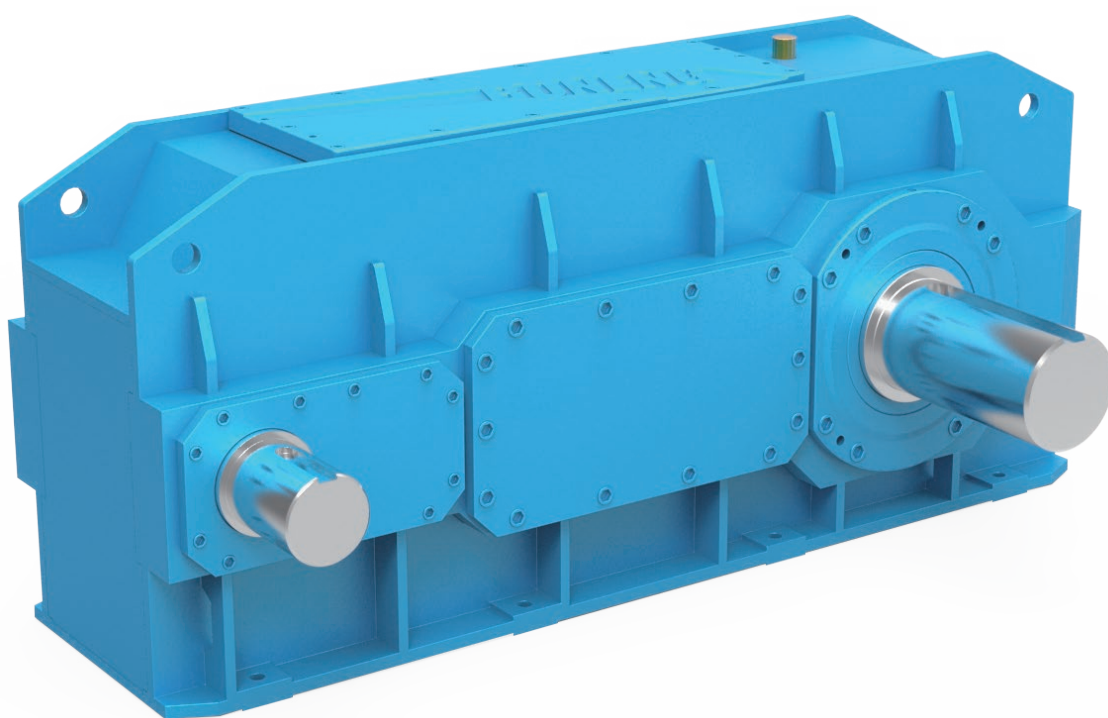


BONENG



HK Helical Gearbox with Extended Center Distance

Modified date 06/2021
Selection Sample C05.0005-EN

Boneng Transmission

Contents

▲.....	Overview	01
▲.....	Product function mark	01
▲.....	Type selection	02
▲.....	Working level and Service factors	03
▲.....	Type instruction	05
▲.....	Type designation	05
▲.....	Type selection and Example	06
▲.....	Transmission capacity	07
▲.....	Permissible additional radial forces on output shaft	11
▲.....	Shaft arrangement	12
▲.....	Outline dimensions	13
▲.....	Screw hole in shaft end	17
▲.....	Parallel keys and keyway	18
▲.....	Dimensions for recommended output connections	19
▲.....	Application drawing	23
▲.....	Lubrication oil	24

1 Overview

Boneng gear units win wide reputation with good service and stable quality both at home and abroad. The products are widely applied in main and subsidiary lifting of portal crane, tower crane, vehicle crane, tyre crane, belt crane, deck crane, float crane, cable crane, loading and unloading bridge, bridge crane and various kinds of cranes, rotary, running and trolley traveling mechanisms. We obtain obvious achievements in port, mine, melt, construction, shipping and other industries.

HK Series is a special kind of gear unit designed according to structure and transmission characteristics of lifting equipment. It has the following characteristics:

- ◆ It expands the central distance between input and output shaft under the same transmission capacity, which avoids the situation of wasting power to satisfy mounting dimension, which is especially appropriate for main and subsidiary lifting mechanisms of portal crane, bridge crane and container crane.
- ◆ Modular design, international production, delivery is more convenient.
- ◆ In HK series, you can select level 3 or level 4 transmission, the ratio range is from 14 to 250.
- ◆ Gear box of HK series (regulation 05~22) applies steel plate welding.
- ◆ Applying grease-filled, refillable Labyrinth seal combinations sealing method, which can guard against ingress of dust-like materials into the gear box effectively with high safety reliable.



Note: 1. Gear unit is on running-permission status before delivery, lubrication oil should be filled before running.
2. The dimension unit not marked in the sample is millimeter (mm).

2 Product function mark



Oil glass



Breather



Oil filler



Oil drain

3 Type selection

Serial NO.	Description	Codes	Parameters calculation	
1	Driven machine factor	f_1	Check f_1 table on page 6 according to working level	
2	Prime mover factor	f_2	Prime Mover Factor	f_2
			Electric motor,hydraulic motor,turbine	1.0
			Piston engine with 4–6 cylinders, cycle variation 1:100 to 1:200	1.25
			Piston engine with 1–3 cylinders,cycle variation 1:100	1.5
3	Factor for gear unit reliability	S_F	Check S_F table on page 6	
4	Transmission Efficiency	η	3 stage: 94%; 4 stage: 92%	
5	Input Speed	n_1	$\leq 1500\text{r/min}$ Consult us if higher speed required.	
6	Calculation of the ratio	i	$i=n_1/n_2$	
7	Calculate the input power of the gear unit on basis of the torque and power required by the driven machine.	P_1	$P_1=T_2 \cdot n_1/(9550 \cdot i \cdot \eta)$ or $P_1=P_2 / \eta$	
8	Determination of gear unit type referring to the table of Transmission Capacity.	T_{2N} 、 P_{1N}	$T_{2N} \geq T_2 \cdot f_1 \cdot f_2 \cdot S_F$ or $P_{1N} \geq P_1 \cdot f_1 \cdot f_2 \cdot S_F$ Check S_F table on page 6	
9	Check Peak Torque*	T_A	$P_{1N} \geq T_A \cdot n_1 \cdot f_3/9550$ Check f_3 table on page 6 according to working level	
10	Check permissible strength of the shaft after output mode and accessories are selected.	F_{r1}/F_{r2} F_{a1}/F_{a2}	It is crucial to check radial forces on the shafts when input and output shafts are for pulleys,sprockets or gears.	
11	Determination of Lubrication Systems and Lubricants		Optional lubrications 1) Splash 2) Forced Shaft–end pump Motor pump User–supplied oil station	
12	Determination of every item included in the type designation		For details about type designation,see Page 7	

* Peak torque: max.load torque,e.g.peak starting,braking and operating torque.(Generally,it refers to peak starting or braking torque.)

4 Working level and Service factors

Cranes type		Working level	Cranes type			Working level
Portal Crane	Fitting hook type	A3–A5	Bridge Crane	Hook type	For power plant installment and inspection	A1–A3
	Loading and unloading hook type	A6–A7			For workshop and warehouse	A3–A5
	Loading and unloading grab type	A7–A8			For arduous workshop and warehouse	A6–A7
Tower Crane	For normal construction fitting	A2–A4		Grab type	For intermittent loading and unloading	A6–A7
	Loading and unloading concrete with bucket	A4–A6			For continuous loading and unloading	A8
Truck、tyre、crawler crane	Fitting loading and unloading hook type	A1–A4		Metallurgy special type	For lifting material box	A7–A8
	Loading and unloading grab type	A4–A6			For feeding material	A8
Deck crane	Hook type	A4–A6			For casting	A6–A8
	Grab type	A6–A7			For forging	A7–A8
Floating crane	Loading and unloading hook type	A5–A6			For quenching	A8
	Loading and unloading grab type	A6–A7			For clamping and ingot drawing	A8
	Shipbuilding mounting type	A4–A6			For uncovering	A7–A8
Cable crane	Fitting hook type	A3–A5			Raking type	A8
	Loading, unloading or construction hook type	A6–A7			Electric magnet type	A7–A8
	Loading, unloading or construction grab type	A7–A8		Portal Crane	Normal using hook type	A5–A6
Loading and unloading bridge	Loading and unloading grab for stockyard	A7–A8			Loading and unloading grab type	A7–A8
	Loading and unloading grab for habor	A8			Hook for power plant	A2–A3
	Loading and unloading container for harbor	A6–A8			Ship–building mounting hook type	A4–A5
–	–	–				Loading and unloading container type

Realiability Factor		SF
Ordinary:single machine halts when gear units fail,easy to replace spare parts and minor loss occurred.		$1.0 \leq SF \leq 1.3$
Important: a product line or and entire plant halts when gear units fail,heavy loss.		$1.3 < SF \leq 1.5$
Highly reliable: severe production problem happens when gear units fail,enormous loss and life injuries.		$1.5 < SF$

Load level	Specification	Service factor	Factor for driven machine f1										Peak torque factor f3	
			Working hours											
			U0		U1		U2		U3		U4			
			≤ 200		$> 200 \sim 400$		$> 400 \sim 800$		$> 800 \sim 1600$		$> 1600 \sim 3200$			
Q1 Light	Rarely hoisting nominal load,normally hoisting light load	1) f1	0.8	A1	0.8	A1	0.8	A1	0.8	A2	0.8	A3		
		2) f3	0.8		0.8		0.8		0.8		0.8			
		3) f3	0.8		0.8		0.8		0.8		0.8			
Q2 Medium	Sometimes hoisting nominal load,normally hoisting medium load	1) f1	0.8	A1	0.8	A1	0.8	A2	0.9	A3	0.9	A4		
		2) f3	0.5		0.5		0.5		0.5		0.5			
		3) f3	0.8		0.8		0.8		0.8		0.8			
Q3 Heavy	Often hoisting nominal load,normally hoisting heavy load	1) f1	0.8	A1	0.8	A2	0.9	A3	1	A4	1	A5		
		2) f3	0.5		0.5		0.5		0.5		0.5			
		3) f3	0.8		0.8		0.8		0.8		0.8			
Q4 Super heavy	Frequently hoisting nominal load	1) f1	0.9	A2	0.9	A3	1	A4	1.1	A5	1.2	A6		
		2) f3	0.5		0.5		0.5		0.5		0.5			
		3) f3	0.8		0.8		0.8		0.8		0.8			

Load level	Specification	Service factor	Factor for driven machine f1										Peak torque factor f3	
			Working hours											
			U5		U6		U7		U8		U9			
			$> 3200 \sim 6300$		$> 6300 \sim 12500$		$> 12500 \sim 50000$		$> 25000 \sim 50000$		> 50000			
Q1 Light	Rarely hoisting nominal load,normally hoisting light load	1) f1	0.9	A4	1	A5	1	A6	1.1	A7	1.2	A8		
		2) f3	0.5		0.56		0.63		0.71		0.8			
		3) f3	0.8		0.8		1.9		1		1.12			
Q2 Medium	Sometimes hoisting nominal load,normally hoisting medium load	1) f1	1	A5	1.1	A6	1.2	A7	1.3	A8	1.4	A8		
		2) f3	0.5		0.56		0.63		0.71		0.8			
		3) f3	0.8		0.8		0.9		1		1.12			
Q3 Heavy	Often hoisting nominal load,normally hoisting heavy load	1) f1	1.1	A6	1.2	A7	1.3	A8	1.4	A8	1.6	A8		
		2) f3	0.56		0.63		0.71		0.8		0.9			
		3) f3	0.8		0.9		1		1.12		1.25			
Q4 Super heavy	Frequently hoisting nominal load	1) f1	1.3	A7	1.4	A8	1.6	A8	1.8	A8	2	A8		
		2) f3	0.56		0.63		0.71		0.8		0.9			
		3) f3	0.8		0.9		1		1.12		1.25			

Note: 1) f1=Factor for driven machine

2) f3=Peak torque factor when load direction is unchanging, such as hoisting mechanisms, lifting mechanisms,etc.

3) f3=Peak torque factor when load direction is alternating, such as rotary,running mechanisms,etc.

5 Symbol specification

Code	Description	Unit
i	actual ratio	/
i _N	Nominal ratio	
i _{ex}	Exact ratio	
T _{2N}	Rated output torque	N • m
T _A	Peak torque	
P _{1N}	Rated input power of gear unit	kW
P ₁	Input power	
P ₂	Power for driven equipment	
P _m	Motor power	
f ₁	Driven machine factor	/
f ₂	Prime mover factor	
f ₃	Peak loading coefficient	
S _F	Factor for gear unit reliability	
n ₁	Input speed	r/min
n _{2N}	Nominal output speed	
n ₂	Output speed	

6 Type designation

Series _____ HK 4 10 H S A - D10 - S + UV32
 Stages _____
 Stages 3、4
 Size _____
 Mounting Mode _____
 H=Horizontal
 Output shaft type _____
 S=Solid shaft with parallel key
 H=Hollow shaft with parallel key
 D=Hollow shaft with shrink disk
 K=Hollow shaft with involute spline
 E=Solid shaft with involute spline
 C=Type C gear output shaft
 Arrangement design _____
 A/B/C/D/E/F/G/H/I
 Nominal Ratio Code _____
 Input part _____
 S=Shaft Input
 Accessories and specific configuration _____

7 Examples

Selection example:

Prime mover:

Motor power: $P_m=30\text{ kW}$

Speed: $n_1=710\text{ rpm}$

Max starting torque: $T_A=645\text{ N.m}$

Driven machine:

Main hoisting gears of bridge crane

hoisting power: $P_2=22\text{ kW}$

Drum speed: $n_2=10\text{ rpm}$

Working level: Q3-U9-A8

Working hour: > 50000 hours

Ambient temperature: 30°C

Gear units:

Parallel shaft gear units

Shaft arrangement: G

Center distance: $\geq 900\text{ mm}$

Selection steps:

1. Calculation of ratio:

$$i=n_1/n_2=710/10=71$$

take $i_N=C71$ four stage.

2. Determination of nominal power of gear unit:

$$P_1=P_2/\eta=22/92\%=23.9\text{ kW}$$

$$P_{1N}\geq P_1 \cdot f_1 \cdot f_2 \cdot S_F$$

$$=23.9 \times 1.6 \times 1 \times 1.2=45.9\text{ kW}$$

Referring to transmission capacity:

Gear unit size is 10, corresponding rated power

$P_{1N}=60\text{ kW}$, Center distance $E=940\text{ mm} > 900\text{ mm}$ meet requirement

3. Verify peak torque:

$$P_{1N}\geq T_A \cdot n_1 \cdot f_3/9550$$

$$=645 \times 710 \times 0.9/9550=43.2\text{ kW}$$

$P_{1N}=60\text{ kW} > 43.2\text{ kW}$ meet requirement

4. Determination of type:

HK410HSG-C71-S

8 Transmission capacity

Code	i _N	n ₁ (r/min)	n _{2N} (r/min)	HK305			HK306			HK307			HK308			HK309			HK310			HK311			HK312			HK313								
				T _{2N} (kN•m)	i _{ex}	P _{1N} (kW)	T _{2N} (kN•m)	i _{ex}	P _{1N} (kW)	T _{2N} (kN•m)	i _{ex}	P _{1N} (kW)	T _{2N} (kN•m)	i _{ex}	P _{1N} (kW)	T _{2N} (kN•m)	i _{ex}	P _{1N} (kW)	T _{2N} (kN•m)	i _{ex}	P _{1N} (kW)	T _{2N} (kN•m)	i _{ex}	P _{1N} (kW)	T _{2N} (kN•m)	i _{ex}	P _{1N} (kW)	T _{2N} (kN•m)	i _{ex}	P _{1N} (kW)						
C14	14	1740	124.3	11.6	14.02	151				21.7	13.76	282	30	13.58	390	35.7	13.86	465	57	13.69	742	64	13.56	833	78	13.58	1015	91	13.36	1184						
		1450	103.6			126						235			325			387			618			694			846			987						
		960	68.6			83						156			215			256			409			460			560			653						
		710	50.7			62						115			159			190			303			340			414			483						
C16	16	1740	108.8	11.6	15.71	132				21.7	15.39	247	30	15.19	342	35.7	15.63	407	57	15.44	649	64	15.41	729	78	15.43	888	91	14.96	1036						
		1450	90.6			110						206			285			339			541			607			740			864						
		960	60.0			73						136			188			224			358			402			490			572						
		710	44.4			54						101			139			166			265			297			362			423						
C18	18	1740	96.7	11.6	18.52	117	18.5	17.93	187	21.7	17.12	220	30	16.90	304	35.7	18.06	361	57	17.83	577	64	17.55	648	78	17.57	790	91	17.14	921						
		1450	80.6			98			156			183			253			301			481			540			658			768						
		960	53.3			65			103			121			168			199			318			357			436			508						
		710	39.4			48			76			90			124			147			235			264			322			376						
C20	20	1740	87.0	11.6	20.09	106	18.5	20.08	169	21.7	19.29	198	30	19.03	273	35.7	20.60	325	57	20.34	519	64	19.19	583	78	19.21	711	91	19.14	829						
		1450	72.5			88			140			165			228			271			433			486			592			691						
		960	48.0			58			93			109			151			179			286			322			392			457						
		710	35.5			43			69			81			112			133			212			238			290			338						
C22	22.4	1740	77.7	11.6	23.46	94	18.5	23.67	150	21.7	22.23	177	30	21.94	244	35.7	22.07	290	57	21.79	464	64	21.40	521	78	21.43	634	91	21.45	740						
		1450	64.7			79			125			147			203			242			386			434			529			617						
		960	42.9			52			83			97			135			160			256			287			350			408						
		710	31.7			39			61			72			100			118			189			212			259			302						
C25	25	1740	69.6	11.6	25.99	85	18.5	25.68	135	21.7	24.53	158	30	24.21	219	35.7	23.85	260	57	23.55	415	64	24.34	466	78	24.38	568	91	24.25	663						
		1450	58.0			70			112			132			182			217			346			389			474			553						
		960	38.4			47			74			87			121			144			229			257			314			366						
		710	28.4			34			55			65			89			106			170			190			232			271						
C28	28	1740	62.1	11.6	27.57	75	18.5	29.99	120	21.7	27.17	141	30	26.81	195	35.7	27.59	232	57	27.24	371	64	27.51	416	78	27.55	508	91	27.09	592						
		1450	51.8			63			100			118			163			194			309			347			423			493						
		960	34.3			42			66			78			108			128			205			230			280			327						
		710	25.4			31			49			58			80			95			151			170			207			242						
C32	31.5	1740	55.2	11.6	31.33	67	18.5	33.23	107	21.7	30.23	126	30	29.83	174	35.7	30.82	206	57	30.44	330	64	31.59	370	78	31.64	451	91	30.96	526						
		1450	46.0			56			89			105			145			172			275			308			376			439						
		960	30.5			37			59			69			96			114			182			204			249			290						
		710	22.5			27			44			51			71			84			135			151			184			215						
C36	35.5	1740	49.0	11.6	35.06	60	18.5	35.24	95	21.7	34.31	111	30	33.86	154	35.7	34.74	183	57	34.30	293	64	36.16	324	78	36.21	401	91	35.82	467						
		1450	40.8			50			79			93			128			153			244			274			334			389						
		960	27.0			33			52			61			85			101			161			181			221			258						
		710	20.0			24			39			45			63			75			119			134			163			191						
C40	40	1740	43.5	11.6	38.93	53	18.5	40.06	84	21.7	38.11	99	30	37.60	137	35.7	38.40	163	57	37.92	260	64	39.84	292	78	39.90	355	91	39.74	415						
		1450	36.3			44			70			82			114			136			216			243			296			345						
		960	24.0			29			46			55			75			90			143			161			196			229						
		710	17.8			22			34			40			56			66			106			119			145			169						
C45	45	1740	38.7	11.6	45.58	47	18.5	44.82	75	21.7	43.29	88	30	42.72	121	35.7	43.18	145	57	42.64	231	64	44.83	259	78	44.89	316	91	44.38	368						
		1450	32.2			39			62			73			101			120			192			216			263			307						
		960	21.3			26			41			48			67			80			127			143			174			203						
		710	15.8			19			31			36			50			59			94			106			129			150						
C50	50	1740	34.8	11.6	49.00	42	18.5	49.77	67	21.7	49.69	79	30	49.03	109	35.7	47.82	130	57	47.22	208	64	49.30	233	78	49.37	284									
		1450	29.0			35			56			66			91			108			173			194			237									
		960	19.2			23			37			44			60			72			115			129			157									
		710	14.2			17			28			32			45			53			85			95			116									
C56	56	1740	31.1				18.5	58.27	60																											
		1450	25.9						50																											
		960	17.1						33																											
		710	12.7						25																											
C63	63	1740	27.6				18.5	62.64	54																											
		1450	23.0						45																											
		960	15.2						30																											
		710	11.3						22																											

HK314			HK315			HK316			HK317			HK318			HK319			HK320			HK321			HK322			n ₁ (r/min)	n _{2N} (r/min)	i _s	Code																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
T _{2N} (kN•m)	i _{ex}	P _{1N} (kW)	T _{2N} (kN•m)	i _{ex}	P _{1N} (kW)	T _{2N} (kN•m)	i _{ex}	P _{1N} (kW)	T _{2N} (kN•m)	i _{ex}	P _{1N} (kW)	T _{2N} (kN•m)	i _{ex}	P _{1N} (kW)	T _{2N} (kN•m)	i _{ex}	P _{1N} (kW)	T _{2N} (kN•m)	i _{ex}	P _{1N} (kW)	T _{2N} (kN•m)	i _{ex}	P _{1N} (kW)	T _{2N} (kN•m)	i _{ex}	P _{1N} (kW)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
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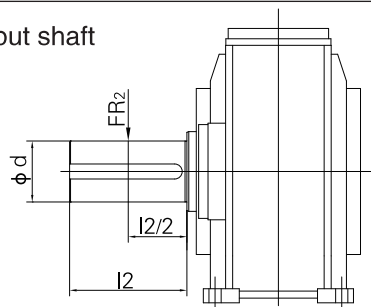
Code	i _N	n ₁ (r/min)	n _{2N} (r/min)	HK405			HK406			HK407			HK408			HK409			HK410			HK411			HK412			HK413		
				T _{2N} (kN•m)	ie _x	P _{1N} (kW)	T _{2N} (kN•m)	ie _x	P _{1N} (kW)	T _{2N} (kN•m)	ie _x	P _{1N} (kW)	T _{2N} (kN•m)	ie _x	P _{1N} (kW)	T _{2N} (kN•m)	ie _x	P _{1N} (kW)	T _{2N} (kN•m)	ie _x	P _{1N} (kW)	T _{2N} (kN•m)	ie _x	P _{1N} (kW)	T _{2N} (kN•m)	ie _x	P _{1N} (kW)	T _{2N} (kN•m)	ie _x	P _{1N} (kW)
C22	22.4	1740	77.7	11.6	23.26	94				21.7	21.40	177	30	21.12	244	35.7	22.22	290	57	21.95	464	64	21.72	521	78	21.75	634	91	21.54	740
		1450	64.7			79						147			203			242			386			434			529			617
		960	42.9			52						97			135			160			256			287			350			408
		710	31.7			39						72			100			118			189			212			259			302
C25	25	1740	69.6	11.6	25.52	85				21.7	23.43	158	30	23.12	219	35.7	24.89	260	57	24.58	415	64	24.30	466	78	24.33	568	91	24.29	663
		1450	58.0			70						132			182			217			346			389			474			553
		960	38.4			47						87			121			144			229			257			314			366
		710	28.4			34						65			89			106			170			190			232			271
C28	28	1740	62.1	11.6	26.45	75	18.5	29.74	120	21.7	27.70	141	30	27.33	195	35.7	29.34	232	57	28.98	371	64	27.03	416	78	27.07	508	91	28.05	592
		1450	51.8			63			118			163			194			309			347			423			493			
		960	34.3			42			78			108			128			205			230			280			327			
		710	25.4			31			58			80			95			151			170			207			242			
C32	31.5	1740	55.2	11.6	30.67	67	18.5	32.63	107	21.7	31.03	126	30	30.62	174	35.7	31.84	206	57	31.44	330	64	30.45	370	78	30.49	451	91	32.00	526
		1450	46.0			56			105			145			172			275			308			376			439			
		960	30.5			37			69			96			114			182			204			249			290			
		710	22.5			27			51			71			84			135			151			184			215			
C36	35.5	1740	49.0	11.6	34.64	60	18.5	33.82	95	21.7	33.96	111	30	33.51	154	35.7	33.95	183	57	33.53	293	64	34.06	328	78	34.11	400	91	34.03	467
		1450	40.8			50			93			128			153			244			274			334			389			
		960	27.0			33			61			85			101			161			181			221			258			
		710	20.0			24			45			63			75			119			134			163			191			
C40	40	1740	43.5	11.6	39.38	53	18.5	39.20	84	21.7	37.18	99	30	36.69	137	35.7	38.02	163	57	37.55	260	64	38.09	292	78	38.14	355	91	38.37	401
		1450	36.3			44			82			114			136			216			243			296			334			
		960	24.0			29			55			75			90			143			161			196			229			
		710	17.8			22			40			56			66			106			119			145			169			
C45	45	1740	38.7	11.6	45.66	47	18.5	44.28	75	21.7	43.95	88	30	43.37	121	35.7	44.83	145	57	44.27	231	64	42.38	259	78	42.44	316	91	44.32	368
		1450	32.2			39			73			101			120			192			216			263			307			
		960	21.3			26			48			67			80			127			143			174			207			
		710	15.8			19			31			50			59			94			106			129			150			
C50	50	1740	34.8	11.6	49.77	42	18.5	50.35	67	21.7	49.24	79	30	48.59	109	35.7	48.64	130	57	48.03	208	64	47.74	233	78	47.80	284	91	50.56	332
		1450	29.0			35			66			91			108			173			194			237			276			
		960	19.2			23			44			60			72			115			129			157			183			
		710	14.2			17			28			45			53			85			95			116			135			
C56	56	1740	31.1	11.6	55.97	38	18.5	58.37	60	21.7	52.58	71	30	51.89	98	35.7	56.80	116	57	56.09	185	64	55.02	208	78	55.10	254	91	54.17	296
		1450	25.9			31			59			81			97			155			174			211			247			
		960	17.1			21			39			54			64			102			115			140			163			
		710	12.7			15			29			40			47			76			85			104			121			
C63	63	1740	27.6	11.6	61.56	34	18.5	63.63	54	21.7	60.16	63	30	59.37	87	35.7	62.93	103	57	62.14	165	64	60.71	185	78	60.80	226	91	62.74	263
		1450	23.0			28			45			72			86			137			154			188			219			
		960	15.2			19			30			48			57			91			102			124			145			
		710	11.3			14			22			35			42			67			76			92			107			
C71	71	1740	24.5	11.6	69.99	30	18.5	71.55	47	21.7	67.99	56	30	67.10	77	35.7	65.91	92	57	65.09	146	64	71.37	164	78	71.47	200	91	70.74	234
		1450	20.4			25			40			64			76			122			137			167			195			
		960	13.5			16			26			31			42			51			81			91			110			
		710	10.0			12			19			23			31			37			60			67			82			
C80	80	1740	21.8	11.6	81.15	26	18.5	78.70	42	21.7	80.37	49	30	79.32	68	35.7	77.70	81	57	76.73	130	64	79.40	146	78	79.52	178	91	81.71	207
		1450	18.1			22			35			41			57			68			108			121			148			
		960	12.0			15			23			27			38			45			72			80			98			
		710	8.9			11			17			20			28			33			53			59			72			
C90	90	1740	19.3	11.6	88.47	23	18.5	89.48	37	21.7	90.06	44	30	88.87	61	35.7	84.31	72	57	83.25	115	64	89.44	130	78	89.57	158	91	93.21	184
		1450	16.1			20			31			37			51			60			96			108			132			
		960	10.7			13			21			24			34			40			64			71			87			
		710	7.9			10			15			18			25			29			47			53			64			
D10	100	1740	17.4	11.6	99.48	21	18.5	103.74	34	21.7	96.17	40	30	94.90	55	35.7	98.44	65	57	97.21	104	64	103.09	117	78	103.23	142	91	99.87	166
		1450	14.5			18			28			33			46			54			87			97			118			
		960	9.6			12			19			22			30			36			57			64			78			
		710	7.1			9			14			16			22			27			42			48			58			
D11	112	1740	15.5	11.6	109.05	19	18.5	113.09	30	21.7	110.02	35	30	108.57	49	35.7	109.08	58	57	107.72	93	64	113.75	104	78	113.91	127	91	107.93	148
		1450	12.9			16			25			29			41			48			77			87			106			
		960	8.6			10			17			19			27			32			51			57			70			
		710	6.3			8			12			14			20			24			38			42			52			
D13	125	1740	13.9	11.6	125.99	17	18.5	127.17	27	21.7	122.30	32	30	120.70	44	35.7	115.68	52	57	114.24	83	64	125.99	93	78	126.17	114	91	124.84	133
		1450	11.6			14			22			26			36			43			69			78			95			
		960	7.7			9			15			17			24			29			46			51			63			
		710	5.7			7			11			13			18			21			34			38			46			
D14	140	1740	12.4	11.6	134.34	15	18.5	139.42	24	21.7	138.71	28	30	136.88	39	35.7	131.49	46	57	129.85	74	64	140.20	83	78	140.39	102	91	139.48	118
		1450	10.4			13			20			24			33			39			62			69			85			
		960	6.9			8			13			16			22			26			41			46			56			
		710	5.1			6			10			12			16			19			30			34			41			
D16	160	1740	10.9	11.6	155.15	13	18.5	161.07	21	21.7	155.47	25	30	153.42	34	35.7	147.13	41	57	145.29	65	64	159.11	73	78	159.33	89	91	157.21	104
		1450	9.1			11			18			21			28			34			54			61			74			
		960	6.0			7			12			14			19			22			36			40			49			
		710	4.4			5			9			10			14			17			26			30			36			
D18	180	1740	9.7	11.6	176.38	12	18.5	171.75	19	21.7	177.45	22	30	175.12	30	35.7	163.37	36	57	161.33	58	64	176.72	65	78	176.97	79	91	173.78	92
		1450	8.1			10			16			18			25			30			48			54			66			
		960	5.3			6			10			12			17			20			32			36			44			
		710	3.9			5			8			9			12			15			24			26			32			
D20	200	1740	8.7	11.6	195.98	11	18.5	198.35	17	21.7	189.13	20	30	186.64	27	35.7	191.26	33	57	188.87	52	64	200.75	58	78	201.03	71	91	195.40	83
		1450	7.3			9			14			16			23			27			43			49			58			
		960	4.8			6			9			11			15			18			29			32			39			
		710	3.6			4			7			8			11			13			21			24			29			
D22	224	1740	7.8		225.49		18.5		15							35.7	205.61	29		203.04	46	64	230.43	52	78	230.75	63	91	216.39	74
		1450	6.5						13									24			39			43			51			
		960	4.3						8									16			26			29			35			
		710	3.2						6									12												

HK414			HK415			HK416			HK417			HK418			HK419			HK420			HK421			HK422									
T _{2N} (kN•m)	i _{ex}	P _{1N} (kW)	T _{2N} (kN•m)	i _{ex}	P _{1N} (kW)	T _{2N} (kN•m)	i _{ex}	P _{1N} (kW)	T _{2N} (kN•m)	i _{ex}	P _{1N} (kW)	T _{2N} (kN•m)	i _{ex}	P _{1N} (kW)	T _{2N} (kN•m)	i _{ex}	P _{1N} (kW)	T _{2N} (kN•m)	i _{ex}	P _{1N} (kW)	T _{2N} (kN•m)	i _{ex}	P _{1N} (kW)	T _{2N} (kN•m)	i _{ex}	P _{1N} (kW)	n ₁ (r/min)	n _{2N} (r/min)	i _N	Code			
125	21.56	1017									1789							2684			3091								1740	77.7	22.4	C22	
		847							1491									2237			2576						1450	64.7					
		561							987									1481			1705						960	42.9					
		415							730									1095			1261						710	31.7					
125	24.31	911			1115			1385			1603			1931			2405			2769									1740	69.6	25	C25	
		759			929			1154			1336			1609			2004			2308								1450	58.0				
		503			615			764			885			1066			1327			1528								960	38.4				
		372			455			565			654			788			981			1130								710	28.4				
125	28.08	813			996			1236			1432			1724			2147			2473			2993						3384	1740	62.1	28	C28
		678			830			1030			1193			1437			1789			2061			2494					2820	1450	51.8			
		449			549			682			790			951			1185			1364			1651				1867	960	34.3				
		332			406			504			584			704			876			1009			1221				1381	710	25.4				
125	32.03	723			885			1099			1273			1533			1909			2198			2661						3008	1740	55.2	31.5	C32
		603			737			916			1060			1277			1591			1832			2217				2506	1450	46.0				
		399			488			606			702			846			1053			1213			1468				1659	960	30.5				
		295			361			448			519			625			779			897			1086				1227	710	22.5				
125	34.06	642			785			975			1129			1360			1694			1950			2361					2669	1740	49.0	35.5	C36	
		535			654			813			941			1133			1411			1625			1967				2224	1450	40.8				
		354			433			538			623			750			934			1076			1303				1472	960	27.0				
		262			320			398			461			555			691			796			963				1089	710	20.0				
125	38.40	569			697			865			1002			1207			1503			1731			2095					2369	1740	43.5	40	C40	
		474			581			721			835			1006			1253			1442			1746				1974	1450	36.3				
		314			385			477			553			666			829			955			1156				1307	960	24.0				
		232			284			353			409			493			613			706			855				966	710	17.8				
125	44.36	506			619			769			891			1073			1336			1539			1862					2105	1740	38.7	45	C45	
		422			516			641			742			894			1113			1282			1552				1755	1450	32.2				
		279			342			424			491			592			737			849			1028				1162	960	21.3				
		207			253			314			363			438			545			628			760				859	710	15.8				
125	50.60	455			558			692			802			966			1203			1385			1676					1895	1740	34.8	50	C50	
		380			465			577			668			805			1002			1154			1397				1579	1450	29.0				
		251			308			382			442			533			663			764			925				1045	960	19.2				
		186			227			283			327			394			491			565			684				773	710	14.2				
125	54.21	407			498			618			716			862			1074			1236			1497					1692	1740	31.1	56	C56	
		339			415			515			596			718			895			1030			1247				1410	1450	25.9				
		224			275			341			395			476			592			682			826				933	960	17.1				
		166			203			252			292			352			438			504			611				690	710	12.7				
125	62.79	362			442			549			636			766			954			1099			1330					1504	1740	27.6	63	C63	
		301			369			458			530			639			795			916			1109				1253	1450	23.0				
		199			244			303			351			423			527			606			734				830	960	15.2				
		148			181			224			260			313			389			448			543				614	710	11.3				
125	70.80	321			393			488			565			680			847			975			1180					1334	1740	24.5	71	C71	
		267			327			406			470			567			706			813			984				1112	1450	20.4				
		177			217			269			311			375			467			538			651				736	960	13.5				
		131			160			199			230			277			346			398			482				545	710	10.0				
125	81.77	285			348			433			501			604			752			865			1048					1184	1740	21.8	80	C80	
		237			290			361			418			503			626			721			873				987	1450	18.1				
		157			192			239			276			333			415			477			578				653	960	12.0				
		116			142			177			204			246			307			353			427				483	710	8.9				
125	93.28	253			310			385			445			536			668			769			931					1053	1740	19.3	90	C90	
		211			258			321			371			447			557			641			776				877	1450	16.1				
		140			171			212			246			296			369			424			514				581	960	10.7				
		103			126			157			182			219			273			314			380				430	710	7.9				
125	99.95	228			279			346			401			483			601			692			838					947	1740	17.4	100	D10	
		190			232			288			334			402			501			577			698				790	1450	14.5				
		126			154			191			221			266			332			382			462				523	960	9.6				
		93			114			141			164			197			245			283			342				387	710	7.1				
125	108.01	203			249			309			358			431			537			618			748					846	1740	15.5	112	D1	
		169			207			258			298			359			447			515			624				705	1450	12.9				
		112			137			171			197			238			296			341			413				467	960	8.6				
		83			102			126			146			176			219			252			305				345	710	6.3				
125	124.93	182			223			277			321			386			481			554			670					758	1740	13.9	125	D13	
		152			186			231			267			322			401			462			559				632	1450	11.6				
		101			123			153			177			213			265			306			370				418	960	7.7				
		74			91			113			131			158			196			226			274				309	710	5.7				
125	139.58	163			199			247			286			345			429			495			599					677	1740	12.4	140	D14	
		136			166			206			239			287			358			412			499				564	1450	10.4				
		90			110			136			158			190			237			273			330				373	960	6.9				
		66			81			101			117			141			175																

9 Permissible additional radial forces on output shaft

9.1 permissible Additional Radial Forces on Output Shaft d

acting on the center of the output shaft



Permissible Additional Radial Forces FR_2 (kN)

Type	Arrangement	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22
HK3...SH	A+B+G+H	18	18	26	26	30	40	50	50	150	150	160	185	185	190	284	305	308	330
	C+D	29	29	40	40	40	60	85	85	190	190	200	265	265	265	365	372	395	400
HK4...SH	A+B+G+H	18	18	26	26	30	40	50	50	150	150	160	185	185	190	284	305	308	330
	C+D	29	29	40	40	40	60	85	85	190	190	200	265	265	265	365	372	395	400

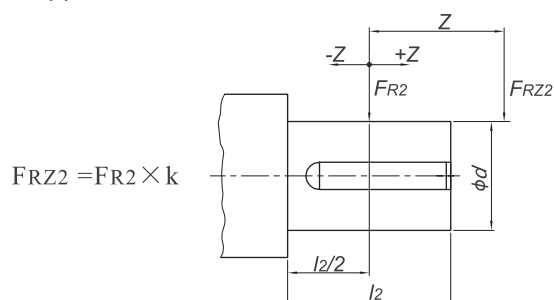
Note: 1) If angle of action and turning direction of the force are known, in most cases, higher radial force can be allowed. Please consult us.

2) *For application of force outside the center of the shaft end, see 9.2.

3) The foundation must be dry and grease-free. Permissible additional radial force on input shaft d_1 is upon request.

9.2 Permissible Additional Radial Forces on Output Shaft d

The application of forces outside the center of shaft end



$$FRZ2 = FR2 \times k$$

$FRZ2$ Permissible external radial force

$FR2$ Permissible additional radial force

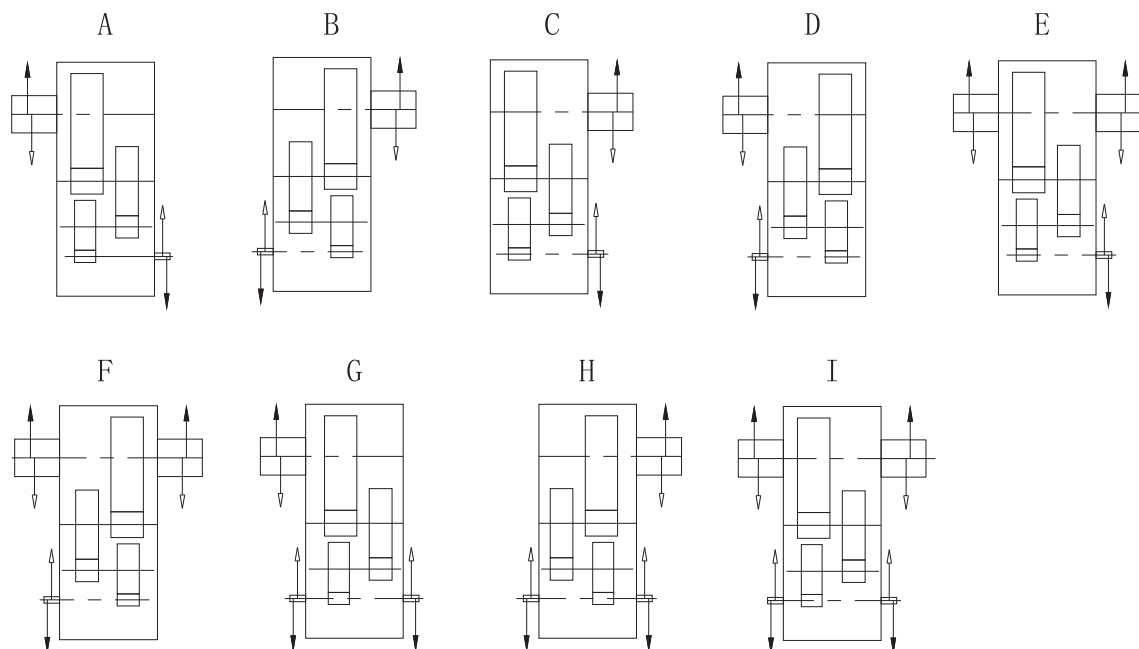
k The factor for action force is in the table below

Factor for action force (K)

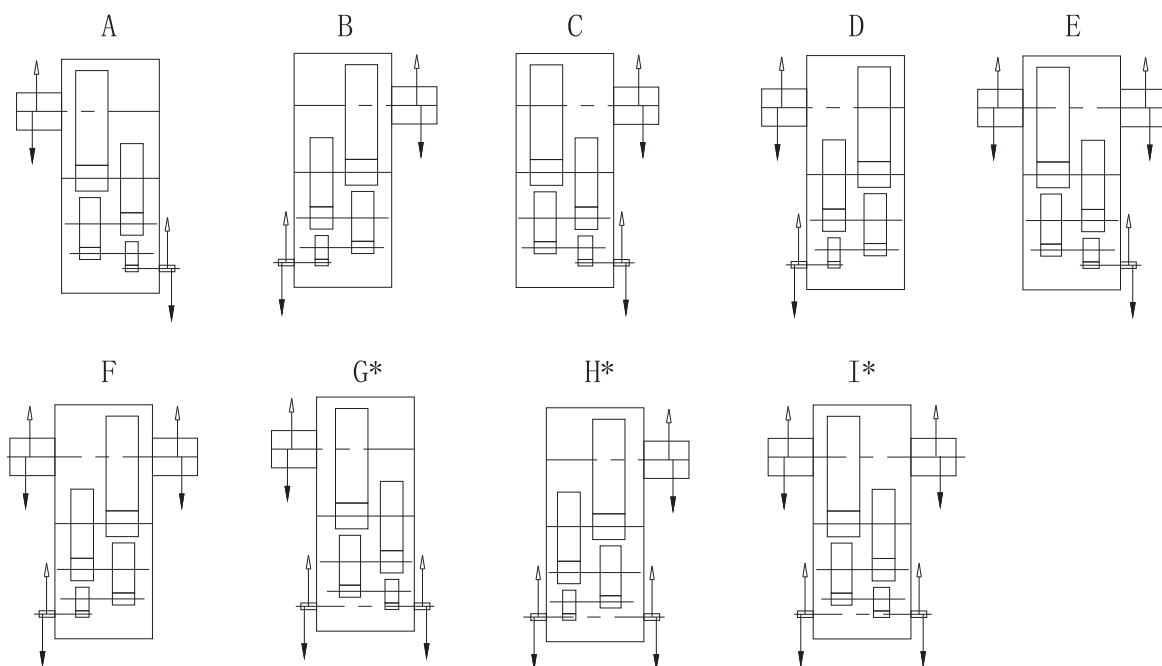
Z (mm)																
Size	-250	-200	-150	-100	-75	-50	-25	0	25	50	75	100	150	200	250	300
05/06					1.22	1.14	1.06	1	0.88	0.79	0.72	0.66	0.62	0.52	0.44	
07/08					1.19	1.12	1.06	1	0.89	0.81	0.74	0.68	0.58	0.51	0.46	0.41
09/10				1.22	1.15	1.1	1.05	1	0.9	0.82	0.76	0.7	0.61	0.54	0.48	0.44
11/12				1.18	1.13	1.08	1.04	1	0.91	0.84	0.78	0.73	0.64	0.57	0.51	0.47
13/14			1.24	1.15	1.11	1.07	1.03	1	0.92	0.86	0.8	0.75	0.67	0.6	0.55	0.5
15/16			1.2	1.12	1.09	1.06	1.03	1	0.93	0.87	0.82	0.77	0.69	0.63	0.58	0.53
17/18		1.25	1.17	1.11	1.08	1.05	1.03	1	0.94	0.88	0.84	0.79	0.72	0.66	0.6	0.56
19/20		1.22	1.13	1.1	1.06	1.04	1.02	1	0.95	0.9	0.85	0.81	0.74	0.69	0.62	0.58
21/22	1.27	1.21	1.12	1.09	1.05	1.04	1.02	1	0.96	0.92	0.86	0.83	0.75	0.71	0.64	0.6

10 Shaft arrangement

HK3

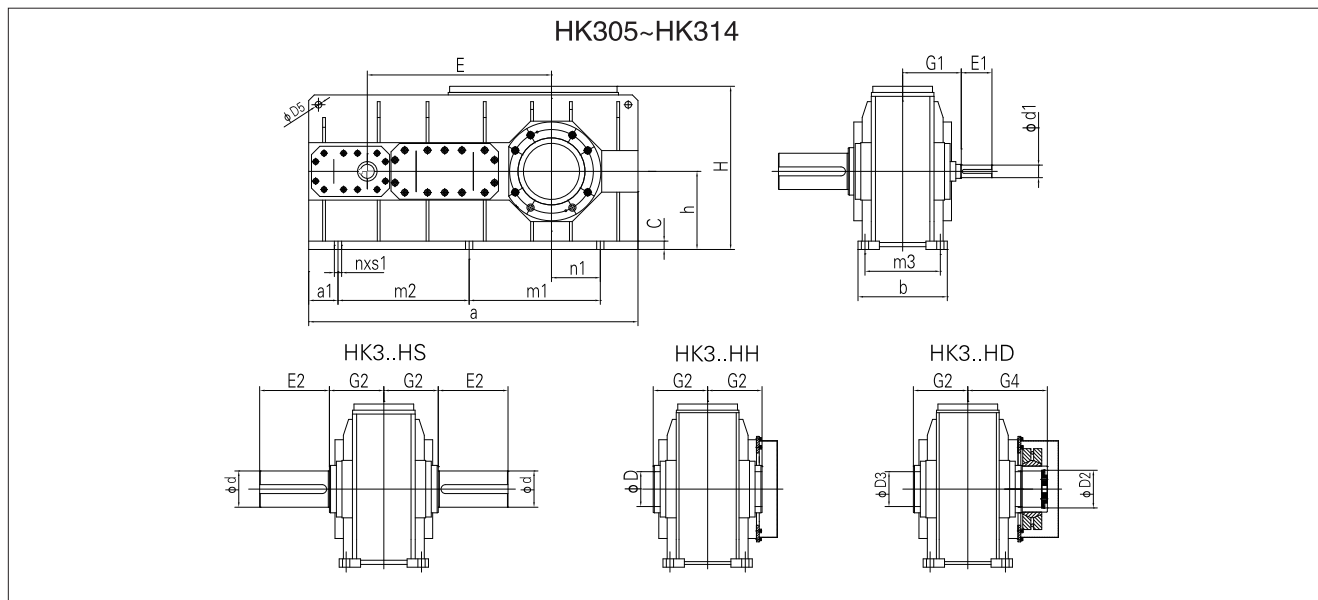


HK4



	Type	Size iN	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
			35.5	45	35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.5	45	45	40	45	35.5	40	45	50
*)Please consult us for arrangement G/H/I when iN are in right table	HK3		40	50	40	40	40	40	40	40	40	40	45	45	40	45	40	45	50	56
			45	56	45	45	45	45	45	45	45	45	50	50	45	50	45	50	56	63
			50	63	50	50	50	50	50	50	50	50					45	50	56	63
	HK4		160	200	160	160	160	160	160	160	160	160	200	200	160	180			200	200
			180	224	180	180	180	180	180	180	180	180	224	224	200	200			224	224
			200	250	200	200	200	200	200	200	200	200	250	250	224	224				
															250	250				

11 Outline dimensions

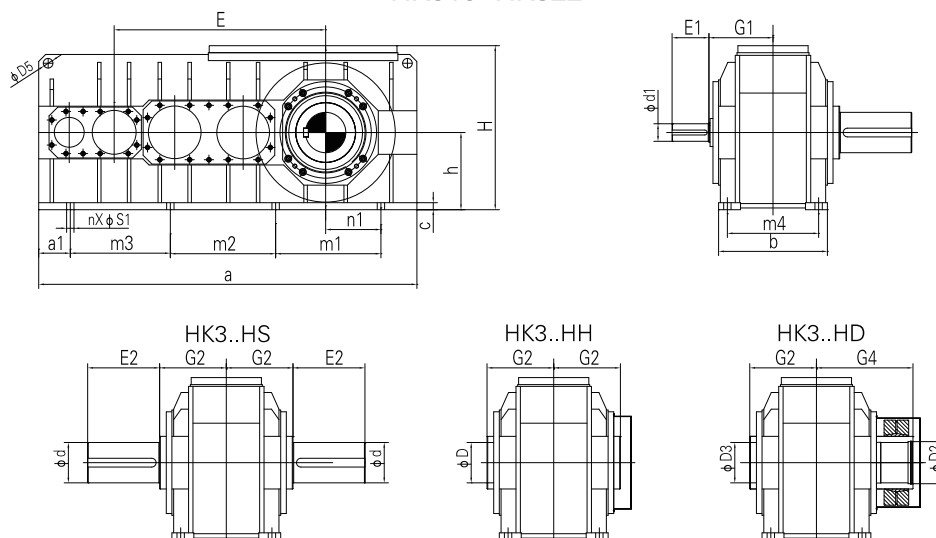


Size	iN=14-25		iN=18-31.5		iN=28-45		iN=28-50		iN=35.5-63		G1
	d1	E1	d1	E1	d1	E1	d1	E1	d1	E1	
05	50k6	110					38k6	80			195
06			50k6	110					38k6	80	195
07	60m6	140					50k6	110			210
08	60m6	140					50k6	110			210
09	75m6	140					60m6	140			240
10	75m6	140					60m6	140			240
11	90m6	170					70m6	140			275
12	90m6	170					70m6	140			275
13	100m6	210			85m6	170					330
14	100m6	210			85m6	170					330

Size	a	b	C	D5	E	h	H	m1	m2	m3	a1	n1	n	S1
05	870	255	30	24	497	220	505	375	315	215	85	158	6	22
06	975	255	30	24	555	230	555	420	400	215	80	213	6	22
07	1165	320	30	24	625	240	575	480	430	270	155	190	6	26
08	1235	320	30	24	665	280	645	505	470	270	150	210	6	26
09	1350	390	35	36	740	280	655	550	500	330	185	210	6	33
10	1460	390	35	36	800	320	745	600	550	330	195	260	6	33
11	1650	470	35	40	886	320	750	605	605	400	240	200	6	39
12	1750	470	35	40	936	380	855	675	675	400	230	270	6	39
13	1870	545	40	48	1027	380	880	712.5	712.5	465	245	240	6	45
14	2025	545	40	48	1105	440	1010	782.5	782.5	465	250	310	6	45

Size	HK3..HS			HK3..HH		HK3..HD				H3..HK	H3..HE	H3..HC	Oil (L)	Weight (Kg)
	d	E2	G2	D	G2	D2	D3	G2	G4					
05	100m6	210	165	95H7	165	100H7	100H7	165	240	Page 21	Page 22	Page 22	20	435
06	110m6	210	165	105H7	165	110H7	110H7	165	240				24	505
07	120m6	210	195	115H7	195	120H7	120H7	195	280				36	720
08	130m6	250	195	125H7	195	130H7	130H7	195	285				44	830
09	140m6	250	235	135H7	235	140H7	140H7	235	330				56	1150
10	160m6	300	235	150H7	235	150H7	150H7	235	350				67	1330
11	170m6	300	270	165H7	270	165H7	165H7	270	400				95	1860
12	180m6	300	270	180H7	270	180H7	180H7	270	405				128	2205
13	200m6	350	335	190H7	335	190H7	190H7	335	480				153	2890
14	220m6	350	335	210H7	335	210H7	210H7	335	480				190	3405

HK315~HK322

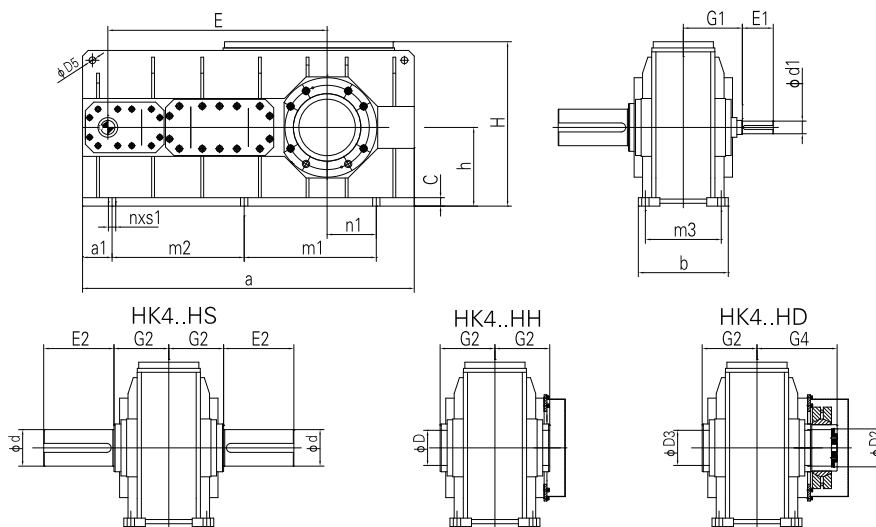


Size	iN=14-28		iN=16-31.5		iN=18-25		iN=20-35.5		iN=28-45		iN=31.5-50		iN=35.5-56		iN=40-63		G1
	d1	E1	d1	E1	d1	E1	d1	E1	d1	E1	d1	E1	d1	E1	d1	E1	
15			120m6	210									100m6	210			365
16			120m6	210									100m6	210			365
17	125m6	210									110m6	210					420
18			125m6	210									110m6	210			420
19					150m6	250			120m6	210							475
20	150m6	250									120m6	210					475
21			170m6	300									140m6	250			495
22							170m6	300							140m6	250	495

Size	a	b	C	D5	E	h	H	m1	m2	m3	m4	a1	n1	n	S1
15	2250	595	40	55	1205	440	1020	600	600	570	520	275	315	8	42
16	2300	595	40	55	1230	500	1100	690	600	570	520	255	360	8	42
17	2410	655	45	55	1315	500	1100	660	660	675	580	205	350	8	42
18	2535	655	45	55	1380	550	1210	790	660	675	580	210	420	8	42
19	2490	750	50	65	1580	550	1255	760	760	525	645	235	400	8	48
20	2600	750	50	65	1635	620	1380	890	760	520	645	220	470	8	48
21	3085	830	55	72	1725	700	1485	870	870	810	700	277.5	450	8	56
22	3195	830	55	72	1780	700	1485	985	870	810	700	280	510	8	56

Size	HK3. . HS			HK3. . HH		HK3. . HD				H3. . HK	H3. . HE	H3. . HC	Oil (L)	Weight (Kg)
	d	E2	G2	D	G2	D2	D3	G2	G4					
15	240m6	410	380	230H7	380	230H7	230H7	380	550	Page 21	Page 22	Page 22	235	4095
16	250m6	410	380	240H7	380	240H7	240H7	380	550				225	4715
17	260m6	410	415	250H7	415	250H7	250H7	415	600				290	5565
18	280m6	470	415	275H7	415	280H7	280H7	415	600				375	6415
19	290m6	470	465	On request									415	8420
20	310m6	470	465										500	9500
21	330m6	550	490										700	11660
22	350m6	550	490										710	12960

HK405~HK414

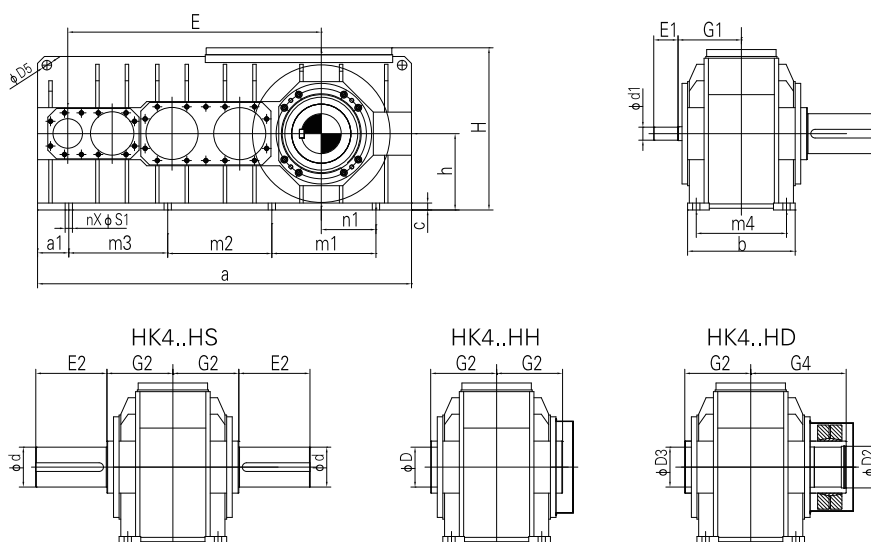


Size	iN=22. 4-100		iN=22. 4-112		iN=28-125		iN=112-200		iN=125-200		iN=125-224		iN=140-250		G1
	d1	E1	d1	E1	d1	E1	d1	E1	d1	E1	d1	E1	d1	E1	
05	40k6	80					30k6	60							170
06					40k6	80							30k6	60	170
07			45k6	110					35k6	80					210
08			45k6	110					35k6	80					210
09			60m6	140							45k6	110			240
10			60m6	140							45k6	110			240
11			70m6	140							50k6	110			275
12			70m6	140							50k6	110			275
13			85m6	170							60m6	140			325
14			85m6	170							60m6	140			325

Size	a	b	C	D5	E	h	H	m1	m2	m3	a1	n1	n	S1
05	950	255	30	24	590.5	220	505	375	375	215	110	158	6	22
06	1040	255	30	24	648.5	230	555	420	420	400	130	213	6	22
07	1165	320	30	24	745	240	575	480	430	270	155	190	6	26
08	1235	320	30	24	785	280	645	505	470	270	150	210	6	26
09	1350	390	35	36	880	280	655	550	500	330	185	210	6	33
10	1460	390	35	36	940	320	745	600	550	330	195	260	6	33
11	1650	470	35	40	1061	320	750	605	605	400	240	200	6	39
12	1750	470	35	40	1111	380	855	675	675	400	230	270	6	39
13	1870	545	40	48	1237	380	880	712.5	712.5	465	245	240	6	45
14	2025	545	40	48	1315	440	1010	782.5	782.5	465	250	310	6	45

Size	HK4. . HS			HK4. . HH		HK4. . HD				H4. . HK	H4. . HE	H4. . HC	Oil (L)	Weight (Kg)
	d	E2	G2	D	G2	D2	D3	G2	G4					
05	100m6	210	165	95H7	165	100H7	100H7	165	240	Page 21	Page 22	Page 22	20	450
06	110m6	210	165	105H7	165	110H7	110H7	165	240				24	520
07	120m6	210	195	115H7	195	120H7	120H7	195	280				35	730
08	130m6	250	195	125H7	195	130H7	130H7	195	285				42	825
09	140m6	250	235	135H7	235	140H7	140H7	235	330				55	1155
10	160m6	300	235	150H7	235	150H7	150H7	235	350				65	1340
11	170m6	300	270	165H7	270	165H7	165H7	270	400				90	1855
12	180m6	300	270	180H7	270	180H7	180H7	270	405				125	2215
13	200m6	350	335	190H7	335	190H7	190H7	335	480				150	2890
14	220m6	350	335	210H7	335	210H7	210H7	335	480				187	3450

HK415~HK422



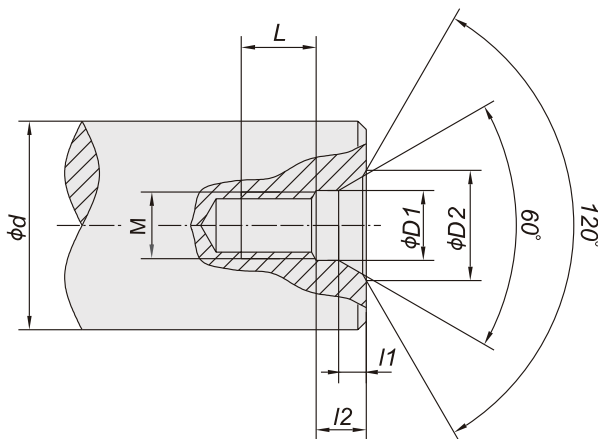
Size	iN=22. 4-112		iN=22. 4-125		iN=25-140		iN=125-250		iN=140-250		iN=160-250		G1
	d1	E1	d1	E1	d1	E1	d1	E1	d1	E1	d1	E1	
15					100m6	210					75m6	140	365
16					100m6	210					75m6	140	365
17	100m6	210						75m6	140				400
18			100m6	210					75m6	140			400
19	110m6	210						90m6	170				440
20			110m6	210					90m6	170			440
21					130m6	250					110m6	210	470
22					130m6	250					110m6	210	470

Size	a	b	C	D5	E	h	H	m1	m2	m3	m4	a1	n1	n	S1
15	2250	595	40	55	1461	440	1020	600	600	570	520	275	315	8	42
16	2300	595	40	55	1486	500	1100	690	600	570	520	255	360	8	42
17	2410	655	45	55	1571	500	1100	660	660	675	580	205	350	8	42
18	2535	655	45	55	1636	550	1210	790	660	675	580	210	420	8	42
19	2700	750	50	65	1776	550	1255	760	760	700	645	235	400	8	48
20	2810	750	50	65	1831	620	1380	890	760	700	645	235	470	8	48
21	3085	830	55	72	2070	700	1485	870	870	810	700	277.5	450	8	56
22	3195	830	55	72	2125	700	1485	985	870	810	700	280	510	8	56

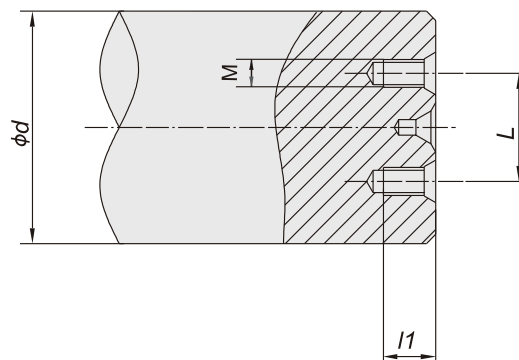
Size		HK4. . HS		HK4. . HH					
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12 Screw hole in shaft end

Type C screw central hole in shaft end

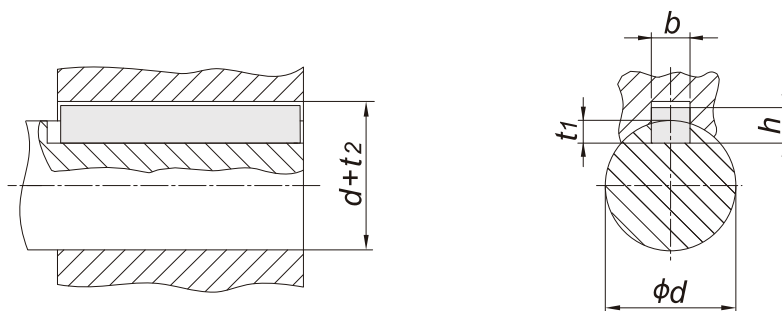


Double screw holes in shaft end



Type C screw central hole in shaft end $7 < d \leq 225$							Double screw holes in shaft end $225 < d$			
d	M	L	12	11	D1	D2	d	M	11	L
$7 < d \leq 10$	M3	10	2.6	1.8	3.2	5.8	$225 < d \leq 230$	M16	28	160
$10 < d \leq 13$	M4	10	3.2	2.1	4.3	7.4	$230 < d \leq 280$	M20	38	180
$13 < d \leq 16$	M5	10	4	2.4	5.3	8.8	$280 < d \leq 290$			190
$16 < d \leq 21$	M6	12	5	2.8	6.4	10.5	$290 < d \leq 310$	M24	45	220
$21 < d \leq 24$	M8	12	6	3.3	8.4	13.2	$310 < d \leq 330$			230
$24 < d \leq 30$	M10	15	7.5	3.8	10.5	16.3	$330 < d \leq 340$			240
$30 < d \leq 38$	M12	20	9.5	4.4	13	19.8	$340 < d \leq 360$			250
$38 < d \leq 50$	M16	25	12	5.2	17	25.3	$360 < d \leq 390$			270
$50 < d \leq 85$	M20	30	15	6.4	21	31.3	$390 < d \leq 420$	M30	55	300
$85 < d \leq 130$	M24	35	18	8	25	38	$420 < d \leq 460$			320
$130 < d \leq 225$	M30	45	18	11	31	48	$460 < d \leq 500$			350

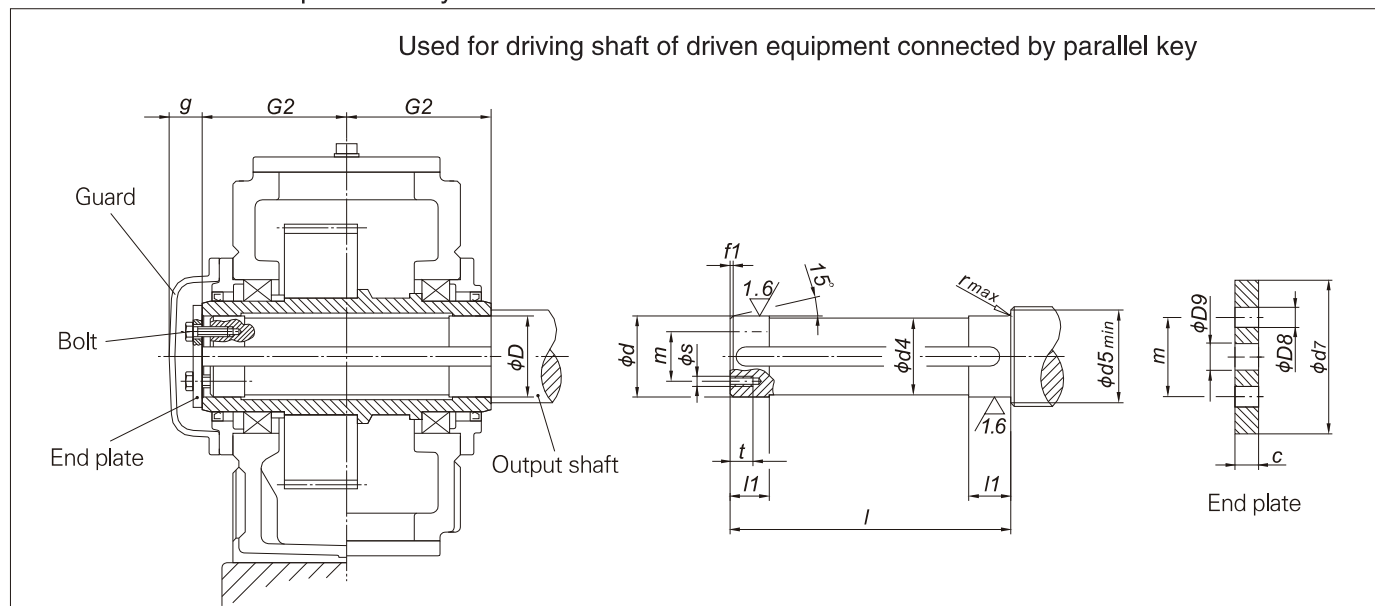
13 Parallel keys and keyway



d	b	h	t1	d+t2
$8 < d \leq 10$	3	3	1.8	d+1.4
$10 < d \leq 12$	4	4	2.5	d+1.8
$12 < d \leq 17$	5	5	3	d+2.3
$17 < d \leq 22$	6	6	3.5	d+2.8
$22 < d \leq 30$	8	7	4	d+3.3
$30 < d \leq 38$	10	8	5	d+3.3
$38 < d \leq 44$	12	8	5	d+3.3
$44 < d \leq 50$	14	9	5.5	d+3.8
$50 < d \leq 58$	16	10	6	d+4.3
$58 < d \leq 65$	18	11	7	d+4.4
$65 < d \leq 75$	20	12	7.5	d+4.9
$75 < d \leq 85$	22	14	9	d+5.4
$85 < d \leq 95$	25	14	9	d+5.4
$95 < d \leq 110$	28	16	10	d+6.4
$110 < d \leq 130$	32	18	11	d+7.4
$130 < d \leq 150$	36	20	12	d+8.4
$150 < d \leq 170$	40	22	13	d+9.4
$170 < d \leq 200$	45	25	15	d+10.4
$200 < d \leq 230$	50	28	17	d+11.4
$230 < d \leq 260$	56	32	20	d+12.4
$260 < d \leq 290$	63	32	20	d+12.4
$290 < d \leq 330$	70	36	22	d+14.4
$330 < d \leq 380$	80	40	25	d+15.4
$380 < d \leq 440$	90	45	28	d+17.4
$440 < d \leq 500$	100	50	31	d+19.5
$500 < d \leq 560$	110	56	34.3	d+22.2
$560 < d \leq 640$	120	63	39	d+24.5

14 Dimensions for recommended output connections

14.1 Hollow shaft with parallel keys



Type HK3H HK4H

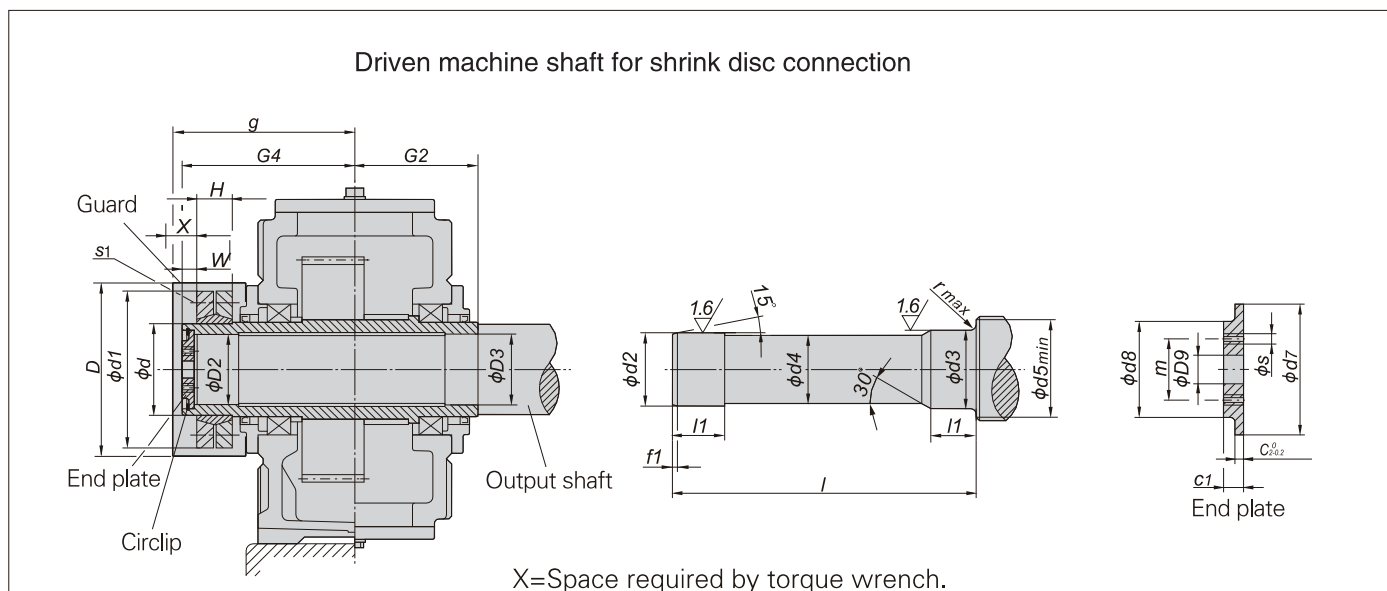
Size	Driven machine shaft									End plate					Bolt		Hollow shaft		
	d	d4	d5	f1	l	l1	r	s	t	c	D8	D9	d7	m	Size	Qty.	D	G2	g
05	95h6	94.5	105	5	328	40	1.6	M10	18	10	11	26	120	70	M10×25	2	95H7	165	40
06	105h6	104.5	116	5	328	45	1.6	M10	18	10	11	26	120	70	M10×25	2	105H7	165	40
07	115h6	114.5	126	5	388	50	1.6	M12	20	12	13.5	26	140	80	M12×30	2	115H7	195	40
08	125h6	124.5	136	6	388	55	2.5	M12	20	12	13.5	26	150	85	M12×30	2	125H7	195	40
09	135h6	134.5	147	6	467	60	2.5	M12	20	12	13.5	33	160	90	M12×30	2	135H7	235	45
10	150h6	149.5	162	6	467	65	2.5	M12	20	12	13.5	33	185	110	M12×30	2	150H7	235	45
11	165h6	164.5	177	7	537	70	2.5	M16	28	15	17.5	33	195	120	M16×40	2	165H7	270	45
12	180h6	179.5	192	7	537	75	2.5	M16	28	15	17.5	33	220	130	M16×40	2	180H7	270	45
13	190h6	189.5	206	7	667	80	3	M16	28	18	17.5	33	230	140	M16×40	2	190H7	335	45
14	210h6	209.5	226	8	667	85	3	M16	28	18	17.5	33	250	160	M16×40	2	210H7	335	45
15	230h6	229.5	248	8	756	100	3	M20	38	25	22	39	270	180	M20×55	4	230H7	380	60
16	240h6	239.5	258	8	756	100	3	M20	38	25	22	39	280	180	M20×55	4	240H7	380	60
17	250h6	249.5	270	8	826	110	4	M20	38	25	22	39	300	190	M20×25	4	250H7	415	60
18	275h6	274.5	295	9	826	120	4	M20	38	25	22	39	330	210	M20×25	4	275H7	415	60

△Note: 1.Material of driven machine shaft:40Cr or higher strength steel.

2.Driven machine shaft and parallel keys don't belong to the scope of our supply.Please order separately,if required.

3.Protection cover,end board and bolts are standed allocation of hollow shaft with parallel key connections.

14.2 Hollow shaft with shrink disk

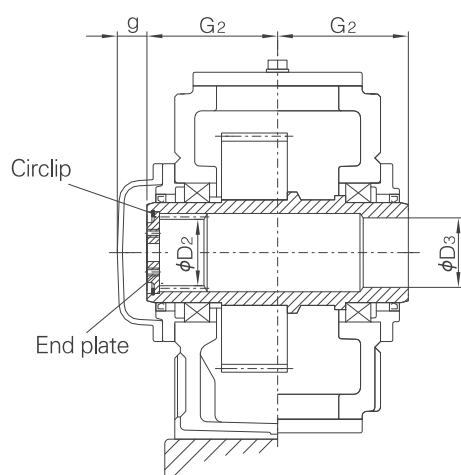


Type HK3D HK4D

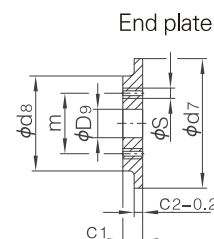
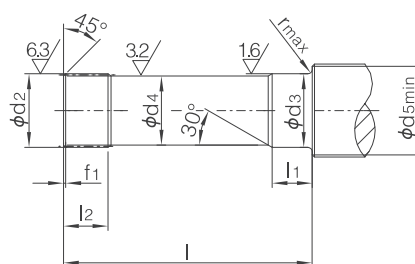
Size	Driven machine shaft ²⁾								End plate								Circlip	Hollow shaft				Shrink disk ¹⁾					Bolt		Guard	
	d2	d3	d4	d5	f1	l	l1	r	c1	c2	d7	d8	D9	m	s	Qty.		D2	D3	G2	G4	Type	d	d1	H	W	S1	D	g	
05	100g6	100h6	99.5	114	5	383	53	2	20	8	105	80	26	55	M10	2	105	100H7	100	165	240	SP2-125	125	215	53	20	M12	275	255	
06	110g6	110h6	109.5	124	5	383	58	3	20	8	115	85	26	60	M10	2	115	110H7	110	165	240	SP2-140	140	230	58	20	M12	285	255	
07	120g6	120h6	119.5	134	5	453	68	3	20	8	125	90	26	65	M12	2	125	120H7	120	195	280	SP2-155	155	263	62	23	M12	330	295	
08	130g6	130h6	129.5	145	6	458	73	3	20	8	135	100	26	70	M12	2	135	130H7	130	195	285	SP2-165	165	290	68	23	M16	340	300	
09	140g6	140h6	139.5	160	6	539	82	4	23	10	150	110	33	80	M12	2	150	140H7	140	235	330	SP2-175	175	300	68	28	M16	360	345	
10	150g6	150h6	149.5	170	6	559	92	4	23	10	160	120	33	90	M12	2	160	150H7	150	235	350	SP2-200	200	340	85	28	M16	395	365	
11	165f6	165g6	164.5	185	7	644	112	4	23	10	175	130	33	90	M12	2	175	165H7	165	270	400	SP2-220	220	370	103	30	M16	435	420	
12	180f6	180g6	179.5	200	7	649	122	4	23	10	190	140	33	100	M16	2	190	180H7	180	270	405	SP2-240	240	405	107	30	M20	450	420	
13	190f6	190g6	189.5	213	7	789	137	5	23	10	200	150	33	110	M16	2	200	190H7	190	335	480	SP2-260	260	430	119	30	M20	500	505	
14	210f6	210g6	209.5	233	8	784	147	5	28	14	220	170	33	130	M16	2	220	210H7	210	335	480	SP2-280	280	460	132	30	M20	525	505	
15	230f6	230g6	229.5	253	8	899	157	5	28	14	240	180	39	140	M16	2	240	230H7	230	380	550	SP2-300	300	485	140	35	M20	575	575	
16	240f6	240g6	239.5	263	8	899	157	5	28	14	250	190	39	150	M20	2	250	240H7	240	380	550	SP2-320	320	520	140	35	M20	595	575	
17	250f6	250g6	249.5	278	8	982	177	5	30	14	265	200	39	150	M20	2	265	250H7	250	415	600	SP2-340	340	570	155	35	M20	615	630	
18	280f6	280g6	279.5	306	9	982	177	5	30	14	290	210	39	160	M20	2	290	280H7	280	415	600	SP2-360	360	590	162	35	M24	635	625	
19-22	On request																													

- △ Note: 1. Material of driven machine shaft: 40Cr or higher strength steel.
 2. Driven machine shaft doesn't belong to the scope of our supply. But you can get the dimensions with e-mail.
 3. Shrink disk, protective cover, end plate and circlip are standard allocation of hollow shaft with shrink disc.
 4. Driven machine shaft must be free of oil or grease.

14.3 Hollow shaft with involute spline



Driven machine shaft with involute spline must be filled with grease before installation.



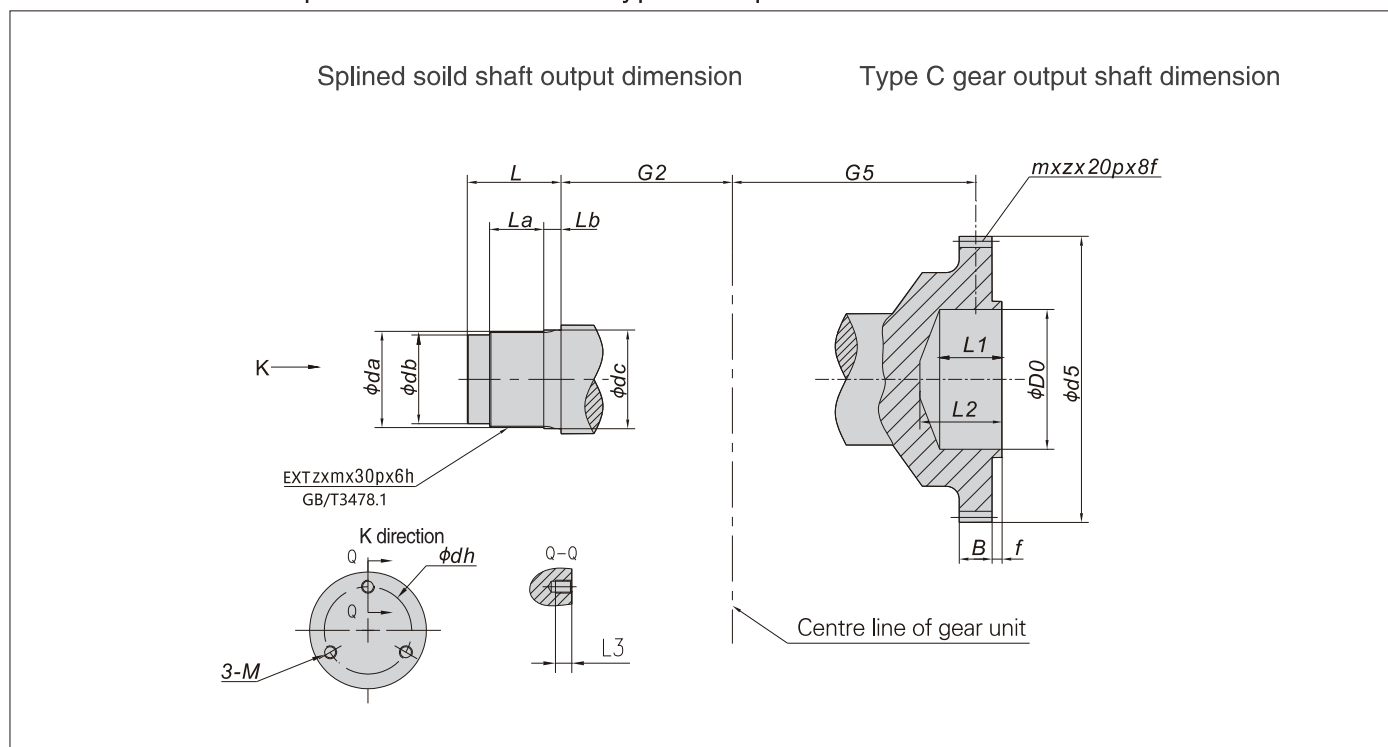
Driven machine shaft with DS center hole machined acc. to DIN 332.

Types HK3K、HK4K

Size	Involute splines DIN5480	Driven equipment shaft ¹⁾										End plate								Circlip	Hollow shaft				Bolt
		d2	d3	d4	d5	f1	l	l1	l2	r	c1	c2	d7	d8	D9	m	s	Qty.	D2		D3	G2	G		
5	W95×3×30×30×8f	94. 4h11	100h6	93	114	3	308	53	90	2	20	8	105d9	80	26	55	M10	2	105	89H11	100H7	165	45	M24	
6	W95×3×30×30×8f	94. 4h11	110h6	93	124	3	308	58	90	3	20	8	105d9	80	26	55	M10	2	105	89H11	110H7	165	45	M24	
7	W120×3×30×38×8f	119. 4h11	120h6	118	134	3	368	68	105	3	20	8	125d9	90	26	65	M12	2	125	114H11	120H7	195	55	M24	
8	W120×3×30×38×8f	119. 4h11	130h6	118	145	3	368	73	105	3	20	8	125d9	90	26	65	M12	2	125	114H11	130H7	195	55	M24	
9	W140×3×30×45×8f	139. 4h11	145h6	138	160	3	444	82	125	4	23	10	150d9	110	33	80	M12	2	150	134H11	145H7	235	55	M30	
10	W140×3×30×45×8f	139. 4h11	155h6	138	170	3	444	92	125	4	23	10	150d9	110	33	80	M12	2	150	134H11	155H7	235	55	M30	
11	W170×5×30×32×8f	169h11	170h6	168	185	5	514	112	150	4	23	10	175d9	130	33	90	M12	2	175	160H11	170H7	270	65	M30	
12	W170×5×30×32×8f	169h11	185h6	168	200	5	514	122	150	4	23	10	175d9	130	33	90	M12	2	175	160H11	185H7	270	65	M30	
13	W190×5×30×36×8f	189h11	195h6	188	213	5	644	137	180	5	23	5	200d9	150	33	110	M16	2	200	180H11	195H7	335	45	M30	
14	W190×5×30×36×8f	189h11	215h6	188	233	5	644	147	180	5	23	5	200d9	150	33	110	M16	2	200	180H11	215H7	335	45	M30	
15~22	On request																								

- ⚠ Note: 1. Material of driven equipment shaft: 40cr or steel with higher strength.
 2. Driven equipment shaft is not in scope of supply, please order if required.
 3. Shrink disc, protection cover, end plate and circlip are supplied with gearbox as standard.
 4. Driven machine shaft with involute spline must be filled with grease before installation.

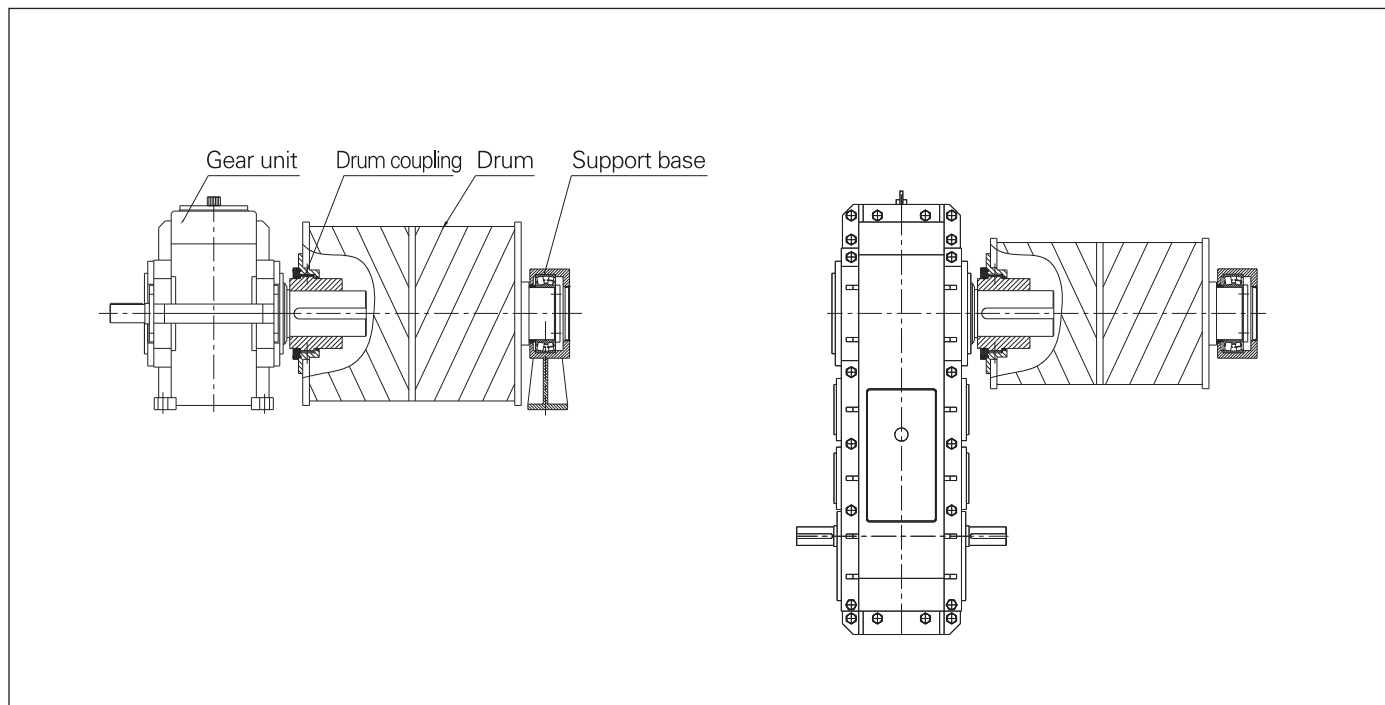
14.4 Dimensions of splined solid shaft and type C output shaft



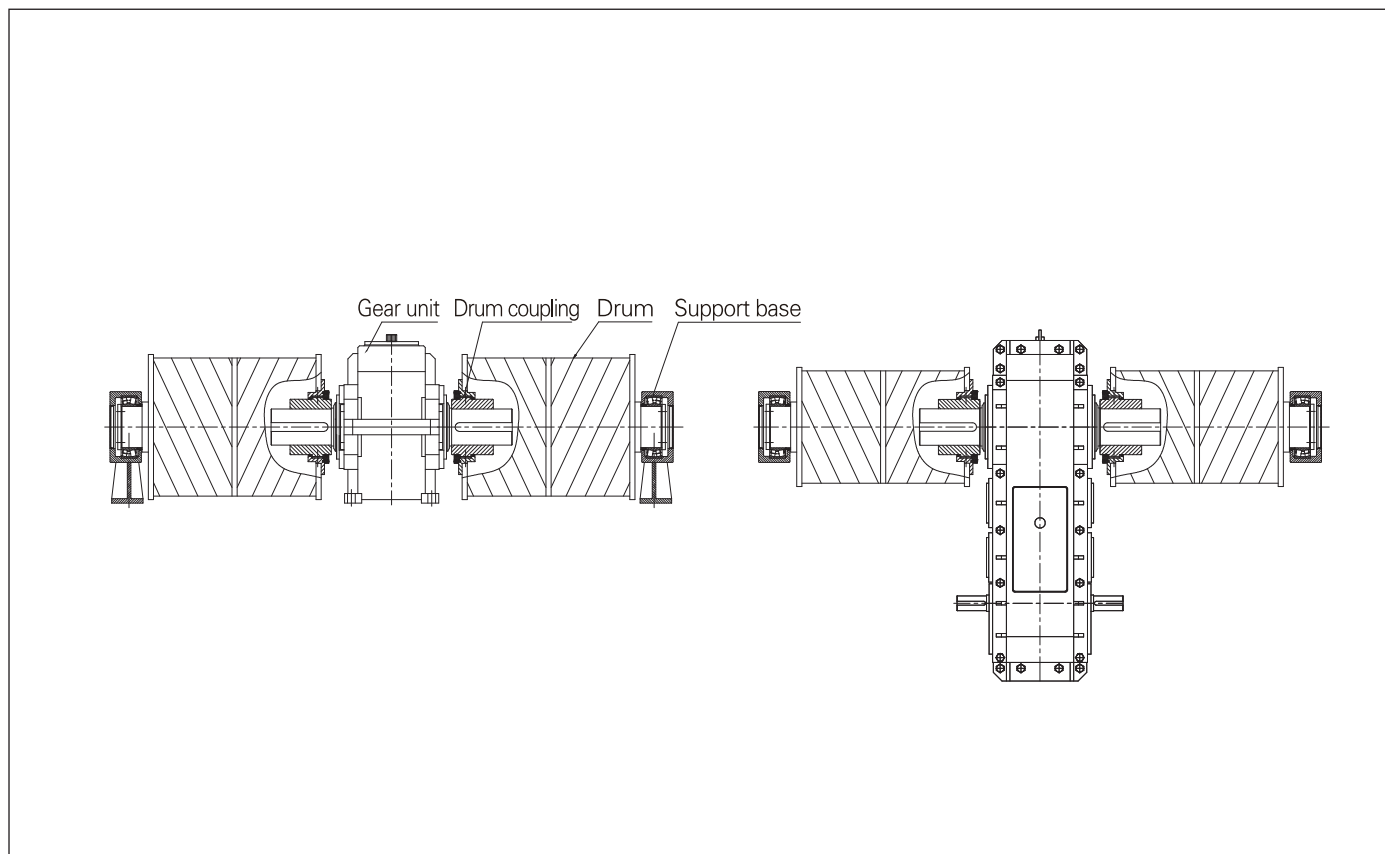
Splined solid shaft output dimension												Type C gear output shaft dimension								
Size	G ₂	z×m	d _a	d _b	d _c	d _h	L	L _a	L _b	M	L ₃	m×z	d ₅	D ₀	L ₁	L ₂	B	f	G ₅	
05	165	18×5	95h6	80h6	100	50	125	55	35	M10	17	4×56	232h11	120H7	50	75	35	14	271	
06	165	22×5	115h6	100h6	120	70	135	60	40	M12	20	4×56	232h11	120H7	50	75	35	14	271	
07	195	26×5	135h6	120h6	140	90	155	75	45	M12	20	4×56	232h11	120H7	76	100	35	14	346	
08	195	26×5	135h6	120h6	140	90	155	75	45	M12	20	4×56	232h11	120H7	76	100	35	14	346	
09	235	30×5	155h6	140h6	160	100	165	80	50	M12	20	8×54	448h11	200H7	78	100	50	15	370	
10	235	34×5	175h6	160h6	180	110	180	80	55	M16	24	8×54	448h11	200H7	78	100	50	15	385	
11	270	38×5	195h6	180h6	200	130	190	100	55	M16	24	8×54	448h11	200H7	78	100	50	15	420	
12	270	38×5	195h6	180h6	200	130	190	100	55	M16	24	8×54	448h11	200H7	78	100	50	15	430	
13	335	26×8	216h6	190h6	222	140	205	110	60	M16	24	10×48	500h11	200H7	78	100	60	35	513	
14	335	26×8	216h6	190h6	222	140	205	110	60	M16	24	10×48	500h11	200H7	78	100	60	35	513	
15	400	30×8	248h6	220h6	254	160	220	125	60	M16	24	10×48	500h11	200H7	78	100	60	35	550	
16	400	30×8	248h6	220h6	254	160	220	125	60	M16	24	10×48	500h11	200H7	78	100	60	35	575	
17	450	30×8	248h6	220h6	254	160	220	125	60	M16	24	12×54	672h11	290H7	78	100	75	45	600	
18	450	34×8	280h6	250h6	286	180	235	140	60	M20	30	12×54	672h11	290H7	78	100	75	45	625	
19	500	34×8	280h6	250h6	286	180	235	140	60	M20	30	12×54	672h11	290H7	78	100	75	45	625	
20	500	38×8	312h6	280h6	318	200	260	155	70	M24	40	12×54	672h11	290H7	78	100	75	45	675	
21	550	38×8	312h6	280h6	318	200	260	155	70	M24	40	/	/	/	/	/	/	/	/	
22	550	44×8	360h6	320h6	366	230	315	205	75	M24	40	/	/	/	/	/	/	/	/	

15 Application drawing

15.1 Single drum transmission



15.2 Double drums transmission



16 Lubrication oil

Heavy-loading industrial gear wheel oil viscosity brand selection :

VG320 (Accessory codeUV32)

VG460 (Accessory codeUV46)

Ambient temperature °C	-20 °C ~ +40 °C
Viscosity brand number	VG320

-  Note: 1.Viscosity brand number in the above table is ISO-VG viscosity under 40°C.
 2.Synthetic oil must be used when ambient temperature is lower than -10°C.
 3.To ensure product lifespan,we suggest synthetic oil in application.
 4.If ambient temperature exceeds the above range,please consult us.

Along with the technology advancedet.,the product of the manual of Boneng will be changed,please forgive.