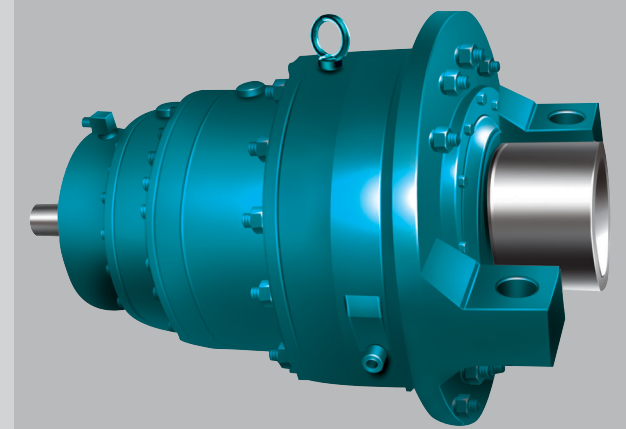
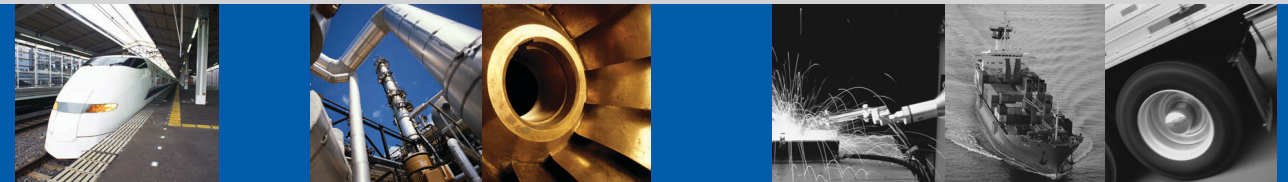


T A I L O N G

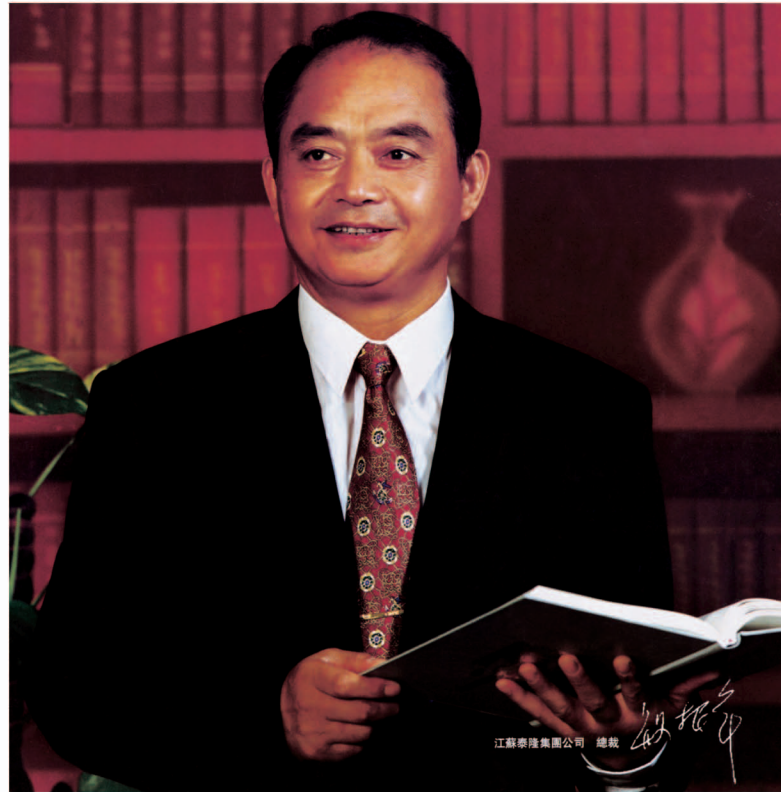


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行星专用减速器

江苏泰隆机械集团
 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

泰隆集团地处扬子江畔的泰兴市区，是泰兴人引以为豪的国家大型企业。集团在全国优秀企业家、江苏省劳动模范董事长殷根章的领导下，经过20多年的悉心经营，昂首迈进了中国机械工业500强，成为全国减速行业龙头老大。

集团现拥有总资产5.8亿元，固定资产3.6亿元，占地面积60万平方米，员工近2612人，专业工程技术人员896人，年销售额15亿元。从美国、德国、日本、俄罗斯等国家引进的大型数控磨齿机、蜗杆磨床、加工中心、碳氮共渗炉等一批高精尖的生产设备和检测设备占48%。建立了全国同行业中检测功能最全、检测功率最大、仪器最先进的测试中心，创建了省级工程技术中心。公司产品在原有的平面二次包络蜗杆减速器、9000系列摆线针轮减速机、圆柱齿轮减速器、行星齿轮减速器等十几个系列，几十万种规格的基础上，采用先进的模块化、点线等技术开发出了TL模块化齿轮减速电机；TPB行星模块化减速器、重载模块化减速器、点线啮合减速器。多年来，起重机用硬齿面、中硬齿面减速器一直在为用户提供最佳的传动方案，在风力发电、水力发电领域捷足先登，做出了不菲的业绩。重载齿轮箱在建材行业、冶金行业成功得到了应用，开发出了建材行业的立式磨机及边缘传动磨机齿轮箱，冶金行业的开卷、卷取齿轮箱、三环减速器、星轮减速器。另外公司还为用户提供榨糖机齿轮箱、螺杆升降机、电动滚筒及各类非标齿轮箱。公司荣获“中国名牌”，“全国首批守合同重信用企业”，“全国重点高新技术企业”、“全国机械工业质量效益型先进企业”、“全国机械工业质量管理奖”、“全国用户满意服务”等殊荣，泰隆商标被评为“中国驰名商标”，在同行业中率先通过质量、环境、安全三位一体认证及ISO10012计量体系确认。

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

Tailong Group is located in Taixing urban area at the border of Yangtse River and it is a state-owned large-sized enterprise boasted by Taixing people. Under the leadership of Mr. Yin genzhang, a nationwide excellent entrepreneur and a model worker of Jiangsu Province, after more than twenty years of operation with concentrated efforts, has proudly marched into the Top 500 enterprises in Chinese Mechanical Industry and has become the industry leader.

At present, the group owns a total assets of RMB 580m, and fixed of RMB 360m, and it covers an area of 600,000 square meters and owns almost 2,612 employees, including 896 technicians, the annual turnover surpasses 1b RMB. The introduced large-sized numerical controlled gear grinding machine, worm grinder, machining center and carbonitriding kiln and etc. advanced, precise and leading manufacturing facilities and inspection apparatus from USA, Germany, Japan and Russia has taken part 48% share in all. At the same time, the group has established a test center with the most complete test functions, the biggest test power, the most advanced instrument and the provincial science & technology park. At the basis of the primary secondary envelope, 9000 series cycloid pinwheel reducer, cylindrical gear, planetary reducer and so on, more than ten series, and several ten thousands specifications, adopting the advanced modularization, point-line technique, ultimately develop TL modular reducer, TPB planetary modular reducer, heavy load modular and point-line meshing decelerator. Along many years, harden-faced reducer for crane, moderate rigid reducer provide the best transmission project for customer all the times; On the other hand, at the wind and water power area, we have taken the swift-footed arrive first, and taken out outstanding success. The heavy load gearboxes has successfully applied in architecture, metallurgy industry, and developed vertical grinder, marginal transmission grinder gearbox which fit for architecture industry, open, convolute gearbox, three-ring, star reducer which special for metallurgy. In addition, the company also supply sugar mill gearbox, worm lifter, electrical roller and various non-standard gearboxes.

The company has been awarded successively with such honorable titles as "China top brand", "National first batch of enterprise honoring contracts and keeping promises", "National key new & hi-tech enterprise", "National mechanical industry quality & benefit type enterprise", "National mechanical industry QC award" and "National customer satisfaction service". Tailong brand is recognized as "the Chinese famous brand" by national industrial and commercial bureau. It has taken the lead in passing the quality, environment and security three in one system certification and ISO10012 metering system certification.

Tailong people will keep to its persistent quality guarantee, service guarantee and credit, satisfying customer as our topmost pursuit.

目录 catalogue

- 一、TSD回转行星齿轮减速器
TSD rotary planetary gear reducer
- 二、TWD卷扬行星齿轮减速器
TWD hoist planetary gear reducer
- 三、TXG辊压机行星齿轮减速器
TXG roller press planetary gear reducer

一、TSD回转行星齿轮减速器

TSD rotany planetary gear reducer

概述 summarize

TSD系列回转减速器是我公司根据市场需求，在充分吸收日本、德国、美国等发达国家的先进技术，总结了国内设计制造经验的不足，结合本公司的特点，开发设计的新一代产品。它广泛用于各种工程机械、挖掘机、起重机、港口及船舶卸货装置、集装箱龙门吊、林业建筑及其它有旋转运动的设备中。同时我们可根据特殊要求，为用户提供各种尺寸和性能的传动装置。因此我们向您建议：在您设计方案需要的时候，泰隆公司的减速器是您最佳的选择。

To meet market demand, TSD series rotary reducers are the new generation which contain the domestic design and manufacture experiences and advanced techniques of Japan, Germany, America and other developed countries. It is widely used in a variety of construction machinery, excavators, cranes, port and ship unloading equipment, container cranes, forestry and other construction equipments with rotation. At the same time, we may provide users with special requirements with various sizes and performances. That is why we propose it to you. When you need reducers, Tailong reducer is your best choice.

性能特点 Features

模块化高性能的行星减速器 High-performance modular planetary reducer

结构紧凑 省空间的二级，三级或四级传动

Compact structure, small room of two levels, three levels or four levels transmission

合金钢齿轮硬化处理、内齿圈氮化处理，高精度磨齿工艺

Hardened steel gears, inner ring with nitrogen, high-precision grinding process

输出轴长度自由变动、灵活选择速比及输出小齿轮参数

Various lengths of output shaft, ratios and pinion parameters

安全系数大，寿命长，承载能力大 Big safety factor, long life, large carrying capacity

运转平稳、低噪音、高效率 Smooth operation, low noise, high efficiency

内装多片式停车制动器 Integrated multi-disc parking brake

安装容易、维护简单 easy installation and maintenance

输出形式多样化 Various output form

使用条件

回转减速器是按使用环境温度范围 $-20^{\circ}\text{C} \sim +40^{\circ}\text{C}$ 设计的，允许油温 $+70^{\circ}\text{C}$ 。在恶劣环境下工作时（如：盐水、含盐的空气、刺激性物质、尘土、泥浆、高压、强烈振动、冲击载荷、高温环境等），都会影响减速器的性能，请选型时给予说明。

The slewing gearbox is designed for the ambient temperature ranging $-20^{\circ}\text{C} \sim +40^{\circ}\text{C}$, oil temperature allowable: $+70^{\circ}\text{C}$. the performance of the gearbox will be influenced by severe conditions (such as: salt water, salt air, dusty, muddy, high pressure, strong vibration, strong impact, ambient temperature and erode media etc.) Please consult with us when choose type.

减速器的设计 Gearbox design

减速器的设计是以多年的使用经验为基础的，且不断改进和更新。

在样本表中的额定输出扭矩 M_{n2} ，对应于GB3811-83标准，当机构载荷状态级别为L2，机构利用等级T5，相当于机构工作级别为M5。标准输出转速最大为25rpm。对于不同的机构工作级别，必须用工况系数K对所需要的输出扭矩进行换算。

最大输出扭矩 M_{2max} 指在静态或长时间间歇工作状态下的工作扭矩，即指短时达到峰值或启动扭矩的情况。

计算输出扭矩 M_{c2} 指注意加速、减速和有风及倾斜状况下，设备的最大工作扭矩。

The gearbox design is based on many years of practical application experience, the rated output torque M_{n2} in the catalogue, in accordance with GB3811-83, collective load class L2, duty cycle class T5, equivalent with working condition class M5, the reference maximum output speed 25 rpm. If the swing drive is classified in another driver group the required output torque must be converted by applying factor k.

Maximum output speed M_{2max} is working torque under static and long time stop condition, i.e.: transient peak value or start torque.

Calculating output speed M_{c2} is the maximum torque under the condition of acceleration, deceleration, windy and inclining.

多片式制动器 Multi-disc brake

超安全系数的设计。减速器装有弹簧+摩擦片液压释放的内置湿片式多片制动器。断油制动，安全可靠。可以使旋转体保持静止，或在紧急状态下停车制动，但不能作为动态工作制动器来使用。系统内残留压力为0.05Mpa。制动力矩根据所选用的速比进行匹配，静态制动力矩 $T_B \geq 1.3M_{2max}/i$ ，用户也可指定。

Full safe factor design, hydraulically released spring friction close brake, which ensures rotating device to keep rest or stop in emergency. But it can not be used as working brake. The residual pressure in system is 0.05 Mpa. Brake torque $T_B \geq 1.3M_{2max}/i$, it can also be specified by the customer.

输入方式 Input way

可选用定量、变量马达或电机或其他方式输入，具体选用应事先注明。电机输入时附加弹性联轴器或极限联轴器（液压卧式制动器）

Constant or variable motor and engine input as optional, please specify before choose. Flexible coupling or limit coupling (hydraulic horizontal brake) are supplied with motor input.

输出小齿轮 Output pinion

采用花键轴插入式结构或一体式锻造结构，小齿轮及齿轮轴材料采用合金钢，可按用户要求对齿面进行强化处理，具体要求可见用户选购表。

齿轮轴与固定法兰之间可制成偏心，是否采用偏心距，定货时请提出。

为准确地调整输出小齿轮与回转支承之间的间隙，对小齿轮进行修形。

小齿轮推荐齿数12,13,14,15,16

模数10,12,14,16,18

变位系数均为+0.5

Use splined shaft or integrated forged structure. gear and shaft material are made of alloy steel, gear surface can be hardened according to customers' requirements, see customers' notice for details.

Eccentricity can be adopted between gear shaft and flange, please specify if you choose eccentricity when order.

For accurate adjustment of backlash between the output pinion and the driven ring gear, make modification on the figure of the output pinion pinion number of teeth 12, 13, 14, 15, 16

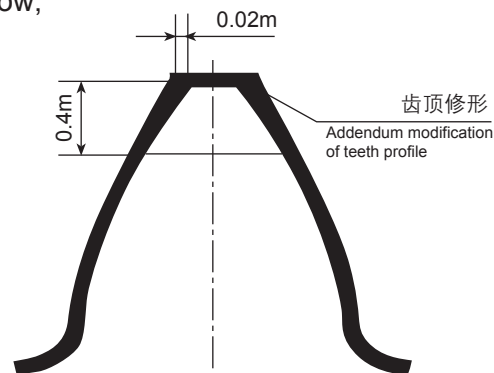
Module 10, 12, 14, 16, 18

Modification coefficient +0.5

安装位置 Installation location

一般为垂直安装，小齿轮在下。如需其他安装方式请提出。

The standard is vertical installation, with pinions below, please specify when choosing other type



型号说明 Explanation of type

TSD 325 N2P A1-X1 BZ D - 89.2

速比 Ratio

电机输入 (没代号为马达输入)

Engine input (motor input without mark)

多片式制动器 (没代号时, 不带制动器)

Multi-disc brake (no brake without brake)

偏心距 X1=2.5mm X2=1.5mm (没代号时, 无偏心距)

Eccentric distance X1=2.5mm X2=1.5mm

(no eccentric without marks)

装配型式 mounting position

N2 二级行星 P圆柱齿轮 S圆锥齿轮

N2 two stage planetary, P cylindrical gear; S spiral bevel gear

规格 specification

回转减速器 slewing gearbox

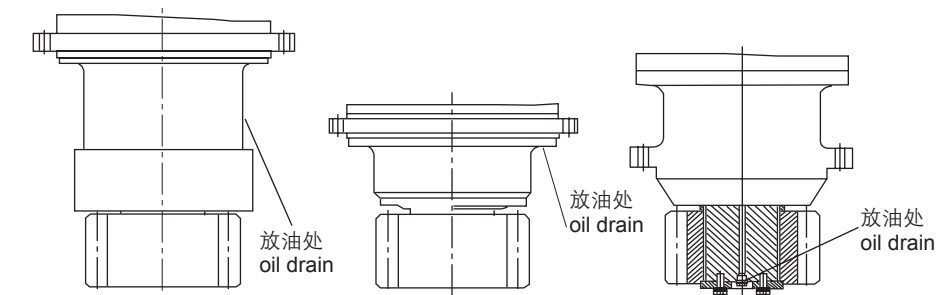
如有特殊要求, 请定货时说明

Please specify your special requirement when order.

放油位置 Oil location

放油位置有要求时请提出。如用户需要, 前两种方式可连接钢管出油。

The first two types can be connected to stainless pipe on request



承载能力 Loading capacity

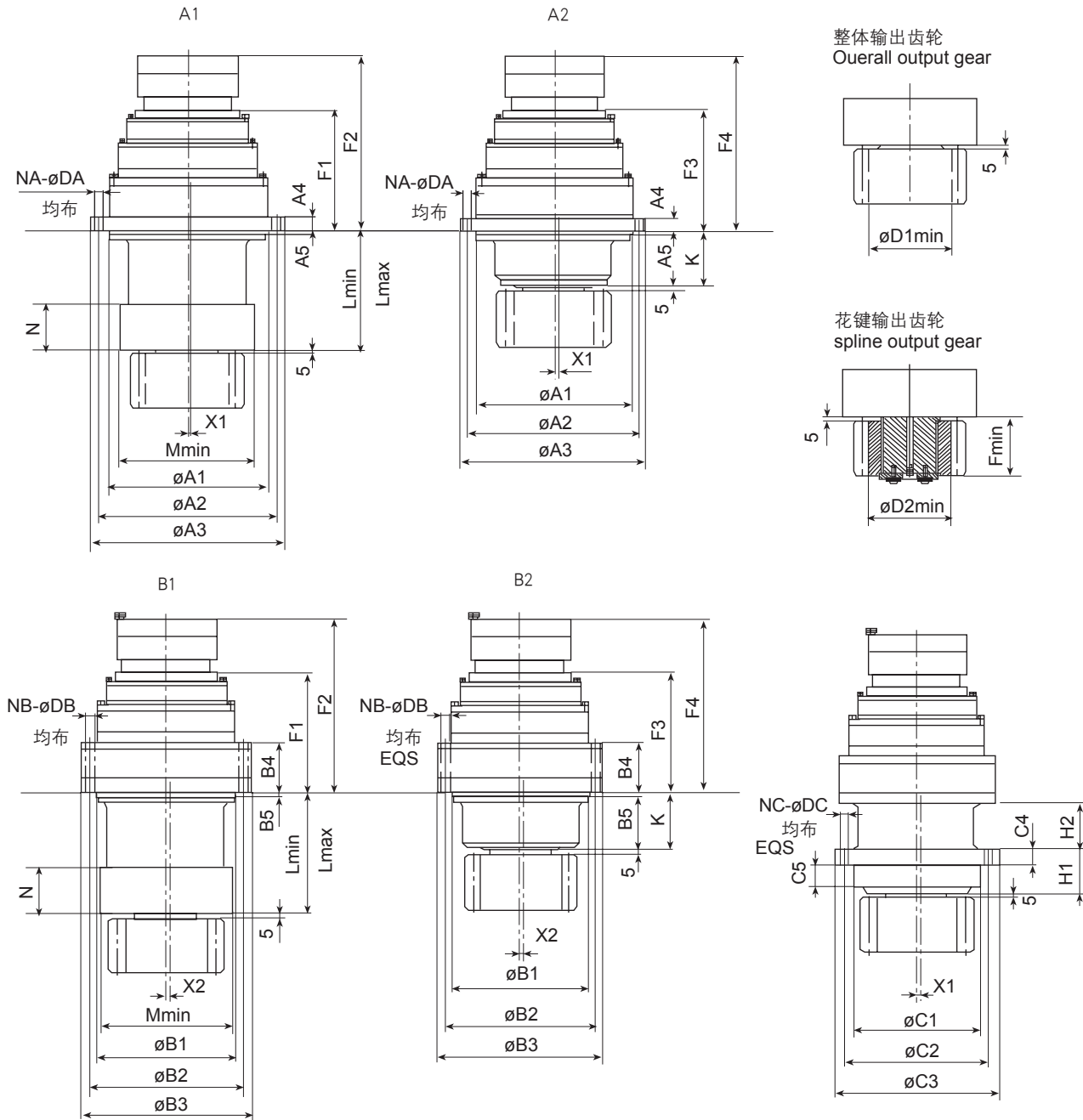
表一 Table 1

型号 Type	输出扭矩 Output torque		最高转速 Max. speed M _{1max} rpm	速比 Ratio i	制动器开启油压 Oil pressure for brake bar	
	M _{n2} N.m	M _{2max} N.m				
TSD313	1400	2100	3000	14~1000	20~38	
TSD315	3850	5770	3000	14~1000	20~38	
TSD319	7150	10700	3000	14~1000	20~38	
TSD320	11000	16500	3000	14~1000	20~38	
TSD322	17100	25600	3000	14~1000	20~38	
TSD324	22500	33700	2800	14~1000	20~38	
TSD325	30000	45000	2800	14~1000	20~38	速比制动器详情请垂询 Please contact us for ratio and brake
TSD326	41000	61500	2800	14~1000	20~38	
TSD327	55000	82500	2800	14~1000	20~38	
TSD329	85000	127000	2300	14~1000	20~38	
TSD331	130000	195000	2300	14~1000	20~38	
TSD332	210000	310000	2300	14~1000	20~38	
TSD333	250000	375000	1900	14~1000	20~38	
TSD334	320000	480000	1900	14~1000	20~38	
TSD336	470000	710000	1900	14~1000	20~38	

注: 若用户所需的转矩比我们表中列出的更大, 请与我们联系。

For gearboxes transmitting torques higher than indicated in the catalog please contact us.

外形尺寸及装配型式 Dimension and mounting position



法兰联接尺寸 Dimension for flange connection

表二 Table 2

单位Unit:mm

型号Type	A 法兰 A Flange							B 法兰 B Flange							C 法兰 C Flange						
	A1	A2	A3	A4	A5	DA	NA	B1	B2	B3	B4	B5	DB	NB	C1	C2	C3	C4	C5	DC	NC
	f7	±0.2						f7	±0.2						f7	±0.2					
TSD313	180	210	240	20	15	11	-	-	-	-	-	-	-	-	140	200	220	18	10	13.5	-
TSD315	210	240	270	20	15	13.5	18	178	200	220	74	15	11	18	180	200	220	20	15	11	18
TSD319	250	290	320	25	15	13.5	24	210	235	260	85	18	13.5	24	210	235	260	25	15	13.5	24
TSD320	285	325	355	25	20	13.5	24	230	258	285	87	24	13.5	24	230	258	282	25	60	13.5	24
TSD322	320	365	395	30	20	17.5	24	265	296	326	112	20	17.5	24	255	345	375	30	65	17.5	24
TSD324	355	400	430	30	20	17.5	24	295	330	368	111	20	22	24	280	330	368	30	85	22	24
TSD325	390	440	475	35	20	22	24	325	362	400	121	20	22	24	280	395	430	35	85	22	24
TSD326	430	475	515	40	20	22	24	365	400	437	136	20	22	24	365	400	440	35	85	22	24
TSD327	465	525	575	45	20	26	24	395	435	480	151	20	26	24	395	435	480	45	100	26	24
TSD329	550	600	660	50	30	26	24	460	510	565	170	20	33	24	435	485	540	45	100	33	24
TSD331	630	680	740	50	30	26	24	530	580	635	204	30	33	24	-	-	-	-	-	-	-
TSD332	680	750	820	55	30	33	24	580	635	685	235	30	33	24	-	-	-	-	-	-	-
TSD333	有需要时请联系 Available on request																				
TSD334	有需要时请联系 Available on request																				
TSD336	有需要时请联系 Available on request																				

液压马达驱动外形尺寸 Hydraulic motor input output drive

表三 Table3

单位Unit:mm

型号Type	K	H1	H2	Lmin	Lmax	Mmin h7	N	Fmin	D1min	D2min	X1	X2	二级2-stage		三级3-stage		四级4-stage		F2	F4	
													F1	F3	F1	F3	F1	F3			
TSD313	50	42	44	140	400	125	51	45	60	80	1.2	-	127	-	-	-	-	-	-	-	
TSD315	55	55	118	170	800	150	55	55	85	100	1.5	1.5	149	184	226	261	-	-	-	-	
TSD319	70	70	125	190	800	180	62	80	110	115	2.5	1.5	180	215	271	306	-	-	-	-	
TSD320	75	75	163	230	1300	210	78	80	115	135	2.5	1.5	191	231	301	341	370	410	-	-	
TSD322	90	78	165	250	1300	240	85	85	135	160	2.5	1.5	226	276	346	396	437	487	-	-	
TSD324	100	100	200	300	1300	270	108	100	150	180	2.5	1.5	226	281	350	405	442	497	-	-	
TSD325	100	78	261	330	1300	270	116	100	160	190	2.5	1.5	257	327	393	463	504	574	-	-	
TSD326	100	100	255	340	1300	270	125	110	170	205	2.5	1.5	286	371	425	510	537	662	-	-	
TSD327	110	185	285	350	1700	340	131	115	180	225	2.5	1.5	319	409	480	570	600	690	-	-	
TSD329	140	190	244	420	1700	380	172	145	220	240	2.5	1.5	350	-	525	615	660	750	-	-	
TSD331	160	-	-	450	1700	420	170	165	240	280	2.5	1.5	379	-	575	685	714	824	-	-	
TSD332	170	-	-	480	1800	450	170	-	-	-	2.5	1.5	432	-	648	783	796	931	-	-	
TSD333	有需要时请联系 Available on request																				
TSD334	有需要时请联系 Available on request																				
TSD336	有需要时请联系 Available on request																				

1) 制动器及速比详情垂询

2) 法兰连接螺栓强度等级均为10.9

3) F2,F4由于各厂家制动器尺寸不同, 请垂询泰隆技术部

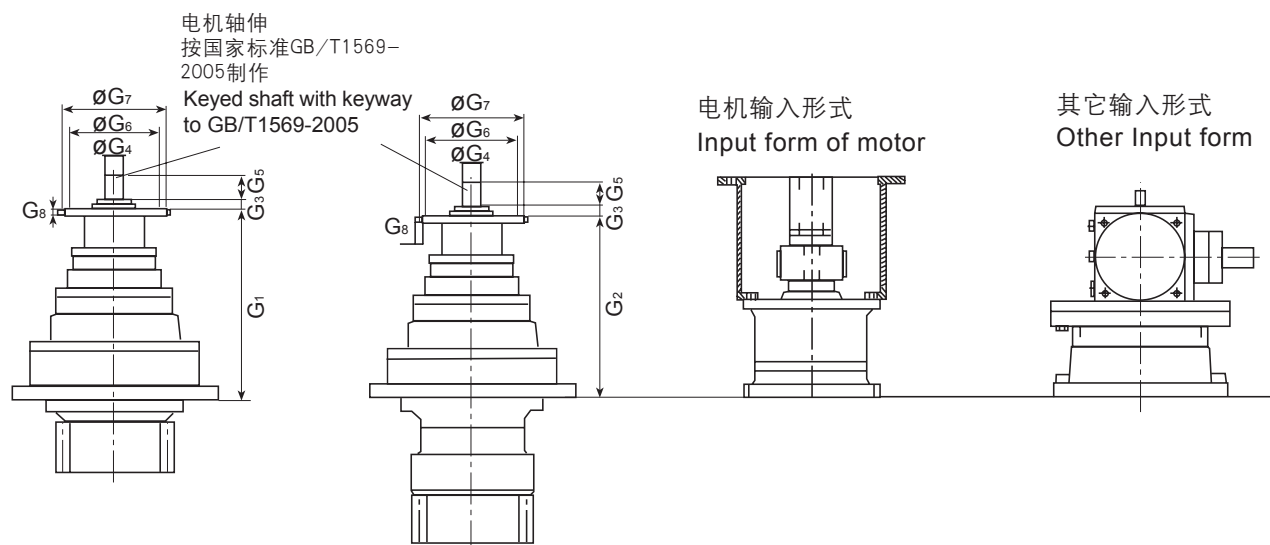
4) 由于技术创新可能引起尺寸的变化, 定货前请垂询

1) we welcome your inquiry on ratio and brake details.

2) Flanges connection bolt strength is 10.9

3) F2,F4 please contact us for other size.

4) The size may vary due to technical innwation, please contance us when you order.



电机或其它输入外形尺寸 Electric motor input

表四 Table 4

单位Unit:mm

型号 Type	二级 2-stage								三级3-stage								四级4-stage							
	G ₁	G ₂	G ₃	G ₄ K ₆	G ₅	G ₆ h ₆	G ₇ ±0.2	G ₈	G ₁	G ₂	G ₃	G ₄ K ₆	G ₅	G ₆ h ₆	G ₇ ±0.2	G ₈	G ₁	G ₂	G ₃	G ₄ K ₆	G ₅	G ₆ h ₆	G ₇ ±0.2	G ₈
TSD313	280	-	38	28	30	200	228	8*M12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TSD315	284	319	38	38	45	250	280	8*M12	335	370	38	28	30	200	228	8*M12	-	-	-	-	-	-	-	-
TSD319	314	349	38	42	50	250	280	8*M12	406	441	38	28	30	250	280	8*M12	457	492	38	28	30	200	228	8*M12
TSD320	348	388	40	42	50	300	340	8*M16	434	474	38	38	45	250	280	8*M12	487	527	38	28	30	200	228	8*M12
TSD322	381	431	40	48	56	300	340	8*M16	480	530	38	38	45	250	280	8*M12	572	622	38	28	30	250	280	8*M12
TSD324	381	436	40	48	56	300	340	8*M16	480	535	38	38	45	250	280	8*M12	572	627	38	28	30	250	280	8*M12
TSD325	440	510	40	55	65	360	415	8*M16	550	620	40	42	50	300	340	8*M16	637	707	38	38	45	250	280	8*M12
TSD326	468	553	40	60	75	360	415	8*M16	579	664	40	48	56	300	340	8*M16	668	753	38	38	45	250	280	8*M12
TSD327	523	613	40	60	75	450	500	8*M16	607	697	40	48	56	300	340	8*M16	706	796	38	38	45	250	280	8*M12
TSD329	-	-	-	-	-	-	-	-	704	794	40	55	65	360	415	8*M16	814	904	40	42	50	300	340	8*M16
TSD331	-	-	-	-	-	-	-	-	734	844	40	60	75	360	415	8*M16	845	955	40	48	56	300	340	8*M16
TSD332	-	-	-	-	-	-	-	-	821	956	40	60	75	450	500	8*M16	942	1077	40	55	65	360	415	8*M16
TSD333	有需要时请联系 Available on request																							
TSD334	有需要时请联系 Available on request																							
TSD336	有需要时请联系 Available on request																							

减速机的选用方法 Selection of gearbox

所选减速机的额定扭矩必须满足下式:

$$M_{k2} = M_{c2} * K \leq M_{n2}$$

M_{c2}=计算输出扭矩 (见附一)

M_{k2}=考虑工况系数后输出扭矩

K-工况系数 根据机构利用级别和机构载荷情况在表中查处 (见附二)

设备分组见附三

the rated torque of the gearbox selected must be in accordance with the following formula:

$$M_{k2} = M_{c2} * K \leq M_{n2}$$

M_{c2}=Calculated output torque(see attached 1)

M_{k2}=Output torque when working condition is considered

K-working factor,look up in the table(attached 2)according to machanism use class and loading cupacity see attached 3 for equipment group.

安装说明 Installation instruction

为了保证回转机构的正常运转, 钢结构的安装中心孔必须同心, 并且法兰安装面必须与其垂直。钢结构的安装中心孔与法兰安装面之间的相对位置在工作中, 环境影响及外力作用下不允许有太大的改变。钢结构的上下止口位和接触面保证同轴度0.3~0.5, 跳动0.05~0.1mm。

To ensure efficient operation,the installation center bore of the steel structure must be concentric,and the flange side must be vertical with the center line,the position of the center bores and flange side must not be altered through the operation,environment influence and external forces.make sure that the location and contact surface of the steel structure be 0.3~0.5mm with the shaft,0.05~0.1mm

密封和润滑 Sears and lubrtcation

长轴输出采用双层骨架密封圈, 下端的滚动轴承加润滑脂, 外加防尘密封圈; 短轴外直接用骨架密封圈, 整体采用浸油润滑, 润滑剂的更换周期和润滑剂的选用见表五。减速器出厂时未加润滑油, 用户可根据下表中推荐的专用油品, 在减速器加入适量润滑油, 加到油标视窗2/3。正确选择和更换油品会延长设备维护时间和增加设备使用寿命。

long output adopts double sketch seals with lubrtcation in the below,with anti-dust seal outside;short shaft uses seals outside,see table 5 for replacement period and selection of the lubrication.the gearbox leaves factory without lubrication.customer ca add suitable oil according to the following list until it reaches 2/3 of oil level.covrect selection and replacment of the lubrication will prolong the lifetime of the gearbox.

表五 Table 5

环境温度 Ambient temperature	-30°C / +5°C	+5°C / +30°C	+30°C / +65°C	+30°C / +65°C
ISO3448	VG100	VG150	VG320	VG220
美孚 Mobil	627	629	632	630

新减速器或大修后的减速器工作300小时后, 必须更换润滑油, 以后每1000小时更换一次润滑油。选用专用润滑油, 可两年换油一次。润滑脂每100小时加补一次。

The new gearbox or gearbox after total repair must be replaced with lubrication offer working for 300 hours, then replace lubrication once every 1000 hours,choose brand lubrication, which can be replaced once every two years,add lubricating grease once 100 hours.

附一 Attached 1

按照FEM标准第三版有关规定，必须注意下列参数

S_{MF}	摩擦造成的最大静态力矩
S_{MA}	加速时的最大扭矩
S_{MW8}	在风速为80N/mm ² 时的最大扭矩
S_{MW25}	在风速为250N/mm ² 时的最大扭矩
S_{MS}	倾斜位置时的最大扭矩
γ_m	设备分组系数

无风时的正常情况： $S_{Mmax I} = (S_{MF} + S_{MA}) \gamma_m$ S_{MF} :最大值 S_{MF} : 中间值
 有风时的正常工况： $S_{Mmax II} = (S_{MF} + S_{MA} + S_{MW8}) \gamma_m$ $S_{Mmax II} = (S_{MF} + S_{MW25}) \gamma_m$

有风、在倾斜位置时的正常工况： $S_{Mmax II} = (S_{MS} + S_{MW8}) \gamma_m$

$$M_{公称} = \frac{S_{Mmax II}}{1.16}$$

S_{Mmax} 是可能同时出现的最不利力矩的组合，而不是单项最大值的和。

DIN标准关于起重机行业驱动部分的基本计算

M_R	摩擦造成的最大静态力矩
M_L	自重和提升载荷造成的最大静态力矩
M_{BS}	加速运动时的最大扭矩
M_{BR}	制动时的最大扭矩
M_{W1}	风在工作时造成的最大扭矩
M_s	倾斜位置时的最大扭矩

在主负载作用下H 运转—风

$$M_{BS} = \varphi\alpha [M_L + M_R + (M_M - M_L - M_R) \frac{J_a}{J_a + J_m}] \quad M_M: \text{动力扭矩}$$

$$M_{BR} = M_L + M_R + \varphi b (M_B - M_L - M_R) \frac{J_a}{J_a + J_m} \quad M_B: \text{制动器最大制动扭矩}$$

在主、附加负载作用下HZ 运转—风 φ_a :加速动力系数

$$M_{BS} = \varphi\alpha [M_L + M_{W1} + (M_M - M_L - M_{W1} - M_R) \frac{J_a}{J_a + J_m}] \quad \varphi_b: \text{制动动力系数}$$

$$M_{BR} = M_L + M_{W1} + M_R + \varphi b (M_B - M_L - M_{W1} - M_R) \frac{J_a}{J_a + J_m} \quad J_a: \text{驱动系统惯性矩}$$

$$M_{公称} = \frac{M_{BS}}{1.16} \text{ 或 } \frac{M_{BR}}{1.16} \quad J_m: \text{马达惯性矩}$$

在主负载作用下H 无运转—风 $M_{AU} = M_B$ M_B :制动器最大制动扭矩

在特殊情况下HS 紧急制动或断电

$$M_{BR} = M_L + M_R + \varphi b (M_B - M_L - M_R) \frac{J_a}{J_a + J_m} \quad M_B: \text{所有主、付制动器最大制动扭矩之和}$$

根据GB3811-83 3.3及表13之规定选取对所计算结构最不利的组合。

●作用在回转机构输出轴上的最大扭矩只能通过整体设备的精确计算得到。

Please consider the following parameters according to FEM standard edition3

S_{MF}	Maximum static torque by friction
S_{MA}	Maximum torque due to acceleration
S_{MW8}	Maximum torque at wind speed 80 N/mm ²
S_{MW25}	Maximum torque at wind speed 250 N/mm ²
S_{MS}	Maximum torque at inclined position
γ_m	Coefficient of mechanism group

Regular service without wind effect:

$$S_{Mmax I} = (S_{MF} + S_{MA}) \gamma_m \quad S_{MF}: \text{Maximum value} \quad S_{MF}: \text{Medium value}$$

$$\text{Regular service with wind effect: } S_{Mmax II} = (S_{MF} + S_{MA} + S_{MW8}) \gamma_m \quad S_{Mmax II} = (S_{MF} + S_{MW25}) \gamma_m$$

$$\text{Regular service with wind effect and inclined position: } S_{Mmax II} = (S_{MS} + S_{MW8}) \gamma_m$$

$$M_{nom} = \frac{S_{Mmax II}}{1.16}$$

S_{Mmax} is the result of the combination of the most unfavorable torques which may occur instead of the sum of individual

DIN standard for calculation principles for hoisting driving device

M_R	Maximum static torque by friction
M_L	Maximum static torque by self weight and lifting load
M_{BS}	Maximum torque due to acceleration
M_{BR}	Maximum torque due to brake
M_{W1}	Maximum torque due to wind effect
M_s	Maximum torque at inclined position

Main design load H running-wind position

$$M_{BS} = \varphi\alpha [M_L + M_R + (M_M - M_L - M_R) \frac{J_a}{J_a + J_m}] \quad M_M: \text{Power torque}$$

$$M_{BR} = M_L + M_R + \varphi b (M_B - M_L - M_R) \frac{J_a}{J_a + J_m} \quad M_B: \text{Max.brake torque of the service brake}$$

φ_a :Accelerating coefficient

Main additional designHZ φ_b :Braking coefficient

$$M_{BS} = \varphi\alpha [M_L + M_{W1} + (M_M - M_L - M_{W1} - M_R) \frac{J_a}{J_a + J_m}]$$

$$M_{BR} = M_L + M_{W1} + M_R + \varphi b (M_B - M_L - M_{W1} - M_R) \frac{J_a}{J_a + J_m} \quad J_a: \text{Driving system inertia torque}$$

J_m :Motor inertia torque

$$M_{nom} = \frac{M_{BS}}{1.16} \text{ OR } \frac{M_{BR}}{1.16} \quad M_B: \text{Max.braking torque}$$

Main load H not running—wind effect $M_{AU} = M_B$

Under social condition HS emergency brake or power failure

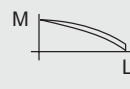
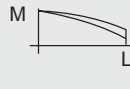
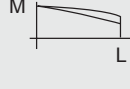

$$M_{BR} = M_L + M_R + \varphi b (M_B - M_L - M_R) \frac{J_a}{J_a + J_m} \quad M_B: \text{Sum of max.braking torque of all main and auxiliary brake}$$

Choose the most unfavorable combination according to GB3811-83 3.3 and table 13

●The maximum torque on the output pinion can only be obtained by the exact calculation of the general equipment.

附二 Attached 2

起重设备工况系数
Service of hoist equipment

机构利用级别 Operation class		T2	T3	T4	T5	T6	T7	T8	
日平均工作时间(小时) Average working time daily (hours)		0.25~0.5	0.5~1	1~2	2~4	4~8	8~16	> 16	
理论寿命(小时), 8年 200天/年 Lifetime(hours),8years 200day/year		400 -	800 -	1600 -	3200 -	6300 -	12500 -	25000 -	
机构载荷情况 Loading condition		机构工作级别/工况系数K Operation class/service factor K							
L1 轻 Light		很少起升额定载荷, 一般起升轻微载荷 Rated load when lift occurs in few case general light load	M1 0.90	M2 0.90	M3 0.92	M4 0.95	M5 1.07	M6 1.18	M7 1.25
L2 中 Medium		有时起升额定载荷, 一般起升中等载荷 Rated load some time medium load at usual lifting	M2 0.90	M3 0.92	M4 0.95	M5 1	M6 1.15	M7 1.25	M8 1.50
L3 重 Heavy		经常起升额定载荷, 一般起升较重载荷 Rated load usual lifting overload at usual lifting	M3 1.05	M4 1.05	M5 1.10	M6 1.25	M7 1.30	M8 1.60	M8 1.80
L4 特重 Over Load		频繁起升额定载荷 Rated load frequent lifting	M4 1.25	M5 1.30	M6 1.45	M7 1.60	M8 1.80	M8 2.00	M8 2.20

附三 Attached 3

起重设备工作级别分级示例
Working level sample of lifting equipment

按FEM 3版表T2.1 3.5
According to table T2.1 3.5 of FEM 3

起重机类型 Crane types	工作零件 Parts	驱动机构位置 Driver position				
		起升 Raise	变幅 Change	小车行走 Little car	大车行走 Large car	回转 Rotate
组装起重机 Assembled bridge		M2,M3	M1,M2	M1,M2	M2,M3	M2,M3
装卸龙门吊 Loading bridge	吊钩 Hook	M5,M6	-	M4,M5	M5,M6	M4
装卸龙门吊 Loading bridge	抓斗或磁铁 Grab or magnet	M7,M8	-	M6,M7	M7,M8	M6
车间用起重机 Workshop cranes		M6	-	M4	M5	M4
桥式起重机、废铁和废钢厂起重机 Bridge cranes, ram crane, scrap yard cranes	抓斗或磁铁 Grab or magnet	M8	-	M6,M7	M7,M8	M6
卸料、集装箱门式起重机, 其它门式起重机 (带行走小车和/或回转机构) Material handling, container portable crane, other cranes (with traveling or slewing device)	吊钩或螺旋进给器 Hook or spiral feeder	M6*M7	M3,M4	M6,M7	M4,M5	M5,M6
卸料、集装箱门式起重机 (带行走小车和/或回转机构) Material handling, container portable crane (with traveling or slewing device)	吊钩 Hook	M4,M5	-	M4,M5	M4,M5	M4,M5
卸料、集装箱门式起重机 (带行走小车和/或回转机构) Material handling, container portable crane (with traveling or slewing device)	抓斗或磁铁 Grab or magnet	M8	M3,M4	M7,M8	M4,M5	M5,M6
船台起重机, 船厂起重机, 拆卸起重机 Drydock crane, shipyard jib crane, crane for dismantling	吊钩 Hook	M5,M6	M4,M5	M4,M5	M4,M5	M4,M5
港口起重机 (回转式、门式...) 浮式起重机, 浮式桅杆起重机 Port crane (slewing, gantry...)	吊钩 Hook	M6,M7	M5,M6	-	M3,M4	M5,M6
港口起重机 (回转式、门式...) 浮式起重机, 浮式桅杆起重机 Port crane (slewing, gantry...)	抓斗或磁铁 Grab or magnet	M7,M8	M6,M7	-	-	M6,M7
甲板起重机 Deck crane	吊钩 Hook	M4	M3,M4	M2	M3	M3,M4
甲板起重机 Deck crane	抓斗或磁铁 Grab or magnet	M5,M6	M3,M4	M4,M5	M3,M4	M3,M4
建筑用塔式起重机 Town crane for construction sites		M4	M4	M3	M3	M5
桅杆起重机 Derrick crane		M2,M3	M1,M2	-	-	M1,M2
铁路起重机 Railway crane		M3,M4	M2,M3	-	-	M2,M3
汽车吊 Automobile crane	吊钩 Hook	M3,M4	M2,M3	-	-	M2,M3

注: 未列入举例表中的起重机构工作级别可参照接近的起重机构工作级别选择。
Remark: for those not listed above, please refer to similar equipment classification in the list.

回转减速机订购单

公司名称 _____
 单位地址 _____ 联系人 _____
 主管部门 _____ 电话号码 _____
 所选型号 _____ 传真号码 _____
 订购量 _____ 台 询价单号 _____
 使用场合 _____

例如：汽车吊，港口起重机，甲板起重机，海上平台，建筑机械等

回转机构技术参数

FEM标准技术参数

设备分组M _____ 工况等级T _____ 载荷系数L _____
 输出扭矩 $S_{Mmax I}$ _____ [Nm] 输出扭矩 $S_{Mmax II}$ _____ [Nm] 输出扭矩 $S_{Mmax III}$ _____ [Nm]
 输出扭矩 $M_{公称}$ _____ [Nm] 输出转速 $n_{额定}$ _____ rpm 输出转速 n_{max} _____ rpm

GB3811-83标准技术参数

设备分组M _____ 工况等级T _____ 载荷系数L _____
 输出扭矩 P_{HI} _____ [Nm] 输出扭矩 P_{HII} _____ [Nm] 输出扭矩 P_{HIII} _____ [Nm]
 输出扭矩 $M_{公称}$ _____ [Nm] 输出转速 $n_{额定}$ _____ rpm 输出转速 n_{max} _____ rpm

回转减速机设计参数

输出扭矩 $M_{额定}$ _____ [Nm] $M_{静态}$ _____ [Nm] 输出转速 $n_{额定}$ _____ rpm n_{max} _____ rpm

在 $M_{额定}$ 和 $n_{额定}$ 作用下的，理论寿命 _____ [小时] 工况系数K _____

疲劳强度 接触/弯曲安全系数 _____ / _____ 静强度 接触/弯曲安全系数 _____ / _____

在 $M_{额定}$ $M_{静力}$ 状态下，抗 断裂极限 疲劳极限 的安全系数 _____

外形参数※ 传动比 i _____ \pm _____ % 安装方式：输出轴方向 上 下 水平

减速器装配型式 A1 A2 B1 B2 C1 C2 其它输出轴长度 $L2$ _____ [mm]

输出齿形参数 模数 m _____ [mm] 相啮合齿轮参数 $Z1$ =外齿, $Z2$ =内齿

齿数 $Z1$ _____ $Z2$ _____

齿宽 $B1$ _____ [mm] $B2$ _____ [mm]

齿形修正系数 $x=0.5$ 指定 $x=$ _____ 齿形参数按照GB10095-88标准

输出齿轮型式 组合式 整体锻造

调质，滚齿

调质，滚齿，齿面高频淬火硬化，刮齿，精度等级7

齿面渗碳硬化，磨齿，精度等级6

马达※

厂家/型号 _____
 功率P _____ [KW]
 流量Q _____ [l/min]
 公称压力差 ΔP _____ [bar]
 最大压力差 ΔP _____ [bar]
 公称转矩 M_{nom} _____ [Nm]

电机※

厂家/型号 _____
 功率P _____ [KW]
 输入转速 _____ [rpm]
 堵转转矩 M_a _____ [Nm]
 最大转矩 M_k _____ [Nm]
 负载持续率 FC _____ [%]

注：带※号为必填项目

Rotary gear reducer order

Company name _____
 Address _____
 Marage Department _____ Contact person _____
 Type _____ telephone _____
 Order quantity _____ set fax _____
 Use occasion _____ order NO. _____

eg:cacrane,pert crane,board crane,sea platform,construction machinery and soon.

Technique parameters of rotany frame work

Technique parameters of PEM standard

Equipment Grouping M _____ Working condition T _____ Loading Parameter L _____

Output torque $S_{Mmax I}$ _____ [Nm] Output torque $S_{Mmax II}$ _____ [Nm] Output torque $S_{Mmax III}$ _____ [Nm]

Output torque M_{nom} _____ [Nm] Output rotate speed n_{nom} _____ rpm Output rotate speed n_{max} _____ rpm

Technique parameter of GB3811-83 standard

Equipment Grouping M _____ Working condition T _____ Loading coefficient L _____

Output torque $S_{Mmax I}$ _____ [Nm] Output torque $S_{Mmax II}$ _____ [Nm] Output torque $S_{Mmax III}$ _____ [Nm]

Output torque M_{nom} _____ [Nm] Output rotate speed n_{nom} _____ rpm Output rotate speed n_{max} _____ rpm

Design parameters of rotay gear reducers

Output torque M_{rated} _____ [Nm] M_{stat} _____ [Nm] Output rotate speed n_{rated} _____ rpm n_{max} _____ rpm

Under the function of M_{rated} and n_{rated} , lifetime _____ [hour] Condition factor K _____

Figure strength contact/carve safety factor _____ / _____ static strength contace/bending safety factor _____ / _____

Under the status of M_{rated} M_{stat} , safety facter regst Ultimate breaking fatigue limit

Shape Parameters※ Ratio i _____ \pm _____ % Installation form: direction of output shaft above below horizontal

assemble type reducer A1 A2 B1 B2 C1 C2 other _____ length of other Output shaft $L2$ _____ [mm]

Output gear parameters Modulus m _____ [mm] meshed gear Parameter $Z1$ =outer gear, $Z2$ =inner gear

Number of Teeth $Z1$ _____ $Z2$ _____

Teech Width $B1$ _____ [mm] $B2$ _____ [mm]

Profile correction f_{outor} $X=+0.5$ Assign $X=$ _____ Gear parameters according to GB10095-88 standard

Output gear form Combined Whole forging

Queneding and tempering, hobbing

Queneding and tempering, hobbing, high frequency quendry hardeny, shaving, preasion level 7

Teeth face carburizing handeniy, grindry, precision level 6

Motor※

Enterprise/type _____
 Power P _____ [KW]
 Flow rate Q _____ [l/min]
 Nominal pressure difference ΔP _____ [bar]
 Max pressure difference ΔP _____ [bar]
 Nominal torque M_{nom} _____ [Nm]

Electromotor※

Enterprise/type _____
 Power P _____ [KW]
 Input rotate speed n _____ [rpm]
 Locked rotate torque M_a _____ [Nm]
 Max. rotate torque M_k _____ [Nm]
 Sustained rate of load EC _____ [%]

Note: Please filled the blank with ※

TWD卷扬行星齿轮减速器 TWD hoist planetary gear reducer

概述 Summarize

TWD系列卷扬减速机是我公司根据市场需求，在充分吸收日本、德国、美国等发达国家的先进技术，总结了国内设计制造经验的不足，结合本公司的特长，开发设计的新一代产品，其结构紧，满足卷筒小尺寸的要求，该卷扬减速机适用于汽车和履带式起重机，铁路起重机，海上平台及平板起重机，港口及船舶起重机，集装箱龙门吊，林业建筑机械等卷扬机构。同时我们可根据您对尺寸和输出的特殊要求，做进一步的变形结构设计。

To meet market demand, TWD series hoist reducers are the new generation which contain the domestic design and manufacture experiences and advanced techniques of Japan, Germany, America and other developed countries. Its tight structure can meet the demand of small size of winch's requirements. The hoist reducers are widely used in car and pedrail type cranes, railroad cranes, offshore platforms and flat-panel cranes, ships and port cranes, container cranes, construction machinery and many other hoist machineries. At the same time, we may provide users with special requirements with various sizes, performances and structures.

结构特点 Features

- 内置式静态液压行星传动
- 结构紧凑 安全系数大，寿命长 结构模块化
- 安装维护简单 低噪音，高效率 换油方便
- 内装多片式制动器

Inner static planetary hydraulic transmission
compact structure,high safty facter, long life time,modular structure
easy mounting and maintenance, low noise,high efficiency, easy replacement of oil
integrated multi-disc brake

使用条件 Using conditions

卷扬减速机是按使用环境温度范围-20℃ ~ +40℃设计的，允许油温+70℃。在恶劣环境下工作时，（如：盐水、含盐份的空气、尘土、泥浆、高压、强烈震动、强烈冲击、环境温度、腐蚀性介质等等）会影响卷扬减速机的性能，请事先通知我们。

The gearbox for winch is desinged for the ambient temperature ranging -20℃ ~+40℃, oil temperature allowable:+70℃.the performance of the gearbox will be influnced by severe conditions(such as:salt water,salt air,dusty,muddy,high pressure,strong vibration, strong impact,ambient temperature and erode media etc.)so please consult with us then you choose type.

设计标准 Design standard

在样本表中的额定输出扭矩 M_{n2} ，按GB3811-83标准，结合载荷级别L2，工况等级T5，相当于机构工作级别M5。参考输出转速为20rpm，（转速 $n=25rpm$,功率 $P=$ 衡量）

最大输出扭矩 M_{2max} 指在静态或长时间间歇工作状态下的工作扭矩，即指短时达到峰值或启动扭矩的情况。

计算输出扭矩 M_{c2} 注意在计算钢丝绳拉力时，加上吊具重量及系统的机械效率。具体计算见后。
The rated output torque M_{n2} in the catalogue,in accordance with GB3811-83,collective loading class L2,working condition class T5, equivalent with working condition class M5.Reference maximum output speed 20rpm(rotating speed $n=25rpm$,power $P=$ constant).

Maximum output speed M_{2max} is working torque under static and long time stop condition,i.E:transient peak value or start torque.

Calculating output speed M_{c2} ,when determining the wire rope,the weight of lifting device and system mechanical efficiency has to be taken into consideration

制动器 Brake

超安全系数设计，液压释放的弹簧-摩擦片常闭式制动器。可以使重物保持静止或在紧急状态下进行减速制动。但不能作为卷扬机刹车来使用。系统内残留压力为0.05Mpa。静态制动力矩 $T_{Br} \geq 1.5M_{2max}/i$.用户也可指定。

Safety is fully considered in the design.The hydraulically released close brake,which ensures rotating device to keep rest or stop in emergency.But it can not be used as working brake of the winch. The residuary pressure in system is 0.05 Mpa. Brake torque $T_{Br} \geq 1.5M_{2max}/i$, it can also be specified by the customer.

输入方式 Input way

可选用定量和变量马达及电机输入，具体选用应事先注明。电机输入可采用直联式或分体式。由于电机较大一般不能放入卷筒内。

Constant or variable motor and engine input as optional,please specify before you choose.Motor input has direct connection or parted connection for alternate.The motor can not be put in the drum due to its big size.

钢丝绳允许偏角

为了保证钢丝绳的正常缠绕，要求绳偏角维持在允许的极限范围之内。
绳偏角不应小于0.5°，以防钢丝绳在侧壁处堆积，而是分层缠绕。

为了使钢丝绳在第一层不受与沟槽方向相反的拉力，并在多层缠绕时钢丝绳至滚筒壁之间均匀地分布，绳偏角不应大于1.5°。

对于光卷筒，钢丝绳与卷筒轴垂直的平面的角度不大于2°。

Rope deflection angle allowable

To achieve acceptable rope winding the deflection angle must be within limit.

Groovers angle must not be less than 0.5° In order to prevent the rope from piling up in the drum flank and to ensure that it is guided securely on to the next layer.

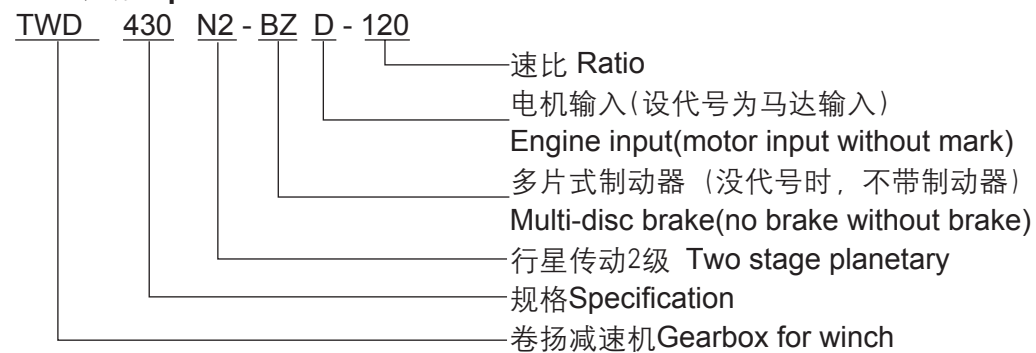
The deflection angle must not exceed 1.5° ,In order to prevent the rope in the first layer being pulled against the groovers and,where a number of layers occur,to enable even winding up to the drum flanges.

For drum without rope groove, the deflection angle must be $\leq 2^\circ$

安装位置 Installation location

水平安装方向 Horizontal installation

型号说明 Specofication



如有特殊要求，请定货时说明

please specify your special requirements when you order

放油位置 Oil location

卷扬减速机固定端有通气罩、油标及放油口

we provide the gearbox for winch with air vent,oil gauge and oil drainer

强制冷却 Force Cooling

当工作环境温度较高，阳光直射或长时间高负载工作时，可能需要进行附加冷却
when ambient temperature is high,sunshine is strong or operate with high load for a long time, additional cooling may be necessary.

附件 Accessories

根据用户要求可提供以下附件：

卷筒和卷扬机架

马达或电机、弹性联轴器

限位开关等

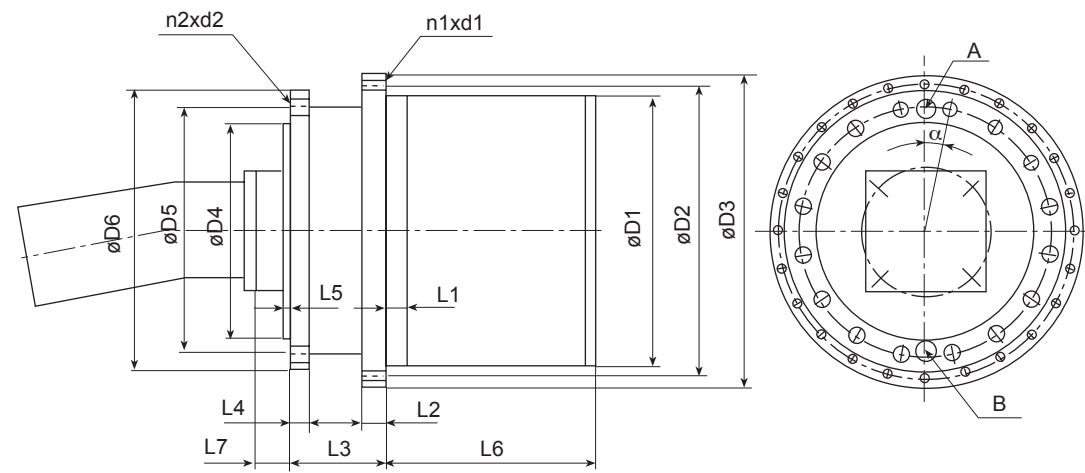
we provide following accessories on request:

drum and winch frame

motor or engine,flexible coupling

limit switch

承载能力及外形尺寸
Loading capacity and dimension



表一 Table 1

单位Unit:mm

型号 Type	输出扭矩 output torque		最高转速 Max.speed n_{1max} rpm	速比 Ratio i	制动器开启油压 Oil pressure bar	滚筒连接尺寸 Drum dimension				
	M_{n2} N.m	M_{2max} N.m				D1 h7	D2 ± 0.2	D3	n1	d1
TWD413	1900	3000	由于传动比和制动器的不同最大输入转速为 2000~3500 rpm	14~45	20~38	160	180	200	12	$\phi 11$
TWD415	5000	8000		14~200	20~38	230	250	270	18	$\phi 11$
TWD419	7400	12000		14~300	20~38	270	295	320	20	$\phi 14$
TWD420	11500	18500		14~300	20~38	295	320	345	24	$\phi 14$
TWD422	20000	32000		14~300	20~38	340	370	400	18	$\phi 18$
TWD424	25000	40000		14~300	20~38	385	406	435	20	$\phi 18$
TWD425	35000	56000		14~300	20~38	400	440	480	20	$\phi 22$
TWD426	46000	73000		20~300	20~38	440	480	520	22	$\phi 22$
TWD427	60000	96000		20~300	20~38	470	520	560	22	$\phi 26$
TWD429	85000	136000		20~300	20~38	530	570	610	24	$\phi 26$
TWD430	100000	160000	2000~3500 rpm	20~300	20~38	550	590	630	24	$\phi 26$
TWD431	140000	220000		20~300	20~38	650	700	750	24	$\phi 33$
TWD432	210000	330000		20~300	20~38	710	760	810	24	$\phi 33$
TWD433	260000	410000		46~300	20~38	800	850	900	30	$\phi 33$
TWD434	365000	584000		46~300	20~38	885	935	985	36	$\phi 33$
TWD436	565000	900000		46~300	20~38	1030	1085	1140	36	$\phi 33$

表二 Table 2

单位Unit:mm

型号 Type	钢结构连接尺寸 Connection size of steel structure						长度结构尺寸 Arial size							最小滚筒尺寸(第一层) Min.size of drum(first layer)	
	D4 h7	D6 ± 0.2	D5	n_2	d_2	a	L1	L2	L3	L4	L5	L6			L7
	二级	三级													
TWD413	140	160	180	12	M10	15	5	15	70	15	5	175	-	130	
TWD415	160	190	220	16	M12	11.25	10	22	85	22	10	195	265	140	265
TWD419	195	230	260	16	M16	11.25	10	25	85	25	10	205	280	120	320
TWD420	200	245	275	16	M16	11.25	10	25	90	25	10	225	315	140	345
TWD422	240	285	315	22	M16	8.15	15	25	90	25	15	255	355	170	400
TWD424	345	390	420	22	M16	8.15	15	25	90	25	15	286	385	170	455
TWD425	300	350	285	20	M20	9	20	30	100	30	20	300	420	160	480
TWD426	330	380	420	22	M20	8.15	20	30	100	30	20	320	440	210	520
TWD427	355	405	445	22	M24	8.15	20	35	105	35	20	335	455	200	570
TWD429	430	480	520	24	M24	7.5	20	35	110	35	20	322	442	200	650
TWD430	440	490	530	24	M24	7.5	20	38	110	38	20	365	530	200	670
TWD431	515	565	615	24	M30	7.5	25	55	110	50	25	415	585	140	770
TWD432	580	635	685	24	M30	6	25	55	120	50	25	465	640	140	830
TWD433	670	725	775	30	M30	6	25	60	120	50	25	570	760	160	930
TWD434	720	775	825	36	M30	5	30	60	130	50	30	585	795	160	1040
TWD436	840	900	960	36	M30	5	30	70	140	55	30	750	960	110	1230

- 1) 制动器及速比详情请垂询
- 2) 尺寸L7因马达和制动器的型号而变化, 表二所示为最大尺寸
- 3) 法兰连接螺栓强度等级均为10.9
- 4) A,B在结构上留有通孔用于通气和放油, 用户卷筒支撑板要留孔, 便于油管通过, 具体尺寸请垂询
- 5) 由于技术创新可能引起尺寸的变化, 定货前请垂询

- 1) we welcome your inquiry on ratio and brake details.
- 2) L7 varies from the type of motor and brake, it's max.size in table 2
- 3) the strength of flange bolt connection is 10.9
- 4) air vent and oil drain are in A and B ,customer should keep hole for oil pipe, please contact us for detailed size.
- 5) the size may vary due to technical innovation, please contact us when you order.

减速机的选用方法 Selection of gearbox

所选减速机的额定扭矩必须满足下式:

$$MK_2 = M_{e2} \times K \leq M_{n2}$$

M_{e2} =计算输出扭矩 (见附一)

M_{k2} =考虑工况系数后输出扭矩

K——工况系数 根据机构利用级别和机构载荷情况在表中查出 (见P11页附二)

设备分组见P12页附三

The rated torque of the gearbox selected must be in accordance with the following formula:

$$MK_2 = M_{e2} \times K \leq M_{n2}$$

M_{e2} =calculated output torque(see attached 1)

M_{k2} =output torque when working condition is considered

K-working factor,look up in the table(See attached 2 on page 11)according to mechanism use class and loading capacity.

See attached 3 on page 12 for equipment group.

安装说明 Installation instruction

为了保证卷扬机构的正常运转,卷扬减速机与支撑钢结构的安装孔必须对中,并且法兰安装面必须与其垂直。

钢结构的安装中心孔与法兰安装面之间的相对位置在工作中、环境影响及外力作用下不允许有过大的改变。在滚筒两支撑距离L上,轴线的最大允许偏差 ΔH_{mm} :

L < 250 L	< 750L	< 1000 L	< 1500 L	< 2000 L	< 2500
$\Delta H=0.1$	$\Delta H=0.2$	$\Delta H=0.2$	$\Delta H=0.4$	$\Delta H=0.5$	$\Delta H=0.7$

To ensure efficient operation,the installation center bore of the steel structure must be concentric, and the flange side must be vertical with the center line.The position of the center bores and flange side must not be altered through the operation,environment influence and external forces.The max.Allowable deflection, ΔH_{mm} of center line on the distance l:

L < 250 L	< 750L	< 1000 L	< 1500 L	< 2000 L	< 2500
$\Delta H=0.1$	$\Delta H=0.2$	$\Delta H=0.2$	$\Delta H=0.4$	$\Delta H=0.5$	$\Delta H=0.7$

密封和润滑 Seals and lubrication

输出和输入端均采用骨架密封,外加防尘和防腐蚀密封,使其可用于船舶行业,所有齿轮啮合部件和轴承采用浸油润滑,使所有部件均能得到良好的润滑,润滑剂的更换周期和润滑剂的选用见表三,减速机出厂时未加润滑油。用户可根据下表中推荐的专用油品,在减速器加入适量润滑油到油标视窗的2/3,正确选择和更换油品会延长设备维护时间和增加设备使用寿命,如果您选择其它油品,在注油前一定咨询我公司设计部门。

Input and output adopt double sketch seals with lubrication in the below,with anti-dust seal outside;short shaft uses sketch outside,which can be used in ship field.All gears and bearings use splash lubrication.See table 3 for replacement period and selection of the lubrication. The gearbox leaves factory without lubrication.Customer can add suitable oil according to the following list until it reaches 2/3 of oil level. Correct selection and replacement of the lubrication will prolong the lifetime of the gearbox.If you choose other oil,please consult technical department when you add oil.

表三 Table 3

品牌 brand	环境温度 Ambient temperature			
	-30℃/+5℃	+5℃/+30℃	+30℃/+65℃	+30℃/+65℃
美孚Mobil	627	629	632	630
ISO3448	VG100	VG150	VG320	VG220

新减速器或大修后的减速器工作300小时后,必须更换润滑油,以后每1000小时更换一次润滑油。选用专用润滑油,可两年换油一次。润滑脂每100小时加补一次。

The new gearbox or gearbox after total repair must be replaced with lubrication after working for 300 hours,then replace lubrication once every 1000 hours.Brand luvrication,which can be replaced once every two years,add lubricating grease once 100 hours.

附四Attached four

钢丝绳拉力F公称

$$F=(Q+q) \times g \times \psi_2/n/\eta_s$$

Q:额定起升重量kg

q:吊具重量kg

起升高度 > 50m,计算钢丝绳重量

i:滚筒与动滑轮组 (负载) 间定滑轮的数量

n:每个动滑轮组的钢丝绳倍率

每个动滑轮组中的所有钢丝绳和滑轮相对滚筒为单绳

ψ_2 : 起升载荷动载系数 (行走式起重机1.6, 旋转式起重机1.3)

Rope pull Fnom

$$F=(Q+q) \times g \times \psi_2/n/\eta_s$$

Q:Nominal lift weight kg

q:lifting device weight kg

lifting devixe weight kg

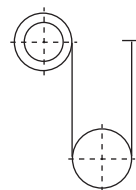
lifting height > 50m,calculated wire rope weight

i:is the number of crown block between the rope drum and travelling block

n:is the number of rope strands in a single pulley block.

the rope of pulley block and an drum is single rope.

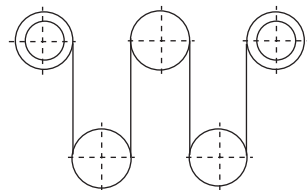
ψ_2 =coefficient of vibration(travelling crane 1.6,rotation crane 1.3)



2根钢丝绳的动滑轮组

Pulley block with 2 ropes

n=2



4绳双滑轮组, 每组2根钢丝绳

Pulley block with 4 ropes ,2

ropes for each 2x(n=2)

系统机械效率

$$\eta_s=(\eta_R)^i \times \eta_F=(\eta_R)^i \times (1-(\eta_R)^n)/n(1-\eta_R)$$

η_R :单个滑轮的机械效率

η_F :动滑轮组的机械效率

η_s :钢丝绳驱动装置的机械效率

滑轮的机械效率除与其使用的轴承形式 (滑轮轴承或滚动轴承) 外, 还同滑轮与钢丝绳直径之比, 钢丝绳型式及钢丝绳的润滑油情况有关。如果没有准确的试验数据, 可选择:

滑动轴承: $\eta_R=0.96$

滚动轴承: $\eta_R=0.98$

从动轮的机械效率可以忽略

efficiency of rope drives:

$$\eta_s=(\eta_R)^i \times \eta_F=(\eta_R)^i \times (1-(\eta_R)^n)/n(1-\eta_R)$$

η_R :is the efficiency of a single rope pulley

η_F :is the efficiency of the pulley block

η_s :is the efficiency of the rope drive

the efficiency of a rope pulley depends not only on its type of bearing used in it (sliding or rolling),but also on the ratio of rope diameter and pulley diameter(D:d),as well as the design of the rope and rope lubrication.

if there is no exact values,apply the following:

with sliding bearing: $\eta_R=0.96$

with rolling bearing: $\eta_R=0.98$

for efficiency of following pulley no value can be considered.

根据GB3811标准钢丝绳和滚筒直径的计算方法 GB3811 for calculation of rope and drum diameter

单位Unit:mm

设备分组 Equipment group	系数C Coefficient C						安全系数 Safety factor	系数e Coefficient e	
	钢丝绳直径 $d_{min}=c\sqrt{S}$ C:系数(mm/ \sqrt{N}) S:最大工作静拉力(N) Rope diameter $d_{min}=c\sqrt{S}$ C:coefficient(mm/ \sqrt{N}) S:max working static pull(N)							滚筒直径 $D_{min}=(e-1)d_{min}$ Drum diameter $D_{min}=(e-1)d_{min}$	
	旋转钢丝绳 Rotation wire rope			无旋转钢丝绳 Wire rope without rotation				旋转钢丝绳 Rotation wire rope	无旋转钢丝绳 Wire rope without rotation
	1550	1700	1850	1550	1700	1850			
M1~M3	0.093	0.098	0.085	0.099	0.095	0.091	4	14	16
M4	0.099	0.0956	0.091	0.104	0.100	0.096	4.5	16	18
M5	0.104	0.100	0.096	0.114	0.109	0.106	5	18	20
M6	0.114	0.109	0.106	0.123	0.118	0.113	6	20	22.4
M7	0.123	0.118	0.113	0.140	0.134	0.126	7	22.4	25
M8	0.140	0.134	0.126		0.150		9	25	28

卷扬减速机设计所需的基本参数

公司名称 _____

单位地址 _____ 联系人 _____

主管部门 _____ 电话号码 _____

所选型号 _____ 传真号码 _____

订购量 _____ 台 询价单号 _____

使用场合 _____

例如：甲板起重机、汽车吊等

卷扬机构技术参数

GB3811-83标准技术参数

设备分组M _____ 工况等级T _____ 载荷系数L _____

内层钢丝绳拉力 F_1 _____ KN

钢丝绳速度 V_1 _____ m/min

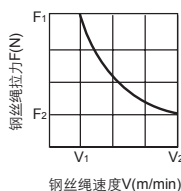
内层钢丝绳拉力 F_2 _____ KN

钢丝绳速度 V_2 _____ m/min

在内层钢丝绳拉力 F_1 _____ KN时，相对材料屈服极限的安全系数

理论计算寿命

在内层钢丝绳拉力 F_1 _____ KN时和速度 V_1 _____ m/min的工作寿命h _____ 小时



卷扬减速机设计参数

输出扭矩 $M_{额定}$ _____ [Nm] $M_{静态}$ _____ [Nm] 输出转速 $n_{额定}$ _____ rpm n_{max} _____ rpm

在 $M_{额定}$ 和 $n_{额定}$ 作用下的，理论寿命 _____ [小时] 工况系数K _____

疲劳强度 接触/弯曲安全系数 _____ / _____ 静强度 接触/弯曲安全系数 _____ / _____

外形参数※ 传动比i _____ ± _____ %

滚筒直径 D_1 _____ mm 滚筒长度L _____ mm 沟槽升角P _____ mm

钢丝绳直径d _____ mm 钢丝绳层数Z _____ 钢丝绳长度 _____ m

沟槽方向 左/右 沟槽型式 普通沟槽/无沟槽/其它 _____

钢丝绳固定方向 驱动端/非驱动端 滚筒侧板直径 D_2 _____ mm

马达※

厂家/型号 _____

功率P _____ [KW]

流量Q _____ [l/min]

公称压力差 ΔP _____ [bar]

最大压力差 ΔP _____ [bar]

公称转矩 M_{nom} _____ [Nm]

电机※

厂家/型号 _____

功率P _____ [KW]

输入转速 _____ [rpm]

起动转矩 M_a _____ [Nm]

最大转矩 M_k _____ [Nm]

起动时间ED _____

注：带※号为必填项目

备注：_____

Parameters of gearbox for winch

Company name _____

Address _____

Department _____ Contact person _____

Type _____ Telephone _____

Quantity _____ Fax _____

Application _____ Inquiry number _____

Such as: automobile crane, deck crane etc.

GB3811-83 standard technical parameters

Group M _____ Working condition T _____

Rope pull on drum F_1 _____ KN

Rope velocity V_1 _____ m/min

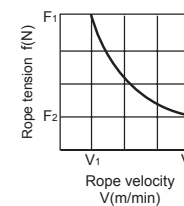
Rope pull on drum F_2 _____ KN

Rope velocity V_2 _____ m/min

With rope pull on drum of F_1 _____ KN, safety factor against yield strength of material _____

Calculated lifetime

With rope pull on drum of F_1 _____ KN Velocity V_1 _____ m/min Work lifetime h _____ Hours



Design criteria of winch gearbox

Output torque M_{nom} _____ [Nm] M_{stat} _____ [Nm] Output speed n_{nom} _____ rpm n_{max} _____ rpm

With the function of M_{nom} and n_{nom} , lifetime _____ [hours] Working condition K _____

Fatigue strength contact/carve safety factor _____ / _____ Static strength contact/carve safety factor _____ / _____

Dimension※ Ratio i _____ ± _____ %

Drum diameter D_1 _____ mm Length L _____ mm Rope groove lead P _____ mm

Rope diameter d _____ mm Number of rope layers Z _____ Rope length _____ m

Groove direction left/right Groove type ordinary/no groove/special _____

Rope direction drive end/non-drive end Drumflank diameter D_2 _____ mm

Motor※

Manufacturer/type _____

Power P _____ [KW]

Flow rate Q _____ [l/min]

Nominal pressure difference ΔP _____ [bar]

Max pressure difference ΔP _____ [bar]

Nominal torque M_{nom} _____ [Nm]

Engine※

Manufacturer/type _____

Power P _____ [KW]

Input speed n _____ [rpm]

Start torque M_a _____ [Nm]

Max. torque M_k _____ [Nm]

Start time ED _____

Note: item with※ should be filled in

Remark: _____

TXG辊压机行星齿轮减速器

TXG roller press planetary gear reducer

一、概述 Summarize

TXG系列行星齿轮减速器是我公司根据市场需求，在充分吸收世界发达国家的先进技术，总结国内设计制造经验的不足，结合本公司的特长，开发设计的新一代专用减速器。该减速器主要适用于水泥工业辊压机主传动。TXG系列产品在设计上采用行星传动方式，使传动功率有效分流，而且在行星传动核心技术——均载传动上实现了突破性的创新。因此该系列减速器能充分适应水泥工业辊压机要求。减速器体积小、重量轻，能在多粉尘环境中承受强烈冲击及振动重载负荷的条件，是水泥工业辊压机必备的配套产品。

该减速器齿轮采用高级优质合金钢材料，并经渗碳淬火处理高精磨齿工艺加工而成。经过十多年工业运行证实，其承载能力达到了当代发达国家同类产品水平。该系列减速器在水泥机械——辊压机上得到成功运用，

该系列减速器主要用于水泥工业辊压机主传动减速装置上。也可用作其它类似的传动装置。（本公司另设计有底座安装，法兰安装和电机直联等联接形式。）

To meet market demand, TSD series rotary reducers are the new generation which contain the domestic design and manufacture experiences and advanced techniques of Japan, Germany, America and other developed countries. It is mainly used in cement industry roller machines. TXG products use the design of the planetary transmission, so as to enable the effective transmission power diversion. It has achieved a breakthrough innovation in the equal load transmission of planetary transmission core technology. Therefore the reducers can meet the demand of cement industry roller machines. The reducers which have small volume and light weight can work and endure intensive impact and overloading in the dust environment. The reducers are the matched products of the cement industry roller machines.

The gear reducers use high-quality steel materials, and they are carburized, quenched and high-fine grinded. After more than ten years of industrial operation, the reducer's load capacity has achieved the contemporary level of similar products in developed countries.

The series reducers are used in decelerate transmission of cement industry roller machines. Also they can be used on other similar transmission set. (We also have mount installation, flange installation, motor direct connection and other connection form.)

二、性能特点 Performances

- 1、连续运转、高承载能力、抗冲击、抗震动
- 2、结构紧凑、体积小、重量轻。
- 3、可正、反两向运转。
- 4、传动效率：0.94~0.96。
- 5、输入轴转速 ≤ 1500r/min
- 6、环境温度-10℃~+40℃.低于0℃时,启动前润滑油应预热.
- 7、特别适用于严重冲击,多粉尘及连续运转的情况.
- 8、使用寿命:不低于50000小时.
- 9、减速器输出轴与工作机轴伸用胀套联结(无键可拆卸联接方式),悬挂安装.通过扭力支撑杆保持平衡,安装调整方便、快速、简单.
- 10、外循环冷却润滑装置简单有效.

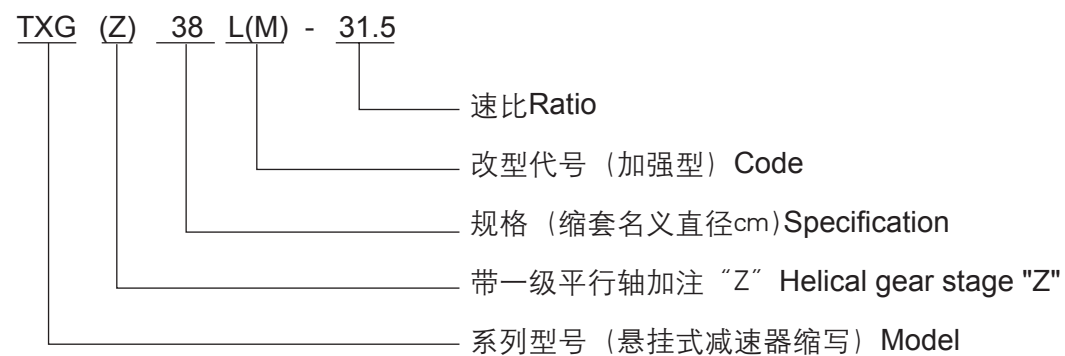
1. Continuous operation, high carrying capacity, impact resistance, anti-vibration
2. Compact, small size, light weight
3. Rotation in both two directions
4. Transmission efficiency
5. Input shaft speed
6. When temperature is below 0 degree, the lubricants should be warmed before start up.
7. Especially suitable for the situation of a serious impact, dust and continuous operation
8. Life: no less than 50,000 hours
9. Bulge sleeve connection between output shaft and crankshaft of decelerators (disassemble connection type with no key), hanging installation. Supporting bar keeps balance, assembly and adjustment are easy and convenient.
10. Outer circle lubrication device is simple and effective.

三、型号规格 The model & specification

1、代号 code

TXG系列减速器的型号规格表示如下:

The model and specification of TXG series is following:

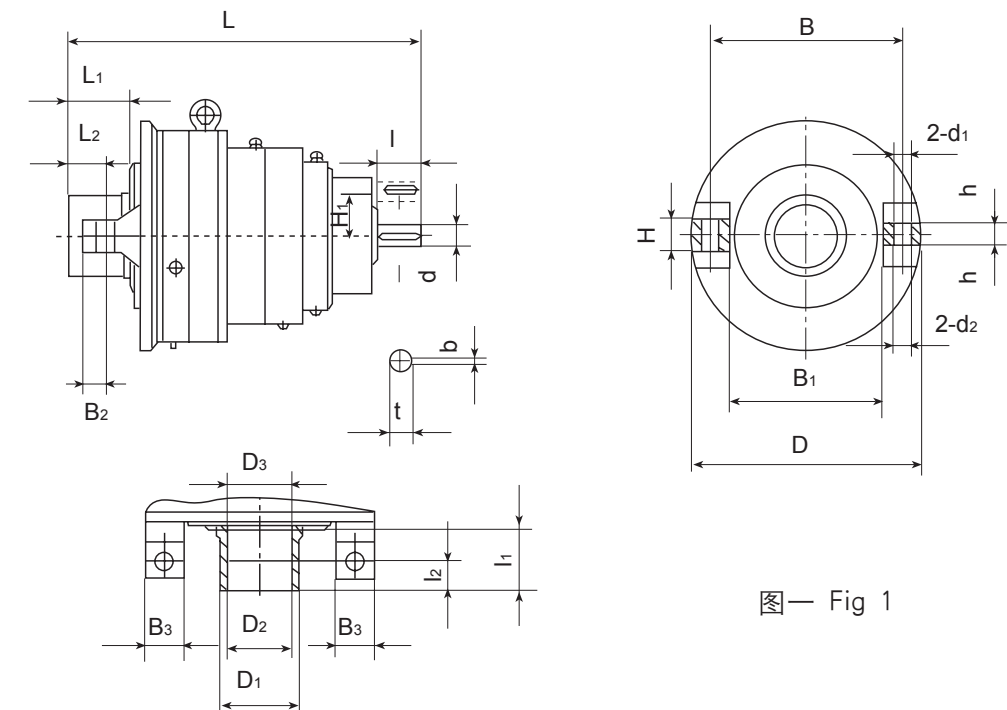


2、规格参数 Specification

减速器型号规格 The model and specification for reducer	传动比 Ratio	辊压机型号规格(直径/宽度) The model and specification for roller (Diameter/width)	电机功率(KW) (8级电机) The power of motor (8 level motor)
TXG22-31.5	31.5	HFCG80-20	75KW
TXG23-25	25		96KW
TXG23-28	28	HFCG80-20	90KW
TXG23-31.5	31.5		75KW
TXG28-28	28		160KW
TXG28-31.5	31.5	HFCG100-35	132KW
TXG38-31.5	31.5	HFCG120-45	220KW
TXG38-41	41	HFCG120-60	275KW
TXG48-36.5	36.5	HFCG140-65	500KW
TXG48-45	45	HFCG140-70	400KW
TXGZ55-76	76	HFCG1200/45	715(4级电机 4 level motor)
TXGZ56-85	85	HFCG1600/120	800(4级电机 4 level motor)

3、减速机的外形及安装尺寸见图一及表一

For the externality and the dimension of installation of reducer, please see Fig.1 and Table1



图一 Fig 1

表一 Table 1

型号规格 The model and specification	外形 Outline		高速轴 Input shaft				低速轴 Output shaft					重量 Weight (kg)
	L	D	d(m6)	l	b(N9)	t	D ₁	D ₂	D ₃	l ₁	l ₂	
TXG22	960	680	50	85	14	54	220	170	166	180	125	800
TXG23	1172	760	75	105	20	79.5	230	180	175	236.5	107.5	1000
TXG28	1284	960	85	125	22	90	280	220	215	220	110	2100
TXG38	1646	1100	100	210	28	106	380	300	295	290	140	3500
TXG48	1920	1260	130	210	32	137	480	390	385	330	165	5000
TXGZ55	2260	1550	140	210	36	148	550	450	445	400	200	9500
TXGZ56	2230	1565	150	240	36	158	560	460	455	405	202.5	9000

型号规格 The model and specification	安装尺寸 Sizes of reducers											油量 (升/台) Oil quantity(L)	备注 Remark
	B	B ₁	B ₂	B ₃	L ₁	L ₂	H	H ₁	h	d ₁	d ₂		
TXG22	560	460	50	105	160	74	70			41		30	可根据需要定制循环润滑冷却装置 Can tailor the lubricating cooler equipment
TXG23	600	480	54	130	210	125	80		5	51	70	40	
TXG28	800	680	78	135	237	140	100		5	51	70	50	
TXG38	890	710	85	200	250	140	150		5	81.2	100	70	采用循环润滑冷却装置或稀油站 Adopt the lubricating cooler equipment
TXG48	1000	780	130	240	335	200	210		5	143	180	100	
TXGZ55	1240	930	280	315	395	220	290	315	5	190	180	150	
TXGZ56	1560	1320	270	0	483	0	87	360		36-q52(法兰联接) (Flange connection)		170	

四、安装与调试 Installation & Debugging

1. 减速器低速轴与主机轴端通过胀套联接应牢固，装配要到位。支承杆两边蝶簧减震的力量要平衡，支承杆运动应灵活。电机输出轴要与减速器输入轴达到同轴度要求。联轴器、联轴节传动应灵活。

2. 减速器安装好空载试运行之前，应在减速器箱内和稀油站中加注美孚Mobil 齿轮632或GB5903-86中极压齿轮油L-CKC220,L-CKC320,同时启动稀油润滑站或循环润滑冷却系统，以排出各联接管及冷却器中的空气，为启动减速器作好准备。

3. 减速器加好油后应进行空载试运转，空载运转一至二小时。在空载运转正常的情况下（无渗漏油、无异常噪音、无异常发热现象），方能开始投料试运转。

4. 投料试运转应逐步均匀加大负荷，在条件许可的情况下，按以下四个阶段加载，每阶段运转一小时：

第一阶段为额定负荷的25%，第二阶段为额定负荷的50%，

第三阶段为额定负荷的75%，第四阶段为额定负荷的100%。

在加载试运转阶段，冷却及润滑系统均要求同步运转。同时观察辊压机电流在各阶段电流的变化并作好记录。观察减速器在运转中噪声和震动是否过大，温升是否过高，是否有渗漏油现象，扭力支承杆摆动是否灵活等。如有异常应卸荷后停机检查。

5. 减速器与稀油站润滑冷却系统的安装联接按图二所示。

6. 减速器与循环润滑系统的安装联接按图三所示。

1. Connect the low speed shaft of reducer and the shaft of mainframe with expansion plate hard, assemble well. The bearing pole should be agility. the coupling arrangement should be agility, too.

2. Before test running without any load after installation, you should add Mobil gear oil 632 or GB5903-86 gear oil L-CKC220, L-CKC320. and start up the oil lubricating station at same time. get rid of air from the cooler and the connection pipe, for starting the reducer make the good preparation.

3. Run it without any load after add oil, the time is one or two hours. after the circumstance is normal (no oil leakage, no exceptional noise, no exceptional hot pheno-Menon), you can test running.

4. For the load according to the following when test running, one hour for every moment.

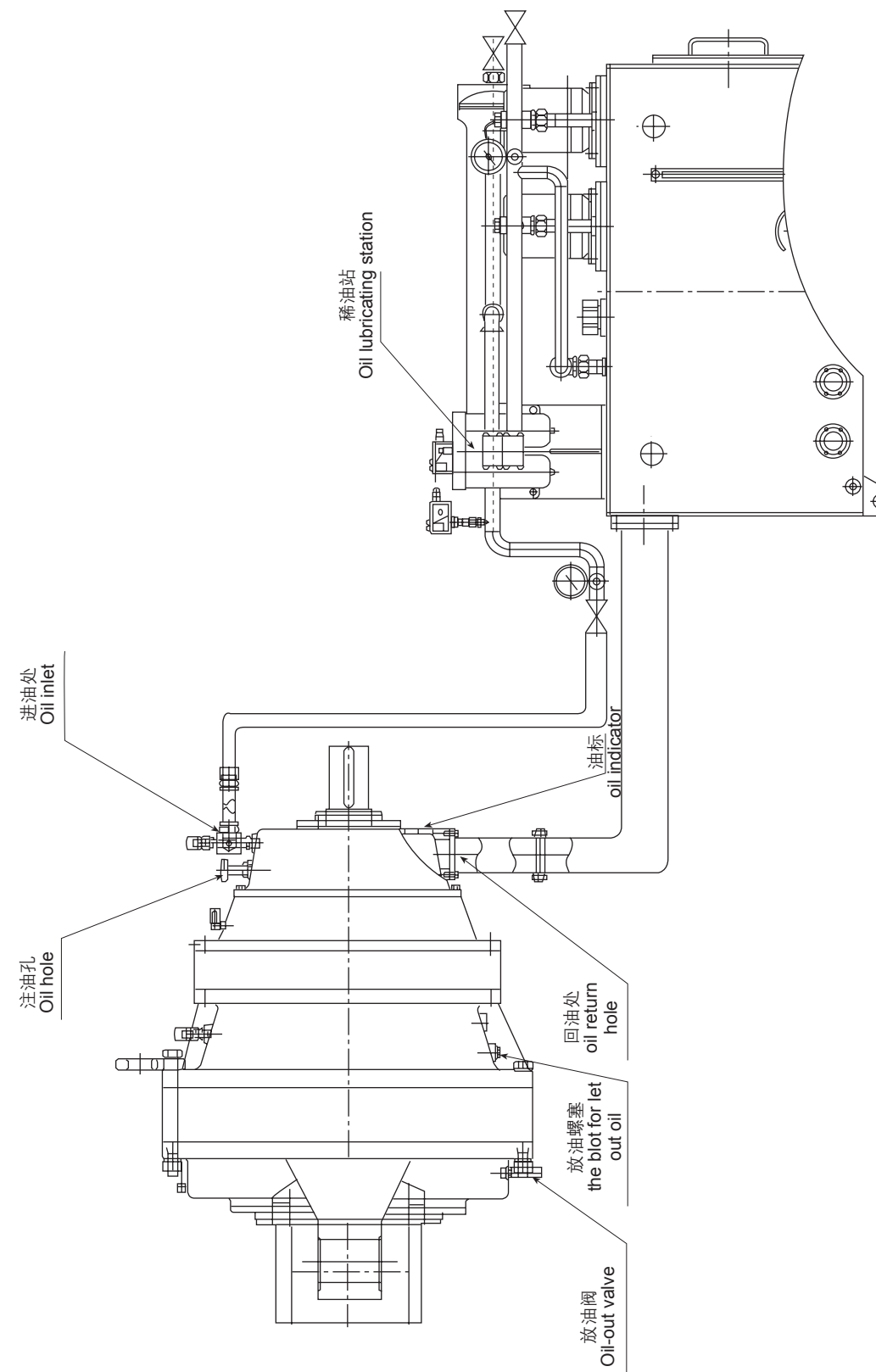
The first moment: the rating is 25%, The second moment: the rating is 50%,

The third moment: the rating is 75%, The fourth moment: the rating is 100%,

The cooling and lubricating system must be in-phase. and pay attention to the electric current of roller, and the noise, and the temperature, and the oil leakage, and so on. if the thing is abnormality, stop the reducer at once.

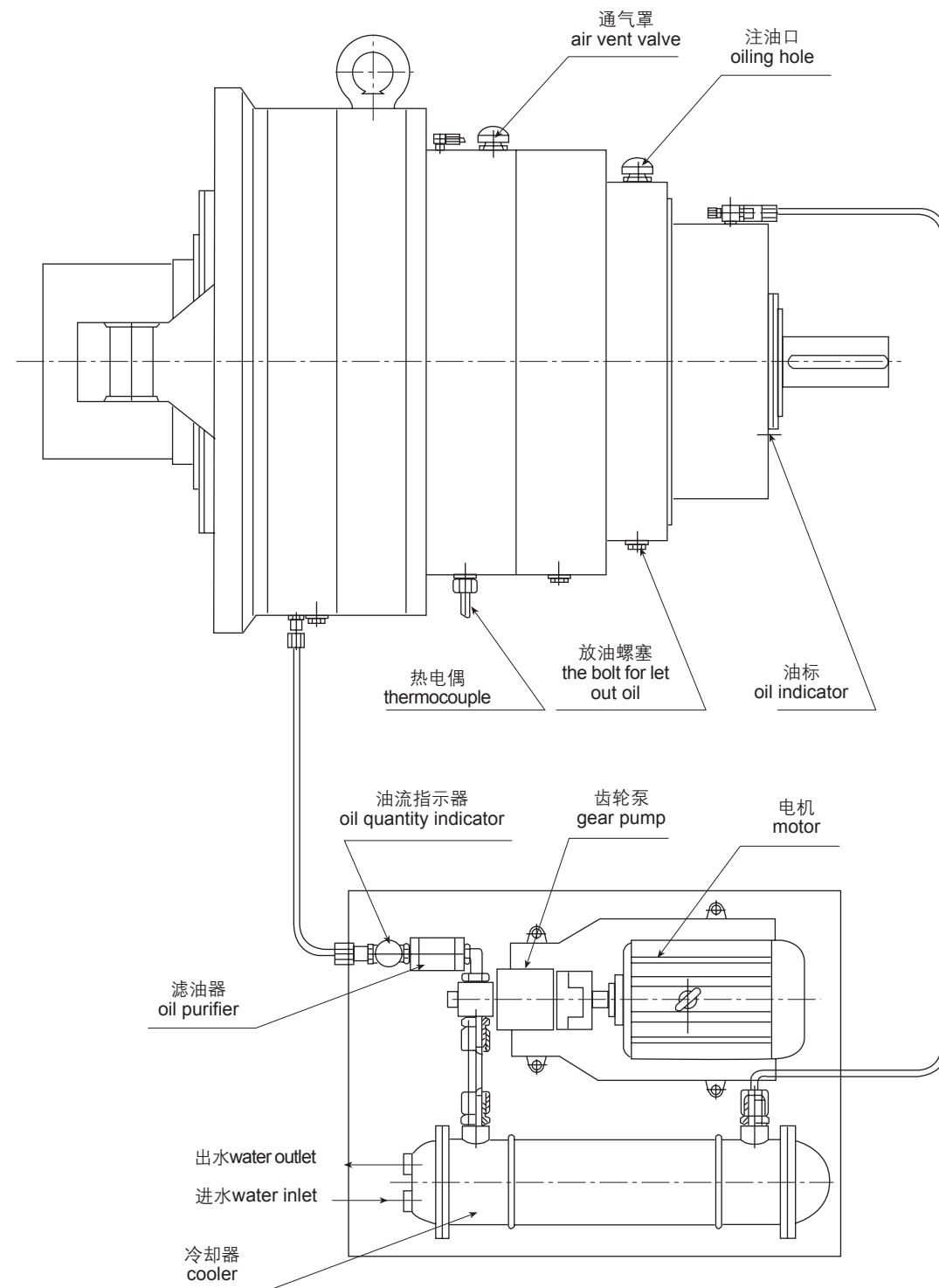
5. See fig.2 for the connection of reducer and oil lubricating station.

6. See fig.3 for the connection of reducer and lubrication cooling system.



图二 减速器与稀油润滑冷却系统联接示意图

Fig 2 :the connection for reducer and oil lubricating station



图三 减速器与循环润滑冷却系统联接示意图

Fig 2 :the connection for reducer and lubricating cooling system

五、使用与维护 Application and Maintenance

1. 润滑油与油量

减速器推荐使用美孚Mobil 齿轮油632或GB5903-86中极压齿轮油L-CKC220,L-CKC320 (当环境温度低于30℃采用L-CKC220号, 当环境温度高于30℃采用N320号油。) 减速器箱内油量按减速器型号从表一中查取。

2. 减速器冷却润滑系统为常开方式, 并且辊压机开启前必须先启动润滑系统, 确认减速器各润滑点有油供给后3-5分钟, 减速器方可带负荷运行。

3. 新减速器或更换新齿轮时, 第一次使用, 运行500小时或4个星期后 (以先期者为准), 将润滑油全部放掉, 并用清洗油 (粘度较低的润滑油) 清洗减速器内部, 但应注意清洗油需与工作的润滑油具有相溶性。初次使用的润滑油经过合适的过滤后还可以重新使用。一般用小于100μm的滤网过滤。采用稀油站的减速器以后每运行8000小时或连续运转12个月后更换润滑油。采用自身循环系统润滑的减速器以后每运行2-3个月须更换一次润滑油, 如果延长换油周期应对润滑油定期检验。此时润滑油不能反复使用, 应放尽残油后注入新的润滑油。且不同种类的油品不可混用。

4. 减速器应经常保持清洁。外露表面不得堆积灰尘。减速器内不得进水。在运行时, 通气孔也要保持气流通畅。油标视孔窗及油流指示器应保持洁净, 以便随时观察减速器的油位变化, 并注意适时增添润滑油以保证油位高度。

5. 减速器不允许超负荷运转, 瞬时尖峰负荷不的大于额定负荷的2倍。

6. 减速器每运行1-2周要检查、紧固减速器的各连接部位螺钉, 及胀套和支承杆上的螺钉。低速轴处出现渗油现象, 则应随时向内调紧该处端盖螺钉。

7. 若减速器出现异常噪声, 温升显著升高, 油温达70℃必须报警停机。辊压机电流、压力增大及发生意外损坏也应立即停机检查并作好记录, 同时咨询我公司。

8. 稀油站使用要求

8.1 稀油站保持常开方式。具体操作见稀油站的使用说明书。

8.2 稀油站中的油路和水路不应有串流现象。油路和水路都要保持畅通, 各连接部位不应有渗、漏油、水的现象出现。

8.3 冷却系统启动时, 先启动油泵电机使冷却器内充满油, 再徐徐开启冷却水的进水阀。要求水压在0.2-0.4Mpa之间。冷却系统内的油流量与水流量比应是1: 1, 即进水量应达40升/分左右。供冷却器使用的水温应尽量低。

8.4 冷却系统若在正常运转情况下进出油管的温度有较明显的变化, 一般油温降低大于12℃。

8.5 对采用地下水或水质较差的用户, 应注意冷却器在使用时间较长时会形成水管阻塞的现象, 要作定期清洗, 一般每半年至一年清洗一次。冷却系统中的滤油器要做到每周清洗一次, 以确保油路的畅通。

1.Lubricating Oil and Amount

The reducer is recommended to use Mobile gear oil 632 or GB5903-86 gear oil No220,No320 see table the oil level for(when the ambient temperature is lower than 30℃ ,please choose No320 ,when the ambient temperature is higher than 30℃ ,please choose No320).

2.The cooling method of lubrication system is in regular open style and before the roller press is started, the lubrication system has to be started in advance. the reducer can run with the workload when it is certain that different lubricating places have been fed oil for 3 to 5 minutes.

3.When the new reducer is used or the new gear is used to change the old gear for the first time,then after it runs for 500 hours or 4 weeks(decided by which occurs at the former date), all the lubricating oil should be replaced,meanwhile the purge oil is used to clean the inner side of the reducer provided that the purge oil(low viscosity lubricating oil) and the using lubricating oil are in compatibility. the lubricating oil used for the first time can be reused after suitable filtering.Generally,the filtering sieve below 100μm should be used.From then on,if the reducer has oil lubricating station,every 8000 hours or after continuous running for 12 months, the lubricating oil should be replaced. if the reducer has lubricating cooling system, the lubricating oil should be replaced every two to three months.If the oil-replaced period is to be extended,the regular check for the lubricating oil should be carried out.In this case,the lubricating oil cannot be used time and again. the correct way is to discharge the residual oil first and then inject new oil into the reducer. In addition,different kinds of oil cannot be mixed together to use.

4.the reducer is needed to keep clean usually. the external side cannot be covered with dust.water must be prevented from entering the inner side of the reducer. when the reducer is running, the ventilation hole should be kept unblocked.the eyesight hole window and the oil indicator should be kept clean so as to watch the changes of the oil level.if necessary,the lubricating oil should be added in time to ensure the height of the oil level.

5.the reducer cannot be allowed to work with overload. the instantaneous peak load cannot be twice higher than the rated load.

6.every one to two weeks, the reducer is needed to have a check including the check on the screw which fastens the connectde parts of the reducer and the screw in the supporting hole,etc. if there is oil osmosis on the low-speed shaft, the screw locating at the nearby end cover should be fastened in wards.

7.if the reducer sends out abnormal noise,coupled with the obvious temperature increase reaching as high as 70℃,the reducer has to be warned to stop running at once.if the electric current and pressure of the roller press become larger and some accidents happen, the reducer has to be shut down, furthermore, the record is to be filed to;in the meantime, to consult our company is necessary.

8.Use demands for oil lubricating station.

8.1 the station should be in usual openness way.specific operations can be referred to application manual of oil-lubricated station.

8.2 the oil passage and the water passage cannot be crossed together. the oil passage and the water passage are to be kept smooth respectively. all connecting parts should not be tolerated leakage,osmosis and water existence.

8.3 when the cooling system begins to be started, the water pressure should be ranged from 0.2 Mpa to 0.3 Mpa;the temperature of the water used to supply the cooler should be as low as much.

8.4Under normal running conditions, the cooling system generally can make the oil temperature drop more than 12 ℃.

8.5 for the customers who use the underground water or poor quality of water,they have to pay attention to the blockage of the water tubing.A regular cleanness is needed once every half of a year or one year.for the oil filter,it needs cleaning once every week so as to guarantee the smooth passage of the oil passage.

9.维护 Maintenance

用户自查项目见表二，要求用户在使用中予以配合并作好观察记录。常见故障及排除方法见表三。Users can check the form two in which some items can be checked by users themselves. Users are asked to have a record for their observations. Common problems and the approaches to get rid off them can be referred to form no.3

表二 Table 2

	检查内容Content
每天 Every day	减速器的油温（温升）是否正常。 If the temperature of oil is normal or not. 观察油泵及冷却器是否开启，润滑油路是否通畅。 If the oil pipe and cooler is on, and the lubrication is well or not. 观察辊压机电流及压力是否异常。 If the electric current and the press of roller is normal or not.
每周 Every week	清洗滤油器 Clean the filter. 添加润滑油 Add lubricating oil 检查各螺栓联结处是否松动 check the tie-in of bolt 观察减速器轴端是否有渗漏油，异常噪声及温升过高现象。 Check the shaft and the noise and the temperature.
每月 Every month	向内调整低速轴端盖螺钉，以补偿油封唇口磨损量，防止出现渗漏油。 Adjust the bolt of the low-speed shaft end 紧牢减速器的各连接部位螺栓及胀紧套螺栓，以防松动。 Tighten all the bolts. 检查扭力支摆动是否灵活，蝶簧减震装置是否有效。 check the torsional arm. 检查冷却器换热性是否正常，是否需要采取清洗等措施。 Check the cooler. 核查上一次更换润滑油的时间，以确保减速器的润滑油每隔2-3个月更换一次。 Check the time for changing lubricating oil last time, the lubrication must be change every two or three months.

表三 Table 3

序号No.	现象Phenomenon	原因cause	排除方法resolvent
1	油管无油 No oil in pipe	机内油面太低 The level of oil is too low	增加润滑油 Add lubricating oil
		油路堵塞 The oil is jamed	拆下滤油器清洗 Clean the filter
		油泵损坏 The oil pump is bad	更换新油泵 change the oil pump
2	高速轴端漏油 Oil leak from high-speed shaft	油封损坏 The oil cover is bad	更换新油封 change the oil cover
		回油孔堵塞 The oil -back hole is jamed	打开端盖，清理、疏通回油孔 Change the oil-back hole
3	低速轴端漏油 Oil leak from low-speed shaft	压盖螺钉松动 The bolt is become flexible	向内调整低速轴盖螺钉 Adjust the bolt of the low-speed shaft entad
		油封损坏 The oil cover is bad	更换新油封 change the oil cover
4	端面漏油 Oil leak from cover	螺栓松动 The bolt is become flexible	均匀拧紧螺栓 screw down the bolt
		端面密封胶失效 The encapsulant is disabled	拆机更换密封胶 change the encapsulant
5	管接头处漏油 Oil leak from the tie-in of pipe	经震动管接头处松动 The tie-in of pipe is become flexible	在管接头处上生胶带和放松胶 Wipe the encapsulant
6	轴端发热或温升过高 The temperature of shaft is very high	润滑不充分、润滑油失效 冷却器工作失效 The lubrication is not enough,and lubricating oil is disabled,and cooler is disabled	检查油量是否足够、润滑油是否如期更换、油路的循环是否通畅，冷却器是否有足够水压、水流量 Check the level of the oil, and the lubricating oil, and the cooler
		轴承装配过紧 The shaft is too tight	拆下端盖，调整轴承游隙 Adjust the shaft tolerance
		轴承损坏 The shaft is bad	更换轴承 Change the bearing
		超负荷运转、偏载严重 Exceed load	应避免超载、偏载 Avoid exceeding load
		环境恶劣、散热差 The circumstance is bad	改善环境，增设水冷、风冷设施 Improve the circumstance
7	异常噪声 Exceptional noise	机体零件松动、损坏 The part becomes flexible	拆机检查维修 Open and check it

