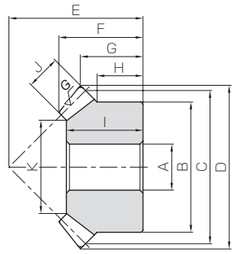
Ground Zerol Miter Gears

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
Surface treatment	Black oxide coated except for ground part



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
KSMZG2-20R KSMZG2-20L	1	***m*2**	20	5°	R L	B3	12	34	40	43.32	37	24.69	18.66
KSMZG2.5-20R KSMZG2.5-20L		***m*2.5**	20	5°	R L	B3	14	42	50	54.16	48	32.34	25.08
KSMZG3-20R KSMZG3-20L		***m*3**	20	5°	R L	B3	16	50	60	64.89	58	39.52	30.45

Hub width H	Length of bore I	Face width J	Holding surface dia. K	Allowable torque (N·m) Bending strength	Allowable torque (N·m) Surface durability	Allowable torque (kgf·m) Bending strength	Allowable torque (kgf·m) Surface durability	Backlash (mm)	Weight (kg)	Catalog No.
14	22	10	21.72	7.76	4.10	0.79	0.42	0.05~0.11	0.15	**KSMZG2-20R KSMZG2-20L**
19	29	12	28.06	14.8	7.92	1.51	0.81	0.06~0.12	0.30	**KSMZG2.5-20R KSMZG2.5-20L**
23	35	15	31.57	26.2	14.3	2.67	1.45	0.07~0.13	0.53	**KSMZG3-20R KSMZG3-20L**

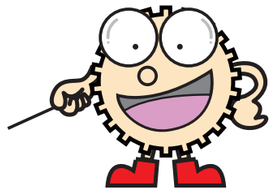
[Caution on Product Characteristics]
① A set of miter gears must be identical in module and number of teeth, but opposite in spiral hands.
② Allowable torques shown in the table are the calculated values according to the assumed usage conditions. Please see page 272 for more details.
③ Dimensions of 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 These gears produce an axial thrust force, which is the same as straight bevel gears. For details, see our technical reference book (Page 108).

[Caution on Secondary Operations]
① Please read "Caution on Performing Secondary Operations" (Page 274) 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. 2to 3 mm).

■ Features of Zerol Miter Gears

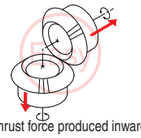
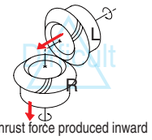
Zerol Miter Gears are spiral miter gears with a helix angle of less than 10 degrees. Balanced, and superior performance as they combine the features of straight and spiral bevel gears.

- Allows compact design as no inward thrust force (＊ Reference to the figure) is produced, which causes problems when using spiral miter gears.
- Unlike straight miter gears, Zerol Miter Gears can be ground finished, allowing higher precision, wear-resistance and are quieter, when compared with straight miter gears.
- Drop-in replacement for KSM Miter Gears is easy, as these gears have similar dimensions including the mounting distance. When replacing, please use a set of Zerol miter gears with opposite spiral hands, one right-hand and the other left-hand.



■ Zerol Miter Gear Set Example

■ Performance Comparison

Gear Type	Bearing Design ＊	Interchangeability Mounting Distance	Precision JIS B 1704	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	Many	Normal	Normal	Bad	Normal	Low
Ground Zerol Miter Gears  **KSMZG2-20R/L**	 No thrust force produced inward	Many	Good	Normal	Good	Low	Normal
Ground Spiral Miter Gears  **KMMSG2-20R/L**	 Thrust force produced inward	None	Good	Strong	Good	Low	Normal

Gear Type	Interchangeability Mounting Distance	Precision JIS B 1704	Strength Bending Strength	Durability Surface Durability	Noise/Vibration Surface Roughness/Total Contact Ratio
Miter Gears	SUM、PM、SMZG	grade 3	7.13N・m	0.72N・m	3.2a/1.62
Ground Zerol Miter Gears	SM、SUM、PM	grade 2	7.76N・m	4.40N・m	0.4a/1.74
Ground Spiral Miter Gears	—	grade 2	15.6N・m	21.7N・m	0.4a/2.49

NOTE: The above evaluations were based on a comparison of 3 products.