KMHP
High-Ratio Hypoid Gears

Gear Ratio 15~200

*m*1, 1.5 Page 456

KMBSG
Ground Spiral Bevel Gears

Gear Ratio 2

*m*2~4 Page 458

KSBSG
Ground Spiral Bevel Gears

Gear Ratio 1.5~3

*m*2~4 Page 460

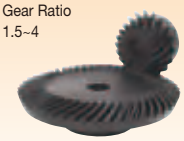
KMBSA • KMBSB
Finished Bore Spiral Bevel Gears

Gear Ratio 1.5~3

*m*2~6 Page 462

KSBS
Spiral Bevel Gears

Gear Ratio 1.5~4



*m*1~5 Page 466

KSBZG
Ground Zerol Bevel Gears

Gear Ratio 1.5, 2

*m*2~3 Page 470

KSB
Steel Bevel Gears

Gear Ratio 1.5~4

*m*1.5~6 Page 472

KSBY
Steel Bevel Gears

Gear Ratio 2~4

*m*5~8 Page 472

KSB
Steel Bevel Gears & Pinion Shafts

Gear Ratio 5

*m*1.5~3 Page 476

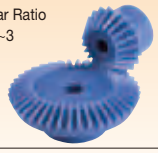
KSUB
Stainless Steel Bevel Gears

Gear Ratio 1.5~3

*m*1.5~3 Page 478

KPB
Plastic Bevel Gears

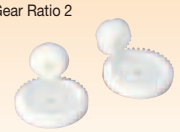
Gear Ratio 1.5~3



*m*1~3 Page 480

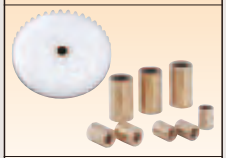
KDB
Injection Molded Bevel Gears

Gear Ratio 2



*m*0.5~1 Page 482

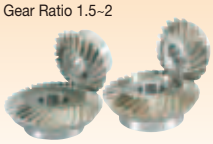
KBB
Sintered Metal Bushings



Ø5~8 Page 482

Nissei KKSP
Ground Spiral Bevel Gears

Gear Ratio 1.5~2



*m*2~5 Page 488

Bevel Gears

Catalog Number of Stock Gears

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

(Example) Bevel Gears

K M BS G 2 - 40 20 R

- R — Direction of Spiral (R)
- 20 — No. of teeth of mating gear (20)
- 40 — No. of teeth (40)
- 2 — Module (2)
- G — Others (Ground Gear)
- BS — Type (Spiral Bevel Gear)
- M — Material (SCM415)

Material

S	S45C
M	SCM415
SU	SUS303
P	MC901
D	DURACON

Type

B	Straight Bevel Gears
BS	Spiral Bevel Gears
HP	High Ratio Hypoid Gears

Other Information

G	Ground Gears

Feature Icons

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

Bevel Gears

Characteristics

KHK stock bevel gears are available in two types, spiral and straight tooth, in gear ratios of 1.5 through 5, and are offered in a large variety of modules, numbers of teeth, materials and styles. The following table lists the main features for easy selection.

Type	Catalog No.	Module	Gear Ratio	Material	Heat Treatment	Tooth Surface Finish	Precision JIS B 1704 : 1978	Secondary Operations	Features
Hypoid Gear	**KMHP**	1~1.5	15~200	SCM415	Carburized Note 1	Cut	3	△	High speed reduction ratio, high efficiency, high rigidity and compact gear assembly.
Spiral bevel gears	**KMBSG**	2~4	2	SCM415	Carburized Note 1	Ground	1	△	High strength, abrasion-resistant and compact for high-speed & torque use.
	KSBSG	2~4	1.5~3	S45C	Gear teeth induction hardened	Ground	2	△	Reasonably priced ground gear, yet remachinable except for the gear teeth.
	KMBSA • KMBSB	2~6	1.5~3	SCM415	Carburized	Cut	4	×	Ready to use without performing secondary operations. Strong and abrasion resistant.
	KSBS	1~5	1.5~4	S45C△	Gear teeth induction hardened	Cut	4	△	Large nos. of teeth and modules are offered in these affordable spiral bevel gears.
Zerol Bevel Gears	**KSBZG**	2~3	1.5~2	S45C	Gear teeth induction hardened	Ground	2	△	A spiral bevel gears with a helix angle less than 10°. Receives forces from the same direction as straight bevel gears receive and have excellent precision properties.
Straight bevel gears	**KSB • KSBY**	1~8	1.5~5	S45C	—	Cut	3	○	Popular series of straight bevel gears for many uses.
	KSUB	1.5~3	1.5~3	SUS303	—	Cut	3	○	Suitable for food machinery due to SUS303's rust-resistant quality.
	KPB	1~3	1.5~3	MC901	—	Cut	4	○	MC nylon products are light and can be used without lubricant.
	KDB	0.5~1	2	Duracon (M90-44)	—	Injection Molded	6	△	Injection molded, mass-produced productions, suitable for office machines.

(NOTE 1) Although these are carburized products, secondary operations can be performed as the bore and the hub portions are masked during the carburization. However, as a precaution, high hardness (HRC40 at maximum) occurs in some cases.

○ Possible △ Partly possible
× Not possible

● **For safe handling and to prevent damage such as deformation, KHK stock bevel gears have round chamfering at the corners, on the top surface plane of a gear tooth.**

The chamfering of the corner gear tips for bevel gear

Module	Outside edge R	Inside edge R
0.5 up to 1	0.5	All burrs removed
1 up to 2.5	1	0.5
2.5 up to 5	2	1
Over 5	3	1.5

Integrated combination of cutting-edge technologies and know-how.

The popularity in our large selection of product lineups is established by a production system integrated with advanced manufacturing technology and know-how, achieving quality products.

Gear cutting of Straight Bevel Gears

Bevel Gear Grinding Machine (Gleason PH-275HG)

Gear cutting of Spiral Bevel Gears

Bevel Gear Cutting Machine Equipment

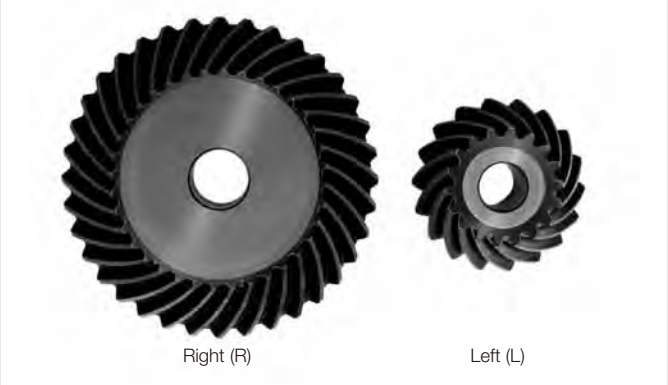
Inspection Equipment

Selection Hints

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

1. Caution in Selecting the Mating Gears

Basically, KHK stock bevel gears should be selected as shown in the catalog in pairs (e.g. MBSG2-4020R should mate with MBSG2-2040L). But, for straight tooth bevel gears, there is some interchangeability with different series. For plastic bevel gears, we recommend metal mating gears for good heat conductivity.



Right (R) Left (L)

Selection Chart for Straight Bevel Gears (○ Allowable × Not allowable)

Pinion \ Gear	KSB	KSUB	KPB	KDB
KSB	○	○	○	×
KSUB	○	○	○	×
KPB	○	○	○	×
KDB	×	×	×	○

Selection Chart for Spiral Bevel Gears (○ Allowable × Not allowable)

Pinion \ Gear	KMBSG	KSBSG	KMBSA KMBSB	KSBS
KMBSG	○	×	×	×
KSBSG	×	○	×	×
KMBSA • KMBSB	×	×	○	×
KSBS	×	×	×	○

2. Caution in Selecting Gears Based on Gear Strength

The gear strength values shown in the product pages were computed by assuming a certain application environment. Therefore, they should be used as reference only. We recommend that each user computes their own values by applying the actual usage conditions. To learn more about strength calculation, please refer to the technical information contained in the "Bending Strength of Bevel Gears" section on Page 87, and the "Surface Durability of Bevel Gears" section on Page 93.

Calculation assumptions for Bending Strength of Gears

Item \ Catalog No.	KMBSG KMBSA KMBSB	KSBSG KSBZG KSBS	KSB NOTE 3 KSBY	KSUB	KPB	KDB
Formula NOTE 1	Formula of bevel gears on bending strength(JGMA403-01)				The Lewis formula	
No. of teeth of mating gear	No. of teeth of the mating gear of the set				—	
Rotation	100rpm (600rpm for MBSG, KSBSG and SBZG)				100rpm	
Durability	Over 10^7cycles				—	
Impact from motor	Uniform load				Allowable bending stress(kgf/mm^2)	
Impact from load	Uniform load				1.15 (40°C with No Lubrication)	*m* 0.5 4.0 *m* 0.8 4.0 *m* 1.0 3.5 (40°C with Grease Lubrication)
Direction of load	Bidirectional					
Allowable bending stress at root σ_{Flim}(kgf/mm^2) NOTE 2	47	21	19 (24.5)	10.5		
Safety factor K_R	1.2					

Calculation assumptions for Surface Durability (Except those in common with bending strength)

Formula NOTE 1	Formula of bevel gears on surface durability(JGMA404-01)			
Kinematic viscosity of lubricant	100cSt (50°C)			
Gear support	Shafts & gear box have normal stiffness, and gears are supported on one end			
Allowable Hertz stress σ_{Hlim}(kgf/mm^2)	166	90	49 (62.5)	41.3
Safety factor C_R	1.15			

(NOTE 1) The gear strength formula is based on JGMA (Japanese Gear Manufacturers Association) specifications. "MC Nylon Technical Data" by Nippon Polypenco Limited and "Duracon Gear Data" by Polyplastic Co. Also, the units (rpm) of number of rotations and unit (kgf/mm^2) of stress are adjusted to the units needed in the formula.

(NOTE 2) The allowable bending stress at the root σ_{Flim} is calculated from JGMA403-01, 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) Since SB Bevel Pinion Shafts are thermally refined, the allowable tooth-root bending stress and allowable hertz stress are referred to the value shown in parentheses.

Application Hints

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

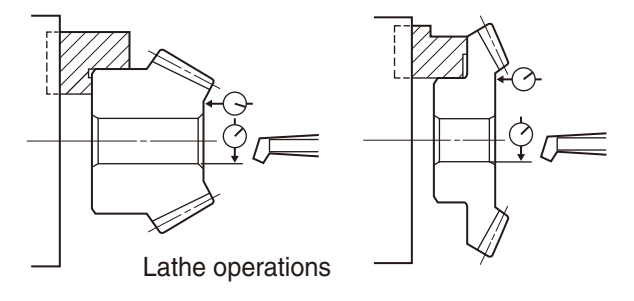
QTC METRIC GEARS
TEL. (516) 437-6700 FAX. (516) 328-3343
E-mail qtcsupport@qtcgears.com

1. Caution on Performing Secondary Operations

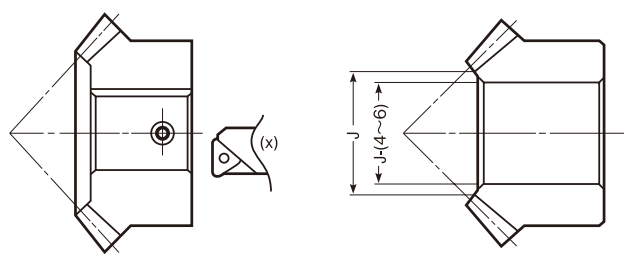
① If you are reboring, it is important to pay special attention to locating the center in order to avoid runout.

② The reference datum for gear cutting is the bore. Therefore, it is best to use the bore for locating the center. If it is too difficult to do for small bores, the alternative is to use one spot on the bore and the runout of the side surface.

③ If reworking using scroll chucks, we recommend the use of new or rebored jaws for improved precision. Please exercise caution not to crush the teeth by applying too much pressure. Any scarring will cause noise during operation.



④ For items with induction hardened teeth, such as KSBSG and KSBS series, the hardness is high near the tooth root. When machining the front end, the machined area should be 4 to 6mm smaller than the dimension, J.

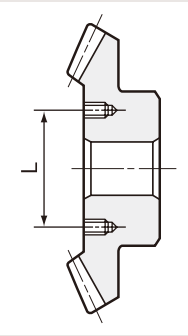


⑤ For tapping and keyway operations, see the examples given in “1. Caution on Performing Secondary Operations” in KHK Stock Spur Gear section. When cutting keyways, to avoid stress concentration, always leave radii on corners.

⑥ KPB plastic bevel gears are susceptible to changes due to temperature and humidity. Dimensions may change between during and after remachining operations.

⑦ When heat treating S45C products, it is possible to get thermal stress cracks. It is best to subject them to penetrant inspection afterwards. While the teeth strength may increase four fold, the precision of the gear will drop approximately one grade.

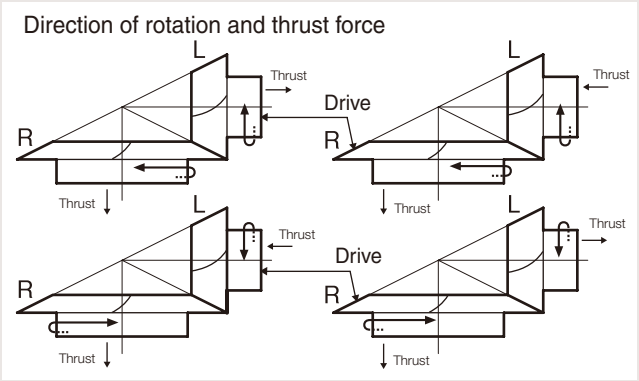
⑧ For the handling conveniences, the KSB and KSBY series listed below has the tapped holes (180° apart, 2 places) on the holding surface.



Catalog No.	L (mm)	Tap Size
KSB6-4515	130	M10 deep 15
KSBY8-4020	160	M10 deep 15
KSBY8-4515	210	M10 deep 15
KSBY5-6015	160	M10 deep 15
KSBY6-6015	220	M10 deep 15

2. Points of Caution in Assembling

① Since bevel gears are cone shaped, they produce axial thrust forces. Especially for spiral bevel gears, the directions of thrust changes with the hand of spiral and the direction of rotation. This is illustrated below. The bearings must be selected properly to be able to handle these thrust forces. For details, please refer to the technical reference, section of “Gear Forces” (Page 108).

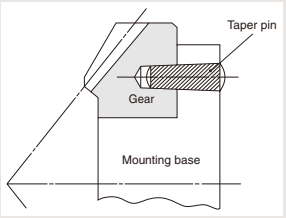


[NOTE] Bevel gears with the gear ratio 1.57 or less, produce a thrust force which has the same direction as miter gears. For details, see page 422.

② If a bevel gear is mounted on a shaft far from the bearings, the shaft may bend. We recommend mounting bevel gears as close to the bearings as possible. This is especially important since most bevel gears are supported on one end. The bending of shafts will cause abnormal noise and wear, and may even cause fatigue failure of the shafts. Both shafts and bearings must be designed with sufficient strength.

③ Due to the thrust load of bevel gears, the gears, shafts and bearings have the tendency to loosen up during operation. Bevel gears should be fastened to the shaft with keys and set screws, taper pins, step shafts, etc.

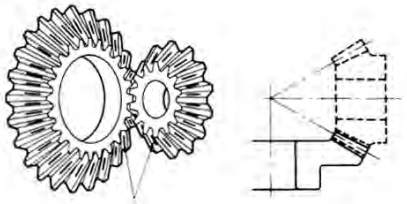
④ When installing KMBSA or KMBSB spiral bevel gears in B7 style (ring type), always secure the gears onto the mounting base with taper pins to absorb the rotational loads. It is dangerous to secure with bolts only.



⑤ KHK stock bevel gears are designed such that, when assembled according to the specified mounting distance with a tolerance of H7 - H8, the backlash shown in the table is obtained. Mounting distance error, offset error and shaft angle error must be minimized to avoid excessive noise and wear. For various conditions of teeth contact, please see the following illustrations, "Correct Tooth Contact" and "Incorrect Tooth Contact".

Correct Tooth Contact

- When assembled correctly, the contact will occur on both gears in the middle of the flank and center of face width but somewhat closer to the toe.

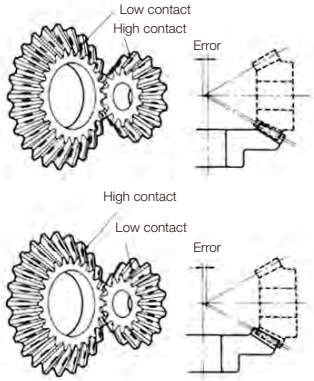


Center contact closer to toes

Incorrect Tooth Contact

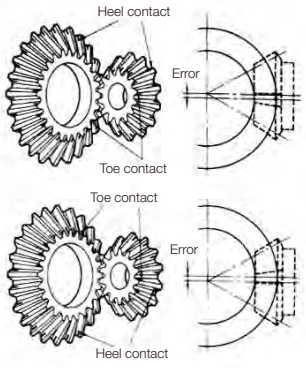
■ Mounting Distance Error

- When the mounting distance of the pinion is incorrect, the contact will occur too high on the flank on one gear and too low on the other.



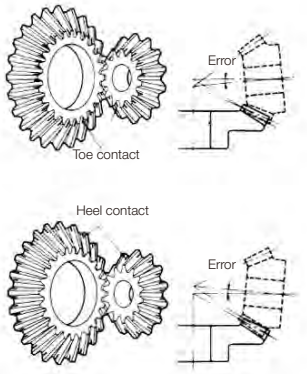
■ Offset Error

- When the pinion shaft is offset, the contact surface is near the toe of one gear and near the heel of the other.



■ Shaft Angle Error

- When there is an angular error of shafts, the gears will contact at the toes or heels depending on whether the angle is greater or less than 90°.



Application Examples

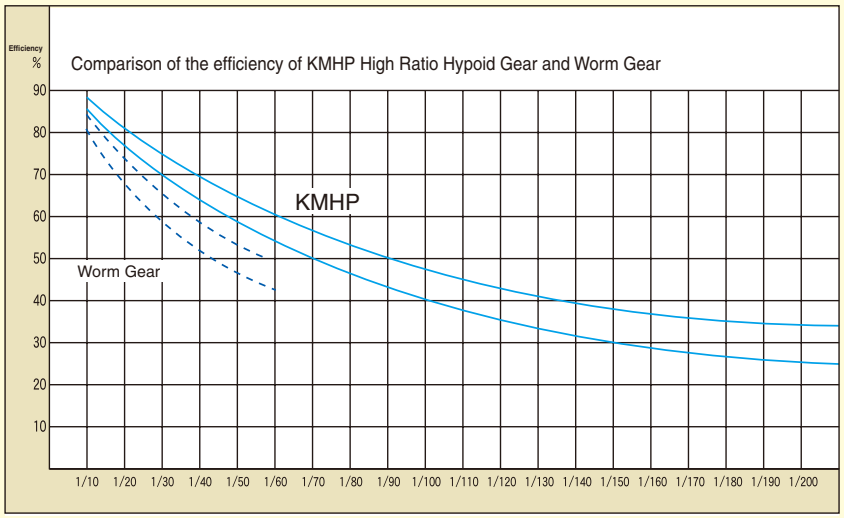
KSB Bevel Gears are used in the automatic line-feeding of a machine part processing machine.

2WD Bicycle by SHESCO
KSB Bevel Gears are used in the driving components in both the front and rear wheels.

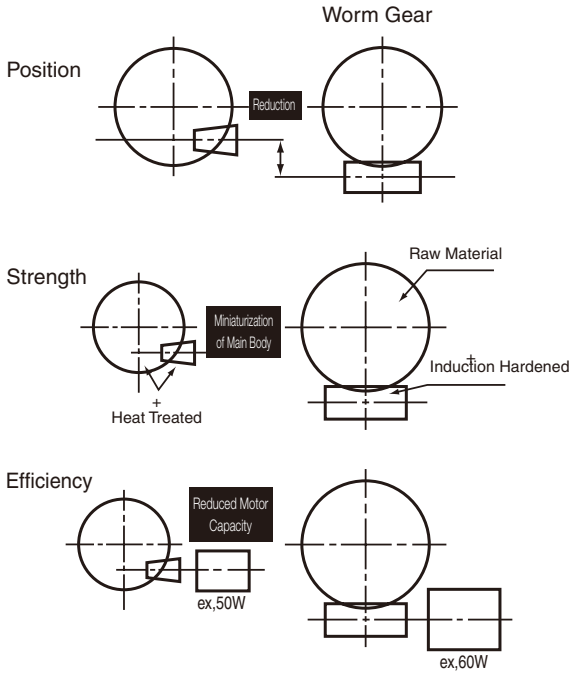
■ Features of KMHP High Ratio Hypoid Gears

A pair of KMHP high-ratio hypoid gears are able to produce an amazing reduction of speed of 200:1 in one stage.

1. Total-cost reduction
   The KMHP provides a compact gearing body replacing several stages of reduction gears. This reduces the cost sharply.
2. High efficiency
   Compared to worm gear drives, the KMHP has less sliding contact. The resulting higher efficiency allows the use of smaller motors (See the graph on the right).
3. High rigidity
   The carburized hypoid gears lead to smaller size than comparable worms gears.
4. Compact gear assembly
   The size of the gear housing is nearly the same as outer diameter of the large gear. (See the diagrams below)



Comparison of KMHP and Worm Gear



■ How to determine the radial and thrust loads

Before using the KMHP high-ratio hypoid gears, be sure to confirm the direction of radial and thrust loads. Following equations are used to compute these loads. The radial and thrust load coefficients are given on the product pages.

Radial load calculation

W_{RP} : Radial load on the pinion or L(N)

$$W_{RP} = W_{KP} \times T_G \times \frac{n}{z}$$

W_{KP} : Radial load coefficient of pinion or L (given on the product pages)
T_G : Torque of gear or R(N·m)
n : Number of teeth of pinion or L
z : Number of teeth of gear or R

W_{RG} : Radial load on the gear or R(N)

$$W_{RG} = W_{KG} \times T_G$$

W_{KG} : Radial load coefficient of gear or R (given on the product pages)
T_G : Torque of gear or R(N·m)

Thrust load calculation

W_{XP} : Thrust load on the pinion or L(N)

$$W_{XP} = W_{NP} \times T_G \times \frac{n}{z}$$

W_{NP} : Thrust load coefficient of pinion or L (given on the product page)
T_G : Torque of gear or R(N·m)
n : Number of teeth of pinion or L
z : Number of teeth of gear or R

W_{XG} : Thrust load of gear or R(N)

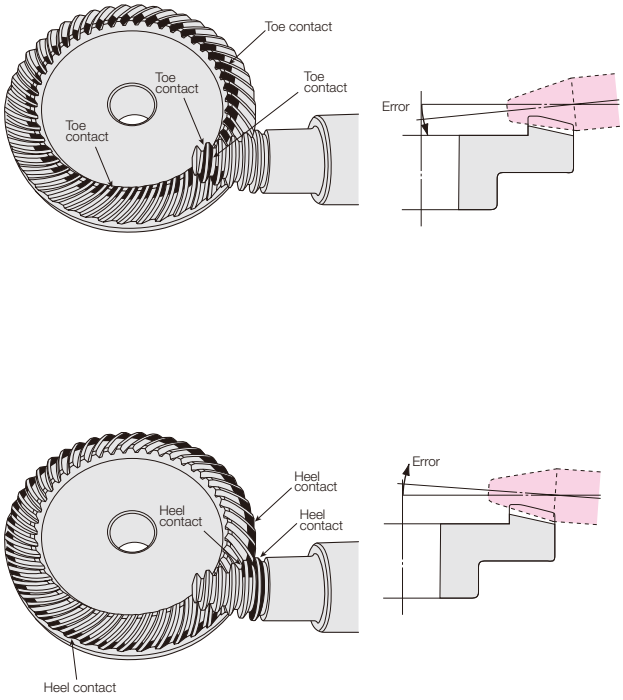
$$W_{XG} = W_{NG} \times T_G$$

W_{NG} : Thrust load coefficient of gear or R (given on the product pages)
T_G : Torque of gear or R(N·m)

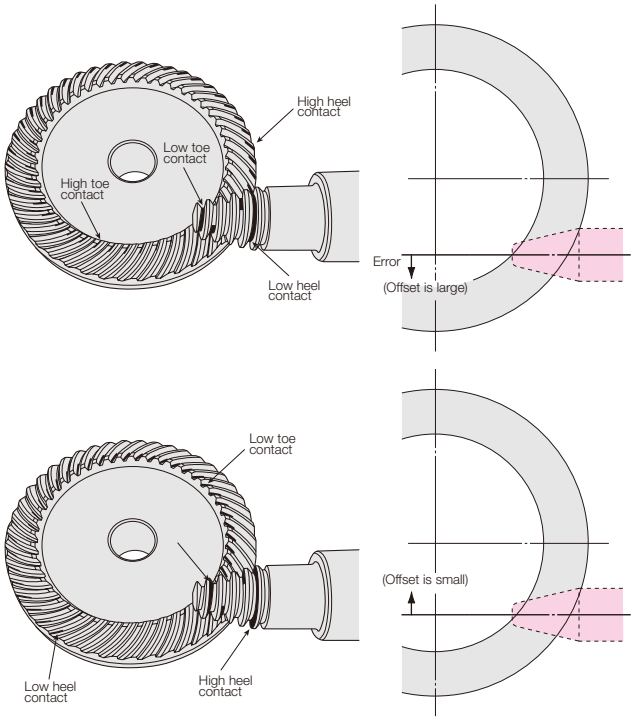
■ Variations in tooth contact due to poor alignment of gears

If the gear engagement position is out of the normal position, variations in tooth contact, as illustrated below, may appear.

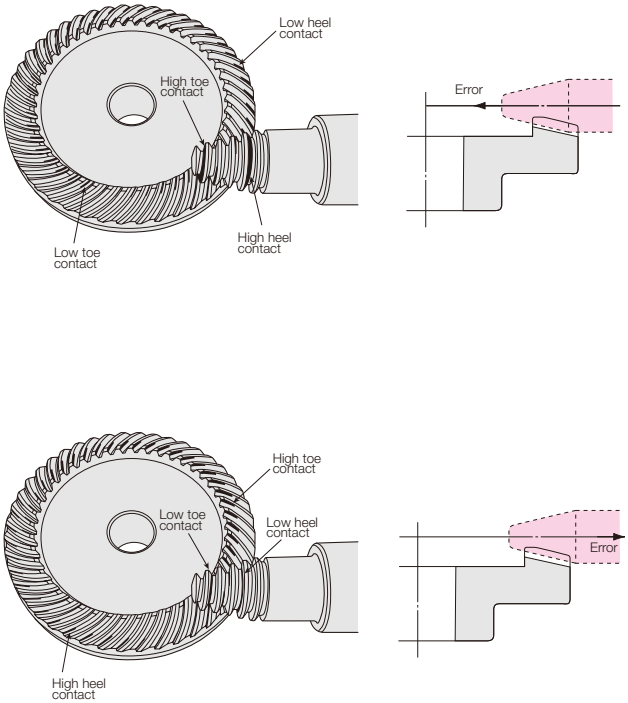
(1) Tooth contact in case of a shaft-angle error



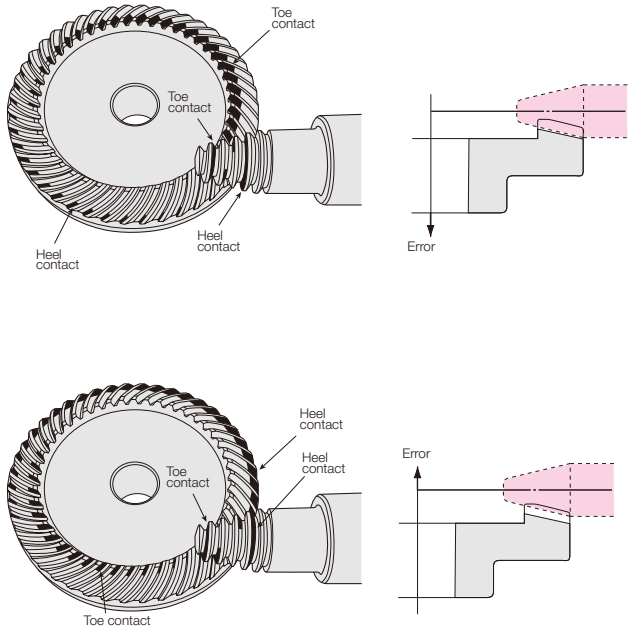
(2) Tooth contact in case of a shaft-offset error



(3) Tooth contact in case of a pinion set position error

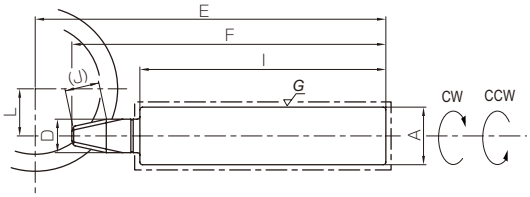


(4) Tooth contact in case of a gear set position error



Specifications	
Precision grade	JIS B 1704 : 1978 grade 3
Gear teeth	Gleason
Pressure angle	20° *
Material	SCM415
Heat treatment	Carburizing
Tooth hardness	60~63HRC

* 22°30' for KMHP1.5-0453R/3045L and KMHP1.5-0451R/1045L



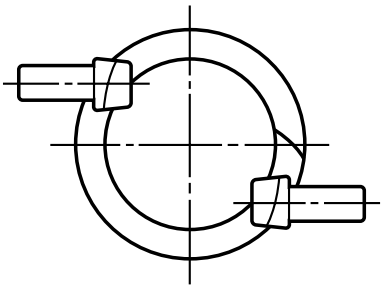
B8

Catalog No.	Reduction ratio	Nominal module	Actual module	No. of teeth	Direction of spiral	Shape	Bore • Shaft Dia. A (Bore: H7 • Shaft: h7)	Hub dia. B	Pitch dia. C	Outside dia. D	Mounting distance E	Total length F	Hub width H	Length of bore and shaft I
KMHP1-0453R	15	***m*1**	1.067	45	R	B9	12	30	48	48	19	16.3	7	14
KMHP1-3045L				3	L	B8	22.1	—	10.3	10.3	127	113	—	94
KMHP1.5-0453R	15	***m*1.5**	1.733	45	R	B9	14	40	78	78	28	23.7	10	20
KMHP1.5-3045L				3	L	B8	31.1	—	17.6	17.6	170	148	—	116
KMHP1-0603R	20	***m*1**	1.05	60	R	B9	12	34	63	63	21	18.1	8	16
KMHP1-3060L				3	L	B8	26.1	—	11.7	11.7	142	125	—	102
KMHP1.5-0603R	20	***m*1.5**	1.633	60	R	B9	20	50	98	98	33	28.7	13	25
KMHP1.5-3060L				3	L	B8	36.1	—	15.7	15.7	199	168	—	135
KMHP1-0602R	30	***m*1**	1.05	60	R	B9	12	34	63	63	21	17.8	8	16
KMHP1-2060L				2	L	B8	22.1	—	12.8	12.8	134	120	—	94
KMHP1.5-0602R	30	***m*1.5**	1.633	60	R	B9	20	50	98	98	33	28.2	13	25
KMHP1.5-2060L				2	L	B8	31.1	—	17.7	17.7	175	149	—	116
KMHP1-0451R	45	***m*1**	1.067	45	R	B9	12	30	48	48	19	16.5	7	14
KMHP1-1045L				1	L	B8	20.1	—	10.1	10.1	115	104	—	85
KMHP1.5-0451R	45	***m*1.5**	1.733	45	R	B9	14	40	78	78	28	23.9	10	20
KMHP1.5-1045L				1	L	B8	26.1	—	18.3	18.3	152	138	—	102
KMHP1-0601R	60	***m*1**	1.05	60	R	B9	12	34	63	63	21	17.9	8	16
KMHP1-1060L				1	L	B8	22.1	—	12.9	12.9	134	122	—	94
KMHP1.5-0601R	60	***m*1.5**	1.633	60	R	B9	20	50	98	98	33	28.2	13	25
KMHP1.5-1060L				1	L	B8	31.1	—	17.7	17.7	175	151	—	116
KMHP1-0901R	90	***m*1**	1.089	90	R	B9	20	50	98	98	33	28.8	13	25
KMHP1-1090L				1	L	B8	31.1	—	15.7	15.7	170	149	—	116
KMHP1-1201R	120	***m*1**	0.817	120	R	B9	20	50	98	98	33	29.3	13	25
KMHP1-1120L				1	L	B8	31.1	—	13.4	13.4	170	149	—	116
KMHP1-1801R	180	***m*1**	1	180	R	B9	25	70	180	180	47	40.1	18	35
KMHP1-1180L				1	L	B8	42.1	—	22.4	22.4	242	200	—	154
KMHP1-2001R	200	***m*1**	1	200	R	B9	25	70	200	200	47	40.6	18	35
KMHP1-1200L				1	L	B8	42.1	—	21.5	21.5	252	205	—	154

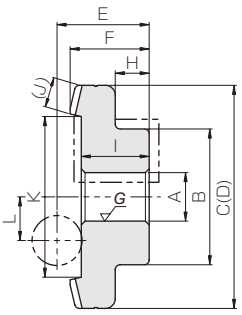
[Caution on Product Characteristics]
① The allowable torques are obtained from the results of experimentation with the pinion at 600 rpm, lubricated with Kingstar SG-O (NIHON GREASE).
② Radial and thrust load coefficients are the factors used for calculation of those loads. As shown in the figure B8 Shape, CW and CCW stand for clockwise and counterclockwise rotation. A plus sign means that the two gears in a set move away each other when load is applied. A minus sign means that two gears in a set approach each other when load is applied. For more details, see the section “How to determine the radial and thrust loads” on page 454.

■ Helix Hands and Offset Position

KMHP High Ratio Hypoid Gears are designed to be right hand helix for gears, left hand helix for pinions. The opposite helix hand gears are not available for these products. Also, the offset position is already set, so please refer to the illustration bellow when designing or assembling.



High-Ratio Hypoid Gears



B9

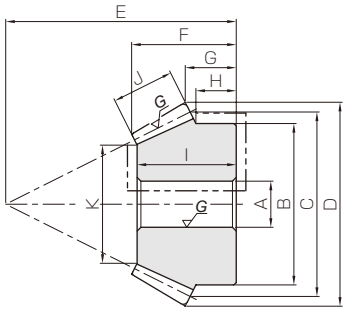
Face width	Holding surface dia.	Offset	Radial load coefficient		Thrust load coefficient		Allowable transmission	Allowable transmission	Backlash	Weight	Catalog No.
(J)	K	L	CW	CCW	CW	CCW	torque (N·m)	torque (kgf·m)	(mm)	(kg)	
(6)	35.1 —	10	48.48 147.3	−37.67 523.74	13 969.92	31.74 −831.16	10.3	1.05	0.05~0.15	0.15 0.29	**KMHP1-0453R** **KMHP1-3045L**
(10)	56.5 —	18	26.78 100.09	−18.67 338.45	8.98 566.72	21.19 −466.63	41.2	4.20	0.10~0.20	0.50 0.73	**KMHP1.5-0453R** **KMHP1.5-3045L**
(8)	46.4 —	15	33.88 159.43	−26.2 502.91	10.11 956.55	23.73 −829.74	23.3	2.38	0.05~0.15	0.29 0.45	**KMHP1-0603R** **KMHP1-3060L**
(10)	76.8 —	22	20.44 119.32	−16.54 302.18	7.15 577.56	13.95 −511.77	82.4	8.40	0.10~0.20	0.94 1.15	**KMHP1.5-0603R** **KMHP1.5-3060L**
(8)	46.4 —	18	33.59 186.59	−24.15 784.31	8.21 1461.23	24.77 −1248.6	24.1	2.46	0.05~0.15	0.29 0.28	**KMHP1-0602R** **KMHP1-2060L**
(10)	76.7 —	28	20.39 142.71	−15.29 466.2	5.96 899.1	14.75 −782.21	87.3	8.90	0.10~0.20	0.94 0.77	**KMHP1.5-0602R** **KMHP1.5-2060L**
(6)	34.9 —	14	48.04 400.81	−35.58 1579.79	11.13 3014.6	34.11 −2605.26	11.3	1.15	0.05~0.15	0.16 0.22	**KMHP1-0451R** **KMHP1-1045L**
(10)	56 —	25	26.36 233.59	−16.04 1034.08	6.88 1755.84	22.02 −1439.58	46.6	4.75	0.10~0.20	0.50 0.48	**KMHP1.5-0451R** **KMHP1.5-1045L**
(8)	46.3 —	20	33.34 357.61	−23.12 1564.81	7.41 2936.72	25.14 −2514.09	25.3	2.58	0.05~0.15	0.29 0.28	**KMHP1-0601R** **KMHP1-1060L**
(10)	76.8 —	30	22.63 303.06	−17.19 974.4	5.82 1912.11	15.81 −1675.65	94.0	9.58	0.10~0.20	0.94 0.77	**KMHP1.5-0601R** **KMHP1.5-1060L**
(10)	76.2 —	32	21.08 464.7	−15.72 1404.28	5.71 2777.98	15.17 −2443.73	71.4	7.28	0.05~0.15	0.94 0.76	**KMHP1-0901R** **KMHP1-1090L**
(10)	76.4 —	32	21.17 720.78	−16.46 1811.47	6.39 3718.13	14.76 −3326.46	51.8	5.28	0.03~0.10	0.94 0.75	**KMHP1-1201R** **KMHP1-1120L**
(15)	148.2 —	60	11.69 614.04	−9.25 1458.9	3.53 3026.67	7.96 −2721.83	260	26.5	0.05~0.15	3.99 1.88	**KMHP1-1801R** **KMHP1-1180L**
(18)	162.4 —	65	10.77 695.62	−8.9 1430.75	3.58 3074.35	7.05 −2808.83	333	34.0	0.05~0.15	4.76 1.88	**KMHP1-2001R** **KMHP1-1200L**

[Caution on Secondary Operations]

① Please read "Caution on Performing Secondary Operations" (Page 452) when performing modifications and/or secondary operations for safety concerns.

② In the illustration, the area surrounded with −−−− line is masked during the carburization process and can be modified. However, care should be exercised since the hardness is high (approx. HRC40, maximum).

Specifications	
Precision grade	JIS B 1704 : 1978 grade 1
Gear teeth	Gleason
Pressure angle	20°
Helix angle	35°
Material	SCM415
Heat treatment	Carburizing
Tooth hardness	55~60HRC



B3

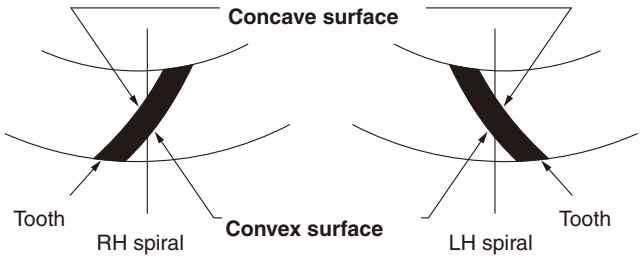
Catalog No.	Reduction ratio	Nominal module	Actual module	No. of teeth	Direction of spiral	Shape	Bore•Shaft Dia. A (Bore: H7•Shaft: h7)	Hub dia. B	Pitch dia. C	Outside dia. D	Mounting distance E	Total length F	Hub width H	Length of bore and shaft I
KMBSG2-4020R	2	***m2***	40	R	B4	15	45	80	81.1	45	31.78	26.1	7	14
KMBSG2-2040L			20	L	B3	12	35	40	44.1	55	28.16	16.02	—	94
KMBSG2.5-4020R		***m2.5***	40	R	B4	16	55	100	101.29	50	33.35	26.29		
KMBSG2.5-2040L			20	L	B3	12	43	50	55.12	65	31.01	16.28		
KMBSG3-4020R		***m3***	40	R	B4	20	65	120	121.57	60	39.81	31.57		
KMBSG3-2040L			20	L	B3	16	52	60	66.03	80	38.9	21.51		
KMBSG4-4020R		***m4***	40	R	B4	25	80	160	162.06	75	48.27	37.06	18	35
KMBSG4-2040L			20	L	B3	20	70	80	88.46	100	45.38	22.12	—	154

[Caution on Product Characteristics] ① Allowable torques shown in the table are the calculated values according to the assumed usage conditions. Please see page 451 for more details.
② Dimensions of the outside diameter, the overall length and crown to back length are all theoretical values, and some differences will occur due to the corner chamfering of the gear tips.
③ These gears produce axial thrust forces. Please see page 452 for more details.

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

■ Contact Surface of Spiral Bevel Gears

Tooth surfaces of spiral gears have concave and convex sides. Changes in the rotational direction of the driving gear alter the contact surface accordingly. The illustrations show the top view of RH and LH Spiral Gears, and the tables on the right explain the different contact surface depending on the situation.



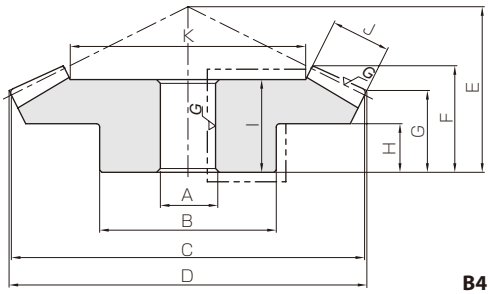
RH Spiral as a driving gear

Rotating Direction of Driving Gear Note 1	Contact Surface	
	Driving Gear (RH Spiral)	Driving Gear (LH Spiral)
RH Rotation (Clockwise)	Convex Surface	Concave Surface
LH rotation (counterclockwise)	Concave Surface	Convex Surface

LH Spiral as a driving gear

Rotating Direction of Driving Gear Note 1	Contact Surface	
	Driving Gear (LH Spiral)	Driving Gear (RH Spiral)
RH Rotation (Clockwise)	Concave Surface	Convex Surface
LH Rotation (Counterclockwise)	Convex Surface	Concave Surface

(Note 1) Rotation directions given in the tables are for viewing the gears from the hub side.



B4

Hub width	Length of bore	Face width	Holding surface dia.	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight	Catalog No.
H	I	J	K	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)	
18 13.75	29 27	14	52.7 25.39	56.5 28.2	94.2 47.1	5.76 2.88	9.61 4.80	0.04~0.10	0.57 0.18	**KMBSG2-4020R** **KMBSG2-2040L**
16 13.25	30 29	17	66.99 29.97	108 54.1	184 91.8	11.0 5.52	18.7 9.37	0.05~0.11	1.01 0.31	**KMBSG2.5-4020R** **KMBSG2.5-2040L**
20 18	35 36.5	20	80.28 36.56	185 92.4	318 159	18.8 9.42	32.4 16.2	0.06~0.12	1.64 0.56	**KMBSG3-4020R** **KMBSG3-2040L**
22 17.5	42 43	27	106.63 51.25	441 221	778 389	45.0 22.5	79.3 39.7	0.09~0.15	3.55 1.20	**KMBSG4-4020R** **KMBSG4-2040L**

[Caution on Secondary Operations] ① Please read "Caution on Performing Secondary Operations" (Page 452) when performing modifications and/or secondary operations for safety concerns.
② In the illustration, the area surrounded with – - - – line is masked during the carburization process and can be modified. However, care should be exercised since the hardness is high (approx. HRC40, maximum).

■ Forces Acting on Spiral Bevel Gear Teeth

For a spiral bevel gear with shaft angle Σ=90°, pressure angle αn=20°, and spiral angle βm=35°, the tables below show the axial thrust force Fx and the radial force Fr when a tangential force Ft of 100 units is applied at the center of face width. For details, please refer to the section "Features of Tooth Surface Contact" in the technical reference.

The tables show the values of $\frac{\text{Axial Thrust Force } Fx}{\text{Radial Force } Fr}$

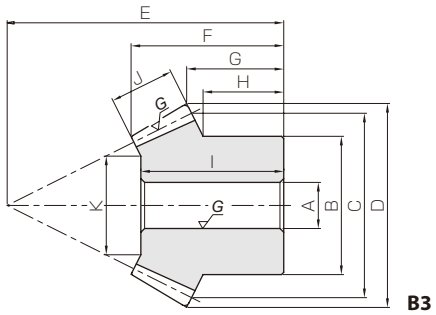
(1) Forces acting upon pinion

Contact Surface	Gear Ratio z_2/z_1						
	1.0	1.5	2.0	2.5	3.0	4.0	5.0
Concave Surface	80.9 −18.1	82.9 −1.9	82.5 8.4	81.5 15.2	80.5 20.0	78.7 26.1	77.4 29.8
Convex Surface	−18.1 80.9	−33.6 75.8	−42.8 71.1	−48.5 67.3	−52.4 64.3	−57.2 60.1	−59.9 57.3

(2) Forces acting upon gear

Contact Surface	Gear Ratio z_2/z_1						
	1.0	1.5	2.0	2.5	3.0	4.0	5.0
Concave Surface	80.9 −18.1	75.8 −33.6	71.1 −42.8	67.3 −48.5	64.3 −52.4	60.1 −57.2	57.3 −59.9
Convex Surface	−18.1 80.9	−1.9 82.9	8.4 82.5	15.2 81.5	20.0 80.5	26.1 78.7	29.8 77.4

Specifications	
Precision grade	JIS B 1704 : 1978 grade 2
Gear teeth	Gleason
Pressure angle	20°
Helix angle	35°
Material	S45C
Heat treatment	Teeth induction hardened
Tooth hardness	50~60HRC



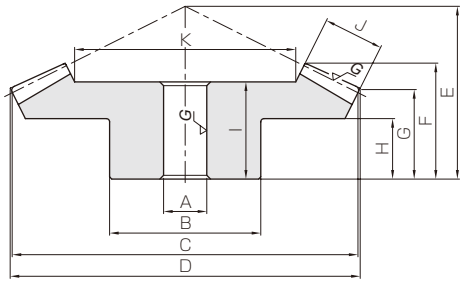
B3

Catalog No.	Gear ratio	Module	No. of teeth	Direction of spiral	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Mounting distance	Total length	Crown to back length
						A_{H7}	B	C	D	E	F	G
KSBSG2-3020R	1.5	***m2***	30	R	B4	12	35	60	61.6	40	26.6	21.2
KSBSG2-2030L			20	L	B3	10	30	40	43.55	45	24.91	16.18
KSBSG2.5-3020R		***m2.5***	30	R	B4	15	45	75	77.09	50	33.86	26.56
KSBSG2.5-2030L			20	L	B3	12	40	50	54.43	55	30.88	18.98
KSBSG3-3020R		***m3***	30	R	B4	16	50	90	92.21	55	35.34	26.66
KSBSG3-2030L			20	L	B3	16	45	60	65.58	70	40.17	26.86
KSBSG4-3020R		***m4***	30	R	B4	20	70	120	122.85	75	47.49	37.14
KSBSG4-2030L			20	L	B3	20	60	80	87.34	90	48.17	32.45
KSBSG2-4020R	2	***m2***	40	R	B4	12	40	80	80.99	45	32.26	25.99
KSBSG2-2040L			20	L	B3	12	32	40	44.10	60	34.04	21.02
KSBSG2.5-4020R		***m2.5***	40	R	B4	15	50	100	101.27	55	39.65	31.27
KSBSG2.5-2040L			20	L	B3	12	40	50	55.21	75	43.61	26.30
KSBSG3-4020R		***m3***	40	R	B4	20	60	120	121.48	65	45.76	36.48
KSBSG3-2040L			20	L	B3	16	50	60	66.06	90	50.63	31.52
KSBSG4-4020R		***m4***	40	R	B4	20	70	160	162.07	80	53.69	42.07
KSBSG4-2040L			20	L	B3	20	60	80	88.50	120	66.24	42.12
KSBSG2-4515R	3	***m2***	45	R	B4	12	40	90	90.67	40	30.29	26.01
KSBSG2-1545L			15	L	B3	10	24	30	34.78	60	29.66	15.80
KSBSG2.5-4515R		***m2.5***	45	R	B4	15	50	112.5	113.32	50	38.25	32.47
KSBSG2.5-1545L			15	L	B3	12	30	37.5	43.36	75	38.27	19.73
KSBSG3-4515R		***m3***	45	R	B4	20	60	135	135.99	55	40.59	33.98
KSBSG3-1545L			15	L	B3	15	38	45	52.08	90	44.98	23.68

[Caution on Product Characteristics]
① Allowable torques shown in the table are the calculated values according to the assumed usage conditions. Please see page 451 for more details.
② Dimensions of the outside diameter, the overall length and crown to back length are all theoretical values, and some differences will occur due to the corner chamfering of the gear tips.
③ These gears produce axial thrust forces. Please see page 452 for more details.

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

Ground Spiral Bevel Gears



B4

Hub width	Length of bore	Face width	Holding surface dia.	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight	Catalog No.
H	I	J	K	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)	
15 11.67	23 22	11	37.56 21.34	14.1 9.61	14.2 9.44	1.44 0.98	1.44 0.96	0.05~0.11	0.26 0.13	**KSBSG2-3020R** **KSBSG2-2030L**
18 14.17	30 28	15	45.61 27.42	29.0 19.8	29.7 19.8	2.96 2.02	3.03 2.02	0.06~0.12	0.55 0.28	**KSBSG2.5-3020R** **KSBSG2.5-2030L**
17 20	31 37	17	57.14 34.71	48.4 33.1	50.4 33.6	4.94 3.37	5.14 3.42	0.07~0.13	0.82 0.49	**KSBSG3-3020R** **KSBSG3-2030L**
25 23.33	40 43	20	78.59 46.89	106 72.2	113 75.3	10.8 7.36	11.5 7.68	0.10~0.16	1.90 1.05	**KSBSG4-3020R** **KSBSG4-2030L**
18 18	27 32	15	48.46 20.92	25.5 12.8	26.7 13.4	2.60 1.30	2.73 1.36	0.05~0.11	0.51 0.19	**KSBSG2-4020R** **KSBSG2-2040L**
20 22.5	34 40	20	59.28 20.56	51.7 25.9	55.1 27.6	5.27 2.64	5.62 2.81	0.06~0.12	1.06 0.42	**KSBSG2.5-4020R** **KSBSG2.5-2040L**
24 27.5	38 47	22	73.81 29.61	84.8 42.5	91.9 46.0	8.65 4.33	9.38 4.69	0.07~0.13	1.67 0.69	**KSBSG3-4020R** **KSBSG3-2040L**
28 35	45 62	28	102.39 42.78	195 97.9	217 109	19.9 9.98	22.2 11.1	0.10~0.16	3.33 1.53	**KSBSG4-4020R** **KSBSG4-2040L**
17 14	26 29	15	59.04 19.13	34.8 11.2	28.1 9.38	3.55 1.14	2.87 0.96	0.05~0.11	0.60 0.095	**KSBSG2-4515R** **KSBSG2-1545L**
22 17.5	35 37	20	72.84 20.51	59.0 18.9		6.01 1.93	4.93 1.64	0.06~0.12	1.21 0.19	**KSBSG2.5-4515R** **KSBSG2.5-1545L**
20 21.33	35 44	23	88.18 28.54	99.3 31.8	82.5 27.5	10.1 3.24	8.41 2.80	0.07~0.13	1.99 0.34	**KSBSG3-4515R** **KSBSG3-1545L**

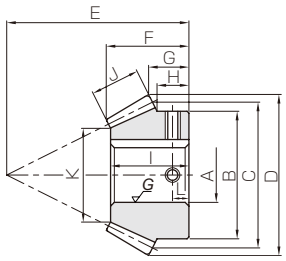
[Caution on Secondary Operations]

① Please read "Caution on Performing Secondary Operations" (Page 452) when performing modifications and/or secondary operations for safety concerns.

② Due to the gear teeth being induction hardened, no secondary operations can be performed on tooth areas including the bottom land (approx. 1 to 2 mm).

Finished Bore Spiral Bevel Gears

Specifications	
Precision grade	JIS B 1704 : 1978 grade 4
Gear teeth	Gleason
Pressure angle	20°
Helix angle	35°
Material	SCM415
Heat treatment	Overall carburizing
Tooth hardness	55~60HRC



BK

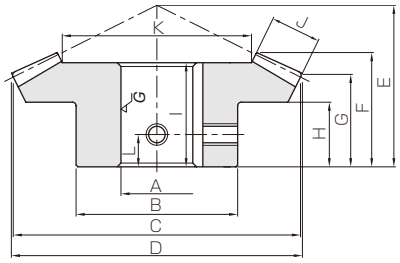
Catalog No.	Gear ratio	Module	No. of teeth	Direction of spiral	Shape	Bore A_{H7}	Hub dia. B	Pitch dia. C	Outside dia. D	Mounting distance E	Total length F	Crown to back length G	Hub width H	Length of bore I
KMBSA2-3020R **KMBSB2-3020R**	1.5	***m2***	30	R	B4	20 22	40	60	61.36	40	26.8	21.02	14	23
KMBSA2-2030L **KMBSB2-2030L**		***m2***	20	L	BK	15 18	35	40	43.49	45	24.96	16.16	13.33	23
KMBSA2.5-3020R **KMBSB2.5-3020R**		***m2.5***	30	R	B4	22 25	48	75	76.74	50	33.6	26.31	18	30
KMBSA2.5-2030L **KMBSB2.5-2030L**		***m2.5***	20	L	BK	18 20	43	50	54.43	55	30.08	18.98	15.17	28
KMBSA3-3020R **KMBSB3-3020R**		***m3***	30	R	B4	25 30	60	90	92.21	60	40.34	31.66	21	36
KMBSA3-2030L **KMBSB3-2030L**		***m3***	20	L	BK	22 25	53	60	65.58	65	35.17	21.86	17.67	32.5
KMBSA4-3020R **KMBSB4-3020R**		***m4***	30	R	B4	35 40	75	120	122.91	70	43.99	32.18	21	39
KMBSA4-2030L **KMBSB4-2030L**		***m4***	20	L	BK	30 35	70	80	87.34	85	45.53	27.45	21.67	42
KMBSA5-3020R		***m5***	30	R	B7	80	—	150	—	70	35.53	23.8	—	31
KMBSA5-2030L **KMBSB5-2030L**		***m5***	20	L	BK	35 40	87	100	109.2	105	55.05	33.07	25.67	51
KMBSA6-3020R		***m6***	30	R	B7	90	—	180	—	80	38.86	24.37	—	33
KMBSA6-2030L **KMBSB6-2030L**		***m6***	20	L	BK	45 50	105	120	130.48	125	65.57	38.49	30	60
KMBSA2-4020R **KMBSB2-4020R**	2	***m2***	40	R	B4	20 22	45	80	81.06	45	31.83	26.06	18	29
KMBSA2-2040L **KMBSB2-2040L**		***m2***	20	L	BK	15 18	35	40	44.2	55	28.16	16.05	13.75	27
KMBSA2.5-4020R **KMBSB2.5-4020R**		***m2.5***	40	R	B4	25 28	55	100	101.29	50	33.35	26.29	16	30
KMBSA2.5-2040L **KMBSB2.5-2040L**		***m2.5***	20	L	BK	20 22	43	50	55.12	65	31.01	16.28	13.25	29
KMBSA3-4020R **KMBSB3-4020R**		***m3***	40	R	B4	30 35	65	120	121.57	60	39.81	31.57	21	35
KMBSA3-2040L **KMBSB3-2040L**		***m3***	20	L	BK	22 25	53	60	66.03	80	38.9	21.51	18.25	36.5
KMBSA4-4020R		***m4***	40	R	B7	80	—	160	—	60	32.08	22.53	—	28
KMBSA4-2040L **KMBSB4-2040L**		***m4***	20	L	BK	30 35	70	80	88.46	100	45.38	22.12	17.5	43
KMBSA5-4020R		***m5***	40	R	B7	90	—	200	—	70	35.2	22.98	—	30
KMBSA5-2040L **KMBSB5-2040L**		***m5***	20	L	BK	40 45	87	100	109.91	125	57.11	27.48	21.75	53.5
KMBSA6-4020R		***m6***	40	R	B7	110	—	240	—	80	37.89	23.62	—	32
KMBSA6-2040L **KMBSB6-2040L**		***m6***	20	L	BK	50 55	105	120	132.04	150	67.8	33.01	26.25	64

[Caution on Product Characteristics]

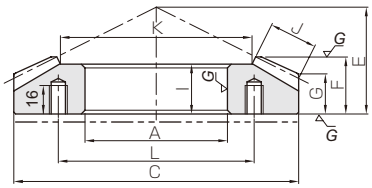
① The allowable torques shown in the table are the calculated values according to the assumed usage conditions. Please see page 451 for more details.
② Dimensions of the outside diameter, the overall length and crown to back length are all theoretical values, and some differences will occur due to the corner chamfering of the gear tips.
③ These gears produce axial thrust forces. See page 452 for more details.
④ Although the dimensions of the keyway are made to the JIS (Js9) tolerance, there may be some deviations due to the effects of heat treatment.
⑤ For products having a tapped hole (Except for B7-shaped products), a tapping screw is attached as an accessory.

Starting from Jan 2012, BK- and B4-shaped products have been improved, and the revised products are to have two tapped holes.

Finished Bore Spiral Bevel Gears



B4

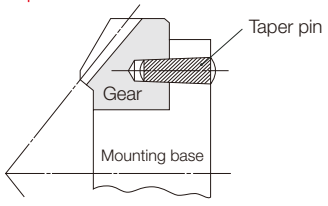


B7

Face width	Holding surface dia.	Keyway	Set Screw		Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash (mm)	Weight (kg)	Catalog No.
J	K	Width×Depth	Size	L	Bending strength	Surface durability	Bending strength	Surface durability			
11	37.56	6 x 2.8 6 x 2.8	2–M5 2–M5	7	34.4	38.4	3.51	3.91	0.06~0.16	0.26 0.24	**KMBSA2-3020R** **KMBSB2-3020R**
11	24.34	5 x 2.3 6 x 2.8	2–M4 2–M5	6.5	23.5	25.6	2.39	2.61		0.14 0.13	**KMBSA2-2030L** **KMBSB2-2030L**
14	48.01	6 x 2.8 8 x 3.3	2–M5 2–M6	9	68.0	76.8	6.93	7.84	0.07~0.17	0.52 0.49	**KMBSA2.5-3020R** **KMBSB2.5-3020R**
14	31.02	6 x 2.8 6 x 2.8	2–M5 2–M5	7.5	46.4	51.2	4.73	5.22		0.26 0.25	**KMBSA2.5-2030L** **KMBSB2.5-2030L**
17	57.14	8 x 3.3 8 x 3.3	2–M6 2–M6	11	118	135	12.1	13.8	0.08~0.18	0.96 0.90	**KMBSA3-3020R** **KMBSB3-3020R**
17	36.2	6 x 2.8 8 x 3.3	2–M5 2–M6	9	80.7	90.1	8.23	9.19		0.46 0.43	**KMBSA3-2030L** **KMBSB3-2030L**
23	76.72	10 x 3.3 12 x 3.3	2–M8 2–M8	10	283	328	28.9	33.5	0.12~0.27	1.77 1.68	**KMBSA4-3020R** **KMBSB4-3020R**
23	48.07	8 x 3.3 10 x 3.3	2–M6 2–M8	11	193	219	19.7	22.3		1.03 0.95	**KMBSA4-2030L** **KMBSB4-2030L**
28	97.36	—	6-M10	110	544	637	55.4	64.9	0.14~0.34	2.80	**KMBSA5-3020R**
28	62.04	10 x 3.3 12 x 3.3	2–M8 2–M8	13	371	425	37.8	43.3		2.01 1.89	**KMBSA5-2030L** **KMBSB5-2030L**
34	115.61	—	6-M10	120	927	1120	94.6	114	0.16~0.36	4.55	**KMBSA6-3020R**
34	72.41	14 x 3.8 14 x 3.8	2-M10 2-M10	15	633	745	64.5	76.0		3.56 3.38	**KMBSA6-2030L** **KMBSB6-2030L**
14	52.7	6 x 2.8 6 x 2.8	2–M5 2–M5	9	59.6	69.6	6.08	7.09	0.06~0.16	0.53 0.51	**KMBSA2-4020R** **KMBSB2-4020R**
14	25.39	5 x 2.3 6 x 2.8	2–M4 2–M5	7	29.9	34.8	3.05	3.55		0.16 0.14	**KMBSA2-2040L** **KMBSB2-2040L**
17	66.99	8 x 3.3 8 x 3.3	2–M6 2–M6	8	114	135	11.7	13.8	0.07~0.17	0.93 0.90	**KMBSA2.5-4020R** **KMBSB2.5-4020R**
17	29.97	6 x 2.8 6 x 2.8	2–M5 2–M5	7	57.3	67.6	5.84	6.89		0.26 0.25	**KMBSA2.5-2040L** **KMBSB2.5-2040L**
20	80.28	8 x 3.3 10 x 3.3	2–M6 2–M8	11	195	233	19.9	23.7	0.08~0.18	1.47 1.40	**KMBSA3-4020R** **KMBSB3-4020R**
20	36.56	6 x 2.8 8 x 3.3	2–M5 2–M6	9.5	97.7	116	9.97	11.9		0.51 0.48	**KMBSA3-2040L** **KMBSB3-2040L**
27	107.63	—	6-M10	110	466	564	47.5	57.5	0.12~0.27	3.11	**KMBSA4-4020R**
27	51.25	8 x 3.3 10 x 3.3	2–M6 2–M8	9	234	282	23.8	28.8		1.05 0.96	**KMBSA4-2040L** **KMBSB4-2040L**
34	133.97	—	6-M10	120	915	1120	93.3	114	0.14~0.34	5.59	**KMBSA5-4020R**
34	61.95	12 x 3.3 14 x 3.8	2–M8 2-M10	11	458	559	46.7	57.0		1.96 1.82	**KMBSA5-2040L** **KMBSB5-2040L**
40	162.56	—	6-M10	140	1530	1920	156	196	0.16~0.36	8.48	**KMBSA6-4020R**
40	77.11	14 x 3.8 16 x 4.3	2-M10 2-M10	14	766	961	78.1	97.9		3.33 3.11	**KMBSA6-2040L** **KMBSB6-2040L**

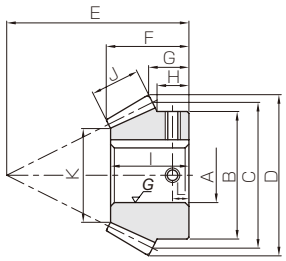
[Caution on Secondary Operations] ① These products which are hardened by carburizing allow no secondary machining. However, for B7 type gear, the area surrounded with ———— line (in the illustration) is masked during the carburization process and can be modified. Care should be exercised since the hardness is high (approx. HRC40, maximum).

When installing B7 type (ring type) Spiral Miter Gears to the base, always secure the gears onto the mounting base with taper pins to absorb the rotational loads. Fastening and securing with only mounting screws could possibly cause the screws to snap due to heavy loads.



Finished Bore Spiral Bevel Gears

Specifications	
Precision grade	JIS B 1704 : 1978 grade 4
Gear teeth	Gleason
Pressure angle	20°
Helix angle	35°
Material	SCM415
Heat treatment	Overall carburizing
Tooth hardness	55~60HRC



BK

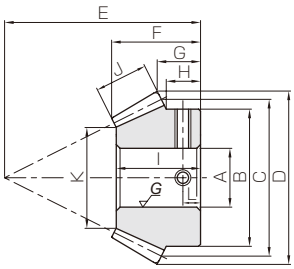
Catalog No.	Gear ratio	Module	No. of teeth	Direction of spiral	Shape	Bore A_{H7}	Hub dia. B	Pitch dia. C	Outside dia. D	Mounting distance E	Total length F	Crown to back length G	Hub width H	Length of bore I
KMBSA2-4518R **KMBSB2-4518R**	2.5	***m2***	45	R	B4	20 25	48	90	90.79	40	27.67	22.98	15	25
KMBSA2-1845L **KMBSB2-1845L**		***m2***	18	L	BK	12 16	32	36	40.42	60	28.54	15.88	14.2	27.5
KMBSA2.5-4518R **KMBSB2.5-4518R**		***m2.5***	45	R	B4	25 30	55	112.5	113.49	50	34.94	28.74	19	31
KMBSA2.5-1845L **KMBSB2.5-1845L**		***m2.5***	18	L	BK	15 20	40	45	50.35	72	33.19	16.82	14.75	31.5
KMBSA3-4518R **KMBSB3-4518R**		***m3***	45	R	B4	30 35	65	135	136.24	60	41.65	34.55	22	37
KMBSA3-1845L **KMBSB3-1845L**		***m3***	18	L	BK	20 25	48	54	60.69	85	37.82	18.84	16.3	36
KMBSA4-4518R		***m4***	45	R	B7	80	—	180	—	55	29.77	21.25	—	25
KMBSA4-1845L **KMBSB4-1845L**		***m4***	18	L	BK	28 32	63	72	80.86	110	48.03	21.77	18.2	46
KMBSA5-4518R		***m5***	45	R	B7	100	—	225	—	65	33.37	22.82	—	28
KMBSA5-1845L **KMBSB5-1845L**		***m5***	18	L	BK	35 42	80	90	101.07	135	57.3	24.71	20.5	54.5
KMBSA6-4518R		***m6***	45	R	B7	110	—	270	—	75	36.97	24.19	—	30
KMBSA6-1845L **KMBSB6-1845L**		***m6***	18	L	BK	45 50	95	108	120.55	160	66.73	27.51	22.4	63
KMBSA2-4515R **KMBSB2-4515R**	3	***m2***	45	R	B4	20 22	48	90	90.66	40	30.01	25.99	18	27
KMBSA2-1545L **KMBSB2-1545L**		***m2***	15	L	BT BK	10 12	26	30	34.59	55	23.78	10.77	9.33	22.5
KMBSA2.5-4515R **KMBSB2.5-4515R**		***m2.5***	45	R	B4	22 25	55	112.5	113.28	45	32.43	27.42	18	28
KMBSA2.5-1545L **KMBSB2.5-1545L**		***m2.5***	15	L	BK	12 15	32	37.5	43.06	70	30.51	14.68	12.84	29
KMBSA3-4515R **KMBSB3-4515R**		***m3***	45	R	B4	30 32	65	135	136.03	55	39.94	34.05	22	35
KMBSA3-1545L **KMBSB3-1545L**		***m3***	15	L	BK	18 20	38	45	52	85	38.12	18.67	16.33	36.5
KMBSA4-4515R		***m4***	45	R	B7	80	—	180	—	50	28.85	22.14	—	25
KMBSA4-1545L **KMBSB4-1545L**		***m4***	15	L	BK	22 25	52	60	69.24	110	47.51	21.54	18.67	45.5
KMBSA5-4515R		***m5***	45	R	B7	90	—	225	—	60	33.57	25.16	—	28
KMBSA5-1545L **KMBSB5-1545L**		***m5***	15	L	BK	28 32	65	75	86.55	135	56.89	24.43	20.83	54
KMBSA6-4515R		***m6***	45	R	B7	110	—	270	—	70	38.28	28.05	—	32
KMBSA6-1545L **KMBSB6-1545L**		***m6***	15	L	BK	35 40	78	90	103.13	160	66.39	27.19	23	63

[Caution on Product Characteristics]

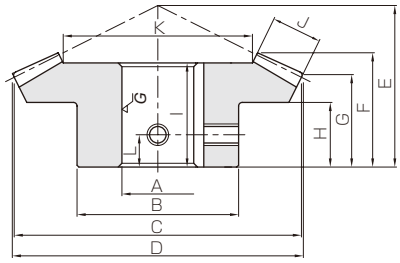
① The allowable torques shown in the table are the calculated values according to the assumed usage conditions. Please see page 451 for more details.
② Dimensions of the outside diameter, the overall length and crown to back length are all theoretical values, and some differences will occur due to the corner chamfering of the gear tips.
③ These gears produce axial thrust forces. See page 452 for more details.
④ Although the dimensions of the keyway are made to the JIS (Js9) tolerance, there may be some deviations due to the effects of heat treatment.
⑤ For products having a tapped hole (Except for B7-shaped products), a tapping screw is attached as an accessory.

Starting from Jan 2012, BK-, BT-, and B4-shaped products have been improved, and the revised products are to have two tapped holes.

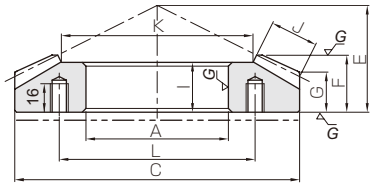
Finished Bore Spiral Bevel Gears



BT



B4

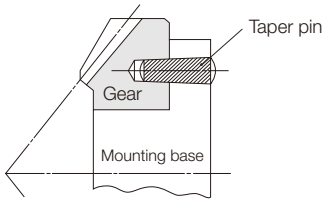


B7

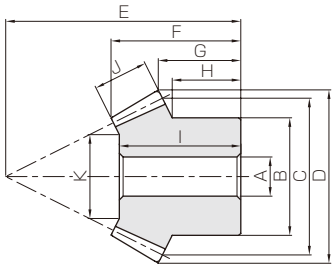
Face width	Holding surface dia.	Keyway	Set Screw		Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight	Catalog No.
J	K	Width×Depth	Size	L	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)	
14	62.24	6 x 2.8 8 x 3.3	2–M5 2–M6	8	69.3	74.3	7.06	7.58	0.06~0.16	0.60 0.56	**KMBSA2-4518R** **KMBSB2-4518R**
14	23.11	4 x 1.8 5 x 2.3	2–M4 2–M4	7	27.2	29.7	2.77	3.03		0.14 0.12	**KMBSA2-1845L** **KMBSB2-1845L**
18	76.53	8 x 3.3 8 x 3.3	2–M6 2–M6	10	138	150	14.1	15.3	0.07~0.17	1.09 1.04	**KMBSA2.5-4518R** **KMBSB2.5-4518R**
18	26.82	5 x 2.3 6 x 2.8	2–M4 2–M5	8	54.1	59.9	5.52	6.11		0.26 0.22	**KMBSA2.5-1845L** **KMBSB2.5-1845L**
21	92.96	8 x 3.3 10 x 3.3	2–M6 2–M8	11	234	256	23.8	26.1	0.08~0.18	1.92 1.84	**KMBSA3-4518R** **KMBSB3-4518R**
21	33.41	6 x 2.8 8 x 3.3	2–M5 2–M6	9	91.8	103	9.36	10.5		0.41 0.36	**KMBSA3-1845L** **KMBSB3-1845L**
29	122.33	—	6-M10	110	567	630	57.8	64.3	0.12~0.27	3.92	**KMBSA4-4518R**
29	45.83	8 x 3.3 10 x 3.3	2–M6 2–M8	10	223	252	22.7	25.7		0.89 0.82	**KMBSA4-1845L** **KMBSB4-1845L**
36	153.85	—	6-M10	130	1100	1240	112	126	0.14~0.34	6.82	**KMBSA5-4518R**
36	56.13	10 x 3.3 12 x 3.3	2–M8 2–M8	11	433	495	44.2	50.5		1.68 1.50	**KMBSA5-1845L** **KMBSB5-1845L**
43	184.57	—	6-M10	140	1860	2150	190	219	0.16~0.36	11.1	**KMBSA6-4518R**
43	66.44	14 x 3.8 14 x 3.8	2-M10 2-M10	12	731	859	74.6	87.6		2.66 2.48	**KMBSA6-1845L** **KMBSB6-1845L**
14	61.82	6 x 2.8 6 x 2.8	2–M5 2–M5	9	67.8	61.3	6.91	6.25	0.06~0.16	0.61 0.60	**KMBSA2-4515R** **KMBSB2-4515R**
14	16.46	— 4 x 1.8	2–M4 2–M4	5	21.7	20.4	2.22	2.08		0.081 0.073	**KMBSA2-1545L** **KMBSB2-1545L**
17	77.83	6 x 2.8 8 x 3.3	2–M5 2–M6	9	130	119	13.3	12.1	0.07~0.17	1.01 0.98	**KMBSA2.5-4515R** **KMBSB2.5-4515R**
17	21.48	4 x 1.8 5 x 2.3	2–M4 2–M4	7	41.6	39.6	4.24	4.04		0.16 0.15	**KMBSA2.5-1545L** **KMBSB2.5-1545L**
21	92.39	8 x 3.3 10 x 3.3	2–M6 2–M8	11	229	211	23.3	21.6	0.08~0.18	1.78 1.75	**KMBSA3-4515R** **KMBSB3-4515R**
21	26.18	6 x 2.8 6 x 2.8	2–M5 2–M5	9	73.3	70.5	7.48	7.18		0.26 0.24	**KMBSA3-1545L** **KMBSB3-1545L**
28	124.3	—	6-M10	110	542	508	55.3	51.8	0.12~0.27	3.93	**KMBSA4-4515R**
28	35.91	6 x 2.8 8 x 3.3	2–M5 2–M6	10	174	169	17.7	17.3		0.63 0.58	**KMBSA4-1545L** **KMBSB4-1545L**
35	154.88	—	6-M10	120	1060	1000	108	102	0.14~0.34	7.38	**KMBSA5-4515R**
35	42.64	8 x 3.3 10 x 3.3	2–M6 2–M8	11	339	334	34.6	34.1		1.16 1.07	**KMBSA5-1545L** **KMBSB5-1545L**
42	186.12	—	6-M10	140	1790	1740	183	178	0.16~0.36	12.0	**KMBSA6-4515R**
42	52.37	10 x 3.3 12 x 3.3	2–M8 2–M8	12	575	581	58.6	59.3		1.90 1.75	**KMBSA6-1545L** **KMBSB6-1545L**

[Caution on Secondary Operations] ① These products which are hardened by carburizing allow no secondary machining. However, for B7 type gear, the area surrounded with ———— line (in the illustration) is masked during the carburization. process and can be modified. Care should be exercised since the hardness is high (approx. HRC40, maximum).

When installing B7 type (ring type) Spiral Miter Gears to the base, always secure the gears onto the mounting base with taper pins to absorb the rotational loads. Fastening and securing with only mounting screws could possibly cause the screws to snap due to heavy loads.



Specifications	
Precision grade	JIS B 1704 : 1978 grade 4
Gear teeth	Gleason
Pressure angle	20°
Helix angle	35°
Material	S45C
Heat treatment	Teeth induction hardened
Tooth hardness	50~60HRC

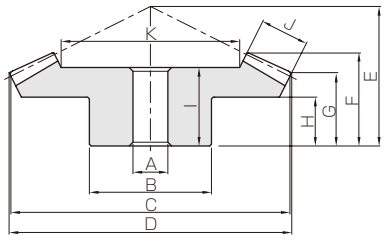


B3

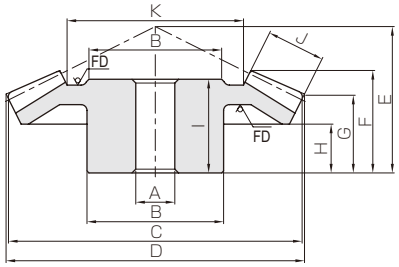
Catalog No.	Gear ratio	Module	No. of teeth	Direction of spiral	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Mounting distance	Total length	Crown to back length
						A	B	C	D	E	F	G
KSBS2-3020R	1.5	***m2***	30	R	B4	12	35	60	61.36	40	26.8	21.02
KSBS2-2030L			20	L	B3	10	30	40	43.49	45	24.96	16.16
KSBS2.5-3020R		***m2.5***	30	R	B4	15	45	75	77.09	50	33.86	26.56
KSBS2.5-2030L			20	L	B3	12	40	50	54.43	55	30.88	18.98
KSBS3-3020R		***m3***	30	R	B4	16	50	90	92.21	55	35.34	26.66
KSBS3-2030L			20	L	B3	16	45	60	65.58	70	40.17	26.86
KSBS4-3020R		***m4***	30	R	B4	20	70	120	122.85	75	47.49	37.14
KSBS4-2030L			20	L	B3	20	60	80	87.34	90	48.17	32.45
KSBS5-3020R		***m5***	30	R	B4	25	90	150	153.67	90	58.08	42.75
KSBS5-2030L			20	L	B3	22	80	100	109.2	110	61.62	38.07
KSBS1-4020R	2	***m1***	40	R	B4	8	25	40	40.52	22	15.02	12.52
KSBS1-2040L			20	L	B3	6	16	20	22.08	28	13.73	8.52
KSBS1.5-4020R		***m1.5***	40	R	B4	10	38	60	60.75	35	24.93	20.75
KSBS1.5-2040L			20	L	B3	8	25	30	33.08	46	25.45	16.77
KSBS2-4020R		***m2***	40	R	B4	12	40	80	81	45	32.27	26
KSBS2-2040L			20	L	B3	12	32	40	44.1	60	34.04	21.02
KSBS2.5-4020R		***m2.5***	40	R	B4	15	50	100	101.27	55	39.65	31.27
KSBS2.5-2040L			20	L	B3	12	40	50	55.21	75	43.61	26.30
KSBS3-4020R		***m3***	40	R	B4	20	60	120	121.48	65	45.76	36.48
KSBS3-2040L			20	L	B3	16	50	60	66.06	90	50.63	31.52
KSBS4-4020R		***m4***	40	R	B4	20	70	160	162.07	80	53.69	42.07
KSBS4-2040L			20	L	B3	20	60	80	88.50	120	66.24	42.12
KSBS5-4020R		***m5***	40	R	B5	25	100	200	202.54	90	55.02	42.54
KSBS5-2040L			20	L	B3	22	80	100	110.45	140	68.48	42.61
KSBS2.5-3618R	2	***m2.5***	36	R	B4	15	55	90	91.29	43	28.38	21.79
KSBS2.5-1836L			18	L	B3	12	38	45	50.30	64	34.06	20.32
KSBS3-3618R		***m3***	36	R	B4	20	60	108	109.53	52	34.82	26.53
KSBS3-1836L			18	L	B3	16	46	54	60.28	75	39.79	22.57
KSBS4-3618R		***m4***	36	R	B4	20	70	144	145.99	72	48.84	37.99
KSBS4-1836L			18	L	B3	20	60	72	80.19	100	52.51	30.05
KSBS2-4518R	2.5	***m2***	45	R	B4	12	48	90	90.79	40	27.67	22.98
KSBS2-1845L			18	L	B3	10	32	36	40.42	60	28.54	15.88
KSBS2.5-4518R		***m2.5***	45	R	B4	15	55	112.5	113.49	50	34.94	28.74
KSBS2.5-1845L			18	L	B3	12	40	45	50.35	72	33.19	16.82
KSBS3-4518R		***m3***	45	R	B4	20	65	135	136.24	60	41.65	34.55
KSBS3-1845L			18	L	B3	16	48	54	60.69	85	37.82	18.84
KSBS4-4518R		***m4***	45	R	B4	25	80	180	181.57	75	50.98	40.96
KSBS4-1845L			18	L	B3	20	62	72	80.86	110	48.03	21.77
KSBS5-4518R		***m5***	45	R	B4	30	100	225	225.81	90	57.9	46.01
KSBS5-1845L			18	L	B3	22	80	90	103.87	135	56.02	25.27

[Caution on Product Characteristics]
① The allowable torques shown in the table are the calculated values according to the assumed usage conditions. Please see page 451 for more details.
② Dimensions of the outside diameter, the overall length and crown to back length are all theoretical values, and some differences will occur due to the corner chamfering of the gear tips.
③ These gears produce axial thrust forces. See page 452 for more details.
④ Due to heat treating, some deformation of the bore may occur. It may be necessary to ream the bore to bring it to the stated dimensions.

Spiral Bevel Gears



B4



B5

* FD has die-forged finish.

Hub width	Length of bore	Face width	Holding surface dia.	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight	Catalog No.
H	I	J	K	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)	
15 11.67	23 22	11	37.56 21.34	15.4 10.5	11.3 7.52	1.57 1.07	1.15 0.77	0.06~0.16	0.26 0.13	**KSBS2-3020R** **KSBS2-2030L**
18 14.17	30 28	15	45.61 27.42	31.7 21.6	23.6 15.7	3.23 2.20	2.40 1.60	0.07~0.17	0.55 0.28	**KSBS2.5-3020R** **KSBS2.5-2030L**
17 20	31 37	17	57.14 34.71	52.9 36.1	39.7 26.5	5.39 3.68	4.05 2.70	0.08~0.18	0.82 0.49	**KSBS3-3020R** **KSBS3-2030L**
25 23.33	40 43	20	78.59 46.89	115 78.7	88.1 58.8	11.8 8.03	8.99 5.99	0.12~0.27	1.90 1.05	**KSBS4-3020R** **KSBS4-2030L**
24 28.33	50 56	30	91.22 54.83	253 173	195 130	25.8 17.6	19.9 13.3	0.14~0.34	4.11 2.29	**KSBS5-3020R** **KSBS5-2030L**
8 7	12 12	6	26.58 9.17	3.01 1.51	2.22 1.11	0.31 0.15	0.23 0.11	0.03~0.13	0.068 0.019	**KSBS1-4020R** **KSBS1-2040L**
15 14.75	22 24	10	39.64 17.28	10.9 5.46	8.22 4.11	1.11 0.56	0.84 0.42	0.05~0.15	0.27 0.088	**KSBS1.5-4020R** **KSBS1.5-2040L**
18 18	27 32	15	48.46 20.92	27.8 13.9	21.3 10.7	2.83 1.42	2.17 1.09	0.06~0.16	0.51 0.19	**KSBS2-4020R** **KSBS2-2040L**
20 22.5	34 40	20	59.28 20.56	56.4 28.2	43.7 21.9	5.75 2.88	4.46 2.23	0.07~0.17	1.06 0.40	**KSBS2.5-4020R** **KSBS2.5-2040L**
24 27.5	38 47	22	73.81 29.61	92.5 46.4	72.6 36.3	9.44 4.73	7.40 3.70	0.08~0.18	1.67 0.69	**KSBS3-4020R** **KSBS3-2040L**
28 35	45 62	28	102.39 42.78	213 107	170 84.8	21.7 10.9	17.3 8.65	0.12~0.27	3.33 1.46	**KSBS4-4020R** **KSBS4-2040L**
26 35	50 63	30	138.92 57.84	376 188	302 151	38.3 19.2	30.8 15.4	0.14~0.34	5.67 2.61	**KSBS5-4020R** **KSBS5-2040L**
13 17.25	24 32	16	57.72 25.45	41.7 20.9	29.3 14.7	4.26 2.13	2.99 1.49	0.07~0.17	0.72 0.27	**KSBS2.5-3618R** **KSBS2.5-1836L**
17 19	30 37	20	68.27 28.56	74.0 37.0	52.4 26.2	7.54 3.78	5.35 2.67	0.08~0.18	1.15 0.44	**KSBS3-3618R** **KSBS3-1836L**
25 25	42 49	26	91.87 39.72	173 86.4	124 62.1	17.6 8.81	12.7 6.33	0.12~0.27	2.65 1.03	**KSBS4-3618R** **KSBS4-1836L**
15 14.2	25 27.5	14	62.24 23.11	31.0 12.2	21.9 8.74	3.16 1.24	2.23 0.89	0.06~0.16	0.65 0.15	**KSBS2-4518R** **KSBS2-1845L**
18 14.75	31 31.5	18	76.53 26.82	61.6 24.2	44.0 17.6	6.28 2.47	4.49 1.80	0.07~0.17	1.23 0.28	**KSBS2.5-4518R** **KSBS2.5-1845L**
22 16.3	37 36	21	92.96 33.41	104 41.0	75.4 30.2	10.7 4.18	7.69 3.07	0.08~0.18	2.05 0.45	**KSBS3-4518R** **KSBS3-1845L**
24 18	45 46	29	122.33 45.83	253 99.5	185 74.1	25.8 10.2	18.9 7.56	0.12~0.27	4.62 1.00	**KSBS4-4518R** **KSBS4-1845L**
28 20.5	51 52.5	34	156.56 56.9	474 186	350 140	48.4 19.0	35.7 14.3	0.14~0.34	8.11 1.94	**KSBS5-4518R** **KSBS5-1845L**

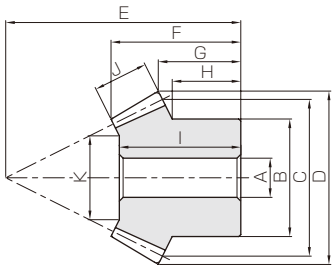
[Caution on Secondary Operations]

① Please read "Caution on Performing Secondary Operations" (Page 452) when performing modification and/or secondary operations for safety concerns.

② Due to the gear teeth being induction hardened, no secondary operations can be performed on tooth areas including the bottom land (approx. 1 to 2 mm).

Specifications	
Precision grade	JIS B 1704 : 1978 grade 4
Gear teeth	Gleason
Pressure angle	20°
Helix angle	35° *
Material	S45C
Heat treatment	Teeth induction hardened
Tooth hardness	50~60HRC

* 39° for 6015R and 1560L of SBS1.5/2 products.



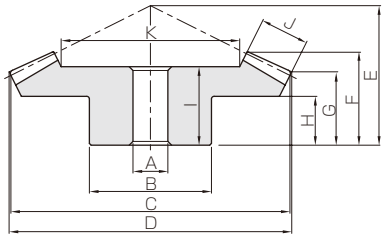
B3

Catalog No.	Gear ratio	Module	No. of teeth	Direction of spiral	Shape	Bore A	Hub dia. B	Pitch dia. C	Outside dia. D	Mounting distance E	Total length F	Crown to back length G
KSBS2-4515R	3	***m*2**	45	R	B4	12	40	90	90.67	40	30.29	26.01
KSBS2-1545L			15	L	B3	10	24	30	34.78	60	29.66	15.80
KSBS2.5-4515R		***m*2.5**	45	R	B4	15	50	112.5	113.32	50	38.25	32.47
KSBS2.5-1545L			15	L	B3	12	30	37.5	43.36	75	38.27	19.73
KSBS3-4515R		***m*3**	45	R	B4	20	60	135	135.99	55	40.59	33.98
KSBS3-1545L			15	L	B3	15	38	45	52.08	90	44.98	23.68
KSBS4-4515R		***m*4**	45	R	B5	20	80	180	181.3	70	50.62	41.95
KSBS4-1545L			15	L	B3	16	50	60	69.30	115	54.37	26.55
KSBS5-4515R		***m*5**	45	R	B5	30	90	225	226.61	75	50.05	39.92
KSBS5-1545L			15	L	B3	20	60	75	86.55	145	66.89	34.43
KSBS1.5-6015R	4	***m*1.5**	60	R	B4	12	60	90	90.36	32	24.08	21.48
KSBS1.5-1560L			15	L	B3	8	18	22.5	26.09	56	22.95	11.45
KSBS2-6015R		***m*2**	60	R	B4	15	80	120	120.46	42	31.5	27.91
KSBS2-1560L			15	L	B3	10	24	30	34.68	75	30.94	15.58
KSBS2.5-6015R		***m*2.5**	60	R	B4	20	100	150	150.5	53	39.68	35.24
KSBS2.5-1560L			15	L	B3	12	30	37.5	44.16	94	38.9	19.83
KSBS3-6015R		***m*3**	60	R	B4	20	120	180	180.57	64	47.61	42.64
KSBS3-1560L			15	L	B3	15	38	45	52.64	112	44.01	22.96

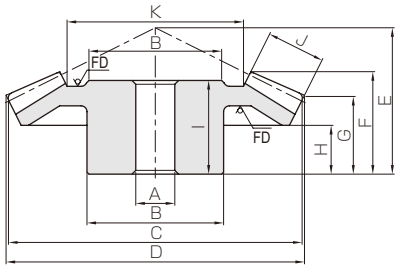
[Caution on Product Characteristics]

① The allowable torques shown in the table are the calculated values according to the assumed usage conditions. Please see page 451 for more details.
② Dimensions of the outside diameter, the overall length and crown to back length are all theoretical values, and some differences will occur due to the corner chamfering of the gear tips.
③ These gears produce axial thrust forces. See page 452 for more details.
④ Due to heat treating, some deformation of the bore may occur. It may be necessary to ream the bore to bring it to the stated dimensions.

Spiral Bevel Gears



B4



B5

* FD has die-forged finish.

Hub width	Length of bore	Face width	Holding surface dia.	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight	Catalog No.
H	I	J	K	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)	
17 14	26 29	15	59.04 19.13	31.7 10.1	18.8 6.27	3.23 1.03	1.92 0.64	0.06~0.16	0.60 0.095	**KSBS2-4515R** **KSBS2-1545L**
22 17.5	35 37	20	72.82 20.51	64.3 20.6	38.7 12.9	6.56 2.10	3.94 1.31	0.07~0.17	1.21 0.19	**KSBS2.5-4515R** **KSBS2.5-1545L**
20 21.33	35 44	23	88.18 28.54	108 34.7	65.8 21.9	11.1 3.54	6.71 2.24	0.08~0.18	1.99 0.34	**KSBS3-4515R** **KSBS3-1545L**
24 23.33	45 52	30	118.08 32.26	253 81.1	156 52.0	25.8 8.27	15.9 5.30	0.12~0.27	4.04 0.76	**KSBS4-4515R** **KSBS4-1545L**
20 30	44 65	35	152.88 48.64	473 152	295 98.2	48.3 15.5	30.0 10.0	0.14~0.34	6.08 1.44	**KSBS5-4515R** **KSBS5-1545L**
12 10.43	21 22.5	12	65.39 15.55	17.9 4.22	12.9 3.21	1.83 0.43	1.31 0.33	0.05~0.15	0.70 0.042	**KSBS1.5-6015R** **KSBS1.5-1560L**
16 14.25	27 30	16	87.02 18.06	42.5 10.0	30.9 7.73	4.33 1.02	3.15 0.79	0.06~0.16	1.59 0.10	**KSBS2-6015R** **KSBS2-1560L**
20 18.06	34 37.5	20	108.64 20.58	96.1 22.6	58.4 14.6	9.79 2.31	5.95 1.49	0.07~0.17	3.13 0.20	**KSBS2.5-6015R** **KSBS2.5-1560L**
25 21.12	41 43	22	134.4 31.58	156 36.8	95.7 23.9	15.9 3.75	9.76 2.44	0.08~0.18	5.38 0.35	**KSBS3-6015R** **KSBS3-1560L**

[Caution on Secondary Operations]

① Please read "Caution on Performing Secondary Operations" (Page 452) when performing modification and/or secondary operations for safety concerns.

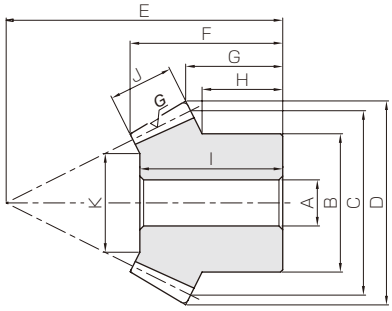
② Due to the gear teeth being induction hardened, no secondary operations can be performed on tooth areas including the bottom land (approx. 1 to 2 mm).

KGCU-M Miter Gear Kit

Installment : Intersecting axes gears
Gear Type : Miter Gears
Gears : KSM2-25
KPM2-25
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.

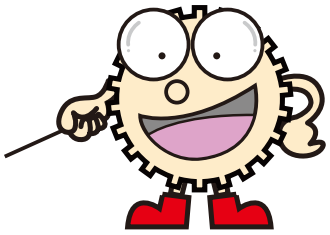
Specifications	
Precision grade	JIS B 1704 : 1978 grade 2
Gear teeth	Gleason
Pressure angle	20°
Material	S45C
Heat treatment	Teeth induction hardened
Tooth hardness	50~60HRC



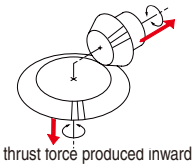
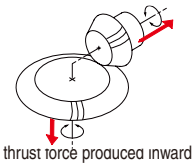
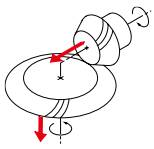
B3

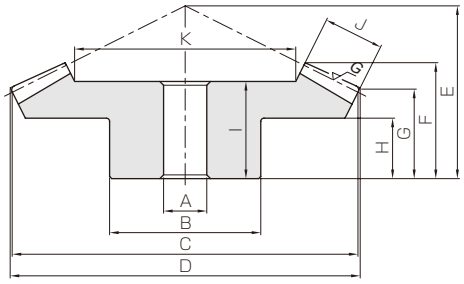
Catalog No.	Gear ratio	Module	No. of teeth	Helix angle	Direction of spiral	Shape	Bore A	Hub dia. B	Pitch dia. C	Outside dia. D	Mounting distance E	Total length F	Crown to back length G
KSBZG2-3020R	1.5	***m2***	30	7°	R	B4	10	35	60	62.16	40	26.48	21.62
KSBZG2-2030L			20		L	B3	10	30	40	44.18	45	25.05	16.39
KSBZG2.5-3020R		***m2.5***	30	7°	R	B4	15	45	75	77.77	50	33.69	27.08
KSBZG2.5-2030L			20		L	B3	12	35	50	55.23	55	31.05	19.24
KSBZG3-3020R		***m3***	30	7°	R	B4	15	50	90	93.27	55	35.01	27.45
KSBZG3-2030L			20		L	B3	15	45	60	66.32	70	40.50	27.11
KSBZG2-4020R	2	***m2***	40	9°	R	B4	12	40	80	81.58	45	31.91	26.58
KSBZG2-2040L			20		L	B3	12	32	40	44.76	60	34.15	21.19
KSBZG2.5-4020R		***m2.5***	40	9°	R	B4	15	50	100	102.01	55	39.16	32.01
KSBZG2.5-2040L			20		L	B3	12	40	50	55.99	75	43.77	26.50
KSBZG3-4020R		***m3***	40	9°	R	B4	20	60	120	122.31	65	45.30	37.31
KSBZG3-2040L			20		L	B3	16	50	60	67.21	90	50.81	31.80

[Caution on Product Characteristics]
① Allowable torques shown in the table are the calculated values according to the assumed usage conditions. Please see page 451 for more details.
② Dimensions of the outside diameter, the overall length and crown to back length are all theoretical values, and some differences will occur due to the corner chamfering of the gear tips.
③ It produces an axial thrust force, which has the same direction as straight bevel gears. For details, see the technical reference (Page 108)



Performance Comparison

Gear Type	Bearing Design*	Interchangeability Mounting Distance	Precision JIS B 1704 : 1978	Strength Bending Strength	Durability Surface Durability	Noise/Vibration Surface Roughness/Total Contact Ratio	Price for single item
Miter Gears  KSM2-20	 No thrust force produced inward	○ KSUB, KPB, KSBZG	△ grade 3	△ 24.2N • m/12.2N • m	× 2.92N • m/1.46N • m	△ 3.2a/1.63	◎
Ground Zerol Miter Gears  KSMZG2-20R/L	 No thrust force produced inward	○ KSB, KSUB, KPB	○ grade 2	△ 26.0N • m/13.1N • m	○ 18.4N • m/9.18N • m	○ 0.4a/1.84	△
Ground Spiral Miter Gears  KMMSG2-20R/L	 Thrust force produced inward	× —	○ grade 2	○ 56.5N • m/28.2N • m	◎ 94.2N • m/47.1N • m	○ 0.4a/3.13	△



B4

Hub width	Length of bore	Face width	Holding surface dia.	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight	Catalog No.
H	I	J	K	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)	
15	23	11	37.56	14.3	8.88	1.46	0.91	0.05~0.11	0.27	**KSBZG2-3020R**
11.67	22	11	21.34	9.89	5.92	1.01	0.60		0.14	**KSBZG2-2030L**
18	30	15	45.61	29.4	18.8	3.00	1.92	0.06~0.12	0.55	**KSBZG2.5-3020R**
12.5	28	15	27.42	20.4	12.5	2.08	1.28		0.25	**KSBZG2.5-2030L**
17	31	17	57.14	51.7	31.6	5.27	3.22	0.07~0.13	0.84	**KSBZG3-3020R**
20	37	17	34.71	35.8	21.1	3.65	2.15		0.50	**KSBZG3-2030L**
18	27	15	48.46	26.0	18.4	2.66	1.87	0.05~0.11	0.52	**KSBZG2-4020R**
18	32	15	20.92	13.1	9.18	1.33	0.94		0.19	**KSBZG2-2040L**
20	35	20	60.28	55.6	38.5	5.67	3.92	0.06~0.12	1.10	**KSBZG2.5-4020R**
22.5	41	20	24.56	27.9	19.2	2.85	1.96		0.40	**KSBZG2.5-2040L**
24	38	22	73.81	96.3	62.8	9.82	6.40	0.07~0.13	1.69	**KSBZG3-4020R**
27.5	47	22	29.61	48.4	31.4	4.93	3.20		0.70	**KSBZG3-2040L**

[Caution on Secondary Operations]

① Please read “Cautions on Performing Secondary Operations” (Page 452) when performing modification and/or secondary operations for safety concerns.

② Due to gear teeth induction hardened, no secondary operations can be performed on tooth areas including the bottom land (approx. 1to 2 mm).

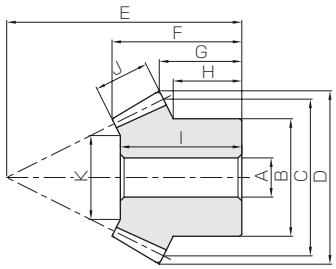
★ For products not categorized in our Stock Gear series', custom gear production services with short lead times is available. For details see page VI.

KGCU-M Miter Gear Kit

Installment : Intersecting axes gears
Gear Type : Miter Gears
Gears : KSM2-25
KPM2-25
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.

Specifications	
Precision grade	JIS B 1704 : 1978 grade 3
Gear teeth	Gleason
Pressure angle	20°
Material	S45C
Heat treatment	—
Tooth hardness	(less than 194HB)

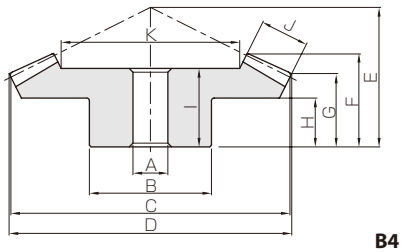


B3

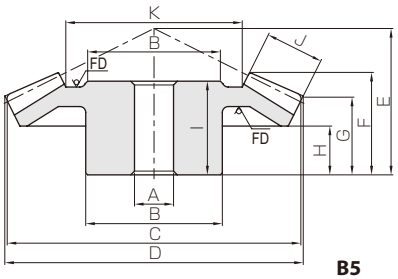
Catalog No.	Gear ratio	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Mounting distance	Total length	Crown to back length	Hub width
					A_{H7}	B	C	D	E	F	G	H
KSB1.5-3020	1.5	***m1.5***	30	B4	10	30	45	46.24	28	18.53	13.93	8
KSB1.5-2030			20	B3	8	25	30	33.13	33	18.63	11.54	8.83
KSB2-3020		***m2***	30	B4	10	35	60	61.65	40	26.87	21.24	15
KSB2-2030			20	B3	10	30	40	44.18	45	25.06	16.39	11.67
KSB2.5-3020		***m2.5***	30	B4	15	45	75	77.07	50	34.22	26.55	18
KSB2.5-2030			20	B3	12	35	50	55.22	55	31.06	19.24	12.5
KSB3-3020		***m3***	30	B4	15	50	90	92.48	55	35.56	26.86	17
KSB3-2030			20	B3	15	45	60	66.27	70	40.48	27.09	20
KSB4-3020		***m4***	30	B4	20	70	120	123.3	75	47.71	37.48	25
KSB4-2030			20	B3	15	60	80	88.32	90	48.53	32.77	23.33
KSB5-3020		***m5***	30	B4	25	90	150	154.13	90	58.45	43.1	24
KSB5-2030			20	B3	20	80	100	110.45	110	62.11	38.48	28.33
KSB1.5-3015	2	***m1.5***	30	B4	8	25	45	45.88	25	17.85	14.63	9
KSB1.5-1530			15	B3	6	16	22.5	26.11	32	17.23	10.4	7.88
KSB2-3015		***m2***	30	B4	10	30	60	61.17	31	21.6	17.17	10
KSB2-1530			15	B3	8	22	30	34.81	40	20.59	11.2	8
KSB2.5-3015		***m2.5***	30	B4	15	40	75	76.46	40	28.75	22.71	15
KSB2.5-1530			15	B3	12	30	37.5	43.51	55	31.81	19	15.63
KSB3-3015		***m3***	30	B4	16	50	90	91.76	50	37.31	29.26	18
KSB3-1530			15	B3	12	35	45	52.22	70	43.88	26.8	22.5
KSB4-3015		***m4***	30	B4	20	60	120	122.34	60	42.4	32.34	20
KSB4-1530			15	B3	16	50	60	69.62	85	48.74	27.41	22.5
KSB5-3015		***m5***	30	B5	20	70	150	152.93	75	52.5	40.43	25
KSB5-1530			15	B3	20	60	75	87.03	110	63.61	38.01	31.25
KSB6-3015		***m6***	30	B5	25	80	180	183.49	90	62.56	48.49	28
KSB6-1530			15	B3	25	70	90	104.44	125	68.48	38.61	30
KSB2.5-3618	2	***m2.5***	36	B4	15	55	90	91.46	43	28.52	21.96	13
KSB2.5-1836			18	B3	12	38	45	51.01	64	34.27	20.5	17.25
KSB3-3618		***m3***	36	B4	20	60	108	109.76	52	34.95	26.76	17
KSB3-1836			18	B3	16	46	54	61.23	75	40.01	22.81	19
KSB4-3618		***m4***	36	B4	20	70	144	146.34	72	49	38.34	25
KSB4-1836			18	B3	20	60	72	81.62	100	52.77	30.41	25
KSB1-4020	2	***m1***	40	B4	8	25	40	40.59	22	15.07	12.59	8
KSB1-2040			20	B3	6	16	20	22.41	28	13.78	8.6	7
KSB1.25-4020		***m1.25***	40	B4	10	32	50	50.73	27	18.54	15.23	10
KSB1.25-2040			20	B3	8	22	25	28.01	36	18.66	11.75	10.25
KSB1.5-4020		***m1.5***	40	B4	10	38	60	60.88	35	25.01	20.88	15
KSB1.5-2040			20	B3	8	25	30	33.61	46	25.54	16.9	14.75
KSB2-4020		***m2***	40	B4	12	40	80	81.17	45	32.37	26.17	18
KSB2-2040			20	B3	12	32	40	44.81	60	34.16	21.2	18
KSB2.5-4020		***m2.5***	40	B4	15	50	100	101.46	55	39.73	31.46	20
KSB2.5-2040			20	B3	12	40	50	56.01	75	43.78	26.5	22.5
KSB3-4020		***m3***	40	B4	20	60	120	121.76	65	45.85	36.76	24
KSB3-2040			20	B3	16	50	60	67.22	90	50.81	31.8	27.5
KSB4-4020		***m4***	40	B4	20	70	160	162.34	80	53.92	42.34	28
KSB4-2040			20	B3	20	60	80	89.62	120	66.59	42.41	35
KSB5-4020		***m5***	40	B5	25	100	200	202.93	90	55.33	42.93	26
KSB5-2040			20	B3	20	80	100	112.03	140	68.92	43.01	35
KSB6-4020		***m6***	40	B5	25	85	240	243.52	105	65.05	48.52	28
KSB6-2040			20	B3	25	90	120	134.44	160	78.16	43.6	32.5
KSBY8-4020		***m8***	40	BT	35	180	320	324.69	130	75.36	54.69	25
KSBY8-2040			20	B3	30	120	160	179.25	210	98	54.81	40

[Caution on Product Characteristics]
① The allowable torques shown in the table are the calculated values according to the assumed usage conditions. Please see page 451 for more details.
② Dimensions of the outside diameter, the overall length and crown to back length are all theoretical values, and some differences will occur due to the corner chamfering of the gear tips.
③ For convenience in handling, BT Shaped Gears have tapped holes on their holding surface. To find the L dimensions and tap sizes, please refer to page 452.

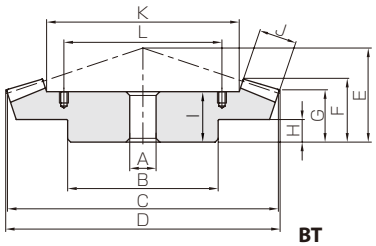
Steel Bevel Gears



B4



B5



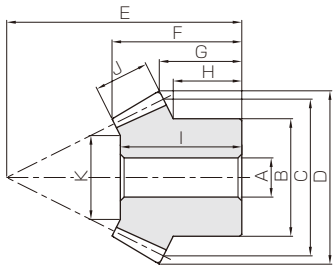
BT

* FD has die-forged finish.

Length of bore	Face width	Holding surface dia.	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight	Catalog No.
l	J	K	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)	
16	9	27.37	5.82	0.65	0.59	0.07	0.05~0.15	0.12	**KSB1.5-3020**
17		17.05	4.04	0.44	0.41	0.04		0.063	**KSB1.5-2030**
23	11	37.56	13.1	1.52	1.33	0.16	0.06~0.16	0.26	**KSB2-3020**
22		21.34	9.07	1.01	0.92	0.10		0.14	**KSB2-2030**
30	15	45.61	26.9	3.21	2.75	0.33	0.07~0.17	0.55	**KSB2.5-3020**
28		27.42	18.7	2.14	1.91	0.22		0.25	**KSB2.5-2030**
31	17	57.14	44.9	5.45	4.58	0.56	0.08~0.18	0.83	**KSB3-3020**
37		34.71	31.2	3.63	3.18	0.37		0.50	**KSB3-2030**
40	20	78.59	98.2	12.3	10.0	1.25	0.12~0.27	1.91	**KSB4-3020**
43		46.89	68.1	8.20	6.95	0.84		1.10	**KSB4-2030**
50	30	91.22	215	27.6	22.0	2.81	0.14~0.34	4.13	**KSB5-3020**
56		54.83	150	18.4	15.3	1.87		2.34	**KSB5-2030**
15	8	28.36	5.02	0.47	0.51	0.05	0.05~0.15	0.10	**KSB1.5-3015**
15.5		10.72	2.60	0.24	0.26	0.02		0.028	**KSB1.5-1530**
18	11	37.4	12.1	1.18	1.24	0.12	0.06~0.16	0.21	**KSB2-3015**
19		16.81	6.28	0.59	0.64	0.06		0.064	**KSB2-1530**
24	15	44.21	24.9	2.48	2.54	0.25	0.07~0.17	0.41	**KSB2.5-3015**
29		16.42	12.9	1.24	1.32	0.13		0.15	**KSB2.5-1530**
30	20	47.78	45.6	4.60	4.65	0.47	0.08~0.18	0.83	**KSB3-3015**
41		19.56	23.6	2.30	2.41	0.23		0.31	**KSB3-1530**
36	25	70.1	104	10.9	10.7	1.11	0.12~0.27	1.64	**KSB4-3015**
46		32.2	54.0	5.43	5.51	0.55		0.66	**KSB4-1530**
48	30	90.41	199	21.3	20.3	2.17	0.14~0.34	2.72	**KSB5-3015**
58		32.83	103	10.6	10.5	1.09		1.28	**KSB5-1530**
57	35	109.74	336	36.9	34.2	3.77	0.16~0.36	4.75	**KSB6-3015**
63		45.48	174	18.5	17.7	1.88		1.94	**KSB6-1530**
24	16	57.72	35.9	4.08	3.66	0.42	0.07~0.17	0.72	**KSB2.5-3618**
32		25.44	18.1	2.04	1.84	0.21		0.27	**KSB2.5-1836**
30	20	68.28	63.7	7.34	6.49	0.75	0.08~0.18	1.15	**KSB3-3618**
37		28.56	32.0	3.67	3.27	0.37		0.44	**KSB3-1836**
42	26	91.86	149	17.7	15.2	1.80	0.12~0.27	2.66	**KSB4-3618**
49		39.72	74.8	8.85	7.62	0.90		1.04	**KSB4-1836**
12	6	26.58	2.61	0.29	0.27	0.03	0.03~0.13	0.068	**KSB1-4020**
12		9.17	1.32	0.15	0.13	0.02		0.019	**KSB1-2040**
16	8	33.61	5.33	0.61	0.54	0.06	0.04~0.14	0.14	**KSB1.25-4020**
17		13.22	2.69	0.31	0.27	0.03		0.046	**KSB1.25-2040**
22	10	39.64	9.47	1.11	0.97	0.11	0.05~0.15	0.27	**KSB1.5-4020**
24		17.28	4.77	0.56	0.49	0.06		0.089	**KSB1.5-2040**
27	15	48.46	24.2	2.92	2.46	0.30	0.06~0.16	0.51	**KSB2-4020**
32		20.92	12.2	1.46	1.24	0.15		0.19	**KSB2-2040**
35	20	60.28	49.0	6.04	4.99	0.62	0.07~0.17	1.09	**KSB2.5-4020**
41		24.56	24.7	3.02	2.52	0.31		0.40	**KSB2.5-2040**
38	22	73.81	80.4	10.1	8.20	1.03	0.08~0.18	1.68	**KSB3-4020**
47		29.61	40.5	5.06	4.13	0.52		0.70	**KSB3-2040**
45	28	102.39	185	24.1	18.9	2.46	0.12~0.27	3.34	**KSB4-4020**
62		42.78	93.3	12.0	9.51	1.23		1.47	**KSB4-2040**
50	30	138.92	327	43.9	33.3	4.47	0.14~0.34	5.63	**KSB5-4020**
63		57.84	165	21.9	16.8	2.24		2.67	**KSB5-2040**
58	40	158.56	600	83.2	61.2	8.48	0.16~0.36	7.77	**KSB6-4020**
70		61.11	302	41.6	30.8	4.24		4.08	**KSB6-2040**
61	50	219.2	1350	196	138	20.0	0.20~0.45	25.75	**KSBY8-4020**
90		96.39	679	98.1	69.3	10.0		9.41	**KSBY8-2040**

[Caution on Secondary Operations] ① Please read "Caution on Performing Secondary Operations" (Page 452) when performing modifications and/or secondary operations for safety concerns.

Specifications	
Precision grade	JIS B 1704 : 1978 grade 3
Gear teeth	Gleason
Pressure angle	20°
Material	S45C
Heat treatment	—
Tooth hardness	(less than 194HB)

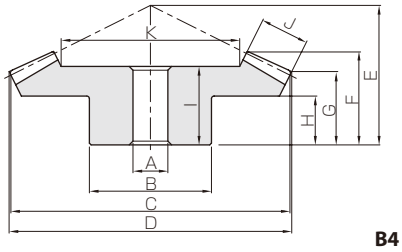


B3

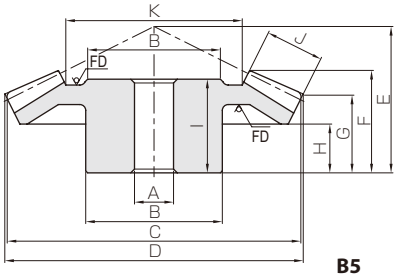
Catalog No.	Gear ratio	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Mounting distance	Total length	Crown to back length	Hub width
					A_{H7}	B	C	D	E	F	G	H
KSB1-4518	2.5	***m*1**	45	B4	8	30	45	45.46	23	16.95	14.57	10
KSB1-1845			18	B3	6	15	18	20.57	32	16.34	10.02	8.9
KSB1.25-4518		***m*1.25**	45	B4	10	34	56.25	56.82	26	18.53	15.46	10
KSB1.25-1845			18	B3	8	19	22.5	25.72	40	20.66	12.52	11.17
KSB1.5-4518		***m*1.5**	45	B4	10	36	67.5	68.18	30	21.1	17.35	10
KSB1.5-1845			18	B3	8	23	27	30.86	45	21.97	12.02	10.45
KSB2-4518		***m*2**	45	B4	12	48	90	90.91	40	27.91	23.14	15
KSB2-1845			18	B3	10	32	36	41.15	60	28.69	16.03	14.2
KSB2.5-4518		***m*2.5**	45	B4	15	55	112.5	113.64	50	35.06	28.92	18
KSB2.5-1845			18	B3	12	40	45	51.44	72	33.31	17.04	14.75
KSB3-4518		***m*3**	45	B4	20	65	135	136.37	60	41.86	34.71	22
KSB3-1845			18	B3	16	48	54	61.72	85	38.04	19.05	16.3
KSB4-4518		***m*4**	45	B4	20	80	180	181.82	75	51.16	41.28	24
KSB4-1845			18	B3	20	62	72	82.3	110	48.28	22.06	18
KSB5-4518		***m*5**	45	B4	25	100	225	227.28	90	59.43	47.85	28
KSB5-1845			18	B3	20	80	90	102.87	135	55.82	25.07	20.5
KSB1-4515	3	***m*1**	45	B4	8	30	45	45.37	17	11.77	10.06	5
KSB1-1545			15	B3	6	12	15	17.67	29	12.51	6.95	6
KSB1.25-4515		***m*1.25**	45	B4	10	34	56.25	56.72	21	14.61	12.33	6
KSB1.25-1545			15	B3	8	15	18.75	22.09	36	15.85	8.43	7.25
KSB1.5-4515		***m*1.5**	45	B4	10	36	67.5	68.06	28	20.44	17.59	11
KSB1.5-1545			15	B3	8	18	22.5	26.54	47	23.19	13.92	12.5
KSB2-4515		***m*2**	45	B4	12	40	90	90.75	40	30.4	26.12	17
KSB2-1545			15	B3	10	24	30	35.35	60	29.8	15.89	14
KSB2.5-4515		***m*2.5**	45	B4	15	50	112.5	113.43	50	38.35	32.65	22
KSB2.5-1545			15	B3	12	30	37.5	44.18	75	38.41	19.86	17.5
KSB3-4515		***m*3**	45	B4	20	60	135	136.12	55	40.74	34.18	20
KSB3-1545			15	B3	15	38	45	53.02	90	45.17	23.84	21.33
KSB4-4515		***m*4**	45	B5	20	80	180	181.5	70	50.79	42.24	24
KSB4-1545			15	B3	16	50	60	70.69	115	54.6	26.78	23.33
KSB5-4515		***m*5**	45	B5	25	90	225	226.87	75	50.28	40.3	20
KSB5-1545			15	B3	20	60	75	88.37	145	67.19	34.73	30
KSB6-4515		***m*6**	45	BT	30	160	270	272.24	100	72.62	58.36	30
KSB6-1545			15	B3	25	70	90	106.03	175	89.04	42.67	36.67
KSBY8-4515		***m*8**	45	BT	35	200	360	362.99	125	83.74	69.49	30
KSBY8-1545			15	B3	30	100	120	141.39	230	99.93	53.56	46.67

[Caution on Product Characteristics]
① The allowable torques shown in the table are the calculated values according to the assumed usage conditions. Please see page 451 for more details.
② Dimensions of the outside diameter, the overall length and crown to back length are all theoretical values, and some differences will occur due to the corner chamfering of the gear tips.
③ For convenience in handling, BT Shaped Gears have tapped holes on their holding surface. To find the L dimensions and tap sizes, please refer to page 452.

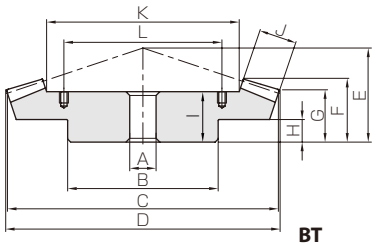
Steel Bevel Gears



B4



B5



BT

* FD has die-forged finish.

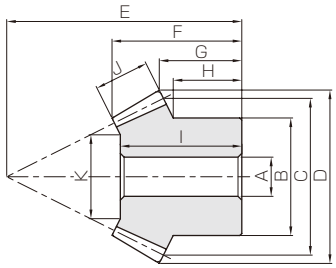
Length of bore	Face width	Holding surface dia.	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight	Catalog No.
l	J	K	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)	
15	7	30.73	3.35	0.35	0.34	0.04	0.03~0.13	0.11	**KSB1-4518**
15.5		10.31	1.33	0.14	0.14	0.01		0.019	**KSB1-1845**
16	9	37.86	6.67	0.72	0.68	0.07	0.04~0.14	0.17	**KSB1.25-4518**
19.5		12.16	2.65	0.29	0.27	0.03		0.038	**KSB1.25-1845**
18	11	45	11.7	1.29	1.19	0.13	0.05~0.15	0.28	**KSB1.5-4518**
21		16.51	4.64	0.51	0.47	0.05		0.063	**KSB1.5-1845**
25	14	62.24	26.8	3.05	2.74	0.31	0.06~0.16	0.65	**KSB2-4518**
27.5		23.11	10.7	1.22	1.09	0.12		0.16	**KSB2-1845**
31	18	76.53	53.4	6.20	5.44	0.63	0.07~0.17	1.23	**KSB2.5-4518**
31.5		26.82	21.2	2.48	2.16	0.25		0.28	**KSB2.5-1845**
37	21	92.96	90.5	10.7	9.23	1.09	0.08~0.18	2.05	**KSB3-4518**
36		33.41	36.0	4.29	3.67	0.44		0.46	**KSB3-1845**
45	29	122.33	220	26.8	22.4	2.73	0.12~0.27	4.69	**KSB4-4518**
46		45.83	87.3	10.7	8.91	1.09		1.01	**KSB4-1845**
51	34	156.56	411	51.8	41.9	5.28	0.14~0.34	8.31	**KSB5-4518**
52.5		56.9	164	20.7	16.7	2.11		1.95	**KSB5-1845**
9	6	32.02	2.84	0.27	0.29	0.027	0.03~0.13	0.078	**KSB1-4515**
12		10.05	0.98	0.09	0.10	0.0091		0.095	**KSB1-1545**
12	8	39.63	5.80	0.56	0.59	0.057	0.04~0.14	0.15	**KSB1.25-4515**
15		10.9	2.00	0.19	0.20	0.019		0.018	**KSB1.25-1545**
17	10	46.58	10.3	1.02	1.05	0.10	0.05~0.15	0.25	**KSB1.5-4515**
22.5		14.75	3.56	0.34	0.36	0.035		0.041	**KSB1.5-1545**
26	15	59.04	26.4	2.68	2.69	0.27	0.06~0.16	0.60	**KSB2-4515**
29		19.13	9.10	0.89	0.93	0.091		0.096	**KSB2-1545**
35	20	72.84	53.6	5.55	5.46	0.57	0.07~0.17	1.22	**KSB2.5-4515**
37		20.51	18.5	1.85	1.89	0.19		0.19	**KSB2.5-1545**
35	23	88.18	90.2	9.53	9.20	0.97	0.08~0.18	1.99	**KSB3-4515**
43		22.53	31.2	3.18	3.18	0.32		0.34	**KSB3-1545**
45	30	118.09	211	23.0	21.5	2.35	0.12~0.27	3.89	**KSB4-4515**
52		32.26	72.8	7.67	7.43	0.78		0.77	**KSB4-1545**
44	35	152.88	394	44.3	40.2	4.52	0.14~0.34	6.10	**KSB5-4515**
65		48.64	136	14.8	13.9	1.51		1.46	**KSB5-1545**
62	50	169.26	751	87.0	76.6	8.87	0.16~0.36	18.0	**KSB6-4515**
86		49.77	259	39.9	26.4	4.06		2.61	**KSB6-1545**
67	50	255.92	1470	179	150	18.3	0.20~0.45	36.4	**KSBY8-4515**
93		61.77	506	59.7	51.6	6.09		5.80	**KSBY8-1545**

[Caution on Secondary Operations] ① Please read "Caution on Performing Secondary Operations" (Page 452) when performing modifications and/or secondary operations for safety concerns.

KSB • KSBY
Steel Bevel Gears

Module 1.5~6

Specifications	
Precision grade	JIS B 1704 : 1978 grade 3
Gear teeth	Gleason
Pressure angle	20°
Material	S45C
Heat treatment	—
Tooth hardness	(less than 194HB)



B3

Catalog No.	Gear ratio	Module	No. of teeth	Shape	Bore A_{H7}	Hub dia. B	Pitch dia. C	Outside dia. D	Mounting distance E	Total length F	Crown to back length G	Hub width H
KSB1.5-6015	4	***m*1.5**	60	B4	12	50	90	90.41	32	24.2	21.58	12
KSB1.5-1560			15	B3	8	18	22.5	26.66	56	23.01	11.52	10.43
KSB2-6015		***m*2**	60	B4	15	60	120	120.55	42	31.6	28.1	16
KSB2-1560			15	B3	10	24	30	35.55	75	31.01	15.69	14.25
KSB2.5-6015		***m*2.5**	60	B4	20	70	150	150.69	53	40	35.63	20
KSB2.5-1560			15	B3	12	30	37.5	44.44	94	39.02	19.87	18.06
KSB3-6015		***m*3**	60	B4	20	80	180	180.83	64	47.97	43.15	25
KSB3-1560			15	B3	15	38	45	53.33	112	44.1	23.04	21.12
KSB4-6015		***m*4**	60	B5	25	85	240	241.1	80	59.2	52.2	36
KSB4-1560			15	B3	16	50	60	71.10	150	62.03	31.39	28.75
KSBY5-6015		***m*5**	60	BT	30	180	300	301.36	80	53.97	45.22	20
KSBY5-1560			15	B3	25	60	75	88.9	185	75.03	36.74	33.13
KSBY6-6015		***m*6**	60	BT	35	200	360	361.66	100	68.16	58.31	25
KSBY6-1560			15	B3	25	75	90	106.66	220	85.17	42.08	38.13

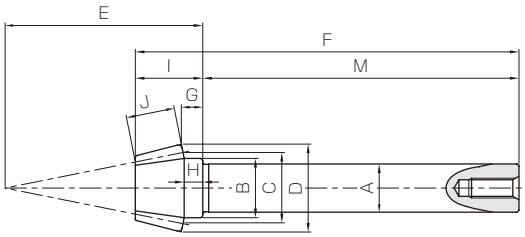
[Caution on Product Characteristics]
① The allowable torques shown in the table are the calculated values according to the assumed usage conditions. Please see page 451 for more details.
② Dimensions of the outside diameter, the overall length and crown to back length are all theoretical values, and some differences will occur due to the corner chamfering of the gear tips.
③ For convenience in handling, BT Shaped Gears have tapped holes on their holding surface. To find the L dimensions and tap sizes, please refer to page 452.

KSB
Steel Bevel Gears & Pinion Shafts

Module 1.5~3

Specifications	
Precision grade	JIS B 1704 : 1978 grade 3
Gear teeth	Gleason
Pressure angle	20°
Material	S45C
Heat treatment	—*
Tooth hardness	(less than 194HB)*

* Pinions are thermal refined.
The hardness of a gear tooth is 200 to 270HB.

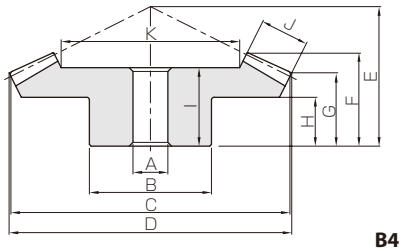


B8

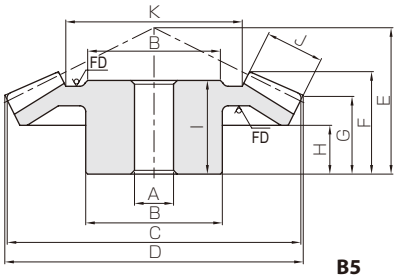
Catalog No.	Gear ratio	Module	No. of teeth	Shape	Bore•Shaft dia. $A_{H7(Bore)}$ $A_{h7(Shaft)}$	Hub dia. B	Pitch dia. C	Outside dia. D	Mounting distance E	Total length F	Crown to back length G	Hub width H	Length of bore•shaft I
KSB1.5-6012	5	***m*1.5**	60	B4	12	50	90	90.33	30	23.89	21.82	12	21
KSB1.5-1260			12	B8	12.2	15	18	22.24	50	97.06	5.42	4.7	17.06
KSB2-6012		***m*2**	60	B4	15	60	120	120.43	40	31.85	29.09	16	24
KSB2-1260			12	B8	15.2	20	24	29.65	66	117.08	6.56	5.6	22.08
KSB2.5-6012		***m*2.5**	60	B4	20	70	150	150.54	50	39.81	36.36	20	34
KSB2.5-1260			12	B8	20.2	25	30	37.06	83	143.1	8.7	7.5	28.1
KSB3-6012		***m*3**	60	B4	20	80	180	180.65	60	47.43	43.64	25	41
KSB3-1260			12	B8	25.25	30	36	44.48	100	172.19	10.85	9.4	32.19

[Caution on Product Characteristics]
① The allowable torques shown in the table are the calculated values according to the assumed usage conditions. Please see page 451 for more details.
② Dimensions of the outside diameter, the overall length and crown to back length are all theoretical values, and some differences will occur due to the corner chamfering of the gear tips.

Steel Bevel Gears



B4



B5

BT

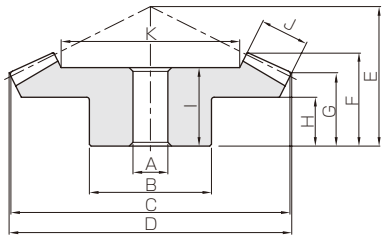
* FD has die-forged finish.

Length of bore	Face width	Holding surface dia.	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight	Catalog No.
I	J	K	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)	
21 22.5	12	65.38 15.54	17.3 4.46	1.75 0.44	1.77 0.45	0.18 0.045	0.05~0.15	0.62 0.043	**KSB1.5-6015** **KSB1.5-1560**
27 30	16	87.02 18.06	41.3 10.6	4.30 1.07	4.21 1.08	0.44 0.11	0.06~0.16	1.35 0.10	**KSB2-6015** **KSB2-1560**
34 37.5	20	108.64 20.57	80.2 20.6	8.54 2.13	8.18 2.10	0.87 0.22	0.07~0.17	2.51 0.21	**KSB2.5-6015** **KSB2.5-1560**
41 43	22	134.4 31.58	130 33.5	14.2 3.54	13.3 3.42	1.44 0.36	0.08~0.18	4.16 0.36	**KSB3-6015** **KSB3-1560**
53 60	32	174.03 36.12	328 84.5	37.0 9.24	33.5 8.62	3.77 0.94	0.12~0.27	6.00 0.91	**KSB4-6015** **KSB4-1560**
45 73	40	218.79 49.15	642 165	74.4 18.6	65.4 16.8	7.59 1.90	0.14~0.34	17.5 1.58	**KSBY5-6015** **KSBY5-1560**
56 82	45	267.73 54.92	1050 270	126 31.5	107 27.5	12.8 3.21	0.16~0.36	30.7 2.83	**KSBY6-6015** **KSBY6-1560**

[Caution on Secondary Operations] ① Please read "Caution on Performing Secondary Operations" (Page 452) when performing modifications and/or secondary operations for safety concerns.

KSB

Steel Bevel Gears & Pinion Shafts

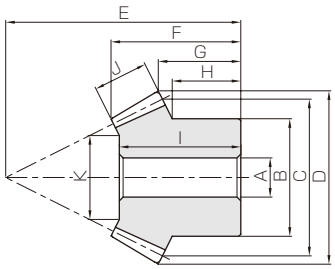


B4

Face width	Holding surface dia.	Shaft length	Screw size	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight	Catalog No.
J	K	M		Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)	
12	65.52 —	— 80	— M5	18.0 4.01	1.41 0.46	1.83 0.41	0.14 0.047	0.05~0.15	0.62 0.097	**KSB1.5-6012** **KSB1.5-1260**
16	86.96 —	— 95	— M6	42.6 9.50	3.43 1.12	4.34 0.97	0.35 0.11	0.06~0.16	1.34 0.19	**KSB2-6012** **KSB2-1260**
20	108.8 —	— 115	— M8	83.2 18.5	6.85 2.23	8.48 1.89	0.70 0.23	0.07~0.17	2.54 0.40	**KSB2.5-6012** **KSB2.5-1260**
22	134.73 —	— 140	— M8	135 30.1	11.4 3.70	13.8 3.07	1.16 0.38	0.08~0.18	4.18 0.74	**KSB3-6012** **KSB3-1260**

[Caution on Secondary Operations] ① Please read "Caution on Performing Secondary Operations" (Page 452) when performing modifications and/or secondary operations for safety concerns.

Specifications	
Precision grade	JIS B 1704 : 1978 grade 3
Gear teeth	Gleason
Pressure angle	20°
Material	SUS303
Heat treatment	—
Tooth hardness	(less than 187HB)



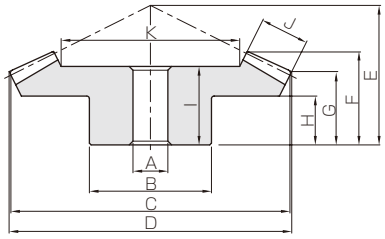
B3

Catalog No.	Gear ratio	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Mounting distance	Total length	Crown to back length	Hub width
					A_{H7}	B	C	D	E	F	G	H
KSUB1.5-3020	1.5	***m*1.5**	30	B4	10	30	45	46.24	28	18.53	13.93	8
KSUB1.5-2030			20	B3	8	25	30	33.13	33	18.63	11.54	8.83
KSUB2-3020		***m*2**	30	B4	10	35	60	61.65	40	26.87	21.24	15
KSUB2-2030			20	B3	10	35	40	44.18	45	25.06	16.39	13.33
KSUB2.5-3020		***m*2.5**	30	B4	15	45	75	77.07	50	34.22	26.55	18
KSUB2.5-2030			20	B3	12	40	50	55.22	55	31.06	19.24	14.16
KSUB3-3020		***m*3**	30	B4	15	60	90	92.48	55	35.56	26.86	17
KSUB3-2030			20	B3	15	50	60	66.27	70	40.48	27.09	21.66
KSUB1.5-4020	2	***m*1.5**	40	B4	10	38	60	60.88	35	25.01	20.88	15
KSUB1.5-2040			20	B3	8	25	30	33.61	46	25.54	16.9	14.75
KSUB2-4020		***m*2**	40	B4	12	50	80	81.17	45	32.37	26.17	18
KSUB2-2040			20	B3	12	32	40	44.81	60	34.16	21.2	18
KSUB2.5-4020		***m*2.5**	40	B4	15	60	100	101.46	55	39.73	31.46	20
KSUB2.5-2040			20	B3	12	40	50	56.01	75	43.78	26.5	22.5
KSUB3-4020		***m*3**	40	B4	20	70	120	121.76	65	45.85	36.76	24
KSUB3-2040			20	B3	16	50	60	67.22	90	50.81	31.8	27.5
KSUB1.5-4515	3	***m*1.5**	45	B4	10	36	67.5	68.06	28	20.44	17.59	11
KSUB1.5-1545			15	B3	8	18	22.5	26.54	47	23.20	13.92	12.5
KSUB2-4515		***m*2**	45	B4	12	60	90	90.75	40	30.4	26.12	17
KSUB2-1545			15	B3	10	24	30	35.35	60	29.8	15.89	14
KSUB2.5-4515		***m*2.5**	45	B4	15	60	112.5	113.43	50	38.35	32.65	22
KSUB2.5-1545			15	B3	12	30	37.5	44.18	75	38.41	19.86	17.5
KSUB3-4515		***m*3**	45	B4	20	80	135	136.12	55	40.74	34.18	20
KSUB3-1545			15	B3	15	38	45	53.02	90	45.17	23.84	21.33

[Caution on Product Characteristics] ① The allowable torques shown in the table are the calculated values according to the assumed usage conditions. Please see page 451 for more details.
② Dimensions of the outside diameter, the overall length and crown to back length are all theoretical values, and some differences will occur due to the corner chamfering of the gear tips.

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

Stainless Steel Bevel Gears



B4

Length of bore	Face width	Holding surface dia.	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight	Catalog No.
I	J	K	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)	
16	9	27.37	3.22	0.46	0.33	0.047	0.05~0.15	0.12	**KSUB1.5-3020**
17		17.05	2.23	0.31	0.23	0.032		0.063	**KSUB1.5-2030**
23	11	37.56	7.22	1.08	0.74	0.11	0.06~0.16	0.26	**KSUB2-3020**
22		21.34	5.01	0.72	0.51	0.074		0.16	**KSUB2-2030**
30	15	45.61	14.9	2.28	1.52	0.23	0.07~0.17	0.54	**KSUB2.5-3020**
28		27.42	10.3	1.52	1.05	0.15		0.28	**KSUB2.5-2030**
31	17	57.14	24.8	3.87	2.53	0.39	0.08~0.18	0.94	**KSUB3-3020**
37		34.71	17.2	2.58	1.76	0.26		0.55	**KSUB3-2030**
22	10	39.64	5.23	0.79	0.53	0.081	0.05~0.15	0.27	**KSUB1.5-4020**
24		17.28	2.64	0.40	0.27	0.040		0.088	**KSUB1.5-2040**
27	15	48.46	13.4	2.07	1.36	0.21	0.06~0.16	0.61	**KSUB2-4020**
32		20.92	6.72	1.04	0.69	0.11		0.19	**KSUB2-2040**
35	20	60.28	27.1	4.29	2.76	0.44	0.07~0.17	1.21	**KSUB2.5-4020**
41		24.56	13.6	2.15	1.39	0.22		0.40	**KSUB2.5-2040**
38	22	73.81	44.4	7.19	4.53	0.73	0.08~0.18	1.86	**KSUB3-4020**
47		29.61	22.4	3.60	2.28	0.37		0.69	**KSUB3-2040**
17	10	46.58	5.70	0.72	0.58	0.074	0.05~0.15	0.25	**KSUB1.5-4515**
22.5		14.75	1.97	0.24	0.20	0.025		0.041	**KSUB1.5-1545**
26	15	59.04	14.6	1.90	1.49	0.19	0.06~0.16	0.80	**KSUB2-4515**
29		19.13	5.03	0.63	0.51	0.065		0.095	**KSUB2-1545**
35	20	72.84	29.6	3.94	3.02	0.40	0.07~0.17	1.36	**KSUB2.5-4515**
37		20.51	10.2	1.31	1.04	0.13		0.19	**KSUB2.5-1545**
35	23	88.18	49.9	6.77	5.09	0.69	0.08~0.18	2.32	**KSUB3-4515**
43		22.53	17.2	2.26	1.76	0.23		0.34	**KSUB3-1545**

[Caution on Secondary Operations] ① Please read "Caution on Performing Secondary Operations" (Page 452) when performing modifications and/or secondary operations for safety concerns.

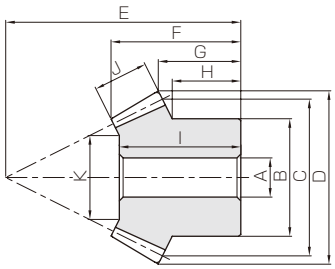
KGCU-M Miter Gear Kit

Installment : Intersecting axes gears
Gear Type : Miter Gears
Gears : KSM2-25
KPM2-25
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.

Specifications	
Precision grade	JIS B 1704 : 1978 grade 4*
Gear teeth	Gleason
Pressure angle	20°
Material	MC901
Heat treatment	—
Tooth hardness	(115~120HRR)

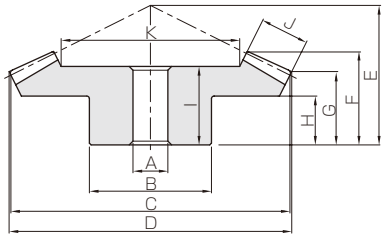
* The precision grade of this product is equivalent to the value shown in the table.



B3

Catalog No.	Gear ratio	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Mounting distance	Total length	Crown to back length	Hub width
					A	B	C	D	E	F	G	H
KPB1.5-3020	1.5	***m*1.5**	30	B4	10	30	45	46.24	28	18.53	13.93	8
KPB1.5-2030			20	B3	8	25	30	33.13	33	18.63	11.54	8.83
KPB2-3020		***m*2**	30	B4	10	35	60	61.65	40	26.87	21.24	15
KPB2-2030			20	B3	10	35	40	44.18	45	25.06	16.39	13.33
KPB2.5-3020		***m*2.5**	30	B4	15	45	75	77.07	50	34.22	26.55	18
KPB2.5-2030			20	B3	12	40	50	55.22	55	31.06	19.24	14.16
KPB3-3020		***m*3**	30	B4	15	60	90	92.48	55	35.56	26.86	17
KPB3-2030			20	B3	15	50	60	66.27	70	40.48	27.09	21.66
KPB1-4020	2	***m*1**	40	B4	8	25	40	40.59	22	15.07	12.59	8
KPB1-2040			20	B3	6	16	20	22.41	28	13.78	8.6	7
KPB1.25-4020		***m*1.25**	40	B4	10	32	50	50.73	27	18.54	15.23	10
KPB1.25-2040			20	B3	8	22	25	28.01	36	18.66	11.75	10.25
KPB1.5-4020		***m*1.5**	40	B4	10	38	60	60.88	35	25.01	20.88	15
KPB1.5-2040			20	B3	8	25	30	33.61	46	25.54	16.9	14.75
KPB2-4020		***m*2**	40	B4	12	40	80	81.17	45	32.37	26.17	18
KPB2-2040			20	B3	12	32	40	44.81	60	34.16	21.2	18
KPB2.5-4020		***m*2.5**	40	B4	15	50	100	101.47	55	39.73	31.47	20
KPB2.5-2040			20	B3	12	40	50	56.01	75	43.78	26.5	22.5
KPB3-4020		***m*3**	40	B4	20	60	120	121.76	65	45.85	36.76	24
KPB3-2040			20	B3	16	50	60	67.22	90	50.81	31.8	27.5
KPB1.5-4515	3	***m*1.5**	45	B4	10	40	67.5	68.06	28	20.44	17.59	11
KPB1.5-1545			15	B3	8	18	22.5	26.54	47	23.20	13.92	12.5
KPB2-4515		***m*2**	45	B4	12	60	90	90.75	40	30.4	26.12	17
KPB2-1545			15	B3	10	24	30	35.35	60	29.8	15.89	14
KPB2.5-4515		***m*2.5**	45	B4	15	60	112.5	113.43	50	38.35	32.65	22
KPB2.5-1545			15	B3	12	30	37.5	44.18	75	38.41	19.86	17.5
KPB3-4515		***m*3**	45	B4	20	80	135	136.12	55	40.74	34.18	20
KPB3-1545			15	B3	15	38	45	53.02	90	45.17	23.84	21.33

[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.
② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see page 451 for more details.
③ Dimensions of the outside diameter, the overall length and crown to back length are all theoretical values, and some differences will occur due to the corner chamfering of the gear tips.
④ Without lubrication, using plastic gears in pairs may generate heat and dilation. It is recommended to mate them with steel gears.



B4

Length of bore	Face width	Holding surface dia.	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash	Weight	Catalog No.
I	J	K	Bending strength	Surface durability	Bending strength	Surface durability	(mm)	(kg)	
16 17	9	27.37 17.05	1.61 0.87	—	0.16 0.089	—	0~0.25	0.018 0.0093	**KPB1.5-3020** **KPB1.5-2030**
23 22	11	37.56 21.34	3.65 1.97	—	0.37 0.20	—	0~0.26	0.039 0.024	**KPB2-3020** **KPB2-2030**
30 28	15	45.61 27.42	7.46 4.04	—	0.76 0.41	—	0~0.27	0.081 0.042	**KPB2.5-3020** **KPB2.5-2030**
31 37	17	57.14 34.71	12.5 6.77	—	1.28 0.69	—	0~0.28	0.14 0.082	**KPB3-3020** **KPB3-2030**
12 12	6	26.58 9.17	0.74 0.28	—	0.075 0.028	—	0~0.23	0.010 0.0029	**KPB1-4020** **KPB1-2040**
16 17	8	33.61 13.22	1.50 0.56	—	0.15 0.058	—	0~0.24	0.021 0.0068	**KPB1.25-4020** **KPB1.25-2040**
22 24	10	39.64 17.28	2.66 1.00	—	0.27 0.10	—	0~0.25	0.039 0.013	**KPB1.5-4020** **KPB1.5-2040**
27 32	15	48.46 20.92	6.72 2.52	—	0.69 0.26	—	0~0.26	0.076 0.028	**KPB2-4020** **KPB2-2040**
35 41	20	60.28 24.56	13.5 5.08	—	1.38 0.52	—	0~0.27	0.16 0.060	**KPB2.5-4020** **KPB2.5-2040**
38 47	22	73.81 29.61	22.4 8.42	—	2.29 0.86	—	0~0.28	0.25 0.10	**KPB3-4020** **KPB3-2040**
17 22.5	10	46.58 14.75	3.18 0.68	—	0.32 0.070	—	0~0.25	0.040 0.0061	**KPB1.5-4515** **KPB1.5-1545**
26 29	15	59.04 19.13	8.07 1.73	—	0.82 0.18	—	0~0.26	0.12 0.014	**KPB2-4515** **KPB2-1545**
35 37	20	72.84 20.51	16.3 3.50	—	1.66 0.36	—	0~0.27	0.20 0.028	**KPB2.5-4515** **KPB2.5-1545**
35 43	23	88.18 22.54	27.6 5.92	—	2.81 0.60	—	0~0.28	0.35 0.050	**KPB3-4515** **KPB3-1545**

[Caution on Secondary Operations]

① Please read "Caution on Performing Secondary Operations" (Page 452) when performing modifications and/or secondary operations for safety concerns.

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

KGCU-M Miter Gear Kit

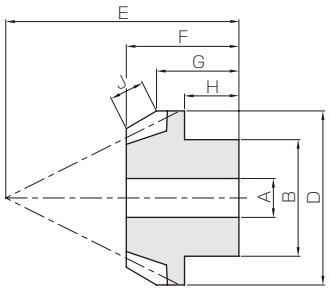
Installment : Intersecting axes gears
Gear Type : Miter Gears
Gears : KSM2-25
KPM2-25
Gear Ratio : 1
Weight : Approx. 1kg

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

KDB Injection Molded Bevel Gears

Module 0.5~1

Specifications	
Precision grade	JIS B 1704 : 1978 grade 6
Gear teeth	Gleason
Pressure angle	20°
Material	Duracon(M90-44)
Heat treatment	—
Tooth hardness	(110~120HRR)



B1

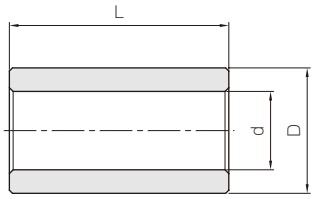
Catalog No.	Gear ratio	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Mounting distance	Total length	Crown to back length
					A	B	C	D	E	F	G
KDB0.5-4020	2	***m*0.5**	40	B9	4	12	20	20.29	12	8.33	7.29
KDB0.5-2040			20	B1	3	8	10	11.2	16	8.46	6.3
KDB0.8-4020		***m*0.8**	40	B9	5	15	32	32.47	18	11.91	10.47
KDB0.8-2040			20	B1	4	12	16	17.92	24	11.5	8.48
KDB1-4020		***m*1**	40	B9	6	18	40	40.59	22	14.45	12.59
KDB1-2040			20	B1	5	15	20	22.4	30	14.49	10.6

[Caution on Product Characteristics]
① The allowable torques shown in the table are the calculated values according to the assumed usage conditions. Please see page 451 for more details.
② The bore tolerance is generally -0.05 to -0.3 but may be + values at the central portion of the hole.
③ To find the dimensional tolerance of these gears, please see the Dimensional Tolerance Table.

KBB Sintered Metal Bushings

Sintered Metal Bushings

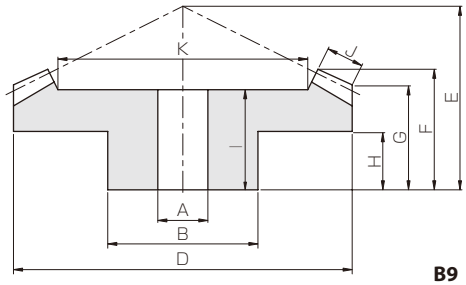
The table shows a series of standard metal bushings that can be pressed into standard Injection Molded Gears. They can be used as bearing metal on idler gears or to reduce the bore of the gears.



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 $^{0}_{-0.3}$	
KBB30507	3	5	7	DB0.8
KBB40612	4	6	12	DB1

Material : Oil impregnated sintered bronze.



B9

Hub width	Length of bore	Face width	Holding surface dia.	Allowable torque (N·m)	Allowable torque (kgf·m)	Backlash	Weight	Catalog No.
H	I	J	K	Bending strength	Bending strength	(mm)	(g)	
4 4	7 —	2.5	14.41 —	0.24 0.092	0.025 0.0094	0 ~ 0.30	2.00 0.54	**KDB0.5-4020** **KDB0.5-2040**
6 5	10 —	3.5	24.17 —	0.91 0.34	0.093 0.035	0 ~ 0.48	6.26 1.87	**KDB0.8-4020** **KDB0.8-2040**
7.5 7	12.5 —	4.5	30.44 —	1.59 0.60	0.16 0.061	0 ~ 0.60	11.9 3.54	**KDB1-4020** **KDB1-2040**

[Caution on Secondary Operations] ① Avoid performing secondary operations as reworking material may expose air bubbles (voids).

Dimensional tolerance table(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

■ Catalog Number of NISSEI Spiral Bevel Gears

The catalog number systems of KKSP Ground Spiral Miter Gears differs from other miter gears.

K KSP 031 001 G F L

- L — Hand of Spiral (L)
- F — Products Shape (Finished Shape)
- G — Surface finish (Ground)
- 001 — Gear Ratio (1)
- 031 — OD of the Larger gear (31 mm)
- KSP — Type (Spiral Miter Gears)

■ The Characteristics of KKSP Spiral Bevel Gears

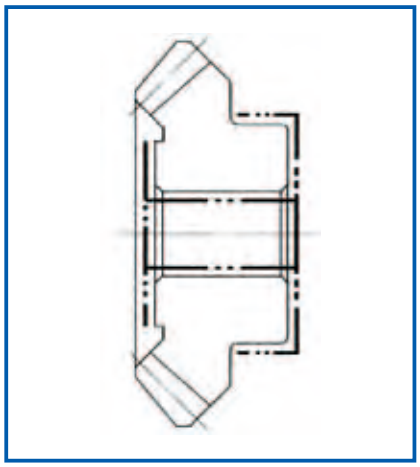
1. JIS Grade 0, high strength, high precision products
2. Superior performance with regard to high speed, low noise, and low vibration.
3. Module range from 1.5 to 6
4. Three gear ratios: 1, 1.5 and 2

■ Products Style

Type F - Finished Style

Type U - Hub masked to Allow Secondary Operations

※ The heavy lines in the figure below indicate the masked areas during carburizing.



Notes about the Transmission Capability Table

1. The values given in the table are for a service factor of 1. Using the table on the right, please modify the value according to the actual conditions. Load torque compensation is calculated from the load torque at the output shaft x service factor (Sf).
2. For speed increaser applications (where the gear is the driver and the pinion is driven), the torque on the pinion is the value in the table multiplied by the speed ratio.

NOTE 1: For speed ratio of 1/1.5, the torque on the pinion is 1/1.5 times the value given in the table.

Service Factor *Sf*

Impact from Prime Mover	Impact from Load Side of Machine		
	Uniform Load	Medium Impact Load	Heavy Impact Load
Uniform Load (Motor, Turbine, Hydraulic Motor)	1.0	1.25	1.75
Light Impact Load (Multicylinder Engine)	1.25	1.5	2.0
Medium Impact Load (Single Cylinder Engine)	1.5	1.75	2.25

Transmission Capability Table (Speed Ratio: 1)

Upper Transmission Capability (kw) Lower Torque (N • m)

Model \ Rotation(rpm)	50	100	300	600	900	1200	1800	3000
KKSP031001	0.035	0.068	0.195	0.375	0.548	0.716	1.04	1.65
	6.65	6.51	6.20	5.98	5.82	5.69	5.51	5.25
KKSP040001	0.092	0.179	0.511	0.980	1.43	1.86	2.69	4.25
	17.6	17.2	16.3	15.6	15.2	14.8	14.3	13.5
KKSP053001	0.211	0.412	1.17	2.23	3.25	4.22	6.08	9.55
	40.4	39.3	37.3	35.6	34.5	33.6	32.3	30.4
KKSP066001	0.367	0.715	2.02	3.85	5.59	7.26	10.4	16.3
	70.2	68.3	64.4	61.4	59.3	57.8	55.4	52.0
KKSP078001	0.577	1.12	3.16	6.00	8.68	11.2	16.1	25.1
	109.8	106.9	101.0	95.5	92.2	89.5	85.5	79.8
KKSP092001	0.901	1.75	4.91	9.31	13.5	17.4	24.9	38.6
	172.6	166.7	156.9	148.1	143.2	138.3	132.4	122.6
KKSP105001	1.44	2.78	7.80	14.7	21.2	27.4	39.1	60.3
	274.6	265.8	248.1	234.4	225.6	218.7	207.9	192.2
KKSP132001	2.33	4.50	12.6	23.6	34.0	43.7	62.0	95.0
	445.2	430.5	400.1	376.6	360.9	348.1	329.5	302.0
KKSP157001	3.68	7.10	19.7	37.0	53.0	68.1	96.2	146
	704.1	678.6	628.6	589.4	562.9	542.3	510.9	466.8
KKSP184001	5.31	10.2	28.3	52.8	75.5	96.8	136	206
	1010	976.7	901.2	841.4	801.2	770.8	722.8	656.1

Transmission Capability Table(Speed Ratio: 1.5)

Upper Transmission Capability (kw) Lower Torque(N • m)

Model \ Pinion Rotation(rpm)	50	100	300	600	900	1200	1800	3000
KKSP0481.5	0.077	0.151	0.432	0.830	1.21	1.58	2.29	3.64
	22.2	21.6	20.6	19.8	19.3	18.9	18.2	17.4
KKSP0611.5	0.159	0.309	0.882	1.69	2.46	3.21	4.64	7.33
	45.4	44.3	42.2	40.4	39.2	38.3	37.0	35.0
KKSP0741.5	0.277	0.540	1.53	2.93	4.27	5.55	8.00	12.6
	79.4	77.4	73.4	70.1	68.0	66.3	63.7	60.1
KKSP0901.5	0.466	0.908	2.57	4.90	7.12	9.24	13.3	20.8
	133.4	130.4	122.6	116.7	113.8	110.8	105.9	99.0
KKSP1051.5	0.700	1.36	3.84	7.31	10.6	13.7	19.7	30.7
	201.0	195.2	183.4	174.6	168.7	163.8	156.9	147.1
KKSP1241.5	1.03	2.00	5.63	10.7	15.5	20.0	28.6	44.5
	295.2	286.4	268.7	255.0	246.1	239.3	227.5	212.8
KKSP1411.5	1.56	3.03	8.51	16.1	23.2	30.1	42.9	66.4
	448.2	434.4	406.0	384.4	370.7	358.9	341.3	317.7
KKSP1631.5	2.27	4.39	12.3	23.2	33.4	43.1	61.4	94.6
	650.2	628.6	587.4	554.1	532.5	514.8	489.4	452.1
KKSP1811.5	2.92	5.64	15.8	29.7	42.7	55.1	78.3	120
	836.5	809.0	754.1	710.0	680.6	658.0	623.7	574.7

Transmission Capability Table(Speed Ratio: 2)

Upper Transmission Capability (kw) Lower Torque (N • m)

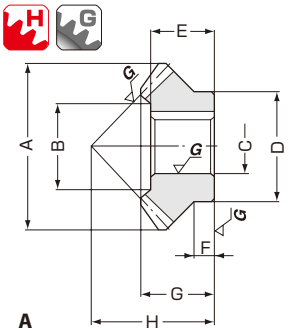
Model \ Pinion Rotation(rpm)	50	100	300	600	900	1200	1800	3000
KKSP039002	0.025	0.049	0.142	0.275	0.404	0.528	0.770	1.23
	9.63	9.45	9.07	8.76	8.57	8.41	8.17	7.83
KKSP056002	0.075	0.147	0.423	0.814	1.19	1.55	2.26	3.59
	28.8	28.1	27.0	26.0	25.3	24.8	23.9	22.8
KKSP075002	0.185	0.361	1.03	1.98	2.89	3.76	5.45	8.61
	70.7	69.0	65.7	63.1	61.3	59.9	57.9	54.8
KKSP096002	0.364	0.710	2.02	3.86	5.62	7.31	10.5	16.6
	139.3	135.3	128.5	122.6	119.6	116.7	111.8	105.9
KKSP119002	0.649	1.26	3.58	6.82	9.90	12.9	18.5	29.0
	248.1	241.2	227.5	217.7	209.9	205.0	196.1	184.4
KKSP145002	1.07	2.08	5.87	11.2	16.2	21.0	30.1	46.9
	408.9	397.2	373.6	356.0	343.2	333.4	319.7	298.1
KKSP172002	1.78	3.45	9.72	18.4	26.6	34.5	49.3	76.5
	680.6	660.0	618.8	587.4	565.8	549.2	523.7	487.4

KKSP
Nissei Ground Spiral Miter Gears

Module 1.5~6

Specifications	
Precision grade	JIS B 1704 : 1978 grade 0
Gear teeth	Gleason
Pressure angle	20°
Helix angle	35°
Material	SCM415*
Heat treatment	Overall carburizing
Tooth hardness	60~63HRC**

* Module 3.5 and larger are made of SCM420.
** Tooth Hardness for module 2 and 2.5 is between 80 to 83 HRA.



Catalog No.	Gear ratio	Module	No. of teeth	Direction of spiral	Pitch dia.	Face width	Shape	Outside dia. A	Holding surface dia. B	Bore C_{H7}	Hub dia. D	Length of bore E
KKSP031001GF L **KKSP031001GF R**	1	***m*1.5**	20	L R	30	7	A	30.5	16.2	12	22	13
KKSP040001GF L **KKSP040001GF R**		***m*2**	20	L R	40	9	B	40	22.5	14	31	14
KKSP053001GF L **KKSP053001GF R**		***m*2.5**	21	L R	52.5	12	B	53	31	19	38	20
KKSP066001GF L **KKSP066001GF R**		***m*3**	21	L R	63	15	B	65	33.6	23	47	25
KKSP078001GF L **KKSP078001GF R**		***m*3.5**	22	L R	77	18	B	78	43.1	27	54	27
KKSP092001GF L **KKSP092001GF R**		***m*4**	22	L R	88	21	B	91	48.6	30	63	32
KKSP105001GF L **KKSP105001GF R**		***m*4.5**	23	L R	103.5	25	C	105	50	32	70	35
KKSP132001GF L **KKSP132001GF R**		***m*5**	26	L R	130	29	C	132	64	36	82	41
KKSP157001GF L **KKSP157001GF R**		***m*5.5**	28	L R	154	34	C	157	76	40	92	47
KKSP184001GF L **KKSP184001GF R**		***m*6**	30	L R	180	38	C	184	84	48	101	51

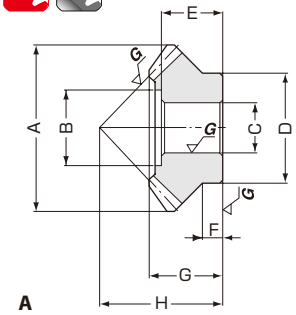
[Caution on Product Characteristics] ① The allowable torque is calculated by converting the output torque (600 rpm) on page 485 to kgf/m, according to assumed usage conditions.
② These gears produce axial thrust forces. See page 452 for more details.

KKSP
Nissei Ground Spiral Miter Gears

Module 1.5~6

Specifications	
Precision grade	JIS B 1704 : 1978 grade 0
Gear teeth	Gleason
Pressure angle	20°
Helix angle	35°
Material	SCM415*
Heat treatment	Carburizing (bore & hubs are masked)
Tooth hardness	60~63HRC**

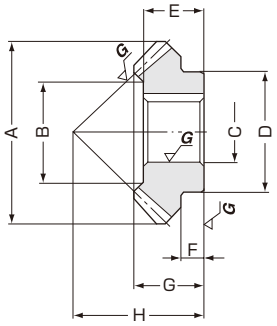
* Module 3.5 and larger are made of SCM420.
** Tooth Hardness for module 2 and 2.5 is between 80 to 83 HRA.



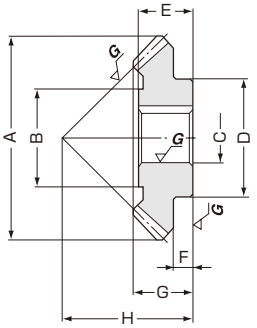
Catalog No.	Gear ratio	Module	No. of teeth	Direction of spiral	Pitch dia.	Face width	Shape	Outside dia. A	Holding surface dia. B	Bore C_{H7}	Hub dia. D	Length of bore E
KKSP031001GU L **KKSP031001GU R**	1	***m*1.5**	20	L R	30	7	A	30.5	16.5	10	22	13
KKSP040001GU L **KKSP040001GU R**		***m*2**	20	L R	40	9	B	40	22.5	12	31	14
KKSP053001GU L **KKSP053001GU R**		***m*2.5**	21	L R	52.5	12	B	53	31	14	38	20
KKSP066001GU L **KKSP066001GU R**		***m*3**	21	L R	63	15	B	65	33.5	16	47	25
KKSP078001GU L **KKSP078001GU R**		***m*3.5**	22	L R	77	18	B	78	43	20	54	27
KKSP092001GU L **KKSP092001GU R**		***m*4**	22	L R	88	21	B	91	49	22	63	32
KKSP105001GU L **KKSP105001GU R**		***m*4.5**	23	L R	103.5	25	C	105	50	26	70	35
KKSP132001GU L **KKSP132001GU R**		***m*5**	26	L R	130	29	C	132	64	30	82	41
KKSP157001GU L **KKSP157001GU R**		***m*5.5**	28	L R	154	34	C	157	76	32	92	47
KKSP184001GU L **KKSP184001GU R**		***m*6**	30	L R	180	38	C	184	84	40	101	51

[Caution on Product Characteristics] ① The allowable torque is calculated by converting the output torque (600 rpm) on page 485 to kgf/m, according to assumed usage conditions.
② These gears produce axial thrust forces. See page 452 for more details.

Ground Spiral Miter Gears



B

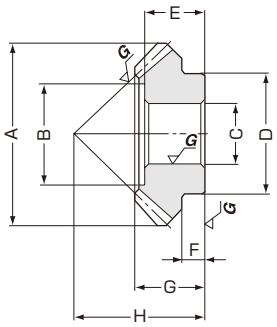


C

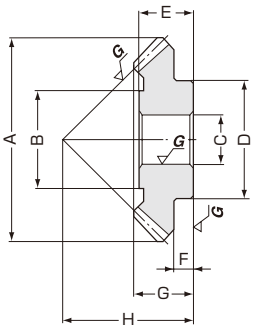
Hub width F	Total length G	Mounting distance H	Keyway	Allowable torque (kgf·m)	Backlash (mm)	Weight (kg)	Catalog No.
6	15	25	4 x 1.8	0.61	0 ~0.05	0.04	**KKSP031001GF L KKSP031001GF R**
7	16.5	30	5 x 2.3	1.59	0 ~0.05	0.08	**KKSP040001GF L KKSP040001GF R**
8	22.8	40	6 x 2.8	3.63	0.05~0.10	0.18	**KKSP053001GF L KKSP053001GF R**
13	29.5	50	7 x 3	6.26	0.05~0.10	0.34	**KKSP066001GF L KKSP066001GF R**
12	32	57	8 x 3.3	9.74	0.05~0.10	0.54	**KKSP078001GF L KKSP078001GF R**
14	38	66	8 x 3.3	15.1	0.05~0.10	0.88	**KKSP092001GF L KKSP092001GF R**
14	39	72	10 x 3.3	23.9	0.05~0.10	1.25	**KKSP105001GF L KKSP105001GF R**
14	45	88	10 x 3.3	38.4	0.05~0.10	2.39	**KKSP132001GF L KKSP132001GF R**
20	53.5	105	12 x 3.3	60.1	0.05~0.10	3.71	**KKSP157001GF L KKSP157001GF R**
17	56.5	118	14 x 3.8	85.8	0.05~0.10	5.55	**KKSP184001GF L KKSP184001GF R**

[Caution on Secondary Operations] ① No secondary operations can be performed on these precision finished gears due to the applied carburizing process.

Ground Spiral Miter Gears



B



C

Hub width F	Total length G	Mounting distance H	Machinable max. bore	Allowable gear torque (kgf·m)	Backlash (mm)	Weight (kg)	Catalog No.
6	15	25	12	0.61	0 ~0.05	0.04	**KKSP031001GU L KKSP031001GU R**
7	16.5	30	16	1.59	0 ~0.05	0.09	**KKSP040001GU L KKSP040001GU R**
8	22.8	40	22	3.63	0.05~0.10	0.21	**KKSP053001GU L KKSP053001GU R**
13	29.5	50	25	6.26	0.05~0.10	0.39	**KKSP066001GU L KKSP066001GU R**
12	32	57	32	9.74	0.05~0.10	0.59	**KKSP078001GU L KKSP078001GU R**
14	38	66	38	15.1	0.05~0.10	0.96	**KKSP092001GU L KKSP092001GU R**
14	39	72	40	23.9	0.05~0.10	1.33	**KKSP105001GU L KKSP105001GU R**
14	45	88	48	38.4	0.05~0.10	2.49	**KKSP132001GU L KKSP132001GU R**
20	53.5	105	55	60.1	0.05~0.10	3.90	**KKSP157001GU L KKSP157001GU R**
17	56.5	118	62	85.8	0.05~0.10	5.79	**KKSP184001GU L KKSP184001GU R**

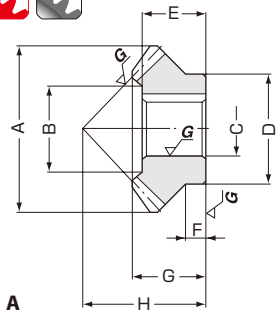
[Caution on Secondary Operations] ① Please read "Caution on Performing Secondary Operations" (Page 452) when performing modifications and/or secondary operations for safety concerns. Gear Kobo, the KHK's system for quick modification of KHK stock gears is also available.

KKSP
Nissei Ground Spiral Bevel Gears

Module 2~5

Specifications	
Precision grade	JIS B 1704 : 1978 grade 0
Gear teeth	Gleason
Pressure angle	20°
Helix angle	35°
Material	SCM415*
Heat treatment	Overall carburizing
Tooth hardness	60~63HRC**

* Module 3.5 and larger are made of SCM420.
** Tooth Hardness for module 2 and 2.5 is between 80 to 83 HRA.



A

Catalog No.	Gear ratio	Module	No. of teeth	Direction of spiral	Pitch dia.	Face width	Shape	Outside dia. A	Holding surface dia. B	Bore C_{H7}	Hub dia. D	Length of bore E
KKSP0481.5GF P **KKSP0481.5GF G**	1.5	***m2***	16 24	L R	32 48	9	A B	34 48	17.5 30.4	12 15	24 30	13 17
KKSP0611.5GF P **KKSP0611.5GF G**		***m2.25***	18 27	L R	40.5 60.75	12	A B	42 61	22.4 36.3	15 20	30 40	17 20
KKSP0741.5GF P **KKSP0741.5GF G**		***m2.75***	18 27	L R	49.5 74.25	15	A B	52 74	28.8 44.5	20 25	40 50	20 25
KKSP0901.5GF P **KKSP0901.5GF G**		***m3***	20 30	L R	60 90	18	B B	63 90	34.1 54.7	22 27	44 56	24 29
KKSP1051.5GF P **KKSP1051.5GF G**		***m3.5***	20 30	L R	70 105	21	B C	74 105	37.8 53	25 30	50 63	25 32
KKSP1241.5GF P **KKSP1241.5GF G**		***m3.75***	22 33	L R	82.5 123.75	24	B C	87 124	46.6 64	27 33	56 69	29 35
KKSP1411.5GF P **KKSP1411.5GF G**		***m4.25***	22 33	L R	93.5 140.25	28	B C	99 141	52.9 68	30 36	63 73	32 41
KKSP1631.5GF P **KKSP1631.5GF G**		***m4.5***	24 36	L R	108 162	32	B C	113 163	64.6 76	33 40	69 82	35 47
KKSP1811.5GF P **KKSP1811.5GF G**		***m5***	24 36	L R	120 180	35	B C	126 181	71.8 86	36 45	73 90	41 48

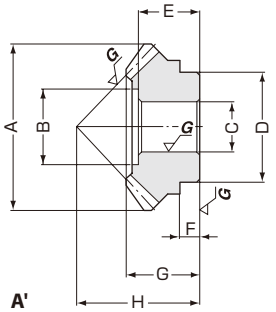
[Caution on Product Characteristics] ① The allowable torque is calculated by converting the output torque (600 rpm) on page 485 to kgf/m, according to assumed usage conditions.
② These gears produce axial thrust forces. See page 452 for more details.

KKSP
Nissei Ground Spiral Bevel Gears

Module 2~5

Specifications	
Precision grade	JIS B 1704 : 1978 grade 0
Gear teeth	Gleason
Pressure angle	20°
Helix angle	35°
Material	SCM415*
Heat treatment	Carburizing (bore & hubs are masked)
Tooth hardness	60~63HRC**

* Module 3.5 and larger are made of SCM420.
** Tooth Hardness for module 2 and 2.5 is between 80 to 83 HRA.

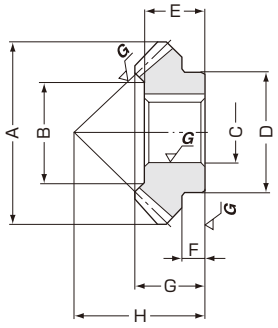


A'

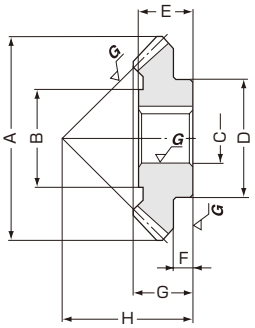
Catalog No.	Gear ratio	Module	No. of teeth	Direction of spiral	Pitch dia.	Face width	Shape	Outside dia. A	Holding surface dia. B	Bore C_{H7}	Hub dia. D	Length of bore E
KKSP0481.5GU P **KKSP0481.5GU G**	1.5	***m2***	16 24	L R	32 48	9	A' B	34 48	17.5 30	10 12	24 30	13 17
KKSP0611.5GU P **KKSP0611.5GU G**		***m2.25***	18 27	L R	40.5 60.75	12	A' B	42 61	22 36	12 14	30 40	17 20
KKSP0741.5GU P **KKSP0741.5GU G**		***m2.75***	18 27	L R	49.5 74.25	15	A' B	52 74	27 44.5	14 20	40 50	20 25
KKSP0901.5GU P **KKSP0901.5GU G**		***m3***	20 30	L R	60 90	18	B B	63 90	34 54.5	16 20	44 56	24 29
KKSP1051.5GU P **KKSP1051.5GU G**		***m3.5***	20 30	L R	70 105	21	B C	74 105	38 53	20 22	50 63	25 32
KKSP1241.5GU P **KKSP1241.5GU G**		***m3.75***	22 33	L R	82.5 123.75	24	B C	87 124	46.5 64	20 26	56 69	29 35
KKSP1411.5GU P **KKSP1411.5GU G**		***m4.25***	22 33	L R	93.5 140.25	28	B C	99 141	53 68	22 30	63 73	32 41
KKSP1631.5GU P **KKSP1631.5GU G**		***m4.5***	24 36	L R	108 162	32	B C	113 163	64.5 76	26 32	69 82	35 47
KKSP1811.5GU P **KKSP1811.5GU G**		***m5***	24 36	L R	120 180	35	B C	126 181	71.5 86	30 38	73 90	41 48

[Caution on Product Characteristics] ① The allowable torque is calculated by converting the output torque (600 rpm) on page 485 to kgf/m, according to assumed usage conditions.
② These gears produce axial thrust forces. See page 452 for more details.

Ground Spiral Bevel Gears



B

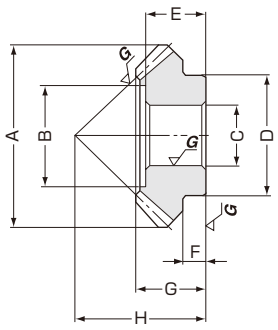


C

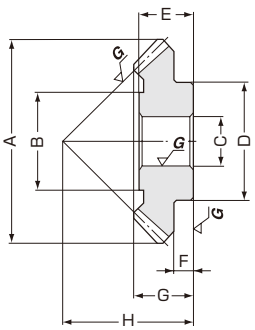
Hub width F	Total length G	Mounting distance H	Keyway	Allowable gear torque (kgf·m)	Backlash (mm)	Weight (kg)	Catalog No.
4.3 7	14.5 19	31 30	4 x 1.8 5 x 2.3	2.02	0 ~0.05	0.05 0.13	**KKSP0481.5GF P** **KKSP0481.5GF G**
5.1 10	19 23.5	39 37	5 x 2.3 6 x 2.8	4.12	0.05~0.10	0.09 0.25	**KKSP0611.5GF P** **KKSP0611.5GF G**
5.7 12	22 29	46 45	6 x 2.8 7 x 3	7.15	0.05~0.10	0.17 0.45	**KKSP0741.5GF P** **KKSP0741.5GF G**
8 13	26.5 33	56 53	6 x 2.8 8 x 3.3	11.9	0.05~0.10	0.29 0.79	**KKSP0901.5GF P** **KKSP0901.5GF G**
7 13	28.5 34	63 57	7 x 3 8 x 3.3	17.8	0.05~0.10	0.43 1.09	**KKSP1051.5GF P** **KKSP1051.5GF G**
7 14	33 36.5	74 64	8 x 3.3 10 x 3.3	26.0	0.05~0.10	0.76 1.59	**KKSP1241.5GF P** **KKSP1241.5GF G**
7 17	36 43.5	82 74	8 x 3.3 10 x 3.3	39.2	0.05~0.10	1.07 2.35	**KKSP1411.5GF P** **KKSP1411.5GF G**
7 19	38.5 49.5	92 85	10 x 3.3 12 x 3.3	56.5	0.05~0.10	1.50 3.70	**KKSP1631.5GF P** **KKSP1631.5GF G**
10 19	45.5 50.5	105 90	10 x 3.3 14 x 3.8	72.4	0.05~0.10	2.12 4.65	**KKSP1811.5GF P** **KKSP1811.5GF G**

[Caution on Secondary Operations] ① No secondary operations can be performed on these precision finished gears due to the applied carburizing process.

Ground Spiral Bevel Gears



B



C

Hub width F	Total length G	Mounting distance H	Machinable max. bore	Allowable gear torque (kgf·m)	Backlash (mm)	Weight (kg)	Catalog No.
4.5 7	14.5 19	31 30	10 20	2.02	0 ~0.05	0.05 0.14	**KKSP0481.5GU P** **KKSP0481.5GU G**
5.5 10	19 23.5	39 37	16 27	4.12	0.05~0.10	0.10 0.28	**KKSP0611.5GU P** **KKSP0611.5GU G**
5.6 12	22 29	46 45	20 35	7.15	0.05~0.10	0.20 0.49	**KKSP0741.5GU P** **KKSP0741.5GU G**
8 13	26.5 33	56 53	25 42	11.9	0.05~0.10	0.34 0.84	**KKSP0901.5GU P** **KKSP0901.5GU G**
7 13	28.5 34	63 57	28 42	17.8	0.05~0.10	0.47 1.18	**KKSP1051.5GU P** **KKSP1051.5GU G**
7 14	33 36.5	74 64	36 48	26.0	0.05~0.10	0.80 1.71	**KKSP1241.5GU P** **KKSP1241.5GU G**
7 17	36 43.5	82 74	42 50	39.2	0.05~0.10	1.15 2.46	**KKSP1411.5GU P** **KKSP1411.5GU G**
7 19	38.5 49.5	92 85	48 55	56.5	0.05~0.10	1.64 3.84	**KKSP1631.5GU P** **KKSP1631.5GU G**
10 19	45.5 50.5	105 90	55 60	72.4	0.05~0.10	2.21 4.85	**KKSP1811.5GU P** **KKSP1811.5GU G**

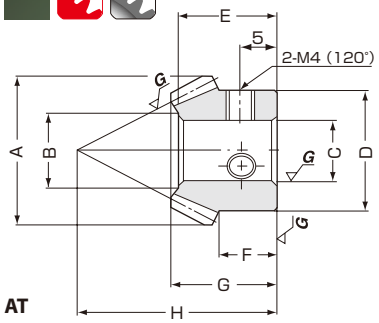
[Caution on Secondary Operations] ① Please read "Caution on Performing Secondary Operations" (Page 452) when performing modifications and/or secondary operations for safety concerns. Gear Kobo, the KHK's system for quick modification of KHK stock gears is also available.

KKSP
Nissei Ground Spiral Bevel Gears

Module 1.5~4.5

Specifications	
Precision grade	JIS B 1704 : 1978 grade 0
Gear teeth	Gleason
Pressure angle	20°
Helix angle	35°
Material	SCM415*
Heat treatment	Overall carburizing
Tooth hardness	60~63HRC**

* Module 3.5 and larger are made of SCM420.
** Tooth Hardness for module 2 and 2.5 is between 80 to 83 HRA.



Catalog No.	Gear ratio	Module	No. of teeth	Direction of spiral	Pitch dia.	Face width	Shape	Outside dia. A	Holding surface dia. B	Bore C_{H7}	Hub dia. D	Length of bore E
KKSP039002GC P **KKSP039002GF G**	2	***m*1.5**	13 26	L R	19.5 39	7	AT B	21 38.5	10.2 24.1	8 12	16 24	14 13
KKSP056002GF P **KKSP056002GF G**		***m*2**	14 28	L R	28 56	10	B B	30 56	15.3 35.6	10 16	20 30	12 18
KKSP075002GF P **KKSP075002GF G**		***m*2.5**	15 30	L R	37.5 75	14	B C	40 75	16.9 36	14 22	30 44	17 24
KKSP096002GF P **KKSP096002GF G**		***m*3**	16 32	L R	48 96	18	B C	53 96	23.5 46	17 27	36 56	19 29
KKSP119002GF P **KKSP119002GF G**		***m*3.5**	17 34	L R	59.5 119	22	A C	65 119	31.1 54	22 33	44 63	25 34
KKSP145002GF P **KKSP145002GF G**		***m*4**	18 36	L R	72 144	27	A C	78 145	31.3 60	26 36	54 73	28 39
KKSP172002GF P **KKSP172002GF G**		***m*4.5**	19 38	L R	85.5 171	32	A C	93 172	44.4 70	33 42	69 79	34 46

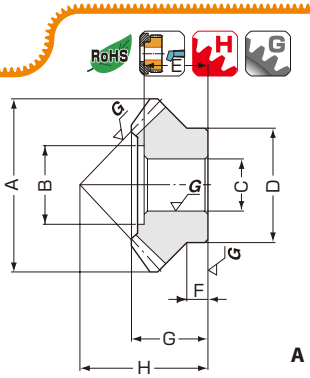
[Caution on Product Characteristics] ① The allowable torque is calculated by converting the output torque (600 rpm) on page 485 to kgf/ m, according to assumed usage conditions.
② These gears produce axial thrust forces. See page 452 for more details.

KKSP
Nissei Ground Spiral Bevel Gears

Module 1.5~4.5

Specifications	
Precision grade	JIS B 1704 : 1978 grade 0
Gear teeth	Gleason
Pressure angle	20°
Helix angle	35°
Material	SCM415*
Heat treatment	Carburizing (bore & hubs are masked)
Tooth hardness	60~63HRC**

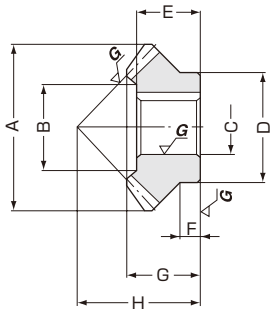
* Module 3.5 and larger are made of SCM420.
** Tooth Hardness for module 2 and 2.5 is between 80 to 83 HRA.



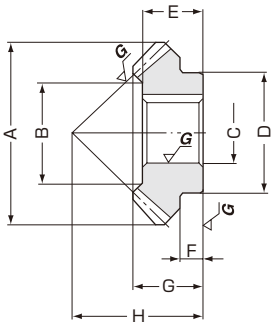
Catalog No.	Gear ratio	Module	No. of teeth	Direction of spiral	Pitch dia.	Face width	Shape	Outside dia. A	Holding surface dia. B	Bore C_{H7}	Hub dia. D	Length of bore E
KKSP039002GU P **KKSP039002GU G**	2	***m*1.5**	13 26	L R	19.5 39	7	A B	21 38.5	10.2 24	8 10	16 24	14 13
KKSP056002GU P **KKSP056002GU G**		***m*2**	14 28	L R	28 56	10	B B	30 56	15.3 35.5	8 12	20 30	12 18
KKSP075002GU P **KKSP075002GU G**		***m*2.5**	15 30	L R	37.5 75	14	A' C	40 75	20 36	12 16	30 44	17 24
KKSP096002GU P **KKSP096002GU G**		***m*3**	16 32	L R	48 96	18	B C	53 96	23.5 46	12 20	36 56	19 29
KKSP119002GU P **KKSP119002GU G**		***m*3.5**	17 34	L R	59.5 119	22	A C	65 119	34 54	16 26	44 63	25 34
KKSP145002GU P **KKSP145002GU G**		***m*4**	18 36	L R	72 144	27	A C	78 145	38 60	20 30	54 73	28 39
KKSP172002GU P **KKSP172002GU G**		***m*4.5**	19 38	L R	85.5 171	32	A C	93 172	48 70	26 36	69 79	34 46

[Caution on Product Characteristics] ① The allowable torque is calculated by converting the output torque (600 rpm) on page 485 to kgf/m, according to assumed usage conditions.
② These gears produce axial thrust forces. See page 452 for more details.

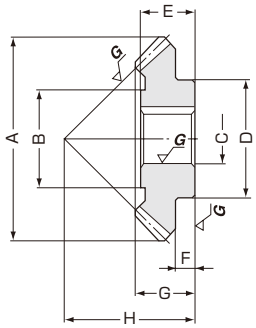
Ground Spiral Bevel Gears



A



B

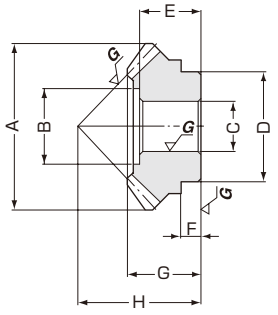


C

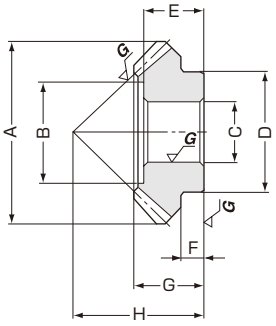
Hub width F	Total length G	Mounting distance H	Keyway	Allowable gear torque (kgf·m)	Backlash (mm)	Weight (kg)	Catalog No.
7.6 7	14.5 15	28 22	– 4 x 1.8	0.89	0 ~0.05	0.02 0.06	**KKSP039002GC P** **KKSP039002GF G**
2.5 8	13 20.5	32 30	3 x 1.4 5 x 2.3	2.65	0 ~0.05	0.03 0.18	**KKSP056002GF P** **KKSP056002GF G**
4.6 11	19.5 25.5	44 38	5 x 2.3 6 x 2.8	6.43	0.05~0.10	0.09 0.41	**KKSP075002GF P** **KKSP075002GF G**
2.5 12	21.5 31	53 47	5 x 2.3 8 x 3.3	12.5	0.05~0.10	0.18 0.85	**KKSP096002GF P** **KKSP096002GF G**
3.6 15	27.5 35.5	67 55	6 x 2.8 10 x 3.3	22.2	0.05~0.10	0.33 1.37	**KKSP119002GF P** **KKSP119002GF G**
3.5 16	33 40.5	80 64	8 x 3.3 10 x 3.3	36.3	0.05~0.10	0.57 2.34	**KKSP145002GF P** **KKSP145002GF G**
4.4 20	38 47	94 75	10 x 3.3 12 x 3.3	59.9	0.05~0.10	0.91 3.60	**KKSP172002GF P** **KKSP172002GF G**

[Caution on Secondary Operations] ① No secondary operations can be performed on these precision finished gears due to the applied carburizing process.

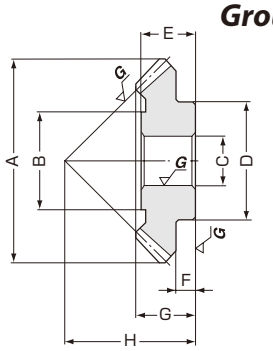
Ground Spiral Bevel Gears



A'



B



C

Hub width F	Total length G	Mounting distance H	Machinable max. bore	Allowable gear torque (kgf·m)	Backlash (mm)	Weight (kg)	Catalog No.
7.6 7	14.5 15	28 22	8 20	0.89	0 ~0.05	0.02 0.07	**KKSP039002GU P** **KKSP039002GU G**
2.5 8	13 20.5	32 30	10 20	2.65	0 ~0.05	0.04 0.19	**KKSP056002GU P** **KKSP056002GU G**
4.5 11	19.5 25.5	44 38	14 25	6.43	0.05~0.10	0.10 0.44	**KKSP075002GU P** **KKSP075002GU G**
2.5 12	21.5 31	53 47	19 32	12.5	0.05~0.10	0.20 0.91	**KKSP096002GU P** **KKSP096002GU G**
3.6 15	27.5 35.5	67 55	25 40	22.2	0.05~0.10	0.36 1.45	**KKSP119002GU P** **KKSP119002GU G**
3.5 16	33 40.5	80 64	30 42	36.3	0.05~0.10	0.65 2.44	**KKSP145002GU P** **KKSP145002GU G**
4.4 20	38 47	94 75	38 50	59.9	0.05~0.10	0.97 3.80	**KKSP172002GU P** **KKSP172002GU G**

[Caution on Secondary Operations] ① Please read "Caution on Performing Secondary Operations" (Page 452) when performing modifications and/or secondary operations for safety concerns. Gear Kobo, the KHK's system for quick modification of KHK stock gears is also available.

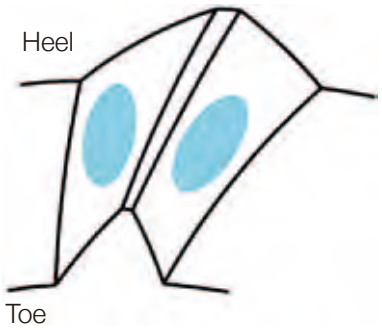
■ Adjusting Tooth Contact

< Centering tooth contact >

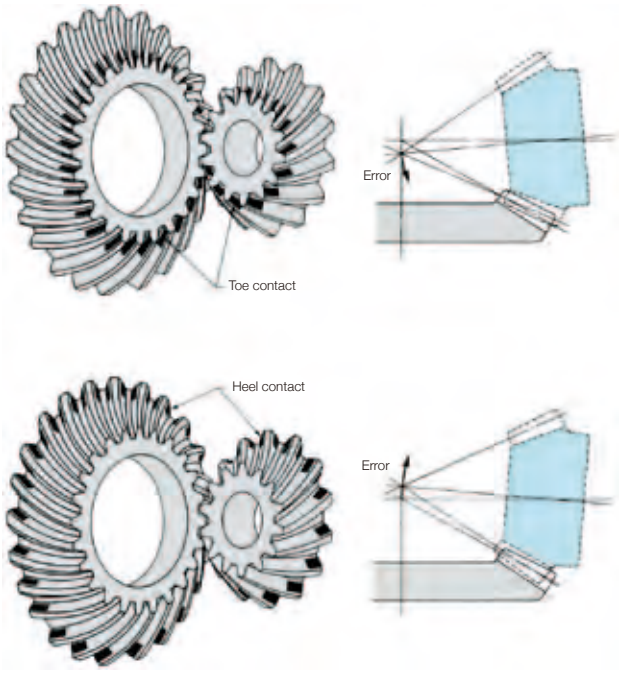
(1) When assembled correctly, the contact will occur in the middle of the tooth flank.

(2) The contact area along the tooth face should be in the center of the tooth, but somewhat closer to the toe is ideal.

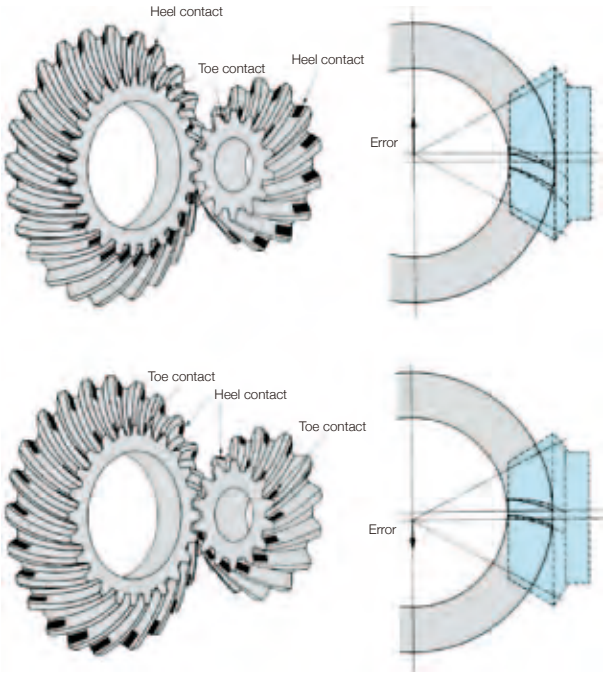
When the gears are assembled in to the gearbox and the backlash is adjusted, adjust the gearbox to obtain the tooth contact as shown below. Inaccurate assembly will lead to irregular noise and uneven wear,



(1) When there is an angular error of the shafts



(2) When the pinion shaft is offset



(3) When the mounting distance of the pinion is incorrect