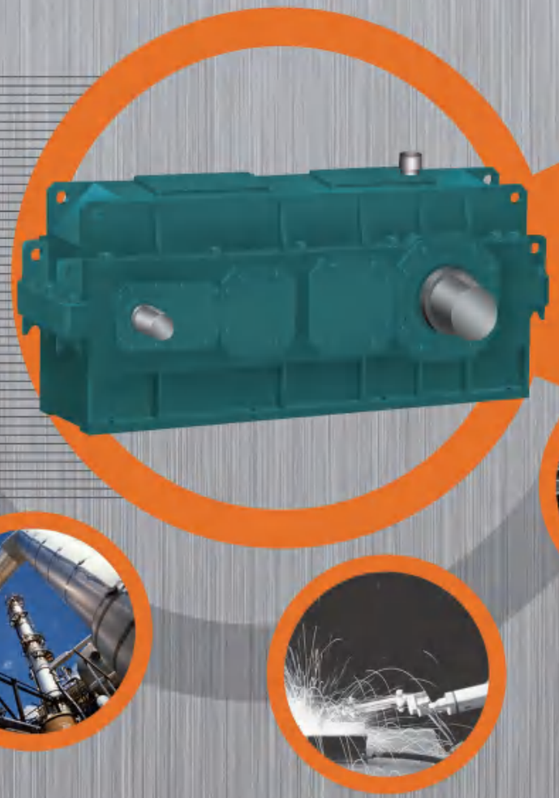
CA-038-2024

中国名牌产品 CHINA TOP BRAND

国家大型企业 NATIONAL LARGE ENTERPRISE

中国驰名商标
CHINA WELL-KNOWN
TRADEMARK



TLHK系列
加长中心距齿轮箱

中国驰名商标
CHINA WELL-KNOWN
TRADEMARK

TAILONG

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TAILONG
MACHINERY

江苏泰隆机械集团公司
JIANGSU TAILONG MACHINERY GROUP COMPANY
江苏泰隆减速机股份有限公司
JIANGSU TAILONG DECELERATOR MACHINERY CO.,LTD.

公司简介

江苏泰隆减速机股份有限公司创办于1982年，坚守改革兴企之初心，砥砺奋斗40年，现为中国减速机行业排头兵企业、全国守合同重信用企业、国家知识产权示范企业、江苏省高新技术企业、江苏省民营企业纳税大户、标准化良好行为AAAA级企业，全国实施卓越绩效模式先进企业，AAA级资信企业。现为全国减变速机行业协会理事长单位、全国减速机标准化技术委员会秘书处单位。

公司拥有总资产32亿元，占地面积近80万平方米，员工2000余人。以齿轮传动装备为主业，主营标准工业齿轮箱、高端定制齿轮箱及精密传动减速器。泰隆致力于“做中国减速机行业的领跑者”，拥有国家级博士后科研工作站、江苏省企业技术中心、江苏省传动机械控制技术研究中心、江苏省工业设计中心。坚持以技术创新为支撑，获得授权专利300余件，其中发明专利58件，主持、参与制定国家、行业标准20件。承担国家、省部级项目课题4项，多次荣获省和国家级科技进步一等奖、二等奖。江苏省首台套RPG辊压磨机齿轮箱、核电循环水泵驱动变速装置填补国内空白。拥有各类通用、专用生产、检测设备1900余台（套），从美国、德国、日本、俄罗斯等国家购进的高精尖生产设备和检测仪器占23%。建立了全国同行业中检测功能全、功率大、仪器先进的2000kW减速机性能测试中心。公司建立了泰隆特色的“六轮相传，一架为心”质量管理模式，通过了ISO9001质量体系认证、ISO14001环境体系认证、OHSAS18001职业健康安全认证，获得了江苏省省长质量奖提名奖。产品通过矿用产品安全标志认证、起重行业型式试验认可认证，CCS产品检验认证、CCC认证、CE认证等。

泰隆以制造技术垂直发展钢帘线机械、风机产品、电机产品，钢帘线公司成为法国米其林公司指定的世界供应商，双叶、三叶罗茨风机及高温风机批量出口东南亚及欧美地区。具有十几个系列，几十万种规格的主业产品减速机成功应用于三峡工程、嫦娥一号发射基地、杭州湾跨海大桥、北京奥体馆、上海世博会等国家重点工程。重点顾客有宝钢集团、首钢集团、建龙钢厂、上海振华港机、葛洲坝集团、中国铝业、伊拉克泵站、卫华集团、成都利君、三一重工、福建宁德与辽宁红沿河核电站等。

泰隆人将遵循自己一贯的质量承诺、服务承诺和信誉承诺，把顾客满意当作我们的最高追求！

Company Brief

Since its founding in 1982, Jiangsu Tailong Decelerator Machinery Co., Ltd. (Jiangsu Tailong in short) has been forging ahead for 40 years while staying committed to the original intention of reform and enterprise revitalization. Currently grown into a leader in China's reducer industry, it has won honors of national contract-honoring and trustworthy enterprise, national intellectual property demonstration enterprise, Jiangsu Provincial high-tech enterprise, large private enterprise taxpayer of Jiangsu Province, AAAA-rating good standardizing practice of enterprise, advanced enterprise implementing excellent performance mode in China and AAA credit-rating enterprise, and become a chairman unit of the National Reducer Industry Association and the secretariat unit of the National Technical Committee on Reducer of Standardization Administration of China.

The company owns total assets of 3.2 billion yuan, covers an area of 800,000 square meters and owns more than 2,000 employees. With gear transmission equipment as the main business, Jiangsu Tailong is mainly engaged in standard industrial gearbox, high-end customized gearbox and precision transmission reducer. Jiangsu Tailong is committed to "becoming the leader in China's reducer industry", and owns national postdoctoral scientific research workstation, Jiangsu Enterprise Technology Center, Jiangsu Transmission Machinery Control Technology Research Center and Jiangsu Industrial Design Center. Thanks to the support by technological innovation, it has obtained more than 300 authorized patents, including 58 invention patents, and presided over and participated in the formulation of 20 national and industrial standards. Jiangsu Tailong has undertaken 4 national, provincial and ministerial projects and won numerous first and second prizes of provincial and national scientific and technological progress awards. The first set of RPG roller mill gearbox and nuclear power circulating water pump speed-change actuating device in Jiangsu Province filled the domestic gap in this field. It has acquired more than 1,900 sets of general and special-purposed production and testing equipment, and purchased 23% of its high-precision production equipment and testing instruments from the United States, Germany, Japan, and Russia. A 2000kW reducer performance test center equipped with full testing function, high-power and advanced instruments among the same industry has been set up. The company has established the quality management mode of "six-gear transmission with planet carrier as the core" with Tailong characteristics, passed ISO9001 quality system certification, ISO14001 environmental system certification and OHSAS18001 occupational health and safety certification, and won the nomination award of Jiangsu Governor Quality Award. The products have passed the safety label certification of mining products, type-test approval certification of hoisting industry, CCS product inspection certification, CCC certification, and CE certification.

Jiangsu Tailong vertically develops steel cord machinery, fan products and motor products relying on its manufacturing technology. The Tailong Steel Cord Machinery Company has become the world supplier designated by French-based Michelin. Double-leaf and three-leaf roots fans and high-temperature fans are exported in batches to Southeast Asia, Europe and US. Boasted with more than dozen of series and hundreds of thousands of specifications, the main product of reducer has been successfully applied to national key projects e.g. the Three Gorges Dam, the Chang'e-1 Launch Base, the Hangzhou Bay Sea-Crossing Bridge, the Beijing Olympic Stadium, and the Shanghai World Expo Park. Key customers include Baosteel Group, Shougang Group, Jianlong Steel Plant, Shanghai Zhenhua Heavy Industries Co., Ltd. (ZPMC), Gezhouba Group, Chinalco, Iraq Pump Station, Weihua Group, Chengdu Lee Jun, Sany Heavy Industry, Fujian Ningde Nuclear Power Station and Liaoning Hongyanhe Nuclear Power Station.

Tailong people will follow their persistent quality guarantee, service guarantee and credit standing guarantee and take customer satisfaction as our tiptop pursuit!

目录
Catalogue

一、简介 Overview

本公司齿轮箱产品在起重设备中广泛应用于门式起重机、塔式起重机、浮式起重机、缆索起重机、装卸桥、桥式起重机等各种起重机设备的主、副起升以及回转、行走、变幅机构中，在港口、矿山、冶金、建筑造船等行业以优质的服务和稳定的产品质量得到了客户的一致好评。

TLHK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，在同样的承载能力下加大了输出、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。

由于采用了模块化设计，减少了零部件的库存，也使交货周期更加缩短。

TLHK系列中可以选择3级或者4级传动，其速比范围可达14~250。

TLHK系列的齿轮箱箱体是采用HT250铸造材质，也可以采用钢板焊接而成；TLHK系列的齿轮箱（机座号15–22)完全采用钢板焊接齿轮箱箱体。

With professional service and stable quality,TAILONG gear units have been well received with praise around china and world.In crane industry,our products are widely used in main or auxillary hoisting gears of gantry crane,tower crane,truck crane,tyre crane,crawler crane,deck crane,floating crane,cable crane,transporter crane,overhead crane etc.,which have made great achievements in different industries such as habor,mine, metallurgy,constructuion,shipbuilding,etc.

TLHK series gear units are specially designed for crane in terms of its structure and characteristics,with the same transmission capacity,we extended center distance between output shaft and input shaft so as to reduce power loss when have to meet requirements of mounting size.TLseries products are in particular fit for main or auxiliary hoisting gears of gantry crane,overhead crane and container crane.

Adopting modular design,which reduce parts stock and motivate fast delivery.

For TLHK series gear units,3-stage or 4-stage transmission can be selected and ratio range is 14-250

The housing of TLHK series gear units are using HT250 casting material or welding steel plate,TLHK series gear units (size 15-22)completely adopt steel plate welding for housing

二、型号标记方法及分类和布置型式 Model marking method, classification, and layout type

2.1标记方法 Marking method

TLHK 3 S H 10 - 56 - A

TLHK系列 TLK Series
TLHK加长中心距齿轮箱
TLHK Helical gear units with extende total centre distance

传动级数Stages
级数Stages:3-4

输出轴方式 Output shaft mode
S=平键实心轴Solid shaft with parallel key
H=平键空心轴Hollow shaft with parallel key
D=带锁紧盘空心轴Hollow shaft with shrink disk
G=G型齿式输出轴Type C gear output shaft
W=花键实心轴 W=Solid shaft with spline
N=空心轴花键联接 N=Hollow shaft spline connection

安装形式Mounting modes
H=卧式安装Horizontal
M=不带底脚卧式安装Horizontal design without feet（三支点安装Three fulcrums mounting）
L=竖直安装Vertical mounting T=力矩臂安装Mounting of torque arm

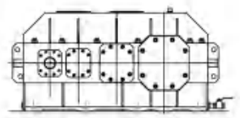
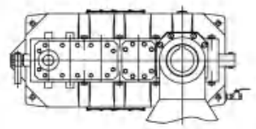
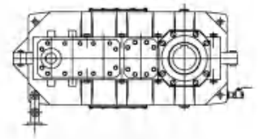
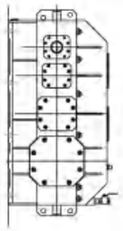
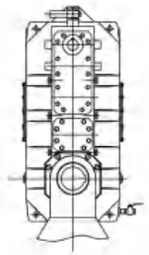
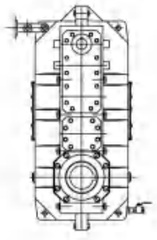
规格Size
4-22

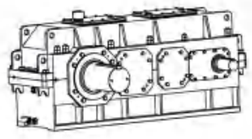
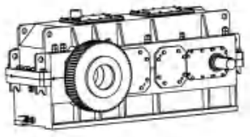
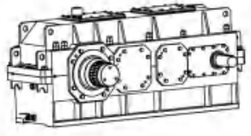
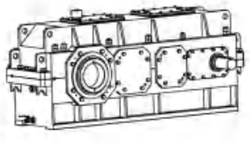
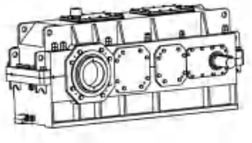
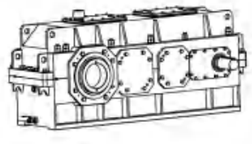
公称减速比Nominal ratio
14-250

布置形式Designs
A/B/C/D/E/F/G/H/I

TAILONG MACHINERY

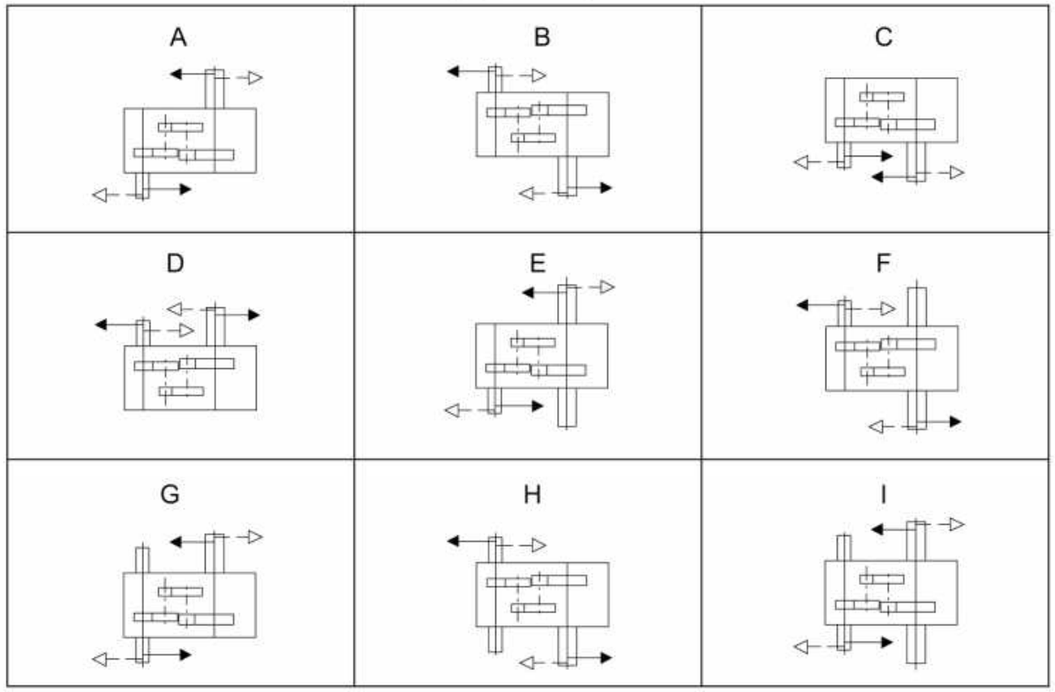
2.2 产品分类 Product classification

类型Type	安装方式Mounting modes		
类型: TLHK3.. 传动级数: 3级 速比范围:14–90 类型: TLHK4.. 传动级数: 4级 速比范围:20–250 Type: TLHK3.. Stages: 3 Ratio scope: 14-90 Type: TLHK4.. Stages: 4 Ratio scope: 20-250	TLHK...HB 卧式地脚安装 Horizontal mounting of anchor 	TLHK...HM 卧式三支点安装 Horizontal mounting of three fulcrums 	TLHK...HT 卧式力矩臂安装 Horizontal mounting of torque arm 
	TLHK...LB 竖直式地脚安装 Vertical mounting of anchor 	TLHK...LM 竖直式三支点安装 Vertical mounting of three fulcrums 	TLHK...LT 竖直式力矩臂安装 Vertical mounting of torque arm 

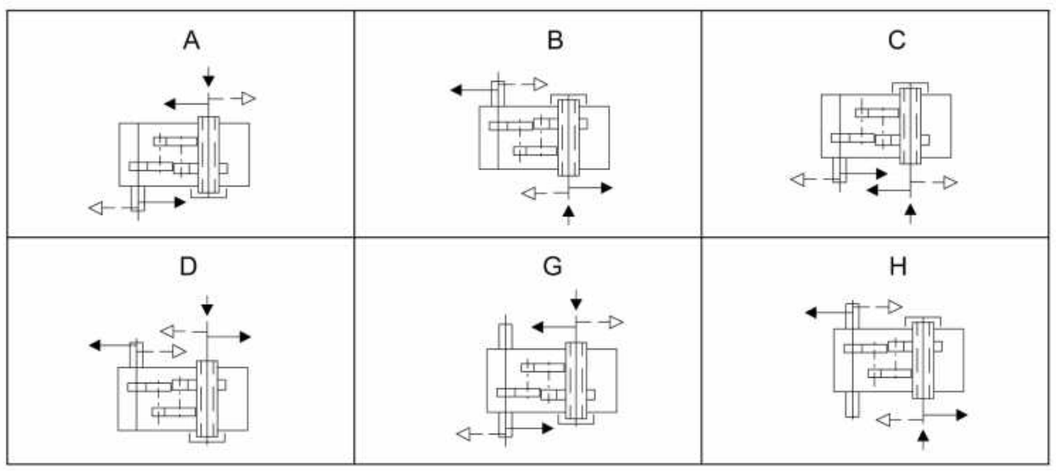
类型Type	输出轴形式Form of output shaft		
类型: TLHK3.. 传动级数: 3级 速比范围:14–90 类型: TLHK4.. 传动级数: 4级 速比范围:20–250 Type: TLHK3.. Stages: 3 Ratio scope: 14-90 Type: TLHK4.. Stages: 4 Ratio scope: 20-250	TLHK.S.H 实心轴平键联接 Solid shaft with parallel key connection 	TLHK.G.H 实心轴齿式联接 Solid shaft gear connection 	TLHK.W.H 实心轴外花键联接 Solid shaft external spline connection 
	TLHK.H.H 空心轴平键联接 Hollow shaft with parallel key connection 	TLHK.D.H 空心锁紧盘联接 Hollow shaft with shrink disk connection 	TLHK.N.H 空心轴内花键联接 Hollow shaft internal spline connection 

2.3 布置形式 Layout form

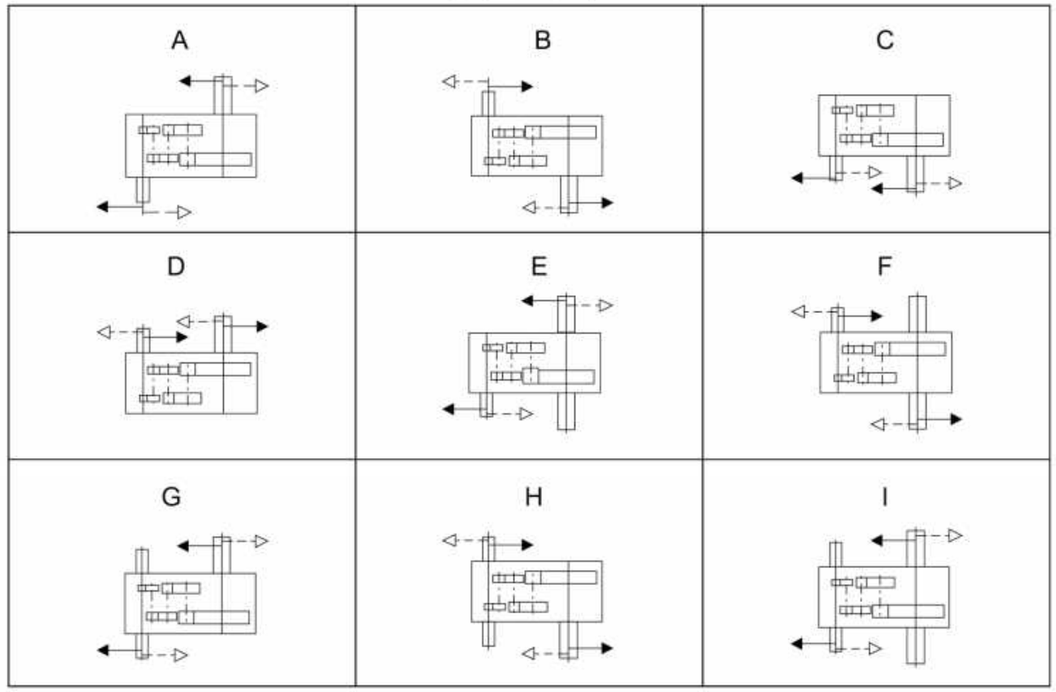
TLHK3S/G/W.. 实心轴布置形式 Layout form of solid shaft



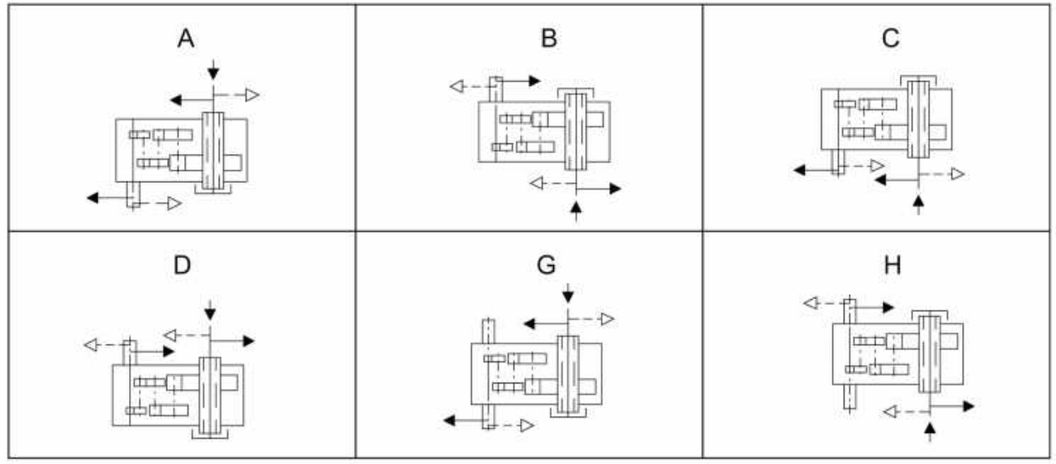
TLHK3H/D/N ... 空心轴布置形式 Layout form of hollow shaft



TLHK4S/G/W .. 实心轴布置形式 Layout form of solid shaft



TLHK4H/D/N ... 空心轴布置形式 Layout form of hollow shaft



三、选型说明 Selection instructions

3.1 选型方法

步骤1：确定原始输入条件

1)原动机（输入轴联接的驱动设备）

原动机名称：_____（电动机、汽轮机、液压马达、单缸内燃机、多缸内燃机）；

原动机功率P_1=_____kW, 转速n_1=_____rpm, 最大启动转矩 _____ Nm；

2)工作机（输出轴联接的作业设备）

工作机应用行业/场合：_____；

工作机功率P_2=_____ kW, 转速n_2=_____ rpm；

每天工作小时数：_____h, FEM工作级别：_____，每小时启动次数：_____次，每小时运转周期：_____%，

（最高）环境温度：_____℃, 安装海拔高度：_____m，

环境条件：_____（正常、多尘、潮湿、腐蚀性、干燥）

3)齿轮箱的要求

类型：_____(TLHB系列标准工业齿轮箱、TLHK系列加长中心距齿轮箱）；

输出轴形式：_____（实心轴：平键、花键、齿式，空心轴：平键、锁紧盘、花键）；

安装方式：_____（卧式安装、竖直式安装）

固定方式：_____（地脚、力矩臂、三点支撑）

布置形式：_____（见2.3说明），输出轴旋向：_____（面对输出轴）；

要求的传动比：$i = n_1/n_2$ = _____(根据计算的速比值选择接近的公称传动比）；

工况服务系数K_{SF}：_____ (查3.2表2工况服务系数）；

输出轴与工作机的联接方式：_____，附加力_____（无附加力不填）；

输入轴与工作机的联接方式：_____，附加力_____（无附加力不填）；

允许的润滑方式：_____（飞溅润滑、强制润滑）；

3.1 Selection Methods

Step 1: Determine the raw input conditions

1) Prime mover (drive equipment connected to input shaft)

Description of prime mover: _____(electric motor, steam turbine, hydraulic motor, single-cylinder internal combustion engine, multi-cylinder internal combustion engine);

Prime mover power P_1=_____kW, rotational speed n_1= _____ rpm, maximum starting torque _____Nm;

2) Working machine (working equipment connected to output shaft)

Application industry/scenario of working machine: _____ ;

Working machine power P_2= _____ kW, speed n_2= _____ rpm;

Working hours per day: _____ h, FEM working level: _____ , number of starts per hour:_____ times,

operating cycle per hour: _____%, (highest) ambient temperature: _____℃, mounting altitude: _____ m,

Environmental conditions: _____ (normal, dusty, humid, corrosive, dry)

3) Requirements for gearbox

Type: _____ (TLHB series standard industrial gearbox, TLHK Helical gear units with extended total centre distance);

Output shaft form: _____ (solid shaft: parallel key, spline, gear-type, hollow shaft: parallel key, shrink disk, spline);

Mounting modes: _____(Horizontal mounting, vertical mounting)

Fixing method: _____ (anchor, torque arm, three fulcrums)

Layout form: _____ (Refer to instructions in 2.3), output shaft rotation direction: _____ (facing the output shaft);

Required transmission ratio: $i = n_1/n_2$ = _____ (Choose a nominal transmission ratio closest to the calculated speed ratio value);

Operating conditions service coefficient K_{SF}: _____(Looking up Table 2 of 3.2 for operating conditions service coefficient);

Connection method between output shaft and operating machine: _____ , additional force _____(not required to be filled out when additional force is not applicable);

Connection method between input shaft and operating machine: _____ , additional force _____(not required to be filled out when additional force is not applicable);

Permissible lubrication methods: _____ (splash lubrication, forced lubrication);

步骤2: 按额定扭矩（或额定功率）选择齿轮箱规格

TLHK系列齿轮箱的额定功率P_N是按载荷平稳，每天工作时间小于等于10小时，每小时启动次数不超过5次，最大启动转矩为额定转矩2倍，单向旋转，单对齿轮的接触强度安全系数约为1,失效概率小于等于1%等条件计算的。当双向运转时，需视情况将P_N乘上0.7–1.0的系数，当反向载荷大，换向频繁，选用的工况系数较低时，系数取较小值，反之，取较大值。所选齿轮箱的额定扭矩（或额定功率）必须满足：

1)按额定扭矩：

$$T_C = \frac{9.550 \times P_2}{n_2} \times K_{SF} \leq T_N$$

2)按额定功率：

$P_C = P_2 \times K_{SF} \leq P_N$

式中，T_C—计算工作扭矩，kN.m; T_N –额定输出扭矩，kN.m

P_C—计算功率，kW; P_2—工作机功率，kW

K_{SF}—工况服务系数，见表1

注：以上两种选型方法二选一即可。

Step 2: Select gearbox size based on rated torque (or rated power)

The rated power PN of TLHK series gearbox is calculated based on conditions e.g. stable load, daily working time less than or equal to 10 hours, no more than 5 times of start per hour, maximum starting torque twice the rated torque, unidirectional rotation, contact strength safety factor of about 1 for single pair of gears, and failure probability less than or equal to 1%. When operating in both directions, PN needs to be multiplied by a coefficient of 0.7-1.0 depending on the situation. When the reverse load is large, the commutation is frequent, and the selected operating condition coefficient is low, the coefficient should be taken as the whichever smaller value, and otherwise, the whichever larger value should be taken. The rated torque (or rated power) of the selected gearbox must meet the following conditions:

1) Based on rated torque:

$$T_C = \frac{9.550 \times P_2}{n_2} \times K_{SF} \leq T_N$$

2) Based on rated power:

$P_C = P_2 \times K_{SF} \leq P_N$

Where T_c —Calculated working torque, kN. m; T_N - Rated output torque, kN. m

P_c — Calculated power, kW; P_2— Working machine power, kW

K_{SF}—Operating conditions service coefficient, see Table 1.

Note: Choose either of the two selection methods above.

步骤3: 校核尖峰载荷

齿轮箱的最大启制动转矩应满足：

$$\frac{T_{1max}\, n_1}{9550} \times K_{SF} \leq P_N$$

式中，T_{1max}一输入最大启制动转矩，N.m;

K_{ST}一尖峰载荷系数，见表2。

Step 3: Check peak load

The maximum starting and braking torque of the gearbox should meet the following formula:

$$\frac{T_{1max}\, n_1}{9550} \times K_{SF} \leq P_N$$

Where T_{1max} — input maximum starting and braking torque, N.m;

K_{ST} —Peak load coefficient, as shown in Table 2.

步骤4: 校核许用热功率

TLHK系列齿轮箱的许用热功率Pt适应于环境温度20° C, 每小时100%连续运转和海拔高度1000米以下的情况，条件不同时，需进行修正。所选齿轮箱的热功率必须满足：

$P_{TC}=P_2 \times K_T \times K_W \times K_H \leq P_T$

式中，P_{TC}一计算热功率，kW

K_T一环境温度系数，见表2,

K_W –运转周期系数，见表3,

K_H –海拔高度系数，见表4。

Step 4: Check permissible thermal power

The permissible thermal power Pt of the TLHK series gearbox is suitable for ambient temperature of 20°C, 100% continuous operation per hour, and conditions below 1000m ASL. If the conditions are different, correction is required. The thermal power of the selected gearbox must meet:

$P_{TC}=P_2 \times K_T \times K_W \times K_H \leq P_T$

Where P_{TC} - calculated thermal power, kW

K_T—Ambient temperature coefficient, see Table 2.

K_W—operating cycle coefficient, as shown in Table 3,

K_H—Altitude coefficient, see Table 4.

步骤5: 校核轴伸的径向载荷

齿轮箱输出若承受附加径向力，按表6和表7进行复核计算

Step 5: Check the radial load of shaft extension

If the gearbox output is subjected to additional radial force, recheck and calculate according to Tables 6 and 7

步骤6: 选型资料汇总

齿轮箱型号：_____

额定功率：_____ kW

公称传动比：_____

润滑方式：_____

冷却方式：_____

Step 6: Summary of type selection data

Gearbox type: _____

Rated power: _____ kW

Normal transmission ratio: _____

Lubrication mode: _____

Cooling mode: _____

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3.2起重机服务系数 Service factor of crane

在使用具有交变负载的齿轮箱时，正如通常在起重机工作的情况，建议按照FEM欧洲起重机设计规范进行分类。其中工作机工况服务系数K_{SF}和峰值扭矩系数K_{ST}可以根据机械设备的分类M_1··· M_8即根据表1中的标准值一，并且根据负载（机械设备负载分级：L_1 ··· L_4)和工作时间（分为T_0 ··· T_9）从表2中确定。K表示在交变负载情况下，在一个典型时间周期内的负载分布，K值计算如下：

When using gearboxes with alternating loads, as is usually the case in crane operation, we recommend to classify them according to the FEM European Crane Design Specification. The operating conditions service coefficient KSF and peak torque coefficient KST of the working machine can be determined from Table 2 based on the classification M1 ··· M8 of mechanical equipment, i.e. standard value I in Table 1, and determined based on the load (mechanical equipment load classification: L_1 ··· L_4) and working time (divided into T_0 ··· T_9). K represents the load distribution within a typical time cycle under alternating load conditions, and the K value is calculated as follows:

$$k=\sqrt[3]{\left(\frac{P_1}{P}\right)^3 \cdot \frac{t_1}{t} + \cdots + \left(\frac{P_n}{P}\right)^3 \cdot \frac{t_n}{t}}$$

其中P_1··· P_N表示在时间周期t1··· tn内的工作周期

Where P_1··· P_N represents the work cycle within the time period t_1··· t_n

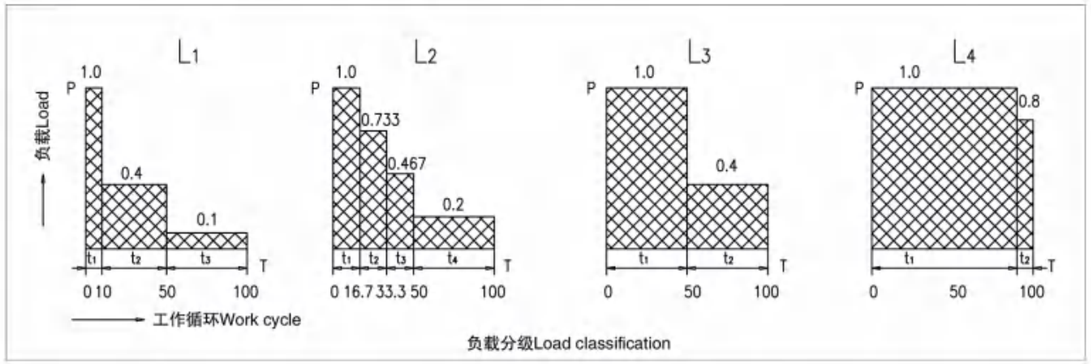

表1: 机构组别划分表 Table 1: Mechanism grouping table

机械设备分组 Mechanical equipment grouping		FEM1001第1部分表T.2.1.3.5 FEM1001 Part 1 Table T.2.1.3.5			
起重机类型起重机类型 Crane type	使用方式 Method of use	机械设备类型机械设备类型 Mechanical equipment type			
		起升机构 Lifting mechanism	回转机构 Slewing mechanism	横行机构 Traversing mechanism	行走机构 Traveling mechanism
电站，机加车间装配吊车 Assembly crane for power station and machining workshop		M2-M3	M2-M3	M1-M2	M2-M3
装卸起重机，堆取料用装卸桥 Loading and unloading crane, loading and unloading bridge for stacking and reclaiming materials	吊钩 Crane hook	M5-M6	M4	M4-M5	M5-M6
装卸起重机，堆取料用装卸桥 Loading and unloading crane, loading and unloading bridge for stacking and reclaiming materials	爪式或电磁 Claw or electromagnetic	M7-M8	M6	M6-M7	M7-M8
车间起重机 Workshop crane		M6	M4	M4	M5
桥式起重机（行车） Overhead crane (traveling)	抓斗或电磁 Grab or electromagnetic	M8	M6	M6-M7	M7 -M8
卸料桥式起重机，集装箱桥式起重机 Unloading overhead crane, container overhead crane	吊钩式或伸展式 Hook or extension type	M6-M7	M5-M6	M6-M7	M4-M5
其他桥式起重机（滑车行走机构和转动吊臂） Other overhead cranes (trolley traveling mechanism and swinging boom)	吊钩 Crane hook	M4-M5	M4-M5	M4-M5	M4-M5
卸料类桥式起重机 其他龙门吊车（滑车行走机构和转动吊臂） Unloading-type overhead crane Other gantry cranes (trolley traveling mechanism and swinging boom)	抓斗或电磁 Grab or electromagnetic	M8	M5-M6	M7 -M8	M4-M5
造船起重机，船坞起重机，拆卸吊车 Shipbuilding crane, dock crane, breakdown crane	吊钩 Crane hook	M5-M6	M4-M5	M4-M5	M5-M6
铸造起重机 Casting crane		M8	-	M5	M6
均热炉起重机 Soaking pit crane		M8	M6	M7	M8
脱锭起重机 Stripper crane		M8	M6	M7	M8
建筑工地用塔式起重机 Tower cranes for construction sites		M4	M4	M3	M3
码头边起重机 Quayside crane	吊钩 Crane hook	M7-M8	M6-M7	M6-M7	M4-M5
动臂起重机 Derrick crane		M2-M3	M1-M2	-	-

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表2: 工况服务系数K_{SF}, 峰值扭矩系数K_{ST}

Table 2: Operating conditions service coefficient K_{SF}, peak torque coefficient K_{ST}

工况服务系数K_{SF}, 峰值扭矩系数K_{ST} Operating conditions service coefficient K_{SF}, peak torque coefficient K_{ST}																							
负载 Load		机构工作级别 4) Mechanism classification group 4)	服务系数 Service coefficient	工作周期/天 Work cycle/ day																			
				T0		T1		T2		T3		T4		T5		T6		T7		T8		T9	
				工作总时间(h) Total working time of (h)																			
机构负载分级 Mechanism load classification	定义 Definition			≤200		> 200 ≤400		> 400 ≤800		> 800 ≤1600		> 1600 ≤3200		> 3200 ≤6300		> 6300 ≤12500		> 12500 ≤25000		>25000 ≤50000		>50000	
轻负载 L1 Light load L1	很少出现最大负载，持续的负载是很轻的负载 Rare maximum load, and continuous load of very light load	k≤0.50	1) K_{SF} 2) K_{ST} 3) K_{ST}	1.00 0.50 0.80	M1	1.00 0.50 0.80	M1	1.00 0.50 0.80	M1	1.04 0.50 0.80	M2	1.08 0.50 0.80	M3	1.12 0.50 0.80	M4	1.16 0.56 0.80	M5	1.20 0.63 0.90	M6	1.25 0.71 1.00	M7	1.30 0.80 1.12	M8
中等负载 L2 Medium load L2	经常出现最大负载，持续的负载是轻负载 Frequent occurrence of maximum load, and continuous load of light load	0.50 < k≤0.63	1) K_{SF} 2) K_{ST} 3) K_{ST}	1.00 0.50 0.80	M1	1.00 0.50 0.80	M1	1.04 0.50 0.80	M2	1.08 0.50 0.80	M3	1.12 0.50 0.80	M4	1.16 0.50 0.80	M5	1.20 0.56 0.80	M6	1.25 0.63 0.90	M7	1.30 0.71 1.00	M8	1.40 0.80 1.12	M8
重负载 L3 Heavy load L3	频繁出现最大负载，持续的负载是中等负载 Frequent occurrence of maximum load, and continuous load of moderate load	0.63 < k≤0.80	1) K_{SF} 2) K_{ST} 3) K_{ST}	1.00 0.50 0.80	M1	1.04 0.50 0.80	M2	1.08 0.50 0.80	M3	1.12 0.50 0.80	M4	1.16 0.50 0.80	M5	1.20 0.56 0.80	M6	1.25 0.63 0.90	M7	1.30 0.71 1.00	M8	1.40 0.80 1.12	M8	1.60 0.90 1.25	M8
特重负载 L4 Extra heavy load L4	负载规律性接近最大负载 Load pattern close to the maximum load	0.80 < k≤1.00	1) K_{SF} 2) K_{ST} 3) K_{ST}	1.04 0.50 0.80	M2	1.08 0.50 0.80	M3	1.12 0.50 0.80	M4	1.16 0.50 0.80	M5	1.20 0.50 0.80	M6	1.30 0.56 0.80	M7	1.40 0.63 0.90	M8	1.60 0.71 1.00	M8	1.80 0.80 1.12	M8	2.00 0.90 1.25	M8

表3: 环境温度系数K_T Table 3: Ambient temperature coefficient K_T

环境温度（℃）Ambient temperature (℃) / 冷却力式Cooling mode	10	20	30	40	50
无冷却力式 No cooling mode	0.88	1.0	1.15	1.35	1.65

表4: 运转周期系数Kw Table 4: Operating cycle coefficient Kw

每小时运转周期（%） Operating cycle per hour (%)	100	80	60	40	20
无冷却力式 No cooling mode	1.0	0.94	0.86	0.74	0.56

表5: 海拔高度系数K_H Table 5: Altitude coefficient K_H

海拔高度(m) Altitude (m) / 冷却方式 Cooling mode	≤1000	≤2000	≤3000	≤4000	≤5000
无冷却方式 No cooling mode	1.0	1.05	1.10	1.18	1.25

1) K_{SF}: 工况服务系数

2) K_{ST}: 负载方向保持不变时的峰值扭矩系数，如起升，变幅等机构

3) K_{ST}: 负载方向交替变化时的峰值扭矩系数，如回转，行走等机构

4) $K=\sqrt[3]{K_m}$ (K_m名义载荷谱系数，参见FEM1.001, 第二册，表T.2.1.3.3.)

如果未给出峰值扭矩，则$T_{2max}=1.6 *T_2$

1) K_{SF}: Operating conditions service coefficient

2) K_{ST}: Peak torque coefficient when the load direction remains unchanged, e.g. lifting, luffing, and other mechanisms

3) K_{ST}: Peak torque coefficient when the load direction changes alternately, e.g. slewing, traveling and other mechanisms

4) $K=\sqrt[3]{K_m}$ (Km nominal load spectrum coefficient, refer to FEM1.001, Volume 2, Table T.2.1.3.3.)

If peak torque is not given, then $T_{2max}=1.6 *T_2$

3.3选型示例 Examples of selection

步骤1：确定原始输入条件

1) 原动机（输入轴联接的驱动设备）

原动机名称：电动机（电动机、汽轮机、液压马达、单缸内燃机、多缸内燃机）；

原动机功率P_1=75 kW，转速n_1= 1000 rpm, 最大启动转矩T_{1max} = 1075 Nm;

2) 工作机（输出轴联接的作业设备）

工作机应用行业/场合：工地用桥式起重机；

工作机功率P_2= 66 kW，转速n_2= 28 rpm；

每天工作小时数：12 h，FEM工作级别：L3,M8,T8, 每小时启动次数：25次，每小时运转周期：40 %

（最高）环境温度：30 ℃, 安装海拔高度：100 m, 海平面

环境条件：多尘（正常、多尘、潮湿、腐蚀性、干燥）

3) 齿轮箱的要求

类型：TLHK系列加长中心距齿轮箱(TLHB系列标准工业齿轮箱、TLHK系列加长中心距齿轮箱）；

输出轴形式：实心轴平键（实心轴：平键、光轴、花键，空心轴：平键、锁紧盘、花键）；

安装方式：卧式安装（卧式安装、竖直式安装）

固定方式：地脚（地脚、力矩臂、三点支撑）

布置形式：C（见2.3说明），输出轴旋向：双向旋转（面对输出轴，双向旋转时请说明主旋向）；

要求的传动比：$i = n_1/n_2$ = 1000 / 28 = 37.71 (根据计算的速比值选择接近的公称传动比为35.5)；

工况服务系数K_{SF}: 1.4 (查3.2表2工况服务系数）；

输出轴与工作机的联接方式：挠性联轴器，输出轴受附加力中部作用有15,000N的径向力；

输入轴与工作机的联接方式：弹性联轴器，输入轴受附加力无；

允许的冷却方式：不带冷却方式；

Step 1: Determine the raw input conditions

1) Prime mover (drive equipment connected to input shaft)

Description of prime mover: electric motor (electric motor, steam turbine, hydraulic motor, single-cylinder internal combustion engine, multi-cylinder internal combustion engine);

Prime mover power P_1= 75 kW, rotational speed n_1= 1000 rpm, maximum starting torque T_{1max} = 1075 Nm;

2) Working machine (working equipment connected to output shaft)

TAILONG MACHINERY

Application industry/scenario of working machine: Tower cranes for construction sites;

Working machine power P_2= 66 kW, rotational speed n_2= 28 rpm;

Working hours per day: 12 h, FEM working level: L3,M8,T8, number of starts per hour: 25 times, operating cycle per hour: 40 %, (highest) ambient temperature: 30℃, mounting altitude: 100 m, sea level

Environmental conditions: dusty(normal, dusty, humid, corrosive, dry)

3) Requirements for gearbox

Type: TLHK series extended center distance gearbox (TLHB series standard industrial gearbox, TLHK series extended center distance gearbox);

Output shaft form: solid shaft with parallel key (solid shaft: parallel key, spline, gear-type, hollow shaft: parallel key, shrink disk, spline);

Mounting modes: Horizontal mounting (Horizontal mounting, vertical mounting)

Fixing method: anchor (anchor, torque arm, three fulcrums)

Layout form: C (Refer to instructions in 2.3), output shaft rotation direction: Bidirectional rotation (facing the output shaft, please indicate the main direction of rotation during bidirectional rotation);

Required transmission ratio: $i = n_1/n_2$ = 1000 / 28 = 37.71(Choose a nominal transmission ratio of 35.5 closest to the calculated speed ratio value);

Operating conditions service coefficient KSF: 1.4 (Looking up Table 2 of 3.2 for operating conditions service coefficient);

Connection method between output shaft and operating machine: flexible coupling, the output shaft is subjected to additional force with radial force of 15,000N acting in the middle;

Connection method between intput shaft and operating machine: elastic coupling, with no additional force on the input shaft;

Permissible cooling method: without cooling method;

步骤2: 按额定扭矩（或额定功率）选择齿轮箱规格

1) 按额定扭矩选型：

$$T_C=\frac{9.550\times P_2}{n_2}\times K_{SF}=\frac{9.550\times 66}{28}\times 1.4=31.51\ (kN.m)$$

查表8, TLHK3系列规格09公称传动比35.5的齿轮箱，额定输出扭矩T_N= 35.7 kN.m> T_C, 满足要求。

2)按额定功率选型：

$P_C=P_2\times K_{SF}=66x1.4=92.4$ (kW)

查表10, TLHK3系列规格09公称传动比35.5的齿轮箱，额定功率P_N=100kW >P_C, 满足要求。

注：以上两种选型方法二选一即可。

Step 2: Select gearbox size based on rated torque (or rated power)

1) Select on basis of rated torque:

$$T_C=\frac{9.550\times P_2}{n_2}\times K_{SF}=\frac{9.550\times 66}{28}\times 1.4=31.51\ (kN.m)$$

Looking up Table 8, the TLHK3-series size 09 gearbox with nominal transmission ratio of 35.5 has rated output torque T_N=35.7 kN.m>T_C, which meets the requirements.

2) Selection based on rated power:

$P_C=P_2\times K_{SF}=66x1.4=92.4$ (kW)

Looking up Table 10, the TLHK3-series size 09 gearbox with nominal transmission ratio of 35.5 has rated Power: P_N=100kW >P_C, which meets the requirements.

Note: Choose either of the two selection methods above.

步骤3: 校核尖峰载荷

查表2, K_{ST} = 0.8

$$\frac{T_{1max}\ n_1}{9550} \times K_{SF} = \frac{1075*1000}{9550} \times 0.8 = 90.052kW < P_N = 100kW$$，满足要求。

Step 3: Check peak load

Looking up Table 2, K_{ST} = 0.8

$$\frac{T_{1max}\ n_1}{9550} \times K_{SF} = \frac{1075*1000}{9550} \times 0.8 = 90.052kW < P_N = 100kW$$, which meets the requirements.

步骤4: 校核许用热功率

在给定条件下，查表2, K_T= 1.15, 查表3, K_W= 0.74, 查表4, K_H =1.0, 因此

$P_{TC} = P_2 \times K_T \times K_W \times K_H = 66 \times 1.15 \times 0.74 \times 1 = 56.166$ (kW)

查表11, TLHK3SH09齿轮箱许用热功率为145.6 kW> P_{TC} = 56.166 kW, 能满足散热要求。

Step 4: Check permissible thermal power

Under the given conditions, look up Table 2, K_T=1.15, look up Table 3, K_W=0.74, look up Table 4, K_H =1.0,

so $P_{TC} = P_2 \times K_T \times K_W \times K_H = 66 \times 1.15 \times 0.74 \times 1 = 56.166$ (kW).

Looking up Table 11, the permissible thermal power of TLHK3SH09 gearbox is 145.6 kW> P_{TC} =56.166 kW, which can meet the heat dissipation requirements.

步骤5: 校核轴伸的径向载荷

查表6, 型号TLHK3SH09, 布置形式为C的齿轮箱输出轴轴伸中间部位允许承受的最大附加径向力为40kN , 大于给定的15,000N, 满足要求。

Step 5: Check the radial load of shaft extension

Looking up Table 6, the middle of the output shaft extension of the gearbox in model of TLHK3SH09 and layout form of C can withstand maximum additional radial force of 40kN, which is greater than the given 15,000N and meets the requirements.

步骤6: 选型资料汇总

齿轮箱型号：TLHK3SH09-35.5-C

额定功率：100 kW

公称传动比：35.5

润滑方式：油浴润滑

冷却方式：自然冷却

Step 6: Summary of type selection data

Gearbox model: TLHK3SH09-35.5-C

Rated power: 100 kW

Nominal transmission ratio: 35.5

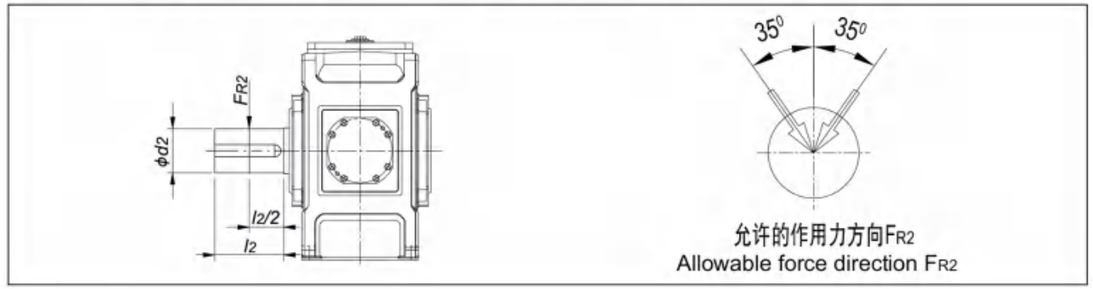
Lubrication method: oil bath lubrication

Cooling method: natural cooling

TAILONG MACHINERY

四、输出轴允许的附加径向力Permissible additional radial forces on output shaft

4.1输出轴d2上允许的附加径向力Permissible additional radial forces on output shaft d2:



允许的作用力方向F_{R2}
Allowable force direction F_{R2}

表6: 允许的附加径向力F_{R2} [kN] (作用在输出轴轴伸中部)
Table 6: Permissible additional radial forces F_{R2} [kN] (Acting on the middle of the output shaft extension)

类型 Type	布置形式 Layout form	齿轮箱规格 Gearbox size																			
		4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
TLHK3S..	A / B / G / H	11	30	30	42	42	42	62	88	88	195	195	270	300	330	360	385	410	440	470
	C / D	9	19	19	28	28	20	42	52	52	153	153	185	205	230	255	270	290	310	330
TLHK4S..	A / B / G / H	-	30	30	42	42	42	62	88	88	195	195	270	300	330	360	385	410	440	470
	C / D	-	19	19	28	28	20	42	52	52	153	153	185	205	230	255	270	290	310	330

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)*当作用力不在轴端中部时，请参见4.2。

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d1上附加径向力，具体请与我司联系。

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

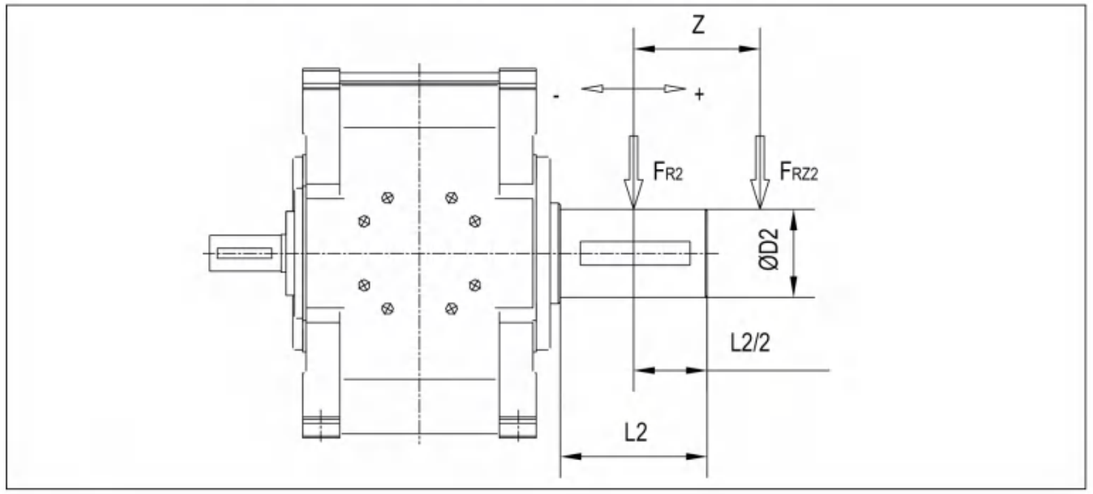
2)*For application of force outside the center of the shaft en,see 4.2.

3)The min.requirement of the foundation bolt is class 8.8.

the foundetion must be dry and grease-free.Permissible additional radial force on input shaft d1 is upon request.

4.2输出轴d2上允许的附加径向力Permissible additional radial forces on output shaft d2:

作用力不在轴伸中部 The force is not acted on the middle of shaft extension



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

F_{RZ2}为允许的外部径向力，F_{R2}为允许的附加径向力，根据表6确定，K_F为作用力系数，根据表7选取。

F_{RZ2} is the permissible external radial force, F_{R2} is the permissible additional radial force, determined according to Table 6, K_F is the force coefficient, selected according to Table 7.

表7: 作用力系数K_F Table 7: Force coefficient K_F

规格 Size	距离Distance **z [mm]**																	
	-250	**-200**	**-150**	**-100**	**-75**	**-50**	**-25**	**0**	**25**	**50**	**75**	**100**	**150**	**200**	**250**	**300**	**350**	**400**
4	-	-	-	-	-	1.17	1.08	1.00	0.86	0.76	0.68	0.62	0.52	0.44	-	-	-	-
5/6	-	-	-	-	1.22	1.14	1.06	1.00	0.88	0.79	0.72	0.66	0.56	0.49	0.43	-		
7/8	-	-	-	-	1.19	1.12	1.06	1.00	0.89	0.81	0.74	0.68	0.58	0.51	0.46	0.41		
9/10	-	-	-	1.22	1.15	1.10	1.05	1.00	0.90	0.82	0.76	0.70	0.61	0.54	0.48	0.44		
11/12	-	-	-	1.18	1.13	1.08	1.04	1.00	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	1.00	0.92	0.86	0.80	0.75	0.67	0.60	0.55	0.50		
15/16	-	-	1.20	1.12	1.09	1.06	1.03	1.00	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	1.00	0.94	0.88	0.84	0.79	0.72	0.66	0.60	0.56		
19/20	-	1.22	1.15	1.09	1.07	1.04	1.02	1.00	0.96	0.89	0.85	0.80	0.74	0.69	0.62	0.58	0.52	-
21/22	1.28	1.20	1.13	1.08	1.06	1.03	1.01	1.00	0.98	0.91	0.87	0.82	0.75	0.72	0.64	0.61	0.56	0.50

TAILONG MACHINERY

1) 表中数值为最小值，在服务系数$K_{SF}\geqslant 1.2$时可以满足要求。如果给出了力的作用角和旋转方向，则在绝大多数情况下可以承受较大的附加力，如有需求请与我们联系，在必要时可以采用一个加强型输出轴；
2) 当作用力不在轴伸中部时，请参阅表7;
3) 地脚螺栓的最低性能等级为8.8, 基础必须干燥，不得有油脂；
4) 以下请咨询：
   a.输入轴D1上允许的附加径向力；
   b.双出轴实心轴上允许的附加径向力（设计型式E、F和I)。

1) The tabulated values are the minimum values, which can meet the requirements when the service coefficient K_{SF} is ≥1.2. If the angle of action and direction of rotation of the force are given, it can withstand larger additional force in most cases. If required, please contact us and when necessary, reinforced output shaft can be used;
2) When the force is not acted on the middle of the shaft extension, please refer to Table 7;
3) The minimum performance level of anchor bolts is 8.8, and the foundation must be dry and free of grease;
4) Please consult the following items:
   a. Permissible additional radial forces on input shaft D1;
   b. Permissible additional radial force on the output shaft solid shaft (design types E, F, and I).

五、承载能力表 Transmission capacity

n_1 (r/min)	i_N	TLK3..4		TLK3..5		TLK3..6		TLK3..7		TLK3..8		TLK3..9		TLK3..10	
		T_{2N} (kN·m)	P_{1N} (kW)	T_{2N} (kN·m)	P_{1N} (kW)	T_{2N} (kN·m)	P_{1N} (kW)	T_{2N} (kN·m)	P_{1N} (kW)	T_{2N} (kN·m)	P_{1N} (kW)	T_{2N} (kN·m)	P_{1N} (kW)	T_{2N} (kN·m)	P_{1N} (kW)
1500			74		125				235				381		
1000	14	6.6	49.1	11.6	83			21.7	156			35.7	254		
750			37.3		62				117				191		
1500			65.0		110				202				330		
1000	16	6.6	43.5	11.6	73			21.7	135			35.7	220		
750			32.5		54				101				165		
1500			57.4		100		135		183		233		298		373
1000	18	6.6	38.7	11.6	66	15.5	90	21.7	122	27.2	155	35.7	198	43.8	248
750			29.0		49		67		92		116		149		187
1500			51.8		91		118		164		202		269		323
1000	20	6.6	34.6	11.6	60	15.5	79	21.7	110	27.2	134	35.7	179	43.8	215
750			26.3		45		59		82		100		134		162
1500			46.3		78		107		148		182		241		292
1000	22.4	6.6	31.1	11.6	53	15.5	72	21.7	99	27.2	122	35.7	160	43,8	194
750			22.8		39		54		74		91		120		146
1500			41.5		71		98		134		163		214		262
1000	25	6.6	27.6	11.6	48	15.5	65	21.7	89	27.2	109	35.7	142	43.8	175
750			20.7		36		49		67		82		108		131
1500			37.3		64		85		115		147		190		236
1000	28	6.6	24.9	11.6	42	15.5	57	21.7	76	27.2	98	35.7	127	43.8	157
750			18.7		32		42		57		74		95		118
1500			33.2		57		77		102		133		168		210
1000	31.5	6.6	22.1	11.6	38	15.5	51	21.7	68	27.2	88	35.7	112	43.8	139
750			16.6		28		38		51		66		84		104
1500			29.0		51		69		91		114		150		186
1000	35.5	6.6	19.4	11.6	33	15.5	46	21.7	60	27.2	76	35.7	100	43.8	124
750			14.5		25		35		45		57		75		93
1500			26.3		45		62		81		101		131		165
1000	40	6.6	17.3	11.6	30	15.5	41	21.7	54	27.2	67	35.7	87	43.8	110
750			13.0		22		30		40		51		65		82
1500			22.8		40		55		72		91		124		147
1000	45	6.6	15.2	11.6	27	15.5	36	21.7	48	27.2	60	35.7	82	43.8	98
750			11.5		20		27		36		45		62		73
1500			20.7		36		48		68		81		110		128
1000	50	6.6	13.8	11.6	24	15.5	32	21.7	46	27.2	54	35.7	73	43.8	85
750			10.4		18		24		34		40		55		64
1500							43				72				121
1000	56					15.5	29			27.2	48			43.8	81
750							22				36				60
1500							38				67				106
1000	63					15.5	26			27.2	45			43.8	71
750							19				34				54

n_1 (r/min)	i_N	TLK3..11		TLK3..12		TLK3..13		TLK3..14		TLK3..15		TLK3..16	
		T_{2N} (kN·m)	P_{1N} (kW)	T_{2N} (kN·m)	P_{1N} (kW)	T_{2N} (kN·m)	P_{1N} (kW)	T_{2N} (kN·m)	P_{1N} (kW)	T_{2N} (kN·m)	P_{1N} (kW)	T_{2N} (kN·m)	P_{1N} (kW)
1500			688				923						
1000	14	63.5	457			88	615						
750			343				461						
1500			622				834						
1000	16	63.5	414			88	556						
750			311				417						
1500			561		657		751		923		1344		
1000	18	63.5	374	77.2	438	88	500	109	615	150	906		
750			281		328		375		462		680		
1500			479		594		673		833		1214		1376
1000	20	63.5	316	77.2	396	88	449	109	555	150	809	170	917
750			240		298		337		417		615		697
1500			427		537		601		750		1085		1229
1000	22.4	63.5	285	77.2	358	88	400	109	499	150	728	170	825
750			213		268		300		375		534		605
1500			394		457		548		672		971		1101
1000	25	63.5	262	77.2	305	88	365	109	448	150	647	170	734
750			197		229		273		334		485		550
1500			352		408		468		600		874		991
1000	28	63.5	235	77.2	272	88	312	109	399	150	583	170	660
750			176		205		234		300		437		495
1500			313		377		418		547		777		881
1000	31.5	63.5	209	77.2	250	88	279	109	364	150	518	170	587
750			156		189		209		274		388		440
1500			276		337		371		471		680		770
1000	35.5	63.5	184	77.2	224	88	247	109	311	150	453	170	513
750			138		169		186		235		340		385
1500			251		300		342		418		615		697
1000	40	63.5	167	77.2	200	88	228	109	278	150	404	170	458
750			126		150		171		209		307		348
1500			225		264		303		370		534		605
1000	45	63.5	150	77.2	176	88	202	109	247	150	356	170	403
750			113		132		152		185		275		312
1500			199		240		264		342		485		550
1000	50	63.5	133	77.2	160	88	176	109	228	150	323	170	367
750			100		120		132		171		242		275
1500					215				303		437		495
1000	56			77.2	143			109	202	150	289	170	328
750					108				151		210		238
1500					191				264				440
1000	63			77.2	127			109	176			170	291
750					95				132				220
1500													385
1000	71											170	258
750													194
1500													345
1000	80											170	229
750													172
1500													306
1000	90											170	203
750													152

n_1 (r/min)	i_N	TLK3..17		TLK3..18		TLK3..19		TLK3..20		TLK3..21		TLK3..22	
		T_{2N} (kN · m)	P_{1N} (kW)	T_{2N} (kN · m)	P_{1N} (kW)	T_{2N} (kN · m)	P_{1N} (kW)	T_{2N} (kN · m)	P_{1N} (kW)	T_{2N} (kN · m)	P_{1N} (kW)	T_{2N} (kN · m)	P_{1N} (kW)
1500													
1000	14												
750													
1500													
1000	16												
750													
1500			1756				2607				3650		
1000	18	196	1185			300	1759			420	2463		
750			888				1319				1847		
1500			1587		1910		2356		2729		3298		3691
1000	20	196	1058	236	1273	300	1570	345	1806	420	2199	470	2461
750			804		968		1193		1372		1671		1870
1500			1417		1707		2104		2420		2946		3297
1000	22.4	196	952	236	1146	300	1413	345	1625	420	1979	470	2214
750			698		840		1036		1192		1451		1624
1500			1269		1528		1885		2167		2639		2953
1000	25	196	846	236	1019	300	1256	345	1445	420	1759	470	1968
750			634		764		942		1083		1319		1476
1500			1142		1375		1696		1951		2375		2657
1000	28	196	761	236	917	300	1131	345	1300	420	1583	470	1771
750			571		687		848		975		1187		1328
1500			1015		1223		1508		1734		2111		2362
1000	315	196	677	236	815	300	1005	345	1156	420	1407	470	1575
750			507		611		754		867		1055		1181
1500			888		1070		1319		1517		1847		2067
1000	35.5	196	592	236	713	300	879	345	1011	420	1231	470	1378
750			444		535		659		758		923		1033
1500			804		968		1193		1372		1671		1870
1000	40	196	529	236	637	300	785	345	903	420	1099	470	1230
750			402		484		590		679		826		925
1500			698		840		1036		1192		1451		1624
1000	45	196	465	236	560	300	691	345	794	420	967	470	1082
750			359		433		524		603		734		822
1500			634		764		942		1083		1319		1476
1000	50	196	423	236	509	300	628	345	722	420	879	470	984
750			317		382		471		541		659		738
1500			571		687		848		975		1187		1328
1000	56	196	378	236	456	300	562	345	646	420	787	470	881
750			275		331		421		484		589		659
1500					611				809				1102
1000	63			236	405			345	574			470	782
750					305				429				585
1500					535				758				1033
1000	71			236	359			345	509			470	694
750					270				383				521
1500					479				679				925
1000	80			236	318			345	451			470	615
750					239				339				462
1500					425				603				822
1000	90			236	282			345	401			470	546
750					211				299				408

TAILONG MACHINERY

n_1 (r/min)	i_N	TLK4..5		TLK4..6		TLK4..7		TLK4..8		TLK4..9		TLK4..10	
		T_{2N} (kN · m)	P_{1N} (kW)	T_{2N} (kN · m)	P_{1N} (kW)	T_{2N} (kN · m)	P_{1N} (kW)	T_{2N} (kN · m)	P_{1N} (kW)	T_{2N} (kN · m)	P_{1N} (kW)	T_{2N} (kN · m)	P_{1N} (kW)
1500			87				162				268		
1000	20	11.6	58			21.7	107			35.7	179		
750			43				80				134		
1500			78				145				240		
1000	22.4	11.6	52			21.7	96			35.7	160		
750			39				72				120		
1500			68				133				209		
1000	25	11.6	45			21.7	89			35.7	139		
750			34				66				104		
1500			63		85		117		144		191		235
100224	28	11.6	42	15.5	56	21.7	78	27.2	96	35.7	127	43.8	156
750			31		42		58		72		95		117
1500			55		74		101		132		180		205
1000	31.5	11.6	36	15.5	49	21.7	67	27.2	88	35.7	120	43.8	136
750			27		37		55		66		90		102
1500			49		67		93		117		164		187
1000	35.5	11.6	33	15.5	45	21.7	62	27.2	78	35.7	109	43.8	125
750			24		34		46		58		82		93
1500			43		59		80		100		150		177
1000	40	11.6	29	15.5	39	21.7	54	27.2	66	35.7	100	43.8	117
750			21		29		40		50		75		86
1500			39		54		73		92		130		161
1000	45	11.6	26	15.5	35	21.7	49	27.2	61	35.7	87	43.8	107
750			20		27		36		46		65		80
1500			35		46		63		80		105		147
1000	50	11.6	23	15.5	31	21.7	42	27.2	54	35.7	70	43.8	98
750			17		23		31		40		53		73
1500			31		42		58		73		92		127
1000	56	11.6	21	15.5	28	21.7	38	27.2	49	35.7	61	43.8	85
750			15		21		29		36		46		63
1500			29		38		52		63		85		103
1000	63	11.6	18	15.5	25	21.7	34	27.2	42	35.7	56	43.8	69
750			14		18		26		31		42		51
1500			26		34		46		58		76		90
1000	71	11.6	17	15.5	23	21.7	31	27.2	38	35.7	51	43.8	60
750			12		16		23		29		38		45
1500			23		31		41		50		68		83
1000	80	11.6	15	15.5	21	21.7	27	27.2	34	35.7	46	43.8	55
750			11		15		20		25		34		41
1500			19		28		36		46		59		75
1000	90	11.6	13	15.5	18	21.7	24	27.2	31	35.7	39	43.8	50
750			10		13		18		23		29		37
1500			17		25		33		41		54		67
1000	100	11.6	12	15.5	16	21.7	22	27.2	27	35.7	36	43.8	45
750			9		12		17		20		27		33
1500			16		22		28		36		47		58
1000	112	11.6	10	15.5	14	21.7	19	27.2	24	35.7	32	43.8	38
750			8		11		14		18		23		29
1500			14		19		26		33		42		52
1000	125	11.6	9	15.5	13	21.7	17	27.2	22	35.7	28	43.8	34
750			7		9		13		16		21		26
1500			12		17		23		28		38		46
1000	140	11.6	8	15.5	11	21.7	15	27.2	19	35.7	25	43.8	31
750			6		8		11		14		19		23
1500			11		15		19		26		34		42
1000	160	11.6	7	15.5	10	21.7	13	27.2	17	35.7	23	43.8	28
750			5		7		10		13		17		21
1500			10		13		18		23		30		37
1000	180	11.6	6	15.5	9	21.7	12	27.2	15	35.7	20	43.8	25
750			5		7		9		11		15		18
1500			9		12		16		19		27		33
1000	200	11.6	6	15.5	8	21.7	10	27.2	13	35.7	18	43.8	22
750			4		6		8		9		13		16
1500					11				18				30
1000	224			15.5	7			27.2	12			43.8	20
750					5				9				15
1500					10				15				26
1000	250			15.5	6			27.2	10			43.8	17
750					5				8				12

n_1 (r/min)	i_{tl}	TLK4..11		TLK4..12		TLK4..13		TLK4..14		TLK4..15		TLK4..16	
		T_{2N} (kN·m)	P_{1N} (kW)	T_{2N} (kN·m)	P_{1N} (kW)	T_{2N} (kN·m)	P_{1N} (kW)	T_{2N} (kN·m)	P_{1N} (kW)	T_{2N} (kN·m)	P_{1N} (kW)	T_{2N} (kN·m)	P_{1N} (kW)
1500			484				651				1214		
1000	20	63.5	323	77.2		88	434			150	809		
750			241				325				615		
1500			433				582				1085		1229
1000	22.4	63.5	289			88	388			150	728	170	825
750			216				291				534		605
1500			374		462		502		650		971		1101
1000	25	63.5	249	77.2	309	88	335	109	433	150	647	170	734
750			187		230		251		324		485		550
1500			338		413		454		581		874		991
1000	28	63.5	225	77.2	276	88	302	109	387	150	583	170	660
750			169		206		274		290		437		495
1500			306		358		409		502		777		881
1000	31.5	63.5	204	77.2	238	88	273	109	335	150	518	170	587
750			153		179		205		251		388		440
1500			275		322		369		454		680		770
1000	35.5	63.5	183	77.2	215	88	246	109	302	150	453	170	513
750			137		161		184		227		340		385
1500			247		292		331		409		615		697
1000	40	63.5	165	77.2	195	88	220	109	273	150	404	170	458
750			123		146		165		205		307		348
1500			224		264		295		369		534		605
1000	45	63.5	149	77.2	176	88	196	109	246	150	356	170	403
750			112		132		147		184		275		312
1500			197		236		264		331		485		550
1000	50	63.5	131	77.2	157	88	176	109	220	150	323	170	367
750			94		118		132		165		242		275
1500			176		214		227		295		437		495
1000	56	63.5	114	77.2	143	88	152	109	196	150	289	170	328
750			88		107		114		147		210		238
1500			151		188		206		262		388		440
1000	63	63.5	103	77.2	125	88	137	109	175	150	257	170	291
750			75		94		103		131		194		220
1500			138		163		185		227		340		385
1000	71	63.5	92	77.2	109	88	123	109	151	150	228	170	258
750			69		82		92		114		178		201
1500			122		147		164		206		304		345
1000	80	63.5	81	77.2	98	88	109	109	137	150	202	170	229
750			61		74		82		103		145		165
1500			109		132		146		185		270		306
1000	90	63.5	73	77.2	88	88	98	109	123	150	179	170	203
750			55		66		73		92		129		146
1500			99		117		131		164		242		275
1000	100	63.5	66	77.2	78	88	87	109	109	150	161	170	183
750			49		58		66		82		121		137
1500			90		104		116		147		217		245
1000	112	63.5	60	77.2	69	88	77	109	98	150	144	170	163
750			45		52		58		73		113		128
1500			75		95		103		131		194		220
1000	125	63.5	50	77.2	63	88	69	109	87	150	129	170	146
750			38		47		51		66		97		110
1500			67		86		92		116		173		196
1000	140	63.5	45	77.2	57	88	61	109	77	150	115	170	130
750			34		43		46		58		81		91
1500			60		72		80		103				172
1000	160	63.5	40	77.2	48	88	54	109	69			170	115
750			30		36		40		52				86
1500			54		64		75		91				152
1000	180	63.5	36	77.2	43	88	50	109	61			170	102
750			27		32		38		46				73
1500			51		58		67		80				137
1000	200	63.5	34	77.2	39	88	45	109	54			170	91
750			25		29		34		40				69
1500					52				75				123
1000	224			77.2	34			109	50			170	82
750					26				38				62
1500					48				67				110
1000	250			77.2	32			109	45			170	73
750					24				34				55

TAILONG MACHINERY

n_1 (r/min)	i_{tl}	TLK4..17		TLK4..18		TLK4..19		TLK4..20		TLK4..21		TLK4..22	
		T_{2N} (kN·m)	P_{1N} (kW)	T_{2N} (kN·m)	P_{1N} (kW)	T_{2N} (kN·m)	P_{1N} (kW)	T_{2N} (kN·m)	P_{1N} (kW)	T_{2N} (kN·m)	P_{1N} (kW)	T_{2N} (kN·m)	P_{1N} (kW)
1500			1587				2356				3298		
1000	20	196	1058			300	1570			420	2199		
750			804				1193				1671		
1500			1417		1707		2104		2420		2946		3297
1000	22.4	196	952	236	1146	300	1413	345	1625	420	1979	470	2214
750			698		840		1036		1192		1451		1624
1500			1269		1528		1885		2167		2639		2953
1000	25	196	846	236	1019	300	1256	345	1445	420	1759	470	1968
750			634		764		942		1083		1319		1476
1500			1142		1375		1696		1951		2375		2657
1000	28	196	761	236	917	300	1131	345	1300	420	1583	470	1771
750			571		687		848		975		1187		1328
1500			1015		1223		1508		1734		2111		2362
1000	31.5	196	677	236	815	300	l005	345	1156	420	1407	470	1575
750			507		611		754		867		1055		1181
1500			888		1070		1319		1517		1847		2067
1000	35.5	196	592	236	713	300	879	345	1011	420	1231	470	1378
750			444		535		b59		758		923		1033
1500			804		968		1193		1372		1671		1870
1000	40	196	529	236	637	300	785	345	903	420	1099	470	1230
750			402		484		590		679		826		925
1500			698		840		1036		1192		1451		1624
1000	45	196	465	236	560	300	691	345	794	420	967	470	1082
750			359		433		524		603		734		822
1500			634		764		942		1083		1319		1476
1000	50	196	423	236	509	300	628	345	722	420	879	470	984
750			317		382		471		541		659		738
1500			571		687		848		975		1187		1328
1000	56	196	378	236	456	300	562	345	646	420	787	470	881
750			275		331		421		484		589		659
1500			507		611		703		809		985		1102
1000	63	196	336	236	405	300	499	345	574	420	699	470	782
750			253		305		373		429		523		585
1500			444		535		659		758		923		1033
1000	71	196	298	236	359	300	443	345	509	420	620	470	694
750			232		280		333		383		466		521
1500			397		479		590		679		826		925
1000	80	196	264	236	318	300	392	345	451	420	549	470	615
750			190		229		295		339		413		462
1500			353		425		524		603		734		822
1000	90	196	234	236	282	300	348	345	401	420	488	470	546
750			169		203		260		299		365		408
1500			317		382		471		541		659		738
1000	100	196	211	236	254	300	314	345	361	420	439	470	492
750			158		191		235		271		329		369
1500			283		341		421		484		589		659
1000	112	196	188	236	226	300	279	345	321	420	391	470	438
750			148		178		210		242		294		329
1500			253		305		377		433		527		590
1000	125	196	169	236	203	300	251	345	289	420	351	470	393
750			127		152		188		216		263		295
1500			226		272		336		386		470		526
1000	140	196	150	236	180	300	223	345	256	420	312	470	349
750			105		127		169		195		237		265
1500					239				339				462
1000	160			236	160			345	227			470	310
750					119				169				231
1500					211				299				408
1000	180			236	142			345	202			470	275
750					101				144				196
1500					191				271				369
1000	200			236	127			345	180			470	246
750					96				137				187
1500					170				242				329
1000	224			236	114			345	162			470	221
750					86				122				167
1500					152				216				295
1000	250			236	101			345	144			470	196
750					76				108				147

六、许用热功率 Permissible thermal power

表11: TLHK3 .. 许用热功率P_T [kW]
Table 11: TLHK3 .. Permissible thermal power P_T [kW]

公称转速 Nominal speed	公称传动比 Normal transmission ratio	环境条件 Environ-mental conditions	齿轮箱规格 Gearbox size										
n_1	i_N		4	5	6	7	8	9	10	11	12	13	14
1500	14~25	P_{T1}	66.24	88.0	115.3	132.4	169.4	188.6	211.6	254.8	323.0	370.3	399.0
	28~45	P_{T1}	53.76	77.0	99.8	114.4	148.0	158.9	173.4	225.1	290.9	334.2	358.3
	50~63	P_{T1}	45.48	68.9	80.6	98.6	120.2	135.8	149.2	192.2	240.7	274.3	295.0
1000	14~25	P_{T1}	60.72	80.6	105.7	121.3	155.3	172.9	193.9	233.5	296.1	339.5	365.8
	28~45	P_{T1}	49.28	70.6	91.5	104.8	135.6	145.6	159.0	206.4	266.6	306.4	328.5
	50~63	P_{T1}	41.69	63.1	73.9	90.4	110.2	124.5	136.7	176.2	220.7	251.5	270.4
750	14~25	P_{T1}	55.2	73.3	96.1	110.3	141.2	157.2	176.3	212.3	269.2	308.6	332.5
	28~45	P_{T1}	44.8	64.2	83.2	95.3	123.3	132.4	144.5	187.6	242.4	278.5	298.6
	50~63	P_{T1}	37.9	57.4	67.2	82.2	100.2	113.2	124.3	160.2	200.6	228.6	245.8

续表11: TLHK3 .. 许用热功率P_T [kW]
Table 11 (continued): TLHK3 .. Permissible thermal power P_T [kW]

公称转速 Nominal speed	公称传动比 Normal transmission ratio	环境条件 Environ-mental conditions	齿轮箱规格 Gearbox size							
n_1	i_N		15	16	17	18	19	20	21	22
1500	18~31.5	P_{T1}	438.4	512.2	550.3	634.1	710.4	783.6	796.8	849.6
	35.5~50	P_{T1}	387.0	439.0	438.2	516.2	594	655.2	690	738
	56~90	P_{T1}	341.4	379.9	425.6	478.3	526.8	582	585.6	655.2
1000	18~31.5	P_{T1}	401.8	469.5	504.5	581.2	651.2	718.3	730.4	778.8
	35.5~50	P_{T1}	354.8	402.4	401.7	473.2	544.5	600.6	632.5	676.5
	56~90	P_{T1}	313.0	348.3	390.2	438.5	482.9	533.5	536.8	600.6
750	18~31.5	P_{T1}	365.3	426.8	458.6	528.4	592	653	664	708
	35.5~50	P_{T1}	322.5	365.8	365.2	430.2	495	546	575	615
	56~90	P_{T1}	284.5	316.6	354.7	398.6	439	485	488	546

注： 1) P_{T1}: 无冷却措施卧式安装时的热功率；
2) 带风扇齿轮箱的热功率请咨询；
3) 竖直安装齿轮箱的热功率请咨询；
4) 表中数值按每小时工作周期100%, 室内大空间安装，海拔高度至1000m得来的。

Note: 1) P_{T1}: Thermal power during horizontal mounting without cooling measures;
2) Please consult for the thermal power of gearbox with fan;
3) Please consult for the thermal power of the vertically installed gearbox;
4) The values in the table are calculated based on work cycle per hour of 100%, mounting in large indoor space, and altitude of up to 1000m.

TAILONG MACHINERY

表12: TLHK4 .. 许用热功率P_T [kW]
Table 12: TLHK4 .. Permissible thermal power P_T [kW]

公称转速 Nominal speed	公称传动比 Normal transmission ratio	环境条件 Environ-mental conditions	齿轮箱规格 Gearbox size									
n_1	i_N		5	6	7	8	9	10	11	12	13	14
1500	20~45	P_{T1}	57.3	73.4	88.2	109.4	121.4	141.8	170.6	211.4	241.8	280.8
	50~100	P_{T1}	50.7	64.0	74.4	94.3	106.3	126.2	148.8	183.8	207.1	237.6
	112~250	P_{T1}	42.9	54.2	64.3	77.0	91.6	102.6	124.3	155.04	177.6	198
1000	20~45	P_{T1}	52.5	67.3	80.8	100.3	111.3	130.2	156.4	193.8	221.6	257.4
	50~100	P_{T1}	46.5	58.7	68.2	86.6	97.6	115.7	136.4	168.5	189.8	217.8
	112~250	P_{T1}	39.3	49.7	58.9	70.6	83.9	93.8	113.9	142.1	162.8	181.5
750	20~45	P_{T1}	47.8	61.2	73.5	91.2	101.2	118.2	142.2	176.2	201.5	234
	50~100	P_{T1}	42.3	53.4	62	78.6	88.6	105.2	124	153.2	172.6	198
	112~250	P_{T1}	35.8	45.2	53.6	64.2	76.3	85.3	103.6	129.2	147.8	165

续表12: TLHK4 .. 许用热功率P_T [kW]
Table 12 (continued): TLHK4 .. Permissible thermal power PT [kW]

公称转速 Nominal speed	公称传动比 Normal transmission ratio	环境条件 Environ-mental conditions	齿轮箱规格 Gearbox size							
n_1	i_N		15	16	17	18	19	20	21	22
1500	20~45	P_{T1}	328.8	369.6	390	444	516	571.2	672	732
	50~100	P_{T1}	280.8	314.4	331.2	384	438	486	578.4	630
	112~250	P_{T1}	247.2	277.2	292.8	333.6	388.8	442.8	525.6	573.6
1000	20~45	P_{T1}	301.4	338.8	357.5	407	473	523.6	616	671
	50~100	P_{T1}	257.4	288.2	303.6	352	401.5	445.5	530.2	577.5
	112~250	P_{T1}	226.6	254.1	268.4	305.8	356.4	405.9	481.8	525.8
750	20~45	P_{T1}	274	308	325	370	430	476	560	610
	50~100	P_{T1}	234	262	276	320	365	405	482	525
	112~250	P_{T1}	206	231	244	278	324	369	438	478

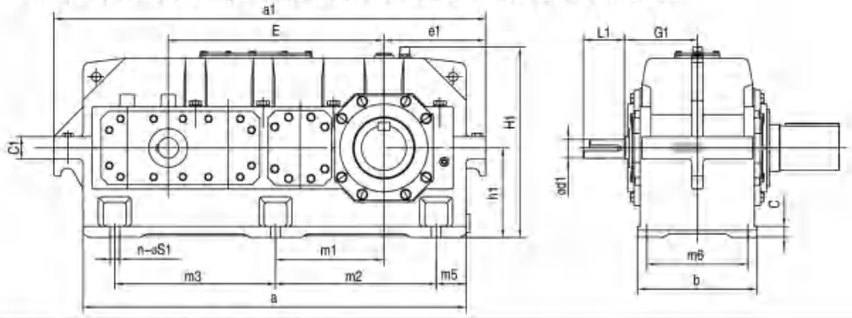
注： 1) P_{T1}: 无冷却措施卧式安装时的热功率；
2) 带风扇齿轮箱的热功率请咨询；
3) 竖直安装齿轮箱的热功率请咨询；
4) 表中数值按每小时工作周期100%, 室内大空间安装，海拔高度至1000m得来的。

Note: 1) P_{T1}: Thermal power during horizontal mounting without cooling measures;
2) Please consult for the thermal power of gearbox with fan;
3) Please consult for the thermal power of the vertically installed gearbox;
4) The values in the table are calculated based on work cycle per hour of 100%, mounting in large indoor space, and altitude of up to 1000m.

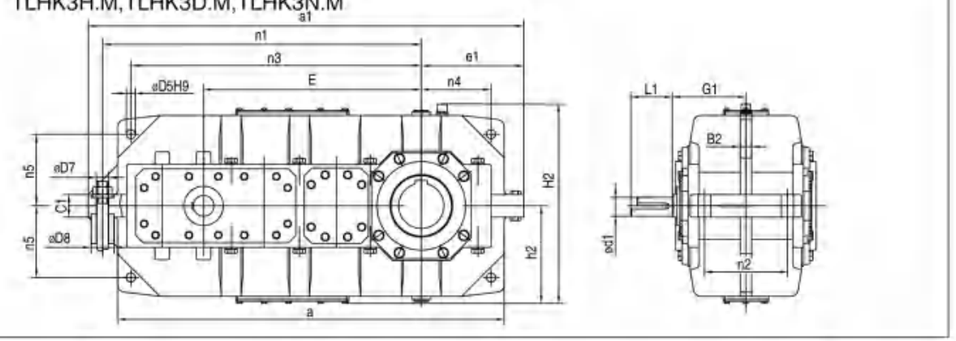
七、外形及安装尺寸 Outline and Installation dimensions

TLHK3.4–14尺寸(mm) TLHK3.4–14 Dimensions (mm)

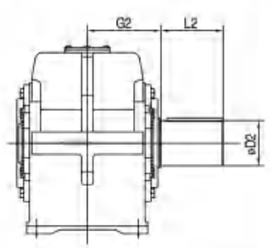
TLHK3S.H,TLHK3G.H,TLHK3W.H,TLHK3H.H,TLHK3D.H,TLHK3N.H



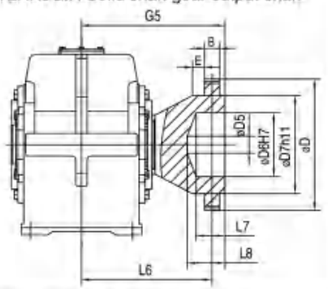
TLHK3H.M,TLHK3D.M,TLHK3N.M



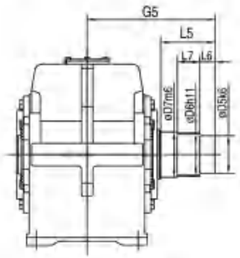
TLHK3S.H实心轴平键
TLHK3S.H Solid shaft with parallel key



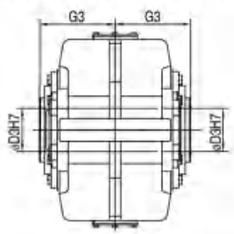
TLHK3G.H实心轴齿式输出轴
TLHK3G.H Solid shaft gear output shaft



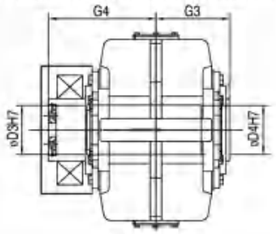
TLHK3W.H实心轴花键
TLHK3W.H Solid shaft with spline



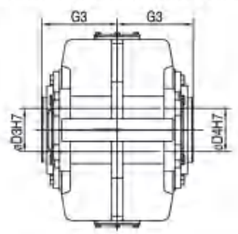
TLHK3H.H空心轴平键
TLHK3H.H Hollow shaft with parallel key



TLHK3D.H空心轴锁紧盘
TLHK3D.H Hollow shaft with shrink disk



TLHK3N.H空心轴花键
TLHK3N.H Solid shaft with spline



TLHK3.4–14尺寸（mm） TLHK3.4–14 Dimensions (mm)

齿轮箱TLHK3..H Gearbox TLHK3 .. H																							
规格 Size	输入轴 Input shaft									输出轴Output shaft			外形尺寸Overall dimension									
	iN=14-25		iN=18-31.5		iN=28-50		iN=35.5-63		G1	TLHK3S.H												
	d1	L1	d1	L1	d1	L1	d1	L1		øD2	L2	G2	a	b	E	a1	e1	H1	h1-$^{0}_{0.5}$	H2	h2
4	45p6	110			32p6	80			150	80r6	130	140	700	225	405	790	240	380	180	400	200
5	50p6	110			38p6	80			170	100r6	165	165	887	270	472	1015	278	465	220	490	245
6			50p6	110			38p6	80	170	110r6	165	165	972	270	507	11 00	328	485	230	510	255
7	55p6	110			45p6	110			195	120r6	165	195	1025	320	577	1155	272	505	240	530	265
8			55p6	110			45p6	110	195	130r6	200	195	1106	320	622	1235	308	585	280	610	305
9	65p6	140			55p6	110			230	140r6	200	235	1190	390	675	1335	320	605	280	650	325
10			65p6	140			55p6	110	230	160r6	240	235	1290	390	725	1435	370	685	320	730	365
11	80p6	170			70p6	140			270	170r6	240	280	1418	470	815	1570	370	685	320	730	365
12			80p6	170			70p6	140	270	180r6	240	280	1556	470	885	1710	440	805	380	850	425
13	90p6	170			80p6	170			325	200r6	280	350	1647	545	950	1830	430	815	380	870	435
14			90p6	170			80p6	170	325	210r6	280	350	1783	545	1020	1970	500	935	440	990	495

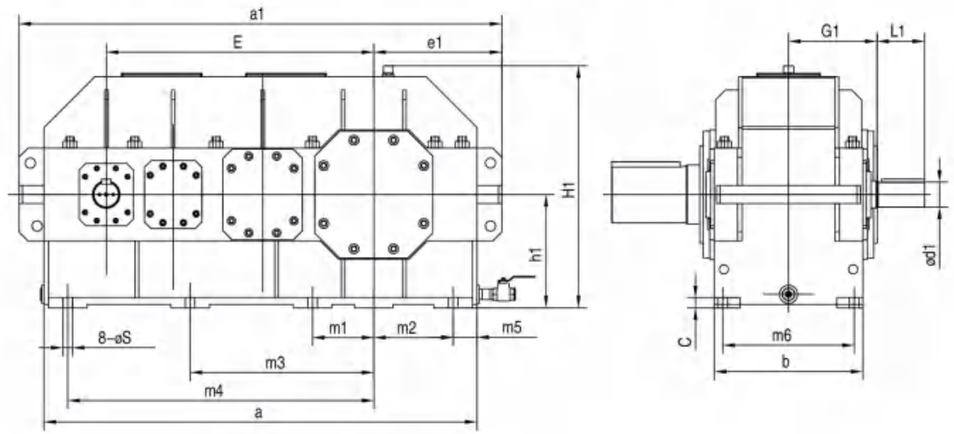
齿轮箱TLHK3..H Gearbox TLHK3 .. H																			
规格 Size	地脚孔安装 Mounting of anchor holes							支撑孔安装Mounting of support holes								重量Weight(kg)		润滑油量 Lubricating oil quantity (L)	
	m1	m2	m3	m5	m6	C	S1	D5	B2	n1	n2	n3	n5	D7	D8	C1	TLHK3.H	TLHK3.M	TLHK3.H	TLHK3.M
4	200	340	250	55	190	30	17.5	20	25	550	90	475	140	22	40	49	240	230	18	15
5	217	375	375	60	230	30	22	24	30	705	100	635	170	26	48	49	380	370	20	18
6	207	420	420	55	230	30	22	24	30	740	100	670	180	26	48	49	440	430	25	23
7	290	430	430	80	270	30	26	24	30	845	110	770	190	33	61	59	605	595	35	30
8	295	470	470	80	270	30	26	24	30	890	110	810	225	33	61	59	690	675	42	38
9	340	500	500	95	330	35	33	36	45	980	130	890	215	33	61	69	955	890	52	48
10	340	550	550	95	330	35	33	36	45	1030	130	940	255	33	61	69	1100	1035	65	60
11	405	605	605	104	400	45	39	40	65	1160	150	1060	250	39	71	79	1535	1475	88	80
12	405	675	575	104	400	45	39	40	65	1230	150	1130	310	39	71	79	1820	1750	120	110
13	472.5	712.5	712.5	110	465	55	45	48	80	1355	170	1240	300	39	71	89	2400	2270	140	125
14	472.5	782.5	782.5	110	465	55	45	48	80	1425	170	1305	360	39	71	89	2860	2710	180	160

输出轴 Output shaft																		
规格 Size	TLHK3H.H		TLHK3D.H				TLHK3N.H				TLHK3W.H							
	D3	G3	D3	D4	G3	G4	INT/DIN 5480	D3	D4	G3	EXT/GB3478	D5	D6	D7	L5	L6	L7	G5
4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-	-	80	95	100	125	35	55	290
6	105	165	110	110	165	240	N95x3x30x30x9H	89	110	165	W22x5x30px7h	100	115	120	135	40	60	300
7	-	-	-	-	-	-	-	-	-	-	-	100	115	120	135	40	60	330
8	125	195	130	130	195	285	N120x3x30x38x9H	114	130	195	W26x5x30px7h	120	135	140	155	45	75	350
9	-	-	-	-	-	-	-	-	-	-	-	140	155	160	165	50	80	400
10	150	235	150	155	235	350	N140x3x30x45x9H	134	155	235	W30x5x30px7h	140	155	160	165	50	80	400
11	-	-	-	-	-	-	-	-	-	-	-	160	175	180	180	55	90	460
12	180	270	180	185	270	405	N170x5x30x32x9H	160	185	270	W38x5x30px7h	180	195	200	190	55	100	470
13	-	-	-	-	-	-	-	-	-	-	-	180	195	200	190	55	100	540
14	210	335	210	215	335	480	N190x5x30x36x9H	180	215	335	W26x8x30px7h	190	216	222	205	60	110	555

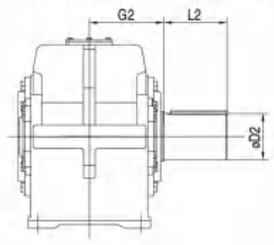
1)实心轴齿式输出轴尺寸TLHK3G.H尺寸见后。
2)平键轴:平键和平键槽按照GB/T1095–2003，轮毂键槽宽按照ISO Js9。
1) The dimension of solid shaft gear output shaft TLHK3G.H is shown below.
2) Shaft with parallel key: parallel key and parallel keyway according to GB/T1095-2003, and the width of hub keyway according to ISO Js9.

TLHK3.15–22尺寸(mm) TLHK3.15–22 Dimension (mm)

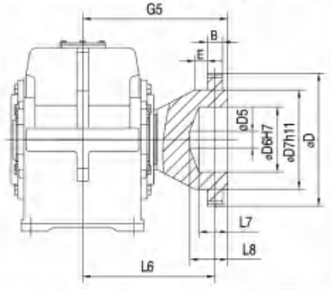
TLHK3S.H,TLHK3G.H,TLHK3W.H,TLHK3H.H,TLHK3D.H,TLHK3N.H



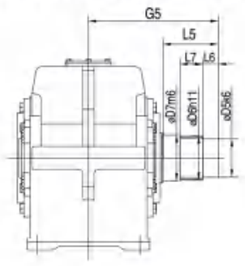
TLHK3S.H实心轴平键
TLHK3S.H Solid shaft with parallel key



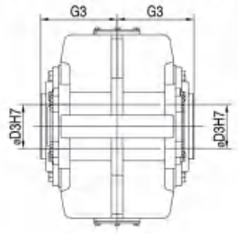
TLHK3G.H实心轴齿式输出轴
TLHK3G.H Solid shaft gear output shaft



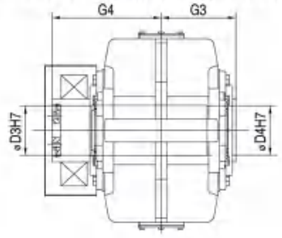
TLHK3W.H实心轴花键
TLHK3W.H Solid shaft with spline



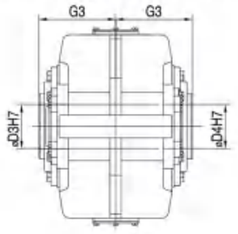
TLHK3H.H空心轴平键
TLHK3H.H Hollow shaft with parallel key



TLHK3D.H空心轴锁紧盘
TLHK3D.H Hollow shaft with shrink disk



TLHK3N.H空心轴花键
TLHK3N.H Solid shaft with spline



TLHK3.15–22尺寸（ mm ） TLHK3.15–22 Dimension (mm)

齿轮箱TLHK3..H Gearbox TLHK3 .. H																			
规格 Size	输入轴 Input shaft								G1	输出轴 Output shaft			外形尺寸 Overall dimension						
	iN=18-31.5		iN=20-50		iN=35.5-56		iN=56-90			TLHK3S.H									
	d1	L1	d1	L1	d1	L1	d1	L1		øD2	L2	G2	a	b	E	a1	e1	H1	h1-$^{0}_{0.5}$
15	90p6	170			70p6	140			360	230r6	330	420	1700	595	1059	1910	525	935	440
16			90p6	170			70p6	140	360	240r6	330	420	1790	595	1105	2006	575	1060	500
17	110p6	210			90p6	170			390	250r6	330	450	1910	655	1180	2130	565	1070	500
18			110p6	210			90p6	170	390	270r6	380	450	2040	655	1240	2260	635	1160	550
19	110p6	210			90p6	170			440	290r6	380	500	2170	730	1335	2395	635	1175	550
20			110p6	210			90p6	170	440	300r6	380	500	2300	730	1395	2525	705	1315	620
21	130p6	250			110p6	210			480	320r6	380	550	2500	790	1510	2717	705	1330	620
22			130p6	250			110p6	210	480	340r6	450	550	2615	790	1565	2832	765	1485	700

齿轮箱TLHK3..H Gearbox TLHK3 .. H											
规格 Size	地脚孔安装 Mounting of anchor holes								重量 Weight(kg)		润滑油 Lubricating oil quantity (L)
	m1	m2	m3	m4	m5	m6	C	S1	A/B/C/D/G/H	E/F/I	
15	235	315	705	1175	105	520	40	42	3390	3505	160
16	280	360	750	1220	105	520	40	42	3870	4000	180
17	270	350	810	1350	105	580	45	42	4570	4730	220
18	330	420	870	1410	105	580	45	42	5325	5510	240
19	300	400	910	1520	120	645	50	48	6810	7050	285
20	360	470	970	1580	120	645	50	48	7690	7960	360
21	360	450	1060	1760	140	700	55	56	9390	9720	410
22	415	510	1115	1815	140	700	55	56	10440	10805	520

输出轴 Output shaft																		
规格 Size	TLHK3H.H		TLHK3D.H				TLHK3N.H				TLHK3W.H							
	D3	G3	D3	D4	G3	G4	INT/DIN 5480	D3	D4	G3	EXT/GB3478	D5	D6	D7	L5	L6	L7	G5
15	-	-	-	-	-	-	-	-	-	-	W26x8x30px7h	190	216	222	205	60	110	625
16	240	380	240	245	380	550	N220x5x30x42x9H	210	245	380	W30x8x30px7h	220	248	254	220	60	125	640
17	-	-	-	-	-	-	-	-	-	-	W30x8x30px7h	220	248	254	220	60	125	670
18	275	415	280	285	415	600	N250x5x30x48x9H	240	285	415	W30x8x30px7h	220	248	254	220	60	125	670
19	-	-	-	-	-	-	-	-	-	-	W34x8x30px7h	280	250	286	235	60	140	735
20	-	-	-	-	-	-	-	-	-	-	W38x8x30px7h	312	280	318	260	70	155	760
21	-	-	-	-	-	-	-	-	-	-	W38x8x30px7h	312	280	318	260	70	155	810
22	-	-	-	-	-	-	-	-	-	-	W44x8x30px7h	360	320	366	285	75	175	835

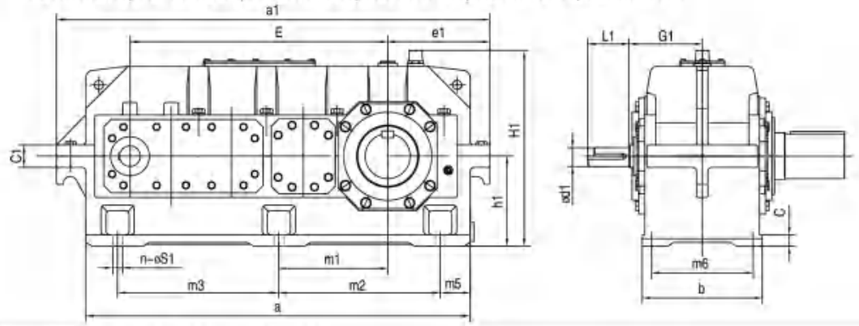
1)实心轴齿式输出轴尺寸TLHK3G.H尺寸见后。

2)平键轴:平键和平键槽按照GB/T1095–2003，轮毂键槽宽按照ISO Js9。

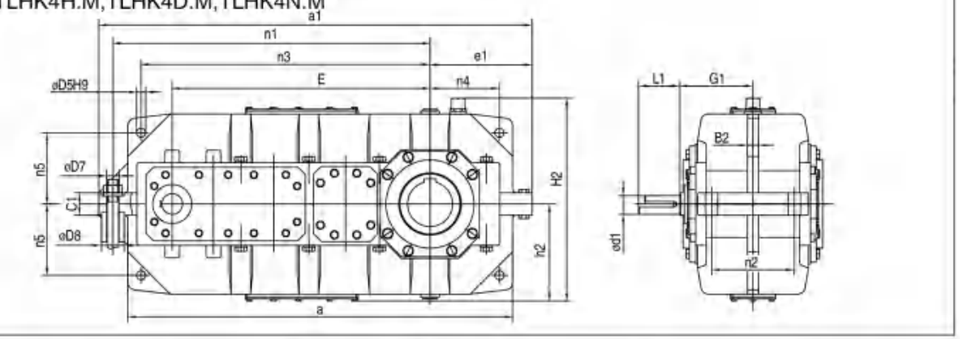
1) The dimension of solid shaft gear output shaft TLHK3G.H is shown below.
2) Shaft with parallel key: parallel key and parallel keyway according to GB/T1095-2003, and the width of hub keyway according to ISO Js9.

TLHK4.5–14尺寸(mm) TLHK4.5–14 Dimension (mm)

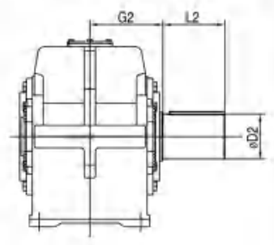
TLHK4S.H,TLHK4G.H,TLHK4W.H,TLHK4H.H,TLHK4D.H,TLHK4N.H



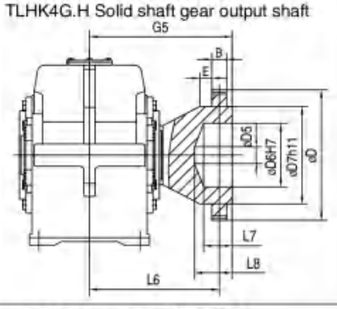
TLHK4H.M,TLHK4D.M,TLHK4N.M



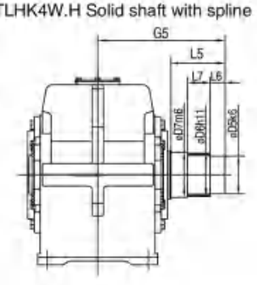
TLHK4S.H 实心轴平键
TLHK4S.H Solid shaft with parallel key



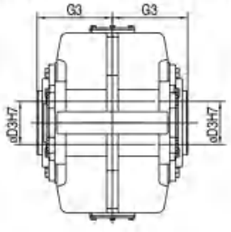
TLHK4G.H 实心轴齿式输出轴
TLHK4G.H Solid shaft gear output shaft



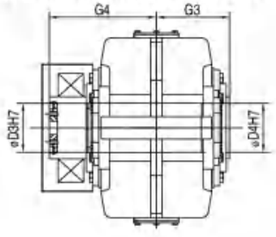
TLHK4W.H 实心轴花键
TLHK4W.H Solid shaft with spline



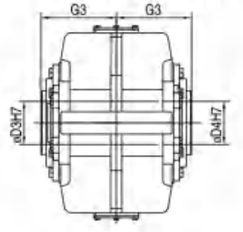
TLHK4H.H 空心轴平键
TLHK4H.H Hollow shaft with parallel key



TLHK4D.H 空心轴锁紧盘
TLHK4D.H Hollow shaft with shrink disk



TLHK4N.H 空心轴花键
TLHK4N.H Solid shaft with spline



TLHK4.5–14尺寸（mm）TLHK4.5–14 Dimension (mm)

齿轮箱TLHK4..H Gearbox TLHK4 .. H																						
规格 Size	输入轴 Input shaft								G1	输出轴Output shaft TLHK3S.H			外形尺寸 Overall dimension								
	iN=20-100		iN=25-125		iN=112-200		iN=140-250															
	d1	L1	d1	L1	d1	L1	d1	L1		øD2	L2	G2	a	b	E	a1	e1	H1	h1-$^{0}_{0.5}$	H2	h2
5	40p6	110			30p6	80			170	100r6	165	165	887	270	562	1015	278	465	220	490	245
6			40p6	110			30p6	80	170	110r6	165	165	972	270	597	1100	328	485	230	510	255
7	45p6	110			35p6	80			195	120r6	165	195	1025	320	687	1155	272	505	240	530	265
8			45p6	110			35p6	80	195	130r6	200	195	1106	320	732	1235	308	585	280	610	305
9	60p6	140			45p6	110			230	140r6	200	235	1190	390	805	1335	320	605	280	650	325
10			60p6	140			45p6	110	230	160r6	240	235	1290	390	855	1435	370	685	320	730	365
11	70p6	140			50p6	110			270	170r6	240	280	1418	470	975	1570	370	685	320	730	365
12			70p6	140			50p6	110	270	180r6	240	280	1556	470	1045	1710	440	805	380	850	425
13	85p6	170			60p6	140			325	200r6	280	350	1647	545	1135	1830	430	815	380	870	435
14			85p6	170			60p6	140	325	210r6	280	350	1783	545	1205	1970	500	935	440	990	495

齿轮箱TLHK4..H Gearbox TLHK4 .. H																			
规格 Size	地脚孔安装 Mounting of anchor holes							支撑孔安装 Mounting of support holes								重量 Weight(kg)		润滑油量 Lubricating oil quantity (L)	
	m1	m2	m3	m5	m6	C	S1	D5	B2	n1	n2	n3	n5	D7	D8	C1	TLHK4.H	TLHK4.M	TLHK4.H	TLHK4.M
5	217	375	375	60	230	30	22	24	30	705	100	635	170	26	48	49	385	375	20	18
6	207	420	420	55	230	30	22	24	30	740	100	670	180	26	48	49	445	435	25	23
7	290	430	430	80	270	30	26	24	30	845	110	770	190	33	61	59	615	605	35	30
8	295	470	470	80	270	30	26	24	30	890	110	810	225	33	61	59	700	685	42	38
9	340	500	500	95	330	35	33	36	45	980	130	890	215	33	61	69	975	910	52	48
10	340	550	550	95	330	35	33	36	45	1030	130	940	255	33	61	69	1120	1055	65	60
11	405	605	605	104	400	45	39	40	65	1160	150	1060	250	39	71	79	1565	1505	88	80
12	405	675	675	104	400	45	39	40	65	1230	150	1130	310	39	71	79	1850	1780	120	110
13	472.5	712.5	712.5	110	465	55	45	48	80	1355	170	1240	300	39	71	89	2455	2315	140	125
14	472.5	782.5	782.5	110	465	55	45	48	80	1425	170	1305	360	39	71	89	2910	2760	180	160

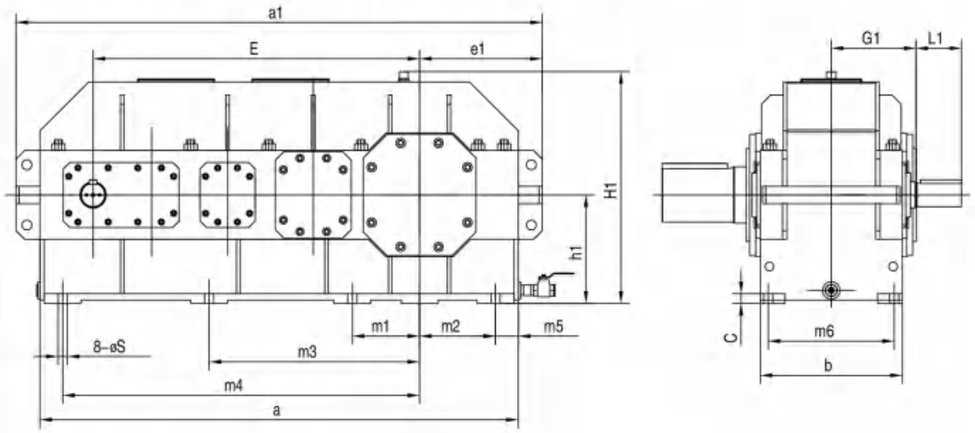
输出轴 Output shaft																		
规格 Size	TLHK4H.H		TLHK4D.H				TLHK4N.H				TLHK4W.H							
	D3	G3	D3	D4	G3	G4	INT/DIN 5480	D3	D4	G3	EXT/GB3478	D5	D6	D7	L5	L6	L7	G5
5	-	-	-	-	-	-	-	-	-	-	W18x5x30px7h	80	95	100	125	35	55	290
6	105	165	110	110	165	240	N95x3x30x30x9H	89	110	165	W22x5x30px7h	100	115	120	135	40	60	300
7	-	-	-	-	-	-	-	-	-	-	W22x5x30px7h	100	115	120	135	40	60	330
8	125	195	130	130	195	285	N120x3x30x38x9H	114	130	195	W26x5x30px7h	120	135	140	155	45	75	350
9	-	-	-	-	-	-	-	-	-	-	W30x5x30px7h	140	155	160	165	50	80	400
10	150	235	150	155	235	350	N140x3x30x45x9H	134	155	235	W30x5x30px7h	140	155	160	165	50	80	400
11	-	-	-	-	-	-	-	-	-	-	W34x5x30px7h	160	175	180	180	55	90	460
12	180	270	180	185	270	405	N170x5x30x32x9H	160	185	270	W38x5x30px7h	180	195	200	190	55	100	470
13	-	-	-	-	-	-	-	-	-	-	W38x5x30px7h	180	195	200	190	55	100	540
14	210	335	210	215	335	480	N190x5x30x36x9H	180	215	335	W26x8x30px7h	190	216	222	205	60	110	555

1)实心轴齿式输出轴尺寸TLHK4G.H尺寸见后。
2)平键轴:平键和平键槽按照GB/T1095–2003，轮毂键槽宽按照ISO Js9。

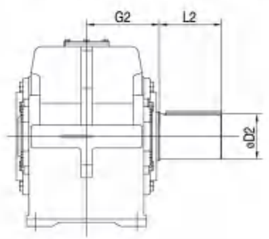
1) The dimension of solid shaft gear output shaft TLHK4G.H is shown below.
2) Shaft with parallel key: parallel key and parallel keyway according to GB/T1095-2003, and the width of hub keyway according to ISO Js9.

TLHK4.15–22尺寸(mm) TLHK4.15–22 Dimension (mm)

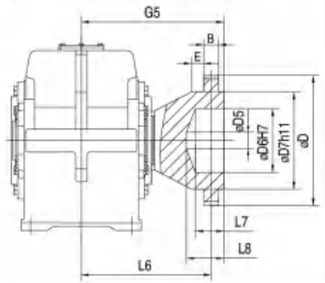
TLHK4S.H,TLHK4G.H,TLHK4W.H,TLHK4H.H,TLHK4D.H,TLHK4N.H



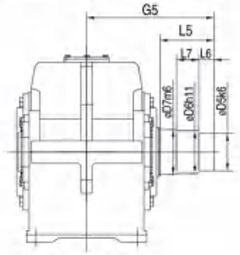
TLHK4S.H 实心轴平键
TLHK4S.H Solid shaft with parallel key



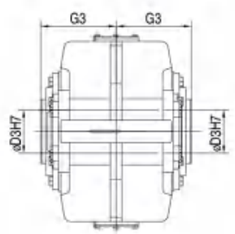
TLHK4G.H 实心轴齿式输出轴
TLHK4G.H Solid shaft gear output shaft



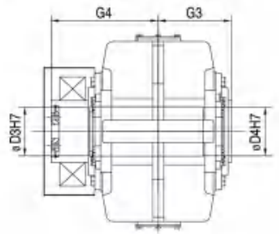
TLHK4W.H 实心轴花键
TLHK4W.H Solid shaft with spline



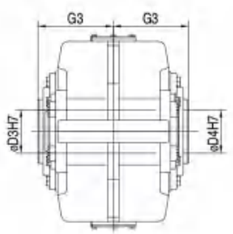
TLHK4H.H 空心轴平键
TLHK4H.H Hollow shaft with parallel key



TLHK4D.H 空心轴锁紧盘
TLHK4D.H Hollow shaft with shrink disk



TLHK4N.H 空心轴花键
TLHK4N.H Solid shaft with spline



TLHK4.15–22尺寸（mm）TLHK4.15–22 Dimension (mm)

齿轮箱TLHK4..H Gearbox TLHK4 .. H																			
规格 Size	输入轴Input shaft								G1	输出轴Output shaft			外形尺寸 Overall dimension						
	iN=20-100		iN=22.4-160		iN=112-140		iN=180-250			TLHK4S.H									
	d1	L1	d1	L1	d1	L1	d1	L1		øD2	L2	G2	a	b	E	a1	e1	H1	h1-$^{0}_{0.5}$
15	90p6	170			70p6	140			360	230r6	330	420	1980	595	1349	2190	525	935	440
16			90p6	170			70p6	140	360	240r6	330	420	2070	595	1395	2286	575	1060	500
17	110p6	210			90p6	170			390	250r6	330	450	2205	655	1505	2425	565	1070	500
18			110p6	210			90p6	170	390	270r6	380	450	2335	655	1565	2555	635	1160	550
19	110p6	210			90p6	170			440	290r6	380	500	2470	730	1700	2690	635	1175	550
20			110p6	210			90p6	170	440	300r6	380	500	2600	730	1760	2820	705	1315	620
21	130p6	250			110p6	210			480	320r6	380	550	2840	790	1925	3060	705	1330	620
22			130p6	250			110p6	210	480	340r6	450	550	2955	790	1980	3175	765	1485	700

齿轮箱TLHK4..H Gearbox TLHK4 .. H										
规格 Size	地脚孔安装 Mounting of anchor holes								重量 Weight(kg)		润滑油 Lubricating oil (L)
	m1	m2	m3	m4	m5	m6	C	S1	A/B/C/D/G/H	E/F/I	
15	285	315	885	1455	105	520	40	42	3910	4030	165
16	330	360	930	1500	105	520	40	42	4310	4440	200
17	310	350	970	1645	105	580	45	42	5245	5400	245
18	370	420	1030	1705	105	580	45	42	6030	6210	285
19	360	400	1120	1820	120	645	50	48	7550	7775	320
20	420	470	1180	1880	120	645	50	48	8450	8700	420
21	420	450	1290	2100	140	700	55	56	10435	10750	465
22	475	510	1345	2155	140	700	55	56	11515	11860	590

输出轴 Output shaft																			
规格 Size	TLHK4H.H		TLHK4D.H				TLHK4N.H				TLHK4W.H								
	D3	G3	D3	D4	G3	G4	INT/DIN 5480	D3	D4	G3	EXT/GB3478	D5	D6	D7	L5	L6	L7	G5	
15	-	-	-	-	-	-	-	-	-	-	W26x8x30px7h	190	216	222	205	60	110	625	
16	240	380	240	245	380	550	N220x5x30x42x9H	210	245	380	W30x8x30px7h	220	248	254	220	60	125	640	
17	-	-	-	-	-	-	-	-	-	-	W30x8x30px7h	220	248	254	220	60	125	670	
18	275	415	280	285	415	600	N250x5x30x48x9H	240	285	415	W30x8x30px7h	220	248	254	220	60	125	670	
19	-	-	-	-	-	-	-	-	-	-	W34x8x30px7h	280	250	286	235	60	140	735	
20	-	-	-	-	-	-	-	-	-	-	W38x8x30px7h	312	280	318	260	70	155	760	
21	-	-	-	-	-	-	-	-	-	-	W38x8x30px7h	312	280	318	260	70	155	810	
22	-	-	-	-	-	-	-	-	-	-	W44x8x30px7h	360	320	366	285	75	175	835	

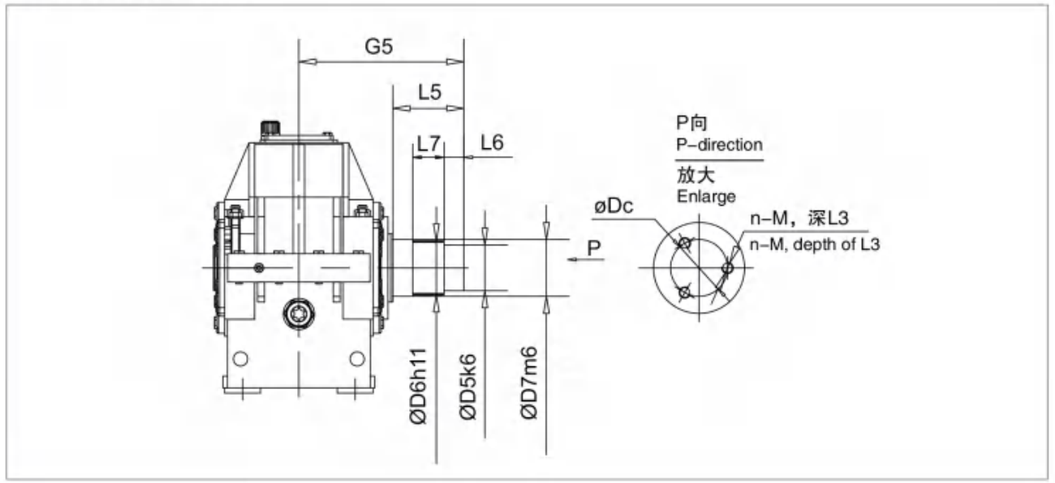
1)实心轴齿式输出轴尺寸TLHK4G.H尺寸见后。
2)平键轴:平键和平键槽按照GB/T1095–2003，轮毂键槽宽按照ISO Js9。

1) The dimension of solid shaft gear output shaft TLHK4G.H is shown below.
2) Shaft with parallel key: parallel key and parallel keyway according to GB/T1095-2003, and the width of hub keyway according to ISO Js9.

八、齿轮箱的输出 Output of gearbox

8.1 实心轴花键 Solid shaft with spline

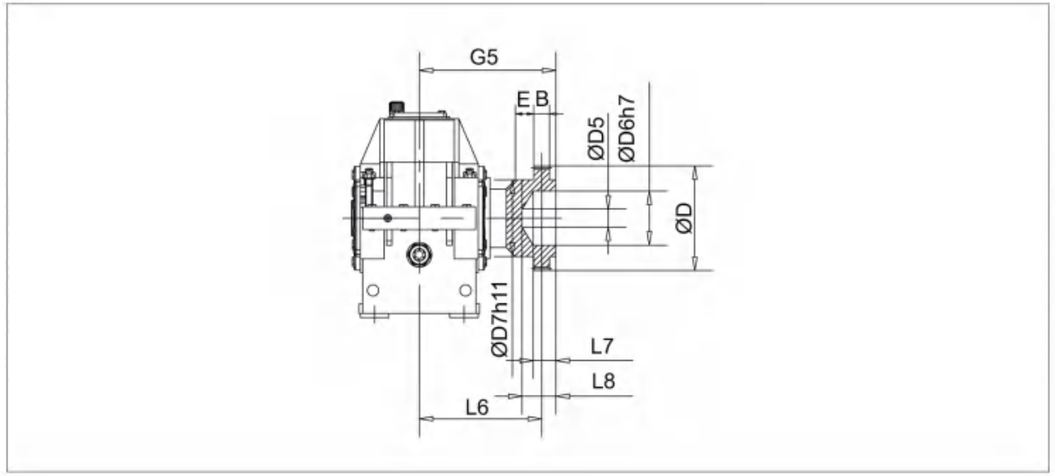
类型TLHK3W.. , TLHK4W...[mm]
Type TLHK3W.. , TLHK4W...[mm]



规格 Size	花键参数Parameters of spline											
	卷筒联轴器型号 Model of drum shaft coupler	G5	Zxmx30px7h	D5	D6	D7	L5	L6	L7	n-M	L3	Dc
5	WZL05	290	W 18X5	80	95	100	125	35	55	3-M10	20	50
6	WZL06	300	W 22X5	100	115	120	135	40	60	3-M12	25	70
7	WZL06	330	W 22X5	100	115	120	135	40	60	3-M12	25	70
8	WZL07	350	W 26X5	120	135	140	155	45	75	3-M16	30	80
9	WZL08	400	W 30X5	140	155	160	165	50	80	3-M16	30	100
10	WZL08	400	W 30X5	140	155	160	165	50	80	3-M16	30	100
11	WZL09	460	W 34X5	160	175	180	180	55	90	3-M20	40	110
12	WZL10	470	W 38X5	180	195	200	190	55	100	3-M20	40	130
13	WZL10	540	W 38X5	180	195	200	190	55	100	3-M20	40	130
14	WZL11	555	W 26X8	190	216	222	205	60	110	3-M20	40	140
15	WZL11	625	W 26X8	190	216	222	205	60	110	3-M20	40	140
16	WZL12	640	W 30X8	220	248	254	220	60	125	3-M24	50	150
17	WZL12	670	W 30X8	220	248	254	220	60	125	3-M24	50	150
18	WZL12	670	W 30X8	220	248	254	220	60	125	3-M24	50	150
19	WZL13	735	W 34X8	250	280	286	235	60	140	3-M24	50	170
20	WZL14	760	W 38X8	280	312	318	260	70	155	4-M24	50	210
21	WZL14	810	W 38X8	280	312	318	260	70	155	4-M24	50	210
22	WZL15	835	W 44X8	320	360	366	285	75	175	4-M30	60	260

1)外花键按GB3478.1执行。GB3478.1 applies to the outer spline.

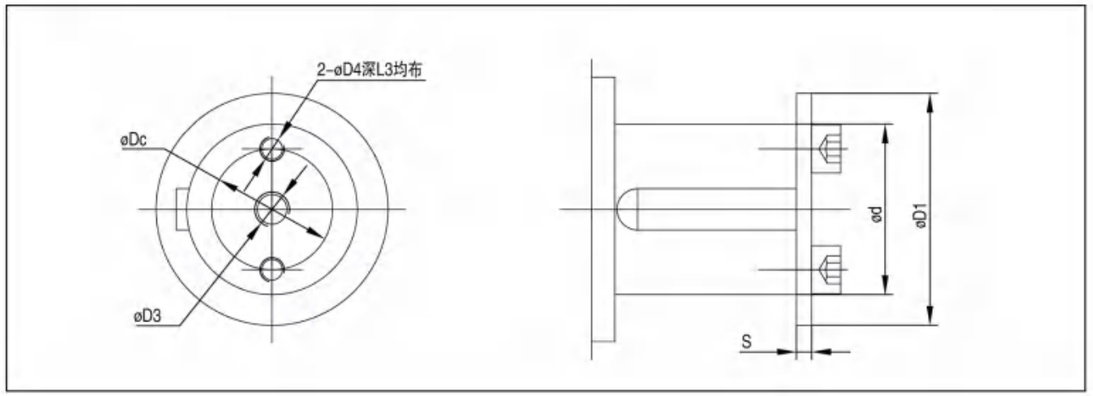
8.2 实心轴齿式输出 Solid shaft gear output



规格 Size	齿轮参数 Gear parameters										
	mXZ	D	B	G5	D5	D6	D7	L6	E	L7	L8
5	4X56	232	35	302.5	40	120	170	271	25	50	75
6	6X56	348	40	340	45	170	260	306	32	76	100
7	6X56	348	40	380	45	170	260	346	32	76	100
8	6X56	348	40	380	45	170	260	346	32	76	100
9	8X48	400	50	410	50	180	260	370	32	76	100
10	8X54	448	50	425	105	200	260	385	32	78	100
11	10X48	500	60	475	105	200	280	410	35	78	100
12	10X48	500	60	475	105	200	280	410	35	78	100
13	10X58	600	70	535	110	250	320	475	40	80	105
14	10X58	600	70	535	110	250	320	475	40	80	105
15	12X54	672	75	660	170	290	400	577.5	45	95	130
16	12X54	672	75	660	170	290	400	577.5	45	95	130
17	12X58	720	85	725	180	310	420	642.5	60	105	140
18	12X58	720	85	725	180	310	420	642.5	60	105	140
19	12X64	792	100	845	230	380	520	745	80	140	180
20	12X64	792	100	845	230	380	520	745	80	140	180
21	-	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-	-	-	-	-

8.3 实心轴轴端尺寸 Dimension of solid shaft end

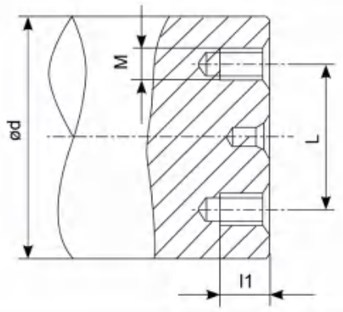
规格 04 22
Sizes 04 22



轴端					轴端档板		轴端止动垫片		螺栓	
d	D3	Dc	D4	L3	D1	S	B	L	规格	数量
≤30	DS10	-	-	-	40	6	-	-	M10×25	1
>30~38	DS12	-	-	-	50	6	-	-	M12×30	1
>38~50	DS16	-	-	-	60	6	-	-	M16×40	1
>50~60	DS10	30	M12	25	80	6	30	70	M12×30	2
>60~70	DS16	40	M12	25	90	6	30	80	M12×30	2
>70~80	DS16	40	M12	25	100	8	30	80	M12×30	2
>80~90	DS20	50	M12	25	125	8	30	90	M12×30	2
>90~110	DS24	60	M12	25	150	8	30	100	M12×30	2
>110~140	DS30	80	M16	30	180	12	35	130	M16×40	2
>140~160	DS30	110	M16	30	220	12	35	160	M16×40	2
>160~220	DS30	140	M16	30	260	12	35	190	M16×40	2

1)实心轴轴端尺寸适用于所有规格车入轴端尺寸和04-14输出轴端尺寸。
2)轴端挡板，止动垫片和螺栓不在供货范围，如需要请另行订购。
3)直径≤50尺寸的轴径的轴端挡板需要用中心孔来固定。
4)直径>50尺寸的轴径的轴端挡板按照JB/ZQ4349，轴端止动垫片按照JB/ZQ4347执行。
5)直径>220尺寸的输出轴端尺寸见下图及下表。

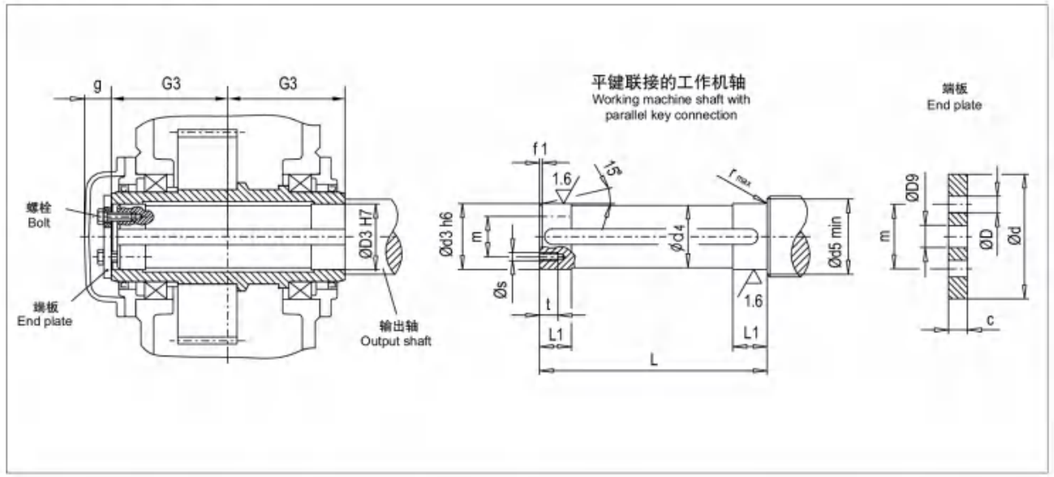
轴端双螺孔尺寸d≥225



轴端双螺孔尺寸			
d	M	l1	L
225<d≤230	M16	28	160
230<d≤280	M20	38	180
280<d≤290			190
290<d≤310	M24	45	220
310<d≤330			230
330<d≤340			240
340<d≤360			250
360<d≤390			270
390<d≤420	M30	55	300
420<d≤460			320
460<d≤550			350

8.4 空心轴平键 Hollow shaft parallel key

类型 TLHK3H .. ,TLHK4H .. [mm]
Type TLHK3H .. , TLHK4H.. [mm]



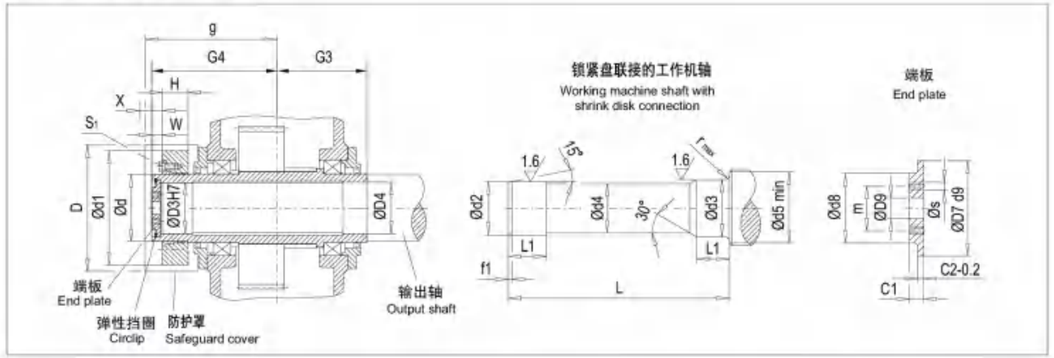
规格 Size	工作机轴 Working machine shaft									端板End plate					螺栓Bolt		空心轴Hollow axles		
	d3	d4	d5	f1	L	L1	r	s	t	c	D	D9	d	m	规格 Size	数量 Quantity	D3	G3	g
4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	105	104.5	116	5	328	45	1.6	M10	18	10	11	26	120	70	M10 × 25	2	105	165	40
7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	125	124.5	136	6	388	55	2.5	M12	20	12	13.5	26	150	85	M12 × 30	2	125	195	40
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	150	149.5	162	6	467	65	2.5	M12	20	12	13.5	33	185	110	M12 × 30	2	150	235	45
11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	180	179.5	192	7	537	75	2.5	M16	28	15	17.5	33	220	130	M16 × 40	2	180	270	45
13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	210	209.5	226	8	667	85	3	M16	28	18	17.5	33	250	160	M16 × 40	2	210	335	45
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	240	239.5	258	8	756	100	3	M20	38	25	22	39	280	180	M20 × 55	4	240	380	60
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	275	274.5	295	9	826	120	4	M20	38	25	22	39	330	210	M20 × 55	4	275	415	60

1)工作机轴材质为42CrMo或强度更高的钢材；
2)平键槽按DIN 68985/1，平键不在供货范围之内；
3)轴端挡板不在供货范围之内。
1) The material of the working machine shaft is 42CrMo or higher strength steel;
2) Parallel keyway according to DIN 68985/1, parallel keys are not within the scope of supply;
3) The shaft end baffle is not within the scope of supply.

8.5 空心轴锁紧盘 Hollow shaft shrink disk

类型TLHK3D .. ,TLHK4D .. [mm]

Type TLHK3D .. ,TLHK4D .. [mm]



规格 Size	工作机轴 Working machine shaft								端板 End plate						螺栓 Bolt		弹性挡圈 Circlip DIN 472
	d2	d3	d4	d5	f1	L	L1	r	C1	C2	D7	d8	D9	m	s	数量 Quantity	
4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	110g6	110h6	109.5	124	5	383	58	3	20	8	115	85	26	60	M10	2	115 × 4
7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	130g6	130h6	129.5	145	6	458	73	3	20	8	135	100	26	70	M12	2	135 × 4
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	150g6	155m6	149.5	170	6	559	92	4	23	10	160	120	33	90	M12	2	160 × 4
11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	180f6	185m6	179.5	200	7	649	122	4	23	10	190	140	33	100	M16	2	190 × 4
13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	210f6	215m6	209.5	233	8	784	147	5	28	14	220	170	33	130	M16	2	220 × 5
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	240f6	245m6	239.5	263	8	899	157	5	28	14	250	190	39	150	M20	2	250 × 5
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	280f6	285m6	279.5	306	9	982	177	5	30	14	290	210	39	160	M20	2	290 × 5

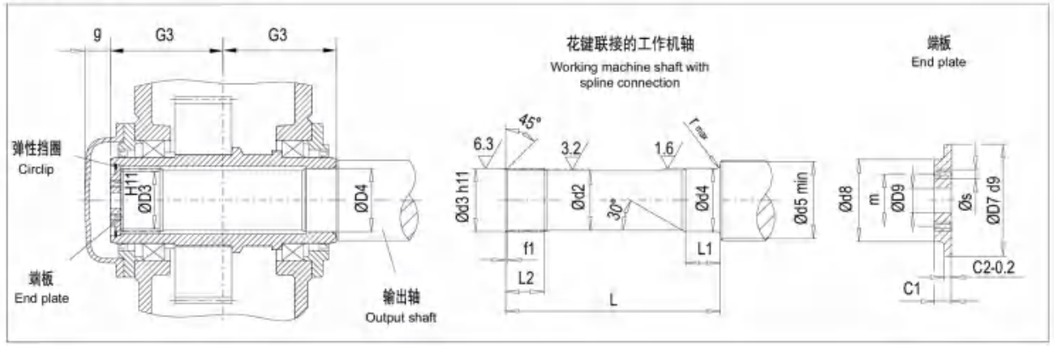
规格 Size	空心轴 Hollow shaft				锁紧盘 Shrink disk					螺栓 Bolt	防护罩 Safeguard cover	
	D3	D4	G3	G4	类型 Type	d	d1	H	W	s1	D	g
4	-	-	-	-	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-	-	-
6	110	110	165	240	140-32	140	230	58	20	M 14	285	255
7	-	-	-	-	-	-	-	-	-	-	-	-
8	130	130	195	285	165-32	165	290	68	23	M 16	340	305
9	-	-	-	-	-	-	-	-	-	-	-	-
10	150	155	235	350	200-32	200	350	85	28	M 16	395	365
11	-	-	-	-	-	-	-	-	-	-	-	-
12	180	185	270	405	240-32	240	405	107	30	M 20	450	420
13	-	-	-	-	-	-	-	-	-	-	-	-
14	210	215	335	480	280-32	280	460	132	30	M 20	525	505
15	-	-	-	-	-	-	-	-	-	-	-	-
16	240	245	380	550	320-32	320	520	140	35	M 24	595	575
17	-	-	-	-	-	-	-	-	-	-	-	-
18	280	285	415	600	360-32	360	590	159	35	M 24	635	625

1)工作机轴材质为42CrMo或强度更高的钢材，工作机轴表面不得沾有机油或润滑脂；
2)在订货时锁紧盘以散件形式提供。
1) The material of working machine shaft is 42CrMo or higher strength steel, and the surface of working machine shaft must not be stained with engine oil or lubricating grease;
2) The shrink disk is supplied as loose part when ordering.

8.6 空心轴花键 Hollow shaft spline

类型TLHK3N .. , TLHK4N .. [mm]

Type TLHK3N .. , TLHK4N .. [mm]



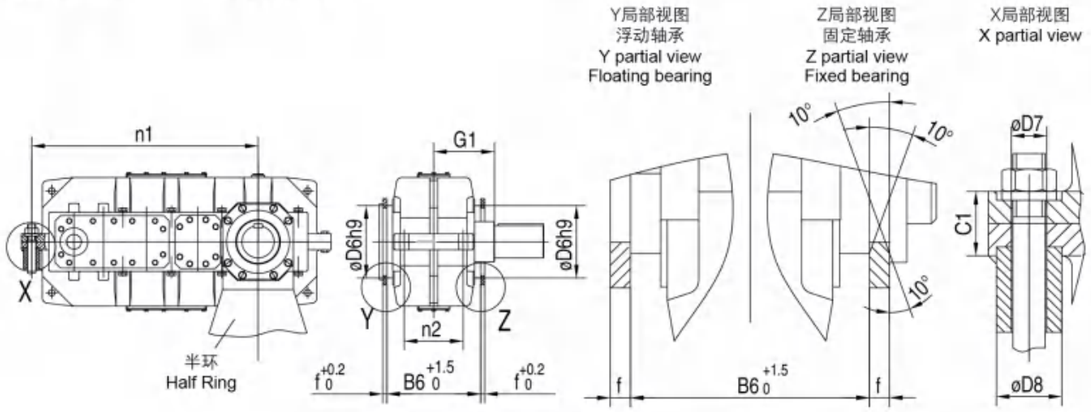
规格 Size	工作机轴 Working machine shaft										弹性挡圈 Circlip DIN472	螺栓 Bolt
	渐开线花键 Involute spline DIN5480	d2	d3	d4	d5	f1	L	L1	L2	r		
5	-	-	-	-	-	-	-	-	-	-	-	-
6	W 95 × 3 × 30 × 30 × 8f	93	94.4	110 h6	124	3	308	58	90	3	105 × 4	M24
7	-	-	-	-	-	-	-	-	-	-	-	-
8	W120 × 3 × 30 × 38 × 8f	118	119.4	130 h6	145	3	368	73	105	3	125 × 4	M24
9	-	-	-	-	-	-	-	-	-	-	-	-
10	W140 × 3 × 30 × 45 × 8f	138	139.4	155m6	170	3	444	92	125	4	150 × 4	M30
11	-	-	-	-	-	-	-	-	-	-	-	-
12	W170 × 5 × 30 × 32 × 8f	168	169	185 m6	200	5	514	122	150	4	175 × 4	M30
13	-	-	-	-	-	-	-	-	-	-	-	-
14	W190 × 5 × 30 × 36 × 8f	188	189	215 m6	233	5	644	147	180	5	200 × 4	M30
15	-	-	-	-	-	-	-	-	-	-	-	-
16	W220 × 5 × 30 × 42 × 8f	218	219	245 m6	263	5	728	157	200	5	240 × 5	M36
17	-	-	-	-	-	-	-	-	-	-	-	-
18	W250 × 5 × 30 × 48 × 8f	248	249	285 m6	306	5	796	177	215	5	265 × 5	M36

规格 Size	空心轴 Hollow shaft				端板 End plate							
	D3	D4	G3	g	C1	C2	D7	d8	D9	m	s	数量 Quantity
5	-	-	-	-	-	-	-	-	-	-	-	-
6	89	110	165	40	20	8	105	80	26	55	M10	2
7	-	-	-	-	-	-	-	-	-	-	-	-
8	114	130	195	40	20	8	125	90	26	65	M12	2
9	-	-	-	-	-	-	-	-	-	-	-	-
10	134	155	235	45	23	10	150	110	33	80	M12	2
11	-	-	-	-	-	-	-	-	-	-	-	-
12	160	185	270	45	23	10	175	130	33	90	M12	2
13	-	-	-	-	-	-	-	-	-	-	-	-
14	180	215	335	45	23	10	200	150	33	110	M16	2
15	-	-	-	-	-	-	-	-	-	-	-	-
16	210	245	380	60	28	14	240	180	39	140	M16	2
17	-	-	-	-	-	-	-	-	-	-	-	-
18	240	285	415	60	30	14	265	200	39	150	M20	2

1)工作机轴材质为42CrMo或强度更高的钢材；
2)安装时花键需加注润滑脂。
1) The material of the working machine shaft is 42CrMo or higher strength steel;
2) The splines need to be greased up during mounting.

8.7 三点式箱体支撑 Three-point box support

类型TLHK3 .. , TLHK4 .. Type TLHK3 .. , TLHK4 ..
规格050···220 Sizes 050··· 220



按顾客可接近程度决定固定轴承在哪一端
Determine which end the fixed bearing is located based on customer accessibility

规格 Size	TLHK3···									TLHK4···								
	G1	D6	B6	f	n1	n2	C1	D7	D8	G1	D6	B6	f	n1	n2	C1	D7	D8
5	210	195	325	20	705	100	49	26	48	210	195	325	20	705	100	49	26	48
6	210	205	325	20	740	100	49	26	48	210	205	325	20	740	100	49	26	48
7	250	235	390	25	845	110	59	33	60	250	235	390	25	845	110	59	33	60
8	250	245	390	25	890	110	59	33	60	250	245	390	25	890	110	59	33	60
9	290	260	460	30	980	130	69	33	60	290	260	460	30	980	130	69	33	60
10	290	280	460	30	1030	130	69	33	60	290	280	460	30	1030	130	69	33	60
11	345	300	550	40	1160	150	79	39	72	345	300	550	40	1160	150	79	39	72
12	345	320	550	40	1230	150	79	39	72	345	320	550	40	1230	150	79	39	72
13	400	360	635	40	1355	170	89	39	72	400	360	635	40	1355	170	89	39	72
14	400	380	635	40	1425	170	89	39	72	400	380	635	40	1425	170	89	39	72
15	480	400	740	50	1310	0	79	39	72	480	400	740	50	1620	0	79	39	72
16	480	420	740	50	1355	0	79	39	72	480	420	740	50	1665	0	79	39	72
17	540	440	810	50	1515	0	79	39	72	540	440	810	50	1810	0	79	39	72
18	540	460	810	50	1575	0	79	39	72	540	460	810	50	1870	0	79	39	72
19	600	500	910	60	1725	0	89	45	84	600	500	910	60	2025	0	89	45	84
20	600	520	910	60	1785	0	89	45	84	600	520	910	60	2060	0	89	45	84
21	660	540	980	60	1980	0	89	45	84	660	540	980	60	2325	0	89	45	84
22	660	560	980	60	2035	0	89	45	84	660	560	980	60	2380	0	89	45	84

TLHK三点式支撑箱体具有如下特点：
1)两个支撑点位于输出轴侧与箱体孔同心的盖板连接部位，第三个支点位于输入轴侧箱体端，允许至结合部；
2)在装配时或在原动力作用时箱体不会发生变形；
3)在安装时减速机自动滑动至适当部位并通过半环形挡板固定在输出轴盖板上，并用螺栓固定在第三个支撑点上；
4)输出的附加径向力不是通过箱体壁而是直接通过轮毂轴承加以传导；
5)输出轴和电机的同心度在拆卸减速机后保持不变。

The TLHK three-point support box bears the following characteristics:
1) Two support points are located at the connection part of cover plate that is concentric with the box hole on the output shaft side, and the third support point is located at the box end on the input shaft side, allowing it to access to the joint part;
2) The box will not deform during assembly or under action of the motive power;
3) During mounting, the gearbox automatically slides to the appropriate position and is fixed on the output shaft cover plate through a semi-circular baffle, and is bolted to the third support point;
4) The additional radial force output is not transmitted through the box wall but directly through the wheel hub bearing;
5) The concentricity of output shaft and motor remains unchanged after disassembling of the reducer.