136	141	13.8		7.70
SSA5-35	35			—	175	185			—	1550	164	158	16.7		9.25
SSA5-36	36			—	180	190			—	1610	174	164	17.8		9.80
SSA5-40	40	S6	30	100	200	210		36	160	1540	182	157	18.5		11.1
SSA5-45	45			120	225	235			185	1780	234	182	23.9		14.0
SSA5-48	48			120	240	250			200	1930	269	197	27.5	0.28~0.58	15.7
SSA5-50	50			130	250	260			210	2030	294	207	30.0		17.1

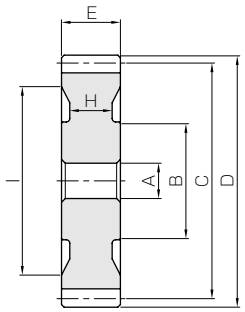
[Caution on Product Characteristics]
① The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
② The backlash values shown in the table are the theoretical values for the backlash in the normal direction of a pair of identical gears in mesh.

[Caution on Secondary Operations]
① Please read "Caution on Performing Secondary Operations" (Page 32) 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.
②Avoid performing secondary operations that narrow the tooth width as it affects precision and strength.

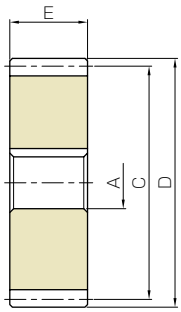
J Series

Steel Hubless Spur Gears

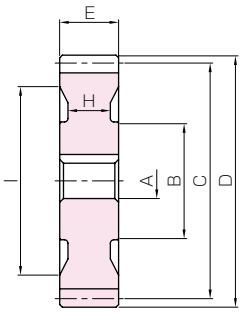
Newly added



S6



S5K



S6K

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

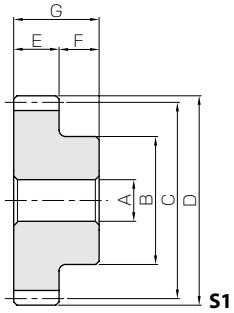
Bore H7	✻ The product shapes of J Series items are identified by background color.														
Keyway Js9	15	16	17	18	19	20	22	25	28	30	32	35	40	45	50
Screw size	5 × 2.3			6 × 2.8				8 × 3.3			10 × 3.3		12 × 3.3	14 × 3.8	
Catalog No.	—														
SSA3-20 J BORE															
SSA3-24 J BORE															
SSA3-25 J BORE															
SSA3-28 J BORE															
SSA3-30 J BORE															
SSA3-32 J BORE															
SSA3-35 J BORE															
SSA3-36 J BORE															
SSA3-40 J BORE															
SSA3-45 J BORE															
SSA3-48 J BORE															
SSA3-50 J BORE															
SSA3-55 J BORE															
SSA3-56 J BORE															
SSA3-60 J BORE															
SSA3-70 J BORE															
SSA3-80 J BORE															

[Caution on J series]

① 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.
② 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.
③ Keyways are made according to JIS B1301 standards, Js9 tolerance.
④ Areas of products which have been re-worked will not be black oxide coated.

Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) ＊ JIS grade 4 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	—
Tooth hardness	(less than 194HB)

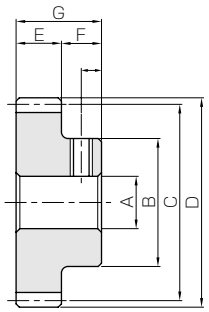
＊ The precision grade of products with a module of less than 0.8 is equivalent to the value shown in the table.



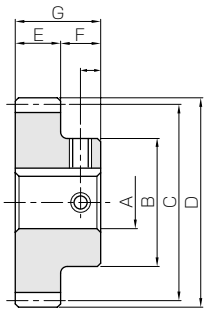
Catalog No.	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total length	Keyway
				A_{H7}	B	C	D	E	F	G	Width×Depth
SSY0.8-20 **SSY0.8-20A**	***m*0.8**	20	S1 S1T	5 5	13.5	16	17.6	4	8	12	— —
SSY0.8-25 **SSY0.8-25A**		25	S1 S1T	5 5	17	20	21.6	4	8	12	— —
SSY0.8-30 **SSY0.8-30A**		30	S1 S1T	5 5	20	24	25.6	4	8	12	— —
SSY0.8-40 **SSY0.8-40A**		40	S1 S1T	5 6	25	32	33.6	4	8	12	— —
SSY0.8-50 **SSY0.8-50A**		50	S1 S1T	5 6	25	40	41.6	4	8	12	— —
SSY1-12 **SSY1-12A**	***m*1**	12	S1 S1T	5 5	9	12	14	6	8	14	— —
SSY1-14 **SSY1-14A**		14	S1 S1T	5 5	11	14	16	6	8	14	— —
SSY1-15 **SSY1-15A**		15	S1 S1T	6 6	12	15	17	6	8	14	— —
SSY1-16 **SSY1-16A**		16	S1 S1T	6 6	13	16	18	6	8	14	— —
SSY1-18 **SSY1-18A**		18	S1 S1T	6 6	14	18	20	6	8	14	— —
SSY1-20 **SSY1-20A** **SSY1-20B**		20	S1 S1T S1T	6 6 8	16	20	22	6	8	14	— — —
SSY1-24 **SSY1-24A** **SSY1-24B**		24	S1 S1T S1T	6 6 8	16	24	26	6	8	14	— — —
SSY1-25 **SSY1-25A**		25	S1 S1T	6 6	16	25	27	6	8	14	— —
SSY1-28 **SSY1-28A**		28	S1 S1T	6 6	16	28	30	6	8	14	— —
SSY1-30 **SSY1-30A** **SSY1-30B**		30	S1 S1T S1T	6 6 8	25	30	32	6	8	14	— — —
SSY1-32 **SSY1-32A**		32	S1 S1T	6 6	25	32	34	6	8	14	— —
SSY1-35 **SSY1-35A** **SSY1-35B**		35	S1 S1T S1K	6 8 10	25	35	37	6	8	14	— — 4 x 1.8
SSY1-36 **SSY1-36A** **SSY1-36B**		36	S1 S1T S1K	6 8 10	25	36	38	6	8	14	— — 4 x 1.8
SSY1-40 **SSY1-40A** **SSY1-40B**		40	S1 S1T S1K	8 8 10	28	40	42	6	8	14	— — 4 x 1.8
SSY1-45 **SSY1-45A**		45	S1 S1T	8 8	28	45	47	6	8	14	— —
SSY1-48 **SSY1-48A**		48	S1 S1T	8 8	28	48	50	6	8	14	— —

[Caution on Product Characteristics] ① Keyways are made according to JIS B1301 standards and Js9 tolerances. For products with a tapped hole, a set screw is included as an accessory.
② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 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.

Steel Thin Face Spur Gears



S1T



S1K

Set Screw		Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight	Catalog No.
Size	J	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)	
—	—	1.47	0.085	0.15	0.0087	0 ~0.10	0.013	**SSY0.8-20**
M4	4						0.013	**SSY0.8-20A**
—	—	2.03	0.134	0.21	0.014	0 ~0.10	0.022	**SSY0.8-25**
M4	4						0.022	**SSY0.8-25A**
—	—	2.60	0.197	0.27	0.020	0 ~0.10	0.032	**SSY0.8-30**
M4	4						0.031	**SSY0.8-30A**
—	—	3.77	0.362	0.39	0.037	0 ~0.10	0.054	**SSY0.8-40**
M4	4						0.053	**SSY0.8-40A**
—	—	4.98	0.580	0.51	0.059	0 ~0.10	0.068	**SSY0.8-50**
M4	4						0.067	**SSY0.8-50A**
—	—	1.22	0.069	0.12	0.0070	0.08~0.18	0.0072	**SSY1-12**
M4	4						0.0070	**SSY1-12A**
—	—	1.98	0.096	0.20	0.010	0.08~0.18	0.011	**SSY1-14**
M4	4						0.011	**SSY1-14A**
—	—	2.22	0.11	0.23	0.011	0.08~0.18	0.012	**SSY1-15**
M4	4						0.012	**SSY1-15A**
—	—	2.46	0.13	0.25	0.013	0.08~0.18	0.015	**SSY1-16**
M4	4						0.014	**SSY1-16A**
—	—	2.95	0.16	0.30	0.017	0.08~0.18	0.019	**SSY1-18**
M4	4						0.018	**SSY1-18A**
—	—	3.45	0.20	0.35	0.021	0.08~0.18	0.024	**SSY1-20**
M4	4						0.024	**SSY1-20A**
M5	4						0.021	**SSY1-20B**
—	—	4.48	0.30	0.46	0.030	0.08~0.18	0.031	**SSY1-24**
M4	4						0.030	**SSY1-24A**
M5	4						0.028	**SSY1-24B**
—	—	4.74	0.32	0.48	0.033	0.08~0.18	0.033	**SSY1-25**
M4	4						0.032	**SSY1-25A**
—	—	5.55	0.41	0.57	0.042	0.08~0.18	0.039	**SSY1-28**
M4	4						0.038	**SSY1-28A**
—	—	6.08	0.47	0.62	0.048	0.08~0.18	0.061	**SSY1-30**
M4	4						0.060	**SSY1-30A**
M5	4						0.057	**SSY1-30B**
—	—	6.63	0.54	0.68	0.055	0.08~0.18	0.066	**SSY1-32**
M4	4						0.065	**SSY1-32A**
—	—	7.45	0.66	0.76	0.067	0.08~0.18	0.073	**SSY1-35**
M5	4						0.069	**SSY1-35A**
M4	4						0.066	**SSY1-35B**
—	—	7.73	0.70	0.79	0.071	0.08~0.18	0.076	**SSY1-36**
M5	4						0.072	**SSY1-36A**
M4	4						0.069	**SSY1-36B**
—	—	8.84	0.87	0.90	0.089	0.08~0.18	0.092	**SSY1-40**
M5	4						0.091	**SSY1-40A**
M4	4						0.088	**SSY1-40B**
—	—	10.3	1.12	1.05	0.11	0.08~0.18	0.11	**SSY1-45**
M5	4						0.11	**SSY1-45A**
—	—	11.1	1.28	1.13	0.13	0.08~0.18	0.12	**SSY1-48**
M5	4						0.12	**SSY1-48A**

[Caution on Secondary Operations]

① Please read "Caution on Performing Secondary Operations" (Page 32) 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.

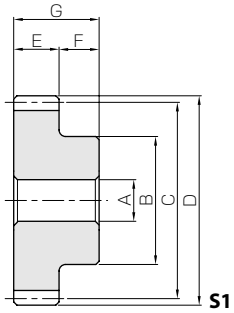
② When performing secondary operations, be aware of deflection and distortion as the tooth is thin in width; deflection might occur if heat treated.

③ Avoid performing secondary operations that narrow the tooth width as it affects precision and strength.

Drawing can be outputted from the Web Catalog as DXF files.

Steel Thin Face Spur Gears

Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) JIS grade 4 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	—
Tooth hardness	(less than 194HB)



Catalog No.	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total length	Keyway
				A_{H7}	B	C	D	E	F	G	Width×Depth
SSY1-50 **SSY1-50A**	*m*1	50	S1 S1T	8 8	28	50	52	6	8	14	— —
SSY1-55 **SSY1-55A**		55	S1 S1K	8 10	28	55	57	6	8	14	— 4 x 1.8
SSY1-56 **SSY1-56A**		56	S1 S1K	8 10	28	56	58	6	8	14	— 4 x 1.8
SSY1-60 **SSY1-60A** **SSY1-60B**		60	S1 S1K S1K	8 10 12	35	60	62	6	8	14	— 4 x 1.8 4 x 1.8
SSY1-64 **SSY1-64A**		64	S1 S1K	8 10	35	64	66	6	8	14	— 4 x 1.8
SSY1-65 **SSY1-65A**		65	S1 S1K	8 10	35	65	67	6	8	14	— 4 x 1.8
SSY1-70 **SSY1-70A**		70	S1 S1K	8 10	35	70	72	6	8	14	— 4 x 1.8
SSY1-72 **SSY1-72A**		72	S1 S1K	8 10	35	72	74	6	8	14	— 4 x 1.8
SSY1-75 **SSY1-75A**		75	S1 S1K	8 10	35	75	77	6	8	14	— 4 x 1.8
SSY1-80 **SSY1-80A**		80	S1 S1K	10 12	40 35	80	82	6	8	14	— 4 x 1.8
SSY1-85 **SSY1-85A**		85	S1 S1K	10 12	40 35	85	87	6	8	14	— 4 x 1.8
SSY1-90 **SSY1-90A**		90	S1 S1K	10 12	40 35	90	92	6	8	14	— 4 x 1.8
SSY1-95 **SSY1-95A**		95	S1 S1K	10 12	40 35	95	97	6	8	14	— 4 x 1.8
SSY1-96 **SSY1-96A**		96	S1 S1K	10 12	40 35	96	98	6	8	14	— 4 x 1.8
SSY1-100 **SSY1-100A**		100	S1 S1K	10 12	50 35	100	102	6	8	14	— 4 x 1.8
SSY1-110 **SSY1-110A**		110	S1 S1K	10 12	50 35	110	112	6	8	14	— 4 x 1.8
SSY1-120 **SSY1-120A**		120	S1 S1K	10 12	50 35	120	122	6	8	14	— 4 x 1.8

[Caution on Product Characteristics]

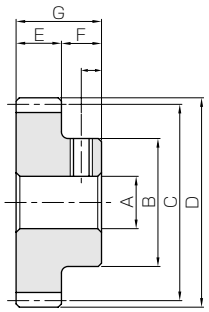
① Keyways are made according to JIS B1301 standards and Js9 tolerances. For products with a tapped hole, a set screw is included as an accessory.

② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 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.

* For products not categorized in our KHK Stock Gear series, custom gear production services with short lead times is available. For details see Page 8.

Steel Thin Face Spur Gears



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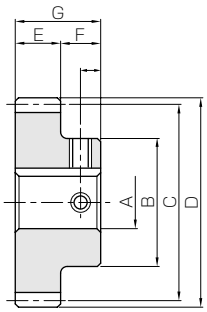


S1K

Set Screw		Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight	Catalog No.
Size	J	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)	
—	—	11.7	1.39	1.19	0.14	0.08~0.18	0.13	**SSY1-50**
M5	4						0.12	**SSY1-50A**
—	—	13.1	1.70	1.34	0.17	0.08~0.18	0.15	**SSY1-55**
M4	4						0.14	**SSY1-55A**
—	—	13.4	1.77	1.37	0.18	0.08~0.18	0.15	**SSY1-56**
M4	4						0.14	**SSY1-56A**
—	—	14.5	2.04	1.48	0.21	0.08~0.18	0.19	**SSY1-60**
M4	4						0.18	**SSY1-60A**
M4	4						0.18	**SSY1-60B**
—	—	15.7	2.34	1.60	0.24	0.08~0.18	0.21	**SSY1-64**
M4	4						0.20	**SSY1-64A**
—	—	16.0	2.41	1.63	0.25	0.08~0.18	0.21	**SSY1-65**
M4	4						0.21	**SSY1-65A**
—	—	17.4	2.82	1.78	0.29	0.08~0.18	0.24	**SSY1-70**
M4	4						0.23	**SSY1-70A**
—	—	18.0	2.99	1.84	0.30	0.08~0.18	0.25	**SSY1-72**
M4	4						0.24	**SSY1-72A**
—	—	18.9	3.26	1.93	0.33	0.08~0.18	0.26	**SSY1-75**
M4	4						0.26	**SSY1-75A**
—	—	20.3	3.74	2.07	0.38	0.08~0.18	0.31	**SSY1-80**
M4	4						0.28	**SSY1-80A**
—	—	21.8	4.25	2.22	0.43	0.08~0.18	0.34	**SSY1-85**
M4	4						0.31	**SSY1-85A**
—	—	23.3	4.79	2.37	0.49	0.08~0.18	0.37	**SSY1-90**
M4	4						0.35	**SSY1-90A**
—	—	24.7	5.37	2.52	0.55	0.08~0.18	0.40	**SSY1-95**
M4	4						0.38	**SSY1-95A**
—	—	25.0	5.49	2.55	0.56	0.08~0.18	0.41	**SSY1-96**
M4	4						0.39	**SSY1-96A**
—	—	26.2	5.98	2.67	0.61	0.08~0.18	0.48	**SSY1-100**
M4	4						0.42	**SSY1-100A**
—	—	29.1	7.31	2.97	0.75	0.08~0.18	0.56	**SSY1-110**
M4	4						0.49	**SSY1-110A**
—	—	32.1	8.80	3.27	0.90	0.08~0.18	0.65	**SSY1-120**
M4	4						0.58	**SSY1-120A**

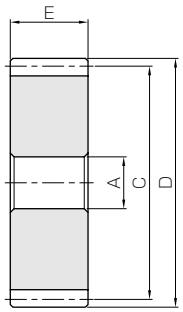
[Caution on Secondary Operations]

① Please read "Caution on Performing Secondary Operations" (Page 32) 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.

② When performing secondary operations, be aware of deflection and distortion as the tooth is thin in width; deflection might occur if heat treated.

③ Avoid performing secondary operations that narrow the tooth width as it affects precision and strength.

Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) JIS grade 4 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	—
Tooth hardness	(less than 194HB)



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Catalog No.	Module	No. of teeth	Shape	Bore	Pitch dia.	Outside dia.	Face width	Allowable torque (N·m)		Allowable torque (kgf·m)	
				A_{H7}	C	D	E	Bending strength	Surface durability	Bending strength	Surface durability
SSAY1-20		20	S5	6	20	22	6	3.45	0.20	0.35	0.021
SSAY1-24		24	S5	6	24	26	6	4.48	0.30	0.46	0.030
SSAY1-25		25	S5	6	25	27	6	4.74	0.32	0.48	0.033
SSAY1-28		28	S5	6	28	30	6	5.55	0.41	0.57	0.042
SSAY1-30		30	S5	6	30	32	6	6.08	0.47	0.62	0.048
SSAY1-32		32	S5	6	32	34	6	6.63	0.54	0.68	0.055
SSAY1-35		35	S5	6	35	37	6	7.45	0.66	0.76	0.067
SSAY1-36		36	S5	6	36	38	6	7.73	0.70	0.79	0.071
SSAY1-40		40	S5	6	40	42	6	8.84	0.87	0.90	0.089
SSAY1-45	***m*1**	45	S5	6	45	47	6	10.3	1.12	1.05	0.11
SSAY1-48		48	S5	6	48	50	6	11.1	1.28	1.13	0.13
SSAY1-50		50	S5	8	50	52	6	11.7	1.39	1.19	0.14
SSAY1-55		55	S5	8	55	57	6	13.1	1.70	1.34	0.17
SSAY1-56		56	S5	8	56	58	6	13.4	1.77	1.37	0.18
SSAY1-60		60	S5	8	60	62	6	14.5	2.04	1.48	0.21
SSAY1-70		70	S5	8	70	72	6	17.4	2.82	1.78	0.29
SSAY1-80		80	S5	10	80	82	6	20.3	3.74	2.07	0.38
SSAY1-100		100	S5	10	100	102	6	26.2	5.98	2.67	0.61

[Caution on Product Characteristics] ① The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
② 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.

＊ For products not categorized in our KHK Stock Gear series, custom gear production services with short lead times is available. For details see Page 8.

Backlash (mm)	Weight (kg)	Catalog No.
0.08~0.18	0.013	**SSAY1-20**
	0.020	**SSAY1-24**
	0.022	**SSAY1-25**
	0.028	**SSAY1-28**
	0.032	**SSAY1-30**
0.08~0.18	0.037	**SSAY1-32**
	0.044	**SSAY1-35**
	0.047	**SSAY1-36**
	0.058	**SSAY1-40**
	0.074	**SSAY1-45**
0.08~0.18	0.084	**SSAY1-48**
	0.090	**SSAY1-50**
	0.11	**SSAY1-55**
	0.11	**SSAY1-56**
	0.13	**SSAY1-60**
0.08~0.18	0.18	**SSAY1-70**
	0.23	**SSAY1-80**
	0.37	**SSAY1-100**

[Caution on Secondary Operations] ① Please read "Caution on Performing Secondary Operations" (Page 32) 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.
② When performing secondary operations, be aware of deflection and distortion as the tooth is thin in width; deflection might occur if heat treated.
③ Avoid performing secondary operations that narrow the tooth width as it affects precision and strength.

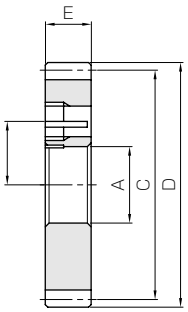
GCU-S Spur Gear Kit

Installment : Parallel axes gears (Two-stage)
Gear Type : Spur Gears
Gears : 2 units of SS1.5-16
2 units of PS1.5-22
Gear Ratio : 1.89
Weight : Approx. 1kg

The Gear Kit contains two-stage spur gears and allows speed increases / reductions, and includes the most commonly used combinations of gears.

Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) ＊ JIS grade 4 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	—
Tooth hardness	(less than 194HB)

＊ The gear grade listed is the value before clamping. The precision grade of products with a module of less than 0.8 is equivalent to the value shown in the table.



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Catalog No.	Module	No. of teeth	Shape	Bore	Pitch dia.	Outside dia.	Face width	Set Screw		Allowable torque (N·m)	
				A_{H7}	C	D	E	Size	J	Bending strength	Surface durability
SSAY0.8-28/K6	***m*0.8**	28	S5	6	22.4	24	6	M5	6.3	3.55	0.26
SSAY0.8-30/K6 /K8		30	S5	6 8	24	25.6	6	M5	6.3 7.3	3.89	0.30
SSAY0.8-32/K6 /K8		32	S5	6 8	25.6	27.2	6	M5	6.3 7.3	4.24	0.34
SSAY0.8-35/K6 /K8		35	S5	6 8	28	29.6	6	M5	6.3 7.3	4.77	0.41
SSAY0.8-36/K6 /K8		36	S5	6 8	28.8	30.4	6	M5	6.3 7.3	4.95	0.43
SSAY0.8-40/K6 /K8 /K10		40	S5	6 8 10	32	33.6	6	M5	6.3 7.3 8.3	5.66	0.54
SSAY0.8-45/K6 /K8 /K10		45	S5	6 8 10	36	37.6	6	M5	6.3 7.3 8.3	6.56	0.70
SSAY0.8-48/K6 /K8 /K10		48	S5	6 8 10	38.4	40	6	M5	6.3 7.3 8.3	7.11	0.80
SSAY0.8-50/K6 /K8 /K10		50	S5	6 8 10	40	41.6	6	M5	6.3 7.3 8.3	7.47	0.87
SSAY0.8-55/K6 /K8 /K10		55	S5	6 8 10	44	45.6	6	M5	6.3 7.3 8.3	8.39	1.06
SSAY0.8-56/K6 /K8 /K10		56	S5	6 8 10	44.8	46.4	6	M5	6.3 7.3 8.3	8.57	1.10
SSAY0.8-60/K6 /K8 /K10		60	S5	6 8 10	48	49.6	6	M5	6.3 7.3 8.3	9.30	1.28

[Caution on Product Characteristics]

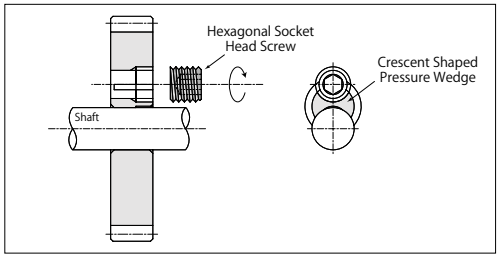
① For products with a tapped hole, a set screw is included.
② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
③ The backlash values shown in the table are the theoretical values for the backlash in the normal direction of a pair of identical gears in mesh.
④ The reference slipping torques shown in the table are experimentally obtained by attaching the gears to shafts with g6 tolerance and 0.4a surface finish.
⑤ Do not tighten the clamping screw without inserting a shaft, or the bore will be permanently deformed and will not accept a shaft.

Allowable torque (kgf·m)		Reference slipping torque (N·m)		Backlash (mm)	Weight (kg)	Catalog No.
Bending strength	Surface durability	Screw fastening torque	Ref. slipping torque			
0.36	0.026	2.8	2.4	0 ~ 0.10	0.017	**SSAY0.8-28/K6**
0.40	0.030	2.8	2.4 3.7	0 ~ 0.10	0.020 0.019	**SSAY0.8-30/K6** **/K8**
0.43	0.035	2.8	2.4 3.7	0 ~ 0.10	0.023 0.022	**SSAY0.8-32/K6** **/K8**
0.49	0.042	2.8	2.4 3.7	0 ~ 0.10	0.028 0.027	**SSAY0.8-35/K6** **/K8**
0.50	0.044	2.8	2.4 3.7	0 ~ 0.10	0.029 0.028	**SSAY0.8-36/K6** **/K8**
0.58	0.055	2.8	2.4 3.7 3.9	0 ~ 0.10	0.037 0.036 0.034	**SSAY0.8-40/K6** **/K8** **/K10**
0.67	0.071	2.8	2.4 3.7 3.9	0 ~ 0.10	0.047 0.046 0.044	**SSAY0.8-45/K6** **/K8** **/K10**
0.72	0.081	2.8	2.4 3.7 3.9	0 ~ 0.10	0.053 0.052 0.051	**SSAY0.8-48/K6** **/K8** **/K10**
0.76	0.089	2.8	2.4 3.7 3.9	0 ~ 0.10	0.058 0.057 0.055	**SSAY0.8-50/K6** **/K8** **/K10**
0.86	0.11	2.8	2.4 3.7 3.9	0 ~ 0.10	0.070 0.069 0.068	**SSAY0.8-55/K6** **/K8** **/K10**
0.87	0.11	2.8	2.4 3.7 3.9	0 ~ 0.10	0.073 0.072 0.071	**SSAY0.8-56/K6** **/K8** **/K10**
0.95	0.13	2.8	2.4 3.7 3.9	0 ~ 0.10	0.084 0.083 0.082	**SSAY0.8-60/K6** **/K8** **/K10**

[Caution on Secondary Operations] ① As these are finished products, avoid performing secondary operations on the bore, with the exception of adding a keyway.
② Perform secondary operations carefully as to not to distort the clamping groove.

■ How does the K-Clamp work?

The K-Clamp uses a crescent shaped piece, appropriate for the size of the shaft as the pressure wedge to secure the gear on the shaft.

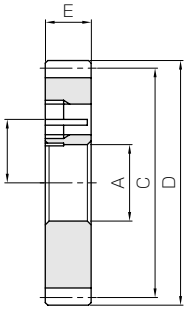


■ Application Hints

1. The slipping torque is affected by the fitting and clamping surface conditions. Remove as much lubricant as possible, and use the same size shaft as the bore, within h7 tolerances.
2. K-Clamp gears are suitable for relatively small gears in light loads with the bore size ranging between φ 6 and φ 12mm. The gear will slip on the shaft when the actual load exceeds the slipping torque. The use of a key in addition to the K-Clamp is recommended for heavier loads or large bores sizes.

Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) ∗ JIS grade 4 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	—
Tooth hardness	(less than 194HB)

∗ The gear grade listed is the value before clamping. The precision grade of products with a module of less than 0.8 is equivalent to the value shown in the table.



S5

Catalog No.	Module	No. of teeth	Shape	Bore	Pitch dia.	Outside dia.	Face width	Set Screw		Allowable torque (N·m)	
				A_{H7}	C	D	E	Size	J	Bending strength	Surface durability
SSAY1-24/K6		24	S5	6	24	26	6	M5	6.3	4.48	0.30
SSAY1-25/K6 /K8		25	S5	6 8	25	27	6	M5	6.3 7.3	4.74	0.32
SSAY1-28/K6 /K8 /K10		28	S5	6 8 10	28	30	6	M5	6.3 7.3 8.3	5.55	0.41
SSAY1-30/K6 /K8 /K10		30	S5	6 8 10	30	32	6	M5	6.3 7.3 8.3	6.08	0.47
SSAY1-32/K6 /K8 /K10		32	S5	6 8 10	32	34	6	M5	6.3 7.3 8.3	6.63	0.54
SSAY1-35/K6 /K8 /K10		35	S5	6 8 10	35	37	6	M5	6.3 7.3 8.3	7.45	0.66
SSAY1-36/K6 /K8 /K10		36	S5	6 8 10	36	38	6	M5	6.3 7.3 8.3	7.73	0.70
SSAY1-40/K6 /K8 /K10	***m*1**	40	S5	6 8 10	40	42	6	M5	6.3 7.3 8.3	8.84	0.87
SSAY1-45/K6 /K8 /K10		45	S5	6 8 10	45	47	6	M5	6.3 7.3 8.3	10.3	1.12
SSAY1-48/K6 /K8 /K10		48	S5	6 8 10	48	50	6	M5	6.3 7.3 8.3	11.1	1.28
SSAY1-50/K8 /K10 /K12		50	S5	8 10 12	50	52	6	M5 M5 M6	7.3 8.3 9.9	11.7	1.39
SSAY1-55/K8 /K10 /K12		55	S5	8 10 12	55	57	6	M5 M5 M6	7.3 8.3 9.9	13.1	1.70
SSAY1-56/K8 /K10 /K12		56	S5	8 10 12	56	58	6	M5 M5 M6	7.3 8.3 9.9	13.4	1.77
SSAY1-60/K8 /K10 /K12		60	S5	8 10 12	60	62	6	M5 M5 M6	7.3 8.3 9.9	14.5	2.04

[Caution on Product Characteristics]

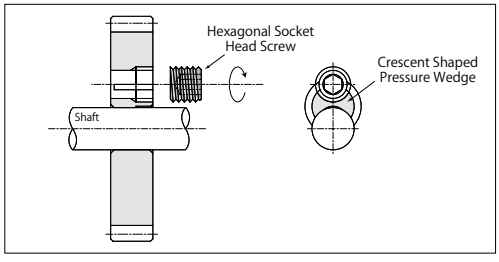
① For products with a tapped hole, a set screw is included.
② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
③ The backlash values shown in the table are the theoretical values for the backlash in the normal direction of a pair of identical gears in mesh.
④ The reference slipping torques shown in the table are experimentally obtained by attaching the gears to shafts with g6 tolerance and 0.4a surface finish.
⑤ Do not tighten the clamping screw without inserting a shaft, or the bore will be permanently deformed and will not accept a shaft.

Allowable torque (kgf·m)		Reference slipping torque (N·m)		Backlash (mm)	Weight (kg)	Catalog No.
Bending strength	Surface durability	Screw fastening torque	Ref. slipping torque			
0.46	0.030	2.8	2.4	0.08~0.18	0.020	**SSAY1-24/K6**
0.48	0.033	2.8 2.8	2.4 3.7	0.08~0.18	0.022 0.021	**SSAY1-25/K6** **/K8**
0.57	0.042	2.8 2.8 2.8	2.4 3.7 3.9	0.08~0.18	0.028 0.027 0.025	**SSAY1-28/K6** **/K8** **/K10**
0.62	0.048	2.8 2.8 2.8	2.4 3.7 3.9	0.08~0.18	0.032 0.031 0.030	**SSAY1-30/K6** **/K8** **/K10**
0.68	0.055	2.8 2.8 2.8	2.4 3.7 3.9	0.08~0.18	0.037 0.036 0.034	**SSAY1-32/K6** **/K8** **/K10**
0.76	0.067	2.8 2.8 2.8	2.4 3.7 3.9	0.08~0.18	0.044 0.043 0.042	**SSAY1-35/K6** **/K8** **/K10**
0.79	0.071	2.8 2.8 2.8	2.4 3.7 3.9	0.08~0.18	0.047 0.046 0.044	**SSAY1-36/K6** **/K8** **/K10**
0.90	0.089	2.8 2.8 2.8	2.4 3.7 3.9	0.08~0.18	0.058 0.057 0.055	**SSAY1-40/K6** **/K8** **/K10**
1.05	0.11	2.8 2.8 2.8	2.4 3.7 3.9	0.08~0.18	0.074 0.073 0.071	**SSAY1-45/K6** **/K8** **/K10**
1.13	0.13	2.8 2.8 2.8	2.4 3.7 3.9	0.08~0.18	0.084 0.083 0.082	**SSAY1-48/K6** **/K8** **/K10**
1.19	0.14	2.8 2.8 4	3.7 3.9 6.6	0.08~0.18	0.090 0.089 0.087	**SSAY1-50/K8** **/K10** **/K12**
1.34	0.17	2.8 2.8 4	3.7 3.9 6.6	0.08~0.18	0.11 0.11 0.11	**SSAY1-55/K8** **/K10** **/K12**
1.37	0.18	2.8 2.8 4	3.7 3.9 6.6	0.08~0.18	0.11 0.11 0.11	**SSAY1-56/K8** **/K10** **/K12**
1.48	0.21	2.8 2.8 4	3.7 3.9 6.6	0.08~0.18	0.13 0.13 0.13	**SSAY1-60/K8** **/K10** **/K12**

[Caution on Secondary Operations] ① As these are finished products, avoid performing secondary operations on the bore, with the exception of adding a keyway.
② Perform secondary operations carefully as to not to distort the clamping groove.

■ How does the K-Clamp work?

The K-Clamp uses a crescent shaped piece, appropriate for the size of the shaft as the pressure wedge to secure the gear on the shaft.



■ Application Hints

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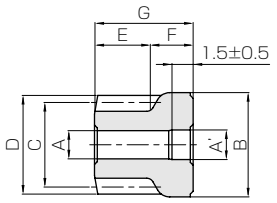
2. K-Clamp gears are suitable for relatively small gears in light loads with the bore size ranging between φ 6 and φ 12mm. The gear will slip on the shaft when the actual load exceeds the slipping torque. The use of a key in addition to the K-Clamp is recommended for heavier loads or large bores sizes.

Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) ＊ JIS grade 4 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	SMF5040(Equivalent to S45C)
Heat treatment	—
Tooth hardness	(70 ～ 95HRB)

＊ The precision grade of products with a module of less than 0.8 is equivalent to the value shown in the table.



S3

Catalog No.	Module	No. of teeth	Shape	Bore 1	Bore 2	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total length	Web thickness
				$A^{-0.005}_{-0.020}$	A'±0.1	B	C	D	E	F	G	H
LS0.5-12	***m*0.5**	12	S3	2	2.1	7.4	6	7	4	3	7	—
LS0.5-16		16	S3	2	2.1	9.4	8	9	4	3	7	—
LS0.5-20		20	S3	3	3.1	11.4	10	11	4	4	8	—
LS0.5-30		30	S1	3	3.1	9	15	16	3	4	7	—
LS0.5-50		50	S9	4	4.1	12	25	26	3	5	8	1.5
LS0.5-60		60	S9	4	4.1	12	30	31	3	5	8	1.5
LS0.5-70		70	S9	4	4.1	12	35	36	3	5	8	1.5
LS0.5-80		80	S9	4	4.1	12	40	41	3	5	8	1.5
LS0.8-12	***m*0.8**	12	S3	3	3.1	11.6	9.6	11.2	5	4	9	—
LS0.8-16		16	S1	3	3.1	8	12.8	14.4	4	4	8	—
LS0.8-20		20	S1	3	3.1	9	16	17.6	4	4	8	—
LS0.8-30		30	S1	4	4.1	12	24	25.6	4	5	9	—
LS0.8-50		50	S9	4	4.1	12	40	41.6	4	5	9	2

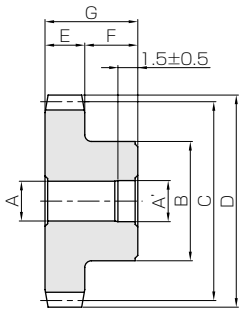
[Caution on Product Characteristics]

① Although the sintering process allows for the inclusion of oil to maintain lubricity, these gears have not been oil impregnated.
② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 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 Since the bore is finished with a minus tolerance, you can use a shaft with a force fit

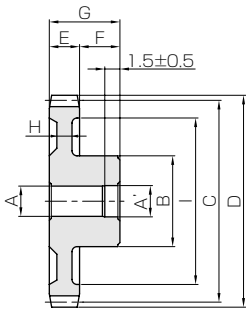
■ Characteristics of LS Sintered Steel Spur gears

1. Cost is minimized due to the elimination of machining and reduction in waste material.
2. Reliable, high precision sintered products (JIS N8 Class) maintain precision.
3. Being porous by oil-impregnated sintering, lubrication is maintained.

＊ For products not categorized in our KHK Stock Gear series, custom gear production services with short lead times is available. For details see Page 8.



S1



S9

Web O.D.	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight	Catalog No.
l	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(g)	
—	0.11	0.0078	0.011	0.0008	0.06~0.16	1.61	**LS0.5-12**
—	0.23	0.015	0.023	0.0015	0.06~0.16	2.84	**LS0.5-16**
—	0.32	0.023	0.032	0.0024	0.06~0.16	4.89	**LS0.5-20**
—	0.42	0.040	0.043	0.0040	0.10~0.20	5.40	**LS0.5-30**
21.5	0.81	0.11	0.082	0.012	0.12~0.24	11.5	**LS0.5-50**
26.5	1.00	0.17	0.10	0.017	0.12~0.24	14.2	**LS0.5-60**
31.5	1.20	0.23	0.12	0.024	0.12~0.24	17.3	**LS0.5-70**
36.5	1.41	0.31	0.14	0.032	0.12~0.24	20.8	**LS0.5-80**
—	0.36	0.026	0.037	0.0027	0.06~0.16	5.29	**LS0.8-12**
—	0.58	0.038	0.059	0.0039	0.06~0.16	4.84	**LS0.8-16**
—	0.81	0.060	0.083	0.0061	0.06~0.16	7.36	**LS0.8-20**
—	1.43	0.14	0.15	0.014	0.10~0.20	16.6	**LS0.8-30**
34.4	2.75	0.41	0.28	0.042	0.12~0.24	28.3	**LS0.8-50**

[Caution on Secondary Operations]

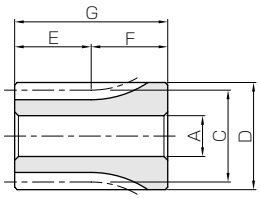
① Please read "Caution on Performing Secondary Operations" (Page 32) when performing modifications and/or secondary operations for safety concerns. KHK Quick-Mod Gears, the KHK's system for quick modification of KHK stock gears is also available.

② Avoid performing secondary operations that narrow the tooth width as it affects precision and strength.

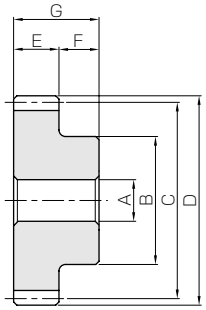
③The rust prevention process involves treating the gears with steam (in effect, creating surface oxidation). A black oxide treatment cannot be done on these gears.

Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) * JIS grade 4 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	SUS303
Heat treatment	—
Tooth hardness	(less than 187HB)
Face width (E)	10
Screw offset (J)	5

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



S3



S1

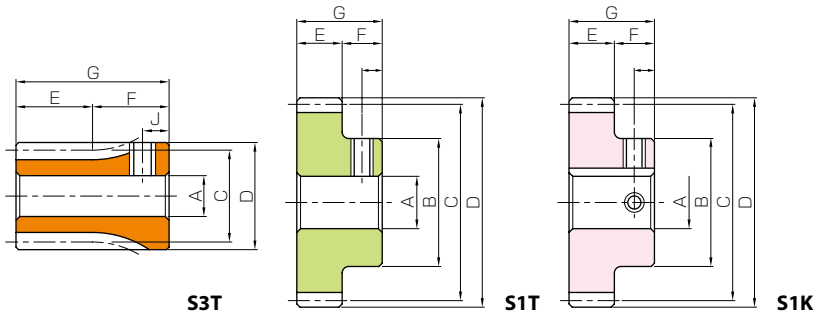
Catalog No.	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Hub width	Total length	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight
			A_{H7}	B	C	D	F	G	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)
SUS1-15	15	S3	8	17	15	17	20	30	2.04	0.12	0.21	0.013	0.08~0.18	0.037
SUS1-16	16			18	16	18			2.26	0.14	0.23	0.015		0.044
SUS1-18	18			20	18	20			2.71	0.18	0.28	0.019		0.057
SUS1-20	20	S1		16	20	22	10	20	3.18	0.23	0.32	0.024		0.032
SUS1-22	22			18	22	24			3.65	0.29	0.37	0.029		0.042
SUS1-24	24			20	24	26			4.13	0.35	0.42	0.036		0.052
SUS1-25	25			20	25	27			4.37	0.38	0.45	0.039		0.055
SUS1-28	28			23	28	30			5.11	0.48	0.52	0.049		0.073
SUS1-30	30			25	30	32			5.6	0.56	0.57	0.057		0.086
SUS1-32	32			26	32	34			6.11	0.64	0.62	0.066		0.096
SUS1-35	35			26	35	37			6.87	0.78	0.70	0.079		0.11
SUS1-36	36			28	36	38			7.12	0.82	0.73	0.084		0.12
SUS1-40	40		10	35	40	42			8.15	1.03	0.83	0.11		0.16
SUS1-42	42			35	42	44			8.66	1.14	0.88	0.12		0.17
SUS1-45	45			35	45	47			9.44	1.32	0.96	0.13		0.19
SUS1-48	48			35	48	50			10.2	1.51	1.04	0.15		0.20
SUS1-50	50			35	50	52			10.8	1.65	1.10	0.17		0.22
SUS1-55	55			40	55	57			12.1	2.01	1.23	0.21		0.27
SUS1-56	56			40	56	58			12.3	2.09	1.26	0.21		0.28
SUS1-60	60			40	60	62			13.4	2.42	1.37	0.25		0.31
SUS1-64	64			45	64	66			14.5	2.77	1.47	0.28		0.36
SUS1-70	70			50	70	72			16.1	3.34	1.64	0.34		0.44
SUS1-75	75			55	75	77			17.4	3.86	1.77	0.39		0.52
SUS1-80	80			60	80	82			18.7	4.42	1.91	0.45		0.60
SUS1-90	90			60	90	92			21.4	5.67	2.19	0.58		0.70
SUS1-100	100		12	60	100	102			24.1	7.08	2.46	0.72		0.82
SUS1-120	120			60	120	122			29.6	10.4	3.01	1.06		1.09

[Caution on Product Characteristics]
① The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
② 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.

[Caution on Secondary Operations]
① Please read "Caution on Performing Secondary Operations" (Page 32) 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.
②Avoid performing secondary operations that narrow the tooth width as it affects precision and strength.

J Series

Stainless Steel Spur Gears



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	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 No.	M5	M4						M5				M6			M8	
SUS1-15 J BORE																
SUS1-16 J BORE																
SUS1-18 J BORE																
SUS1-20 J BORE																
SUS1-22 J BORE																
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SUS1-64 J BORE																
SUS1-70 J BORE																
SUS1-75 J BORE																
SUS1-80 J BORE																
SUS1-90 J BORE																
SUS1-100 J BORE																
SUS1-120 J BORE																

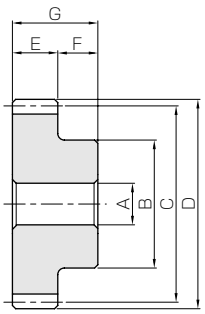
[Caution on J series]

① 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.
② 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.
③ Keyways are made according to JIS B1301 standards, Js9 tolerance.
④ Certain products which would otherwise have a very long tapped hole are conterbored to reduce the length of the tap.
⑤ For products having a tapped hole, a set screw is included.
⑥ The use of S3T and S1T shaped set screws for fastening gears to a shaft are only applicable to light load usage. For secure fastening, please use dowel pins, in combination.

Stainless Steel Spur Gears

Specifications		
Precision grade	JIS grade N8 (JIS B1702-1: 1998) * JIS grade 4 (JIS B1702: 1976)	
Gear teeth	Standard full depth	
Pressure angle	20°	
Material	SUS303	
Heat treatment	—	
Tooth hardness	(less than 187HB)	
Module	*m* 1.5	*m* 2
Face width (E)	15	20
Screw offset (J)	7	8

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



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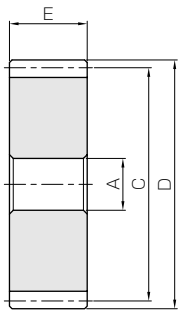


S5

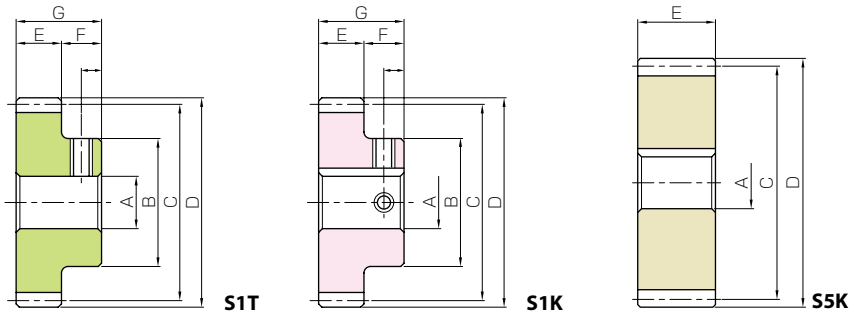
Catalog No.	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Hub width	Total length	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight
			A_{H7}	B	C	D	F	G	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)
SUS1.5-15	15	S1	8	18	22.5	25.5	14	16	6.89	0.43	0.70	0.044	0.10~0.22	0.063
SUS1.5-16	16			20	24	27			7.63	0.50	0.78	0.051		0.076
SUS1.5-18	18			22	27	30			9.16	0.65	0.93	0.066		0.097
SUS1.5-20	20			24	30	33			10.7	0.82	1.09	0.084		0.12
SUS1.5-22	22			26	33	36			12.3	1.01	1.26	0.10	0.12~0.26	0.15
SUS1.5-24	24			28	36	39			13.9	1.23	1.42	0.13		0.17
SUS1.5-25	25			30	37.5	40.5			14.8	1.35	1.50	0.14		0.20
SUS1.5-28	28		10	36	42	45			17.2	1.71	1.76	0.17		0.26
SUS1.5-30	30			38	45	48			18.9	1.98	1.93	0.20		0.29
SUS1.5-32	32			40	48	51			20.6	2.27	2.10	0.23		0.33
SUS1.5-35	35			42	52.5	55.5			23.2	2.74	2.36	0.28		0.39
SUS1.5-36	36			45	54	57			24.0	2.91	2.45	0.30		0.42
SUS1.5-40	40			45	60	63			27.5	3.62	2.80	0.37		0.48
SUS1.5-42	42		12	45	63	66			29.2	4.01	2.98	0.41	0.14~0.32	0.51
SUS1.5-45	45			45	67.5	70.5			31.9	4.64	3.25	0.47		0.57
SUS1.5-48	48			45	72	75			34.5	5.31	3.52	0.54		0.62
SUS1.5-50	50			50	75	78			36.3	5.79	3.70	0.59		0.71
SUS1.5-55	55			55	82.5	85.5			40.7	7.08	4.15	0.72		0.86
SUS1.5-56	56			55	84	87			41.6	7.36	4.24	0.75		0.88
SUS1.5-60	60			60	90	93			45.2	8.51	4.61	0.87		1.01
SUS1.5-64	64		15	60	96	99			48.8	9.75	4.97	0.99		1.12
SUS1.5-70	70			70	105	108			54.2	11.8	5.52	1.20		1.39
SUS1.5-75	75			70	112.5	115.5			58.7	13.6	5.99	1.39		1.54
SUS1.5-80	80			80	120	123			63.2	15.6	6.45	1.59		1.83
SUS1.5-90	90			80	135	138			72.3	20.1	7.37	2.05	0.18~0.38	2.18
SUS1.5-100	100			80	150	153			81.4	25.2	8.30	2.57		2.58
SUS2-15	15		12	24	30	34	29	36	16.3	1.05	1.67	0.11	0.12~0.26	0.13
SUS2-16	16			26	32	36			18.1	1.22	1.85	0.12		0.16
SUS2-18	18			30	36	40			21.7	1.59	2.21	0.16		0.22
SUS2-20	20			32	40	44			25.4	2.01	2.59	0.20		0.26
SUS2-22	22			36	44	48			29.2	2.48	2.98	0.25	0.14~0.30	0.33
SUS2-24	24			38	48	52			33.0	3.01	3.37	0.31		0.39
SUS2-25	25			40	50	54			35.0	3.30	3.57	0.34		0.43
SUS2-28	28			45	56	60			40.9	4.18	4.17	0.43		0.55
SUS2-30	30			50	60	64			44.8	4.83	4.57	0.49		0.65
SUSA2-32	32	S5	15	—	64	68	—	—	48.9	5.53	4.98	0.56	0.18~0.36	0.47
SUSA2-35	35				70	74			54.9	6.67	5.60	0.68		0.57
SUSA2-36	36				72	76			57.0	7.08	5.81	0.72		0.61
SUSA2-40	40				80	84			65.2	8.85	6.65	0.90		0.76
SUSA2-42	42				84	88			69.3	9.81	7.07	1.00		0.84
SUSA2-45	45				90	94			75.5	11.4	7.70	1.16		0.96
SUSA2-48	48				96	100			81.8	13.0	8.34	1.33		1.10
SUSA2-50	50				100	104			86.0	14.2	8.77	1.44		1.20
SUSA2-55	55				110	114			96.5	17.3	9.84	1.77		1.45
SUSA2-56	56				112	116			98.7	18.0	10.1	1.83		1.51
SUSA2-60	60				120	124			107	20.8	10.9	2.13		1.74
SUSA2-64	64				128	132			116	23.9	11.8	2.44		1.98
SUSA2-70	70				140	144			128	29.0	13.1	2.96		2.37

[Caution on Product Characteristics] ① The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
② 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.

[Caution on Secondary Operations] ① Please read "Caution on Performing Secondary Operations" (Page 32) 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.
②Avoid performing secondary operations that narrow the tooth width as it affects precision and strength.

J Series

Stainless Steel Spur Gears



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	8	10	12	14	15	16	17	18	19	20	22	25	28	30	32	35	40	45	50
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	14 x 3.8	
Catalog No.	M5	M4						M5				M6			M8			M10	–
SUS1.5-15 J BORE																			
SUS1.5-16 J BORE																			
SUS1.5-18 J BORE																			
SUS1.5-20 J BORE																			
SUS1.5-22 J BORE																			
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SUSA2-60 J BORE																			
SUSA2-64 J BORE																			
SUSA2-70 J BORE																			

[Caution on J series]

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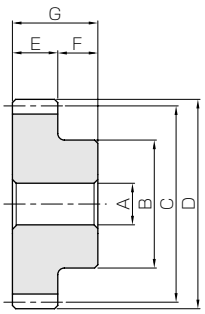
Please allow additional shipping time to get to your local distributor.
② Number of products we can process for one order is 1 to 20 units. For quantities of 21 or more pieces, we need to quote price and lead time.
③ Keyways are made according to JIS B1301 standards, Js9 tolerance.
④ Certain products which would otherwise have a very long tapped hole are conterbored to reduce the length of the tap.
⑤ For products having a tapped hole, a set screw is included.
⑥ The use of S1T and S1T shaped set screws for fastening gears to a shaft are only applicable to light load usage. For secure fastening, please use dowel pins, in combination.

Stainless Steel Spur Gears

Specifications			
Precision grade	JIS grade N8 (JIS B1702-1: 1998) * JIS grade 4 (JIS B1702: 1976)		
Gear teeth	Standard full depth		
Pressure angle	20°		
Material	SUS303		
Heat treatment	—		
Tooth hardness	(less than 187HB)		
Module	*m* 2.5	*m* 3	*m* 4
Face width (E)	25	30	40
Screw offset (J)	9	10	12.5

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



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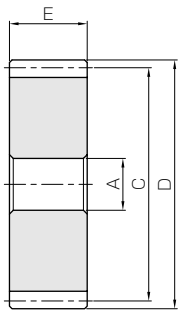


S5

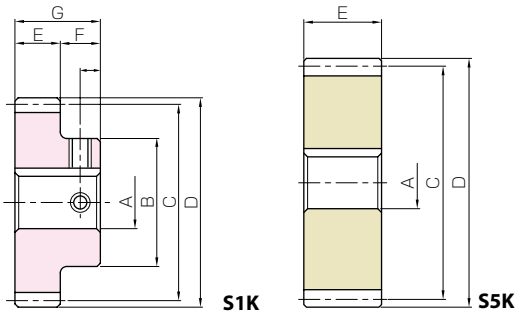
Catalog No.	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Hub width	Total length	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight
			A_{H7}	B	C	D	F	G	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)
SUS2.5-15	15	S1	15	30	37.5	42.5	18	43	31.9	2.11	3.25	0.21	0.14~0.28	0.26
SUS2.5-16	16			32	40	45			35.3	2.44	3.6	0.25		0.30
SUS2.5-18	18			38	45	50			42.4	3.18	4.32	0.32		0.41
SUS2.5-20	20			40	50	55			49.6	4.02	5.06	0.41		0.50
SUS2.5-22	22			44	55	60			57.0	4.96	5.81	0.51	0.16~0.34	0.62
SUS2.5-24	24			48	60	65			64.5	6.01	6.58	0.61		0.75
SUS2.5-25	25			50	62.5	67.5			68.3	6.58	6.96	0.67		0.81
SUS2.5-28	28			60	70	75			79.8	8.34	8.14	0.85		1.09
SUS2.5-30	30			65	75	80			87.6	9.65	8.93	0.98		1.27
SUSA2.5-32	32	S5		—	80	85	—	—	95.4	11.1	9.73	1.13		0.95
SUSA2.5-35	35				87.5	92.5			107	13.4	10.9	1.36		1.14
SUSA2.5-36	36				90	95			111	14.2	11.3	1.45		1.21
SUSA2.5-40	40		20		100	105			127	17.7	13.0	1.81		1.47
SUSA2.5-42	42				105	110			135	19.6	13.8	2.00	0.18~0.40	1.63
SUSA2.5-45	45				112.5	117.5			148	22.7	15.0	2.31		1.88
SUSA2.5-48	48				120	125			160	26.1	16.3	2.66		2.14
SUSA2.5-50	50				125	130			168	28.4	17.1	2.90		2.33
SUSA2.5-55	55				137.5	142.5			189	34.9	19.2	3.56		2.83
SUSA2.5-56	56				140	145			193	36.2	19.6	3.70		2.94
SUSA2.5-60	60				150	155			209	42.0	21.3	4.28		3.38
SUSA2.5-64	64				160	165			226	48.2	23.0	4.91		3.86
SUS3-15	15	S1	15	36	45	51	20	50	55.1	3.71	5.62	0.38	0.14~0.32	0.46
SUS3-16	16			38	48	54			61.1	4.29	6.23	0.44		0.53
SUS3-18	18			40	54	60			73.3	5.59	7.47	0.57		0.66
SUS3-20	20			50	60	66			85.8	7.07	8.74	0.72		0.90
SUS3-22	22			54	66	72			98.5	8.73	10.0	0.89	0.18~0.38	1.09
SUS3-24	24		20	58	72	78			111	10.6	11.4	1.08		1.30
SUS3-25	25			60	75	81			118	11.6	12.0	1.18		1.35
SUS3-28	28			70	84	90			138	14.7	14.1	1.50		1.77
SUS3-30	30			75	90	96			151	17.0	15.4	1.74		2.06
SUSA3-32	32	S5		—	96	102	—	—	165	19.5	16.8	1.99		1.62
SUSA3-35	35				105	111			185	23.6	18.9	2.40		1.95
SUSA3-36	36				108	114			192	25.0	19.6	2.55		2.07
SUSA3-40	40		25		120	126			220	31.3	22.4	3.19		2.53
SUSA3-42	42				126	132			234	34.7	23.9	3.54	0.20~0.44	2.80
SUSA3-45	45				135	141			255	40.2	26.0	4.10		3.23
SUSA3-48	48				144	150			276	46.2	28.2	4.71		3.70
SUSA3-50	50				150	156			290	50.4	29.6	5.14		4.02
SUSA3-55	55				165	171			326	61.7	33.2	6.30		4.89
SUSA3-56	56				168	174			333	64.1	33.9	6.54		5.07
SUSA3-60	60				180	186			362	74.3	36.9	7.58		5.84
SUS4-15	15	S1	20	45	60	68	25	65	131	9.06	13.3	0.92	0.18~0.38	1.03
SUS4-20	20			65	80	88			203	17.3	20.7	1.76		2.06
SUS4-25	25			84	100	108			280	28.3	28.5	2.89		3.37
SUS4-30	30			100	120	128			359	41.7	36.6	4.25	0.20~0.44	4.90
SUSA4-40	40	S5	30	—	160	168	—	—	521	77.1	53.2	7.86		6.05
SUSA4-50	50				200	208			573	103	58.5	10.5	0.24~0.52	9.58

[Caution on Product Characteristics]
① The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
② 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.

[Caution on Secondary Operations]
① Please read "Caution on Performing Secondary Operations" (Page 32) 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.
②Avoid performing secondary operations that narrow the tooth width as it affects precision and strength.

J Series

Stainless Steel Spur Gears



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

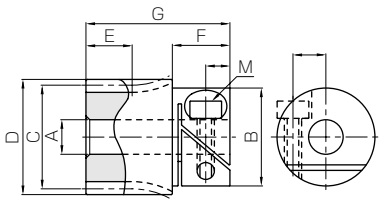
Bore H7	✻ The product shapes of J Series items are identified by background color.														
Keyway Js9	15	16	17	18	19	20	22	25	28	30	32	35	40	45	50
Screw size	5 × 2.3			6 × 2.8				8 × 3.3			10 × 3.3		12 × 3.3	14 × 3.8	
Catalog No.	M4			M5				M6			M8			M10	–
SUS2.5-15 J BORE															
SUS2.5-16 J BORE															
SUS2.5-18 J BORE															
SUS2.5-20 J BORE															
SUS2.5-22 J BORE															
SUS2.5-24 J BORE															
SUS2.5-25 J BORE															
SUS2.5-28 J BORE															
SUS2.5-30 J BORE															
SUSA2.5-32 J BORE															
SUSA2.5-35 J BORE															
SUSA2.5-36 J BORE															
SUSA2.5-40 J BORE															
SUSA2.5-42 J BORE															
SUSA2.5-45 J BORE															
SUSA2.5-48 J BORE															
SUSA2.5-50 J BORE															
SUSA2.5-55 J BORE															
SUSA2.5-56 J BORE															
SUSA2.5-60 J BORE															
SUSA2.5-64 J BORE															
SUS3-15 J BORE															
SUS3-16 J BORE															
SUS3-18 J BORE															
SUS3-20 J BORE															
SUS3-22 J BORE															
SUS3-24 J BORE															
SUS3-25 J BORE															
SUS3-28 J BORE															
SUS3-30 J BORE															
SUSA3-32 J BORE															
SUSA3-35 J BORE															
SUSA3-36 J BORE															
SUSA3-40 J BORE															
SUSA3-42 J BORE															
SUSA3-45 J BORE															
SUSA3-48 J BORE															
SUSA3-50 J BORE															
SUSA3-55 J BORE															
SUSA3-56 J BORE															
SUSA3-60 J BORE															
SUS4-15 J BORE															
SUS4-20 J BORE															
SUS4-25 J BORE															
SUS4-30 J BORE															
SUSA4-40 J BORE															
SUSA4-50 J BORE															

[Caution on J series]

① 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.
② 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.
③ Keyways are made according to JIS B1301 standards, Js9 tolerance.
④ Certain products which would otherwise have a very long tapped hole are conterbored to reduce the length of the tap.
⑤ For products having a tapped hole, a set screw is included.

Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) ＊ JIS grade 4 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	SUS303
Heat treatment	—
Tooth hardness	less than 187HB

＊ The gear grade listed is the value before clamping. The precision grade of products with a module of less than 0.8 is equivalent to the value shown in the table.



S3

Catalog No.	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total length	Cap screw dimensions		
				A_{H7}	B	C	D	E	F	G	M	J	K
SUSL0.5-16		16	S3	4	14	8	9	7	8	22	M2.5	3.3	4.4
SUSL0.5-18		18	S3	4	14	9	10	7	8	22	M2.5	3.3	4.4
SUSL0.5-20		20	S3	4	14	10	11	7	8	22	M2.5	3.3	4.4
SUSL0.5-24		24	S3	5	14	12	13	7	8	22	M2.5	3.3	4.4
SUSL0.5-25		25	S3	5	14	12.5	13.5	7	8	22	M2.5	3.3	4.4
SUSL0.5-28		28	S3	5	14	14	15	7	8	22	M2.5	3.3	4.4
SUSL0.5-30		30	S3	5	14	15	16	7	8	22	M2.5	3.3	4.4
SUSL0.5-32		32	S3	6	17	16	17	5	10	15	M3	4.5	5.3
SUSL0.5-36		36	S3	6	17	18	19	5	10	15	M3	4.5	5.3
SUSL0.5-40		40	S1	6	17	20	21	5	10	15	M3	4.5	5.3
SUSL0.5-45		45	S1	6	17	22.5	23.5	5	10	15	M3	4.5	5.3
SUSL0.5-48		48	S1	6	17	24	25	5	10	15	M3	4.5	5.3
SUSL0.5-50		50	S1	6	17	25	26	5	10	15	M3	4.5	5.3
SUSL0.5-54	***m*0.5**	54	S1	6	17	27	28	5	10	15	M3	4.5	5.3
SUSL0.5-56		56	S1	6	17	28	29	5	10	15	M3	4.5	5.3
SUSL0.5-60		60	S1	8	17	30	31	5	10	15	M3	4.5	6
SUSL0.5-64		64	S1	8	17	32	33	5	10	15	M3	4.5	6
SUSL0.5-70		70	S1	8	17	35	36	5	10	15	M3	4.5	6
SUSL0.5-72		72	S1	8	17	36	37	5	10	15	M3	4.5	6
SUSL0.5-75		75	S1	8	17	37.5	38.5	5	10	15	M3	4.5	6
SUSL0.5-80		80	S1	10	24	40	41	5	14	19	M4	5.3	7.7
SUSL0.5-90		90	S1	10	24	45	46	5	14	19	M4	5.3	7.7
SUSL0.5-96		96	S1	10	24	48	49	5	14	19	M4	4.9	8
SUSL0.5-100		100	S1	10	24	50	51	5	14	19	M4	4.9	8
SUSL0.5-112		112	S1	10	24	56	57	5	14	19	M4	4.9	8
SUSL0.5-120		120	S1	10	24	60	61	5	14	19	M4	4.9	8
SUSL0.8-14		14	S3	4	14	11.2	12.8	7	8	22	M2.5	3.3	4.4
SUSL0.8-15		15	S3	4	14	12	13.6	7	8	22	M2.5	3.3	4.4
SUSL0.8-16		16	S3	4	14	12.8	14.4	7	8	22	M2.5	3.3	4.4
SUSL0.8-18		18	S3	4	14	14.4	16	7	8	22	M2.5	3.3	4.4
SUSL0.8-20		20	S1	4	14	16	17.6	5	8	13	M2.5	3.3	4.4
SUSL0.8-22	***m*0.8**	22	S1	4	14	17.6	19.2	5	8	13	M2.5	3.3	4.4
SUSL0.8-24		24	S1	5	14	19.2	20.8	5	8	13	M2.5	3.3	4.4
SUSL0.8-25		25	S1	5	14	20	21.6	5	8	13	M2.5	3.3	4.4
SUSL0.8-28		28	S1	5	14	22.4	24	5	8	13	M2.5	3.3	4.4
SUSL0.8-30		30	S1	5	14	24	25.6	5	8	13	M2.5	3.3	4.4

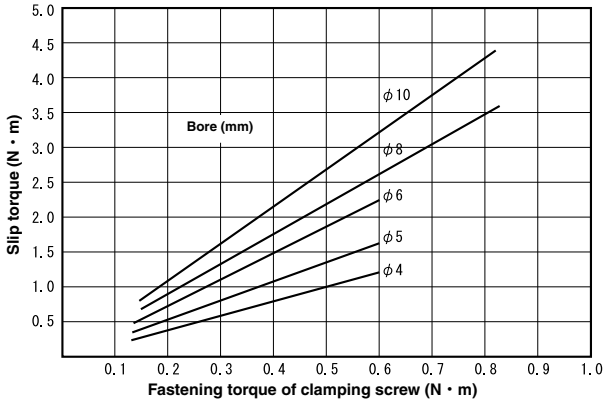
[Caution on Product Characteristics]

① The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
② 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.
③ Fairloc Hub Gears are attached to the shaft by a friction coupling. Recommended shaft tolerances are g6, h6 and h7. Torque slippage should be considered when making a selection.
④ Do not tighten the clamping screw without inserting a shaft, or the bore will be permanently deformed and will not accept a shaft
⑤ The following products are gear press-fitted into a hub : SUSL0.5 with 96 teeth or more, SUSL0.8 with 60 teeth or more. Also, some of the hubs might slightly differ in shape as shown in the diagram.

■ Fastening torque vs. Slipping torque

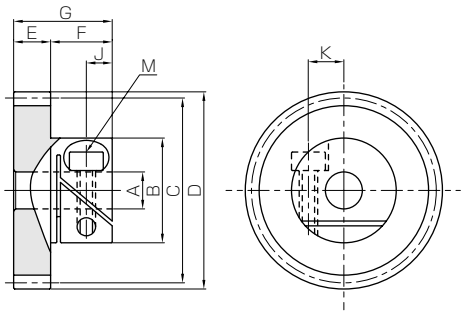
The slipping torque which is dependent on the fastening torque can sometimes be less than the gear strength. Please use caution in selecting. The chart on the right shows the relationship between the slipping torque and the fastening torque.

■ Fastening torque vs. Slipping torque



※ Data supplied by Designatronics Inc.

Stainless Steel Fairloc Hub Spur Gears



S1

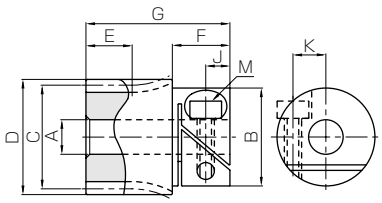
Allowable torque (N·m)		Allowable torque (kgf·m)		Ref. Slipping torque / Recommended fastening torque (N·m)	Backlash (mm)	Weight (kg)	Catalog No.
Bending strength	Surface durability	Bending strength	Surface durability				
0.40	0.023	0.04	0.0023	1.20 / 0.60	0~0.10	0.012	**SUSL0.5-16**
0.47	0.03	0.048	0.0031	1.20 / 0.60	0~0.10	0.013	**SUSL0.5-18**
0.56	0.038	0.057	0.0039	1.20 / 0.60	0~0.10	0.015	**SUSL0.5-20**
0.72	0.056	0.074	0.0057	1.60 / 0.60	0~0.10	0.018	**SUSL0.5-24**
0.76	0.061	0.078	0.0062	1.60 / 0.60	0~0.10	0.019	**SUSL0.5-25**
0.89	0.079	0.091	0.0080	1.60 / 0.60	0~0.10	0.022	**SUSL0.5-28**
0.98	0.091	0.10	0.0093	1.60 / 0.60	0~0.10	0.025	**SUSL0.5-30**
0.76	0.076	0.078	0.0077	2.25 / 0.60	0~0.10	0.021	**SUSL0.5-32**
0.89	0.096	0.091	0.0098	2.25 / 0.60	0~0.10	0.023	**SUSL0.5-36**
1.02	0.12	0.10	0.012	2.25 / 0.60	0~0.10	0.025	**SUSL0.5-40**
1.18	0.15	0.12	0.016	2.25 / 0.60	0~0.10	0.029	**SUSL0.5-45**
1.28	0.17	0.13	0.018	2.25 / 0.60	0~0.10	0.031	**SUSL0.5-48**
1.34	0.19	0.14	0.019	2.25 / 0.60	0~0.10	0.032	**SUSL0.5-50**
1.48	0.22	0.15	0.023	2.25 / 0.60	0~0.10	0.035	**SUSL0.5-54**
1.54	0.24	0.16	0.025	2.25 / 0.60	0~0.10	0.037	**SUSL0.5-56**
1.67	0.28	0.17	0.029	3.45 / 0.80	0~0.10	0.038	**SUSL0.5-60**
1.81	0.32	0.18	0.033	3.45 / 0.80	0~0.10	0.042	**SUSL0.5-64**
2.01	0.39	0.20	0.04	3.45 / 0.80	0~0.10	0.048	**SUSL0.5-70**
2.07	0.41	0.21	0.042	3.45 / 0.80	0~0.10	0.050	**SUSL0.5-72**
2.17	0.45	0.22	0.046	3.45 / 0.80	0~0.10	0.054	**SUSL0.5-75**
2.34	0.51	0.24	0.053	4.30 / 0.80	0~0.10	0.084	**SUSL0.5-80**
2.68	0.66	0.27	0.067	4.30 / 0.80	0~0.10	0.097	**SUSL0.5-90**
2.88	0.76	0.29	0.077	4.30 / 0.80	0~0.10	0.11	**SUSL0.5-96**
3.02	0.82	0.31	0.084	4.30 / 0.80	0~0.10	0.11	**SUSL0.5-100**
3.42	1.05	0.35	0.11	4.30 / 0.80	0~0.10	0.13	**SUSL0.5-112**
3.69	1.21	0.38	0.12	4.30 / 0.80	0~0.10	0.15	**SUSL0.5-120**
0.82	0.048	0.083	0.0049	1.20 / 0.60	0~0.10	0.017	**SUSL0.8-14**
0.92	0.056	0.093	0.0057	1.20 / 0.60	0~0.10	0.019	**SUSL0.8-15**
1.01	0.065	0.10	0.0066	1.20 / 0.60	0~0.10	0.021	**SUSL0.8-16**
1.22	0.083	0.12	0.0085	1.20 / 0.60	0~0.10	0.024	**SUSL0.8-18**
1.02	0.076	0.10	0.0077	1.20 / 0.60	0~0.10	0.015	**SUSL0.8-20**
1.17	0.091	0.12	0.0093	1.20 / 0.60	0~0.10	0.017	**SUSL0.8-22**
1.32	0.11	0.13	0.011	1.60 / 0.60	0~0.10	0.018	**SUSL0.8-24**
1.40	0.12	0.14	0.012	1.60 / 0.60	0~0.10	0.019	**SUSL0.8-25**
1.63	0.15	0.17	0.015	1.60 / 0.60	0~0.10	0.022	**SUSL0.8-28**
1.79	0.17	0.18	0.018	1.60 / 0.60	0~0.10	0.024	**SUSL0.8-30**

[Caution on Secondary Operations] ① Perform secondary operations carefully as to not distort the groove for clamping.

Stainless Steel Fairloc Hub Spur Gears

Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) ＊ JIS grade 4 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	SUS303
Heat treatment	—
Tooth hardness	(less than 187HB)

＊ The gear grade listed is the value before clamping. The precision grade of products with a module of less than 0.8 is equivalent to the value shown in the table.



S3

Catalog No.	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total length	Cap screw dimensions		
				A_{H7}	B	C	D	E	F	G	M	J	K
SUSL0.8-32		32	S1	5	14	25.6	27.2	5	8	13	M2.5	3.3	4.4
SUSL0.8-36		36	S1	6	17	28.8	30.4	5	10	15	M3	4.5	5.3
SUSL0.8-40		40	S1	6	17	32	33.6	5	10	15	M3	4.5	5.3
SUSL0.8-45		45	S1	6	17	36	37.6	5	10	15	M3	4.5	5.3
SUSL0.8-48		48	S1	6	17	38.4	40	5	10	15	M3	4.5	5.3
SUSL0.8-50		50	S1	6	17	40	41.6	5	10	15	M3	4.5	5.3
SUSL0.8-54		54	S1	6	17	43.2	44.8	5	10	15	M3	4.5	5.3
SUSL0.8-56	***m*0.8**	56	S1	6	17	44.8	46.4	5	10	15	M3	4.5	5.3
SUSL0.8-60		60	S1	8	17	48	49.6	5	10	15	M3	4.5	6
SUSL0.8-64		64	S1	8	17	51.2	52.8	5	10	15	M3	4.5	6
SUSL0.8-72		72	S1	8	17	57.6	59.2	5	10	15	M3	4.5	6
SUSL0.8-80		80	S1	10	24	64	65.6	5	14	19	M4	4.9	8
SUSL0.8-90		90	S1	10	24	72	73.6	5	14	19	M4	4.9	8
SUSL0.8-100		100	S1	10	24	80	81.6	5	14	19	M4	4.9	8
SUSL1-14		14	S3	6	17	14	16	8	10	25	M3	4.5	5.3
SUSL1-15		15	S3	6	17	15	17	8	10	25	M3	4.5	5.3
SUSL1-16		16	S3	6	17	16	18	8	10	25	M3	4.5	5.3
SUSL1-18		18	S3	6	17	18	20	8	10	25	M3	4.5	5.3
SUSL1-20		20	S1	6	17	20	22	6	10	16	M3	4.5	5.3
SUSL1-24		24	S1	6	17	24	26	6	10	16	M3	4.5	5.3
SUSL1-25		25	S1	6	17	25	27	6	10	16	M3	4.5	5.3
SUSL1-28		28	S1	6	17	28	30	6	10	16	M3	4.5	5.3
SUSL1-30		30	S1	8	17	30	32	6	10	16	M3	4.5	6
SUSL1-32		32	S1	8	17	32	34	6	10	16	M3	4.5	6
SUSL1-35		35	S1	8	17	35	37	6	10	16	M3	4.5	6
SUSL1-36		36	S1	8	17	36	38	6	10	16	M3	4.5	6
SUSL1-40	***m*1**	40	S1	8	17	40	42	6	10	16	M3	4.5	6
SUSL1-45		45	S1	8	17	45	47	6	10	16	M3	4.5	6
SUSL1-48		48	S1	8	17	48	50	6	10	16	M3	4.5	6
SUSL1-50		50	S1	10	24	50	52	6	14	20	M4	4.9	8
SUSL1-56		56	S1	10	24	56	58	6	14	20	M4	4.9	8
SUSL1-60		60	S1	10	24	60	62	6	14	20	M4	4.9	8
SUSL1-64		64	S1	10	24	64	66	6	14	20	M4	4.9	8
SUSL1-70		70	S1	10	24	70	72	6	14	20	M4	4.9	8
SUSL1-72		72	S1	10	24	72	74	6	14	20	M4	4.9	8
SUSL1-80		80	S1	10	24	80	82	6	14	20	M4	4.9	8
SUSL1-90		90	S1	10	24	90	92	6	14	20	M4	4.9	8
SUSL1-100		100	S1	10	24	100	102	6	14	20	M4	4.9	8

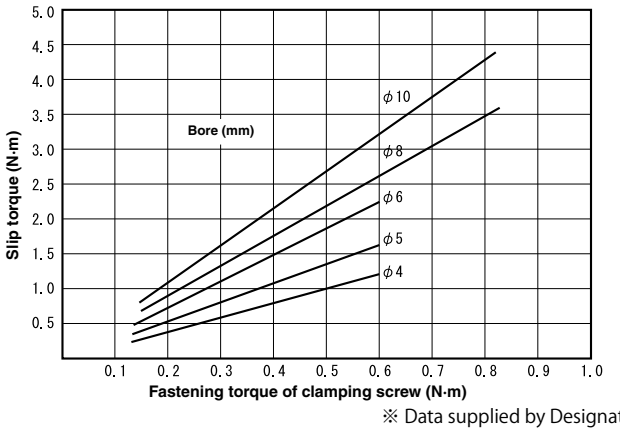
[Caution on Product Characteristics]

① The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
② 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.
③ Fairloc Hub Gears are attached to the shaft by a friction coupling. Recommended shaft tolerances are g6, h6 and h7. Torque slippage should be considered when making a selection.
④ Do not tighten the clamping screw without inserting a shaft, or the bore will be permanently deformed and will not accept a shaft
⑤ The following products are gear press-fitted into a hub : SUSL0.8 with 60 teeth or more, SUSL1 with 48 teeth or more. Also, some of the hubs might slightly differ in shape as shown in the diagram.

■ Fastening torque vs. Slipping torque

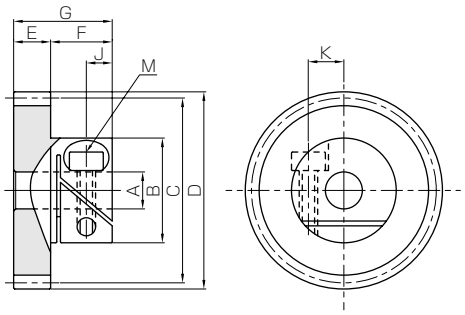
The slipping torque which is dependent on the fastening torque can sometimes be less than the gear strength. Please use caution in selecting. The chart on the right shows the relationship between the slipping torque and the fastening torque.

■ Fastening torque vs. Slipping torque



※ Data supplied by Designatronics Inc.

Stainless Steel Fairloc Hub Spur Gears



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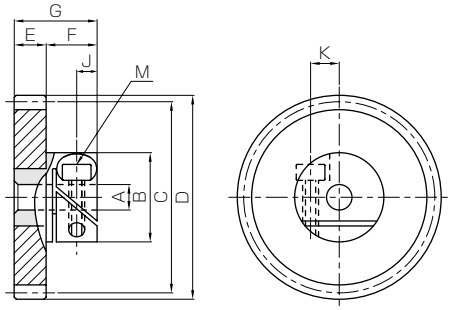
Allowable torque (N·m)		Allowable torque (kgf·m)		Ref. Slipping torque / Recommended fastening torque (N·m)	Backlash (mm)	Weight (kg)	Catalog No.
Bending strength	Surface durability	Bending strength	Surface durability				
1.95	0.20	0.20	0.020	1.60 / 0.60	0~0.10	0.027	**SUSL0.8-32**
2.28	0.26	0.23	0.026	2.25 / 0.60	0~0.10	0.038	**SUSL0.8-36**
2.61	0.32	0.27	0.033	2.25 / 0.60	0~0.10	0.044	**SUSL0.8-40**
3.02	0.41	0.31	0.042	2.25 / 0.60	0~0.10	0.053	**SUSL0.8-45**
3.27	0.47	0.33	0.048	2.25 / 0.60	0~0.10	0.058	**SUSL0.8-48**
3.44	0.51	0.35	0.053	2.25 / 0.60	0~0.10	0.062	**SUSL0.8-50**
3.78	0.61	0.39	0.062	2.25 / 0.60	0~0.10	0.070	**SUSL0.8-54**
3.95	0.65	0.40	0.067	2.25 / 0.60	0~0.10	0.075	**SUSL0.8-56**
4.28	0.76	0.44	0.077	3.45 / 0.80	0~0.10	0.081	**SUSL0.8-60**
4.63	0.87	0.47	0.088	3.45 / 0.80	0~0.10	0.091	**SUSL0.8-64**
5.31	1.11	0.54	0.11	3.45 / 0.80	0~0.10	0.11	**SUSL0.8-72**
6.00	1.38	0.61	0.14	4.30 / 0.80	0~0.10	0.16	**SUSL0.8-80**
6.86	1.77	0.70	0.18	4.30 / 0.80	0~0.10	0.19	**SUSL0.8-90**
7.72	2.21	0.79	0.23	4.30 / 0.80	0~0.10	0.23	**SUSL0.8-100**
1.46	0.088	0.15	0.0090	2.25 / 0.60	0~0.10	0.029	**SUSL1-14**
1.63	0.10	0.17	0.010	2.25 / 0.60	0~0.10	0.032	**SUSL1-15**
1.81	0.12	0.18	0.012	2.25 / 0.60	0~0.10	0.034	**SUSL1-16**
2.17	0.15	0.22	0.016	2.25 / 0.60	0~0.10	0.041	**SUSL1-18**
1.91	0.14	0.19	0.015	2.25 / 0.60	0~0.10	0.028	**SUSL1-20**
2.48	0.21	0.25	0.021	2.25 / 0.60	0~0.10	0.034	**SUSL1-24**
2.62	0.23	0.27	0.023	2.25 / 0.60	0~0.10	0.036	**SUSL1-25**
3.06	0.29	0.31	0.030	2.25 / 0.60	0~0.10	0.042	**SUSL1-28**
3.36	0.34	0.34	0.034	3.45 / 0.80	0~0.10	0.043	**SUSL1-30**
3.66	0.39	0.37	0.039	3.45 / 0.80	0~0.10	0.048	**SUSL1-32**
4.12	0.47	0.42	0.048	3.45 / 0.80	0~0.10	0.055	**SUSL1-35**
4.27	0.49	0.44	0.050	3.45 / 0.80	0~0.10	0.058	**SUSL1-36**
4.89	0.62	0.50	0.063	3.45 / 0.80	0~0.10	0.069	**SUSL1-40**
5.67	0.79	0.58	0.081	3.45 / 0.80	0~0.10	0.085	**SUSL1-45**
6.14	0.91	0.63	0.093	3.45 / 0.80	0~0.10	0.095	**SUSL1-48**
6.45	0.99	0.66	0.10	4.30 / 0.80	0~0.10	0.13	**SUSL1-50**
7.40	1.25	0.75	0.13	4.30 / 0.80	0~0.10	0.15	**SUSL1-56**
8.03	1.45	0.82	0.15	4.30 / 0.80	0~0.10	0.17	**SUSL1-60**
8.67	1.66	0.88	0.17	4.30 / 0.80	0~0.10	0.19	**SUSL1-64**
9.63	2.00	0.98	0.20	4.30 / 0.80	0~0.10	0.21	**SUSL1-70**
9.95	2.12	1.02	0.22	4.30 / 0.80	0~0.10	0.23	**SUSL1-72**
11.2	2.65	1.15	0.27	4.30 / 0.80	0~0.10	0.27	**SUSL1-80**
12.9	3.40	1.31	0.35	4.30 / 0.80	0~0.10	0.33	**SUSL1-90**
14.5	4.25	1.48	0.43	4.30 / 0.80	0~0.10	0.40	**SUSL1-100**

[Caution on Secondary Operations] ① Perform secondary operations carefully as to not distort the groove for clamping.

Acetal Fairloc Hub Spur Gears

Specifications	
Precision grade	JIS grade N10 (JIS B1702-1: 1998) ＊ JIS grade 6 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	Acetal with SUS303 core
Heat treatment	—
Tooth hardness	(110 ～ 120HRR)

＊ The gear grade listed is the value before clamping. The precision grade of products with a module of less than 0.8 is equivalent to the value shown in the table.



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Catalog No.	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total length	Cap screw dimensions		
				A_{H7}	B	C	D	E	F	G	M	J	K
DSL0.5-28		28	S1	5	14	14	15	5	8.5	13.5	M2.5	3.3	4.4
DSL0.5-30		30	S1	5	14	15	16	5	8.5	13.5	M2.5	3.3	4.4
DSL0.5-32		32	S1	5	14	16	17	5	8.5	13.5	M2.5	3.3	4.4
DSL0.5-36		36	S1	5	14	18	19	5	8.5	13.5	M2.5	3.3	4.4
DSL0.5-40		40	S1	5	14	20	21	5	8.5	13.5	M2.5	3.3	4.4
DSL0.5-45		45	S1	5	14	22.5	23.5	5	8.5	13.5	M2.5	3.3	4.4
DSL0.5-48		48	S1	5	14	24	25	5	8.5	13.5	M2.5	3.3	4.4
DSL0.5-50		50	S1	5	14	25	26	5	8.5	13.5	M2.5	3.3	4.4
DSL0.5-56		56	S1	5	14	28	29	5	8.5	13.5	M2.5	3.3	4.4
DSL0.5-60	***m*0.5**	60	S1	5	14	30	31	5	8.5	13.5	M2.5	3.3	4.4
DSL0.5-64		64	S1	5	14	32	33	5	8.5	13.5	M2.5	3.3	4.4
DSL0.5-70		70	S1	5	14	35	36	5	8.5	13.5	M2.5	3.3	4.4
DSL0.5-72		72	S1	5	14	36	37	5	8.5	13.5	M2.5	3.3	4.4
DSL0.5-75		75	S1	5	14	37.5	38.5	5	8.5	13.5	M2.5	3.3	4.4
DSL0.5-80		80	S1	5	14	40	41	5	8.5	13.5	M2.5	3.3	4.4
DSL0.5-90		90	S1	8	17	45	46	5	9.8	14.8	M3	4.3	5.9
DSL0.5-96		96	S1	8	17	48	49	5	9.8	14.8	M3	4.3	5.9
DSL0.5-100		100	S1	8	17	50	51	5	9.8	14.8	M3	4.3	5.9
DSL0.5-120		120	S1	8	17	60	61	5	9.8	14.8	M3	4.3	5.9
DSL0.8-20		20	S1	5	14	16	17.6	5	8.5	13.5	M2.5	3.3	4.4
DSL0.8-24		24	S1	5	14	19.2	20.8	5	8.5	13.5	M2.5	3.3	4.4
DSL0.8-25		25	S1	5	14	20	21.6	5	8.5	13.5	M2.5	3.3	4.4
DSL0.8-28		28	S1	5	14	22.4	24	5	8.5	13.5	M2.5	3.3	4.4
DSL0.8-30		30	S1	5	14	24	25.6	5	8.5	13.5	M2.5	3.3	4.4
DSL0.8-32		32	S1	5	14	25.6	27.2	5	8.5	13.5	M2.5	3.3	4.4
DSL0.8-36		36	S1	5	14	28.8	30.4	5	8.5	13.5	M2.5	3.3	4.4
DSL0.8-40		40	S1	5	14	32	33.6	5	8.5	13.5	M2.5	3.3	4.4
DSL0.8-45	***m*0.8**	45	S1	5	14	36	37.6	5	8.5	13.5	M2.5	3.3	4.4
DSL0.8-48		48	S1	5	14	38.4	40	5	8.5	13.5	M2.5	3.3	4.4
DSL0.8-50		50	S1	5	14	40	41.6	5	8.5	13.5	M2.5	3.3	4.4
DSL0.8-56		56	S1	5	14	44.8	46.4	5	8.5	13.5	M2.5	3.3	4.4
DSL0.8-60		60	S1	8	17	48	49.6	5	9.8	14.8	M3	4.3	5.9
DSL0.8-72		72	S1	8	17	57.6	59.2	5	9.8	14.8	M3	4.3	5.9
DSL0.8-80		80	S1	8	17	64	65.6	5	9.8	14.8	M3	4.3	5.9
DSL0.8-90		90	S1	8	17	72	73.6	5	9.8	14.8	M3	4.3	5.9
DSL0.8-100		100	S1	8	17	80	81.6	5	9.8	14.8	M3	4.3	5.9

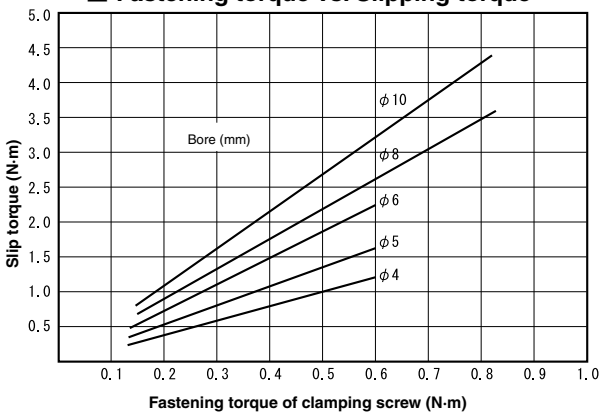
[Caution on Product Characteristics]

① The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
② 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.
③ Holding strength between the teeth (acetal) and the core (SUS303) is 2.9N・m for all DSL products. Please consider holding strength when selecting products.
④ Fairloc Hub Gears are attached to the shaft by a friction coupling. Recommended shaft tolerances are g6, h6 and h7. Torque slippage should be considered when making a selection.
⑤ Do not tighten the clamping screw without inserting a shaft, or the bore will be permanently deformed and will not accept a shaft.

■ Fastening torque vs. Slipping torque

The slipping torque which is dependent on the fastening torque can sometimes be less than the gear strength. Please use caution in selecting. The chart on the right shows the relationship between the slipping torque and the fastening torque.

■ Fastening torque vs. Slipping torque



※ Data supplied by Designatronics Inc.

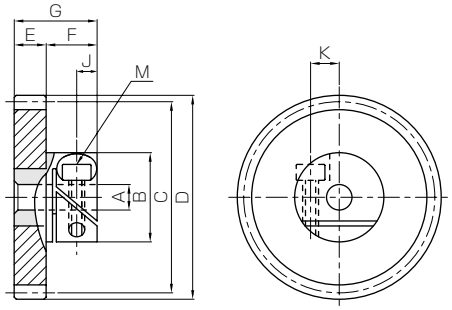
Allowable torque (N·m) Bending strength	Allowable torque (kgf·m) Bending strength	Ref. Slipping torque / Recommended fastening torque (N·m)	Backlash (mm)	Weight (kg)	Catalog No.
0.39	0.04	1.60 / 0.60	0~0.10	10.8	**DSL0.5-28**
0.43	0.044	1.60 / 0.60	0~0.10	11.0	**DSL0.5-30**
0.46	0.047	1.60 / 0.60	0~0.10	11.2	**DSL0.5-32**
0.54	0.055	1.60 / 0.60	0~0.10	11.5	**DSL0.5-36**
0.62	0.063	1.60 / 0.60	0~0.10	12.0	**DSL0.5-40**
0.71	0.073	1.60 / 0.60	0~0.10	12.5	**DSL0.5-45**
0.78	0.079	1.60 / 0.60	0~0.10	12.9	**DSL0.5-48**
0.82	0.083	1.60 / 0.60	0~0.10	13.2	**DSL0.5-50**
0.93	0.095	1.60 / 0.60	0~0.10	14.1	**DSL0.5-56**
1.01	0.10	1.60 / 0.60	0~0.10	14.7	**DSL0.5-60**
1.08	0.11	1.60 / 0.60	0~0.10	15.4	**DSL0.5-64**
1.20	0.12	1.60 / 0.60	0~0.10	16.5	**DSL0.5-70**
1.24	0.13	1.60 / 0.60	0~0.10	16.9	**DSL0.5-72**
1.29	0.13	1.60 / 0.60	0~0.10	17.5	**DSL0.5-75**
1.39	0.14	1.60 / 0.60	0~0.10	18.6	**DSL0.5-80**
1.58	0.16	3.45 / 0.80	0~0.10	23.9	**DSL0.5-90**
1.70	0.17	3.45 / 0.80	0~0.10	25.5	**DSL0.5-96**
1.78	0.18	3.45 / 0.80	0~0.10	26.6	**DSL0.5-100**
2.15	0.22	3.45 / 0.80	0~0.10	32.6	**DSL0.5-120**
0.58	0.059	1.60 / 0.60	0~0.10	11.2	**DSL0.8-20**
0.73	0.075	1.60 / 0.60	0~0.10	11.8	**DSL0.8-24**
0.78	0.079	1.60 / 0.60	0~0.10	12.0	**DSL0.8-25**
0.89	0.091	1.60 / 0.60	0~0.10	12.5	**DSL0.8-28**
0.97	0.099	1.60 / 0.60	0~0.10	12.9	**DSL0.8-30**
1.06	0.11	1.60 / 0.60	0~0.10	13.4	**DSL0.8-32**
1.23	0.13	1.60 / 0.60	0~0.10	14.3	**DSL0.8-36**
1.41	0.14	1.60 / 0.60	0~0.10	15.4	**DSL0.8-40**
1.62	0.17	1.60 / 0.60	0~0.10	16.9	**DSL0.8-45**
1.76	0.18	1.60 / 0.60	0~0.10	17.9	**DSL0.8-48**
1.85	0.19	1.60 / 0.60	0~0.10	18.6	**DSL0.8-50**
2.11	0.22	1.60 / 0.60	0~0.10	20.8	**DSL0.8-56**
2.28	0.23	3.45 / 0.80	0~0.10	25.5	**DSL0.8-60**
2.8	0.29	3.45 / 0.80	0~0.10	31.1	**DSL0.8-72**
3.15	0.32	3.45 / 0.80	0~0.10	35.4	**DSL0.8-80**
3.58	0.37	3.45 / 0.80	0~0.10	41.4	**DSL0.8-90**
4.03	0.41	3.45 / 0.80	0~0.10	48.1	**DSL0.8-100**

[Caution on Secondary Operations] ① Perform secondary operations carefully as to not distort the groove for clamping.

Acetal Fairloc Hub Spur Gears

Specifications	
Precision grade	JIS grade N10 (JIS B1702-1: 1998) ＊ JIS grade 6 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	Acetal with SUS303 core
Heat treatment	—
Tooth hardness	(110 ～ 120HRR)

＊ The gear grade listed is the value before clamping. The precision grade of products with a module of less than 0.8 is equivalent to the value shown in the table.



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Catalog No.	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total length	Cap screw dimensions		
				A_{H7}	B	C	D	E	F	G	M	J	K
DSL1-15		15	S1	5	14	15	17	5	8.5	13.5	M2.5	3.3	4.4
DSL1-16		16	S1	5	14	16	18	5	8.5	13.5	M2.5	3.3	4.4
DSL1-18		18	S1	5	14	18	20	5	8.5	13.5	M2.5	3.3	4.4
DSL1-20		20	S1	5	14	20	22	5	8.5	13.5	M2.5	3.3	4.4
DSL1-24		24	S1	5	14	24	26	5	8.5	13.5	M2.5	3.3	4.4
DSL1-25		25	S1	5	14	25	27	5	8.5	13.5	M2.5	3.3	4.4
DSL1-28		28	S1	5	14	28	30	5	8.5	13.5	M2.5	3.3	4.4
DSL1-30		30	S1	8	17	30	32	5	9.8	14.8	M3	4.3	5.9
DSL1-32		32	S1	8	17	32	34	5	9.8	14.8	M3	4.3	5.9
DSL1-35		35	S1	8	17	35	37	5	9.8	14.8	M3	4.3	5.9
DSL1-36		36	S1	8	17	36	38	5	9.8	14.8	M3	4.3	5.9
DSL1-40	***m*1**	40	S1	8	17	40	42	5	9.8	14.8	M3	4.3	5.9
DSL1-45		45	S1	8	17	45	47	5	9.8	14.8	M3	4.3	5.9
DSL1-48		48	S1	8	17	48	50	5	9.8	14.8	M3	4.3	5.9
DSL1-50		50	S1	8	17	50	52	5	9.8	14.8	M3	4.3	5.9
DSL1-56		56	S1	8	17	56	58	5	9.8	14.8	M3	4.3	5.9
DSL1-60		60	S1	8	17	60	62	5	9.8	14.8	M3	4.3	5.9
DSL1-64		64	S1	8	17	64	66	5	9.8	14.8	M3	4.3	5.9
DSL1-70		70	S1	8	17	70	72	5	9.8	14.8	M3	4.3	5.9
DSL1-72		72	S1	8	17	72	74	5	9.8	14.8	M3	4.3	5.9
DSL1-80		80	S1	8	17	80	82	5	9.8	14.8	M3	4.3	5.9
DSL1-90		90	S1	8	17	90	92	5	9.8	14.8	M3	4.3	5.9
DSL1-100		100	S1	8	17	100	102	5	9.8	14.8	M3	4.3	5.9

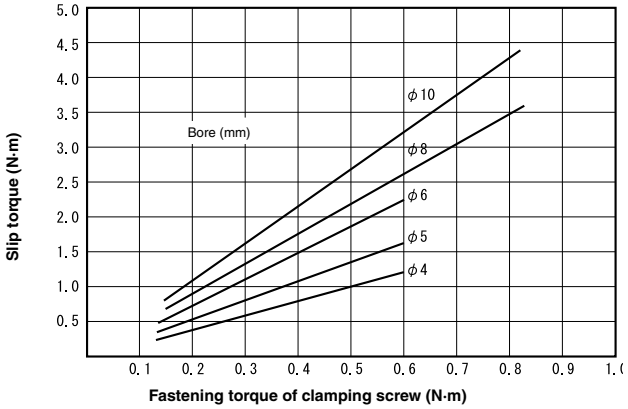
[Caution on Product Characteristics]

① The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
② 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.
③ Holding strength between the teeth (acetal) and the core (SUS303) is 2.9N・m for all DSL products. Please consider holding strength when selecting products.
④ Fairloc Hub Gears are attached to the shaft by a friction coupling. Recommended shaft tolerances are g6, h6 and h7. Torque slippage should be considered when making a selection.
⑤ Do not tighten the clamping screw without inserting a shaft, or the bore will be permanently deformed and will not accept a shaft.

■ Fastening torque vs. Slipping torque

The slipping torque which is dependent on the fastening torque can sometimes be less than the gear strength. Please use caution in selecting. The chart on the right shows the relationship between the slipping torque and the fastening torque.

■ Fastening torque vs. Slipping torque



※ Data supplied by Designatronics Inc.

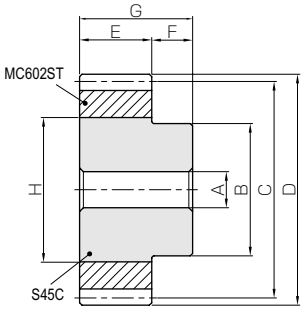
Allowable torque (N·m) Bending strength	Allowable torque (kgf·m) Bending strength	Ref. Slipping torque / Recommended fastening torque (N·m)	Backlash (mm)	Weight (kg)	Catalog No.
0.53	0.054	1.60 / 0.60	0~0.10	11.0	**DSL1-15**
0.59	0.06	1.60 / 0.60	0~0.10	11.2	**DSL1-16**
0.69	0.07	1.60 / 0.60	0~0.10	11.5	**DSL1-18**
0.80	0.081	1.60 / 0.60	0~0.10	12.0	**DSL1-20**
1.00	0.10	1.60 / 0.60	0~0.10	12.9	**DSL1-24**
1.06	0.11	1.60 / 0.60	0~0.10	13.2	**DSL1-25**
1.22	0.12	1.60 / 0.60	0~0.10	14.1	**DSL1-28**
1.33	0.14	3.45 / 0.80	0~0.10	17.7	**DSL1-30**
1.44	0.15	3.45 / 0.80	0~0.10	18.4	**DSL1-32**
1.62	0.17	3.45 / 0.80	0~0.10	19.5	**DSL1-35**
1.68	0.17	3.45 / 0.80	0~0.10	19.9	**DSL1-36**
1.92	0.20	3.45 / 0.80	0~0.10	21.6	**DSL1-40**
2.22	0.23	3.45 / 0.80	0~0.10	23.9	**DSL1-45**
2.41	0.25	3.45 / 0.80	0~0.10	25.5	**DSL1-48**
2.53	0.26	3.45 / 0.80	0~0.10	26.6	**DSL1-50**
2.88	0.29	3.45 / 0.80	0~0.10	30.1	**DSL1-56**
3.12	0.32	3.45 / 0.80	0~0.10	32.6	**DSL1-60**
3.35	0.34	3.45 / 0.80	0~0.10	35.4	**DSL1-64**
3.71	0.38	3.45 / 0.80	0~0.10	39.8	**DSL1-70**
3.83	0.39	3.45 / 0.80	0~0.10	41.4	**DSL1-72**
4.30	0.44	3.45 / 0.80	0~0.10	48.1	**DSL1-80**
4.89	0.50	3.45 / 0.80	0~0.10	57.6	**DSL1-90**
5.49	0.56	3.45 / 0.80	0~0.10	68.1	**DSL1-100**

[Caution on Secondary Operations] ① Perform secondary operations carefully as to not distort the groove for clamping.

Plastic Spur Gears with Steel Core

Specifications	
Precision grade	JIS grade N9 (JIS B1702-1: 1998) * JIS grade 5 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	MC602ST with S45C core
Heat treatment	—
Tooth hardness	(115 ~ 120HRR)
Face width (E)	10
Hub width (F)	10
Total length (G)	20
Screw offset (J)	5

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



S1

Catalog No.	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Metal core dia.	Allowable torque (N·m)	Allowable torque (kgf·m)	Backlash	Weight
			A_{H7}	B	C	D	H	Bending strength	Bending strength	(mm)	(kg)
NSU1-30	30	S1	8	20	30	32	20	1.23	0.13	0~0.34	0.046
NSU1-32	32			22	32	34	22	1.34	0.14		0.057
NSU1-34	34			25	34	36	25	1.44	0.15		0.074
NSU1-35	35			25	35	37	25	1.50	0.15		0.075
NSU1-36	36			25	36	38	25	1.56	0.16		0.076
NSU1-40	40		10	25	40	42	28	1.78	0.18		0.082
NSU1-45	45			30	45	47	34	2.06	0.21		0.12
NSU1-48	48			30	48	50	34	2.23	0.23		0.13
NSU1-50	50			30	50	52	34	2.35	0.24		0.13
NSU1-60	60			40	60	62	45	2.93	0.30		0.23
NSU1-70	70		40		70	72	45	3.46	0.35	0~0.36	0.24
NSU1-80	80				80	82	45	4.00	0.41		0.25
NSU1-90	90				90	92	55	4.56	0.46		0.32
NSU1-100	100				100	102	65	5.12	0.52		0.40

[Caution on Product Characteristics]

① Significant variations in temperature or humidity can cause dimensional changes in plastic gears (MC Nylon gears), teeth diameter and backlash. Please see the section "Design of Plastic Gears" in separate technical reference book.
② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
③ When the core O.D is the same as the hub diameter, you may see some serration on the hub. There is no effect on the strength of the gear.
④ Without lubrication, using plastic gears in pairs may generate heat and dilation. It is recommended to mate them with steel gears.
⑤ 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.

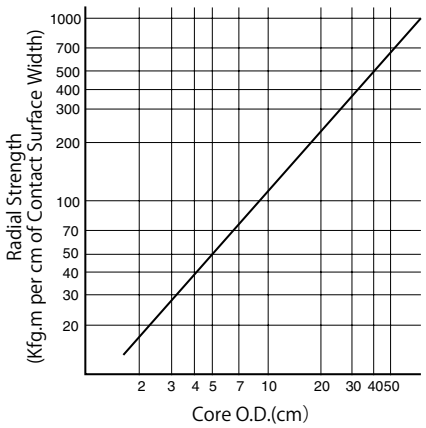
[Caution on Secondary Operations]

①Please read "Caution on Performing Secondary Operations" (Page 32) 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.
② Even though the holding strength at the material interface is designed to be stronger than the teeth, a secondary operation may weaken the holding 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.

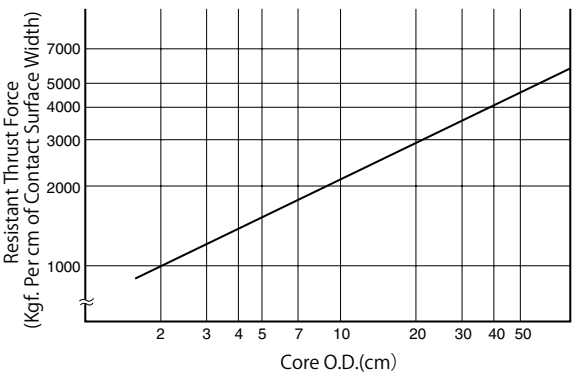
Definition of Holding Strength and Safety Factor

① The holding strength between the metal core and the molded material is a function of the contact area. The relationship between the core outside diameter and the radial strength (torque) is shown on the left, while the relationship between the core diameter and the resistant thrust force is shown on the right.

Relationship between radial strength and core diameter



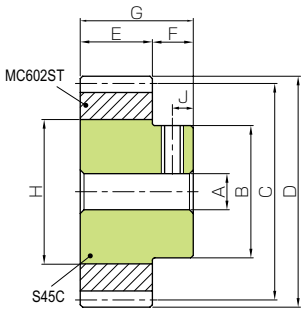
Relationship between resistant thrust force and core diameter



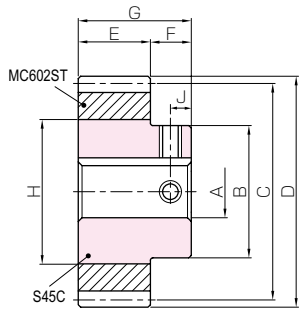
J Series

Plastic Spur Gears with Steel Core

Newly added



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	8	10	12	14	15	16	17	18	19	20	22	25	28	30
Screw size	—	5 × 2.3						6 × 2.8				8 × 3.3		
Catalog No.	M5	M4						M5				M6		
NSU1-30 J BORE														
NSU1-32 J BORE														
NSU1-34 J BORE														
NSU1-35 J BORE														
NSU1-36 J BORE														
NSU1-40 J BORE														
NSU1-45 J BORE														
NSU1-48 J BORE														
NSU1-50 J BORE														
NSU1-60 J BORE														
NSU1-70 J BORE														
NSU1-80 J BORE														
NSU1-90 J BORE														
NSU1-100 J BORE														

[Caution on J series]

① 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.
② 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.
③ Keyways are made according to JIS B1301 standards, Js9 tolerance.
④ Certain products which would otherwise have a very long tapped hole are conterbored to reduce the length of the tap.
⑤ For products having a tapped hole, a set screw is included.

② When the ambient temperature rises, obtain the temperature compensation factor, T, from the chart on the right. Also, use a safety factor of 4 to 5 in the calculation.

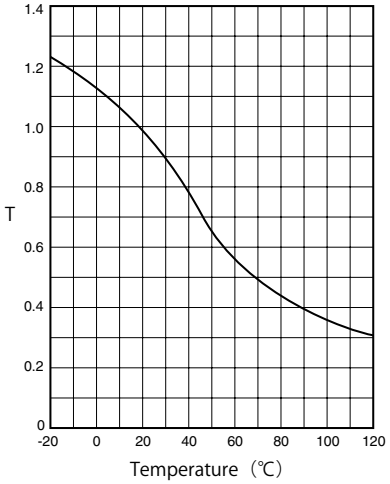
$$Tal = Tmax \times \frac{1}{\text{Safety Factor}} \times T$$

Where

Tal : Allowable Holding Strength at the contact surface
$Tmax$: Maximum Holding Strength - Find from the charts on the left.
T : Temperature Compensation Factor

＊ Data supplied by Japan Polypenco Limited.

■ Ambient temperature compensation factor **T**

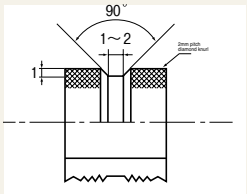


■ How is MC nylon fused to the metal core

This method is superior to other conventional methods such as bolting, shrink fitting and bonding.

① Outline of the procedure

The surface of the core material is rolled with a 2mm pitch diamond knurl. Then one or more grooves (1 to 2mm wide and 1mm deep) are cut as shown below. The metal surface is treated prior to casting nylon in a mold.



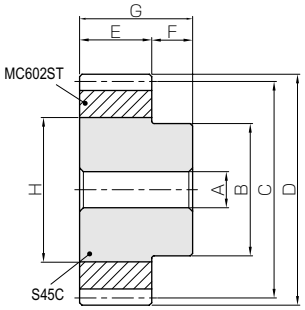
② Advantage of MC nylon with metal core

1. Wide temperature range.
There are examples of wheel use in furnaces at 130 to 140° C.
2. Good dimensional stability
Since nylon is fused to the whole outer surface of the metal hub, dimensional change is very small even under temperature variations.
3. Good appearance
Elimination of bolts and nuts provides a cleaner physical appearance.

Plastic Spur Gears with Steel Core

Specifications	
Precision grade	JIS grade N9 (JIS B1702-1: 1998) * JIS grade 5 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	MC602ST with S45C core
Heat treatment	—
Tooth hardness	(115 ~ 120HRR)
Face width (E)	15
Hub width (F)	12
Total length (G)	27
Screw offset (J)	6

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



S1

Catalog No.	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Metal core dia.	Allowable torque (N·m)	Allowable torque (kgf·m)	Backlash	Weight
			A_{H7}	B	C	D	H	Bending strength	Bending strength	(mm)	(kg)
NSU1.5-28	28	S1	10	30	42	45	30	3.82	0.39	0~0.38	0.15
NSU1.5-30	30				45	48	30	4.15	0.42		0.15
NSU1.5-32	32			33	48	51	33	4.51	0.46		0.18
NSU1.5-34	34				51	54	33	4.88	0.50	0~0.40	0.19
NSU1.5-35	35				52.5	55.5	36	5.07	0.52		0.20
NSU1.5-36	36				54	57	36	5.26	0.54		0.21
NSU1.5-40	40			40	60	63	45	6.00	0.61		0.31
NSU1.5-45	45				67.5	70.5	45	6.94	0.71		0.33
NSU1.5-48	48				72	75	45	7.53	0.77		0.33
NSU1.5-50	50		12		75	78	45	7.92	0.81		0.33
NSU1.5-56	56			50	84	87	55	9.09	0.93		0.50
NSU1.5-60	60				90	93	55	9.89	1.01		0.51
NSU1.5-68	68				102	105	67	11.3	1.15		0.66
NSU1.5-70	70				105	108	70	11.7	1.19	0~0.42	0.70
NSU1.5-80	80			60	120	123	85	13.5	1.38		1.01
NSU1.5-90	90				135	138	100	15.4	1.57		1.29

[Caution on Product Characteristics]

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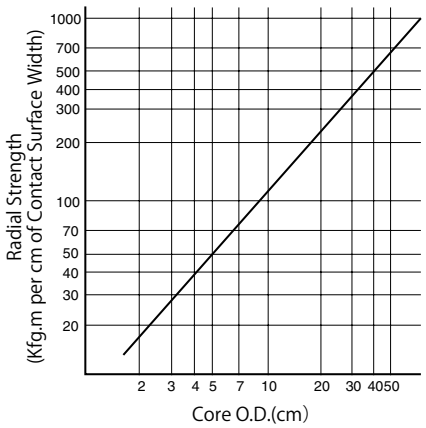
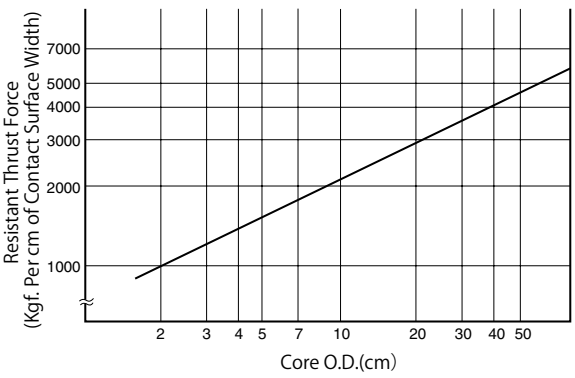


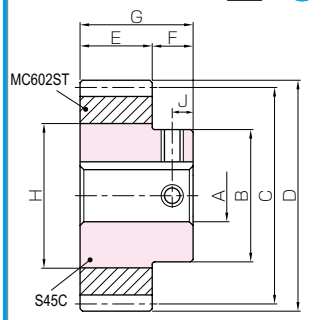
Relationship between resistant thrust force and core diameter



J Series

Plastic Spur Gears with Steel Core

Newly added



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	10	12	14	15	16	17	18	19	20	22	25	28	30	32	35
Screw size	5 × 2.3						6 × 2.8				8 × 3.3			10 × 3.3	
Catalog No.	M4						M5				M6			M8	
NSU1.5-28 J BORE															
NSU1.5-30 J BORE															
NSU1.5-32 J BORE															
NSU1.5-34 J BORE															
NSU1.5-35 J BORE															
NSU1.5-36 J BORE															
NSU1.5-40 J BORE															
NSU1.5-45 J BORE															
NSU1.5-48 J BORE															
NSU1.5-50 J BORE															
NSU1.5-56 J BORE															
NSU1.5-60 J BORE															
NSU1.5-68 J BORE															
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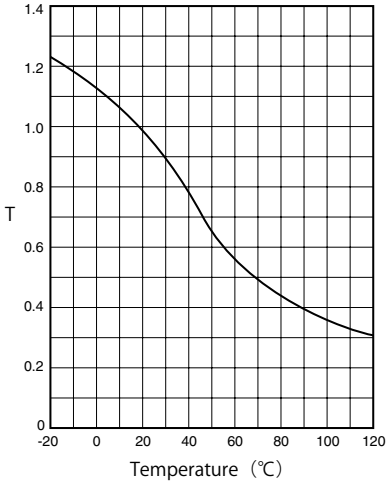

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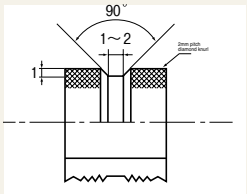

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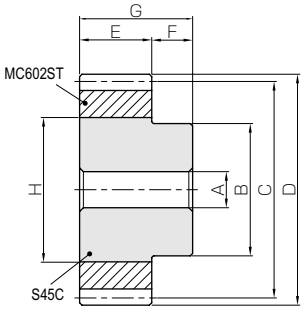
Plastic Spur Gears with Steel Core

Specifications	
Precision grade	JIS grade N9 (JIS B1702-1: 1998) * JIS grade 5 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	MC602ST with S45C core
Heat treatment	—
Tooth hardness	(115 ~ 120HRR)
Face width (E)	20
Hub width (F)	14
Total length (G)	34
Screw offset (J)	7

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



S1

Catalog No.	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Metal core dia.	Allowable torque (N·m)	Allowable torque (kgf·m)	Backlash	Weight
			A_{H7}	B	C	D	H	Bending strength	Bending strength	(mm)	(kg)
NSU2-20	20	S1	10	22	40	44	22	5.89	0.60	0~0.42	0.10
NSU2-22	22			30	44	48	30	6.66	0.68		0.19
NSU2-24	24				48	52	30	7.43	0.76		0.19
NSU2-25	25				50	54	30	7.85	0.80		0.20
NSU2-28	28			35	56	60	35	9.05	0.92		0.27
NSU2-30	30				60	64	35	9.84	1.00	0~0.44	0.28
NSU2-32	32		12	40	64	68	40	10.7	1.09		0.35
NSU2-34	34				68	72	45	11.6	1.18		0.41
NSU2-35	35				70	74	45	12.0	1.22		0.41
NSU2-36	36				72	76	45	12.5	1.27		0.42
NSU2-40	40		15	55	80	84	60	14.2	1.45		0.71
NSU2-44	44				88	92	60	16.0	1.63		0.74
NSU2-45	45				90	94	60	16.5	1.68		0.74
NSU2-48	48			60	96	100	65	17.8	1.82		0.88
NSU2-50	50				100	104	65	18.8	1.92		0.90
NSU2-56	56				112	116	65	21.5	2.20	0~0.46	0.95
NSU2-60	60				120	124	85	23.5	2.39		1.29
NSU2-68	68				136	140	100	26.8	2.74		1.66
NSU2-70	70				140	144	105	27.7	2.82		1.79
NSU2-80	80				160	164	125	32.0	3.27		2.38

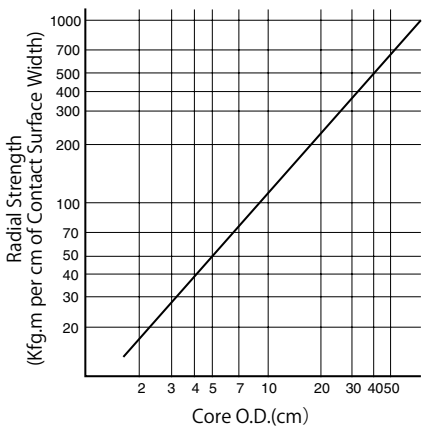
[Caution on Product Characteristics]
① Significant variations in temperature or humidity can cause dimensional changes in plastic gears (MC Nylon gears), teeth diameter and backlash. Please see the section "Design of Plastic Gears" in separate technical reference book.
② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
③ When the core O.D is the same as the hub diameter, you may see some serration on the hub. There is no effect on the strength of the gear.
④ Without lubrication, using plastic gears in pairs may generate heat and dilation. It is recommended to mate them with steel gears.
⑤ 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.

[Caution on Secondary Operations]
①Please read "Caution on Performing Secondary Operations" (Page 32) 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.
② Even though the holding strength at the material interface is designed to be stronger than the teeth, a secondary operation may weaken the holding 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.

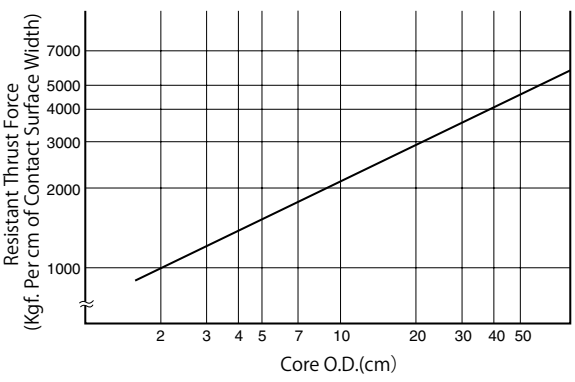
■ Definition of Holding Strength and Safety Factor

① The holding strength between the metal core and the molded material is a function of the contact area. The relationship between the core outside diameter and the radial strength (torque) is shown on the left, while the relationship between the core diameter and the resistant thrust force is shown on the right.

■ Relationship between radial strength and core diameter



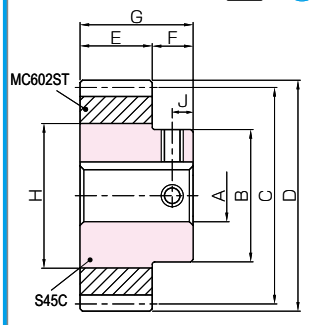
■ Relationship between resistant thrust force and core diameter



J Series

Plastic Spur Gears with Steel Core

Newly added



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	10	12	14	15	16	17	18	19	20	22	25	28	30	32	35
Screw size	5 × 2.3						6 × 2.8				8 × 3.3			10 × 3.3	
Catalog No.	M4						M5				M6			M8	
NSU2-20 J BORE															
NSU2-22 J BORE															
NSU2-24 J BORE															
NSU2-25 J BORE															
NSU2-28 J BORE															
NSU2-30 J BORE															
NSU2-32 J BORE															
NSU2-34 J BORE															
NSU2-35 J BORE															
NSU2-36 J BORE															
NSU2-40 J BORE															
NSU2-44 J BORE															
NSU2-45 J BORE															
NSU2-48 J BORE															
NSU2-50 J BORE															
NSU2-56 J BORE															
NSU2-60 J BORE															
NSU2-68 J BORE															
NSU2-70 J BORE															
NSU2-80 J BORE															

[Caution on J series]

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③ Keyways are made according to JIS B1301 standards, Js9 tolerance.
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⑤ For products having a tapped hole, a set screw is included.

② When the ambient temperature rises, obtain the temperature compensation factor, T, from the chart on the right. Also, use a safety factor of 4 to 5 in the calculation.

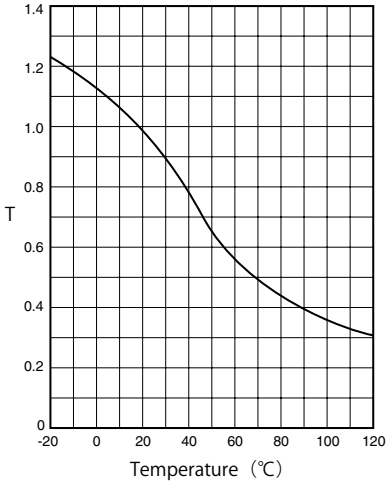
$$Tal = Tmax \times \frac{1}{\text{Safety Factor}} \times T$$

Where

Tal : Allowable Holding Strength at the contact surface
$Tmax$: Maximum Holding Strength - Find from the charts on the left.
T : Temperature Compensation Factor

＊ Data supplied by Japan Polypenco Limited.

■ Ambient temperature compensation factor T

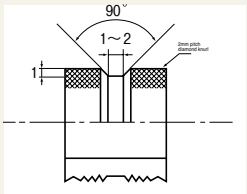


■ How is MC nylon fused to the metal core

This method is superior to other conventional methods such as bolting, shrink fitting and bonding.

① Outline of the procedure

The surface of the core material is rolled with a 2mm pitch diamond knurl. Then one or more grooves (1 to 2mm wide and 1mm deep) are cut as shown below. The metal surface is treated prior to casting nylon in a mold.



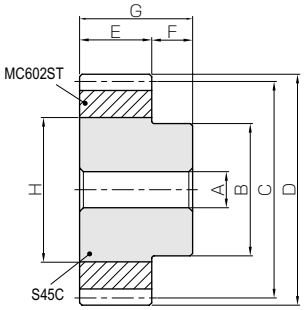
② Advantage of MC nylon with metal core

1. Wide temperature range.
There are examples of wheel use in furnaces at 130 to 140° C.
2. Good dimensional stability
Since nylon is fused to the whole outer surface of the metal hub, dimensional change is very small even under temperature variations.
3. Good appearance
Elimination of bolts and nuts provides a cleaner physical appearance.

Plastic Spur Gears with Steel Core

Specifications	
Precision grade	JIS grade N9 (JIS B1702-1: 1998) * JIS grade 5 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	MC602ST with S45C core
Heat treatment	—
Tooth hardness	(115 ~ 120HRR)
Face width (E)	25
Hub width (F)	15
Total length (G)	40
Screw offset (J)	7.5

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



S1

Catalog No.	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Metal core dia.	Allowable torque (N·m)	Allowable torque (kgf·m)	Backlash	Weight
			A_{H7}	B	C	D	H	Bending strength	Bending strength	(mm)	(kg)
NSU2.5-18	18	S1	12	25	45	50	25	9.93	1.01	0~0.44	0.15
NSU2.5-20	20			28	50	55	28	11.5	1.17		0.20
NSU2.5-22	22			35	55	60	35	13.0	1.33	0~0.46	0.31
NSU2.5-24	24			35	60	65	35	14.5	1.48		0.32
NSU2.5-25	25			35	62.5	67.5	35	15.3	1.56		0.33
NSU2.5-28	28			40	70	75	40	17.7	1.80		0.44
NSU2.5-30	30			45	75	80	50	19.2	1.96		0.61
NSU2.5-32	32			45	80	85	50	20.9	2.13		0.63
NSU2.5-34	34			50	85	90	55	22.6	2.30		0.76
NSU2.5-35	35			55	87.5	92.5	60	23.5	2.39		0.90
NSU2.5-36	36		15	55	90	95	60	24.3	2.48		0.91
NSU2.5-40	40			65	100	105	70	27.8	2.83		1.21
NSU2.5-44	44			65	110	115	75	31.3	3.19	0~0.48	1.36
NSU2.5-45	45			65	112.5	117.5	75	32.1	3.28		1.37
NSU2.5-48	48			65	120	125	85	34.8	3.55		1.62
NSU2.5-50	50			65	125	130	95	36.7	3.74		1.89
NSU2.5-56	56			65	140	145	105	42.1	4.29		2.24
NSU2.5-60	60		20	70	150	155	115	45.8	4.67		2.62
NSU2.5-68	68			70	170	175	135	52.4	5.34		3.42
NSU2.5-70	70			70	175	180	140	54.1	5.51		3.64

[Caution on Product Characteristics]
① Significant variations in temperature or humidity can cause dimensional changes in plastic gears (MC Nylon gears), teeth diameter and backlash. Please see the section "Design of Plastic Gears" in separate technical reference book.
② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
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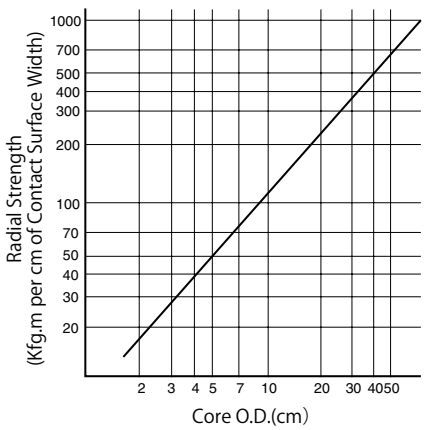
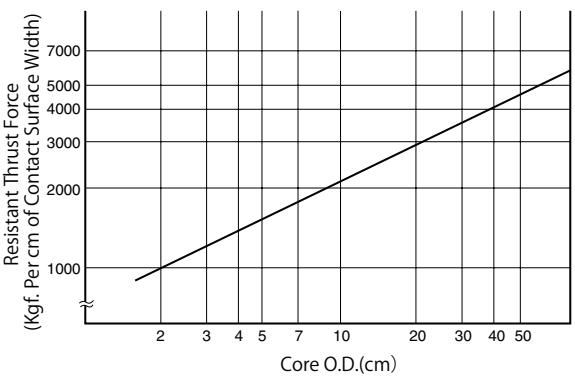
Definition of Holding Strength and Safety Factor

① The holding strength between the metal core and the molded material is a function of the contact area. The relationship between the core outside diameter and the radial strength (torque) is shown on the left, while the relationship between the core diameter and the resistant thrust force is shown on the right.

Relationship between radial strength and core diameter



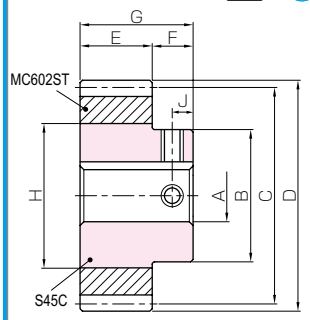
Relationship between resistant thrust force and core diameter



J Series

Plastic Spur Gears with Steel Core

Newly added



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
Screw size	5 × 2.3					6 × 2.8				8 × 3.3			10 × 3.3		12 × 3.3
Catalog No.	M4					M5				M6			M8		
NSU2.5-18 J BORE															
NSU2.5-20 J BORE															
NSU2.5-22 J BORE															
NSU2.5-24 J BORE															
NSU2.5-25 J BORE															
NSU2.5-28 J BORE															
NSU2.5-30 J BORE															
NSU2.5-32 J BORE															
NSU2.5-34 J BORE															
NSU2.5-35 J BORE															
NSU2.5-36 J BORE															
NSU2.5-40 J BORE															
NSU2.5-44 J BORE															
NSU2.5-45 J BORE															
NSU2.5-48 J BORE															
NSU2.5-50 J BORE															
NSU2.5-56 J BORE															
NSU2.5-60 J BORE															
NSU2.5-68 J BORE															
NSU2.5-70 J BORE															

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③ Keyways are made according to JIS B1301 standards, Js9 tolerance.
④ Certain products which would otherwise have a very long tapped hole are conterbored to reduce the length of the tap.
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② When the ambient temperature rises, obtain the temperature compensation factor, T, from the chart on the right. Also, use a safety factor of 4 to 5 in the calculation.

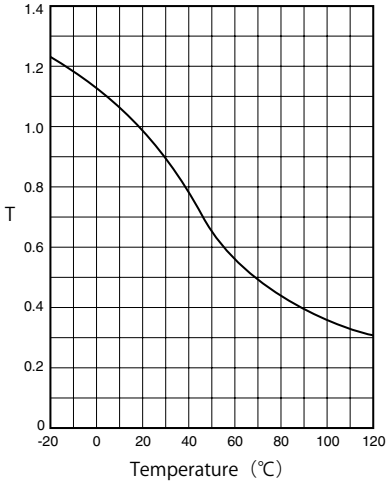
$$Tal = Tmax \times \frac{1}{\text{Safety Factor}} \times T$$

Where

Tal : Allowable Holding Strength at the contact surface
$Tmax$: Maximum Holding Strength - Find from the charts on the left.
T : Temperature Compensation Factor

＊ Data supplied by Japan Polypenco Limited.

■ Ambient temperature compensation factor **T**

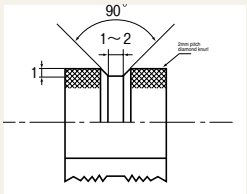


■ How is MC nylon fused to the metal core

This method is superior to other conventional methods such as bolting, shrink fitting and bonding.

① Outline of the procedure

The surface of the core material is rolled with a 2mm pitch diamond knurl. Then one or more grooves (1 to 2mm wide and 1mm deep) are cut as shown below. The metal surface is treated prior to casting nylon in a mold.



② Advantage of MC nylon with metal core

1. Wide temperature range.
There are examples of wheel use in furnaces at 130 to 140° C.
2. Good dimensional stability
Since nylon is fused to the whole outer surface of the metal hub, dimensional change is very small even under temperature variations.
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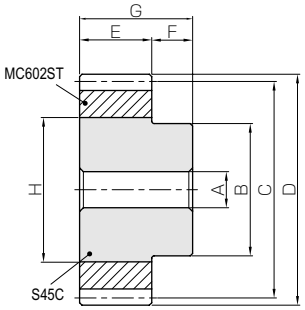
Elimination of bolts and nuts provides a cleaner physical appearance.

Plastic Spur Gears with Steel Core

Specifications	
Precision grade	JIS grade N9 (JIS B1702-1: 1998) * JIS grade 5 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	MC602ST with S45C core
Heat treatment	—
Tooth hardness	(115 ~ 120HRR)
Face width (E)	30
Hub width (F)	17
Total length (G)	47
Screw offset (J)	8.5

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



S1

Catalog No.	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Metal core dia.	Allowable torque (N·m)	Allowable torque (kgf·m)	Backlash	Weight
			A_{H7}	B	C	D	H	Bending strength	Bending strength	(mm)	(kg)
NSU3-16	16	S1	12	24	48	54	24	14.7	1.50	0~0.52	0.18
NSU3-18	18			30	54	60	30	17.2	1.75	0~0.54	0.28
NSU3-20	20			33	60	66	33	19.9	2.03		0.35
NSU3-22	22			38	66	72	38	22.5	2.29		0.46
NSU3-24	24			43	72	78	43	25.1	2.56		0.59
NSU3-25	25		15	45	75	81	45	26.5	2.70		0.65
NSU3-28	28			50	84	90	50	30.5	3.11		0.79
NSU3-30	30			55	90	96	60	33.2	3.39		1.05
NSU3-32	32			60	96	102	65	36.1	3.68		1.24
NSU3-34	34			60	102	108	65	39.0	3.98	0~0.56	1.27
NSU3-35	35		20	60	105	111	75	40.5	4.13		1.51
NSU3-36	36			60	108	114	80	42.1	4.29		1.65
NSU3-40	40			70	120	126	85	48.0	4.90		1.94
NSU3-44	44			70	132	138	95	54.0	5.51		2.31
NSU3-45	45			70	135	141	105	55.5	5.66		2.65
NSU3-48	48			70	144	150	105	60.2	6.14		2.72
NSU3-50	50				150	156	105	63.4	6.46		2.77
NSU3-56	56				168	174	130	72.7	7.42		3.85
NSU3-60	60				180	186	145	79.1	8.07		4.62
NSU3-68	68				204	210	165	90.6	9.23		5.85
NSU3-70	70				210	216	175	93.4	9.53		6.45

[Caution on Product Characteristics]

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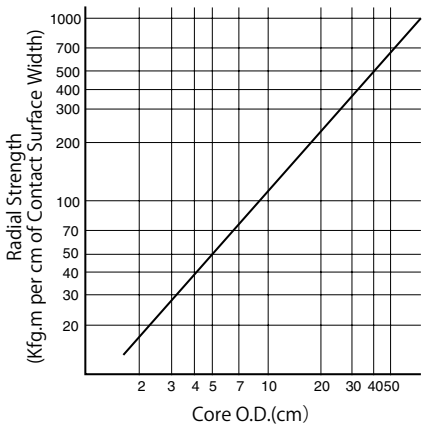
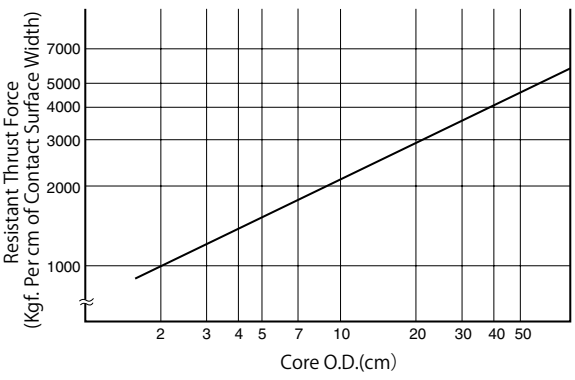
■ Relationship between radial strength and core diameter



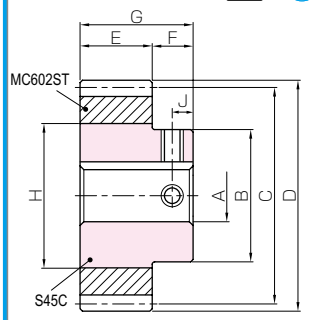
■ Relationship between resistant thrust force and core diameter



J Series

Plastic Spur Gears with Steel Core

Newly added



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
Screw size	5 × 2.3					6 × 2.8				8 × 3.3			10 × 3.3		12 × 3.3
Catalog No.	M4					M5				M6			M8		
NSU3-16 J BORE															
NSU3-18 J BORE															
NSU3-20 J BORE															
NSU3-22 J BORE															
NSU3-24 J BORE															
NSU3-25 J BORE															
NSU3-28 J BORE															
NSU3-30 J BORE															
NSU3-32 J BORE															
NSU3-34 J BORE															
NSU3-35 J BORE															
NSU3-36 J BORE															
NSU3-40 J BORE															
NSU3-44 J BORE															
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NSU3-48 J BORE															
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NSU3-70 J BORE															

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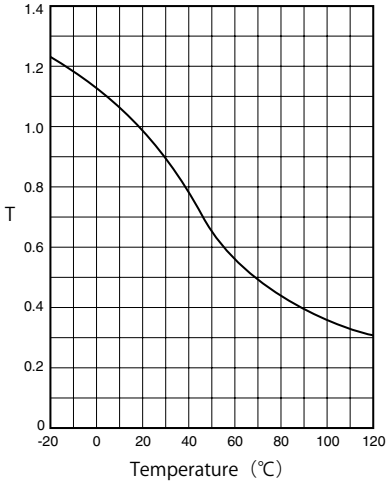
＊ Data supplied by Japan Polypenco Limited.

■ Ambient temperature compensation factor T

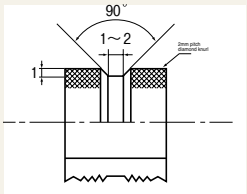


■ How is MC nylon fused to the metal core

This method is superior to other conventional methods such as bolting, shrink fitting and bonding.

① Outline of the procedure

The surface of the core material is rolled with a 2mm pitch diamond knurl. Then one or more grooves (1 to 2mm wide and 1mm deep) are cut as shown below. The metal surface is treated prior to casting nylon in a mold.

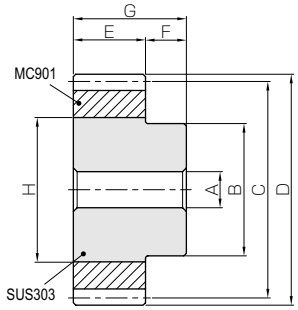


② Advantage of MC nylon with metal core

1. Wide temperature range.
There are examples of wheel use in furnaces at 130 to 140° C.
2. Good dimensional stability
Since nylon is fused to the whole outer surface of the metal hub, dimensional change is very small even under temperature variations.
3. Good appearance
Elimination of bolts and nuts provides a cleaner physical appearance.

Specifications			
Precision grade	JIS grade N9 (JIS B1702-1: 1998) ＊ JIS grade 5 (JIS B1702: 1976)		
Gear teeth	Standard full depth		
Pressure angle	20°		
Material	MC901 with SUS303 core		
Heat treatment	—		
Tooth hardness	(115 ~ 120HRR)		
Module	***m*1**	***m*1.5**	***m*2**
Face width (E)	10	15	20
Hub width (F)	10	12	14
Total length (G)	20	27	34
Screw offset (J)	5	6	7

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



S1

Catalog No.	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Metal core dia.	Allowable torque (N·m)	Allowable torque (kgf·m)	Backlash	Weight
			A_{H7}	B	C	D	H	Bending strength	Bending strength	(mm)	(kg)
PU1-30	30	S1	8	20	30	32	20	1.03	0.10	0~0.34	0.046
PU1-35	35			25	35	37	25	1.25	0.13		0.074
PU1-40	40		10	25	40	42	28	1.48	0.15		0.081
PU1-50	50			30	50	52	34	1.96	0.20		0.13
PU1-60	60			40	60	62	45	2.41	0.25	0~0.36	0.22
PU1-80	80			40	80	82	45	3.34	0.34		0.25
PU1.5-30	30			30	45	48	30	3.46	0.35	0~0.38	0.15
PU1.5-35	35			33	52.5	55.5	36	4.22	0.43	0~0.40	0.20
PU1.5-40	40			40	60	63	45	5.00	0.51		0.31
PU1.5-50	50		12	40	75	78	45	6.60	0.67		0.33
PU1.5-60	60			50	90	93	55	8.14	0.83		0.51
PU1.5-80	80			60	120	123	85	11.26	1.15	0~0.42	1.00
PU2-20	20		10	22	40	44	22	4.91	0.50		0.10
PU2-25	25			30	50	54	30	6.54	0.67		0.20
PU2-30	30			35	60	64	35	8.20	0.84	0~0.44	0.28
PU2-35	35		12	40	70	74	45	10.0	1.02		0.41
PU2-40	40		15	55	80	84	60	11.9	1.21		0.70
PU2-50	50			60	100	104	65	15.7	1.60		0.88
PU2-60	60			60	120	124	85	19.3	1.97	0~0.46	1.28

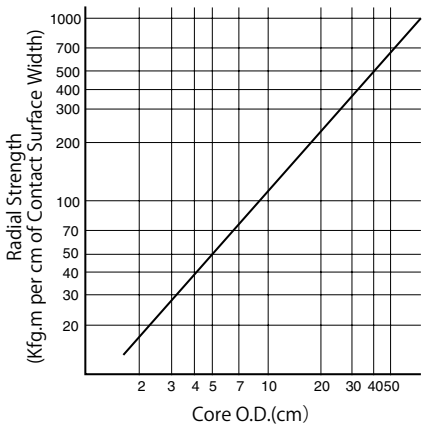
[Caution on Product Characteristics]
① Significant variations in temperature or humidity can cause dimensional changes in plastic gears (MC Nylon gears), including bore size (H8 when produced), tooth diameter, and backlash. Please see the section "Design of Plastic Gears" in separate technical reference book. (Page 101).
② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
③ When the core O.D is the same as the hub diameter, you may see some serration on the hub. There is no effect on the strength of the gear.
④ Without lubrication, using plastic gears in pairs may generate heat and dilation. It is recommended to mate them with steel gears.
⑤ 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.

[Caution on Secondary Operations]
①Please read "Caution on Performing Secondary Operations" (Page 32) 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.
② Even though the holding strength at the material interface is designed to be stronger than the teeth, a secondary operation may weaken the holding 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.

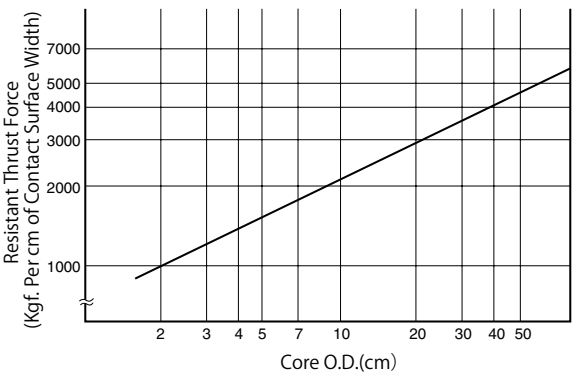
■ Definition of Holding Strength and Safety Factor

① The holding strength between the metal core and the molded material is a function of the contact area. The relationship between the core outside diameter and the radial strength (torque) is shown on the left, while the relationship between the core diameter and the resistant thrust force is shown on the right.

■ Relationship between radial strength and core diameter



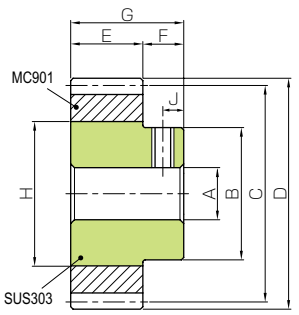
■ Relationship between resistant thrust force and core diameter



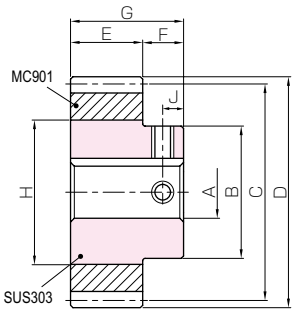
J Series

Plastic Spur Gears with Stainless Steel Core

Newly added



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	8	10	12	14	15	16	17	18	19	20	22	25	28	30	32	35
Screw size	—	5 × 2.3						6 × 2.8				8 × 3.3			10 × 3.3	
Catalog No.	M5	M4						M5				M6			M8	
PU1-30 J BORE																
PU1-35 J BORE																
PU1-40 J BORE																
PU1-50 J BORE																
PU1-60 J BORE																
PU1-80 J BORE																
PU1.5-30 J BORE																
PU1.5-35 J BORE																
PU1.5-40 J BORE																
PU1.5-50 J BORE																
PU1.5-60 J BORE																
PU1.5-80 J BORE																
PU2-20 J BORE																
PU2-25 J BORE																
PU2-30 J BORE																
PU2-35 J BORE																
PU2-40 J BORE																
PU2-50 J BORE																
PU2-60 J BORE																

[Caution on J series]

① 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.
② 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.
③ Keyways are made according to JIS B1301 standards, Js9 tolerance.
④ Certain products which would otherwise have a very long tapped hole are conterbored to reduce the length of the tap.
⑤ For products having a tapped hole, a set screw is included.

② When the ambient temperature rises, obtain the temperature compensation factor, T, from the chart on the right. Also, use a safety factor of 4 to 5 in the calculation.

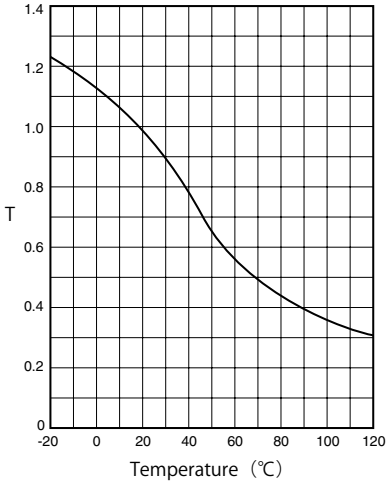
$$Tal = Tmax \times \frac{1}{\text{Safety Factor}} \times T$$

Where

Tal : Allowable Holding Strength at the contact surface
$Tmax$: Maximum Holding Strength - Find from the charts on the left.
T : Temperature Compensation Factor

＊ Data supplied by Japan Polypenco Limited.

■ Ambient temperature compensation factor T

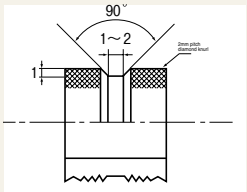


■ How is MC nylon fused to the metal core

This method is superior to other conventional methods such as bolting, shrink fitting and bonding.

① Outline of the procedure

The surface of the core material is rolled with a 2mm pitch diamond knurl. Then one or more grooves (1 to 2mm wide and 1mm deep) are cut as shown below. The metal surface is treated prior to casting nylon in a mold.

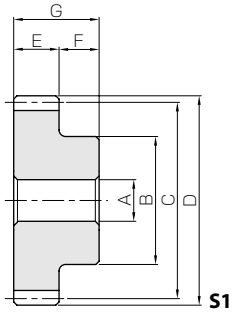


② Advantage of MC nylon with metal core

1. Wide temperature range.
There are examples of wheel use in furnaces at 130 to 140° C.
2. Good dimensional stability
Since nylon is fused to the whole outer surface of the metal hub, dimensional change is very small even under temperature variations.
3. Good appearance
Elimination of bolts and nuts provides a cleaner physical appearance.

Specifications	
Precision grade	JIS grade N9 (JIS B1702-1: 1998) ∗ JIS grade 5 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	MC901
Heat treatment	—
Tooth hardness	(115 ～ 120HRR)
Face width (E)	10
Hub width (F)	10
Total length (G)	20
Screw offset (J)	5

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



Catalog No.	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Allowable torque (N·m)	Allowable torque (kgf·m)	Backlash	Weight
			A_{H7}	B	C	D	Bending strength	Bending strength	(mm)	(kg)
PS1-15	15	S1	6	12	15	17	0.41	0.042	0~0.32	0.0027
PS1-16	16			12	16	18	0.45	0.046		0.0030
PS1-18	18			14	18	20	0.53	0.054		0.0041
PS1-20	20			16	20	22	0.61	0.063		0.0053
PS1-22	22		8	18	22	24	0.69	0.071	0~0.34	0.0062
PS1-24	24			20	24	26	0.77	0.079		0.0077
PS1-25	25			20	25	27	0.82	0.083		0.0082
PS1-26	26			20	26	28	0.86	0.088		0.0086
PS1-28	28			22	28	30	0.94	0.096		0.010
PS1-30	30			25	30	32	1.03	0.10		0.013
PS1-32	32			26	32	34	1.11	0.11		0.014
PS1-35	35			26	35	37	1.25	0.13		0.016
PS1-36	36			28	36	38	1.30	0.13		0.018
PS1-40	40		10	35	40	42	1.48	0.15		0.024
PS1-45	45			35	45	47	1.71	0.17		0.028
PS1-48	48			35	48	50	1.86	0.19		0.030
PS1-50	50				50	52	1.96	0.20		0.032
PS1-55	55				55	57	2.18	0.22	0~0.36	0.037
PS1-60	60				60	62	2.41	0.25		0.042
PS1-65	65				65	67	2.64	0.27		0.048
PS1-70	70			40	70	72	2.87	0.29		0.057
PS1-75	75				75	77	3.11	0.32		0.064
PS1-80	80				80	82	3.34	0.34		0.071
PS1-85	85				85	87	3.57	0.36		0.079
PS1-90	90				90	92	3.80	0.39		0.087
PS1-95	95			40	95	97	4.03	0.41		0.095
PS1-100	100				100	102	4.27	0.44		0.10

[Caution on Product Characteristics]
① Significant variations in temperature or humidity can cause dimensional changes in plastic gears (MC Nylon gears), including bore size (H8 when produced), tooth diameter, and backlash. Please see the section "Design of Plastic Gears" in separate technical reference book. (Page 101).
② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
③ Without lubrication, using plastic gears in pairs may generate heat and dilation. It is recommended to mate them with steel gears.
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.

[Caution on Secondary Operations]
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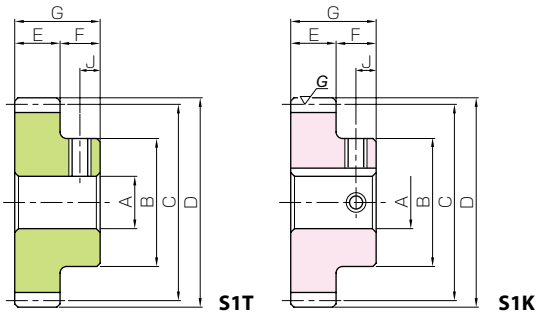
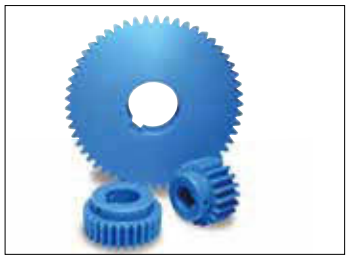
②Plastic gears are susceptible to the effects of temperature and moisture. Dimensional changes may occur while performing secondary operations and during post-machining operations.

∗ In regards to MC Nylon gears, other materials are available for plastic gears, including Ultra High Molecular Weight Polyethylene (UHMW-PE), which has excellent abrasion resistance. Poly Ether Ether Ketone (PEEK) also has quality properties. A single piece order is acceptable and will be produced as a custom-made gear. For details on quotations and orders please see page 8.

J Series

Plastic Spur Gears





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 No.	M4	M5	M4						M5				M6		
PS1-15 J BORE															
PS1-16 J BORE															
PS1-18 J BORE															
PS1-20 J BORE															
PS1-22 J BORE															
PS1-24 J BORE															
PS1-25 J BORE															
PS1-26 J BORE															
PS1-28 J BORE															
PS1-30 J BORE															
PS1-32 J BORE															
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PS1-45 J BORE															
PS1-48 J BORE															
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PS1-55 J BORE															
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PS1-65 J BORE															
PS1-70 J BORE															
PS1-75 J BORE															
PS1-80 J BORE															
PS1-85 J BORE															
PS1-90 J BORE															
PS1-95 J BORE															
PS1-100 J BORE															

[Caution on J series]

① 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.
② 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.
③ Keyways are made according to JIS B1301 standards, Js9 tolerance.
④ Certain products which would otherwise have a very long tapped hole are conterbored to reduce the length of the tap.
⑤ For products having a tapped hole, a set screw is included.
⑥ Since tapped holes of plastic products are easily broken, avoid too much tightening when fastening screws. For products which have a short tapped hole (Products marked with " ** " are the tap size), fasten with torques less than 0.12N・m for M4, and 0.38N・m for M5.

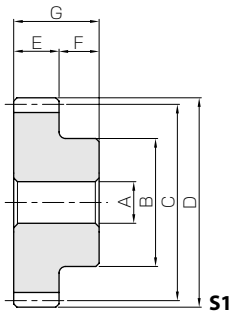
GCU-S Spur Gear Kit

Installment : Parallel axes gears (Two-stage)
Gear Type : Spur Gears
Gears : 2 units of SS1.5-16
2 units of PS1.5-22
Gear Ratio : 1.89
Weight : Approx. 1kg

The Gear Kit contains two-stage spur gears and allows speed increases / reductions, and includes the most commonly used combinations of gears.

Specifications	
Precision grade	JIS grade N9 (JIS B1702-1: 1998) ＊ JIS grade 5 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	MC901
Heat treatment	—
Tooth hardness	(115 ～ 120HRR)
Face width (E)	15
Hub width (F)	10
Total length (G)	25
Screw offset (J)	5

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



Catalog No.	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Allowable torque (N·m)	Allowable torque (kgf·m)	Backlash	Weight
			A_{H7}	B	C	D	Bending strength	Bending strength	(mm)	(kg)
PS1.5-15	15	S1	8	18	22.5	25.5	1.39	0.14	0~0.38	0.0084
PS1.5-16	16			20	24	27	1.53	0.16		0.010
PS1.5-18	18			22	27	30	1.79	0.18		0.013
PS1.5-20	20			24	30	33	2.07	0.21		0.016
PS1.5-22	22			26	33	36	2.34	0.24		0.020
PS1.5-24	24			28	36	39	2.61	0.27		0.023
PS1.5-25	25			30	37.5	40.5	2.76	0.28		0.026
PS1.5-26	26			32	39	42	2.91	0.3		0.029
PS1.5-28	28			36	42	45	3.18	0.32		0.034
PS1.5-30	30			38	45	48	3.46	0.35		0.039
PS1.5-32	32			40	48	51	3.76	0.38		0.045
PS1.5-35	35			42	52.5	55.5	4.22	0.43		0.052
PS1.5-36	36			45	54	57	4.38	0.45		0.057
PS1.5-40	40		10	45	60	63	5.00	0.51		0.065
PS1.5-45	45			45	67.5	70.5	5.79	0.59		0.078
PS1.5-48	48			45	72	75	6.27	0.64	0~0.40	0.087
PS1.5-50	50			45	75	78	6.60	0.67		0.093
PS1.5-55	55			45	82.5	85.5	7.36	0.75		0.11
PS1.5-60	60			50	90	93	8.14	0.83		0.13
PS1.5-65	65		12	50	97.5	100.5	8.91	0.91		0.15
PS1.5-70	70			50	105	108	9.69	0.99		0.17
PS1.5-75	75			50	112.5	115.5	10.5	1.07		0.19
PS1.5-80	80			55	120	123	11.3	1.15		0.22
PS1.5-85	85			55	127.5	130.5	12.0	1.23	0~0.42	0.25
PS1.5-90	90			55	135	138	12.8	1.31		0.27
PS1.5-95	95			60	142.5	145.5	13.6	1.39		0.31
PS1.5-100	100			60	150	153	14.4	1.47		0.34

[Caution on Product Characteristics]
① Significant variations in temperature or humidity can cause dimensional changes in plastic gears (MC Nylon gears), including bore size (H8 when produced), tooth diameter, and backlash. Please see the section "Design of Plastic Gears" in separate technical reference book. (Page 101).
② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
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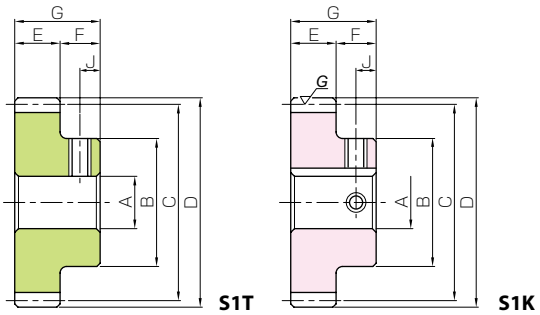
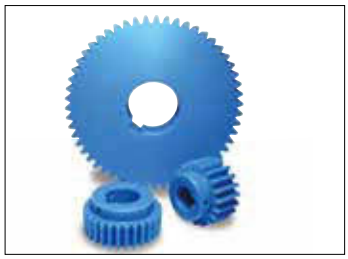
J Series

Plastic Spur Gears





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 No.	M4	M5	M4						M5				M6		
PS1.5-15 J BORE															
PS1.5-16 J BORE															
PS1.5-18 J BORE															
PS1.5-20 J BORE															
PS1.5-22 J BORE															
PS1.5-24 J BORE															
PS1.5-25 J BORE															
PS1.5-26 J BORE															
PS1.5-28 J BORE															
PS1.5-30 J BORE															
PS1.5-32 J BORE															
PS1.5-35 J BORE															
PS1.5-36 J BORE															
PS1.5-40 J BORE															
PS1.5-45 J BORE															
PS1.5-48 J BORE															
PS1.5-50 J BORE															
PS1.5-55 J BORE															
PS1.5-60 J BORE															
PS1.5-65 J BORE															
PS1.5-70 J BORE															
PS1.5-75 J BORE															
PS1.5-80 J BORE															
PS1.5-85 J BORE															
PS1.5-90 J BORE															
PS1.5-95 J BORE															
PS1.5-100 J BORE															

[Caution on J series]

① 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.
② 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.
③ Keyways are made according to JIS B1301 standards, Js9 tolerance.
④ Certain products which would otherwise have a very long tapped hole are conterbored to reduce the length of the tap.
⑤ For products having a tapped hole, a set screw is included.
⑥ Since tapped holes of plastic products are easily broken, avoid too much tightening when fastening screws. For products which have a short tapped hole (Products marked with " ** " are the tap size), fasten with torques less than 0.12N・m for M4, and 0.38N・m for M5.

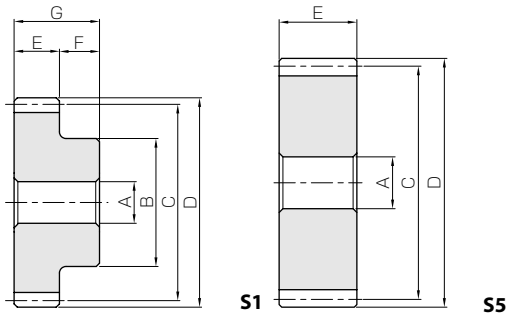
GCU-S Spur Gear Kit

Installment : Parallel axes gears (Two-stage)
Gear Type : Spur Gears
Gears : 2 units of SS1.5-16
2 units of PS1.5-22
Gear Ratio : 1.89
Weight : Approx. 1kg

The Gear Kit contains two-stage spur gears and allows speed increases / reductions, and includes the most commonly used combinations of gears.

Specifications	
Precision grade	JIS grade N9 (JIS B1702-1: 1998) ∗ JIS grade 5 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	MC901
Heat treatment	—
Tooth hardness	(115 ~ 120HRR)
Face width (E)	20
Hub width (F)	10 (Shape S1)
Total length (G)	30 (Shape S1)
Screw offset (J)	5 (Shape S1)

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



Catalog No.	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Allowable torque (N·m)	Allowable torque (kgf·m)	Backlash	Weight
			A_{H7}	B	C	D	Bending strength	Bending strength	(mm)	(kg)
PS2-12	12	S1	10	18	24	28	2.25	0.23	0~0.42	0.011
PS2-13	13			20	26	30	2.59	0.26		0.013
PS2-14	14			20	28	32	2.96	0.30		0.015
PS2-15	15			24	30	34	3.29	0.34		0.019
PS2-16	16			26	32	36	3.63	0.37		0.022
PS2-18	18			30	36	40	4.24	0.43		0.029
PS2-20	20			32	40	44	4.91	0.50		0.036
PS2-22	22			35	44	48	5.55	0.57		0.044
PS2-24	24			38	48	52	6.19	0.63		0.052
PS2-25	25			40	50	54	6.54	0.67		0.057
PS2-26	26			42	52	56	6.90	0.70	0~0.44	0.063
PS2-28	28			45	56	60	7.54	0.77		0.073
PS2-30	30			50	60	64	8.20	0.84		0.086
PSA2-32	32	S5	12	—	64	68	8.91	0.91		0.075
PSA2-35	35				70	74	10.0	1.02		0.089
PSA2-36	36				72	76	10.4	1.06		0.094
PSA2-40	40				80	84	11.9	1.21		0.12
PSA2-45	45				90	94	13.7	1.40		0.15
PSA2-48	48				96	100	14.9	1.52		0.17
PSA2-50	50				100	104	15.7	1.60		0.18
PSA2-55	55				110	114	17.5	1.78	0~0.46	0.22
PSA2-60	60				120	124	19.3	1.97		0.26
PSA2-65	65				130	134	21.1	2.15		0.31
PSA2-70	70				140	144	23.0	2.34		0.36
PSA2-75	75				150	154	24.9	2.54		0.41
PSA2-80	80				160	164	26.7	2.72		0.47
PSA2-85	85				170	174	28.5	2.91		0.53
PSA2-90	90				180	184	30.4	3.10		0.59
PSA2-95	95				190	194	32.3	3.29		0.66
PSA2-100	100				200	204	34.2	3.48		0.73

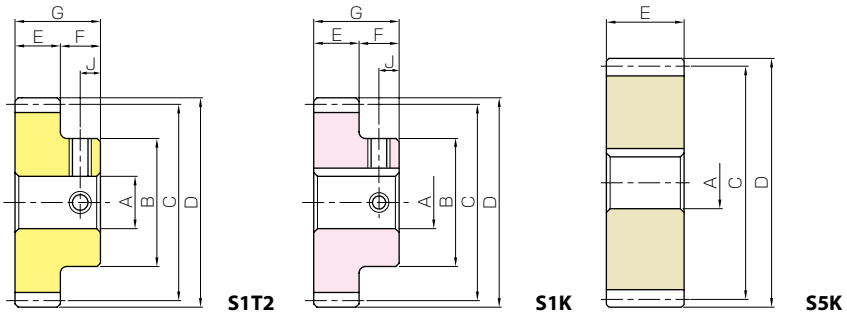
[Caution on Product Characteristics]
① Significant variations in temperature or humidity can cause dimensional changes in plastic gears (MC Nylon gears), including bore size (H8 when produced), tooth diameter, and backlash. Please see the section "Design of Plastic Gears" in separate technical reference book. (Page 101).
② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
③ Without lubrication, using plastic gears in pairs may generate heat and dilation. It is recommended to mate them with steel gears.
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.

[Caution on Secondary Operations]
①Please read "Caution on Performing Secondary Operations" (Page 32) 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.
②Plastic gears are susceptible to the effects of temperature and moisture. Dimensional changes may occur while performing secondary operations and during post-machining operations.

∗ In regards to MC Nylon gears, other materials are available for plastic gears, including Ultra High Molecular Weight Polyethylene (UHMW-PE), which has excellent abrasion resistance. Poly Ether Ether Ketone (PEEK) also has quality properties. A single piece order is acceptable and will be produced as a custom-made gear. For details on quotations and orders please see Page 8.

J Series

Plastic Spur Gears



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	10	12	14	15	16	17	18	19	20	22	25	28	30	32	35	40	45	50
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	14 x 3.8	
Catalog No.	M4						M5				M6			M8		—		
PS2-12 J BORE																		
PS2-13 J BORE																		
PS2-14 J BORE																		
PS2-15 J BORE																		
PS2-16 J BORE																		
PS2-18 J BORE																		
PS2-20 J BORE																		
PS2-22 J BORE																		
PS2-24 J BORE																		
PS2-25 J BORE																		
PS2-26 J BORE																		
PS2-28 J BORE																		
PS2-30 J BORE																		
PSA2-32 J BORE																		
PSA2-35 J BORE																		
PSA2-36 J BORE																		
PSA2-40 J BORE																		
PSA2-45 J BORE																		
PSA2-48 J BORE																		
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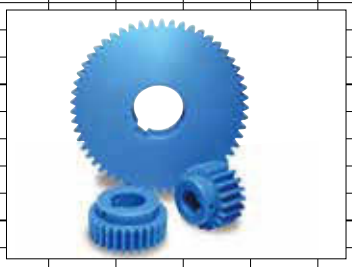
PSA2-90 J BORE																		
PSA2-95 J BORE																		
PSA2-100 J BORE																		



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③ Keyways are made according to JIS B1301 standards, Js9 tolerance.
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⑤ For products having a tapped hole, a set screw is included.
⑥ Since tapped holes of plastic products are easily broken, avoid too much tightening when fastening screws. For products which have a short tapped hole (Products marked with " ** " are the tap size), fasten with torques less than 0.12N • m for M4, and 0.38N • m for M5.

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Sectional Parts

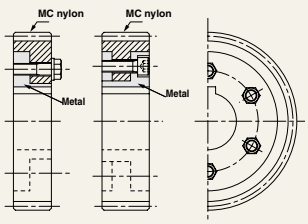
For details, please see Page 150.

■ How to attach gears to shafts

To attach gears to shafts, in case of light loads, methods include using keys, taper pins, spring pins, and press fitting after mounting the setscrews. While looseness tends to occur in the conditions below, plastic gears are fastened by applying a steel hub.

1. When the circumferential temperature is high
2. For large diameter gears
3. If forward-reverse motion impacts keys

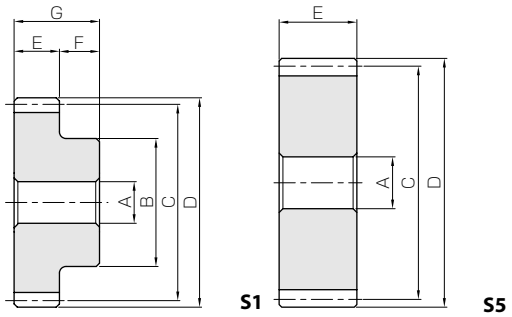
For fastening steel hubs into plastic gears with bolts, see below for various methods. For gears, which cannot be fasten with bolts due to their shape; it is recommended to use the method of fusion bonding with metal cores.



Fastening with a steel hub bolt

Specifications	
Precision grade	JIS grade N9 (JIS B1702-1: 1998) ∗ JIS grade 5 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	MC901
Heat treatment	—
Tooth hardness	(115 ~ 120HRR)
Face width (E)	20
Hub width (F)	12 (Shape S1)
Total length (G)	37 (Shape S1)
Screw offset (J)	6 (Shape S1)

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



Catalog No.	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Allowable torque (N·m)	Allowable torque (kgf·m)	Backlash	Weight
			A_{H7}	B	C	D	Bending strength	Bending strength	(mm)	(kg)
PS2.5-12	12	S1	10	23	30	35	4.39	0.45	0~0.44	0.023
PS2.5-13	13			25	32.5	37.5	5.06	0.52		0.028
PS2.5-14	14			25	35	40	5.77	0.59		0.031
PS2.5-15	15		12	30	37.5	42.5	6.42	0.65		0.037
PS2.5-16	16			32	40	45	7.09	0.72		0.043
PS2.5-18	18			38	45	50	8.28	0.84		0.057
PS2.5-20	20			40	50	55	9.59	0.98		0.070
PS2.5-22	22			44	55	60	10.8	1.11	0~0.46	0.085
PS2.5-24	24			48	60	65	12.1	1.23		0.10
PS2.5-25	25			50	62.5	67.5	12.8	1.30		0.11
PS2.5-26	26			55	65	70	13.5	1.37		0.12
PS2.5-28	28			60	70	75	14.7	1.50		0.15
PS2.5-30	30			65	75	80	16.0	1.63		0.17
PSA2.5-32	32	S5	15	—	80	85	17.4	1.77		0.15
PSA2.5-35	35				87.5	92.5	19.5	1.99		0.17
PSA2.5-36	36				90	95	20.3	2.07		0.18
PSA2.5-40	40				100	105	23.2	2.36		0.23
PSA2.5-45	45				112.5	117.5	26.8	2.73	0~0.48	0.29
PSA2.5-48	48				120	125	29.0	2.96		0.33
PSA2.5-50	50				125	130	30.6	3.12		0.36
PSA2.5-55	55				137.5	142.5	34.1	3.48		0.43
PSA2.5-60	60				150	155	37.7	3.84		0.51

[Caution on Product Characteristics]
① Significant variations in temperature or humidity can cause dimensional changes in plastic gears (MC Nylon gears), including bore size (H8 when produced), tooth diameter, and backlash. Please see the section "Design of Plastic Gears" in separate technical reference book. (Page 101).
② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
③ Without lubrication, using plastic gears in pairs may generate heat and dilation. It is recommended to mate them with steel gears.
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.

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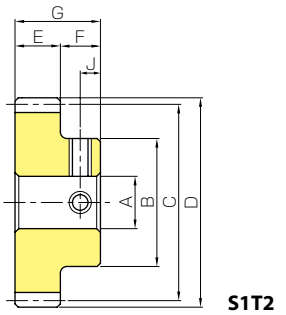
GCU-S Spur Gear Kit

Installment : Parallel axes gears (Two-stage)
Gear Type : Spur Gears
Gears : 2 units of SS1.5-16
2 units of PS1.5-22
Gear Ratio : 1.89
Weight : Approx. 1kg

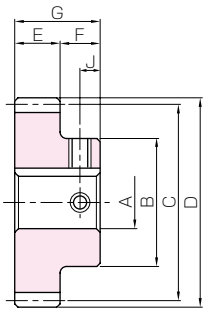
The Gear Kit contains two-stage spur gears and allows speed increases / reductions, and includes the most commonly used combinations of gears.

J Series

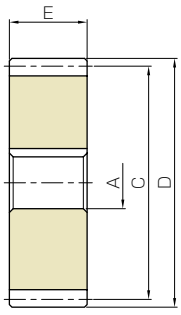
Plastic Spur Gears



S1T2



S1K



S5K

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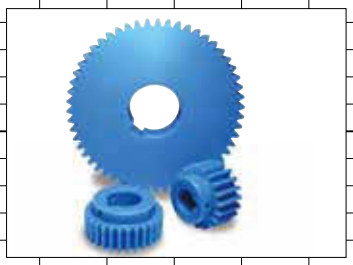
Bore H7	＊ The product shapes of J Series items are identified by background color.																	
Keyway Js9	10	12	14	15	16	17	18	19	20	22	25	28	30	32	35	40	45	50
Screw size	4 x 1.8		5 x 2.3				6 x 2.8				8 x 3.3			10 x 3.3		12 x 3.3	14 x 3.8	
Catalog No.	M4						M5				M6			M8		—		
PS2.5-12 J BORE																		
PS2.5-13 J BORE																		
PS2.5-14 J BORE																		
PS2.5-15 J BORE																		
PS2.5-16 J BORE																		
PS2.5-18 J BORE																		
PS2.5-20 J BORE																		
PS2.5-22 J BORE																		
PS2.5-24 J BORE																		
PS2.5-25 J BORE																		
PS2.5-26 J BORE																		
PS2.5-28 J BORE																		
PS2.5-30 J BORE																		
PSA2.5-32 J BORE																		
PSA2.5-35 J BORE																		
PSA2.5-36 J BORE																		
PSA2.5-40 J BORE																		
PSA2.5-45 J BORE																		
PSA2.5-48 J BORE																		
PSA2.5-50 J BORE																		
PSA2.5-55 J BORE																		
PSA2.5-60 J BORE																		



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For details, please see Page 150.

■ How to attach gears to shafts

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1. When the circumferential temperature is high
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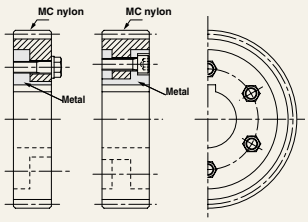
For fastening steel hubs into plastic gears with bolts, see below for various methods. For gears, which cannot be fasten with bolts due to their shape; it is recommended to use the method of fusion bonding with metal cores.



Fastening with a steel hub bolt

Specifications	
Precision grade	JIS grade N9 (JIS B1702-1: 1998) ∗ JIS grade 5 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	MC901
Heat treatment	—
Tooth hardness	(115 ~ 120HRR)
Face width (E)	30
Hub width (F)	15 (Shape S1)
Total length (G)	45 (Shape S1)
Screw offset (J)	7.5 (Shape S1)

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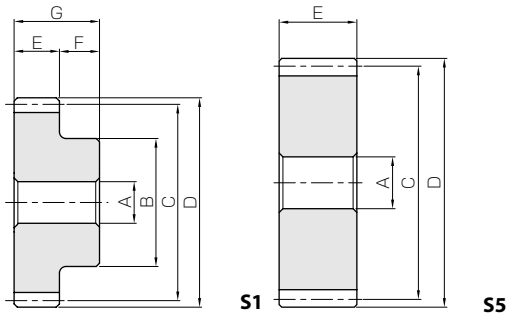

Catalog No.	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Allowable torque (N·m)	Allowable torque (kgf·m)	Backlash	Weight
			A_{H7}	B	C	D	Bending strength	Bending strength	(mm)	(kg)
PS3-12	12	S1	12	28	36	42	7.58	0.77	0~0.52	0.040
PS3-13	13			30	39	45	8.74	0.89		0.048
PS3-14	14			32	42	48	9.97	1.02		0.056
PS3-15	15		14	36	45	51	11.1	1.13		0.065
PS3-16	16			38	48	54	12.3	1.25		0.075
PS3-18	18			40	54	60	14.3	1.46	0~0.54	0.094
PS3-20	20			50	60	66	16.6	1.69		0.12
PS3-22	22			54	66	72	18.7	1.91		0.15
PS3-24	24			58	72	78	20.9	2.13		0.18
PS3-25	25			60	75	81	22.1	2.25		0.19
PS3-26	26			65	78	84	23.3	2.37		0.22
PS3-28	28			70	84	90	25.5	2.60		0.25
PS3-30	30			75	90	96	27.7	2.82		0.29
PSA3-32	32	S5	18	—	96	102	30.1	3.07	0~0.56	0.25
PSA3-35	35				105	111	33.8	3.44		0.30
PSA3-36	36				108	114	35.1	3.57		0.32
PSA3-40	40				120	126	40.0	4.08		0.39
PSA3-45	45				135	141	46.3	4.72		0.50
PSA3-48	48				144	150	50.2	5.12		0.57
PSA3-50	50				150	156	52.8	5.39		0.61
PSA3-55	55				165	171	58.9	6.01		0.74
PSA3-60	60				180	186	65.1	6.64		0.89

[Caution on Product Characteristics]
① Significant variations in temperature or humidity can cause dimensional changes in plastic gears (MC Nylon gears), including bore size (H8 when produced), tooth diameter, and backlash. Please see the section "Design of Plastic Gears" in separate technical reference book. (Page 101).
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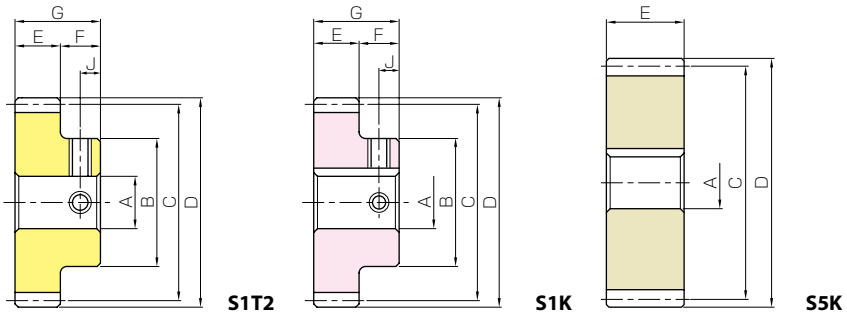
J Series

Plastic Spur Gears



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	10	12	14	15	16	17	18	19	20	22	25	28	30	32	35	40	45	50
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	14 x 3.8	
Catalog No.	M4						M5				M6			M8		—		
PS3-12 J BORE																		
PS3-13 J BORE																		
PS3-14 J BORE																		
PS3-15 J BORE																		
PS3-16 J BORE																		
PS3-18 J BORE																		
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PSA3-36 J BORE																		
PSA3-40 J BORE																		
PSA3-45 J BORE																		
PSA3-48 J BORE																		
PSA3-50 J BORE																		
PSA3-55 J BORE																		
PSA3-60 J BORE																		

[Caution on J series]

① 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.
② 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.
③ Keyways are made according to JIS B1301 standards, Js9 tolerance.
④ Certain products which would otherwise have a very long tapped hole are conterbored to reduce the length of the tap.
⑤ For products having a tapped hole, a set screw is included.
⑥ Since tapped holes of plastic products are easily broken, avoid too much tightening when fastening screws. For products which have a short tapped hole (Products marked with " ** " are the tap size), fasten with torques less than 0.12N・m for M4, and 0.38N・m for M5.

Stainless Steel Hubs for PSA are now available!

Standardized sectional stainless steel hubs. It enhances a secure fastening to the shaft.

Sectional Parts

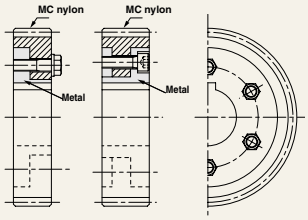
For details, please see Page 150.

■ How to attach gears to shafts

To attach gears to shafts, in case of light loads, methods include using keys, taper pins, spring pins, and press fitting after mounting the setscrews. While looseness tends to occur in the conditions below, plastic gears are fastened by applying a steel hub.

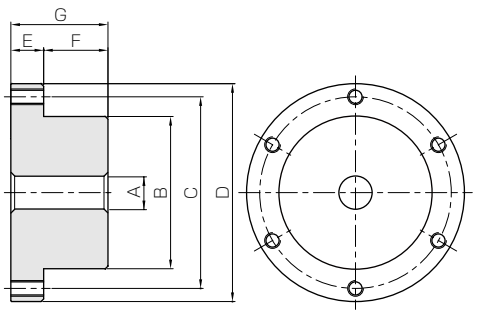
1. When the circumferential temperature is high
2. For large diameter gears
3. If forward-reverse motion impacts keys

For fastening steel hubs into plastic gears with bolts, see below for various methods. For gears, which cannot be fasten with bolts due to their shape; it is recommended to use the method of fusion bonding with metal cores.



Fastening with a steel hub bolt

Stainless Steel Hubs for PSA



■ Material : SUS303

Catalog No.	Partner	Shape	Bore	Hub dia.	Socket head screw			Flange diameter	Flange length	Hub width	Total length
			A_{H7}	B	No. of threaded hole	Size	C	D	E	F	G
SUKB20030 **SUKB20046** **SUKB20066**	**PSA2-32 or more** **PSA2-40 or more** **PSA2-50 or more**	T8	10	30 46 66	6	M5	42 58 78	51 67 87	10	20	30
SUKB25038 **SUKB25058** **SUKB25083**	**PSA2.5-32 or more** **PSA2.5-40 or more** **PSA2.5-50 or more**	T8	12	38 58 83	6	M6	53 73 98	63 83 108	12.5	24.5	37
SUKB30046 **SUKB30070** **SUKB30100**	**PSA3-32 or more** **PSA3-40 or more** **PSA3-50 or more**	T8	15	46 70 100	6	M8	64 88 118	76 100 130	15	30	45

[Caution on Product Characteristics]

① The area where PSA Plastic Spur Gears are attached, with hub tolerance h7.
② The friction coupling torques shown in the table are reference values calculated according to these set values; friction factors and fastening torques of the tapping screw.
③ Please refer to the assembly example below, and then attach the hub to the gear with the accessories, plain washers, spring washers and hexagon socket head cap screws.
④ In accordance with the fastening torque values shown in the dimension table, use a torque wrench and fasten hexagon socket head cap screws firmly, to attach the hub.
⑤ If a fastened hexagon socket head cap screw comes loose, the friction tightening torque values shown in the table can not be maintained. It is recommended to check the fasteners regularly and retighten when required.
⑥ For secure positioning, it is recommended to use dowel pins.

■ Features of Stainless Steel Hubs

- This is an attached stainless steel hub with excellent rust resistance.
- Perfectly matches with PSA Plastic Spur Gears, and suitable for food processing machinery.
- Efficient use of materials and superior cost performance for this product.

■ Friction Coupling Torque for Stainless Steel Hubs

Friction coupling torque, for Stainless Steel Hubs, is calculated from the frictional force generated by the fastening torque at the contact face of the gear and the stainless steel hub.

Fastening Torque F(N) is calculated from the equation below.

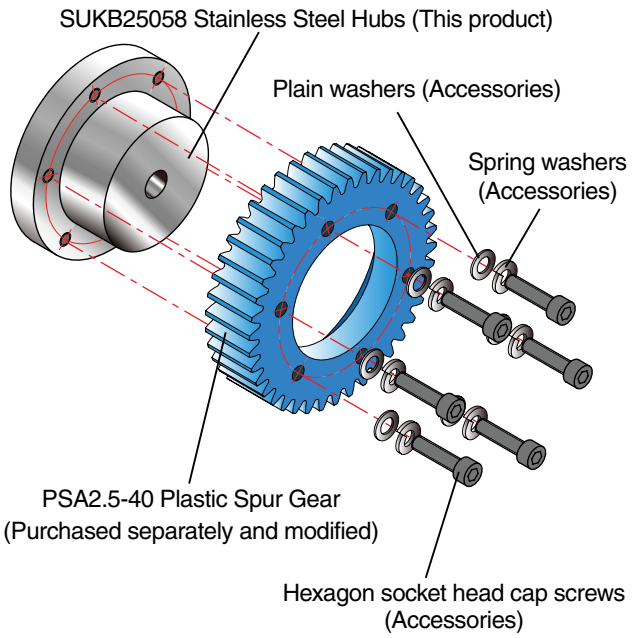
$$F = \frac{n \cdot 1000 \cdot T}{K \cdot d}$$

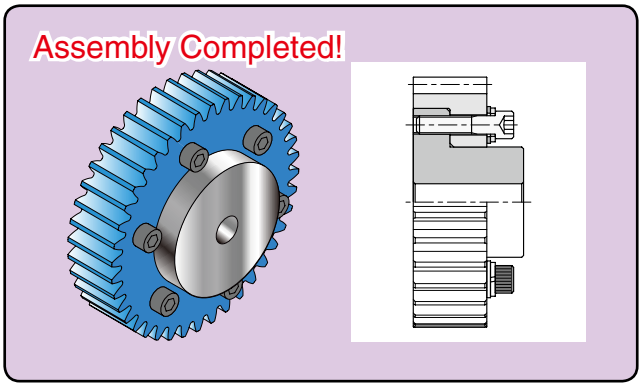
n : Number → No. of threaded holes shown in the dimension table.
T : Tightening torque (N・m) → Fastening torque shown in the dimension table.
K : Torque coefficient → Set the value at 0.164
d : Nominal diameter (mm) → Socket head screw size shown in the dimension table (M5 = 5mm)

Friction Coupling Torque T_f (N・m) is calculated from the equation below.

$$T_f = \frac{F \cdot \mu \cdot d_w}{2000}$$

F : Fastening torque (N) → The value obtained from the calculation above.
μ : Friction factor at the contact face of the gear and the stainless steel hub → Set the value at 0.18
d_w : Pitch diameter of the threaded hole (mm) → Socket head screw size C shown in the dimension table





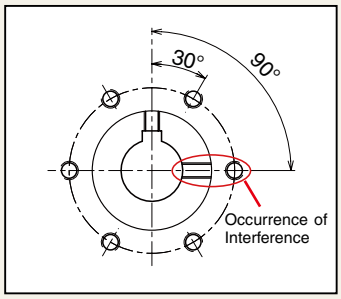
Recommended fastening torque		Friction coupling torque		Weight	Catalog No.
(N·m)	(kgf·m)	(N·m)	(kgf·m)	(kg)	
0.9	0.092	24.9 34.4 46.2	2.54 3.51 4.71	0.24 0.51 0.97	**SUKB20030** **SUKB20046** **SUKB20066**
1.5	0.15	43.6 60.1 80.7	4.45 6.13 8.23	0.47 0.98 1.88	**SUKB25038** **SUKB25058** **SUKB25083**
3.7	0.38	97.5 134 180	9.94 13.7 18.3	0.82 1.72 3.29	**SUKB30046** **SUKB30070** **SUKB30100**

[Caution on Secondary Operations]

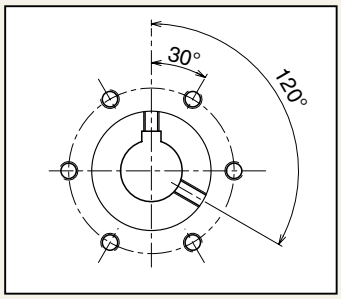
① Please read "Cautions on Performing Secondary Operations" in Page 32 when performing modification and/or secondary operations for safety concerns. KHK Quick-Mod Gears, the KHK's system for quick modification of KHK stock gears is also available.
② Datum plane for machining hubs is the outer circumference of the hub, where PSA Plastic Spur Gears are attached, and the flank of the flange is facing the hub.
③ For modifying tapped holes at the outer circumference of the hub, apply machining with care and in consideration of the positions of the screw holes for the fastening screws, that attach the hub. (This position is where no interference occurs with the hexagon socket head cap screws).

■ Tapped holes at the outer circumference of the hub

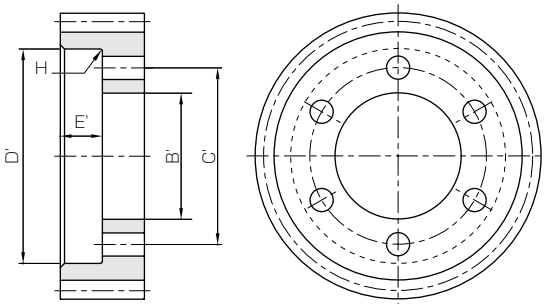
● Interference occurred



● Recommended positioning for two tapped holes



■ Partner Products and Modifications



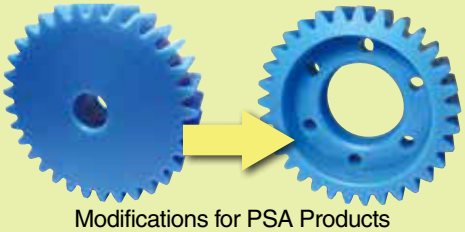
Stainless Steel Hubs	Partner							
Catalog No.	Catalog No.	Bore	Drilled hole			Bore 2	Length of bore	Fillet radius
		B'_{H8}	No. of threaded hole	Size	C'	D'	$E'_{\pm 0.1}$	H
SUKB20030 **SUKB20046** **SUKB20066**	**PSA2-32 or more** **PSA2-40 or more** **PSA2-50 or more**	30 46 66	6	ϕ5.5	42 58 78	51 67 87	10	R0.5 or less
SUKB25038 **SUKB25058** **SUKB25083**	**PSA2.5-32 or more** **PSA2.5-40 or more** **PSA2.5-50 or more**	38 58 83	6	ϕ6.6	53 73 98	63 83 108	12.5	R0.5 or less
SUKB30046 **SUKB30070** **SUKB30100**	**PSA3-32 or more** **PSA3-40 or more** **PSA3-50 or more**	46 70 100	6	ϕ9	64 88 118	76 100 130	15	R0.5 or less

Modifications for bores, keyways and tapped holes done in 3 days!

Please request modifications at KHK Quick-Mod Gears.

To find more information on KHK Quick-Mod Gears, please see Page 6.

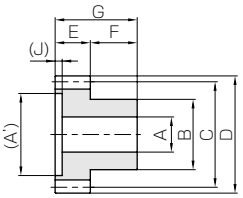
Modifications for SUKB Products (With fee)



Modifications for PSA Products
(Purchased separately and modified with fee)

Specifications	
Precision grade	JIS grade N12 (JIS B1702-1: 1998) ＊ JIS grade 8 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	Duracon acetal（M90-44）
Heat treatment	—
Tooth hardness	(110 ～ 120HRR)

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

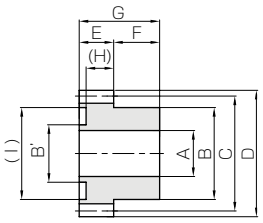


S8

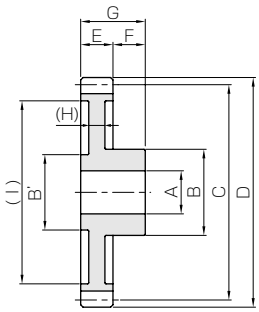
Catalog No.	Module	No. of teeth	Shape	Bore 1	Bore 2	Hub dia. 1	Hub dia. 2	Pitch dia.	Outside dia.	Face width	Hub width
				A	(A')	B	B'	C	D	E	F
DS0.5-12	***m*0.5**	12	S8	2	(4)	4.5	—	6	7	3	4
DS0.5-15		15	S8	2	(5.5)	4.5	—	7.5	8.5	3	4
DS0.5-16		16	S8	3	(6)	6	—	8	9	3	4
DS0.5-18		18	S8	3	(7)	6	—	9	10	3	4
DS0.5-20		20	S8B	4	—	8	5	10	11	3	4
DS0.5-24		24	S9	4	—	8	5	12	13	3	4
DS0.5-25		25	S9	4	—	8	6	12.5	13.5	3	4
DS0.5-28		28	S9	4	—	8	6	14	15	3	4
DS0.5-30		30	S9	5	—	10	7	15	16	3	4
DS0.5-32		32	S9	5	—	10	7	16	17	3	4
DS0.5-35		35	S9	5	—	10	7	17.5	18.5	3	4
DS0.5-36		36	S9	5	—	10	7	18	19	3	4
DS0.5-40		40	S9	5	—	12	8	20	21	3	4
DS0.5-45		45	S9	5	—	12	8	22.5	23.5	3	4
DS0.5-48		48	S9	5	—	12	8	24	25	3	4
DS0.5-50		50	S9	5	—	12	8	25	26	3	4
DS0.5-56		56	S9	6	—	14	10	28	29	3	5
DS0.5-60		60	S9	6	—	14	10	30	31	3	5
DS0.5-64		64	S9	6	—	14	10	32	33	3	5
DS0.5-70		70	S9	6	—	14	10	35	36	3	5
DS0.5-72		72	S9	6	—	14	10	36	37	3	5
DS0.5-80		80	S9	6	—	14	10	40	41	3	5
DS0.8-12	***m*0.8**	12	S9	3	—	6	4	9.6	11.2	4	5
DS0.8-15		15	S9	3	—	6	4.5	12	13.6	4	5
DS0.8-16		16	S9	4	—	8	6	12.8	14.4	4	5
DS0.8-18		18	S9	4	—	8	6	14.4	16	4	5
DS0.8-20		20	S9	5	—	10	8	16	17.6	4	5
DS0.8-24		24	S9	5	—	10	8	19.2	20.8	4	5
DS0.8-25		25	S9	5	—	10	8	20	21.6	4	5
DS0.8-28		28	S9	5	—	10	8	22.4	24	4	5
DS0.8-30		30	S9	6	—	12	10	24	25.6	4	5
DS0.8-32		32	S9	6	—	12	10	25.6	27.2	4	5
DS0.8-35		35	S9	6	—	12	10	28	29.6	4	5
DS0.8-36		36	S9	6	—	12	10	28.8	30.4	4	5
DS0.8-40		40	S9	6	—	12	10	32	33.6	4	5
DS0.8-45		45	S9	6	—	12	10	36	37.6	4	5
DS0.8-48		48	S9	6	—	14.5	11.7	38.4	40	4	6
DS0.8-50		50	S9	6	—	14.5	11.7	40	41.6	4	6
DS0.8-56		56	S9	6	—	14.5	11.7	44.8	46.4	4	6
DS0.8-60		60	S9	6	—	14.5	11.7	48	49.6	4	6
DS0.8-64		64	S9	6	—	15.5	11.7	51.2	52.8	4	6
DS0.8-70		70	S9	6	—	15.5	11.7	56	57.6	4	6
DS0.8-72		72	S9	6	—	15.5	11.7	57.6	59.2	4	6
DS0.8-80		80	S9	6	—	15.5	11.7	64	65.6	4	6

[Caution on Product Characteristics]
① The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
② 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.
③ The bore tolerance is generally -0.05 to -0.30 but may be + value at the central portion of the hole.
④ To find dimensional precision, see the table "Tolerance of Injection Molded Products".

Injection Molded Spur Gears



S8B



S9

Total length G	Web thickness (H)	Web O.D. (I)	Depth of counterbore (J)	Allowable torque (N·m) Bending strength	Allowable torque (kgf·m) Bending strength	Backlash (mm)	Weight (g)	Catalog No.
7	—	—	(0.6)	0.063	0.0064	0~0.30	0.17	**DS0.5-12**
7	—	—	(0.6)	0.092	0.0094		0.23	**DS0.5-15**
7	—	—	(0.6)	0.10	0.010		0.28	**DS0.5-16**
7	—	—	(0.6)	0.12	0.012		0.33	**DS0.5-18**
7	(2.4)	(8)	—	0.14	0.014		0.47	**DS0.5-20**
7	(1.8)	(9.5)	—	0.17	0.018		0.58	**DS0.5-24**
7	(1.8)	(10)	—	0.18	0.019		0.61	**DS0.5-25**
7	(1.8)	(11.5)	—	0.21	0.022		0.69	**DS0.5-28**
7	(1.8)	(12)	—	0.23	0.023		0.90	**DS0.5-30**
7	(1.8)	(13)	—	0.25	0.025		0.97	**DS0.5-32**
7	(1.8)	(14.5)	—	0.28	0.029		1.09	**DS0.5-35**
7	(1.8)	(15)	—	0.29	0.030		1.13	**DS0.5-36**
7	(1.8)	(16.5)	—	0.33	0.034		1.53	**DS0.5-40**
7	(1.8)	(19)	—	0.38	0.039		1.78	**DS0.5-45**
7	(1.8)	(21)	—	0.42	0.043		1.91	**DS0.5-48**
7	(1.8)	(21.5)	—	0.44	0.045		2.02	**DS0.5-50**
8	(1.8)	(24.5)	—	0.50	0.051		2.77	**DS0.5-56**
8	(1.8)	(26.5)	—	0.54	0.055		3.02	**DS0.5-60**
8	(1.8)	(28.5)	—	0.58	0.059		3.29	**DS0.5-64**
8	(1.8)	(31.5)	—	0.64	0.066		3.71	**DS0.5-70**
8	(1.8)	(32)	—	0.67	0.068		3.86	**DS0.5-72**
8	(1.8)	(36.5)	—	0.75	0.076		4.51	**DS0.5-80**
9	(2)	(6.7)	—	0.22	0.022	0~0.48	0.48	**DS0.8-12**
9	(2)	(8.8)	—	0.31	0.032		0.64	**DS0.8-15**
9	(2)	(9.2)	—	0.35	0.035		0.84	**DS0.8-16**
9	(2)	(10.7)	—	0.41	0.041		0.97	**DS0.8-18**
9	(2)	(12.7)	—	0.47	0.048		1.26	**DS0.8-20**
9	(2)	(15)	—	0.59	0.060		1.59	**DS0.8-24**
9	(2)	(16.5)	—	0.63	0.064		1.73	**DS0.8-25**
9	(2)	(18.5)	—	0.72	0.074		1.91	**DS0.8-28**
9	(2)	(19.5)	—	0.79	0.080		2.37	**DS0.8-30**
9	(2)	(21)	—	0.85	0.087		2.57	**DS0.8-32**
9	(2)	(23.5)	—	0.96	0.098		2.91	**DS0.8-35**
9	(2)	(24.5)	—	0.99	0.10		3.00	**DS0.8-36**
9	(2)	(27.5)	—	1.13	0.12		3.47	**DS0.8-40**
9	(2)	(31)	—	1.31	0.13		4.18	**DS0.8-45**
10	(2)	(33.5)	—	1.42	0.15		5.31	**DS0.8-48**
10	(2)	(35)	—	1.50	0.15		5.60	**DS0.8-50**
10	(2)	(39.5)	—	1.70	0.17		6.55	**DS0.8-56**
10	(2)	(42.5)	—	1.85	0.19		7.30	**DS0.8-60**
10	(2)	(46)	—	1.98	0.20		8.64	**DS0.8-64**
10	(2)	(50.5)	—	2.20	0.22		9.52	**DS0.8-70**
10	(2)	(51.5)	—	2.27	0.23		9.85	**DS0.8-72**
10	(2)	(55.5)	—	2.55	0.26		11.8	**DS0.8-80**

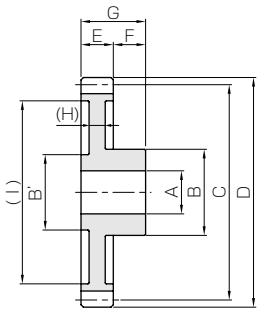
[Caution on Secondary Operations] ① Injection molded products may have air bubbles inside of the material; please avoid performing secondary operations.

DS Injection Molded Spur Gears

Module 1

Specifications	
Precision grade	JIS grade N12 (JIS B1702-1: 1998) ＊ JIS grade 8 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	Duracon acetal（M90-44）
Heat treatment	—
Tooth hardness	(110 ～ 120HRR)

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



S9

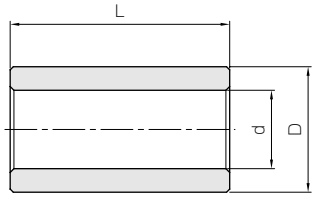
Catalog No.	Module	No. of teeth	Shape	Bore 1	Bore 2	Hub dia. 1	Hub dia. 2	Pitch dia.	Outside dia.	Face width	Hub width
				A	(A')	B	B'	C	D	E	F
DS1-12		12	S9	4	—	8	6	12	14	6	6
DS1-15		15	S9	4	—	8	7	15	17	6	6
DS1-16		16	S9	5	—	10	8	16	18	6	6
DS1-18		18	S9	5	—	10	8	18	20	6	6
DS1-20		20	S9	5	—	11.7	9	20	22	6	6
DS1-24		24	S9	5	—	11.7	9	24	26	6	6
DS1-25		25	S9	5	—	11.7	9	25	27	6	6
DS1-28		28	S9	5	—	11.7	9	28	30	6	6
DS1-30		30	S9	6	—	14	12	30	32	6	6
DS1-32		32	S9	6	—	14	12	32	34	6	6
DS1-35	***m*1**	35	S9	6	—	14	12	35	37	6	6
DS1-36		36	S9	6	—	14	12	36	38	6	6
DS1-40		40	S9	8	—	16	14	40	42	6	6
DS1-45		45	S9	8	—	16	14	45	47	6	6
DS1-48		48	S9	8	—	16	14	48	50	6	8
DS1-50		50	S9	8	—	16	14	50	52	6	8
DS1-56		56	S9	8	—	18	15.6	56	58	6	8
DS1-60		60	S9	8	—	18	15.6	60	62	6	8
DS1-64		64	S9	8	—	18	15.6	64	66	6	8
DS1-70		70	S9	8	—	18	15.6	70	72	6	8
DS1-72		72	S9	8	—	18	15.6	72	74	6	8
DS1-80		80	S9	8	—	18	15.6	80	82	6	8

[Caution on Product Characteristics]
① The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
② 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.
③ The bore tolerance is generally -0.05 to -0.30 but may be + value at the central portion of the hole.
④ To find dimensional precision, see the table "Tolerance of Injection Molded Products".

BB Sintered Metal Bushings

Sintered Metal Bushings

The table below shows a series of standard metal bushings that can be pressed into standard injection molded gears.



T8

Catalog No.	I.D. of bushing	O.D. of bushing	Length	Products that can use the bushing
	d $^{+0.02}_{0}$	D $^{+0.02}_{-0.01}$	L $^{0}_{-0.3}$	
BB30507	3	5	7	DS0.5
BB30608	3	6	8	DS0.5,DS0.8
BB40609	4	6	9	DS0.8
BB40612	4	6	12	DS1
BB50812	5	8	12	DS1
BB50814	5	8	14	DS1

Material：Oil impregnated sintered bronze

Total length	Web thickness	Web O.D.	Depth of counterbore	Allowable torque (N·m)	Allowable torque (kgf·m)	Backlash	Weight	Catalog No.
G	(H)	(I)	(J)	Bending strength	Bending strength	(mm)	(g)	
12	(3)	(8.5)	—	0.44	0.045		1.10	**DS1-12**
12	(3)	(11)	—	0.65	0.066		1.49	**DS1-15**
12	(3)	(11.5)	—	0.71	0.073		1.87	**DS1-16**
12	(3)	(13.5)	—	0.83	0.085		2.15	**DS1-18**
12	(3)	(15)	—	0.96	0.098		2.85	**DS1-20**
12	(3)	(17)	—	1.22	0.12		3.81	**DS1-24**
12	(3)	(20)	—	1.28	0.13		3.76	**DS1-25**
12	(3)	(23)	—	1.48	0.15		4.39	**DS1-28**
12	(3)	(24)	—	1.61	0.16		5.46	**DS1-30**
12	(3)	(26.5)	—	1.75	0.18		5.86	**DS1-32**
12	(3)	(29)	—	1.96	0.20		6.73	**DS1-35**
12	(3)	(30)	—	2.04	0.21		7.01	**DS1-36**
12	(3)	(34)	—	2.33	0.24		8.39	**DS1-40**
12	(3)	(39.5)	—	2.69	0.27		9.87	**DS1-45**
14	(3)	(40)	—	2.92	0.30		12.0	**DS1-48**
14	(3)	(42.5)	—	3.07	0.31		12.6	**DS1-50**
14	(3)	(48.5)	—	3.49	0.36		15.8	**DS1-56**
14	(3)	(52.5)	—	3.78	0.39		17.6	**DS1-60**
14	(3)	(56.5)	—	4.07	0.41		19.4	**DS1-64**
14	(3)	(62.5)	—	4.50	0.46		22.4	**DS1-70**
14	(3)	(64)	—	4.65	0.47		23.7	**DS1-72**
14	(3)	(72.5)	—	5.23	0.53		27.9	**DS1-80**

0~0.60

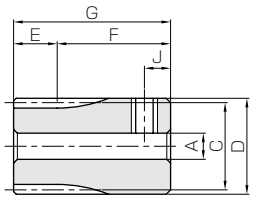
[Caution on Secondary Operations] ① Injection molded products may have air bubbles inside of the material; please avoid performing secondary operations.

■ Tolerance of Injection Molded Products. (Unit : mm)

Range	Tolerance
below 3 mm	± 0.20
3 up to 6 mm	± 0.25
6 up to 10 mm	± 0.30
10 up to 18 mm	± 0.35
18 up to 30 mm	± 0.40
30 mm up	± 0.50

Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) ＊ JIS grade 4 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	Free cutting brass（C3604）
Heat treatment	—
Tooth hardness	(more than 80HV)

＊ The precision grade of products with a module of less than 0.8 is equivalent to the value shown in the table.

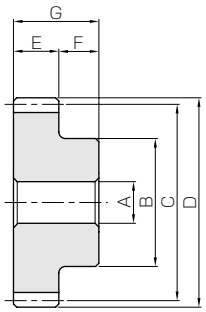


S3T

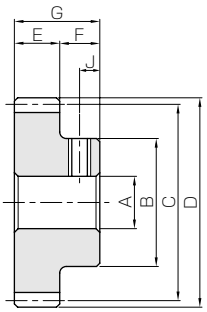
Catalog No.	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total length	Keyway
				A_{H7}	B	C	D	E	F	G	Width×Depth
BSS0.5-15A	*m*0.5	15	S3T	3	8.5	7.5	8.5	3	11	14	—
BSS0.5-16A		16	S3T	3	9	8	9	3	11	14	—
BSS0.5-17A		17	S3T	3	9.5	8.5	9.5	3	11	14	—
BSS0.5-18A		18	S3T	3	10	9	10	3	11	14	—
BSS0.5-19A		19	S3T	3	10.5	9.5	10.5	3	11	14	—
BSS0.5-20 **BSS0.5-20A** **BSS0.5-20B**		20	S1 S3T S3T	4 3 4	8.5 11 11	10	11	3	7 11 11	10 14 14	— — —
BSS0.5-21A		21	S3T	3	11.5	10.5	11.5	3	11	14	—
BSS0.5-22A		22	S1T	3	9	11	12	3	7	10	—
BSS0.5-23A		23	S1T	3	9	11.5	12.5	3	7	10	—
BSS0.5-24A		24	S1T	3	10	12	13	3	7	10	—
BSS0.5-24B		24	S1T	4	10	12	13	3	7	10	—
BSS0.5-25 **BSS0.5-25A** **BSS0.5-25B**		25	S1 S1T S1T	4 3 4	11 10 10	12.5	13.5	3	7	10	— — —
BSS0.5-26A		26	S1T	3	10	13	14	3	7	10	—
BSS0.5-27A		27	S1T	3	10	13.5	14.5	3	7	10	—
BSS0.5-28A		28	S1T	3	12	14	15	3	7	10	—
BSS0.5-29A		29	S1T	3	12	14.5	15.5	3	7	10	—
BSS0.5-30 **BSS0.5-30A** **BSS0.5-30B** **BSS0.5-30C**		30	S1 S1T S1T S1T	4 3 4 5	13 12 12 12	15	16	3	7	10	— — — —
BSS0.5-32A		32	S1T	4	14	16	17	3	7	10	—
BSS0.5-34A		34	S1T	4	15	17	18	3	7	10	—
BSS0.5-35A		35	S1T	4	15	17.5	18.5	3	7	10	—
BSS0.5-36A		36	S1T	4	16	18	19	3	7	10	—
BSS0.5-38A		38	S1T	4	16	19	20	3	7	10	—
BSS0.5-40 **BSS0.5-40A** **BSS0.5-40B**		40	S1 S1T S1T	4 4 5	17 18 18	20	21	3	7	10	— — —
BSS0.5-50A **BSS0.5-50B**		50	S1T S1T	4 5	22 22	25	26	3	7	10	— —
BSS0.5-60A **BSS0.5-60B**		60	S1T S1T	5 6	28 28	30	31	3	7	10	— —
BSS0.5-70A **BSS0.5-70B**		70	S1T S1T	5 6	28 28	35	36	3	7	10	— —
BSS0.5-80A **BSS0.5-80B**		80	S1T S1T	5 6	28 28	40	41	3	7	10	— —

[Caution on Product Characteristics]
① For products with a tapped hole, a set screw is included.
② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 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 If diameter is less than φ 4, the diameter tolerance is H8. If diameter is φ 5 or φ 6, and the hole length exceeds 3 times of the diameter, the tolerance is also H8.

＊ For products not categorized in our KHK Stock Gear series, custom gear production services with short lead times is available. For details see Page 8.



S1



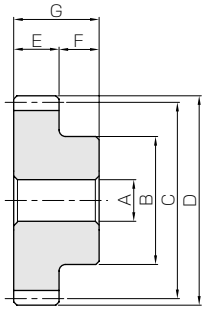
S1T

Set Screw		Allowable torque (N·m)	Allowable torque (kgf·m)	Backlash	Weight	Catalog No.
Size	J	Bending strength	Bending strength	(mm)	(kg)	
M3	2.5	0.058	0.0059	0 ~0.10	0.0054	**BSS0.5-15A**
M3	2.5	0.065	0.0066	0 ~0.10	0.0062	**BSS0.5-16A**
M3	2.5	0.071	0.0072	0 ~0.10	0.0070	**BSS0.5-17A**
M3	2.5	0.078	0.0079	0 ~0.10	0.0079	**BSS0.5-18A**
M3	2.5	0.084	0.0086	0 ~0.10	0.0088	**BSS0.5-19A**
—	—	0.091	0.0093	0 ~0.10	0.0043	**BSS0.5-20**
M3	2.5				0.0098	**BSS0.5-20A**
M3	2.5				0.0091	**BSS0.5-20B**
M3	2.5	0.10	0.0099	0 ~0.10	0.011	**BSS0.5-21A**
M3	3.5	0.10	0.011	0 ~0.10	0.0054	**BSS0.5-22A**
M3	3.5	0.11	0.011	0 ~0.10	0.0056	**BSS0.5-23A**
M3	3.5	0.12	0.012	0 ~0.10	0.0067	**BSS0.5-24A**
M3	3.5	0.12	0.012	0 ~0.10	0.0063	**BSS0.5-24B**
—	—	0.12	0.013	0 ~0.10	0.0077	**BSS0.5-25**
M3	3.5				0.0070	**BSS0.5-25A**
M3	3.5				0.0065	**BSS0.5-25B**
M3	3.5	0.13	0.013	0 ~0.10	0.0072	**BSS0.5-26A**
M3	3.5	0.14	0.014	0 ~0.10	0.0075	**BSS0.5-27A**
M3	3.5	0.15	0.015	0 ~0.10	0.0097	**BSS0.5-28A**
M3	3.5	0.15	0.016	0 ~0.10	0.010	**BSS0.5-29A**
—	—	0.16	0.016	0 ~0.10	0.011	**BSS0.5-30**
M3	3.5				0.010	**BSS0.5-30A**
M3	3.5				0.0099	**BSS0.5-30B**
M4	3.5				0.0092	**BSS0.5-30C**
M3	3.5	0.17	0.018	0 ~0.10	0.013	**BSS0.5-32A**
M3	3.5	0.19	0.019	0 ~0.10	0.015	**BSS0.5-34A**
M3	3.5	0.20	0.020	0 ~0.10	0.015	**BSS0.5-35A**
M3	3.5	0.20	0.021	0 ~0.10	0.017	**BSS0.5-36A**
M3	3.5	0.22	0.022	0 ~0.10	0.018	**BSS0.5-38A**
—	—	0.23	0.024	0 ~0.10	0.020	**BSS0.5-40**
M3	3.5				0.022	**BSS0.5-40A**
M4	3.5				0.021	**BSS0.5-40B**
M3	3.5	0.31	0.031	0 ~0.10	0.033	**BSS0.5-50A**
M4	3.5				0.032	**BSS0.5-50B**
M4	3.5	0.38	0.039	0 ~0.10	0.052	**BSS0.5-60A**
M4	3.5				0.051	**BSS0.5-60B**
M4	3.5	0.46	0.047	0 ~0.10	0.058	**BSS0.5-70A**
M4	3.5				0.057	**BSS0.5-70B**
M4	3.5	0.54	0.055	0 ~0.10	0.065	**BSS0.5-80A**
M4	3.5				0.065	**BSS0.5-80B**

[Caution on Secondary Operations] ①Please read "Caution on Performing Secondary Operations" (Page 32) 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.
② Avoid performing secondary operations that narrow the tooth width as it affects precision and strength.
③ When performing secondary operations, be aware of deflection and distortion as the tooth is thin in width.

Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) ＊ JIS grade 4 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	Free cutting brass（C3604）
Heat treatment	—
Tooth hardness	(more than 80HV)

＊ The precision grade of products with a module of less than 0.8 is equivalent to the value shown in the table.



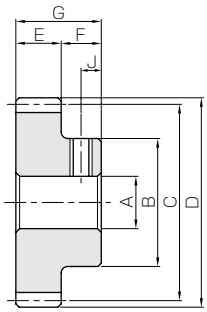
S1

Catalog No.	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total length	Keyway
				A_{H7}	B	C	D	E	F	G	Width×Depth
BSS0.8-15A	*m*0.8	15	S1T	4	9	12	13.6	4	8	12	—
BSS0.8-16A		16	S1T	4	10	12.8	14.4	4	8	12	—
BSS0.8-17A		17	S1T	4	10	13.6	15.2	4	8	12	—
BSS0.8-18A		18	S1T	4	10	14.4	16	4	8	12	—
BSS0.8-19A		19	S1T	4	12	15.2	16.8	4	8	12	—
BSS0.8-20 **BSS0.8-20A** **BSS0.8-20B**		20	S1 S1T S1T	5 4 5	13.5 12 12	16	17.6	4	8	12	— — —
BSS0.8-21A		21	S1T	5	14	16.8	18.4	4	8	12	—
BSS0.8-22A		22	S1T	5	15	17.6	19.2	4	8	12	—
BSS0.8-23A		23	S1T	5	15	18.4	20	4	8	12	—
BSS0.8-24A **BSS0.8-24B**		24	S1T S1T	4 5	16 16	19.2	20.8	4	8	12	— —
BSS0.8-25 **BSS0.8-25A** **BSS0.8-25B**		25	S1 S1T S1T	5 4 5	17 16 16	20	21.6	4	8	12	— — —
BSS0.8-26A		26	S1T	5	18	20.8	22.4	4	8	12	—
BSS0.8-27A		27	S1T	5	18	21.6	23.2	4	8	12	—
BSS0.8-28A		28	S1T	5	18	22.4	24	4	8	12	—
BSS0.8-29A		29	S1T	5	20	23.2	24.8	4	8	12	—
BSS0.8-30 **BSS0.8-30A** **BSS0.8-30B** **BSS0.8-30C**		30	S1 S1T S1T S1T	5 4 5 6	20 20 20 20	24	25.6	4	8	12	— — — —
BSS0.8-32A		32	S1T	5	22	25.6	27.2	4	8	12	—
BSS0.8-34A		34	S1T	5	22	27.2	28.8	4	8	12	—
BSS0.8-35A		35	S1T	5	25	28	29.6	4	8	12	—
BSS0.8-36A		36	S1T	5	25	28.8	30.4	4	8	12	—
BSS0.8-38A		38	S1T	5	25	30.4	32	4	8	12	—
BSS0.8-40 **BSS0.8-40A** **BSS0.8-40B**		40	S1 S1T S1T	5 5 6	20 28 28	32	33.6	4	8	12	— — —
BSS0.8-50A **BSS0.8-50B**		50	S1T S1T	5 6	28 28	40	41.6	4	8	12	— —
BSS0.8-60A **BSS0.8-60B**		60	S1T S1T	5 6	28 28	48	49.6	4	8	12	— —

[Caution on Product Characteristics]

① For products with a tapped hole, a set screw is included.
② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 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 If diameter is less than φ 4, the diameter tolerance is H8. If diameter is φ 5 or φ 6, and the hole length exceeds 3 times of the diameter, the tolerance is also H8.

＊ For products not categorized in our KHK Stock Gear series, custom gear production services with short lead times is available. For details see Page 8.

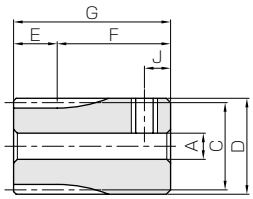


S1T

Set Screw		Allowable torque (N·m)	Allowable torque (kgf·m)	Backlash	Weight	Catalog No.
Size	J	Bending strength	Bending strength	(mm)	(kg)	
M3	4	0.20	0.020	0 ~0.10	0.0067	**BSS0.8-15A**
M3	4	0.22	0.022	0 ~0.10	0.0082	**BSS0.8-16A**
M3	4	0.24	0.025	0 ~0.10	0.0088	**BSS0.8-17A**
M3	4	0.26	0.027	0 ~0.10	0.0094	**BSS0.8-18A**
M3	4	0.29	0.029	0 ~0.10	0.012	**BSS0.8-19A**
—	—	0.31	0.032	0 ~0.10	0.014	**BSS0.8-20**
M3	4				0.013	**BSS0.8-20A**
M4	4				0.012	**BSS0.8-20B**
M4	4	0.33	0.034	0 ~0.10	0.015	**BSS0.8-21A**
M4	4	0.36	0.036	0 ~0.10	0.018	**BSS0.8-22A**
M4	4	0.38	0.039	0 ~0.10	0.018	**BSS0.8-23A**
M3	4	0.40	0.041	0 ~0.10	0.022	**BSS0.8-24A**
M4	4			0 ~0.10	0.021	**BSS0.8-24B**
—	—	0.43	0.043	0 ~0.10	0.024	**BSS0.8-25**
M3	4				0.023	**BSS0.8-25A**
M4	4				0.022	**BSS0.8-25B**
M4	4	0.45	0.046	0 ~0.10	0.026	**BSS0.8-26A**
M4	4	0.47	0.048	0 ~0.10	0.027	**BSS0.8-27A**
M4	4	0.50	0.051	0 ~0.10	0.028	**BSS0.8-28A**
M4	4	0.52	0.053	0 ~0.10	0.033	**BSS0.8-29A**
—	—	0.55	0.056	0 ~0.10	0.034	**BSS0.8-30**
M3	4				0.035	**BSS0.8-30A**
M4	4				0.034	**BSS0.8-30B**
M4	4				0.033	**BSS0.8-30C**
M4	4	0.60	0.061	0 ~0.10	0.040	**BSS0.8-32A**
M4	4	0.64	0.066	0 ~0.10	0.042	**BSS0.8-34A**
M4	4	0.67	0.068	0 ~0.10	0.051	**BSS0.8-35A**
M4	4	0.69	0.071	0 ~0.10	0.052	**BSS0.8-36A**
M4	4	0.74	0.076	0 ~0.10	0.055	**BSS0.8-38A**
—	—	0.79	0.081	0 ~0.10	0.046	**BSS0.8-40**
M4	4				0.066	**BSS0.8-40A**
M4	4				0.065	**BSS0.8-40B**
M4	4	1.05	0.11	0 ~0.10	0.081	**BSS0.8-50A**
M4	4				0.080	**BSS0.8-50B**
M4	4	1.31	0.13	0 ~0.10	0.10	**BSS0.8-60A**
M4	4				0.099	**BSS0.8-60B**

[Caution on Secondary Operations] ①Please read "Caution on Performing Secondary Operations" (Page 32) 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.
② Avoid performing secondary operations that narrow the tooth width as it affects precision and strength.
③ When performing secondary operations, be aware of deflection and distortion as the tooth is thin in width.

Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) JIS grade 4 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	Free cutting brass（C3604）
Heat treatment	—
Tooth hardness	(more than 80HV)

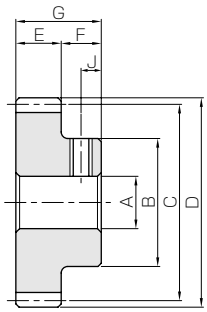


S3T

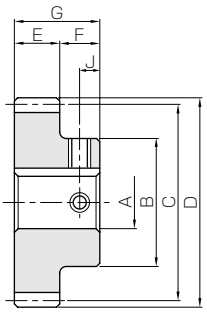
Catalog No.	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total length	Keyway
				A_{H7}	B	C	D	E	F	G	Width×Depth
BSS1-15A	***m*1**	15	S3T	4	17	15	17	6	15	21	—
BSS1-15B			S3T	5	17						—
BSS1-16A		16	S1T	4	12	16	18	6	8	14	—
BSS1-16B			S1T	5	12						—
BSS1-17A		17	S1T	6	14	17	19	6	8	14	—
BSS1-18A		18	S1T	5	15	18	20	6	8	14	—
BSS1-18B			S1T	6	15						—
BSS1-19A		19	S1T	6	16	19	21	6	8	14	—
BSS1-20A		20	S1T	4	16	20	22	6	8	14	—
BSS1-20B			S1T	5	16						—
BSS1-20C			S1T	6	16						—
BSS1-21A		21	S1T	6	18	21	23	6	8	14	—
BSS1-22A		22	S1T	6	18	22	24	6	8	14	—
BSS1-23A		23	S1T	6	20	23	25	6	8	14	—
BSS1-24A		24	S1T	5	20	24	26	6	8	14	—
BSS1-24B			S1T	6	20						—
BSS1-24C			S1T	8	20						—
BSS1-25A		25	S1T	5	22	25	27	6	8	14	—
BSS1-25B			S1T	6	22						—
BSS1-25C			S1T	8	22						—
BSS1-26A		26	S1T	6	22	26	28	6	8	14	—
BSS1-26B			S1T	8	22						—
BSS1-27A		27	S1T	6	22	27	29	6	8	14	—
BSS1-28A		28	S1T	6	25	28	30	6	8	14	—
BSS1-29A		29	S1T	8	25	29	31	6	8	14	—
BSS1-30A		30	S1T	5	25	30	32	6	8	14	—
BSS1-30B			S1T	6	25						—
BSS1-30C			S1T	8	25						—
BSS1-30D			S1K	10	25						4 x 1.8
BSS1-32A		32	S1T	5	28	32	34	6	8	14	—
BSS1-32B			S1T	6	28						—
BSS1-32C			S1T	8	28						—
BSS1-32D			S1K	10	28						4 x 1.8
BSS1-34A		34	S1T	8	28	34	36	6	8	14	—
BSS1-35A		35	S1T	8	28	35	37	6	8	14	—
BSS1-35B			S1K	10	28						4 x 1.8
BSS1-36A		36	S1T	8	28	36	38	6	8	14	—
BSS1-36B			S1K	10	28						4 x 1.8
BSS1-38A		38	S1T	8	28	38	40	6	8	14	—
BSS1-40A		40	S1T	6	28	40	42	6	8	14	—
BSS1-40B			S1T	8	28						—
BSS1-40C			S1K	10	28						4 x 1.8
BSS1-50A		50	S1T	6	28	50	52	6	8	14	—
BSS1-50B			S1T	8	28						—
BSS1-50C			S1K	10	28						4 x 1.8

[Caution on Product Characteristics]

① Keyways are made according to JIS B1301 standards and Js9 tolerances. For products with a tapped hole, a set screw is included as an accessory.
② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 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 If diameter is less than φ 4, the diameter tolerance is H8. If diameter is φ 5 or φ 6, and the hole length exceeds 3 times of the diameter, the tolerance is also H8.



S1T

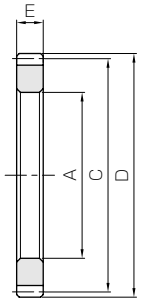


S1K

Set Screw		Allowable torque (N·m)	Allowable torque (kgf·m)	Backlash	Weight	Catalog No.
Size	J	Bending strength	Bending strength	(mm)	(kg)	
M3	4	0.47	0.048	0.08~0.18	0.035	**BSS1-15A**
M4	4			0.08~0.18	0.034	**BSS1-15B**
M3	4	0.52	0.053	0.08~0.18	0.016	**BSS1-16A**
M4	4			0.08~0.18	0.015	**BSS1-16B**
M4	4	0.57	0.058	0.08~0.18	0.018	**BSS1-17A**
M4	4	0.62	0.063	0.08~0.18	0.022	**BSS1-18A**
M4	4			0.08~0.18	0.021	**BSS1-18B**
M4	4	0.67	0.069	0.08~0.18	0.024	**BSS1-19A**
M3	4	0.73	0.074	0.08~0.18	0.028	**BSS1-20A**
M4	4			0.08~0.18	0.027	**BSS1-20B**
M4	4			0.08~0.18	0.026	**BSS1-20C**
M4	4	0.78	0.080	0.08~0.18	0.031	**BSS1-21A**
M4	4	0.83	0.085	0.08~0.18	0.033	**BSS1-22A**
M4	4	0.89	0.091	0.08~0.18	0.038	**BSS1-23A**
M4	4	0.94	0.10	0.08~0.18	0.041	**BSS1-24A**
M4	4			0.08~0.18	0.040	**BSS1-24B**
M5	4			0.08~0.18	0.037	**BSS1-24C**
M4	4	1.00	0.10	0.08~0.18	0.047	**BSS1-25A**
M4	4			0.08~0.18	0.046	**BSS1-25B**
M5	4			0.08~0.18	0.044	**BSS1-25C**
M4	4	1.05	0.11	0.08~0.18	0.048	**BSS1-26A**
M5	4			0.08~0.18	0.046	**BSS1-26B**
M4	4	1.11	0.11	0.08~0.18	0.051	**BSS1-27A**
M4	4	1.17	0.12	0.08~0.18	0.060	**BSS1-28A**
M5	4	1.22	0.12	0.08~0.18	0.059	**BSS1-29A**
M4	4	1.28	0.13	0.08~0.18	0.066	**BSS1-30A**
M4	4			0.08~0.18	0.065	**BSS1-30B**
M5	4			0.08~0.18	0.062	**BSS1-30C**
M4	4			0.08~0.18	0.058	**BSS1-30D**
M4	4	1.40	0.14	0.08~0.18	0.079	**BSS1-32A**
M4	4			0.08~0.18	0.078	**BSS1-32B**
M5	4			0.08~0.18	0.075	**BSS1-32C**
M4	4			0.08~0.18	0.071	**BSS1-32D**
M5	4	1.51	0.15	0.08~0.18	0.080	**BSS1-34A**
M5	4	1.57	0.16	0.08~0.18	0.083	**BSS1-35A**
M4	4			0.08~0.18	0.079	**BSS1-35B**
M5	4	1.63	0.17	0.08~0.18	0.086	**BSS1-36A**
M4	4			0.08~0.18	0.082	**BSS1-36B**
M5	4	1.74	0.18	0.08~0.18	0.092	**BSS1-38A**
M4	4	1.86	0.19	0.08~0.18	0.10	**BSS1-40A**
M5	4			0.08~0.18	0.098	**BSS1-40B**
M4	4			0.08~0.18	0.094	**BSS1-40C**
M4	4	2.46	0.25	0.08~0.18	0.14	**BSS1-50A**
M5	4			0.08~0.18	0.13	**BSS1-50B**
M4	4			0.08~0.18	0.13	**BSS1-50C**

[Caution on Secondary Operations]
① Please read "Caution on Performing Secondary Operations" (Page 32) 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.
② Avoid performing secondary operations that narrow the tooth width as it affects precision and strength.
③ When performing secondary operations, be aware of deflection and distortion as the tooth is thin in width.

Specifications	
Precision grade	JIS grade N9 (JIS B1702-1: 1998) JIS grade 5 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	—
Tooth hardness	(less than 194HB)



S5

Catalog No.	Module	No. of teeth	Shape	Bore	Pitch dia.	Outside dia.	Face width	Allowable torque (N·m)		Allowable torque (kgf·m)	
				A_{H8}	C	D	E	Bending strength	Surface durability	Bending strength	Surface durability
SSR2-120	***m*2**	120	S5	194	240	244	20	366	44.0	37.4	4.49
SSR2-200		200	S5	354	400	404	20	630	84.2	64.3	8.59
SSR2.5-120	***m*2.5**	120	S5	245	300	305	25	715	88.5	72.9	9.02
SSR2.5-200		200	S5	445	500	505	25	1230	169	126	17.2
SSR3-120	***m*3**	120	S5	296	360	366	30	1240	157	126	16.0
SSR3-160		160	S5	416	480	486	30	1680	226	171	23.0

Backlash (mm)	Weight (kg)	Catalog No.
0.17~0.37	2.46	**SSR2-120**
0.20~0.41	4.28	**SSR2-200**
0.19~0.41	4.62	**SSR2.5-120**
0.22~0.46	8.01	**SSR2.5-200**
0.22~0.45	7.77	**SSR3-120**
0.22~0.45	10.6	**SSR3-160**

[Caution on Product Characteristics]
① The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 31 for more details.
② The backlash values shown in the table are the theoretical values for the normal direction for the ring gear in mesh with a 30 tooth SS type spur gear.
③ Although the inside diameter of these gears are made to H8 tolerance, since the ring shape is easily deformed, some error may occur beyond the stated tolerance.

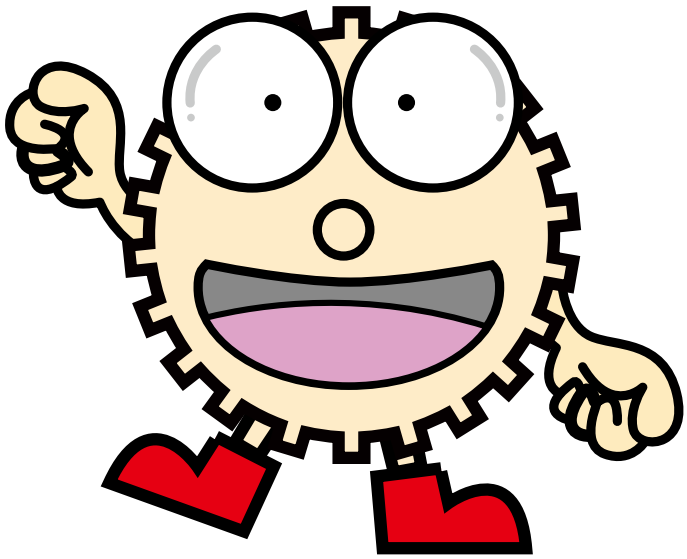
[Caution on Secondary Operations]
①Please read "Caution on Performing Secondary Operations" (Page 32) when performing modifications and/or secondary operations for safety concerns. KHK Quick-Mod Gears, the KHK's system for quick modification of KHK stock gears is also available.
② Avoid performing secondary operations that narrow the tooth width as it affects precision and strength.

＊ For products not categorized in our KHK Stock Gear series, custom gear production services with short lead times is available. For details see Page 8.

Helical Gears

KHG
Ground Helical Gears
J Series
Newly added
*m*1 ~ 3 Page 168

SH
Steel Helical Gears
*m*2, 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

K H G 1 - 20 R

- Direction of Helix (R)
- No. of Teeth (20)
- Module (1)
- Others (Ground Gear)
- Type (Helical Gear)
- Material (SCM440)

S S45C
K SCM440

H Helical Gears

Other Information
G Ground Gears

■ Feature Icons

- RoHS Compliant Product
- Finished Product
- Ground Gear
- Resin Product
- Injection Molded Product
- Re-machinable Product
- Heat Treated Product
- Stainless Product
- Copper Alloy Product
- Black Oxide coated Product

Characteristics

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 No.	KHG	SH
Module	1 ～ 3	2 ～ 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	Have excellent strength and wear resistance which allow your designs to be more compact. Finished products for J Series are also available.	Having larger contact ratios compared to the SS spur gears, effective in reducing noise and vibration.

Advanced grinding equipment allows for efficient production

The use of electro deposition grinding wheel produces consistent precision with shorter grinding usage, making products affordable.

Gleason Cylindrical Gear Grinding Machine (RZ701)

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.

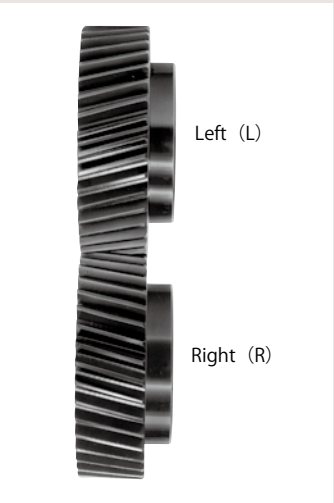
We have two different types of KHK helical gear products, one is a KHG gear type, and the other is a SH gear type. Each type of gear has different module systems, pressure angle designations and helix angles. Since the KHG Gears are of the transverse module style, and the SH gears are of normal module 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. The table shows the possible combinations.

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

Catalog No. & Helix Hand		KHG		SH		KRHG KRHGF		SRH	
		RH	LH	RH	LH	RH	LH	RH	LH
KHG	RH	×	○	×	×	×	○	×	×
	LH	○	×	×	×	○	×	×	×
SH	RH	×	×	×	○	×	×	×	○
	LH	×	×	○	×	×	×	○	×

■ **Helix Direction**

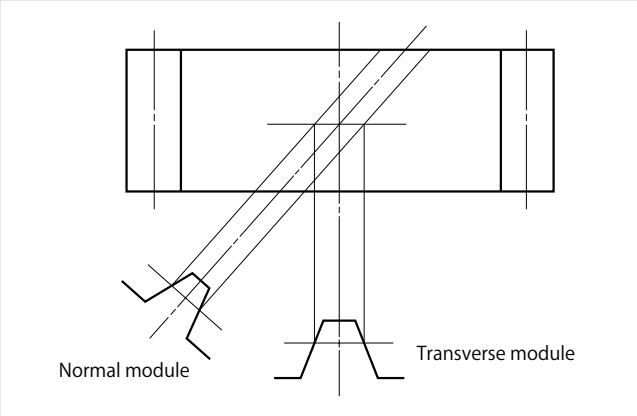


Pinion (L) & Rack (R)

Pinion (R) & Rack (L)

■ Transverse module and Normal module

The difference between transverse module and normal module is defined as the difference of basic tooth form. As shown on the right, the module of tooth datum orthogonal to the center axis of gear is called transverse module. The module of tooth datum orthogonal to the thread helix is called normal module. The characteristics of each are shown as below.



〔**CAUTION**〕 Above is for illustration purpose only and not a representation of the true tooth forms. For detailed technical information, please refer to separate technical reference book, in the section of "4.3 Helical Gears" (Page 22).

■ Characteristics of Transverse module and Normal module

Style	Advantages	Disadvantages
Transverse module (KHG)	Replaces spur gears having the same module, number of teeth, and center distance.	Special gear cutting or grinding machines are required for processing each helix angle.
Normal module (SH)	Modifications of spur gears are made by gear cutting or grinding machines, even if they have different helix angles.	Have a center distance value different from that of a spur gear, although they have the same module size and the same number of gear teeth. The center distance value is rarely an integral number.

2. Caution in Selecting Gears Based on Gear Strength

Allowable bending strength and surface durability values shown in product tables were computed by assuming a certain application environment. They should be used as reference only. We recommend that each user computes his own values by applying the actual usage conditions.
To find more information on gear strength calculations, please refer to 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 assumptions for Bending Strength of Gears

Item \ Catalog No.	KHG	SH
Formula NOTE 1	Formula of spur and helical gears on bending strength (JGMA401-01)	
No. of teeth of Mating Gears	Same number of teeth	
Rotation	600rpm	100rpm
Durability	Over 10^7 cycles	
Impact from motor	Uniform load	
Impact from load	Uniform load	
Direction of load	Bidirectional	
Allowable bending stress at root σ_{Flim} (kgf/mm^2) NOTE2	30	19
Safety factor S_F	1.2	

■ Calculation assumptions for Surface Durability (Except where it is common with bending strength)

Item \ Catalog No.	KHG	SH
Formula NOTE 1	Formula of spur and helical gears on bending strength (JGMA402-01)	
Kinematic viscosity of lubricant	100cSt (50°C)	
Gear support	Symmetric support by bearings	
Allowable Hertz stress σ_{Hlim} (kgf/mm^2)	116	49
Safety factor S_H	1.15	

〔**NOTE 1**〕 The formula for gear strength is based on JGMA Standard. The units for the rotational speed (rpm) and the load (kgf/mm^2) were matched to the units needed in the equation.
〔**NOTE 2**〕 The allowable bending stress at the root σ_{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.

■ Definition of Bending Strength by JGMA 401-01 (1974)

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 the failure due to insufficient bending strength.

■ Definition of Surface Durability by JGMA 402-01 (1975)

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.

Example of the defacement due to insufficient surface durability.

Application Hints

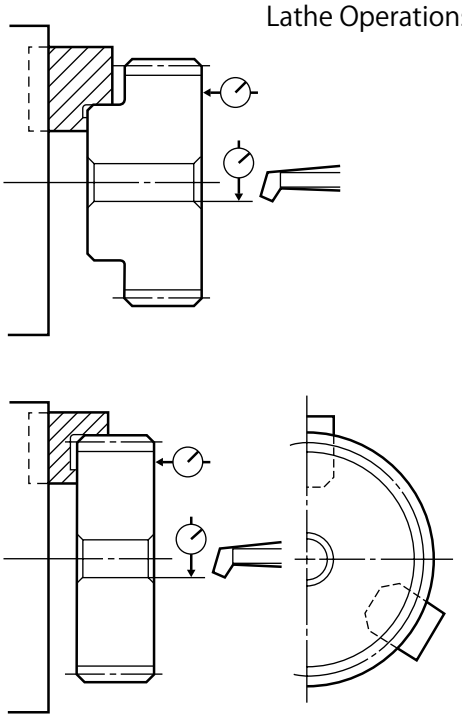
In order to use KHK stock gears safely, carefully read the Application Hints before proceeding. If there are questions or if you require clarifications, please contact our technical department or your nearest distributor.

KHK CO., LTD. TECHNICAL DEPARTMENT
PHONE: 81-48-254-1744 FAX: 81-48-254-1765
E-mail export@khkgears.co.jp

1. Caution on Performing Secondary Operations

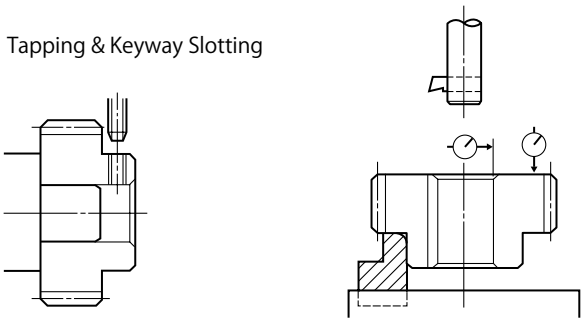
① If you are reboring, it is important to pay special attention to locating the center in order to avoid runout.
② The reference datum for gear cutting is the bore. Therefore, use the bore for locating the center. If it is too difficult to do for small bores, the alternative is to use one spot on the bore and the runout of the side surface.
③ If the rework requires using scroll chucks, we recommend the use of new or rebored jaws for improved precision. If chucking by the teeth, please apply the pressure carefully to avoid crushing the teeth which will lead to noisy gears.
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.

Lathe Operations



⑤ In order to avoid stress concentrations, leave radii on 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 KHG Ground Helical Gears are already stress relieved. But if you subject them to a heavy turning operation such as removing the hubs, the residual stress may cause deformation.
⑧ When heat-treating SH Helical Gears, it is possible to get thermal stress cracks. It is best to subject them to penetrant inspection afterwards. If the tooth strength is not sufficient, it can be increased approximately four times by heat-treating. On the other hand, the precision of the gear will drop about one grade.

Heat Treatment

If you apply induction hardening to the gear teeth of S45C products, you need to designate the hardness and where to apply the heat treatment. Below is an example of common specifications and KHK's specifications for hardening:

● Common Specifications for Heat Treatment
Area: Tooth surface, or, Tooth surface and Tooth root
Hardness: Within 10 HRC in the range from 45 to 60 HRC. (e.g. 48 - 58 HRC)

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

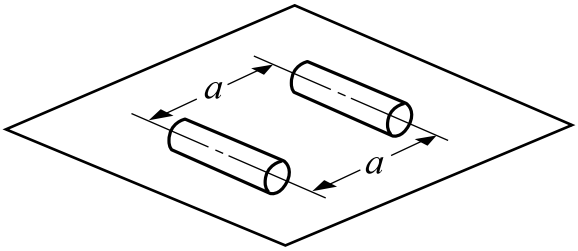
＊Hardness and Depth of Gear-teeth Induction Hardening
The hardening method and the state of hardened teeth area are varied depending on the size of gears. Since different hardening treatment is applied in accordance with the module and number of teeth, the hardness level you designate is referred to as the hardness of the reference diameter. For some of our products, there may be a case that the hardness at tooth tip / root may not be equal to the hardness you designated.
As to the effective case depth for S45C, 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.

2. Points of Caution in Assembling

① KHK stock helical gears are designed to give the proper 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.

② Please refer to overall length tolerance for Helical Gears on page 33.

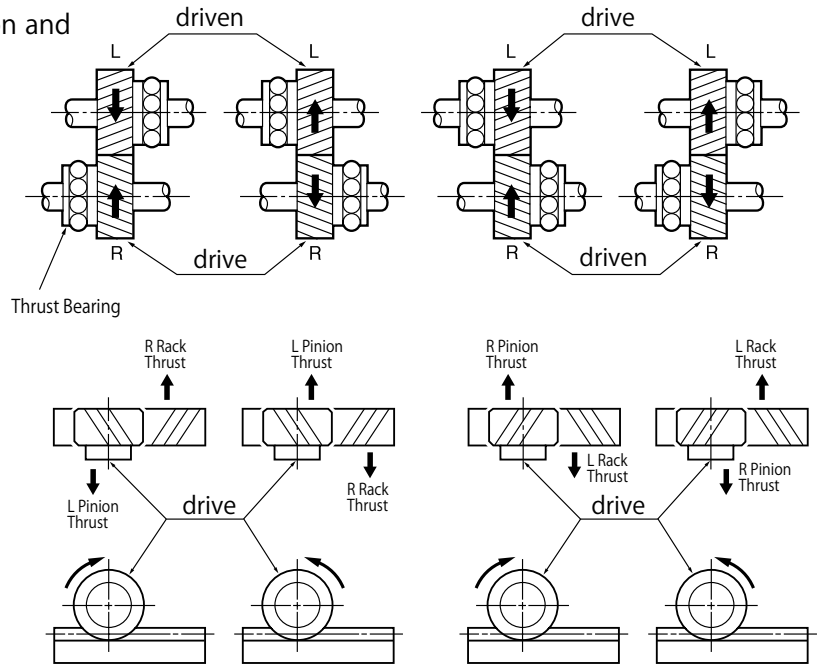
③ Because of the helix of the gear teeth, helical gears in mesh produce thrust forces in the axial directions. The axial thrust bearings must be able to resist these forces. The direction of the thrust forces depend on the helix hand and the direction of rotation as shown below. For details, please refer to separate technical reference book, section of "Gear Forces" (Page 107).



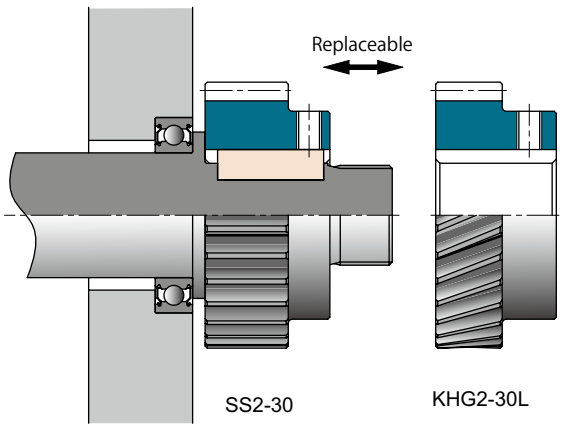
$$a = \frac{d_1 + d_2}{2}$$

where
a : Center Distance
d_1 : Pitch Diameter of Pinion
d_2 : Pitch Diameter of Gear

Direction of Rotation and Thrust Force



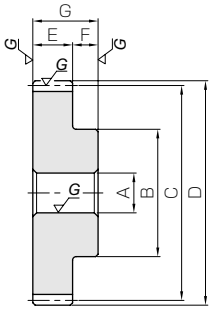
Application Examples



To increase strength, the SS2-30 Spur Gear is replaced with the KHG2-30R Helical Gear (mating with the left hand of KHG).

Specifications	
Precision grade	JIS grade N6 (JIS B1702-1: 1998) JIS grade 2 (JIS B1702: 1976)
Reference section of gear	Rotating plane
Gear teeth	Standard full depth
Transverse pressure angle	20°
Helix angle	21°30'
Material	SCM440
Heat treatment	Thermal refinined, tooth surface induction hardened
Tooth hardness	50 ～ 60HRC
Face width (E)	8
Hub width (F)	10
Total length (G)	18
Screw offset (J)	5

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



S1

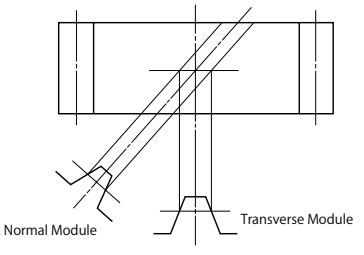
Catalog No.	No. of teeth	Direction of helix	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash (mm)	Weight (kg)
				A_{H7}	B	C	D	Bending strength	Surface durability	Bending strength	Surface durability		
KHG1-20R KHG1-20L	20	R L	S1	6	17	20	22	7.79	4.98	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
KHG1-25R KHG1-25L	25	R L	S1	8	20	25	27	10.7	8.12	1.09	0.83	0.08~0.16	0.048
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
KHG1-44R KHG1-44L	44	R L	S1	10	30	44	46	20.2	25.3	2.06	2.58	0.08~0.16	0.14
KHG1-45R KHG1-45L	45	R L	S1	10	30	45	47	20.7	26.5	2.12	2.71	0.08~0.16	0.14
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
KHG1-80R KHG1-80L	80	R L	S1	15	50	80	82	41.0	91.8	4.18	9.36	0.10~0.18	0.44
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]

① The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 165 for more details.
② 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.
③ These gears produce axial thrust forces. See Page 167 for more details.
④ 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]

① 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.
② 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).
③ While cutting off the entire hub may cause curvature deformation by residual stress, some products are straightened and annealed after refining the material.

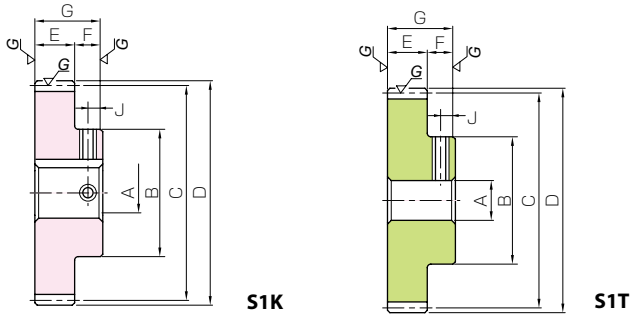


∗ Above is for illustration purposes only and differs from actual tooth forms. To find more details, please see the section "4.3 Helical Gears" in separate technical reference book (Page 22).

J Series

Ground Helical Gears

Newly added



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

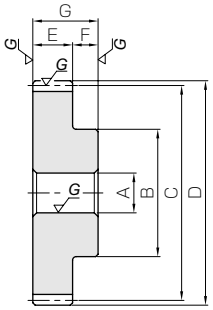
Bore H7	✻ The product shapes of J Series items are identified by background color.														
Keyway Js9	6	8	10	12	14	15	16	17	18	19	20	22	25	28	30
Screw size	—		4 X 1.8		5 X 2.3				6 X 2.8				8 X 3.3		
Catalog No.	M4	M5	M4						M5				M6		
KHG1-20R J BORE **KHG1-20L J BORE**															
KHG1-22R J BORE **KHG1-22L J BORE**															
KHG1-24R J BORE **KHG1-24L J BORE**															
KHG1-25R J BORE **KHG1-25L J BORE**															
KHG1-28R J BORE **KHG1-28L J BORE**															
KHG1-30R J BORE **KHG1-30L J BORE**															
KHG1-32R J BORE **KHG1-32L J BORE**															
KHG1-35R J BORE **KHG1-35L J BORE**															
KHG1-36R J BORE **KHG1-36L J BORE**															
KHG1-40R J BORE **KHG1-40L J BORE**															
KHG1-44R J BORE **KHG1-44L J BORE**															
KHG1-45R J BORE **KHG1-45L J BORE**															
KHG1-48R J BORE **KHG1-48L 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**															
KHG1-80R J BORE **KHG1-80L J BORE**															
KHG1-90R J BORE **KHG1-90L J BORE**															
KHG1-100R J BORE **KHG1-100L J BORE**															

[Caution on J series]

① 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.
② 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.
③ Keyways are made according to JIS B1301 standards, Js 9 tolerance.
④ Certain products which would otherwise have a very long tapped hole are conterbored to reduce the length of the tap.
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 N6 (JIS B1702-1: 1998) JIS grade 2 (JIS B1702: 1976)
Reference section of gear	Rotating plane
Gear teeth	Standard full depth
Transverse pressure angle	20°
Helix angle	21°30'
Material	SCM440
Heat treatment	Thermal refinined, tooth surface induction hardened
Tooth hardness	50 ～ 60HRC
Face width (E)	12
Hub width (F)	12
Total length (G)	24
Screw offset (J)	6

∗ 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	Hub dia.	Pitch dia.	Outside dia.	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		
KHG1.5-20R **KHG1.5-20L**	20	R L	S1	12	24	30	33	26.3	18.5	2.68	1.89	0.08~0.16	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		15	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
KHG1.5-35R **KHG1.5-35L**	35	R L			42	52.5	55.5	51.1	58.5	5.21	5.96	0.10~0.18	0.30
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
KHG1.5-44R **KHG1.5-44L**	44	R L			50	66	69	68.1	96.8	6.95	9.87		0.47
KHG1.5-45R **KHG1.5-45L**	45	R L		18	50	67.5	70.5	70.0	102	7.14	10.4		0.47
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		20	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	0.12~0.20	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]

① The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 165 for more details.
② 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.
③ These gears produce axial thrust forces. See Page 167 for more details.
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[Caution on Secondary Operations]

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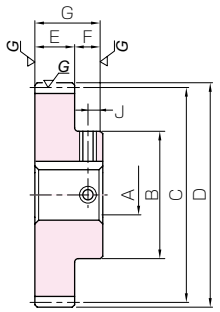
②Due to the gear teeth being induction hardened, no secondary operations can be performed on tooth areas including the bottom land (approx. 2 to 3 mm).
③While cutting off the entire hub may cause curvature deformation by residual stress, some products are straightened and annealed after refining the material.

J Series

Ground Helical Gears

Newly added



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
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															
KHG1.5-22R J BORE KHG1.5-22L J BORE															
KHG1.5-24R J BORE KHG1.5-24L J BORE															
KHG1.5-25R J BORE KHG1.5-25L J BORE															
KHG1.5-25R J BORE KHG1.5-25L J BORE															
KHG1.5-28R J BORE KHG1.5-28L J BORE															
KHG1.5-30R J BORE KHG1.5-30L J BORE															
KHG1.5-32R J BORE KHG1.5-32L J BORE															
KHG1.5-35R J BORE KHG1.5-35L J BORE															
KHG1.5-36R J BORE KHG1.5-36L J BORE															
KHG1.5-40R J BORE KHG1.5-40L J BORE															
KHG1.5-44R J BORE KHG1.5-44L J BORE															
KHG1.5-45R J BORE KHG1.5-45L J BORE															
KHG1.5-48R J BORE KHG1.5-48L J BORE															
KHG1.5-50R J BORE KHG1.5-50L J BORE															
KHG1.5-50R J BORE KHG1.5-50L J BORE															
KHG1.5-60R J BORE KHG1.5-60L J BORE															
KHG1.5-70R J BORE KHG1.5-70L 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]

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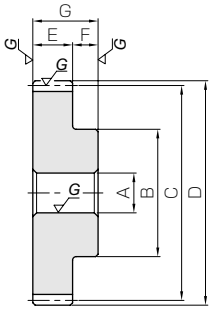
⑥ For products having a tapped hole, a set screw is included.

Specifications	
Precision grade	JIS grade N6 (JIS B1702-1: 1998) JIS grade 2 (JIS B1702: 1976)
Reference section of gear	Rotating plane
Gear teeth	Standard full depth
Transverse pressure angle	20°
Helix angle	21°30'
Material	SCM440
Heat treatment	Thermal refinined, tooth surface induction hardened
Tooth hardness	50 ～ 60HRC
Face width (E)	16
Hub width (F)	13
Total length (G)	29
Screw offset (J)	6.5

∗ 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	Hub dia.	Pitch dia.	Outside dia.	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	40.5	22.8	4.13	2.32	0.10~0.20	0.11
KHG2-16R **KHG2-16L**	16	R L			26	32	36	40.6	24.1	4.14	2.46		0.13
KHG2-18R **KHG2-18L**	18	R L			30	36	40	48.5	31.9	4.95	3.25		0.17
KHG2-20R **KHG2-20L**	20	R L		15	32	40	44	56.6	40.8	5.77	4.16		0.20
KHG2-22R **KHG2-22L**	22	R L			36	44	48	64.9	50.6	6.62	5.16		0.25
KHG2-24R **KHG2-24L**	24	R L			38	48	52	73.3	61.4	7.47	6.26		0.30
KHG2-25R **KHG2-25L**	25	R L			40	50	54	77.5	67.3	7.90	6.86		0.33
KHG2-26R **KHG2-26L**	26	R L			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		0.43
KHG2-30R **KHG2-30L**	30	R L		18	50	60	64	99.1	101	10.1	10.3		0.50
KHG2-32R **KHG2-32L**	32	R L			50	64	68	108	117	11.0	11.9		0.55
KHG2-35R **KHG2-35L**	35	R L			50	70	74	121	142	12.3	14.5		0.63
KHG2-36R **KHG2-36L**	36	R L			50	72	76	126	151	12.8	15.4		0.65
KHG2-40R **KHG2-40L**	40	R L		20	60	80	84	143	191	14.6	19.5		0.85
KHG2-44R **KHG2-44L**	44	R L			60	88	92	161	236	16.5	24.0		0.98
KHG2-45R **KHG2-45L**	45	R L			60	90	94	166	248	16.9	25.3		1.02
KHG2-48R **KHG2-48L**	48	R L			60	96	100	172	273	17.5	27.9		1.13
KHG2-50R **KHG2-50L**	50	R L		25	60	100	104	181	299	18.4	30.5		1.16
KHG2-52R **KHG2-52L**	52	R L			65	104	108	189	326	19.3	33.2	0.14~0.24	1.29
KHG2-60R **KHG2-60L**	60	R L			65	120	124	225	447	22.9	45.6		1.65
KHG2-70R **KHG2-70L**	70	R L			70	140	144	269	625	27.4	63.7		2.21
KHG2-80R **KHG2-80L**	80	R L			80	160	164	301	799	30.7	81.4		2.93
KHG2-90R **KHG2-90L**	90	R L			90	180	184	344	1030	35.0	105		3.73
KHG2-100R **KHG2-100L**	100	R L			100	200	204	387	1290	39.4	132		4.64

[Caution on Product Characteristics]
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② 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).
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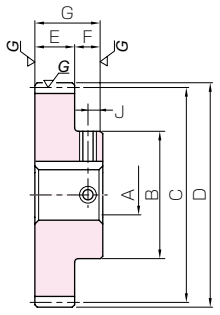
J Series

Ground Helical Gears

Newly added



S1K

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

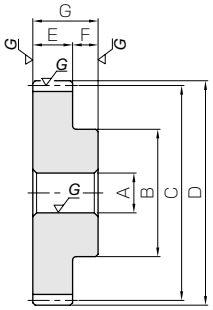
Bore H7	✻ The product shapes of J Series items are identified by background color.																	
Keyway Js9	12	14	15	16	17	18	19	20	22	25	28	30	32	35	40	45	50
Screw size	4 x 1.8	5 x 2.3				6 x 2.8				8 x 3.3			10 x 3.3		12 x 3.3	14 x 3.8	
Catalog No.	M4					M5				M6			M8			M10	
KHG2-15R J BORE **KHG2-15L J BORE**																	
KHG2-16R J BORE **KHG2-16L J BORE**																	
KHG2-18R J BORE **KHG2-18L J BORE**																	
KHG2-20R J BORE **KHG2-20L J BORE**																	
KHG2-22R J BORE **KHG2-22L J BORE**																	
KHG2-24R J BORE **KHG2-24L J BORE**																	
KHG2-25R J BORE **KHG2-25L J BORE**																	
KHG2-26R J BORE **KHG2-26L J BORE**																	
KHG2-28R J BORE **KHG2-28L 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**																	
KHG2-44R J BORE **KHG2-44L J BORE**																	
KHG2-45R J BORE **KHG2-45L J BORE**																	
KHG2-48R J BORE **KHG2-48L J BORE**																	
KHG2-50R J BORE **KHG2-50L J BORE**																	
KHG2-52R J BORE **KHG2-52L 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**																	
KHG2-90R J BORE **KHG2-90L J BORE**																	
KHG2-100R J BORE **KHG2-100L J BORE**																	

[Caution on J series]

① 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.
② 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.
③ Keyways are made according to JIS B1301 standards, Js 9 tolerance.
④ Certain products which would otherwise have a very long tapped hole are conterbored to reduce the length of the tap.
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 N6 (JIS B1702-1: 1998) JIS grade 2 (JIS B1702: 1976)
Reference section of gear	Rotating plane
Gear teeth	Standard full depth
Transverse pressure angle	20°
Helix angle	21°30'
Material	SCM440
Heat treatment	Thermal refinined, tooth surface induction hardened
Tooth hardness	50 ~ 60HRC
Face width (E)	20
Hub width (F)	14
Total length (G)	34
Screw offset (J)	7

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



S1

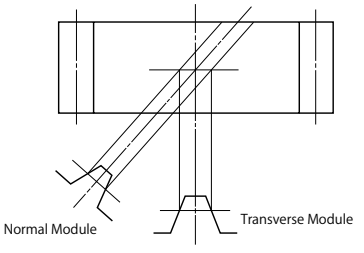
Catalog No.	No. of teeth	Direction of helix	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash (mm)	Weight (kg)
				A_{H7}	B	C	D	Bending strength	Surface durability	Bending strength	Surface durability		
KHG2.5-15R **KHG2.5-15L**	15	R L	S1	15	30	37.5	42.5	71.8	41.1	7.32	4.19	0.10~0.20	0.20
KHG2.5-16R **KHG2.5-16L**	16	R L			32	40	45	79.4	47.9	8.09	4.89		0.24
KHG2.5-18R **KHG2.5-18L**	18	R L			38	45	50	94.8	63.4	9.67	6.47		0.33
KHG2.5-20R **KHG2.5-20L**	20	R L		18	40	50	55	111	81.3	11.3	8.29		0.38
KHG2.5-22R **KHG2.5-22L**	22	R L			44	55	60	127	101	12.9	10.3	0.12~0.22	0.47
KHG2.5-24R **KHG2.5-24L**	24	R L			48	60	65	143	122	14.6	12.5		0.57
KHG2.5-25R **KHG2.5-25L**	25	R L		20	50	62.5	67.5	151	134	15.4	13.7		0.61
KHG2.5-26R **KHG2.5-26L**	26	R L			50	65	70	160	146	16.3	14.9		0.65
KHG2.5-28R **KHG2.5-28L**	28	R L			60	70	75	176	173	18.0	17.6		0.83
KHG2.5-30R **KHG2.5-30L**	30	R L			65	75	80	193	201	19.7	20.5		0.97
KHG2.5-32R **KHG2.5-32L**	32	R L			70	80	85	211	232	21.5	23.7		1.13
KHG2.5-35R **KHG2.5-35L**	35	R L			70	87.5	92.5	236	284	24.1	28.9		1.28
KHG2.5-36R **KHG2.5-36L**	36	R L			70	90	95	245	302	25.0	30.8		1.34
KHG2.5-40R **KHG2.5-40L**	40	R L		25	70	100	105	268	365	27.3	37.2		1.53
KHG2.5-44R **KHG2.5-44L**	44	R L			75	110	115	302	451	30.8	46.0	0.14~0.24	1.85
KHG2.5-45R **KHG2.5-45L**	45	R L			75	112.5	117.5	310	474	31.6	48.3		1.92
KHG2.5-48R **KHG2.5-48L**	48	R L			75	120	125	336	547	34.2	55.8		2.13
KHG2.5-50R **KHG2.5-50L**	50	R L			80	125	130	353	599	36.0	61.0		2.35
KHG2.5-52R **KHG2.5-52L**	52	R L			80	130	135	370	652	37.7	66.5		2.51
KHG2.5-60R **KHG2.5-60L**	60	R L			80	150	155	439	890	44.7	90.8		3.20

[Caution on Product Characteristics]

① The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 165 for more details.
② 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.
③ These gears produce axial thrust forces. See Page 167 for more details.
④ 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]

① 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.
② 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).
③ While cutting off the entire hub may cause curvature deformation by residual stress, some products are straightened and annealed after refining the material.

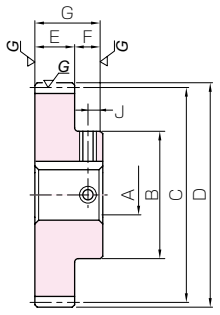


∗ Above is for illustration purposes only and differs from actual tooth forms. To find more details, please see the section "4.3 Helical Gears" in separate technical reference book (Page 22).

J Series

Ground Helical Gears

Newly added



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	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 No.	M4			M5				M6			M8			M10		
KHG2.5-15R J BORE **KHG2.5-15L J BORE**																
KHG2.5-16R J BORE **KHG2.5-16L J BORE**																
KHG2.5-18R J BORE **KHG2.5-18L J BORE**																
KHG2.5-20R J BORE **KHG2.5-20L J BORE**																
KHG2.5-22R J BORE **KHG2.5-22L J BORE**																
KHG2.5-24R J BORE **KHG2.5-24L J BORE**																
KHG2.5-25R J BORE **KHG2.5-25L J BORE**																
KHG2.5-26R J BORE **KHG2.5-26L J BORE**																
KHG2.5-28R J BORE **KHG2.5-28L J BORE**																
KHG2.5-30R J BORE **KHG2.5-30L J BORE**																
KHG2.5-32R J BORE **KHG2.5-32L J BORE**																
KHG2.5-35R J BORE **KHG2.5-35L J BORE**																
KHG2.5-36R J BORE **KHG2.5-36L J BORE**																
KHG2.5-40R J BORE **KHG2.5-40L J BORE**																
KHG2.5-44R J BORE **KHG2.5-44L J BORE**																
KHG2.5-45R J BORE **KHG2.5-45L J BORE**																
KHG2.5-48R J BORE **KHG2.5-48L J BORE**																
KHG2.5-50R J BORE **KHG2.5-50L J BORE**																
KHG2.5-52R J BORE **KHG2.5-52L J BORE**																
KHG2.5-60R J BORE **KHG2.5-60L J BORE**																

[Caution on J series]

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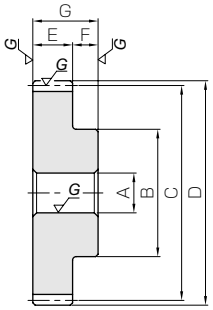
② Number of products we can process for one order is 1 to 20 units. For quantities of 21 or more pieces, we need to quote price and lead time.
③ Keyways are made according to JIS B1301 standards, Js 9 tolerance.
④ Certain products which would otherwise have a very long tapped hole are conterbored to reduce the length of the tap.
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 N6 (JIS B1702-1: 1998) JIS grade 2 (JIS B1702: 1976)
Reference section of gear	Rotating plane
Gear teeth	Standard full depth
Transverse pressure angle	20°
Helix angle	21°30'
Material	SCM440
Heat treatment	Thermal refinined, tooth surface induction hardened
Tooth hardness	50 ～ 60HRC
Face width (E)	25
Hub width (F)	16
Total length (G)	41
Screw offset (J)	8

∗ 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	Hub dia.	Pitch dia.	Outside dia.	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		
KHG3-15R **KHG3-15L**	15	R L	S1	18	36	45	51	129	74.7	13.2	7.62	0.10~0.20	0.36
KHG3-16R **KHG3-16L**	16	R L			38	48	54	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	0.12~0.22	0.53
KHG3-20R **KHG3-20L**	20	R L		20	50	60	66	199	148	20.3	15.1		0.70
KHG3-22R **KHG3-22L**	22	R L			54	66	72	228	184	23.3	18.8		0.86
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		1.12
KHG3-26R **KHG3-26L**	26	R L			60	78	84	287	268	29.3	27.3		1.19
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		25	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		30	85	150	156	635	1090	64.7	112		3.95
KHG3-52R **KHG3-52L**	52	R L			85	156	162	666	1190	67.9	122		4.24
KHG3-60R **KHG3-60L**	60	R L			90	180	186	757	1560	77.2	159		5.57

[Caution on Product Characteristics]

① The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 165 for more details.
② 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.
③ These gears produce axial thrust forces. See Page 167 for more details.
④ 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]

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② 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).
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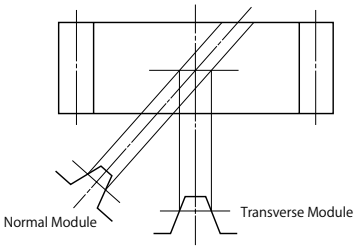

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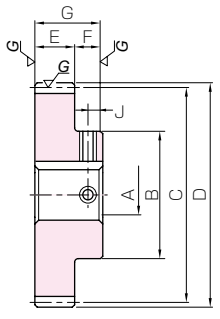
J Series

Ground Helical Gears

Newly added



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	18	19	20	22	25	28	30	32	35	40	45	50
Screw size	6 X 2.8				8 X 3.3			10 X 3.3		12 X 3.3	14 X 3.8	
Catalog No.	M5				M6			M8			M10	
KHG3-15R J BORE KHG3-15L J BORE												
KHG3-16R J BORE KHG3-16L J BORE												
KHG3-18R J BORE KHG3-18L J BORE												
KHG3-20R J BORE KHG3-20L J BORE												
KHG3-22R J BORE KHG3-22L J BORE												
KHG3-24R J BORE KHG3-24L J BORE												
KHG3-25R J BORE KHG3-25L J BORE												
KHG3-26R J BORE KHG3-26L J BORE												
KHG3-28R J BORE KHG3-28L J BORE												
KHG3-30R J BORE KHG3-30L J BORE												
KHG3-32R J BORE KHG3-32L J BORE												
KHG3-35R J BORE KHG3-35L J BORE												
KHG3-36R J BORE KHG3-36L J BORE												
KHG3-40R J BORE KHG3-40L J BORE												
KHG3-44R J BORE KHG3-44L J BORE												
KHG3-45R J BORE KHG3-45L J BORE												
KHG3-48R J BORE KHG3-48L J BORE												
KHG3-50R J BORE KHG3-50L J BORE												
KHG3-52R J BORE KHG3-52L J BORE												
KHG3-60R J BORE KHG3-60L J BORE												

[Caution on J series]

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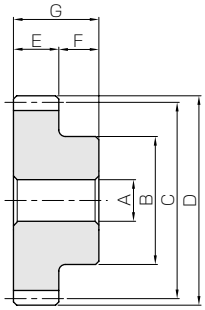
④ Certain products which would otherwise have a very long tapped hole are conterbored to reduce the length of the tap.
⑤ Areas of products which have been re-worked will not be black oxide coated.
⑥ For products having a tapped hole, a set screw is included.

Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) JIS grade 4 (JIS B1702: 1976)
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)

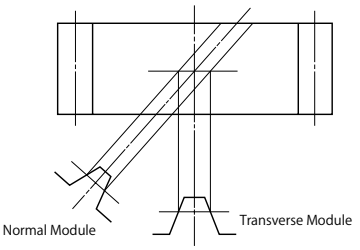


S1

Catalog No.	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	***m*2**	15	R	S1	12	24	31.06	35.06	25	10	35
SH2-15L			L								
SH2-20R		20	R	S1	12	32	41.41	45.41	25	10	35
SH2-20L			L								
SH2-30R		30	R	S1	12	50	62.12	66.12	25	10	35
SH2-30L			L								
SH2-40R		40	R	S1	18	60	82.82	86.82	25	10	35
SH2-40L			L								
SH2-60R		60	R	S1	18	70	124.23	128.23	25	10	35
SH2-60L			L								
SH2-90R		90	R	S1	18	120	186.35	190.35	25	10	35
SH2-90L			L								
SH3-15R	***m*3**	15	R	S1	15	36	46.59	52.59	35	15	50
SH3-15L			L								
SH3-20R		20	R	S1	15	50	62.12	68.12	35	15	50
SH3-20L			L								
SH3-30R		30	R	S1	20	70	93.17	99.17	35	15	50
SH3-30L			L								
SH3-40R		40	R	S1	20	80	124.23	130.23	35	15	50
SH3-40L			L								
SH3-60R		60	R	S1	20	140	186.35	192.35	35	15	50
SH3-60L			L								

[Caution on Product Characteristics]

① The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 165 for more details.
② 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.
③ These gears produce axial thrust forces. See Page 167 for more details.
④ 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.



∗ 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).

∗ For products not categorized in our KHK Stock Gear series, custom gear production services with short lead times is available. For details see Page 8.

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]

①Please 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.

②Avoid performing secondary operations that narrow the tooth width as it affects precision and strength.

■ **SH Helical Gear Center Distance**

Catalog No.	SH2-15 R L	SH2-20 R L	SH2-30 R L	SH2-40 R L	SH2-60 R L	SH2-90 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	—
SH2-90 R L	108.70	113.88	124.23	134.59	155.29	186.35

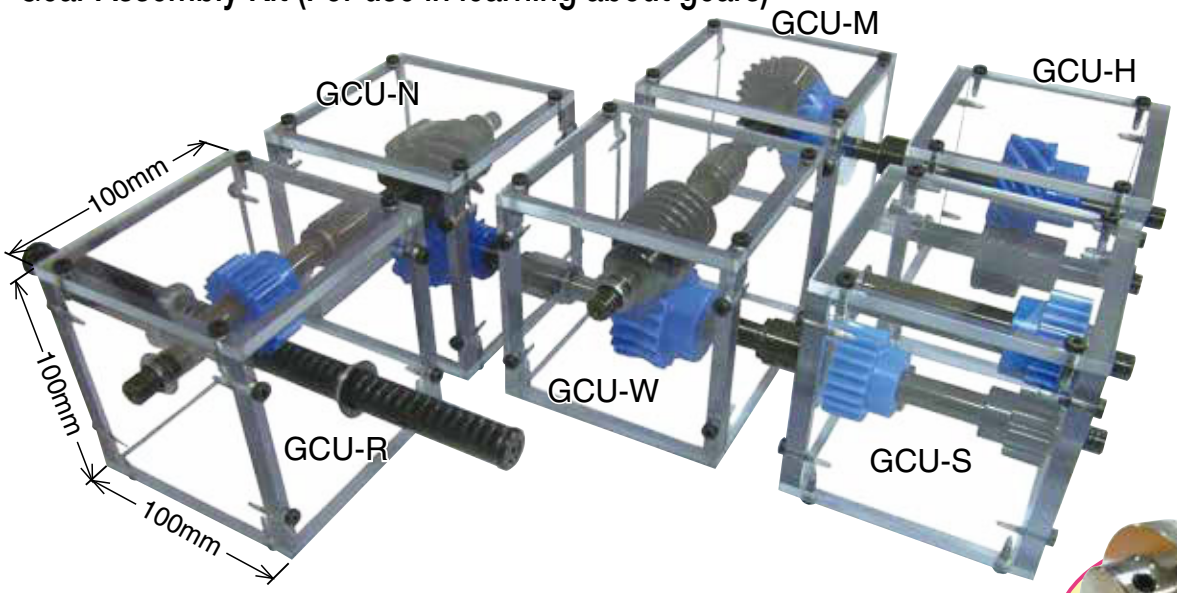
■ **SH Helical Gear Center Distance**

Catalog No.	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

KAWAGUCHI i-mono Certified as Kawaguchi i-mono Brand Products

GCU

Gear Assembly Kit (For use in learning about gears)



GCU-S Spur Gear Kit

Installment : Parallel axes gears (Two-stage)
Gear Type : Spur Gears
Gears : 2 units of SS1.5-16
2 units of PS1.5-22
Gear Ratio : 1.89
Weight : Approx. 1kg

The Gear Kit contains two-stage spur gears and allows speed increases / reductions, and includes the most commonly used combinations of gears.

GCU-H Helical Gear Kit

Installment : Parallel axes gears
Gear Type : Helical Gears (Screw Gears)
Gears : SN2.5-10L
PN2.5-10R
Gear Ratio : 1
Weight : Approx. 1kg

Helical gears have more strength than spur gears of the same dimensions and have the advantage of being less noisy.

GCU-R Rack Kit

Installment : Parallel axes gears
Gear Type : Racks & Pinions
Gears : SRO1.5-500
PS1.5-20
Weight : Approx. 1kg

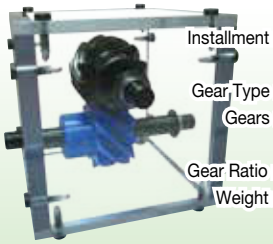
Use of racks enables the conversion of rotation motion to linear motion. Applications include devices that provide lift.

GCU-M Miter Gear Kit

Installment : Intersecting axes gears
Gear Type : Miter Gears
Gears : SM2-25
PM2-25
Gear Ratio : 1
Weight : Approx. 1kg

Use of bevel gears allows the changing of the shaft angle by 90 degrees. Applications include the changing of the direction of power.

GCU-N Screw Gear Kit



Installment : 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.

GCU-W Worm Gear Pair Kit

Installment : Nonparallel and nonintersecting gears
Gear Type : Worm Gear Pair
Gears : SW2-R1
PG2-20R1
Gear Ratio : 20
Weight : Approx. 1kg

Worm Gear Pairs can be used to make large reductions in speed in a single phase. The Worm gear cannot be driven by the worm wheel due to inherent self-locking.

* These kits are not for actual use to transmit power and please use only as representations of gear systems.

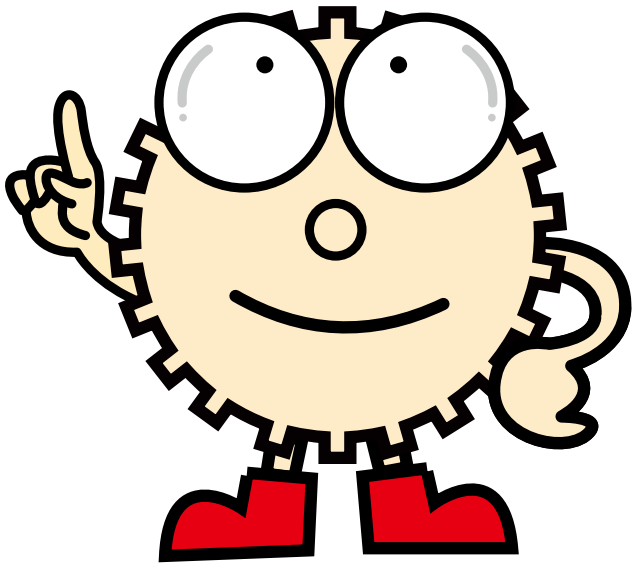
Internal Gears

SI
Steel Internal Gears

*m*0.5 ~ 3 Page 184

SIR
Steel Ring Gears

*m*2 ~ 3 Page 186



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) Internal Geas

S I R 1 - 60

- 60 — No. of teeth (60)
- 1 — Module (1)
- R — Others (Ring Gear)
- I — Type (Internal Gear)
- S — Material (S45C)

Material
S S45C

Type
I Internal Gears

Other Information
R Ring Gears

■ Feature Icons

- RoHS Compliant Product
- Finished Product
- Ground Gear
- Resin Product
- Injection Molded Product
- Re-machinable Product
- Heat Treated Product
- Stainless Product
- Copper Alloy Product
- Black Oxide coated Product

Internal Gears

Characteristics

KHK stock internal gears are offered in modules 0.5 to 3 in 50 to 200 teeth. They can be used in many applications including planetary gear drives.

Catalog No.	SI	SIR
Module	0.5 ~ 3	2 ~ 3
Material	S45C	S45C
Heat Treatment	—	—
Tooth Surface Finish	Cut	Cut
Precision JIS B 1702-1:1998	N8 NOTE 1	N9
Secondary Operations	Possible	Possible
Features	A popular type of internal gear; low cost and suitable for many applications.	Ring gear large in size / number of tooth. It can be cut to make segment gears and corner racks.

〔**Note 1**〕 The Product accuracy class having a module less than 0.8 corresponds to 'equivalent' as shown in the table.

Selection Hints

Please select the most suitable products by carefully considering the characteristics of items and contents of the product tables. It is also important to read all applicable notes before the final selection.

1. Caution in Selecting the Mating Gears

KHK stock internal gears can mate with any spur gears of the same module, however, there are cases of involute, trochoid and trimming interference occurrences, depending on the number of teeth of the mating gear. Various types of interference and their symptoms and causes are tabulated below, also shown, the number of teeth of allowable mating pinions.

■ Interferences and the symptoms

TYPE	SYMPTOMS	CAUSES
Involute interference	The tip of the internal gear digs into the root of the pinion.	Too few teeth on the pinion.
Trochoid interference	The exiting pinion tooth contacts the internal gear tooth.	Too little difference in number of teeth of the two gears.
Trimming interference	Pinion can slide in or out axially but cannot move radially.	Too little difference in number of teeth of the two gears.

■ Allowable Mating Pinions and Number of Teeth

No. of teeth of Internal Gear	No. of teeth of Allowable Mating Pinions		
	Lower limit No. of teeth by Involute interference	Upper limit No. of teeth by Trochoid interference	Upper limit No. of teeth by Trimming interference
50	22	41	33
60	21	51	43
80	20	72	64
100	19	92	84
120	19	112	104
160	19	152	144
200	18	192	184

Established equipment and technology. Custom Gears are also available.

Diameter φ700mm maximum, Module 6.5 maximum, Cutting Stroke 170 mm

Gear cutting by CNC Gear Shaper

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 his own values by applying the actual usage conditions. The table below contains the assumptions established for these products in order to compute gear strengths.

■ Calculation assumptions for Bending Strength of Gears

Item \ Catalog No.	SI	SIR
Formula NOTE 1	Formula of spur and helical gears on bending strength (JGMA401-01)	
No. of teeth of mating gears	30	
Rotation	100rpm	
Durability	Over 10^7 cycles	
Impact from motor	Uniform load	
Impact from load	Uniform load	
Direction of load	Bidirectional	
Allowable beam stress at root σ_{Flim} (kgf/mm^2) Note 2	19	
Safety factor S_F	1.2	

■ Calculation assumptions for Surface Durability (Except where it is common with bending strength)

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)	49
Safety factor S_H	1.15

〔**Note 1**〕 The gear strength formula is based on JGMA (Japanese Gear Manufacturers' Association) The units for the rotational speed (rpm) and the stress (kgf/mm^2) are adjusted to the units needed in the formula.

〔**Note 2**〕 The allowable bending stress at the root σ_{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.

Application Hints

In order to use KHK stock internal gears safely, read the Application Hints carefully before proceeding. Also "1. Caution on Performing Secondary Operations", "3. Notes on Starting Operations" and "4. Other Points to Consider in Applications" in the spur gear section should be consulted (Page 32).

1. Point of Caution in Assembling

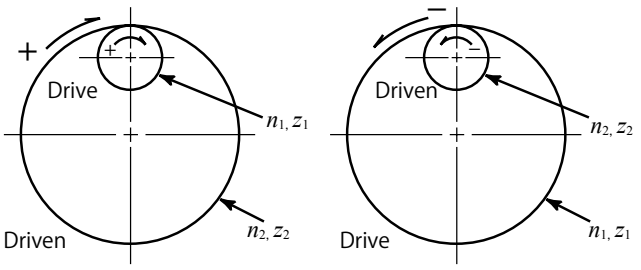
①KHK stock internal gears are designed to give the proper backlash when assembled using the center distance given by the formula below. The amount of backlash is given in the product table for each gear.

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

Where
a : Center distance
d_1 : Pitch diameter of Pinion
d_2 : Pitch diameter of Internal Gear

② Note that the direction of rotation of the internal gear is different from that of two spur gears in mesh.

Gear Ratio and Direction of Rotation



Gear Ratio $i = \frac{z_2}{z_1} = \frac{n_1}{n_2}$

z : No. of teeth
n : Rotational speed

③ To use as a planetary gear drive, the following conditions must be satisfied.

Condition on number of teeth in planetary mechanism

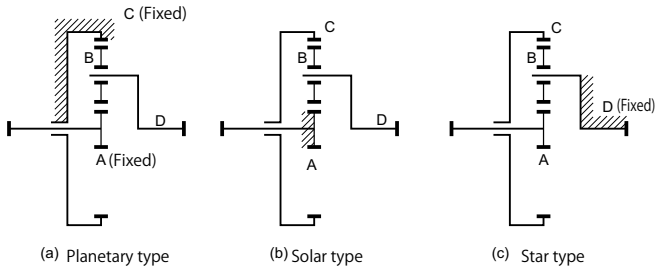
- Condition 1 $\cdots z_c = z_a + 2z_b$
- Condition 2 $\cdots \frac{z_a + z_c}{N}$ = Integer
- Condition 3 $\cdots z_b + 2 < (z_a + z_b) \sin \frac{180°}{N}$

z_a : No. of teeth of Sun Gear
z_b : No. of teeth of Planet Gears
z_c : No. of teeth of Internal Gear
N : No. of Planet Gears

■ Example of combinations

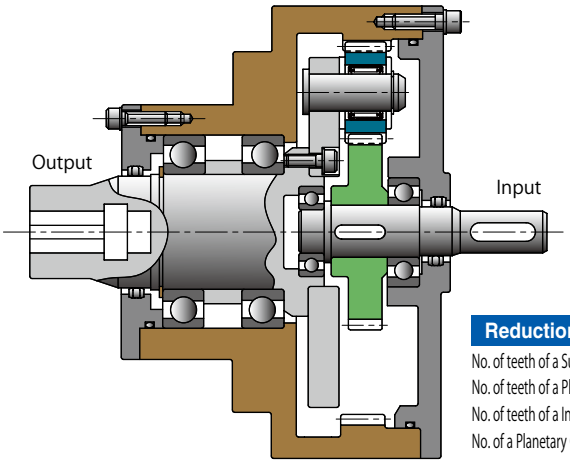
No. of teeth of internal gear	No. of planet gears	No. of teeth of sun gear	No. of teeth of planet gears	Reduction ratio of planetary type	Reduction ratio of solar type	Reduction ratio of star type
60	3	18	21	4.333	1.3	− 3.333
80	3	16	32	6	1.2	− 5
80	3	40	20	3	1.5	− 2
100	3	20	40	6	1.2	− 5
100	3	50	25	3	1.5	− 2

Types of planetary gear reduction mechanism



Application Examples

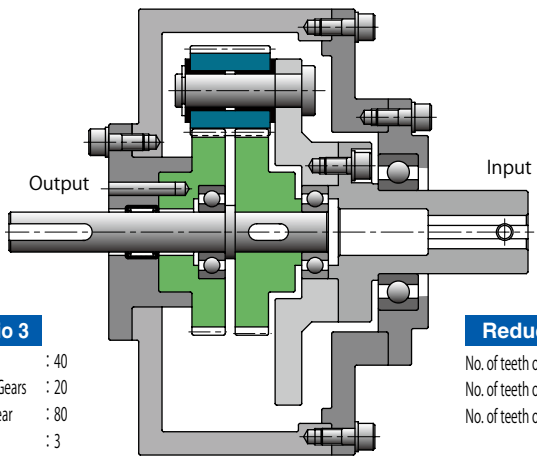
* The illustration is a design example, not a design for machinery or a device in actual use.



Reduction Ratio 3

No. of teeth of a Sun Gear	: 40
No. of teeth of a Planetary Gears	: 20
No. of teeth of a Internal Gear	: 80
No. of a Planetary Gears	: 3

Planetary Gear Mechanism used in a reduction gear *



Reduction Ratio 60

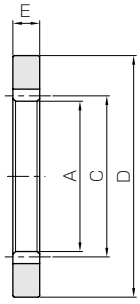
No. of teeth of a fixed Sun Gear	: 60
No. of teeth of a Planetary Gears	: 25
No. of teeth of a rotating Sun Gear	: 61*

*Negative dislocation

Mechanical Paradox Gear Mechanism used in a large reduction gear

Specifications	
Precision grade	JIS grade N8 (JIS B1702-1: 1998) ∗ JIS grade 4 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	—
Tooth hardness	less than 194HB

∗ The precision grade of products with a module of less than 0.8 is equivalent to the value shown in the table.



T1

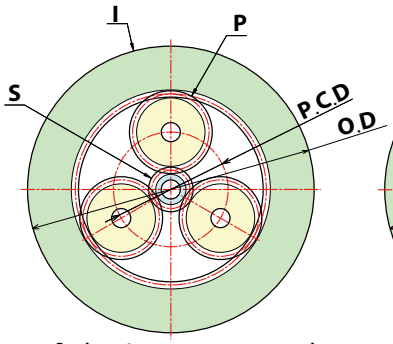
Catalog No. New items indicated in blue letters.	Module	No. of teeth	Shape	Internal dia. A	Pitch dia. C	Outside dia. D	Face width E	Allowable torque (N·m) Bending strength	Allowable torque (N·m) Surface durability	Allowable torque (kgf·m) Bending strength	Allowable torque (kgf·m) Surface durability	Backlash (mm)	Weight (kg)
SI0.5-60	***m*0.5**	60	T1	29	30	50	5	3.75	0.67	0.38	0.07	0.04~0.15	0.049
SI0.5-80		80	T1	39	40	60	5	4.85	0.75	0.49	0.08	0.04~0.15	0.062
SI0.5-100		100	T1	49	50	70	5	5.97	0.87	0.61	0.09	0.04~0.15	0.074
SI0.8-60	***m*0.8**	60	T1	46.4	48	75	8	15.4	2.87	1.57	0.29	0.05~0.16	0.16
SI0.8-80		80	T1	62.4	64	90	8	19.9	3.24	2.03	0.33	0.05~0.16	0.20
SI0.8-100		100	T1	78.4	80	105	8	24.5	3.75	2.50	0.38	0.05~0.16	0.23
SI1-60	***m*1**	60	T1	58	60	90	10	30.0	5.95	3.06	0.61	0.10~0.22	0.28
SI1-80		80	T1	78	80	110	10	38.8	6.59	3.96	0.67	0.10~0.22	0.35
SI1-100		100	T1	98	100	130	10	47.8	7.64	4.87	0.78	0.12~0.25	0.43
SI1.5-50	***m*1.5**	50	T1	72	75	115	15	87.1	20.9	8.88	2.13	0.13~0.29	0.70
SI1.5-60		60	T1	87	90	130	15	101	20.6	10.3	2.10	0.13~0.29	0.81
SI1.5-80		80	T1	117	120	160	15	131	23.3	13.4	2.38	0.13~0.29	1.04
SI1.5-100		100	T1	147	150	190	15	161	27.0	16.5	2.75	0.15~0.32	1.26
SI2-50	***m*2**	50	T1	96	100	150	20	206	50.3	21.0	5.13	0.16~0.33	1.54
SI2-60		60	T1	116	120	170	20	240	50.5	24.5	5.15	0.16~0.33	1.79
SI2-80		80	T1	156	160	210	20	311	57.0	31.7	5.81	0.16~0.33	2.28
SI2-100		100	T1	196	200	250	20	382	65.7	39.0	6.70	0.17~0.37	2.77
SI2.5-50	***m*2.5**	50	T1	120	125	185	25	403	101	41.1	10.3	0.17~0.37	2.87
SI2.5-60		60	T1	145	150	210	25	469	101	47.8	10.3	0.17~0.37	3.33
SI2.5-80		80	T1	195	200	260	25	607	114	61.9	11.6	0.17~0.37	4.25
SI3-50	***m*3**	50	T1	144	150	220	30	697	178	71.0	18.1	0.19~0.41	4.79
SI3-60		60	T1	174	180	250	30	811	178	82.7	18.2	0.19~0.41	5.57

[Caution on Product Characteristics]
① The backlash values shown in the table are the theoretical values for the normal direction for the internal ring in mesh with a 30 tooth SS spur gear.
② The allowable torque shown in the table are the calculated values according to the assumed usage conditions. Please see page 182 for more details
③ Please check for the involute interference, trochoid interference and trimming interference prior to using internal gears.

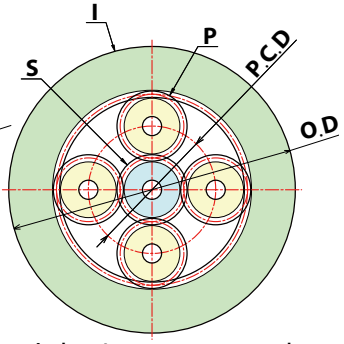
[Caution on Secondary Operations]
① Please read "Caution on Performing Secondary Operations" (Page 32) when performing modifications and/or secondary operations for safety concerns. KHK Quick-Mod Gears, the KHK's system for quick modification of KHK stock gears is also available.
② Avoid performing secondary operations that narrow the tooth width as it affects precision and strength.

∗ For products not categorized in our KHK Stock Gear series, custom gear production services with short lead times is available. For details see page 8.

■ Planetary Gear Systems created by using KHK Stock Gears



3 planetary gears are used



4 planetary gears are used

KHK's stock internal and spur gears working together will allow you to create planetary gear devices. In the table below, we introduce examples of planetary gear systems, where gears are assembled without meshing interference. The velocity ratio (*Note 1) in the table are for planetary gear systems created with a stationary internal gear.
Used as speed deceleration devices from input by the sun gear and output by the carrier. Selection of the number of teeth also enables you to create various planetary gear devices with different transmission ratios.

Velocity ratio Note 1	Stock gears used in the system										Allowable transmission torque (kgf·m)				Total weight (kg)
	Internal gears (I)			Planetary gears (P)					Sun gear (S)		Sun gear _T1		Planetary carrier _T2		
	OD(mm)	Catalog No.	No. of teeth	Catalog No.	No. of teeth	Quantity	P.C.D(mm)	Equal angles	Catalog No.	No. of teeth	Bending strength	Surface durability	Bending strength	Surface durability	
6	50	SI0.5-60	60	SS0.5-24A	24	3	18	120°	SSS0.5-12	12	0.072	0.0003	0.43	0.013	0.10
	75	SI0.8-60		SS0.8-24A			28.8		SSS0.8-12		0.30	0.0011	1.78	0.057	0.30
	90	SI1-60		SSA1-24			36		SSS1-12		0.58	0.0023	3.47	0.11	0.48
	130	SI1.5-60		SSA1.5-24			54		SS1.5-12		1.77	0.0081	10.7	0.40	1.20
	170	SI2-60		SSA2-24			72		SS2-12		4.21	0.020	25.2	0.99	2.66
	210	SI2.5-60		SSA2.5-24			90		SS2.5-12		8.21	0.040	49.3	1.98	5.03
	250	SI3-60		SSA3-24			108		SS3-12		14.2	0.070	85.2	3.49	8.57
	60	SI0.5-80	80	SS0.5-32A	32	3	24	120°	SS0.5-16A	16	0.12	0.0005	0.75	0.027	0.11
	90	SI0.8-80		SS0.8-32A			38.4		SS0.8-16A		0.51	0.0024	3.05	0.12	0.38
	110	SI1-80		SSA1-32			48		SS1-16		0.99	0.0047	5.96	0.24	0.57
	160	SI1.5-80		SSA1.5-32			72		SS1.5-16		3.35	0.026	20.1	1.32	1.72
	210	SI2-80		SSA2-32			96		SS2-16		7.95	0.064	47.7	3.22	3.85
	260	SI2.5-80		SSA2.5-32			120		SS2.5-16		15.5	0.13	93.2	6.45	7.33
	70	SI0.5-100	100	SS0.5-40A	40	4	30	90°	SS0.5-20A	20	0.23	0.0019	1.39	0.10	0.18
	105	SI0.8-100		SS0.8-40A			48		SS0.8-20A		0.95	0.0082	5.68	0.41	0.59
	130	SI1-100		SSA1-40			60		SS1-20		1.85	0.016	11.1	0.82	0.84
	190	SI1.5-100		SSA1.5-40			90		SS1.5-20		6.24	0.058	37.5	2.90	2.62
	250	SI2-100		SSA2-40			120		SS2-20		14.8	0.14	88.8	7.09	6.01
5	60	SI0.5-80	80	SS0.5-30A	30	4	25	90°	SS0.5-20A	20	0.23	0.0012	1.13	0.070	0.12
	90	SI0.8-80		SS0.8-30A			40		SS0.8-20A		0.93	0.0050	4.65	0.30	0.40
	110	SI1-80		SSA1-30			50		SS1-20		1.82	0.010	9.08	0.60	0.59
	160	SI1.5-80		SSA1.5-30			75		SS1.5-20		6.13	0.035	30.63	2.13	1.86
	210	SI2-80		SSA2-30			100		SS2-20		14.5	0.087	72.6	5.21	4.18
	260	SI2.5-80		SSA2.5-30			125		SS2.5-20		28.4	0.17	142	10.4	7.97
3	60	SI0.5-80	80	SS0.5-20A	20	4	30	90°	SS0.5-40A	40	0.46	0.0016	1.39	0.10	0.13
	90	SI0.8-80		SS0.8-20A			48		SS0.8-40A		1.89	0.0068	5.68	0.41	0.35
	110	SI1-80		SSA1-20			60		SS1-40		3.70	0.014	11.1	0.82	0.60
	160	SI1.5-80		SSA1.5-20			90		SS1.5-40		12.5	0.048	37.5	2.91	1.77
	210	SI2-80		SSA2-20			120		SS2-40		29.6	0.12	88.8	7.12	3.93
	260	SI2.5-80		SSA2.5-20			150		SS2.5-40		57.8	0.24	173	14.3	7.47
	70	SI0.5-100	100	SS0.5-25A	25	3	37.5	120°	SS0.5-50A	50	0.47	0.0020	1.42	0.12	0.16
	105	SI0.8-100		SS0.8-25A			60		SS0.8-50A		1.94	0.0084	5.83	0.51	0.43
	130	SI1-100		SSA1-25			75		SS1-50		3.79	0.017	11.4	1.01	0.75
	190	SI1.5-100		SSA1.5-25			112.5		SS1.5-50		12.8	0.060	38.4	3.58	2.24
	250	SI2-100		SSA2-25			150		SS2-50		30.4	0.15	91.1	8.79	5.02

■ Calculation of Allowable Transmission Torque

One advantage of a planetary gear system is that they share load burdens by grouping multiple planetary gears, enabling high torque capacity transmission. The following formula is the calculation method for T_1 (Allowable transmission torque of Sun Gear) and T_2 (Allowable transmission torque of Planetary Carrier), shown in the table.

$T_1 = Ts \cdot Zp \cdot \eta$ (kgf · m) ・・・・・・・・・(1)

$T_2 = Ts \cdot Zp \cdot u \cdot \eta$ (kgf · m) ・・・・・・・(2)

Where:

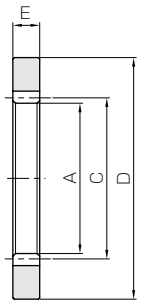
Ts : Allowable transmission torque for a Sun gear (kgf · m) on a meshed pair of sun gear and planetary gear. For a sun gear meshed with a planetary gear, the number of revolutions is set to 100rpm.

Zp : Number of planetary gears used in the system

u : Velocity ratio

η : Contact efficiency for torque transmission
In consideration of machining accuracy, variation in tooth thickness or other factors on the planetary carrier, the contact efficiency is set to 75%.

Specifications	
Precision grade	JIS grade N9 (JIS B1702-1: 1998) JIS grade 5 (JIS B1702: 1976)
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	—
Tooth hardness	less than 194HB



T1

Catalog No.	Module	No. of teeth	Shape	Internal dia. A	Pitch dia. C	Outside dia. D	Face width E	Allowable torque (N·m) Bending strength	Allowable torque (N·m) Surface durability	Allowable torque (kgf·m) Bending strength	Allowable torque (kgf·m) Surface durability	Backlash (mm)	Weight (kg)
SIR2-120	***m*2**	120	T1	236	240	286	20	413	68.8	42.1	7.02	0.17~0.37	2.98
SIR2-200		200	T1	396	400	446	20	677	110	69.0	11.2	0.20~0.41	4.80
SIR2.5-120	***m*2.5**	120	T1	295	300	355	25	807	138	82.3	14.0	0.19~0.41	5.55
SIR2.5-200		200	T1	495	500	555	25	1320	220	135	22.5	0.22~0.46	8.94
SIR3-120	***m*3**	120	T1	354	360	424	30	1390	244	142	24.9	0.22~0.45	9.28
SIR3-160		160	T1	474	480	544	30	1840	315	188	32.1	0.22~0.45	12.1

[Caution on Product Characteristics]
① The backlash values shown in the table are the theoretical values for the normal direction for the internal ring in mesh with a 30 tooth SS spur gear.
② The allowable torque shown in the table are the calculated values according to the assumed usage conditions. Please see Page 182 for more details
③ Please check for the involute interference, trochoid interference and trimming interference prior to using internal gears.

[Caution on Secondary Operations]
① Please read "Caution on Performing Secondary Operations" (Page 32) 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.
② Avoid performing secondary operations that narrow the tooth width as it affects precision and strength.

＊ For products not categorized in our KHK Stock Gear series, custom gear production services with short lead times is available. For details see page 8.

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