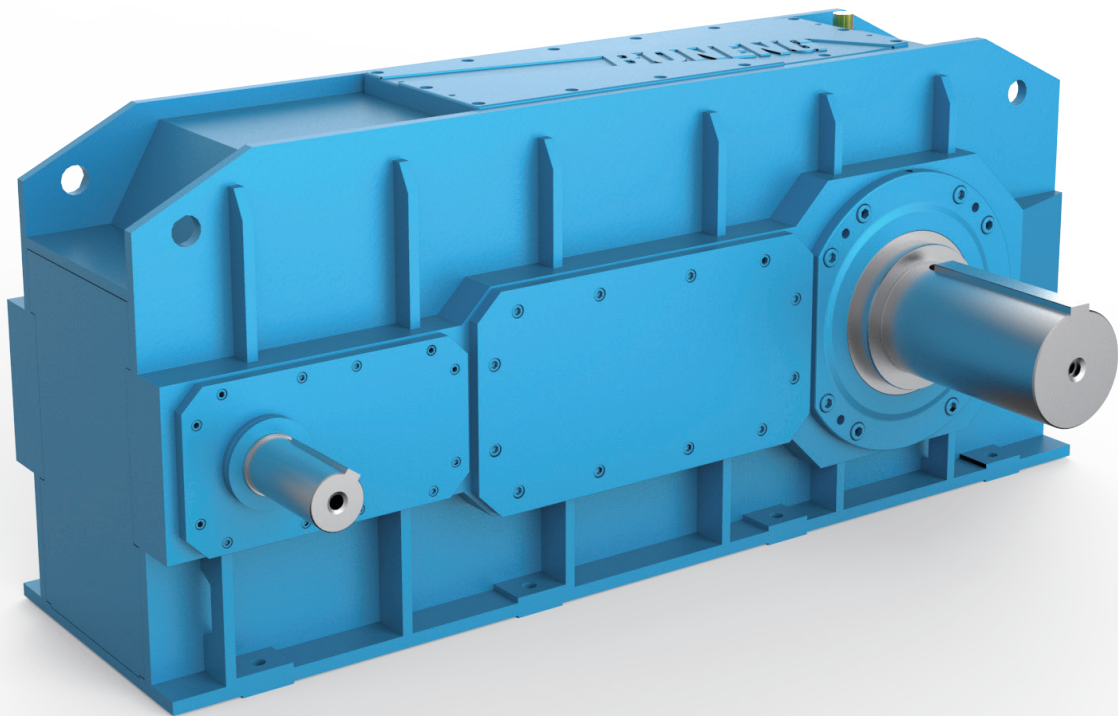


BONENG



HK Helical Gearbox with Extended Center Distance **HK 加长中心距齿轮箱**
博能传动

3/2019

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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, shipbuilding 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

1 概述

博能齿轮箱以优质的服务和稳定的质量赢得了国内外用户的广泛赞誉，我公司产品广泛应用于门式起重机、塔式起重机、汽车起重机、轮胎起重机、履带起重机、甲板起重机、浮式起重机、缆索起重机、装卸桥、桥式起重机等各种起重设备的主、副起升以及回转、行走、变幅机构中，在港口、矿山、冶金、建筑、造船等行业都取得了显著的业绩。

HK系列是根据起重设备的结构和传动特点专门设计的一款齿轮箱，具有以下特点：

- ◆ 在同样的传动能力下加大了输出、输入轴之间的中心距，避免了为满足安装尺寸而不得不浪费功率的情况，特别适合用于门式起重机、桥式起重机、集装箱起重机的主、副起升机构中。
- ◆ 模块化设计，国际化生产，交货更加快捷。
- ◆ HK系列中可以选择3级或者4级传动，其速比范围14~250。
- ◆ HK系列的齿轮箱（规格05~22）箱体是采用钢板焊接而成。
- ◆ 采用具有很高安全可靠性的迷宫式组合密封方式，可以有效防止粉尘状颗粒等物质进入减速箱内部，且可以重复填充油脂。



注：1. 齿轮箱供货前已处于准运行状态，运行前需加润滑油。
2. 样本中未注尺寸单位均为毫米（mm）。

2 产品功能标识



油 镜



通气帽



进油孔



放油孔

3 Type selection

3 选型

Serial NO.	Description	Codes	Parameters calculation
1	Driven machine factor 被驱动设备系数	f ₁	Check f ₁ table on page 6 according to working level /根据工作级别见6页f ₁ 表
2	Prime mover factor 原动机系数	f ₂	Prime Mover Factor /原动机系数
			Electric motor, hydraulic motor, turbine /电机、液压马达、汽轮机
			Piston engine with 4-6 cylinders, cycle variation 1:100 to 1:200 4-6缸活塞发动机, 周期变化1: 100至1: 200
			Piston engine with 1-3 cylinders, cycle variation 1:100 1-3缸活塞发动机, 周期变化1: 100
3	Factor for gear unit reliability 齿轮箱可靠度系数	S _F	Check S _F table on page 6 /见6页S _F 表
4	Transmission Efficiency 齿轮箱传动效率	η	3 stage/三级: 94%; 4 stage/四级: 92%
5	Input Speed 输入转速	n ₁	≤1500r/min Consult us if higher speed required. /更高转速请来电咨询
6	Calculation of the ratio 确定减速比	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. 以被驱动设备所需的扭矩或功率, 确认齿轮箱输入功率	P ₁	$P_1 = T_2 \cdot n_1 / (9550 \cdot i \cdot \eta)$ Or/或 $P_1 = P_2 / \eta$
8	Determination of gear unit type referring to the table of Transmission Capacity. 根据计算, 查传动能力表, 确定齿轮箱机座号	T _{2N} 、P _{1N}	$T_{2N} \geq T_2 \cdot f_1 \cdot f_2 \cdot S_F$ Or/或 $P_{1N} \geq P_1 \cdot f_1 \cdot f_2 \cdot S_F$ Check S _F table on page 6 /见6页S _F 表
9	Check Peak Torque 峰值扭矩校核*	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 /根据工作级别见6页f ₃ 表
10	Check permissible strength of the shaft after output mode and accessories are selected. 选定连接安装和附件后, 校核轴许用强度	Fr ₁ /Fr ₂ Fa ₁ /Fa ₂	It is crucial to check radial forces on the shafts when input and output shafts are for pulleys, sprockets or gears. 当输入、输出轴为皮带轮、链轮或齿轮等明显有附加径向力传动时必须校核径向力。
11	Determination of Lubrication Systems and Lubricants 确认润滑方式、选择润滑油		Optional lubrications/可供选择的润滑方式 1) Splash/飞溅润滑 2) Forced/强制润滑 Shaft-end pump/轴端泵润滑 Motor pump/电机油泵润滑 User-supplied oil station/用户自备稀油润滑
12	Determination of every item included in the type designation 按型号表示方法确定各项		For details about type designation, see Page 7 /型号表示方法第7页

* Peak torque: max. load torque, e.g. peak starting, braking and operating torque. (Generally, it refers to peak starting or braking torque.) * 峰值扭矩: 最大负载扭矩, 是指启动、制动或最大脉动载荷所引起的最大扭矩。(一般工况条件下峰值扭矩为启动或制动时的最大扭矩)

4 Working level and Service factors

4 机构工作级别及服务系数

Cranes type		Working level	Cranes type		Working level	
Portal Crane 门式起重机	安装用吊钩式 Fitting hook type	A3-A5	Hook type 吊钩式	For power plant installment and inspection 电厂安装及检修用	A1-A3	
	Loading and unloading hook type 装卸用吊钩式	A6-A7		For workshop and warehouse 车间及仓库用	A3-A5	
	Loading and unloading grab type 装卸用抓斗式	A7-A8		For arduous workshop and warehouse 繁重车间及仓库用	A6-A7	
Tower crane 塔式起重机	For normal construction fitting 一般建筑安装用	A2-A4	Grab type 抓斗式	For intermittent loading and unloading 间断装卸用	A6-A7	
	Loading and unloading concrete with bucket 用吊罐装卸混凝土	A4-A6		For continuous loading and unloading 连续装卸用	A8	
Truck、tyre、crawler crane 汽车、轮胎、履带起重机	Fitting loading and unloading hook type 安装及装卸用吊钩式	A1-A4	Bridge Crane 桥式起重机	For lifting material box 吊料箱用	A7-A8	
	Loading and unloading grab type 装卸用抓斗式	A4-A6		For feeding material 加料用	A8	
Deck crane 甲板起重机	Hook type 吊钩式	A4-A6		For casting 铸造用	A6-A8	
	Grab type 抓斗式	A6-A7		锻造用 For forging	A7-A8	
Floating crane 浮式起重机	Loading and unloading hook type 装卸用吊钩式	A5-A6		冶金专用 Metallurgy special type	淬火用 For quenching	A8
	Loading and unloading grab type 装卸用抓斗式	A6-A7		夹钳、脱锭用 For clamping and ingot drawing	A8	
	Shipbuilding mounting type 造船安装用	A4-A6		揭盖用 For uncovering	A7-A8	
Cable crane 缆索起重机	Fitting hook type 安装用吊钩式	A3-A5		料耙式 Raking type	A8	
	Loading,unloading or construction hook type 装卸或施工用吊钩式	A6-A7		电磁铁式 Electric magnet type	A7-A8	
	Loading,unloading or construction grab type 装卸或施工用抓斗式	A7-A8				
Loading and unloading bridge 装卸桥	Loading and unloading grab for stockyard 料场装卸用抓斗式	A7-A8	Portal Crane 门式起重机	Normal using hook type 一般用途吊钩式	A5-A6	
	Loading and unloading grab for harbor 港口装卸用抓斗式	A8		Loading and unloading grab type 装卸用抓斗式	A7-A8	
	Loading and unloading container for harbor 港口装卸集装箱用	A6-A8		Hook for power plant 电厂用吊钩式	A2-A3	
-	-	-		Ship-building mounting hook type 造船安装用吊钩式	A4-A5	
-	-	-		Loading and unloading container type 装卸集装箱用	A6-A8	

Reliability Factor		SF
Ordinary: single machine halts when gear units fail, easy to replace spare parts and minor loss occurred. 一般设备, 齿轮箱失效后仅仅引起单机停产, 并且更换零部件比较容易, 损失较小		$1.0 \leq SF \leq 1.3$
Important: a product line or an entire plant halts when gear units fail, heavy loss. 重要设备, 齿轮箱失效后使生产线或者全厂停工, 停机事故损失		$1.3 < SF \leq 1.5$
Highly reliable: severe production problem happens when gear units fail, enormous loss and life injuries. 高可靠度要求, 齿轮箱失效后可能成重大停产事故, 成极大的经济损失, 以及人生命事故		$1.5 < SF$

Load level	Specification	Service factor	Factor for driven machine f_1		Peak torque factor f_3							
			Working hours									
			U0	U1	U2	U3	U4					
≤ 200	$> 200 \sim 400$	$> 400 \sim 800$	$> 800 \sim 1600$	$> 1600 \sim 3200$								
Q1 Light / 轻	Rarely hoisting nominal load, normally hoisting light load 很少起升额定载荷, 一般起升较轻载荷	1) f_1	0.8	A1	0.8	A1	0.8	A1	0.8	A2	0.8	A3
		2) f_3	0.8		0.8		0.8		0.8			
		3) f_3	0.8		0.8		0.8		0.8			
Q2 Medium / 中	Sometimes hoisting nominal load, normally hoisting medium load 有时起升额定载荷, 一般起升中等载荷	1) f_1	0.8	A1	0.8	A1	0.8	A2	0.9	A3	0.9	A4
		2) f_3	0.5		0.5		0.5		0.5			
		3) f_3	0.8		0.8		0.8		0.8			
Q3 Heavy / 重	Often hoisting nominal load, normally hoisting heavy load 经常起升额定载荷, 一般起升较重载荷	1) f_1	0.8	A1	0.8	A2	0.9	A3	1	A4	1	A5
		2) f_3	0.5		0.5		0.5		0.5			
		3) f_3	0.8		0.8		0.8		0.8			
Q4 Super heavy / 特重	Frequently hoisting nominal load 频繁的起升额定载荷	1) f_1	0.9	A2	0.9	A3	1	A4	1.1	A5	1.2	A6
		2) f_3	0.5		0.5		0.5		0.5			
		3) f_3	0.8		0.8		0.8		0.8			

Load level	Specification	Service factor	Factor for driven machine f_1		Peak torque factor f_3							
			Working hours									
			U5	U6	U7	U8	U9					
$> 3200 \sim 6300$	$> 6300 \sim 12500$	$> 12500 \sim 50000$	$> 25000 \sim 50000$	> 50000								
Q1 Light / 轻	Rarely hoisting nominal load, normally hoisting light load 很少起升额定载荷, 一般起升较轻载荷	1) f_1	0.9	A4	1	A5	1	A6	1.1	A7	1.2	A8
		2) f_3	0.5		0.56		0.63		0.71		0.8	
		3) f_3	0.8		0.8		1.9		1		1.12	
Q2 Medium / 中	Sometimes hoisting nominal load, normally hoisting medium load 有时起升额定载荷, 一般起升中等载荷	1) f_1	1	A5	1.1	A6	1.2	A7	1.3	A8	1.4	A8
		2) f_3	0.5		0.56		0.63		0.71		0.8	
		3) f_3	0.8		0.8		0.9		1		1.12	
Q3 Heavy / 重	Often hoisting nominal load, normally hoisting heavy load 经常起升额定载荷, 一般起升较重载荷	1) f_1	1.1	A6	1.2	A7	1.3	A8	1.4	A8	1.6	A8
		2) f_3	0.56		0.63		0.71		0.8		0.9	
		3) f_3	0.8		0.9		1		1.12		1.25	
Q4 Super heavy / 特重	Frequently hoisting nominal load 频繁的起升额定载荷	1) f_1	1.3	A7	1.4	A8	1.6	A8	1.8	A8	2	A8
		2) f_3	0.56		0.63		0.71		0.8		0.9	
		3) f_3	0.8		0.9		1		1.12		1.25	

注: 1) f_1 = Factor for driven machine / 被驱动设备系数

2) f_3 = Peak torque factor when load direction is unchanging, such as hoisting mechanisms, lifting mechanisms, etc. / 在负载方向保持不变时的峰值扭矩系数, 如起升, 变幅机构等

3) f_3 = Peak torque factor when load direction is alternating, such as rotary, running mechanisms, etc. / 在负载方向交替改变时的峰值扭矩系数, 如回转, 行走机构等

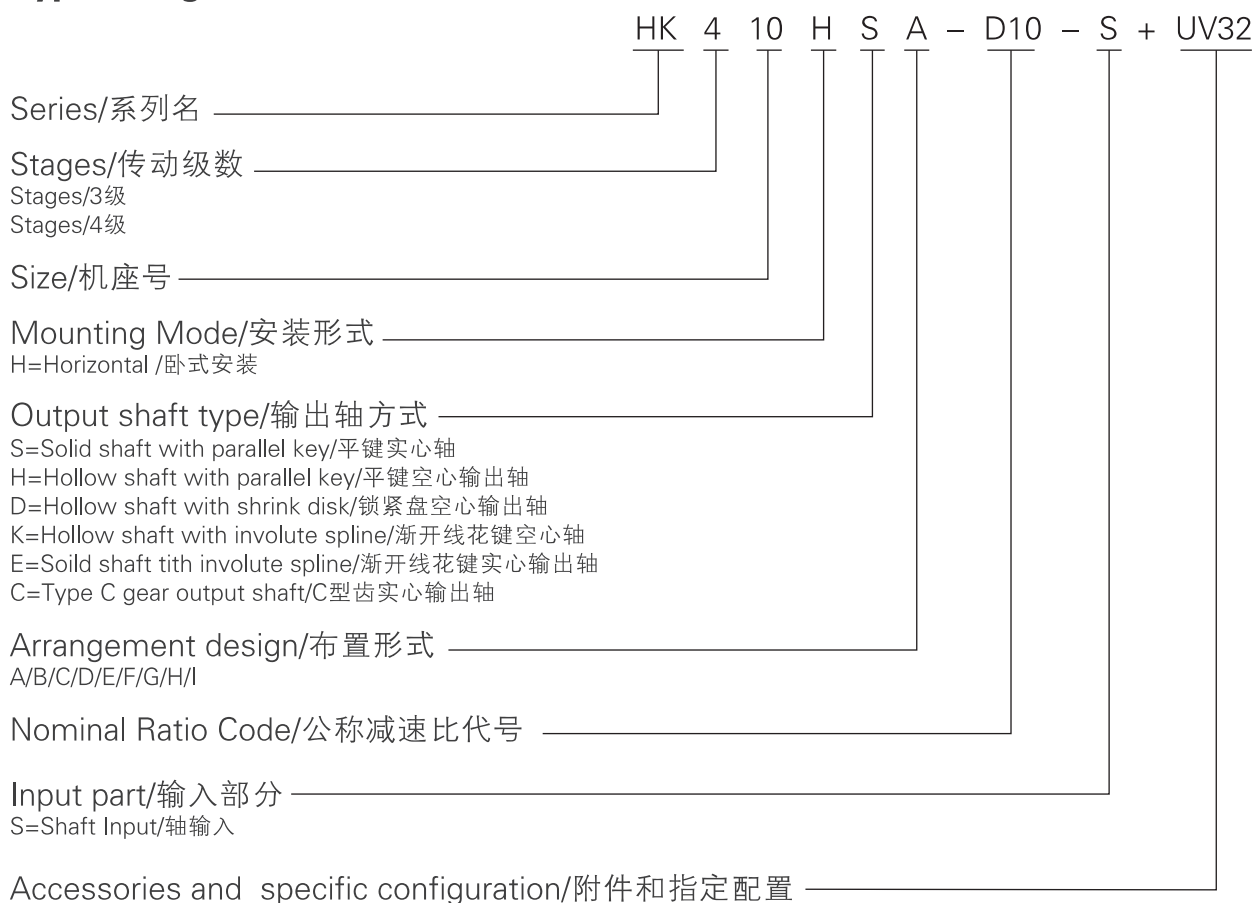
5 Symbol specification

5 常用代号说明

Code	Specification	Description	Unit
i	actual ratio	实际减速比	/
i _N	Nominal ratio	公称减速比	
i _{ex}	Exact ratio	精确减速比	
T _{2N}	Rated output torque	额定输出扭矩	N · m
T _A	Peak torque	峰值扭矩	
P _{1N}	Rated input power of gear unit	齿轮箱额定输入功率	kW
P ₁	Input power	输入功率	
P ₂	Power for driven equipment	被驱动设备使用功率	
P _m	Motor Power	电机功率	
f ₁	Driven machine factor	被驱动设备系数	/
f ₂	Prime mover factor	原动机系数	
f ₃	Peak loading coefficient	峰值负荷系数	
S _F	Factor for gear unit reliability	齿轮箱可靠度系数	
n ₁	Input speed	输入转速	r/min
n _{2N}	Nominal output speed	公称输出转速	
n ₂	Output speed	输出转速	

6 Type designation

6 型号表示方法



7 Examples

7 选型举例

Selection example

Prime mover:

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

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

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

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: $> 50000 \text{ hours}$

Ambient temperature: $0 \sim 30^\circ \text{C}$

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

$P_{1N} = 53 \text{ kW}$, Center distance $E = 940 \text{ mm} > 900 \text{ mm}$ requirement meet

3. Verify peak torque:

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

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

$$P_{1N} = 53 \text{ kW} > 43.2 \text{ kW} \quad \text{meet requirement}$$

4. Determination of type:

HK410HSG-C71-S

选型示例

原动机:

电机功率: $P_m = 30 \text{ kW}$

电机转速: $n_1 = 710 \text{ rpm}$

最大启动扭矩: $T_A = 645 \text{ N} \cdot \text{m}$

被驱动设备(工作机):

桥式起重机主起升

提升功率: $P_2 = 22 \text{ kW}$

卷筒转速: $n_2 = 10 \text{ rpm}$

工作级别: Q3-U9-A8

工作时间: $> 50000 \text{ 小时}$

环境温度: 30°C

齿轮箱:

平行轴齿轮箱

轴布置形式: G

中心距: $\geq 900 \text{ mm}$

选型步骤:

1. 计算速比: $i = n_1/n_2 = 710/10 = 71$

取 $i_N = C71$ 传动级数: 4级

2. 确定齿轮箱的额定功率:

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

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

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

根据传动能力表查得: 齿轮箱规格10, 对应额定功率

$P_{1N} = 53 \text{ kW}$, 中心距 $E = 940 \text{ mm} > 900 \text{ mm}$ 满足要求

3. 峰值扭矩校核:

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

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

$$P_{1N} = 53 \text{ kW} > 43.2 \text{ kW} \quad \text{满足要求}$$

4. 确定型号:

HK410HSG-C71-S

8 Transmission capacity

8 传动能力表

Code	i _N	n ₁ (r/min)	n _{2N} (r/min)	HK305			HK306			HK307			HK308			HK309			HK310			HK311			HK312			HK313						
				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)				
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	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			301			481			540			658			768							
		960	53.3			65			103			121			199			318			357			436			508							
		710	39.4			48			76			90			147			235			264			322			376							
C20	20	1740	87.0	11.6	20.09	106	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			433			486			592			691							
		960	48.0			58			93			109			151			179			286			322			392							
		710	35.5			43			69			81			112			133			212			238			290							
C22	22.4	1740	77.7	11.6	23.46	94	21.7	22.23	150	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			242			386			434			529			617							
		960	42.9			52			83			97			135			160			256			287			350							
		710	31.7			39			61			72			100			118			189			212			259							
C25	25	1740	69.6	11.6	25.99	85	21.7	24.53	135	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							
		960	38.4			47			74			87			121			144			229			257			314							
		710	28.4			34			55			65			89			106			170			190			232							
C28	28	1740	62.1	11.6	27.57	75	21.7	27.17	120	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							
		960	34.3			42			66			78			108			128			205			230			280							
		710	25.4			31			49			58			80			95			151			170			207							
C32	31.5	1740	55.2	11.6	31.33	67	21.7	30.23	107	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							
		960	30.5			37			59			69			96			114			182			204			249							
		710	22.5			27			44			51			71			84			135			151			184							
C36	35.5	1740	49.0	11.6	35.06	60	21.7	34.31	95	30	33.86	154	35.7	34.74	183	57	34.30	293	64	36.16	324	78	36.21	416	91	35.82	467							
		1450	40.8			50			79			93			128			153			244			274			334							
		960	27.0			33			52			61			85			101			161			181			221							
		710	20.0			24			39			45			63			75			119			134			163							
C40	40	1740	43.5	11.6	38.93	53	21.7	38.11	84	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							
		960	24.0			29			46			55			75			90			143			161			196							
		710	17.8			22			34			40			56			66			106			119			145							
C45	45	1740	38.7	11.6	45.58	47	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							
		960	21.3			26			41			48			67			80			127			143			174							
		710	15.8			19			31			36			50			59			94			106			129							
C50	50	1740	34.8	11.6	49.00	42	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	91	48.88	355							
		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	11.6	58.27	60	21.7	57.17	99	30	56.66	137	35.7	56.17	163	57	55.68	260	64	57.17	292	78	57.17	355	91	56.66	415							
		1450	25.9			50			70			82			114			136			216			243			296							
		960	17.1			33			46			55			75			90			143			161			196							
		710	12.7			25			34			40			56			66			106			119			145							
C63	63	1740	27.6	11.6	62.64	54	21.7	61.54	84	30	60.44	121	35.7	60.94	145	57	60.44	231	64	61.54	259	78	61.54	316	91	61.54	368							
		1450	23.0			45			62			73			101			120			192			216			263							
		960	15.2			30			41			48			67			80			127			143			174							
		710	11.3			22			31			36			50			59			94			106			129							

HK314		HK315		HK316		HK317		HK318		HK319		HK320		HK321		HK322		n ₁	n ₂	i _x	Code								
T _{2N}	i _{ex}	P _{1N}	T _{2N}	i _{ex}	P _{1N}	T _{2N}	i _{ex}	P _{1N}	T _{2N}	i _{ex}	P _{1N}	T _{2N}	i _{ex}	P _{1N}	T _{2N}	i _{ex}	P _{1N}	T _{2N}	i _{ex}	P _{1N}	T _{2N}	i _{ex}	P _{1N}	(r/min)	(r/min)				
125	13.37	575							2603																1740	124.3	14	C14	
		479							2169																1450	103.6			
		317							1436																960	68.6			
		235							1062																710	50.7			
125	14.97	575							2505																1740	108.8	16	C16	
		479							2088																1450	90.6			
		317							1382	265	15.65														960	60.0			
		235							1022																710	44.4			
125	17.16	575			1549			1923				2682													1740	96.7	18	C18	
		479	153	17.48	1291		190	17.47	1603			2227													1450	80.6			
		317			854				1061			1856	265	18.27												960			53.3
		235			632				785			1229														710			39.4
125	19.16	575			1394			1731				2414													1740	87.0	20	C20	
		479	153	20.45	1162		190	20.44	1442			2004													1450	72.5			
		317			769				955			1670	265	20.86												960			48.0
		235			569				706			1106														710			35.5
125	21.47	575			1244			1545				2155													1740	77.7	22.4	C22	
		479	153	23.30	1037		190	23.29	1288			1789														1450			64.7
		317			687				853			1491	265	23.66												960			42.9
		235			508				631			987														710			31.7
125	24.27	575			1115			1385				1931													1740	69.6	25	C25	
		479	153	25.47	929		190	25.45	1154			1603														1450			58.0
		317			615				764			1336	265	25.80												960			38.4
		235			455				565			885														710			28.4
125	27.11	575			996			1236				1724													1740	62.1	28	C28	
		479	153	28.79	830		190	28.77	1030			1432														1450			51.8
		317			549				682			1193	265	29.00												960			34.3
		235			406				504			790														710			25.4
125	30.98	575			885			1099				1533													1740	55.2	31.5	C32	
		479	153	31.75	737		190	31.73	916			1273														1450			46.0
		317			488				606			1060	265	31.82												960			30.5
		235			361				448			702														710			22.5
125	35.85	575			785			975				1360													1740	49.0	35.5	C36	
		479	153	35.56	654		190	35.54	813			1129														1450			40.8
		317			433				538			941	265	35.52												960			27.0
		235			320				398			623														710			20.0
125	39.77	575			697			865				1207													1740	43.5	40	C40	
		479	153	39.93	581		190	39.90	721			1002														1450			36.3
		317			385				477			835	265	39.77												960			24.0
		235			284				353			553														710			17.8
125	44.41	575			619			769				1073													1740	38.7	45	C45	
		479	153	44.17	516		190	44.14	641			891														1450			32.2
		317			342				424			742	265	43.81												960			21.3
		235			253				314			491														710			15.8
					558			692																	1740	34.8	50	C50	
					465		190	50.09	577																	1450			29.0
					308				382																	960			19.2
					227				283																	710			14.2
																									1740	31.1	56	C56	
																									1410	25.9			
																									933	17.1			
																									690	12.7			
																									1504	27.6	63	C63	
																									1253	23.0			
																									830	15.2			
																									614	11.3			

9 Permissible additional radial forces on output shaft

9 输出轴允许的附加径向力

9.1 Permissible Additional Radial Forces on Output Shaft d:

9.1 输出轴d上允许的附加径向力:

acting on the center of the output shaft

Permissible Additional Radial Forces F_{R2} (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	18	40	50	50	150	150	120	185	185	190	284	305	308	330
	C+D	29	29	40	40	40	60	85	85	190	190	185	265	265	265	365	372	395	400
HK4...SH	A+B+G+H	18	18	26	26	18	40	50	50	150	150	120	185	185	190	284	305	308	330
	C+D			40	40	40	60	85	85	190	190	185	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 min. requirement of the foundation bolt is class 8.8.
 The foundation must be dry and grease-free. Permissible additional radial force on input shaft d_1 is upon request.

注: 1) 如果给定了力的作用角和回转方向, 通常情况下, 可允许承受较大的附加力。请与我司联系。
 2) * 当作用力不在轴中部时, 请参见9.2。
 3) 基础螺栓的最低性能等级为8.8级。基础必须干燥, 不得有油脂。如用户要求, 允许输入轴 d_1 上附加径向力, 具体请与我司联系。

9.2 Permissible Additional Radial Forces on Output Shaft d:

9.2 输出轴d上允许的附加径向力:

The application of forces outside the center of shaft end

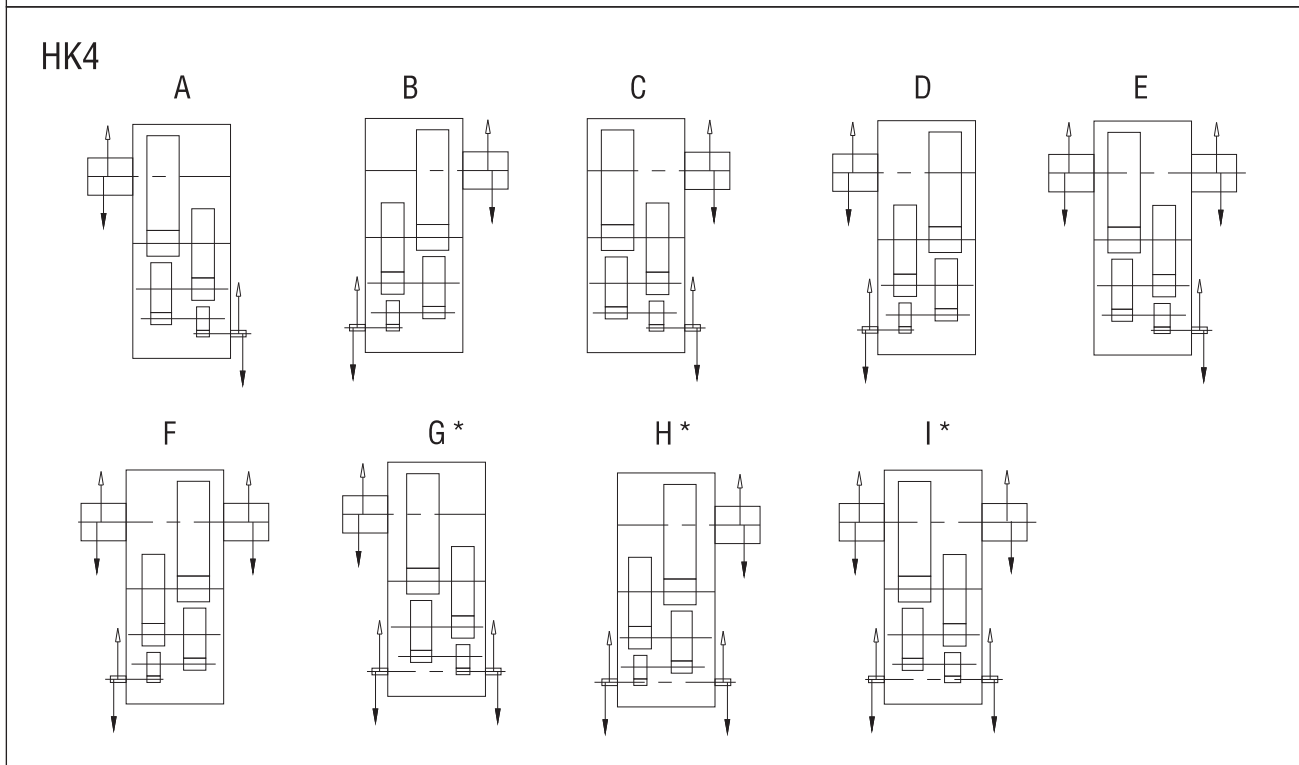
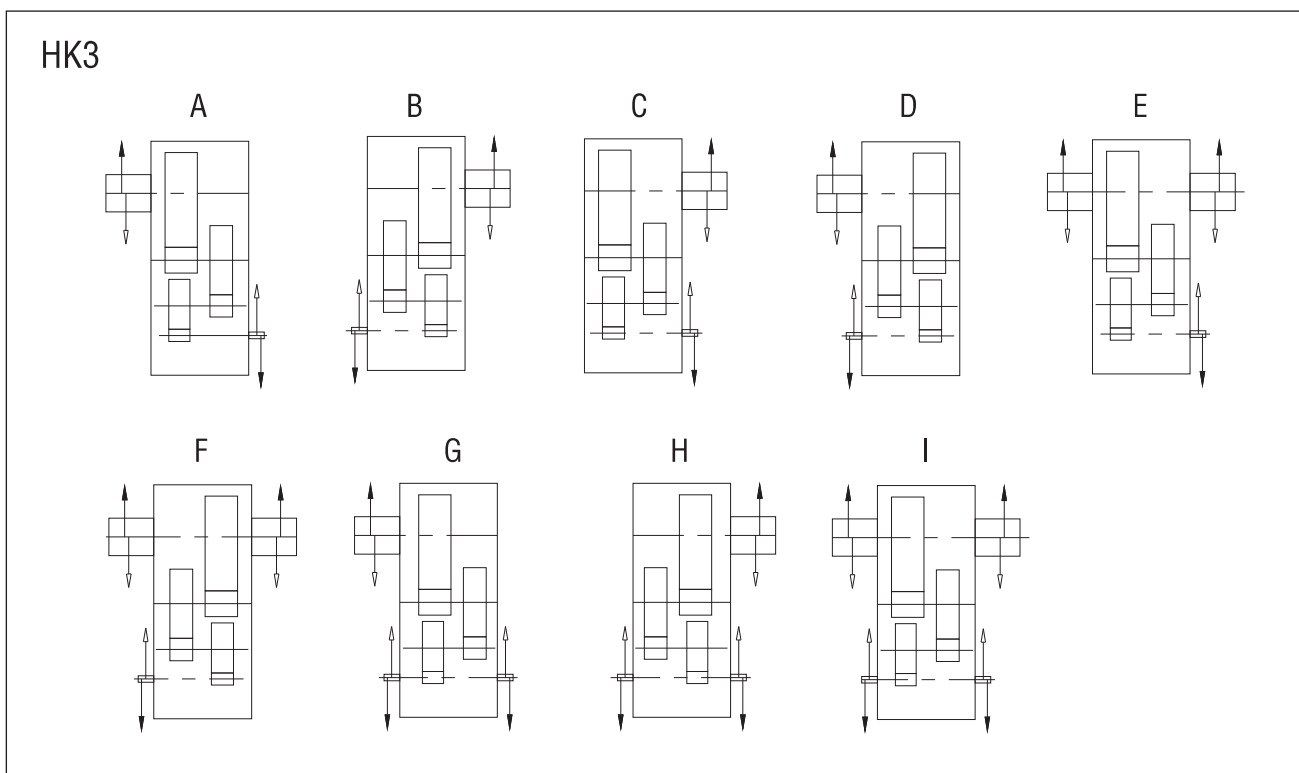
$F_{RZ2} = F_{R2} \times k$

F_{RZ2} Permissible external radial force
 F_{R2} 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

10 轴布置形式

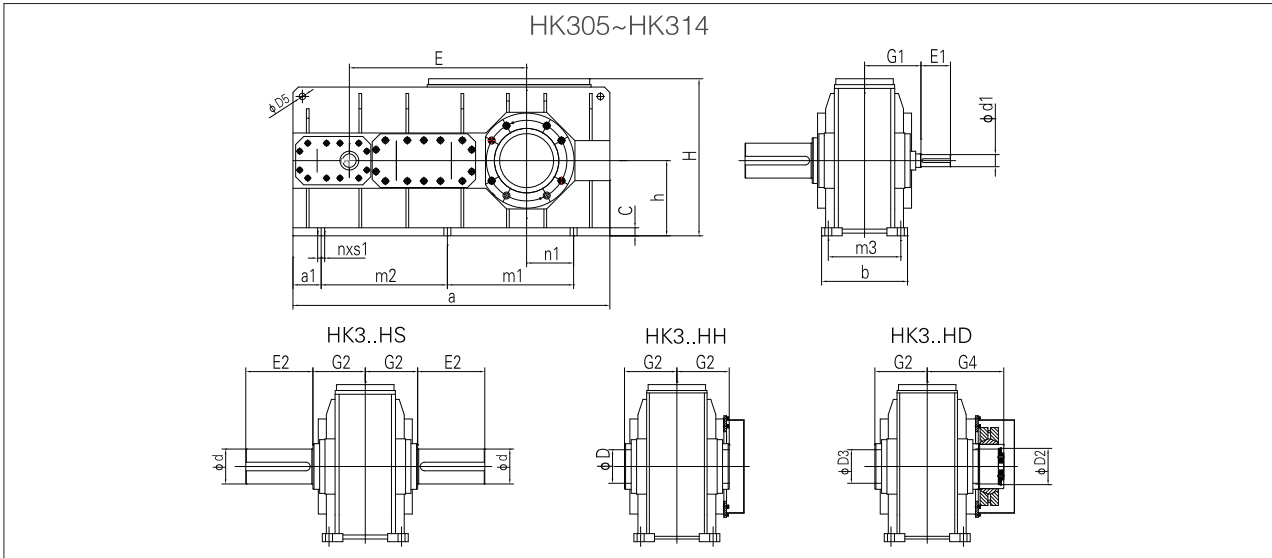


Type	Size	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
	jN																		
HK3	35.5	45	35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.5	45	45	40	45	35.5	40	45	50
	40	50	40	40	40	40	40	40	40	40	40	50	50	45	50	40	45	50	56
	45	56	45	45	45	45	45	45	45	40	40	50	50	45	50	45	45	50	56
	50	63	50	50	50	50	50	50	50	45	45	50	50	45	50	45	50	56	63
HK4	160	200	160	160	160	160	160	160	160	160	160	200	200	160	180	160	180	200	200
	180	224	180	180	180	180	180	180	180	180	180	224	224	180	200	180	200	200	224
	200	250	200	200	200	200	200	200	200	200	200	250	250	200	224	200	224	224	224
					224	224	224	224	224	224	224	224			250	250			

*)Please consult us for arrangement G/H/I when iN are in right table

11 Outline dimensions

11 外形尺寸图

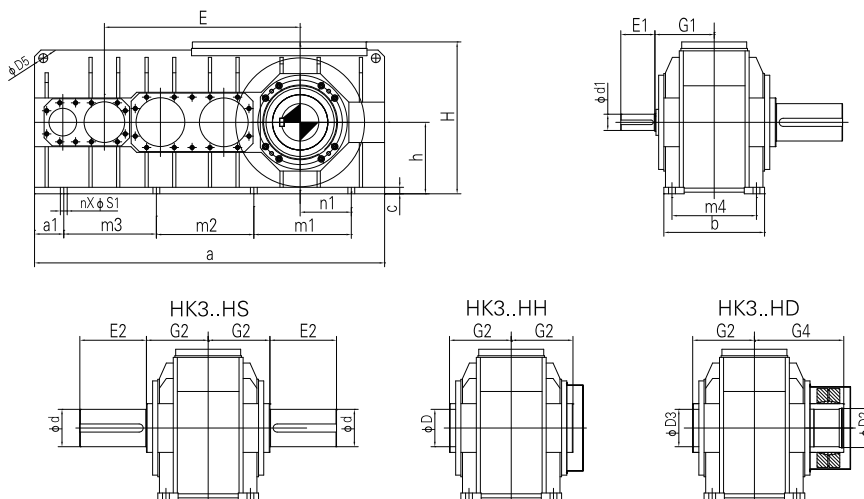


Size	iN=14-25		iN=18-31.5		iN=28-45		iN=28-50		iN=35.5-63		G1
	d1	E1	d1	E1	d1	E1	d1	E1	d1	E1	
05	50k6	110					38k6	80			195
06			50k6	110					38k6	80	195
07	60m6	140					50k6	110			210
08	60m6	140					50k6	110			210
09	75m6	140					60m6	140			240
10	75m6	140					60m6	140			240
11	90m6	170					70m6	140			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	450	375	315	215	85	158	6	22
06	975	255	30	24	555	230	500	420	400	215	80	213	6	22
07	1165	320	30	24	625	240	520	480	430	270	155	190	6	26
08	1235	320	30	24	665	280	600	505	470	270	150	210	6	26
09	1350	390	35	36	740	280	600	550	500	330	185	210	6	33
10	1460	390	35	36	800	320	690	600	550	330	195	260	6	33
11	1650	470	35	40	886	320	695	605	605	400	245	200	6	39
12	1750	470	35	40	936	380	800	675	675	400	235	270	6	39
13	1870	545	40	48	1027	380	815	712.5	712.5	465	245	240	6	45
14	2025	545	40	48	1105	440	950	782.5	782.5	465	260	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

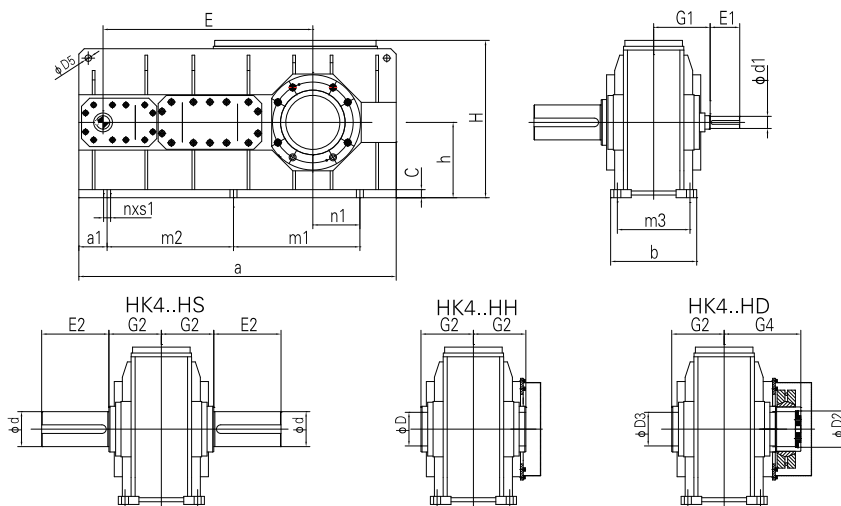


Size	iN=14-25		iN=16-28		iN=18-25		iN=18-31.5		iN=20-28		iN=20-35.5		iN=28-45		iN=31.5-50		iN=35.5-50		iN=35.5-56		iN=40-63		G1
	d1	E1	d1	E1	d1	E1	d1	E1	d1	E1	d1	E1	d1	E1	d1	E1	d1	E1	d1	E1	d1	E1	
15							120m6	210									100m6	210					365
16							120m6	210									100m6	210					365
17	125m6	210												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	960	600	600	570	520	265	315	8	42
16	2300	595	40	55	1230	500	1035	690	600	570	520	245	360	8	42
17	2400	655	45	55	1315	500	1035	660	660	675	580	205	350	8	42
18	2535	655	45	55	1380	550	1145	790	660	675	580	210	420	8	42
19	2490	790	50	65	1580	550	1190	760	760	525	645	220	400	8	48
20	2600	790	50	65	1635	620	1260	890	760	520	645	220	470	8	48
21	3085	830	55	72	1725	700	1420	870	870	810	700	285	450	8	56
22	3195	830	55	72	1780	700	1420	985	870	810	700	285	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	200	4095
16	250m6	410	380	240H7	380	240H7	240H7	380	550				215	4715
17	260m6	410	415	250H7	415	250H7	250H7	415	600				230	5565
18	280m6	470	415	275H7	415	280H7	280H7	415	600				260	6415
19	290m6	470	465	On Request									310	8420
20	310m6	470	465										385	9500
21	330m6	550	490										465	11660
22	350m6	550	490										580	12960

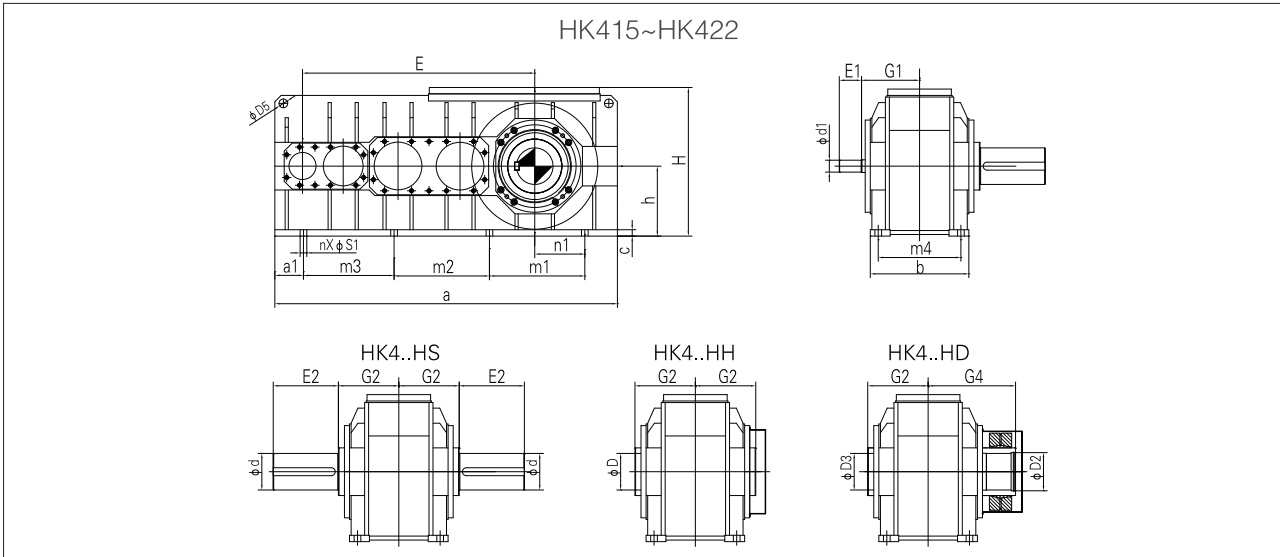
HK405~HK414



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	450	375	375	215	110	158	6	22
06	1040	255	30	24	648.5	230	500	420	420	400	130	213	6	22
07	1165	320	30	24	745	240	520	480	430	270	155	190	6	26
08	1235	320	30	24	785	280	600	505	470	270	150	210	6	26
09	1350	390	35	36	880	280	600	550	500	330	185	210	6	33
10	1460	390	35	36	940	320	690	600	550	330	195	260	6	33
11	1650	470	35	40	1061	320	695	605	605	400	245	200	6	39
12	1750	470	35	40	1111	380	800	675	675	400	235	270	6	39
13	1870	545	40	48	1237	380	815	712.5	712.5	465	245	240	6	45
14	2025	545	40	48	1315	440	950	782.5	782.5	465	260	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



Size	iN=22.4-112		iN=22.4-125		iN=25-125		iN=25-140		iN=28-140		iN=125-200		iN=125-250		iN=140-224		iN=140-250		iN=160-224		iN=160-250		G1	
	d1	E1	d1	E1	d1	E1	d1	E1	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											460
20			110m6	210											90m6	170								460
21								130m6	250												110m6	210		490
22								130m6	250												110m6	210		490

Size	a	b	C	D5	E	h	H	m1	m2	m3	m4	a1	n1	n	S1
15	2250	595	40	55	1461	440	960	600	600	570	520	265	315	8	42
16	2300	595	40	55	1486	500	1035	690	600	570	520	245	360	8	42
17	2400	655	45	55	1571	500	1035	660	660	675	580	205	350	8	42
18	2535	655	45	55	1636	550	1145	790	660	675	580	210	420	8	42
19	2700	790	50	65	1776	550	1190	760	760	700	645	255	400	8	48
20	2810	790	50	65	1831	620	1260	890	760	700	645	250	470	8	48
21	3085	830	55	72	2070	700	1420	870	870	810	700	285	450	8	56
22	3195	830	55	72	2125	700	1420	985	870	810	700	285	510	8	56

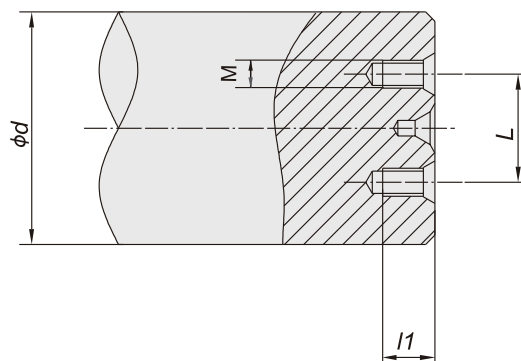
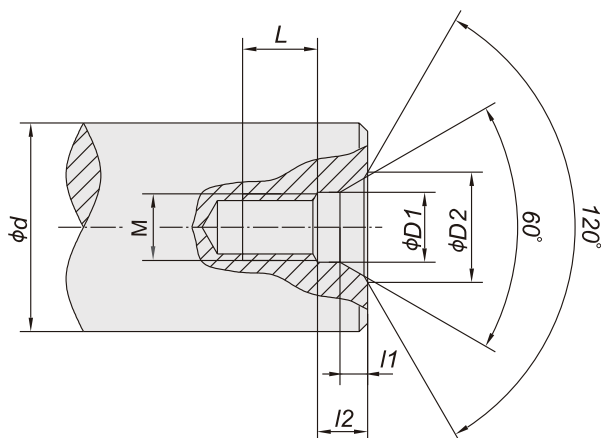
Size	HK4..HS			HK4..HH		HK4..HD				H4..HK	H4..HE	H4..HC	Oil(L)	Weight(Kg)
	d	E2	G2	D	G2	D2	D3	G2	G4					
15	240m6	410	380	230H7	380	230H7	230H7	380	550	Page 21	Page 22	Page 22	190	4635
16	250m6	410	380	240H7	380	240H7	240H7	380	550				210	5150
17	260m6	410	415	250H7	415	250H7	250H7	415	600				225	6190
18	280m6	470	415	275H7	415	280H7	280H7	415	600				250	7280
19	290n6	470	465	On Request									305	9135
20	310n6	470	465										380	10180
21	330n6	550	490										460	12600
22	350n6	550	490							575	13915			

12 Screw hole in shaft end

12 轴端螺纹孔

Type C screw central hole in shaft end / 轴端C型螺纹中心孔

Double screw holes in shaft end / 轴端双螺孔



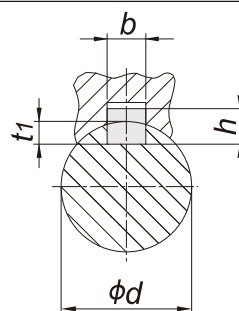
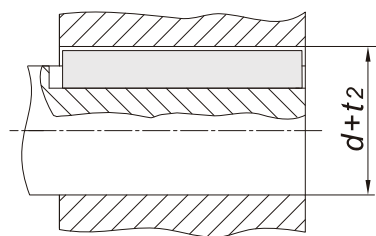
Type C screw central hole in shaft end / 轴端C型螺纹中心孔
 $7 < d \leq 225$

Double screw holes in shaft end / 轴端双螺孔
 $225 < d$

d	M	L	l2	l1	D1	D2	d	M	l1	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

13 平键键槽尺寸



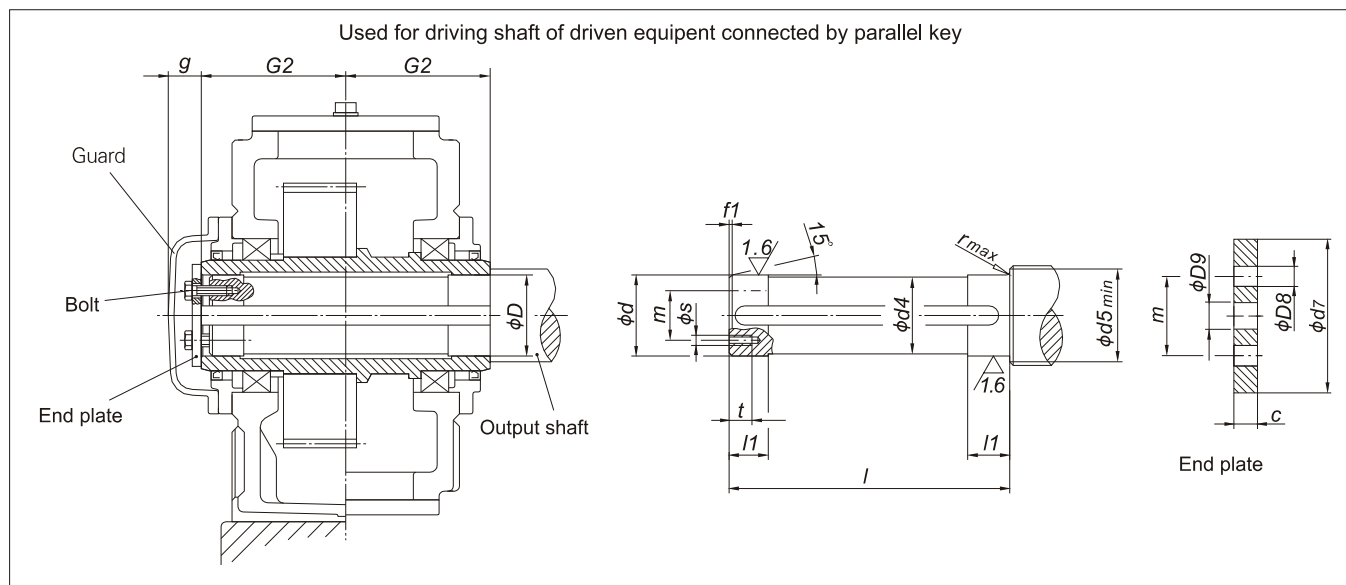
d	b	h	t ₁	d + t ₂
8 < d ≤ 10	3	3	1.8	d + 1.4
10 < d ≤ 12	4	4	2.5	d + 1.8
12 < d ≤ 17	5	5	3	d + 2.3
17 < d ≤ 22	6	6	3.5	d + 2.8
22 < d ≤ 30	8	7	4	d + 3.3
30 < d ≤ 38	10	8	5	d + 3.3
38 < d ≤ 44	12	8	5	d + 3.3
44 < d ≤ 50	14	9	5.5	d + 3.8
50 < d ≤ 58	16	10	6	d + 4.3
58 < d ≤ 65	18	11	7	d + 4.4
65 < d ≤ 75	20	12	7.5	d + 4.9
75 < d ≤ 85	22	14	9	d + 5.4
85 < d ≤ 95	25	14	9	d + 5.4
95 < d ≤ 110	28	16	10	d + 6.4
110 < d ≤ 130	32	18	11	d + 7.4
130 < d ≤ 150	36	20	12	d + 8.4
150 < d ≤ 170	40	22	13	d + 9.4
170 < d ≤ 200	45	25	15	d + 10.4
200 < d ≤ 230	50	28	17	d + 11.4
230 < d ≤ 260	56	32	20	d + 12.4
260 < d ≤ 290	63	32	20	d + 12.4
290 < d ≤ 330	70	36	22	d + 14.4
330 < d ≤ 380	80	40	25	d + 15.4
380 < d ≤ 440	90	45	28	d + 17.4
440 < d ≤ 500	100	50	31	d + 19.5
500 < d ≤ 560	110	56	34.3	d + 22.2
560 < d ≤ 640	120	63	39	d + 24.5

14 Dimensions for recommended output connections

14 建议输出联接尺寸图表

14.1 Hollow shaft with parallel keys:

14.1带平键联接的空心轴尺寸图表:



Type HK3H HK4H

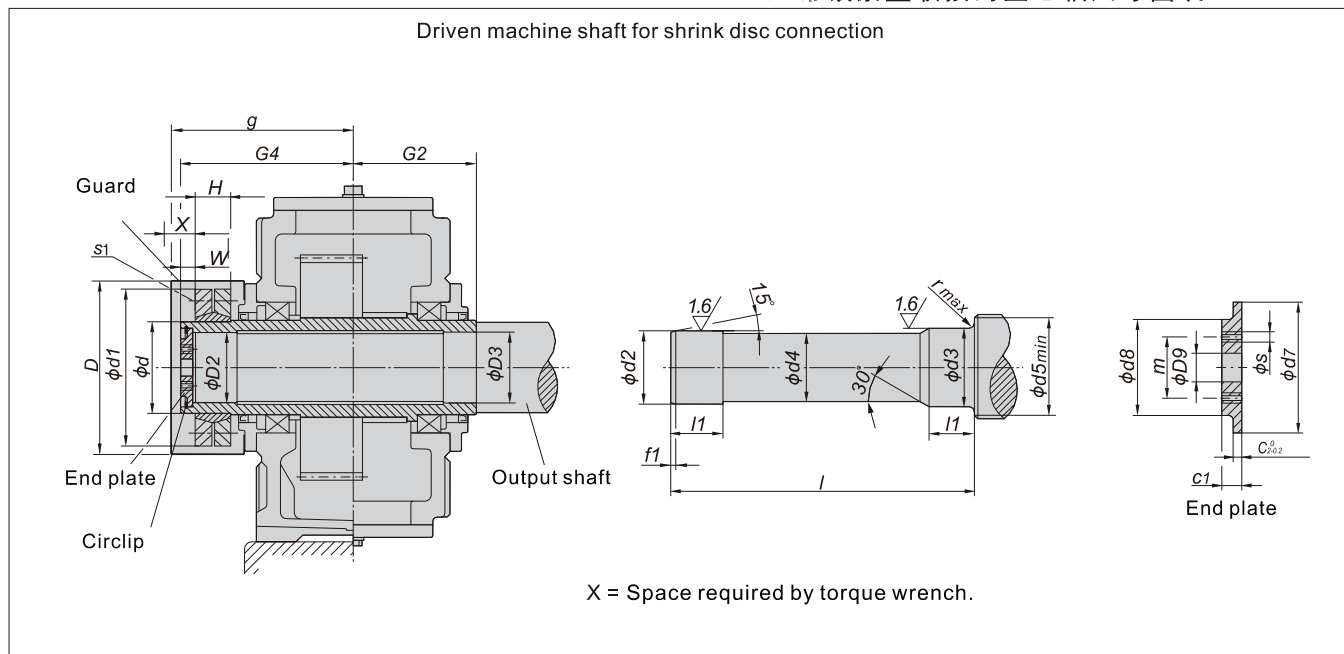
Size	Driven machine shaft									End plate					Bolt		Hollow shaft		
	d	d ₄	d ₅	f ₁	l	l ₁	r	s	t	c	D ₈	D ₉	d ₇	m	Size	Qty.	D	G ₂	g
05	95h6	94.5	105	5	328	40	1.6	M 10	18	10	11	26	120	70	M 10 x 25	2	95H7	165	40
06	105h6	104.5	116	5	328	45	1.6	M 10	18	10	11	26	120	70	M 10 x 25	2	105H7	165	40
07	115h6	114.5	126	5	388	50	1.6	M 12	20	12	13.5	26	140	80	M 12 x 30	2	115H7	195	40
08	125h6	124.5	136	6	388	55	2.5	M 12	20	12	13.5	26	150	85	M 12 x 30	2	125H7	195	40
09	135h6	134.5	147	6	467	60	2.5	M 12	20	12	13.5	33	160	90	M 12 x 30	2	135H7	235	45
10	150h6	149.5	162	6	467	65	2.5	M 12	20	12	13.5	33	185	110	M 12 x 30	2	150H7	235	45
11	165h6	164.5	177	7	537	70	2.5	M 16	28	15	17.5	33	195	120	M 16 x 40	2	165H7	270	45
12	180h6	179.5	192	7	537	75	2.5	M 16	28	15	17.5	33	220	130	M 16 x 40	2	180H7	270	45
13	190h6	189.5	206	7	667	80	3	M 16	28	18	17.5	33	230	140	M 16 x 40	2	190H7	335	45
14	210h6	209.5	226	8	667	85	3	M 16	28	18	17.5	33	250	160	M 16 x 40	2	210H7	335	45
15	230h6	229.5	248	8	756	100	3	M 20	38	25	22	39	270	180	M 20 x 55	4	230H7	380	60
16	240h6	239.5	258	8	756	100	3	M 20	38	25	22	39	280	180	M 20 x 55	4	240H7	380	60
17	250h6	249.5	270	8	826	110	4	M 20	38	25	22	39	300	190	M 20 x 55	4	250H7	415	60
18	275h6	274.5	295	9	826	120	4	M 20	38	25	22	39	330	210	M 20 x 55	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 standard allocation of hollow shaft with parallel key connections.

注: 1. 被驱动设备的驱动轴材质: 40Cr或强度更高的钢。
 2. 被驱动设备的驱动轴及平键不在我们的供货范围之内。如果需要的话, 订货。
 3. 防护罩、端板及螺栓均为带平键联接空心轴的标准配置。

14.2 Hollow shaft with shrink disk:

14.2 带锁紧盘联接的空心轴尺寸图表:



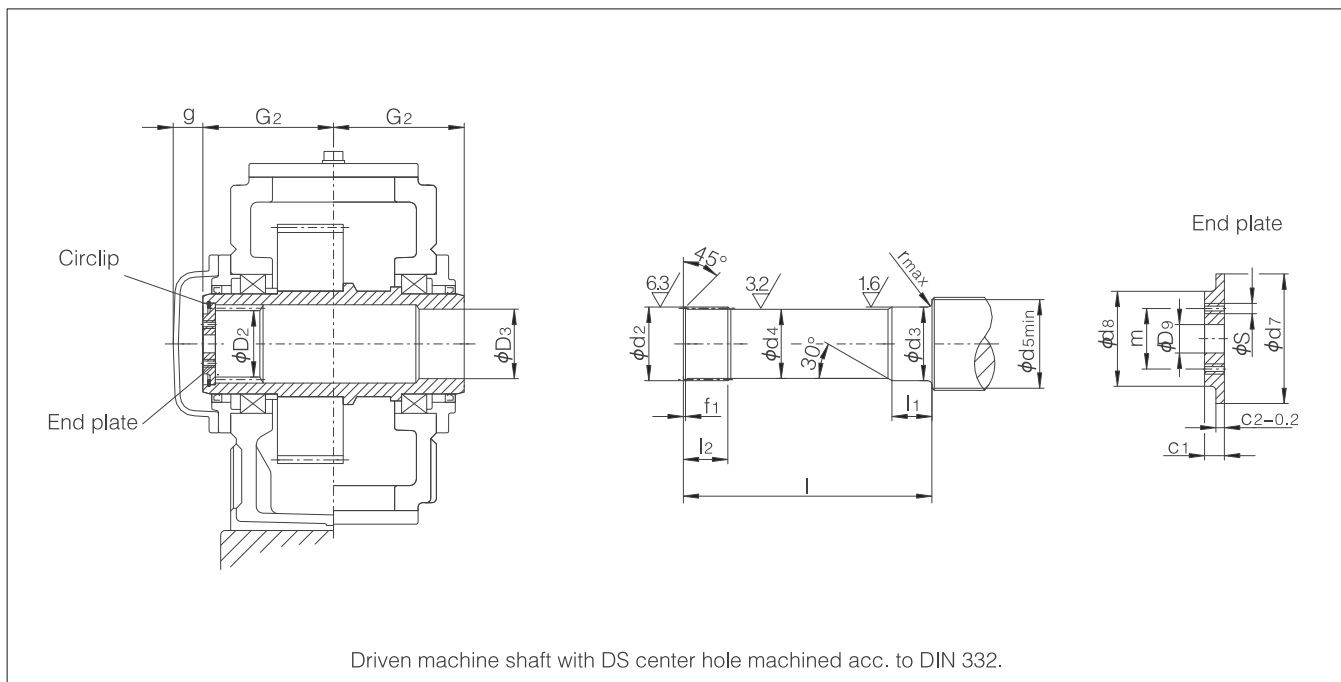
Type HK3D HK4D																													
Size	Driven machine shaft ²⁾															Circlip	Hollow shaft				Shrink disk ¹⁾				Bolt	Guard			
	d ₂	d ₃	d ₄	d ₅	f ₁	l	l ₁	r	c ₁	c ₂	d ₇	d ₈	D ₉	m	s		Qty.	D ₂	D ₃	G ₂	G ₄	Type	d	d ₁		H	W	s ₁	D
05	100 g6	100 h6	99.5	114	5	383	53	2	20	8	105	80	26	55	M 10	2	105	100H7	100	165	240	SP2-125	125	215	53	20	M 12	275	255
06	110 g6	110 h6	109.5	124	5	383	58	3	20	8	115	85	26	60	M 10	2	115	110H7	110	165	240	SP2-140	140	230	58	20	M 12	285	255
07	120 g6	120 h6	119.5	134	5	453	68	3	20	8	125	90	26	65	M 12	2	125	120H7	120	195	280	SP2-155	155	263	62	23	M 12	330	295
08	130 g6	130 h6	129.5	145	6	458	73	3	20	8	135	100	26	70	M 12	2	135	130H7	130	195	285	SP2-165	165	290	68	23	M 16	340	300
09	140 g6	140 h6	139.5	160	6	539	82	4	23	10	150	110	33	80	M 12	2	150	140H7	140	235	330	SP2-175	175	300	68	28	M 16	360	345
10	150 g6	150 h6	149.5	170	6	559	92	4	23	10	160	120	33	90	M 12	2	160	150H7	150	235	350	SP2-200	200	340	85	28	M 16	395	365
11	165 f6	165 g6	164.5	185	7	644	112	4	23	10	175	130	33	90	M 12	2	175	165H7	165	270	400	SP2-220	220	370	103	30	M 16	435	420
12	180 f6	180 g6	179.5	200	7	649	122	4	23	10	190	140	33	100	M 16	2	190	180H7	180	270	405	SP2-240	240	405	107	30	M 20	450	420
13	190 f6	190 g6	189.5	213	7	789	137	5	23	10	200	150	33	110	M 16	2	200	190H7	190	335	480	SP2-260	260	430	119	30	M 20	500	505
14	210 f6	210 g6	209.5	233	8	784	147	5	28	14	220	170	33	130	M 16	2	220	210H7	210	335	480	SP2-280	280	460	132	30	M 20	525	505
15	230 f6	230 g6	229.5	253	8	899	157	5	28	14	240	180	39	140	M 16	2	240	230H7	230	380	550	SP2-300	300	485	140	35	M 20	575	575
16	240 f6	240 g6	239.5	263	8	899	157	5	28	14	250	190	39	150	M 20	2	250	240H7	240	380	550	SP2-320	320	520	140	35	M 20	595	575
17	250 f6	250 g6	249.5	278	8	982	177	5	30	14	265	200	39	150	M 20	2	265	250H7	250	415	600	SP2-340	340	570	155	35	M 20	615	630
18	280 f6	280 g6	279.5	306	9	982	177	5	30	14	290	210	39	160	M 20	2	290	280H7	280	415	600	SP2-360	360	590	162	35	M 24	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.

注: 1. 被驱动设备的驱动轴材质: 40Cr或强度更高的钢。
 2. 被驱动设备的驱动轴不在供货范围之内。但尺寸函索即复。
 3. 锁紧盘、防护罩、端板及弹性挡圈均为带锁紧盘联接空心轴的标准配置。
 4. 被驱动设备的驱动轴表面不得沾有机油或润滑脂。

14.3 Hollow shaft with involute spline:

14.3 带花键空心轴尺寸图表：



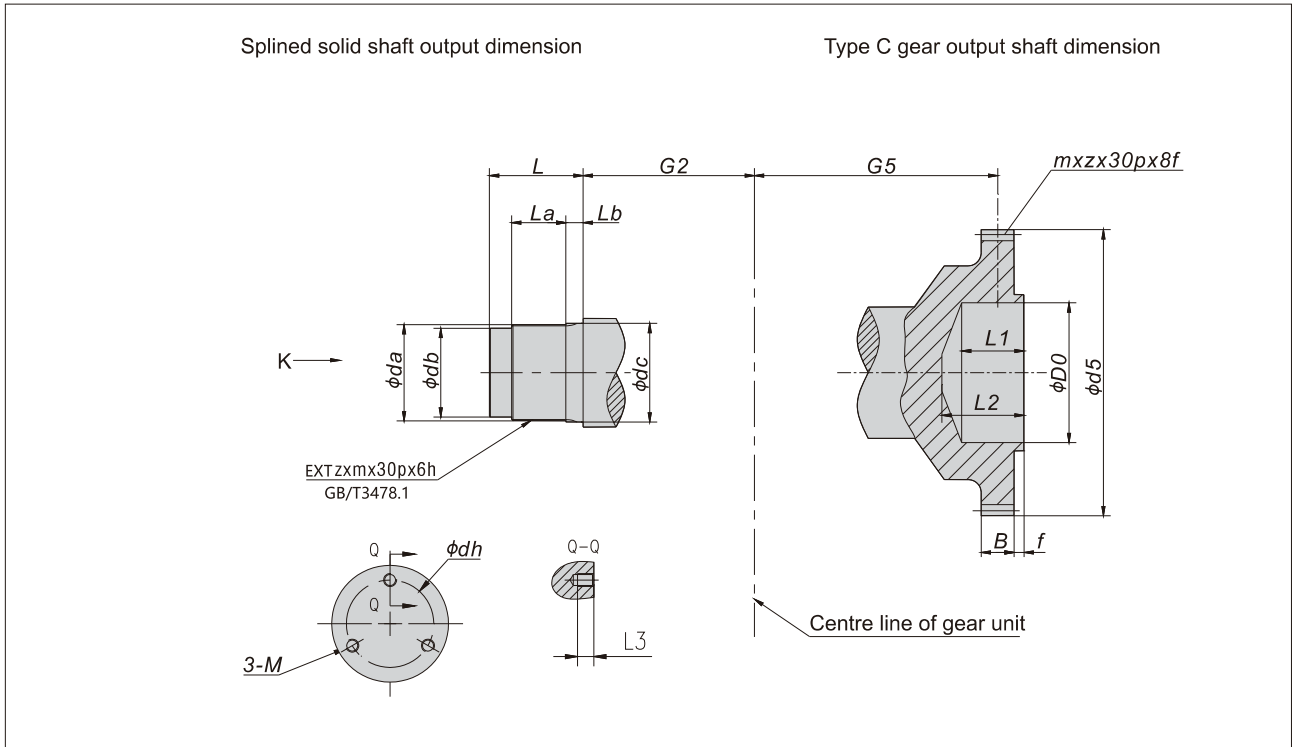
Types HK3K、HK4K																								
Size	Involute splines DIN 5480	Driven equipment shaft ¹⁾										End plate							Circlip	Hollow shaft				Bolt
		d2	d3	d4	d5	f1	l	l1	l2	r	c1	c2	d7	d8	D9	m	s	Qty.		D2	D3	G2	G	
5	W95X3X30X30X8f	94.4h11	100h6	93	114	3	308	53	90	2	20	8	105d9	80	26	55	M10	2	105	89H11	100H7	165	45	M24
6	W95X3X30X30X8f	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	W120X3X30X38X8f	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	W120X3X30X38X8f	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	W140X3X30X45X8f	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	W140X3X30X45X8f	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	W170X5X30X32X8f	169h11	170g6	168	185	5	514	112	150	4	23	10	175d9	130	33	90	M12	2	175	160H11	170H7	270	65	M30
12	W170X5X30X32X8f	169h11	185g6	168	200	5	514	122	150	4	23	10	175d9	130	33	90	M12	2	175	160H11	185H7	270	65	M30
13	W190X5X30X36X8f	189h11	195g6	188	213	5	644	137	180	5	23	10	200d9	150	33	110	M16	2	200	180H11	195H7	335	45	M30
14	W190X5X30X36X8f	189h11	215g6	188	233	5	644	147	180	5	23	10	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.

- 注: 1. 被驱动设备的驱动轴材质: 40Cr或强度更高的钢。
 2. 被驱动设备的驱动轴不在我们的供货范围之内。如果需要的话,请另订货。
 3. 防护罩、端板及弹性挡圈均为带花键联接空心轴的标准配制。
 4. 带花键联接的工作机驱动轴, 安装时花键需加注润滑脂。

14.4 Dimensions of splined solid shaft and type C output shaft:

14.4 花键实心轴和C型齿式输出轴尺寸图表:



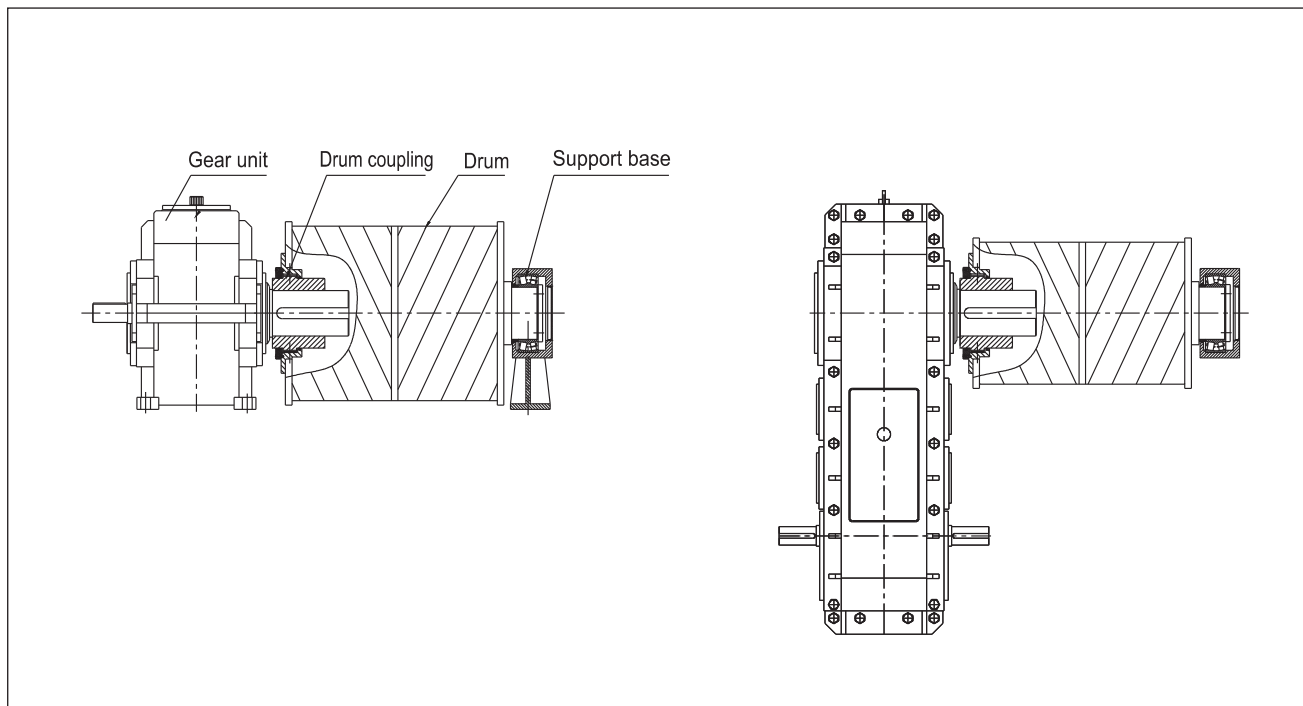
Splined solid shaft output dimension											Type C gear output shaft dimension								
Size	G ₂	zxm	d _a	d _b	d _c	d _h	L	L _a	L _b	M	L ₃	mxz	d ₅	D ₀	L ₁	L ₂	B	f	G ₅
05	165	18x5	95h6	80h6	100	50	125	55	35	M10	17	4X56	232h11	120H7	50	75	35	14	271
06	165	22x5	115h6	100h6	120	70	135	60	40	M12	20	4X56	232h11	120H7	50	75	35	14	271
07	195	26x5	135h6	120h6	140	90	155	75	45	M12	20	4X56	232h11	120H7	76	100	35	14	346
08	195	26x5	135h6	120h6	140	90	155	75	45	M12	20	4X56	232h11	120H7	76	100	35	14	346
09	235	30x5	155h6	140h6	160	100	165	80	50	M12	20	8X54	448h11	200H7	78	100	50	15	370
10	235	34x5	175h6	160h6	180	110	180	80	55	M16	24	8X54	448h11	200H7	78	100	50	15	385
11	270	38x5	195h6	180h6	200	130	190	100	55	M16	24	8X54	448h11	200H7	78	100	50	15	420
12	270	38x5	195h6	180h6	200	130	190	100	55	M16	24	8X54	448h11	200H7	78	100	50	15	430
13	335	26x8	216h6	190h6	222	140	205	110	60	M16	24	10X48	500h11	200H7	78	100	60	35	513
14	335	26x8	216h6	190h6	222	140	205	110	60	M16	24	10X48	500h11	200H7	78	100	60	35	513
15	400	30x8	248h6	220h6	254	160	220	125	60	M16	24	10X48	500h11	200H7	78	100	60	35	550
16	400	30x8	248h6	220h6	254	160	220	125	60	M16	24	10X48	500h11	200H7	78	100	60	35	575
17	450	30x8	248h6	220h6	254	160	220	125	60	M16	24	12X54	672h11	290H7	78	100	75	45	600
18	450	34x8	280h6	250h6	286	180	235	140	60	M20	30	12X54	672h11	290H7	78	100	75	45	625
19	500	38x8	312h6	280h6	318	200	260	155	70	M24	40	12X54	672h11	290H7	78	100	75	45	655
20	500	38x8	312h6	280h6	318	200	260	155	70	M24	40	12X54	672h11	290H7	78	100	75	45	675
21	550	44x8	360h6	320h6	366	230	285	175	75	M24	40	/	/	/	/	/	/	/	/
22	550	44x8	360h6	320h6	366	230	315	205	75	M24	40	/	/	/	/	/	/	/	/

15 Application drawing

15 应用示意图

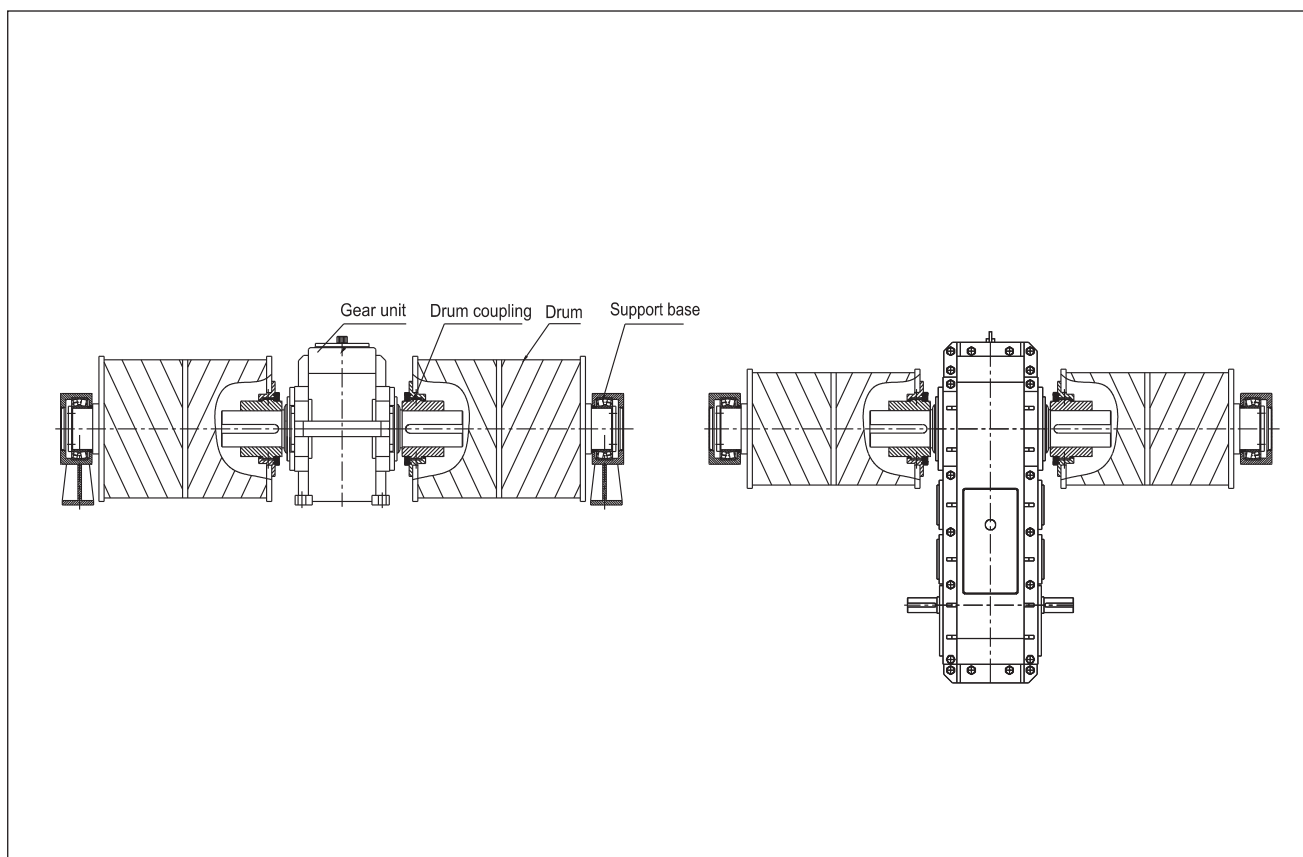
15.1 Single drum transmission:

15.1 单卷筒传动示意图:



15.2 Double drums transmission:

15.2 双卷筒传动示意图:



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	+30°C~+50°C
Viscosity brand number	VG320	VG460

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.

16 润滑油

重负荷工业齿轮油粘度牌号选用:
 VG320 (附件代号UV32)
 VG460 (附件代号UV46)

 注: 1.上表中粘度牌号为40°C温度下的ISO-VG粘度。
 2.环境温度低于-10°C必须使用合成油。
 3.为保证产品寿命,实际使用中建议使用合成油。
 4.若环境温度超出上述范围,敬请垂询。

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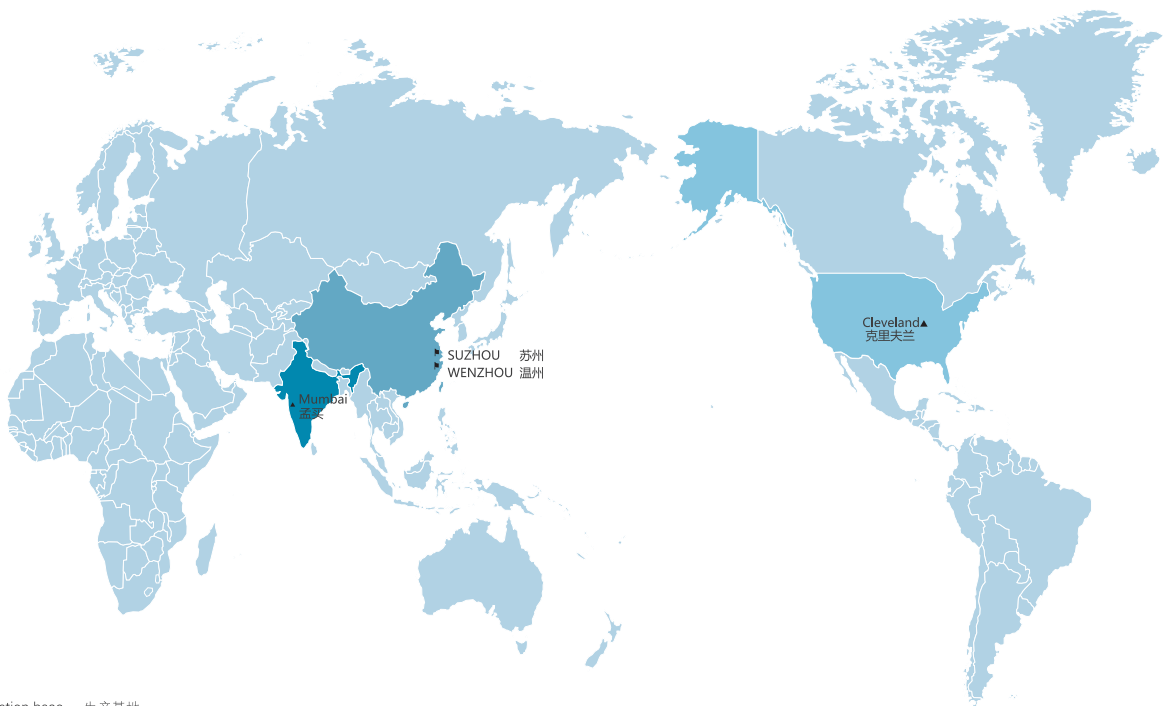
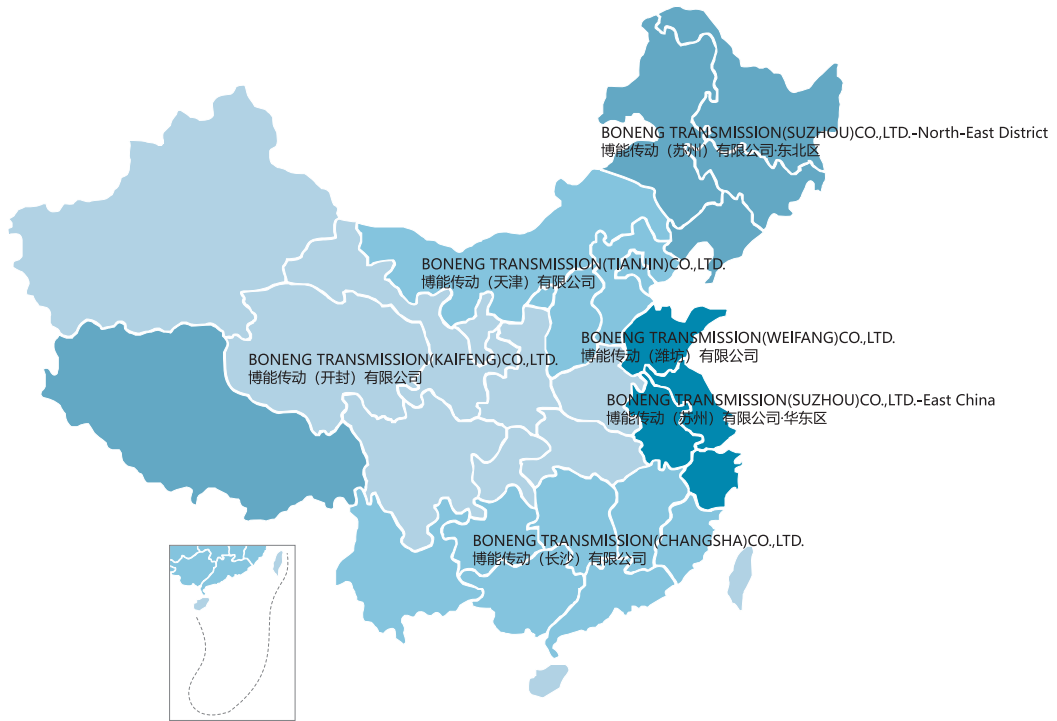
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