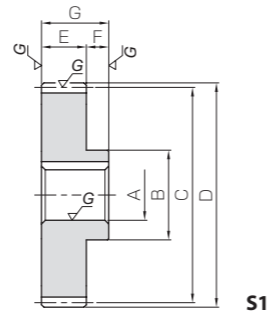


Specifications	
Precision grade	JIS grade N5 (JIS B1702-1:1998)
Gear teeth	Standard full depth
Pressure angle	20°
Material	SCM415
Heat Treatment	Carburized
Tooth hardness	55 to 60HRC



S1

Catalog Number	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total Length	Web thickness	Web O.D.
				A <sub>H7</sub>	B	C	D	E	F	G	H	I
KMSGA2-15 KMSGB2-15**	m2	15	S1	12 15	24	30	34	20	10	30	—	—
KMSGA2-18 KMSGB2-18		18		12 15	30	36	40					
KMSGA2-20 KMSGB2-20		20		15 18	32	40	44					
KMSGA2-24 KMSGB2-24		24		15 18	35	48	52					
KMSGA2-25 KMSGB2-25		25		16 20	35	50	54					
KMSGA2-30 KMSGB2-30		30		18 22	40	60	64					
KMSGA2-35 KMSGB2-35		35		18 22	40	70	74					
KMSGA2-36 KMSGB2-36		36		18 22	40	72	76					
KMSGA2-40 KMSGB2-40		40		20 25	45	80	84					
KMSGA2-45 KMSGB2-45		45		20 25	45	90	94					
KMSGA2-48 KMSGB2-48		48		22 28	50	96	100					
KMSGA2-50 KMSGB2-50		50		22 28	50	100	104					
KMSGA2-55 KMSGB2-55		55		25 30	55	110	114					
KMSGA2-60 KMSGB2-60		60		25 30	55	120	124					
KMSGA2-70 KMSGB2-70		70		25 30	55	140	144					
KMSGA2-80 KMSGB2-80		80		30 35	60	160	164					
KMSGA2-100 KMSGB2-100	100	35 40	80	200	204							

- [Caution on Product Characteristics]
- ① Although the dimensions of the keyway are made to the JIS B1301 (Js9) tolerance, there may be some deviations due to the effects of the heat treatment.
  - ② The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 24 for more details.
  - ③ The backlash values shown in the table are the theoretical values for the backlash in the normal direction of a pair of identical gears in mesh.
  - ④ Products marked with "\*\*" have a small amount of material between the corner of the keyway and the tooth root. This mode of failure must be considered when selecting these gears. For details, please see our web site.

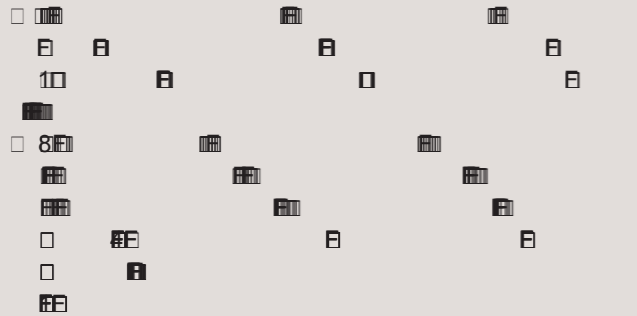
Keyway Width × Depth	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash (mm)	Weight (kg)	Catalog Number
	Bending strength	Surface durability	Bending strength	Surface durability			
4 x 1.8 5 x 2.3	73.1	35.7	7.46	3.64	0.10~0.20	0.12 0.10	KMSGA2-15 KMSGB2-15**
4 x 1.8 5 x 2.3	97.2	53.5	9.91	5.46		0.19 0.17	KMSGA2-18 KMSGB2-18
5 x 2.3 6 x 2.8	114	67.6	11.6	6.89		0.22 0.20	KMSGA2-20 KMSGB2-20
5 x 2.3 6 x 2.8	148	101	15.1	10.3		0.32 0.30	KMSGA2-24 KMSGB2-24
5 x 2.3 6 x 2.8	157	110	16.0	11.2		0.33 0.31	KMSGA2-25 KMSGB2-25
6 x 2.8 6 x 2.8	201	161	20.5	16.5		0.48 0.45	KMSGA2-30 KMSGB2-30
6 x 2.8 6 x 2.8	246	223	25.1	22.7	0.12~0.22	0.64 0.61	KMSGA2-35 KMSGB2-35
6 x 2.8 6 x 2.8	255	236	26.0	24.1		0.67 0.64	KMSGA2-36 KMSGB2-36
6 x 2.8 8 x 3.3	292	294	29.7	30.0		0.84 0.79	KMSGA2-40 KMSGB2-40
6 x 2.8 8 x 3.3	338	377	34.5	38.4		1.05 1.00	KMSGA2-45 KMSGB2-45
6 x 2.8 8 x 3.3	349	411	35.6	41.9		1.20 1.14	KMSGA2-48 KMSGB2-48
6 x 2.8 8 x 3.3	367	448	37.4	45.7		1.29 1.24	KMSGA2-50 KMSGB2-50
8 x 3.3 8 x 3.3	412	548	42.0	55.8		1.56 1.51	KMSGA2-55 KMSGB2-55
8 x 3.3 8 x 3.3	457	658	46.6	67.1		1.84 1.79	KMSGA2-60 KMSGB2-60
8 x 3.3 8 x 3.3	547	909	55.8	92.7		2.48 2.43	KMSGA2-70 KMSGB2-70
8 x 3.3 10 x 3.3	610	1150	62.2	117		2.55 2.49	KMSGA2-80 KMSGB2-80
10 x 3.3 12 x 3.3	785	1820	80.1	186	4.16 4.09	KMSGA2-100 KMSGB2-100	

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

Selection Hints



1. Caution in Selecting the Mating Gears



2. Caution in Selecting Gears Based on Gear Strength

5IF HFBSTFOHJWBHTTIPD JOU Q PEDQHT KSF  
 DPNBECBTTMJOHB DFSBJGQJDBUPQFOWJSPONFOU  
 5IFSGPSFUZ TIPME CF VTFEBSFGFSFOZOMVF SFDPN  
 N FOELBU FBDIVFS DPNBT UFJS PØ WBMFCZ  
 BQZOHUF BDBMVBFH DPOEJUPOMTP ,464' MPDIQ  
 TQ HFBST,% MPDIQTQ HFBST BOEWBSJPVTFJSJFT  
 LBU VF UF QJDUPQPMJOH NFUPEB GBTEWFHFB  
 TI EGOFEEJUPOBMDPOTJEFSBUPOGPSTBSUOHBSR7  
 5I F BCMFCMFPXPOBJOTF BTMOPOT FTBCMIFE GPS  
 WBSJVPSPEDUWOPSEFSBDPNEHFBSTFOHT

Calculation of Bending Strength of Gears

Item	Catalog Number	.MSGA .MSGB	.SSGS	.SSG .SSAG	.SSS,SS .SSA,SSY .SSA V,SSR	.SUS .SUSA .SUSF	.BSS	.KSG	.KS	.NSU	.PU .PS .PSA	.DSF .DS
Formula /05&	PSNVMBPGTQVBOEIFMJBDMHFBSTPOCFEJOHTSFOHL"									5IF-FXTGPSNVMB		
No. of teeth of mating gears	4BNFOVNCFSPPGFLPS,44(4,444,			443			3BDLT			•		
Rotational speed	SQN			SQN			SQN			•		
Design life (durability)	0WFS			DØMFT			•			•		
Impact from motor	6OJGPSNMPBE			MMPBCMFCFOEJOHTSFTTLHGNN			•			•		
Impact from load	6OJGPSNMPBE			N N N			•			•		
Direction of load	JEJSFDUPOBM			XUP XUP XU			•			•		
Allowable bending stress at root $\sigma_{lim}$ (LHGNN) /05&	/PB			/PB			•			•		
Safety factor $S_F$	/PB			/PB			•			•		

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

Formula /05&	PSNVMBPGTQVBOEIFMJBDMHFBSTPOTVSGBDFEVBCJMJZ"											
Kinematic viscosity of lubricant	D4U											
Gear support	4NFBJDVTQQPSQZQFBSJOHTPB						4VQQPSBEPOFFOE					
Allowable Hertz stress $1_{Hlim}$ (LHGNN)	/PB			/PB			•			•		
Safety factor $S_H$	•											

[NOTE 1] 5IFHFBSTFOHJWBHTTIPD JOU Q PEDQHT KSF BOE%BDPO(FBSBZCPMBTUDP5IFQJUGPSUFSPUBMTSFEQBQOEJFTTHTGNN BSFBEKVBEJUFUOFFEFEJOUFGPSNMB  
 [NOTE 2] 5IFBMMPCMFCEJOHTSFTTBUFSPPUim.TDMEK.BDFBMDPESBVFQZBS  
 FIFBSZENNEDID  
 [NOTE 3] PS,44(SPOE4QFBSTXUNPEMFSMFTTFSNBMSFPJOHJTBQJFEMMPBCMFCFOEJOHTSFTTBOEBMMPBCMFIJSFTTWMFTBSFTIPBJO  
 BSFOJFTT [NOTE 4] PS ,4444Q1JOJPO4IBGUXUNPEMFPWFSPJJOEDUPOIBSEFOJHJTOPBQJFEMMPBCMFCFOEJOHTSFTTBOEBMMPBCMFIJS  
 TSFTTWBMFTBSPBJOBSFOJFTT  
 [NOTE 5] ,4444Q1JOJPO4IBGUXUNPEMFSMFTT ,4DPOHBSBUBOBSFTTBDBOUMFWFSTQSBTUFBSFTJOHMTIBGHT

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

1SPEVDUOPMJTBEJOUJTDDBMPPHSNBBSJBMTNPEVMFTOVNCFSPGFLBOEJFJLFOPMJTBEJOUFEJNFOTJPOBMB  
 BCMFTDBOCFNBOVGDBUSFEBTDVTBNJENT1MFBTFTFF1BHFGPSNPSFEFBJMTBCPVDVTBNNBEFPSEFST  
 5IFDPMPSBOETIBQFPGUQSPEVDUNBHFTMJTBEPOJFEJNFOTJPOBCMFCQBHFPGFBDIQSPEVDNBZJFSGSPNIFBDMQSPVEVU  
 FTVSFBDPOpSNUFITBQFJOUFEJNFOTJPOBCMFCGFSFTFMFDUPO  
 5IF EF BJMT TQFDJGJDBBQJFOTJPOQTQSJTBQ MJTBEJO UF DBBMPHNBZF DI BOHFE XUPVQSJPS OPUDF  
 IBOHFTBSFOOPVODFEPOJF,).XCTJB

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

**Step 1** Determine the actual load torque applied to the gear and the gear type suitable for the purpose.

Definition of Bending Strength of Gears  
 5IFBMMPCMFCEJOHTSFOHJWBHTTIPD JOU Q PEDQHT KSF BOE%BDPO(FBSBZCPMBTUDP5IFQJUGPSUFSPUBMTSFEQBQOEJFTTHTGNN BSFBEKVBEJUFUOFFEFEJOUFGPSNMB  
 PG B HFBST % EFGJOFE BT UF BM  
 BCMFCBOHFOUBMGPSDFBUF  
 QDIDJSDMFCBTFEPOJFNU V  
 BMMBMMPCMFSPUSFTTPG  
 NFTIJOHHFBSTOEF SMPBE

Definition of Surface Durability  
 5IFTSGBDFESBCJMJZGBHFB  
 JTEFpOFEBTUFBMMPCMFBO  
 HFOUBMGPSDFBQDJDSDMF  
 XIJDI QSNJU UF GPSF P  
 CF BBTNJQETBGFMXUPV  
 JODSSJOHTSGBDF QEFJMS  
 BMMPCMFISPELMPBEPGB  
 HFBSJTEFpOFEBTUFBMMPCMF  
 BOHFOUB GPSDF BUF QDI  
 DJSDMFCBTFEPOJFNUHFB  
 BPI SFOHLPQNFTIJ OH  
 HFBSTOEF SMPBE

**Step 2** Select provisionally from the allowable torque table of the Master Catalog based on the load torque.

For provisional selection from the Master Catalog

**Step 3** We recommend that each user computes their own values by applying the actual usage conditions to determine the suitability of the gear strength.

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

Strength confirmation is simple when using the website.

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

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

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

$$\sigma_r \leq \sigma_{rlim} \quad (10.5)$$

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

$$F_{lim} = \sigma_{rlim} \frac{m \cdot b}{Y_F Y_G} \left( \frac{K_I K_{FX}}{K_V K_O} \right) \frac{1}{S_F} \quad (10.6)$$

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

$$\sigma_r = F \frac{Y_F Y_G}{b} \left( \frac{K_V K_O}{K_I K_{FX}} \right) S_F \quad (10.7)$$
