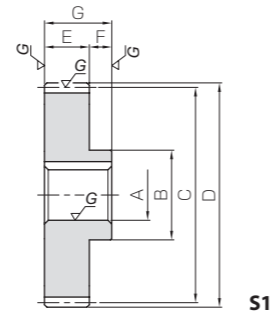


Specifications	
Precision grade	JIS grade N5 (JIS B1702-1:1998)
Gear teeth	Standard full depth
Pressure angle	20°
Material	SCM415
Heat Treatment	Carburized
Tooth hardness	55 to 60HRC



Catalog Number	Module	No. of teeth	Shape	Bore				Face width	Hub width	Total Length	Web thickness	Web O.D.
				A _{H7}	B	C	D					
KMSGA1-18	m1	18	S1	8	15	18	20	10	5	15	—	—
KMSGA1-20		20		8	17	20	22					
KMSGB1-20**				10	20	24	26					
KMSGA1-24		24		10	20	24	26					
KMSGB1-24				12	20	24	26					
KMSGA1-25		25		10	20	25	27					
KMSGB1-25				12	20	25	27					
KMSGA1-30		30		10	25	30	32					
KMSGB1-30				12	25	30	32					
KMSGA1-35		35		10	25	35	37					
KMSGB1-35				15	25	35	37					
KMSGA1-36		36		12	25	36	38					
KMSGB1-36				15	25	36	38					
KMSGA1-40		40		12	30	40	42					
KMSGB1-40				15	30	40	42					
KMSGA1-45		45		12	30	45	47					
KMSGB1-45		15	30	45	47							
KMSGA1-48	48	12	30	48	50							
KMSGB1-48		15	30	48	50							
KMSGA1-50	50	12	35	50	52							
KMSGB1-50		15	35	50	52							
KMSGA1-55	55	15	40	55	57							
KMSGB1-55		20	40	55	57							
KMSGA1-60	60	15	40	60	62							
KMSGB1-60		20	40	60	62							
KMSGA1-70	70	20	45	70	72							
KMSGB1-70		25	45	70	72							
KMSGA1-80	80	20	45	80	82							
KMSGB1-80		25	45	80	82							
KMSGA1-100	100	20	45	100	102							
KMSGB1-100		25	45	100	102							

[Caution on Product Characteristics] 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.
 The allowable torques shown in the table are calculated values according to the assumed usage conditions. Please see Page 24 for more details.
 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.
 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.

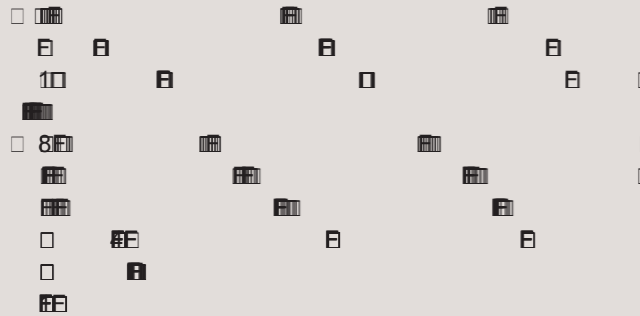
Keyway Width × Depth	Allowable torque (N·m)		Allowable torque (kgf·m)		Backlash (mm)	Weight (kg)	Catalog Number
	Bending strength	Surface durability	Bending strength	Surface durability			
3 x 1.4	12.1	6.37	1.24	0.65	0.08~0.16	0.020	KMSGA1-18
3 x 1.4	14.2	8.04	1.45	0.82		0.027	KMSGA1-20
4 x 1.8						0.023	KMSGB1-20**
4 x 1.8	18.5	12.0	1.88	1.22		0.038	KMSGA1-24
4 x 1.8						0.034	KMSGB1-24
4 x 1.8	19.6	13.1	2.00	1.33		0.041	KMSGA1-25
4 x 1.8						0.037	KMSGB1-25
4 x 1.8	25.1	19.0	2.56	1.94		0.065	KMSGA1-30
4 x 1.8						0.061	KMSGB1-30
4 x 1.8	30.7	26.2	3.13	2.67		0.085	KMSGA1-35
5 x 2.3						0.073	KMSGB1-35
4 x 1.8	31.9	27.8	3.25	2.84		0.085	KMSGA1-36
5 x 2.3						0.077	KMSGB1-36
4 x 1.8	36.5	34.6	3.72	3.53		0.11	KMSGA1-40
5 x 2.3						0.10	KMSGB1-40
4 x 1.8	42.3	44.3	4.31	4.51		0.14	KMSGA1-45
5 x 2.3					0.13	KMSGB1-45	
4 x 1.8	45.8	50.6	4.67	5.16	0.16	KMSGA1-48	
5 x 2.3					0.15	KMSGB1-48	
4 x 1.8	48.1	55.1	4.91	5.62	0.18	KMSGA1-50	
5 x 2.3					0.17	KMSGB1-50	
5 x 2.3	54.0	67.3	5.51	6.86	0.26	KMSGA1-55	
6 x 2.8					0.23	KMSGB1-55	
5 x 2.3	59.9	80.6	6.11	8.22	0.29	KMSGA1-60	
6 x 2.8					0.27	KMSGB1-60	
6 x 2.8	71.9	111	7.33	11.4	0.37	KMSGA1-70	
8 x 3.3					0.35	KMSGB1-70	
6 x 2.8	83.9	147	8.55	15.0	0.47	KMSGA1-80	
8 x 3.3					0.44	KMSGB1-80	
6 x 2.8	103	224	10.5	22.8	0.69	KMSGA1-100	
8 x 3.3					0.66	KMSGB1-100	

[Caution on Secondary Operations] 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 HFBSTFOHJWBFTTIPD JOU Q PEDQHT KSF
 DPNBECBTTMJOHB DFSBJGQJDBUPQFOWJSPONFOU
 5IFSGPSFUFZ TIPME CF VTFEBTSFGFSFORZMVF SFDPN
 N FOELBU FBDIVFS DPNBT UFJS PØ WBMFCZ
 BQZOHUF BDBMVBHF DPOEJUPOMTP ,464' MPDIQ
 TQ HFBST,% MPDIQTQHFBS BOEWBSJPVTFJSJT
 LBU VF UF QSDUPQPMJOH NFUPEB GBTEWFHFB
 TI EGQFFBEEJUPOBMDPOTJEFSBUPOGPSTBSUOHBSR7
 5I FBCMCFMPPXPOBJOTF BTMOPOT FTBCMIFE GPS
 WBSJVPSPEDUWOPSEFSBDPNHFBSTFOHT

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&		PSNVMBPGTQVBOEIFMJDDBMHFBSTPOCFEJOHTSFOHL"							5IF-FXTGPSNVMB				
No. of teeth of mating gears		4BNFOVNCFSPGBFU			PS,44(4,444,		443	3BDLT		•			
Rotational speed		SQN				SQN				SQN			
Design life (durability)		0WFS DØMFT							•				
Impact from motor		6OJGPSNMPBE							MMPBEMFCFOEJOHTSFTTLHGNN				
Impact from load		6OJGPSNMPBE							N N N XU				
Direction of load		JEJSFDUPOBM							XUP XUP -VCSJDBUPO-VCSJDBUPO (SFBTF -VCSJDBUPO				
Allowable bending stress at root σ_{lim} (LHGNN) /05&				/PB	/PB								
Safety factor S_F													

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

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

[NOTE 1] 5IFHFBSTFOHJWBFTTIPD JOU Q PEDQHT KSF BOEWBSJPVTFJSJT LBU VF UF QSDUPQPMJOH NFUPEB GBTEWFHFB
 BOEWBSJPVTFJSJT LBU VF UF QSDUPQPMJOH NFUPEB GBTEWFHFB
 [NOTE 2] 5IFBMMPEMFCFOEJOHTSFTTLHGNN BSBFBEKVBEJUFUOFFEFEJOUFGPSNMB
 BSBFBEKVBEJUFUOFFEFEJOUFGPSNMB
 [NOTE 3] PS,44(SPOE4QFBSTXUNPEMFSMFTTIFSNBMSFpOJHJTBQJFEMMPBEMFCFOEJOHTSFTTBOEBMMPBEMFCFISJTSFTTWBMTBSFTIPBJO
 BSOJFTFT [NOTE 4] PS ,4444Q1JOJPO4IBGUXUNPEMFPWFSPJJOEDUPOIBSEFOJHJTOPBQJFEMMPBEMFCFOEJOHTSFTTBOEBMMPBEMFCFISJ
 TSBFTTWBMTBSFTIPBJOJBSFOJFTT
 [NOTE 5] ,4444Q1JOJPO4IBGUXUNPEMFSMFTT ,4DPOHBSBUBOBSFTFBDBOUMFWFSTQSBTUFBSFTJOHMTIBGHT

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

1SPEVDUOPMJTBEJOUJTDDBMHPSPNBBSJBMTNPEVMFTOVNCFSPGEBFUBOEJFMJLFOPMJTBEJOUFEJNFOTJPOBMB
 BCMFTDBOCFNBOVGBDUSFEBTDVTBNJENT1MFBTFTFF1BHFGPSNPSFEFBJMTBCPVDVTBNNEBFPSEFST
 5IFDPMPSBOETIBQFPGUQSPEVDUNBHFTMJTBEPOJFEJNFOTJPOBMBQBFHFGFBDIQSPEVDNBZJFSGSPNIFBDUWBMQSPEVDU
 FTVSFBDOpSNUTIBQFJOUFEJNFOTJPOBMBMFCFGPSFTFMFDUPO
 5IF EF BJMT TQFDJGJDBBQJFOTJPO TQSJTB MJTBEJO UF DBBMPHNBZFDI BOHFE XUPVQJSJPS 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

5IFBMMPEMFCFOEJOHTSFOHL
 PGBHFBSEFGJOFE BT UF BM
 MFCMFOHFOUBMGPSDFBUB
 QDIDJSDMFCBTFEPOJFNU V
 BMMBMMPEMFCFSPUSFTTPG
 NFTIJOHHFBSTOEFMSPBE

Definition of Surface Durability

5IFTSGBDFESBCJMBHFB
 JTEFpOFEBTUFBMMPEMFCFBO
 HFOUBMGPSDFBQDJDSDMF
 XIJDIQSNJUF GP SF P
 CFB BOTNJEBTGFMXUPV
 JODSSJOHTSGBDFCFEJMS
 BMMPEMFCFSPUSFTTPG
 HFBSTOEFMSPBE

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_t on the meshing pitch circle must be less than or equal to the allowable circumferential force F_{tlim} on the meshing pitch circle calculated by the permissible bending stress at root.

$$F_t \leq F_{tlim} \quad (10.4)$$

Alternatively, the bending stress at root σ_F obtained from the nominal circumferential force F_t on the meshing pitch circle must be less than or equal to the permissible bending stress at root σ_{Flim} .

$$\sigma_F \leq \sigma_{Flim} \quad (10.5)$$

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

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

The bending stress at root (kgf/mm²) is obtained by the following equation.

$$\sigma_F = F_t \frac{Y_F Y_G}{m \cdot b} \left(\frac{K_I K_{FX}}{K_V K_O} \right) S_F \quad (10.7)$$
