



Helical Gear

Module 3.0 Shaft Bore Configurable Type, Helix Angle 19°31'42"

Features: Compared to spur gears, these gears have excellent transmission accuracy and quietness.

Type			Material	Surface Treatment	Accessories
Straight Bore	Straight Bore + Tap	Keyway, Keyway + Tap			
HGEARHB	HGEARB	HGEARKB	1045 Carbon Steel	Black Oxide Electroless nickel plating	Set Screw (4137 Alloy Steel, Black Oxide)
HGEARHBB	HGEARBB	HGEARKBB			
HGEARHBG	HGEARBG	HGEARKBG			

ⓘ Set Screw is not included when an untapped specification is selected.

Gear Shape

Shape A

Shape B

Gear Specifications	
Datum Section of Gears	Teeth perpendicular
Module	3.0
Pressure Angle	20°
Helix Angle	19°31'42"
Gear Accuracy	Old JIS B 1702 Class 4 (Equivalent to the new JIS B 1702-1 Class B)

Shaft Bore Specifications (Selectable Gear Shapes)	
Straight Bore (Shape A, Shape B)	Straight Bore + Tap (Shape B)
Keyway (Shape A) Keyway + Tap (Shape B)	

ⓘ Refer to the dimensions table for keyway dimension details.
ⓘ Relative positioning of keyway and teeth is not fixed.

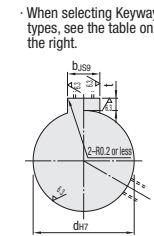
Specification Table

Part Number	Number of Teeth	B Face Width	Gear Shape	Shaft Bore Dia. P _{H7}		Twisting Direction	d Reference Dia.	D Tip Dia.	G Root Dia.	H	L	ℓ ₁	ℓ ₂	M (Coarse)	*1 Allowable Torque (N·m)	
				Straight Bore	Keyway + Tap										Bending Strength	Tooth Surface Strength
Straight Bore (Shape A, Shape B) HGEARHB HGEARHBB HGEARHBG Straight Bore + Tap (Shape B) HGEARB HGEARBB HGEARBG Keyway (Shape A) Keyway + Tap (Shape B) HGEARKB HGEARKBB HGEARKBG	15	30	A B	8 to 24	8 to 19	LH (Left) RH (Right)	47.75	53.75	40.25	36	48	18	9	M4	121.33	9.10
	16			8 to 28	8 to 23		50.93	56.93	43.43	39						
	17			8 to 32	8 to 27		54.11	60.11	46.61	42						
	18			8 to 36	8 to 31		57.30	63.30	49.80	45						
	19			8 to 40	8 to 35		60.48	66.48	52.98	48						
	20			8 to 44	8 to 39		63.66	69.66	56.16	51						
	21			8 to 48	8 to 43		66.85	72.85	59.35	54						
	22			8 to 52	8 to 47		70.03	76.03	62.53	57						
	23			8 to 56	8 to 51		73.21	79.21	65.71	60						
	24			8 to 60	8 to 55		76.39	82.39	68.89	63						
	25			8 to 64	8 to 59		79.58	85.58	72.08	66						
	26			10 to 68	10 to 63		82.76	88.76	75.26	69						
	27			10 to 72	10 to 67		85.94	91.94	78.44	72						
	28			10 to 76	10 to 71		89.13	95.13	81.63	75						
	29			10 to 80	10 to 75		92.31	98.31	84.81	78						
	30			10 to 84	10 to 79		95.49	101.49	87.99	81						
	31			10 to 88	10 to 83		98.67	104.67	91.17	84						
	32			10 to 92	10 to 87		101.85	107.85	94.35	87						
	33			10 to 96	10 to 91		105.03	111.03	97.53	90						
	34			10 to 100	10 to 95		108.21	114.21	100.71	93						
	35			12 to 104	12 to 99		111.39	117.39	103.89	96						
	36			12 to 108	12 to 103		114.57	120.57	107.07	99						
	37			12 to 112	12 to 107		117.75	123.75	110.25	102						
	38			12 to 116	12 to 111		120.93	126.93	113.43	105						
	39			12 to 120	12 to 115		124.11	130.11	116.61	108						
	40			12 to 124	12 to 119		127.29	133.29	119.81	111						
	41			12 to 128	12 to 123		130.47	136.47	123.01	114						
	42			12 to 132	12 to 127		133.65	139.65	126.21	117						
	43			12 to 136	12 to 131		136.83	142.83	129.41	120						
	44			12 to 140	12 to 135		140.01	146.01	132.61	123						
	45			12 to 144	12 to 139		143.19	149.19	135.81	126						
	46			12 to 148	12 to 143		146.37	152.37	139.01	129						
	47			12 to 152	12 to 147		149.55	155.55	142.21	132						
	48			12 to 156	12 to 151		152.73	158.73	145.41	135						
	49			12 to 160	12 to 155		155.91	161.91	148.61	138						
	50			12 to 164	12 to 159		159.09	165.09	151.81	141						
	51			12 to 168	12 to 163		162.27	168.27	155.01	144						
	52			12 to 172	12 to 167		165.45	171.45	158.21	147						
	53			12 to 176	12 to 171		168.63	174.63	161.41	150						
	54			12 to 180	12 to 175		171.81	177.81	164.61	153						
	55			12 to 184	12 to 179		174.99	180.99	167.81	156						
	56			12 to 188	12 to 183		178.17	184.17	171.01	159						
	57			12 to 192	12 to 187		181.35	187.35	174.21	162						
	58			12 to 196	12 to 191		184.53	190.53	177.41	165						
	59			12 to 200	12 to 195		187.71	193.71	180.61	168						
	60			12 to 204	12 to 199		190.89	196.89	183.81	171						
	61			12 to 208	12 to 203		194.07	200.07	187.01	174						
	62			12 to 212	12 to 207		197.25	203.25	190.21	177						
	63			12 to 216	12 to 211		200.43	206.43	193.41	180						
	64			12 to 220	12 to 215		203.61	209.61	196.61	183						
	65			12 to 224	12 to 219		206.79	212.79	199.81	186						
	66			12 to 228	12 to 223		210.00	216.00	203.00	189						
	67			12 to 232	12 to 227		213.20	219.20	206.20	192						
	68			12 to 236	12 to 231		216.40	222.40	209.40	195						
	69			12 to 240	12 to 235		219.60	225.60	212.60	198						
	70			12 to 244	12 to 239		222.80	228.80	215.80	201						

ⓘ Shaft Bore Dia. 9 is not available for Keyway + Tap.
 ⓘ The tooth trace is twisted, generating thrust. Design the bearing to be able to withstand axial thrust.
 ⓘ Helical gears engage with the same helix angle with right and left twisting. Please bear this in mind when selecting as part of a set.
 *1 Allowable Transmission Forces in the table are reference values calculated with prescribed conditions. For conditions, see P.1586.

Part Number Example

Part Number	-	Number of Teeth	-	B	-	Gear Shape	-	P	-	Twisting Direction
HGEARHB3.0	-	25	-	30	-	A	-	10	-	LH
HGEARBG3.0	-	38	-	30	-	B	-	20	-	RH
HGEARKB3.0	-	18	-	30	-	A	-	12	-	LH



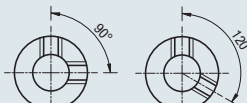
New JIS (B1301) Keyway Dimensions

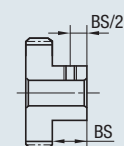
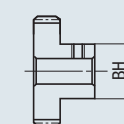
Nominal	d _{H7}	b _{JS9}	t Tolerance	Nominal	d _{H7}	b _{JS9}	t Tolerance
8	8	+0.015	3	23	23		
10	10	0		24	24		
11	11			25	25		
12	12	4	+0.0125	26	26		
13	13			27	27		
14	14	+0.018	5	28	28	+0.021	8
15	15	0		29	29	0	
16	16			30	30		
17	17		+0.0150	31	31		
18	18			32	32		
19	19			33	33		
20	20	+0.021	6	34	34	+0.025	10
21	21	0		35	35	0	
22	22			36	36		
				37	37		
				38	38		

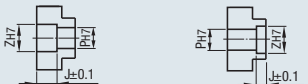
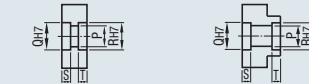
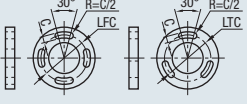
Helical Gear

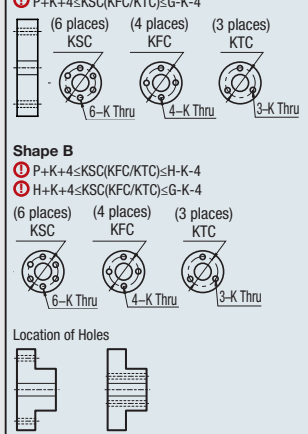
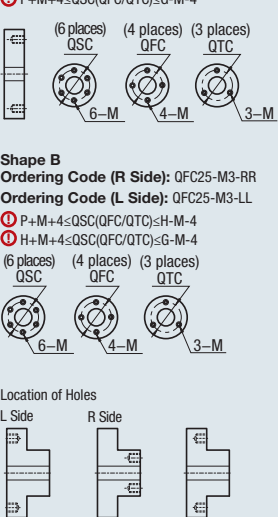
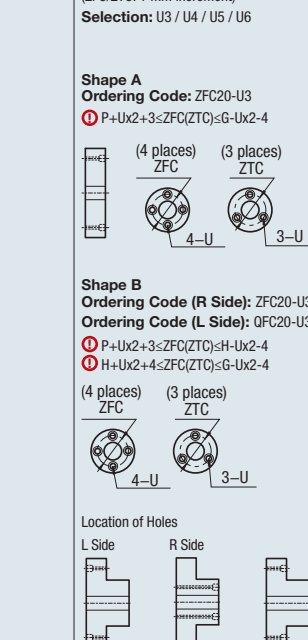
Module 3.0 Shaft Bore Configurable Type, Helix Angle 19°31'42", continued

Part Number Alterations	Part Number	Number of Teeth	B	Gear Shape	P	Twisting Direction	(KC90, KC120, BS, BH, etc.)
	HGEARHB3.0	25	30	A	10	LH	QFC20 - M3
	HGEARBG3.0	38	30	B	20	RH	BS10 - BH50

Alterations	Set Screw	Tapped Hole Dimension								
Code	KC90 / KC120	TPC								
Spec.	<p>KC90: Adds another set screw at 90° position. KC120: Adds another set screw at 120° position. Ordering Code: KC90 ⓧ Not applicable to Shape A. ⓧ Not applicable to Straight Bore Type.</p> 	<p>Changes the tapped hole dimension. Ordering Code: TPC4 ⓧ Not applicable to Shape A. ⓧ Not applicable to Straight Bore Type ⓧ ⓧ1-ⓧ2>TPC/2 ⓧ When TCP0, no tapped hole.</p> <table border="1"> <thead> <tr> <th>M</th> <th>TPC</th> </tr> </thead> <tbody> <tr> <td>M4</td> <td>M0 M3 M5</td> </tr> <tr> <td>M5</td> <td>M0 M4 M6</td> </tr> <tr> <td>M6</td> <td>M0 M5 M8</td> </tr> </tbody> </table>	M	TPC	M4	M0 M3 M5	M5	M0 M4 M6	M6	M0 M5 M8
M	TPC									
M4	M0 M3 M5									
M5	M0 M4 M6									
M6	M0 M5 M8									

Alterations	Hub Shortening	Hub O.D. Cut
Code	BS	BH
Spec.	<p>Cuts the hub length in 0.5 mm increments Ordering Code: BS6.5 ⓧ Not available for A Shape. ⓧ Straight Bore Type: 0<BS<ⓧ1 ⓧ Straight Bore + Tap Type: BS=0; M+3<BS<ⓧ1 ⓧ Keyway + Tap Type: BS=0; M+3<BS<ⓧ1 ⓧ When BS=0, there are no tapped holes</p> 	<p>Cut hub O.D. for specified dimension. (1 mm Increment) Ordering Code: BH10 ⓧ Not available for A Shape. ⓧ Straight Bore Type: P+4<BH<H ⓧ Straight Bore + Tap Type: P+6<BH<H ⓧ Keyway + Tap Type: P+14<BH<H</p> 

Alterations	Stepped Hole	Both Ends Stepped Bore	Side Slotted Hole										
Code	DHL / DHR	WDH	LFC / LTC										
Spec.	<p>Changes shaft bores to stepped bores. (Z: 1 mm Increment / J: 0.1 mm Increment) Ordering Code: DHL-Z20-J4.0 ⓧ Applicable to Straight Bore Type only.</p> <p>DHL ⓧ Shape A: P+2<Z<G-4, 2<J<B-3 ⓧ Shape B: P+2<Z<G-4, 2<J<L-3</p> <p>DHR ⓧ Shape A: P+2<Z<G-4, 2<J<B-3 ⓧ Shape B: P+2<Z<H-4, 2<J<ⓧ1</p> 	<p>Changes shaft bores to both ends stepped hole. (Q / R / S / T: 1 mm Increment) ⓧ S, T≥3 Ordering Code: WDH-Q10-R10-S5-T5 ⓧ Applicable to Straight Bore Type Only General tolerance on P.</p> <p>Shape A ⓧ P+2<Q, R<G-4 ⓧ S+T<B-3</p> <p>Shape B ⓧ P+2<Q, R<H-4 ⓧ S+T<L-3</p> 	<p>Machines slotted holes on the side surface (30°) (LFC / LTC: 1 mm Increment) M Selection: M3 / M4 / M5 / M6 Ordering Code: LFC20-M3 ⓧ Applicable to Shape A Only. ⓧ P+C+4<LFC(LTC)<G-C-4</p> <table border="1"> <thead> <tr> <th>M</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>M3</td> <td>3.5</td> </tr> <tr> <td>M4</td> <td>4.5</td> </tr> <tr> <td>M5</td> <td>5.5</td> </tr> <tr> <td>M6</td> <td>6.5</td> </tr> </tbody> </table> 	M	C	M3	3.5	M4	4.5	M5	5.5	M6	6.5
M	C												
M3	3.5												
M4	4.5												
M5	5.5												
M6	6.5												

Alterations	Side Through Hole	Side Tapped Hole	Size Counter Bored Hole																				
Code	KSC / KFC / KTC	QSC / QFC / QTC	ZFC / ZTC																				
Spec.	<p>Machines through holes on the side surface. (KFC/KTC: 1 mm Increment / K: 0.5 mm Increment) K Selection: K3.0-K6.0 Ordering Code: KFC20-K3.5</p> <p>Shape A ⓧ P+K+4<KSC(KFC/KTC)<G-K-4 (6 places) KSC (4 places) KFC (3 places) KTC 6-K Thru 4-K Thru 3-K Thru</p> <p>Shape B ⓧ P+K+4<KSC(KFC/KTC)<H-K-4 ⓧ H+K+4<KSC(KFC/KTC)<G-K-4 (6 places) KSC (4 places) KFC (3 places) KTC 6-K Thru 4-K Thru 3-K Thru</p> <p>Location of Holes</p> 	<p>Machines tapped holes on the side surface of the gear. (QFC/QTC: 1 mm Increment) M Selection: M3 / M4 / M5 / M6 ⓧ Depth of Tapped Hole: Mx2 (if B<Mx2, then thru)</p> <p>Shape A Ordering Code: QFC25-M3 ⓧ P+M+4<QSC(QFC/QTC)<G-M-4 (6 places) QSC (4 places) QFC (3 places) QTC 6-M 4-M 3-M</p> <p>Shape B Ordering Code (R Side): QFC25-M3-RR Ordering Code (L Side): QFC25-M3-LL ⓧ P+M+4<QSC(QFC/QTC)<H-M-4 ⓧ H+M+4<QSC(QFC/QTC)<G-M-4 (6 places) QSC (4 places) QFC (3 places) QTC 6-M 4-M 3-M</p> <p>Location of Holes L Side R Side</p> 	<p>Machines counterbore holes on the side surface of the hub side. (ZFC/ZTC: 1 mm Increment) Selection: U3 / U4 / U5 / U6</p> <p>Shape A Ordering Code: ZFC20-U3 ⓧ P+Ux2+3<ZFC(ZTC)<G-Ux2-4 (4 places) ZFC (3 places) ZTC 4-U 3-U</p> <table border="1"> <thead> <tr> <th>U Sel.</th> <th>U1</th> <th>U2</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>6.5</td> <td>3.5</td> <td>3.5</td> </tr> <tr> <td>4</td> <td>8</td> <td>4.5</td> <td>4.5</td> </tr> <tr> <td>5</td> <td>9.5</td> <td>5.5</td> <td>5.5</td> </tr> <tr> <td>6</td> <td>11</td> <td>6.5</td> <td>6.5</td> </tr> </tbody> </table> <p>Shape B Ordering Code (R Side): ZFC20-U3-RR Ordering Code (L Side): ZFC20-U3-LL ⓧ P+Ux2+3<ZFC(ZTC)<H-Ux2-4 ⓧ H+Ux2+4<ZFC(ZTC)<G-Ux2-4 (4 places) ZFC (3 places) ZTC 4-U 3-U</p> <p>Location of Holes L Side R Side</p> 	U Sel.	U1	U2	F	3	6.5	3.5	3.5	4	8	4.5	4.5	5	9.5	5.5	5.5	6	11	6.5	6.5
U Sel.	U1	U2	F																				
3	6.5	3.5	3.5																				
4	8	4.5	4.5																				
5	9.5	5.5	5.5																				
6	11	6.5	6.5																				