



DC 系列

卷筒用鼓形齿式联轴器

Series DC Curved Tooth Drum Coupling

(企业标准STANDARD: WL/Q 003-2001)

(2020年7月版 Jul. 2020 Edition)



宁波伟隆港口机械有限公司

NINGBO WEILONG PORT MACHINERY CO., LTD.

宁波伟隆传动机械有限公司

NINGBO WEILONG TRANSMISSION MACHINERY CO., LTD.

感谢您使用我公司生产的DC系列卷筒用鼓形齿式联轴器！

We appreciate you to choose our DC drum coupling!

同时我们有下列品种的联轴器可供您选择。

We are also can supply below couplings for your option!



金属弹性元件，缓冲减振性好，使用寿命长。
Metal elastic component, good vibration-damping and long service life.

JS系列蛇形弹簧联轴器
Series JS steelflex grid coupling



弹性好，无润滑，高可靠。
Good flexibility, lubricant free and high reliable performance.

ML系列梅花形弹性联轴器
Series ML coupling with elastic spider



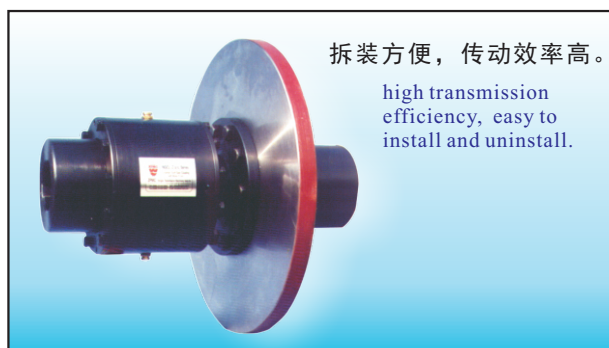
承载能力大，适用于低速重载工况。
Large loading capability, suit to use for low speed and heavy loading.

GICL, GIICL系列鼓形齿式联轴器
Series GICL & GIICL curved tooth coupling



径向载荷大，用于起重设备的起重机械。
Large radial load capability, suit to use for hoist machine of cranes.

DC系列卷筒用鼓形齿式联轴器
Series DC curved tooth drum coupling



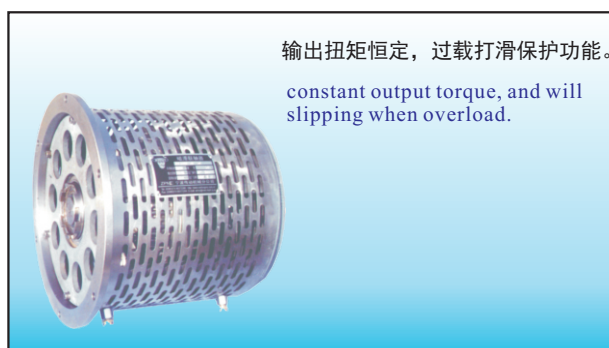
拆装方便，传动效率高。
high transmission efficiency, easy to install and uninstall.

PGCLK系列鼓形齿式联轴器
Series PGCLK curved tooth coupling



传动精度高，少维护，无噪声，寿命长。
high transmission accuracy, less maintenance, non-noise, and long service life.

JM系列膜片联轴器
Series JM diaphragm coupling



输出扭矩恒定，过载打滑保护功能。
constant output torque, and will slipping when overload.

MH系列磁滞联轴器
Series MH hysteresis coupling with permanent magnet



承载能力大，具有很大的角度补偿能力。
High capacity of loading, and large angular deviation compensation.

SWP、SWC系列十字轴式万向联轴器
Series SWP & SWC cardan universal coupling

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1. DC系列卷筒用联轴器的性能与结构形式

1. Application and Characteristics Coupling Model DC

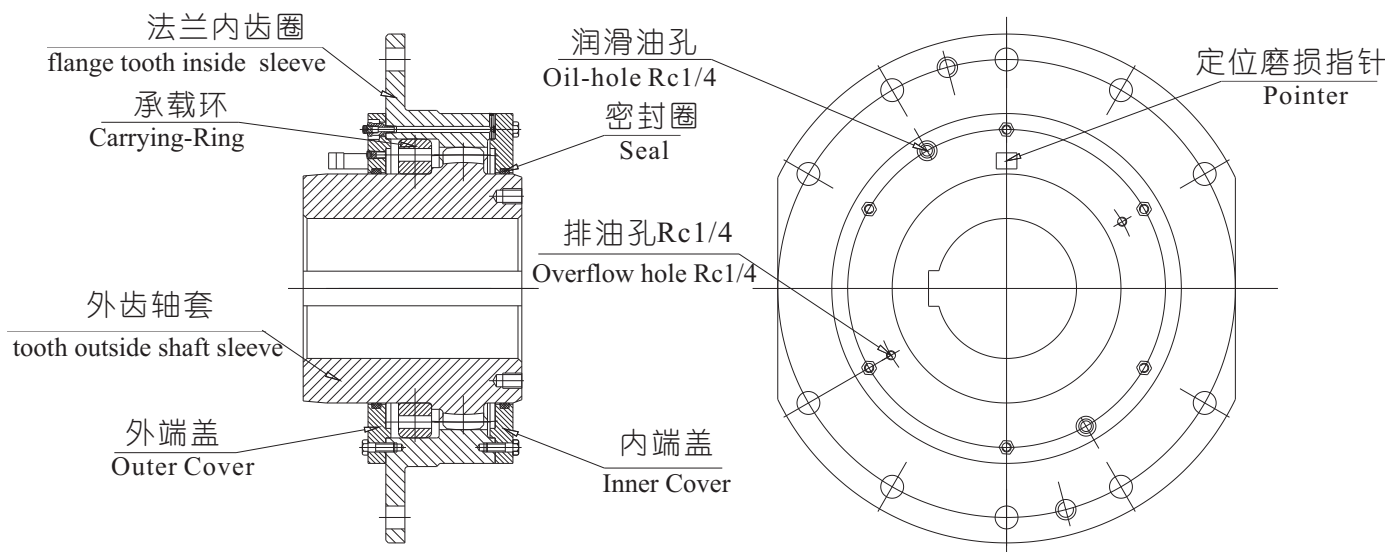


图1 联轴器的结构图
Figure1 Configuration of the coupling

卷筒用鼓形齿式联轴器(图1)是一种新型挠性联轴器,主要用于起重设备中起升机构的减速器输出轴与钢丝绳卷筒的联接,也适用于其它类似的既传递转矩又承受径向载荷的机械设备,但不能用作需承受轴向载荷的传动。

卷筒用鼓形齿式联轴器由带鼓形齿的外齿轴套、带联接法兰的法兰内齿圈、带外球面的承载环、内外端盖和密封圈等组成,并设有定位磨损指针、润滑油孔和排油孔等(见图1)。外齿轴套和法兰内齿圈构成的鼓形齿式联轴器传递驱动功率,而由承载环的外球面和法兰内齿圈的内承载面形成的接触副构成自动调位的球面轴承,承受径向载荷。

与其他卷筒用联轴器比较,卷筒用鼓形齿式联轴器具有如下特点:

工作稳定可靠,能承受很大径向载荷和传递较大的转矩,过载能力大。

结构紧凑牢固,系列化设计,可简化整机结构,减轻设备重量。

调位性能好,安装、调整方便,维护简单。

设有定位磨损指示,安全可靠。

可配用普通轴伸式减速机,降低设备成本。

The drum coupling, model DC, see Fig.1, is a novel flexible gear coupling, and is especially recommended for installation in drum drives in cranes. The coupling is also suitable for that similar mechanical equipment which is able to transmit torque and subject to radial load but cannot withstand axial load.

The drum coupling comprises: the hub with crowned spur gear teeth, the flanged housing with internal gear teeth, the load carrying ring with outer sphere, the end covers and seals, also pointer, lubrication hole and breather hole etc. (see Fig.1). Power is transmitted positively by the flexible gear coupling comprised of the hub and housing, but the self-aligning bearing comprised of the load carrying ring and housing bear the radial load.

The drum coupling has the following advantages:

High performance, reliable, capable of high torque transmission and radial load, high capability of overloading.

Compactness, robust and series design, simplifying construction and light-weight of the main set. 1.3.3

Alignment, easy installation and adjustment, easy maintenance.

Wear indicator to ensure safety.

Suitable for gearbox reducer with extension shaft.

Reducing the cost.

2. 标记方法

订购卷筒用鼓形齿式联轴器时，规定的标记方法如下：

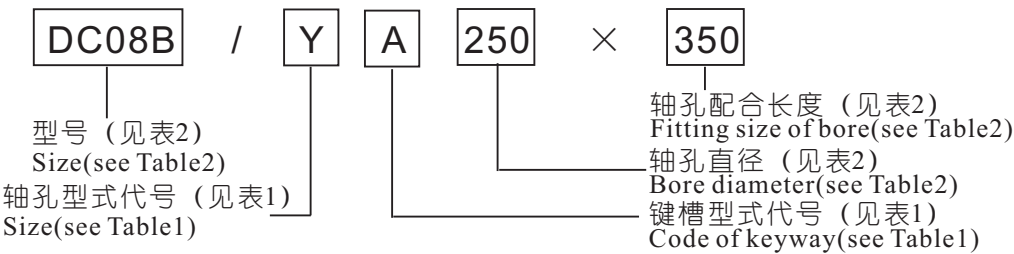


表1:轴孔联接型式及其代号

Table 1: Bore Type and Code of Keyway

联接型式 Type	代号 Code	图示 Schematic Drawing
平键单键槽 Single Rectangular Keyway Y型-长圆柱形轴孔 Type Y—Long Cylindrical Bore	YA	
布置平键双键槽120° Arrangement Double Rectangular Keyway 120° Y型-长圆柱形轴孔 Type Y—Long Cylindrical Bore	YB	
布置平键双键槽180° Arrangement Double Rectangular Keyway 180° Y型-长圆柱形轴孔 Type Y—Long Cylindrical Bore	YB ₁	
圆柱直齿渐开线花键 Involute spline with columned spur gear	(GB/T3478.1-1995)	

标记示例：
例1 欲订购DC08B型卷筒用鼓形齿式联轴器，要求：主动端Y型轴孔，A型键槽，d=250mm，L=350mm，标准配合；从动端按样本标准联接。
标记为：DC08B/YA250×350
例2 欲订购DC08A型卷筒用鼓形齿式联轴器，要求：主动端Y型轴孔，B型键槽，d=300mm，L=410mm，标准配合；从动端按样本标准联接。
标记为：DC 08A/YB300×410
注：标准DC系列联轴器的键槽宽度采用国家标准GB/T1095-2003《平键 键槽的剖面尺寸》的标准值，键槽宽度的极限偏差采用该标准中规定的正常联结穀JS9。如用户的轴伸键槽不符合GB/T1095-2003标准，务必在订货时说明。
标准系列的轴孔配合采用H7，如用户对轴孔配合另有要求，请务必在订货时说明。

2. Sign for Ordering

For ordering the drum coupling following sign shall be used:

Example :
Example 1 Type DC08B of drum coupling is to be ordered, and the driving end is Type Y bore, type A keyway, d=250mm, L=350mm, standard fitting and the driven end is in accordance with standard shown in this catalogue.
Sign: **DC08B/YA250×350**
Example 2 Type DC08A of drum coupling is to be ordered, and the driving end is Type Y bore, type B keyway, d=300mm, L=410mm, standard fitting and the driven end is in accordance with standard shown in this catalogue.
Sign: **DC 08A/YB300×410**
Note: Width of the keyway for series DC drum couplings complies with the Standard GB1059-2003 and the tolerance limits of width are JS 9 specified in the Standard. When you order, please offer the information if the keyway on shaft extension does not comply with standard GB1095-2003.
Match of shaft & hole is commonly H7, if others is needed, the requirement has to be offered in ordering.

3. DC系列卷筒用联轴器的基本参数和主要尺寸

3. Specification and Size of Drum Coupling Model DC

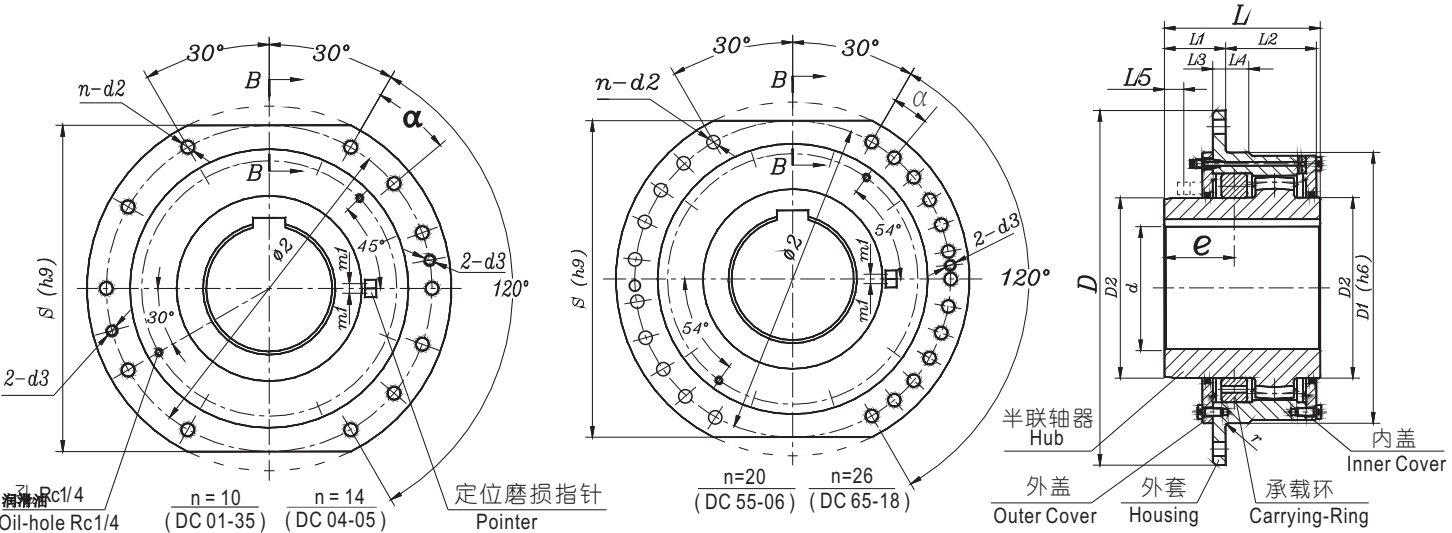
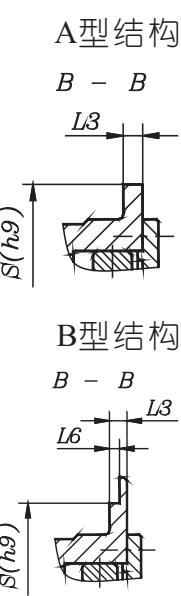


图2联轴器的结构图
Fig. 2 Configuration of the Coupling



- 注: 1. 本联轴器允许最大轴偏角为 $\pm 0.5^\circ$ 。
2. 润滑注油嘴连接螺纹均为 Rc 1/4。
3. 转动惯量 I 和质量 m 均为近似值, 仅供参考。
4. 当轴孔直径 $d > 500\text{mm}$ 时, 推荐采用渐开线花键联接, 选用基本参数为: $m=10$, 执行标准 GB/T3478.1-1995。用户有特殊要求, 请在订货时注明。
5. 随着产品标准的修订, 材质的改变以及工艺技术的进步, 本文件中的参数可能会有更改, 恕不另行通知。
6. 用户如对 DC11-DC18 各档规格有需要 A 型结构的, 请在订货时注明。

- Note: 1. Allowable max. angular misalignment is $\pm 0.5^\circ$ for the coupling.
2. Threads for lubrication holes Rc 1/4.
3. Inertial moment I and mass m are approximate value and be used for reference only.
4. when the bore diameter $d > 500$, we suggest choosing involute spline to connect. its base value: $m=10$, standard: GB/T3478.1-1995. other requirements need to clear indication in ordering.
5. Information in this document, adaption to new standards or new scientific knowledge, is subject to change without notice.
6. Please give clear indication in ordering if user need sizes of DC11A~DC18A.

Table 2 Specification and Size of Drum Coupling Model DC

表2 DC系列卷筒用联轴器的基本参数和主要尺寸															Table 2 Specification and Size of Drum Coupling Model												
型号 Size	许用 转速 Speed	公称 转矩 Torque	径向 载荷 Radial Load	轴孔 Bore		外形尺寸 Overall Dimensions									卷筒联结尺寸 Dimensions of the Flange								磨 损 刻 度 Wear Allowance	轴 向 间 隙 Axial Clearance	载 荷 位 置 Load Location	转 动 惯 量 Inertia	质 量 Mass
				直径 Diameter	长度 Length										Dimensions of the Flange												
				$n_{\max}$ r/min	$T_{\max}$ KN·m	$F_{\max}$ KN	$d_{\max}$	$L_{\min}$	D	$D_1(h6)$	$D2(h9)$	L_1	L_2	L_3	L_4	L_5	L_6	S(h9)	Φ_2	n-d ₂	螺栓 Bolt	α					
DC01A DC01B	200	16	18	110	185	400	280	180	80	95	15 20	25	26 21	11	360	360	10-18	M16	30°	M16	2.5	1.5	±3	88	1.0	80	
DC02A DC02B	200	22.4	25	125	200	420	310	212	80	102	15 20	25	26 21	11	380	380	10-18	M16	30°	M16	2.5	1.5	±3	88	1.5	100	
DC03A DC03B	200	31.5	35.5	150	225	450	340	230	80	110	15 20	25	26 21	11	400	400	10-22	M20	30°	M20	2.5	1.5	±3	88	2.5	120	
DC035A DC035B	200	45	50	160	235	510	400	250	95	124	20 25	30	34 29	15	460	460	10-22	M20	30°	M20	2.5	2.0	±3	106	3.0	150	
DC04A DC04B	200	63	71	200	250	550	420	280	95	130	20 25	30	34 29	15	500	500	14-22	M20	20°	M20	2.5	2.0	±3	106	4.5	190	
DC05A DC05B	200	90	90	220	265	580	450	315	95	145	20 25	30	34 29	15	530	530	14-22	M20	20°	M20	2.5	2.0	±3	110	7.3	245	
DC055A DC055B	200	125	112	240	290	620	500	345	101	160	25 30	35	35 30	19	560	560	20-22	M20	13.3°	M20	2.5	2.5	±3	116	10.3	330	
DC06A DC06B	200	160	140	260	300	650	530	375	101	170	25 30	35	35 30	19	580	600	20-22	M20	13.3°	M20	2.5	2.5	±3	116	15.5	385	
DC065A DC065B	200	190	165	270	300	665	545	387	101	175	25 30	35	35 30	19	590	615	26-22	M20	10°	M20	4	2.5	±3	116	18.3	435	
DC07A DC07B	200	224	180	280	310	680	560	400	101	183	25 30	35	35 30	19	600	630	26-22	M20	10°	M20	4	2.5	±3	116	21.4	485	
DC08A DC08B	200	315	224	300	345	720	600	437	111	185	35	40	35	21	640	660	26-26	M24	10°	M24	4	3.0	±3	118	30.6	550	
DC09A DC09B	200	450	280	340	380	780	670	487	111	213	35	40	33	21	700	730	26-26	M24	10°	M24	4	3.0	±3	118	40.2	650	
DC10A DC10B	200	560	355	380	420	850	730	545	111	230	35	45	33	21	760	800	26-26	M24	10°	M24	4	3.0	±3	120	65.1	890	
DC11B	200	710	450	420	420	950	800	600	120	240	40	50	35	26	840	880	26-32	M30	10°	M24	5	3.0	±3	131	100	1000	
DC12B	200	1000	600	460	440	1010	860	650	127	256	46	50	36	30	890	940	26-32	M30	10°	M24	5	3.0	±3	134	140	1225	
DC13B	200	1250	750	500	470	1090	930	720	133	282	50	55	36	32	960	1020	26-32	M30	10°	M24	5	3.0	±3	145	207	1540	
DC14B	200	1600	900	540	490	1170	1010	780	140	297	55	60	36	36	1030	1100	26-32	M30	10°	M30	5	3.0	±3	150	310	1925	
DC15B	200	2000	1100	580	510	1270	1090	840	145	318	60	70	36	40	1120	1200	26-32	M30	10°	M30	5	3.0	±3	162	449	2395	
DC16B	200	2500	1300	640	540	1430	1240	960	145	346	60	70	36	40	1260	1360	26-32	M30	10°	M30	6	4.0	±4	168	809	3370	
DC17B	200	3150	1500	700	570	1540	1340	1050	159	365	70	80	38	45	1360	1460	26-38	M36	10°	M30	6	4.0	±4	181	1177	4170	
DC18B	200	4000	1800	780	600	1640	1440	1150	159	394	70	80	38	45	1460	1560	26-38	M36	10°	M30	6	4.0	±4	191	1634	4930	

4、选型方法和计算

卷筒用鼓形齿式联轴器的选型，一般是根据起重设备的实际工况，减速器的轴伸配合以及卷筒的联接尺寸来进行的。选用时应校核轴伸配合和卷筒联接的强度以及可靠性。

当轴孔直径 $d \geq 500\text{mm}$ 时，推荐采用圆柱直齿渐开线花键联接，基本齿廓为30P,公差等级和齿侧配合采用6H/6h。

联轴器的选型可按计算转矩和最大径向载荷进行计算：

$$T_K \leq T_{K \max}$$

$$F_r \leq F_{r \max} + (T_{K \max} - T_k) \times K_1$$

式中：

T_K — 联接处的计算转矩，由下式给出：

Where:

T_k — Calculated torque at joint determined through the following formula:

$$T_K = 9550 \frac{N_T}{n_T \times \eta_T} \times K_2 \times \Phi_6$$

$T_{K \max}$ — 标准联轴器的许用最大转矩 (N · m)，由表2给出；

F_r — 联接处实际承受的径向载荷，(N)，计算方法见附录；

$F_{r \max}$ — 标准联轴器的许用最大径向载荷，(N)，由表2给出；

N_T — 减速器输出功率，或钢丝绳卷筒的缠绕功率，Kw,计算方法见附录；

n_T — 稳定运行时卷筒转速，(r/min)；

η_T — 卷筒支承轴承的效率：

滚动轴承 $\eta_T = 0.98$ ，

滑动轴承 $\eta_T = 0.96$ ；

K_1 — 径向载荷补偿系数，由表3给出；

K_2 — 工作级别系数，由表4给出；

Φ_6 — 动载系数，由下式给出：

$$\Phi_6 = \frac{(1 + \Phi_2)}{2}$$

Φ_2 — 起升载荷系数，一般在1-2之间。当起升速度快、系统刚度大、操作猛烈时， Φ_2 取较大值（详见GB3811-83《起重机设计规范》）。

$T_{K \max}$ — Admissible max. torque of standard coupling . in N · m, given in Table2;

F_r — Actual radial load at connection in N, see Appendix;

$F_{K \max}$ — Admissible radial load of standard coupling, in N, given in Table2;

N_T — Required drive rating, or the horsepower of the wire rope revving on the drum, in Kw, see appendix;

n_T — Speed of the rope drum, in r/min;

η_T — Efficiency of drum support bearing,
 $\eta_T = 0.98$ for anti-friction bearing, and
 $\eta_T = 0.96$ for plain bearing

K_1 — Radial load compensation factor, shown in Table 3;

K_2 — Required operating coefficient for drive groups given in Table 4;

Φ_6 — Dynamic load factor, given by the following formula:

Φ_2 — Lifting load factor, it varies between 1 and 2, higher value is taken for the case when lifting speed is fairly high and system stiffness is high and operation of control device is very rapid (for details refer to GB3811-83).

4. Size Selection

Size selection for drum coupling is usually based on actual duty cycle of the crane (or other hoists) fitting with the reducer shaft extension and flange dimensions. The strength and reliability of the hub/shaft connection must be checked if necessary.

The involute spline with columned spur gear is recommended when the bore diameter is bigger than 500mm, the basic tooth shape is 30P, the tooth fitting and tolerance is 6H/6h.

Size selection may be made based on calculated torque and max. radial load:

Novel couplings Bring More Benetits For you!

表3 径向载荷补偿系数 K_1

Table 3 Radial Load Compensation Factor K_1

规格 Size	DC01A DC01B	DC02A DC02B	DC03A DC03B	DC035A DC035B	DC04A DC04B	DC05A DC05B	DC055A DC055B	DC06A DC06B	DC065A DC065B	DC07A DC07B	DC08A DC08B
系数 K_1 Factor K_1	5.2	4.7	4.1	3.7	3.4	3.0	2.8	2.6	2.6	2.4	2.2
规格 Size	DC 09A DC 09B	DC10A DC10B	DC11B	DC12B	DC13B	DC14B	DC15B	DC16B	DC17B	DC18B	
系数 K_1 Factor K_1	2.0	1.8	1.6	1.4	1.3	1.2	1.15	1.1	1.05	1.0	

表4 工作级别系数 K_2

Table 4 Operating Coefficient for Drive Groups k_2

工作级别C Group drive C	M2	M3	M4	M5	M6	M7	M8
系数 K_2 Factor K_2	1.0	1.12	1.25	1.4	1.6	1.8	2.0

表5 工作级别 C

Table 5 Drive Group C

利用 等级 Class of utilization	缩 写 Brevity			T0	T1	T2	T3	T4	T5	T6	T7	T8
	根据一年内每天平均利用时间(小时计) Based on average service time(in hours) per day during every year			≤ 0.125	>0.125 ~ 0.25	>0.25 ~ 0.5	>0.5 ~ 1	>1 ~ 2	>2 ~ 4	>4 ~ 8	>8 ~ 16	>16
载 荷 谱 State of loading	编号No.	级别 State	说 明 Description	工 作 级 别 C Drive group C								
	1	L1 轻级 Light	很少承受最大载荷 Seldom subject to max. Load	M1	M1	M1	M2	M3	M4	M5	M6	M7
	2	L2 中级 Medium	承受最小中等和最大 载荷的频率大致相等 Equal frequency of min. Medium & max. load	M1	M1	M2	M3	M4	M5	M6	M7	M8
	3	L3 重级 Heavy	持续承受较大载荷, 也常承受最大载荷 Subject to max. load & large load	M1	M2	M3	M4	M5	M6	M7	M8	M8
	4	L4 特重级 Super Heavy	持续承受最大载荷 Subject to max. load continuously	M2	M3	M4	M5	M6	M7	M8	M8	M8

注：当一个工作循环时间为12分钟或更长时,工作级别应按利用等级和载荷谱求得的级别低一级选取。

Note: When on duty cycle time is 12 minutes or more the drive shall be chosen lower than that selected. Based on class of utilization and state of loading by one class.

5. 卷筒的联接尺寸

5. Connecting size of drum

联轴器与钢丝绳卷筒采用楔键直接联接结构, 其结构和要求如图3所示, 联接尺寸见表6。

Coupling connects the drum by wedge connection. the configure and requirements see fig 3, The main dimensions of the flange are shown in Table 6.

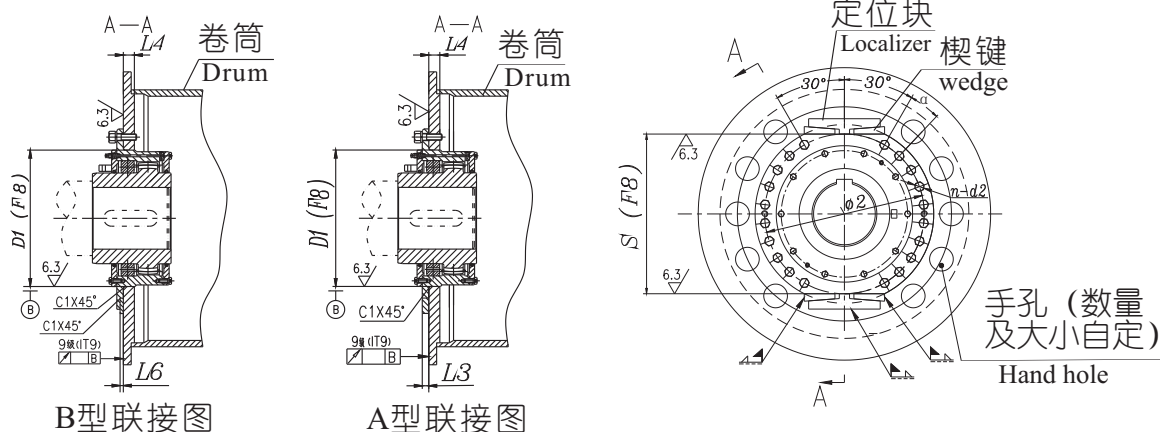


图3 联接方式 Fig.3 Connection Mode

表6 联接法兰尺寸

Table 6 Flange of cable drum

型号 Size	L ₄ (mm)	L ₃ (mm)	L ₆ (mm)	C ₁ (mm)	C ₂ (mm)	S (F8) (mm)	Φ ₂ (mm)	D ₁ (F8) (mm)	α (⁰)	n-d ₂		
DC 01 ^A _B	≥20	≥15	≥11	4	2	360	360	280	30	10-18	10-M16	
DC 02 ^A _B						380	380	310				
DC 03 ^A _B						400	400	340				
DC 35 ^A _B	≥25	≥20	≥15			460	460	400	20	10-22	10-M20	
DC 04 ^A _B						500	500	420				
DC 05 ^A _B						530	530	450				
DC 55 ^A _B	≥30	≥25	≥19			6	560	560	500	13.3	20-22	20-M20
DC 06 ^A _B							580	600	530			
DC 65 ^A _B							590	615	545		10	26-22
DC 07 ^A _B	600	630	560									
DC 08 ^A _B	≥40	≥35	≥21	640			660	600	26-26	26-M24		
DC 09 ^A _B				700			730	670				
DC 10 ^A _B				760			800	730				
DC 11B				840			880	800				26-32
DC 12B	890	940	860									
DC 13B	960	1020	930									
DC 14B	1030	1100	1010									
DC 15 B	≥65	≥60	≥40	3	1120		1200	1090				
DC 16 B					1260	1360	1240					
DC 17 B	≥75	≥70	≥45		1360	1460	1340	26-38	26-M36			
DC 18 B					1460	1560	1440					

6. 安装方法和注意事项

联轴器安装前，应检查联接的配合表面，并清洗掉防锈油脂，去除毛刺，擦尽油污等。

本联轴器应以解体加热套装为宜。解体后，应将全部零件集中放置，以免丢失和损坏。

安装时，先将外端盖和密封圈套在外齿轴套的减速器侧，然后将外齿轴套加热后套装在减速器的输出轴上。注意，加热可在油浴中进行，油温不超过130℃，且应缓慢均匀地加热，切不可加热过快，造成局部冷热不匀而变形。

当外齿轴套冷却后，先按标记将法兰内齿圈装上，再将外端盖、内端盖和密封圈装上。

安装时，必须保证定位磨损指针的位置正确。装好后，指针两侧刻线与轴向定位刻痕平齐(见图4a)，指针前端刻线正对齿侧隙界限刻痕之间(图4b)。

6. Installation and cautions

Before coupling installation check the fitting surfaces of the joint and clean them.

The coupling should preferably be disassembled and heated and them installed. Upon disassembly take care of all its parts to avoid from missing and/or damage.

During installation fit up the outer cover and seals first on the hub at gear box end, then heat the hub and install it onto the gear box output shaft. The hub may be dipped into an oil bath and heated to a maximum temperature of 130℃. The heating rate up to the shrinking temperature must be slow and gradual. Local hot-spots must be avoided.

After the hub has been cooled install the housing according to the fitting marks and then fit the outer cover, inner cover and seals.

During installation, care must be taken to ensure that the pointer, the wear notches and the markings on the teeth, if any, are in their correct position, see Fig.4.

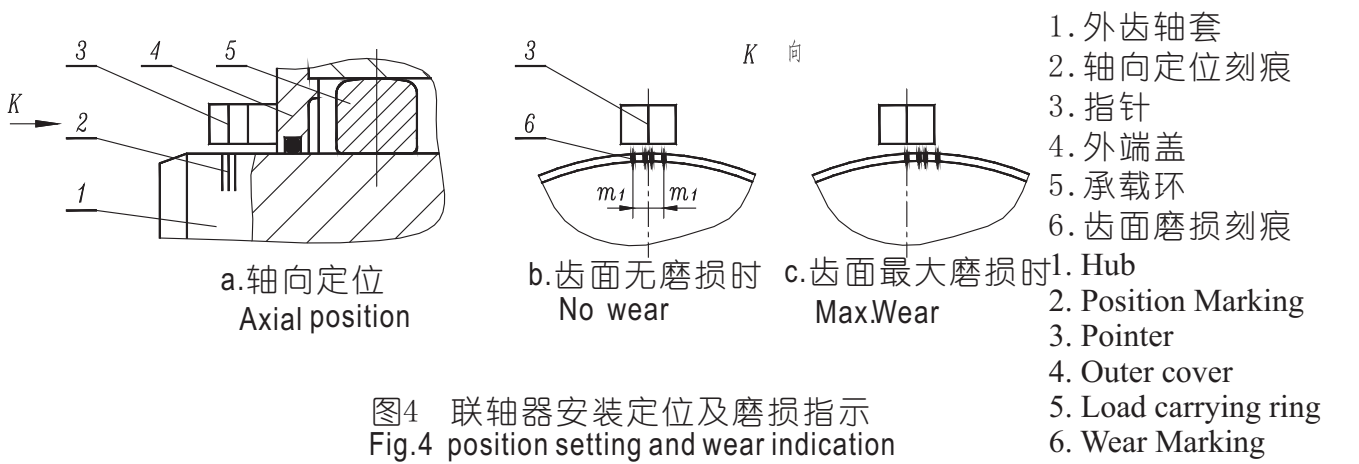


图4 联轴器安装定位及磨损指示
Fig.4 position setting and wear indication

联轴器与卷筒的联接以及端盖紧固应采用强度性能等级大于或等于8.8级的螺栓组，推荐按表7给定的预紧力矩拧紧，必要时由设计计算确定。

Bolts of strength classification 8.8 should be used as fixing bolts and also to retain the covers. These are to be pre-tightened with a torque-wrench to the torque figures shown in Table 7 or must be checked based on calculated if necessary.

表7 联接螺栓的预紧力矩 Table 7 Pretension Torque of Bolts

螺纹规格 Thread	M8	M10	M12	M16	M20	M24	M30	M36
预紧力矩 (N · m) Tightening torque N m 8.8 grade	23	46	80	195	385	660	1250	2220

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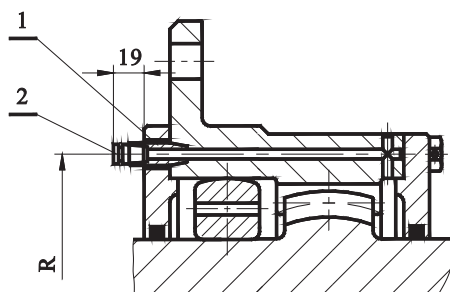
本联轴器不能承受轴向载荷。卷筒工作时产生的附加轴向载荷必须始终由卷筒固定支承座承受，因此，联轴器安装时必须保证轴向定位正确。否则卷筒工作时产生的弹性水平位移可能会破坏联轴器的轴向限位，造成联接失效，甚至酿成严重事故。

7. 润滑

在联轴器安装时，应使用规格为PT1/4的平头油嘴，通过接头连接，如图5所示，接头两端的螺纹为R1/4。

我公司生产的DC系列卷筒用鼓形齿式联轴器是装配成套后提供给用户的，出厂时未加注足量的润滑脂。因此，联轴器在安装完毕后，即应注入锂基润滑脂，直至润滑油从溢流孔溢出新油脂为止。绝对禁止在未加注润滑脂的情况下启动设备，以避免联轴器的早期损坏。

鼓形齿式联轴器适用的润滑脂牌号及注油量见表8。



The coupling can not be subjected to axial load. Therefore, during installation of the coupling, its correct axial position setting must be ensured, otherwise the elastic horizontal displacement of the drum occurred during operation may damage the axial limit of the coupling resulting in connection failure and even serious accident.

7. Lubrication

During installation, a flat head grease fitting size PT1/4 should be mounted in the coupling with adaptor for convenient filling the grease, see Fig.5, threads at both ends of the adaptor are R1/4.

The drum couplings, model DC, are supplied completely assembled but not filled with lubricant enough. Therefore after installation of the coupling into the rope drum, grease should be forced in until clean lubricant flows out of the overflow hole to prevent the coupling from premature damage.

The types and quantities of lubricant are shown on Table 8.

- | | |
|-------------|-------------------------|
| 1. 接头 | 2. 平头油嘴PT1/4 |
| 1. Addaptor | 2. Grease Fitting PT1/4 |

图5 油嘴安装

Fig.5 Mounting of grease fitting

联轴器的齿面润滑状况，直接影响着使用寿命和安全可靠性。因此至少每3个月必须检查一次联轴器的润滑状况，并加注一次润滑脂。当设备停用较长时期后，应更换全部润滑脂，以防润滑脂日久失效。

正常工作境况下，至少每年须更换一次润滑脂。润滑周期见表9。

Lubrication condition of the coupling directly effect on the service life and reliability, therefore, lubrication condition shall be checked and grease must be filled in at least every three months. After a long period of non-operation, the grease shall be replaced to avoid from using of deteriorated grease.

Usually, the grease shall be replaced at least once per year.

表 8 润滑脂牌号及注油量

Table 8 Type and Quantity of Lubricant

型号 Size	注脂量 Quantity of lubricant (Kg)	润滑脂牌号 Mark of Lubricant	润滑脂换油周期 Lubricant replaced period
DC 01	0.38	SY ZL-2 DIN KP2K BP LS-EP2 ESSO EP2 KLUBER 2EP Mobil EP2 Shell Ep2	按表9 according to Table9
DC 02	0.44		
DC 03	0.83		
DC 035	0.90		
DC 04	0.96		
DC 05	1.03		
DC 055	1.22		
DC 06	1.30		
DC065	1.45		
DC 07	1.55		
DC 08	1.83		
DC 09	2.25		
DC 10	3.22		
DC11	5.70		
DC12	6.33		
DC13	8.04		
Dc14	10.78		
DC15	12.41		
DC16	16.10		
DC17	20.16		
DC18	22.86		

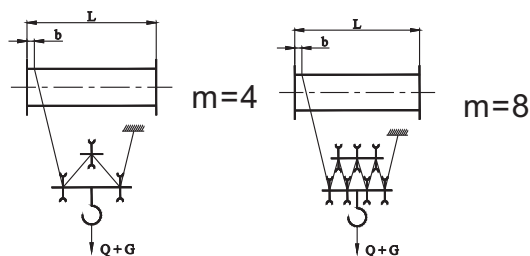
表 9 润滑脂换油周期

Table 9 Lubricant replaced period

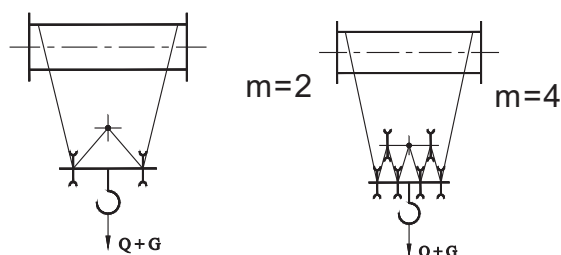
工作级别 Drive group	润滑脂换油周期 Lubricant replaced period	
	运行时间 (小时) Running time(hours)	周期 Period
M2-M6	2000	每年至少一次 At least once yearly
M7-M8	1000	每半年至少一次 At least once every 6 months

8、附录

起升机构的单联滑轮组如附图1所示，其中 m 是滑轮组的倍率。



起升机构的双联滑轮组的附图2所示，其中 m 是滑轮组的倍率。



起升机构卷筒所受的钢丝绳拉力之和 ΣS 为：

$$\Sigma S = \frac{Q + G}{m \cdot \eta_m \cdot \eta_T} \quad (\text{N}) \quad (\text{A } 1)$$

式中：

- Q — 起升机构额定起重量，N；
- G — 起升机构滑轮组、钢丝绳等自重总和，N；
- m — 滑轮组的倍率；
- η_m — 滑轮组的效率，与滑轮组倍率 m 和卷筒支承效率 η_T 有关，见附表1；
- η_T — 卷筒支承轴承的效率，见附表1；
- L — 卷筒两支承间距离。

8. Appendix

Single line winding rope reeving sheave block for hoisting is shown in Appendix Fig.1 where m is multiplying rate of rope reeving sheave block.

附图1 单联滑轮组简图

Appendix Fig.1 Single line winding rope reeving block

Double line winding (on drum) rope reeving block for hoisting is shown in Appendix Fig.2 where m is multiplying rate of rope reeving sheave block.

附图2 双联滑轮组简图

Appendix Fig.2 Double line winding (on drum) rope reeving block

8.3 Sum of all line pulls on hoisting drum ΣS is

Where:

- Q — Rated capacity of hoisting , in N;
- G — Sum of the weight of sheave block , wire rope etc. for the hoisting, in N ;
- m — Multiplying power of rope reeving on sheave block;
- η_m — Efficiency of sheave block depending on m and η_T , see Appendix. Table1;
- η_T — Efficiency of drum support bearings , see App. Table1;
- L — The distance between the two supporting.

附表1 滑轮组的效率 η_m

App.Table 1 Efficiency of sheave block η_m

轴承型式 Mode of Bearing	η_T	η_m							
		m							
		1	2	3	4	5	6	8	10
滑动 Plain bearing	0.95	1.0	0.98	0.95	0.93	0.9	0.88	0.84	0.8
滚动 Rolling bearing	0.98	1.0	0.99	0.985	0.98	0.97	0.96	0.95	0.92

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起升机构钢丝绳卷筒缠绕功率 N_T 为：

Wire rope drum winding power N_T for hoisting is

$$N_T = \frac{\sum S \cdot V_T}{60000} \quad (\text{KW}) \quad (\text{A } 2)$$

式中：

V_T —稳定运行时卷筒钢绳的线速度, m/min, 由下式给出：

Where:

V_T —Line velocity on drum during steady reeving, in m/min; given in the following

$$V_T = \pi D_T \cdot n_T \quad (\text{m/min}) \quad (\text{A } 3)$$

D_T —折算到钢丝绳中心的卷筒直径, m;

D_T —Drum diameter measured at wire rope center, in m;

n_T —稳定运行时卷筒的转速, rpm。

n_T —Drum revolution during steady state running, in r/min.

起升机构稳定工作时, 卷筒联接处所承受的实际转矩 T ：

Actual torque T at drum connection under steady state hoisting operation:

$$T = \frac{\sum S \cdot D_T}{2 \eta_T} \quad (\text{N} \cdot \text{m}) \quad (\text{A } 4)$$

稳定工作时联接处实际承受的径向载荷 Fr 为：

Actual radial load Fr at drum connection under steady state operation:

单联滑轮组：

For single ling winding block:

$$Fr = \sum S \cdot (1 - b/L) + P/2 \quad (\text{N}) \quad (\text{A } 5)$$

双联滑轮组：

For double line winding block:

$$Fr = \sum S/2 + P/2 \quad (\text{N}) \quad (\text{A } 6)$$

式中： P —卷筒自重, N 。

Where: P --- Weight of drum, in N .

选型计算例：

Example for calculation:

已知条件：额定起重量 $Q=300000\text{ N}$, 滑轮组、钢绳等自重 $G=10000\text{ N}$, 卷筒自重 $P=14000\text{ N}$, 卷筒转速 $n_T=8\text{ r/min}$, 卷筒直径 $D_T=0.8\text{ m}$; 系统布置为单联滑轮组, 滑轮组倍率 $m=4$, 滑轮组效率 $\eta_T=0.98$, 工作制 $M6$, $K_2=1.6$, 尺寸 $b=400\text{ mm}$, $L=1200\text{ mm}$, 动载系数 $\Phi_6=1.12$, 求：

It is known that rated capacity $Q=300,000\text{ N}$, $G=10,000\text{ N}$, $P=14000\text{ N}$, $n_T=8\text{ r/min}$, $D_T=0.8\text{ m}$, the system is a single winding (on drum) sheave block, and $m=4$, $\eta_T=0.98$, group classification $M6$, $K_2=1.6$, $b=400\text{ mm}$, $L=1,200\text{ mm}$, dynamic factor $\Phi_6=1.12$, The following value calculations are required:

① 卷筒钢丝绳拉力 $\sum S$ ：

The force of rope of reel:

$$\sum S = \frac{Q + G}{m \cdot \eta_m \cdot \eta_T} = 80696\text{ N}$$

② 联接处所受实际转矩 T ：

The in fact torque at connecting place:

$$T = \frac{\sum S \cdot D_T}{2 \eta_T} = 32937\text{ N} \cdot \text{m}$$

③ 联接处的计算转矩 T_K ：

The calculated torque at connecting place:

$$T_K = T \cdot K_2 \cdot \Phi_6 = 59023\text{ N} \cdot \text{m}$$

④ 联接处实际所受径向载荷 Fr ：

The fact radial load at connecting place:

$$Fr = \sum S \cdot (1 - b/L) + P/2 = 60797\text{ N}$$

⑤ 选用DC04联轴器：

Select DC04 coupling:

$$T_{K \max} = 63000\text{ N} \cdot \text{m}, \quad F_{r \max} = 71000\text{ N}, \quad K_1 = 3.4$$

则 Then

$$T_K < T_{K \max}$$

$$Fr < [Fr] = F_{r \max} + (T_{K \max} - T_K) \cdot K_1 = 84522\text{ N}$$

联轴器选型正确。

The coupling is selected correctly.

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