

FCD系列减速器性能参数
THE PERFORMANCE PARAMETER OF FCD SERIES REDUCER

项目 Item	减速比 Reduction ratio	输入 2000r/min 时的额定 转矩 rated torque under 2000r/min input	起动、停止 时的容许 最大转矩 the biggest admissible- torque when start and stop	平均负载 矩的容许 最大值 the admissible maximum value of average load torque	瞬间容许 最大转矩 the instant admissible maximum torque	容许最高 输入转速 the admissible highest input rev	容许平均 输入转速 the admissible average input rev	启动转矩 Starting torque	背隙 back lash	重量 weight	设计寿命 design lifespan
型号 Model		Nm	Nm	Nm	Nm	rpm	rpm	cNm	Arc sec	Kg	Hour
14	50	3.6	11.8	4.7	23.5	8200	3500	4.6	≤20	0.5	9000
	80	5.1	15	6.2	29			3.6	≤20		10000
	100	5.3	18.6	7.5	34			2.9	≤20		10000
17	50	10.8	22.5	17.6	47	7200	3500	7	≤20	0.66	9000
	80	14	39	21	54			5.1	≤20		10000
	100	15.7	36	22.5	70			4	≤20		10000
20	50	16.6	38	23.5	68	5500	3500	9.3	≤20	0.94	9000
	80	23	49	28	78			7	≤20		10000
	100	27	56	33	93			5.4	≤20		10000
25	50	26.5	68	37	125	4800	3500	16.8	≤20	1.7	9000
	80	42	91	62	157			12.6	≤20		10000
	100	46	108	73.5	180			9.5	≤20		10000
32	50	52	148	73.5	263	4000	3500	34	≤20	3.3	9000
	80	79	202	126	350			26	≤20		10000
	100	94	228	148	412			21	≤20		10000



FCD-C-C

杯型一体凸轮超薄整机

CUP TYPE INTEGRATED CAM ULTRA-THIN MACHINE

由三大基本部件构成, 包括柔轮、刚轮、波发生器。柔轮为杯型标准结构, 输入轴直接与波发生器内孔配合, 通过平键或紧定螺钉连接。

It consists of three basic components, including a flexible wheel, a rigid wheel, and a wave generator. The flexible wheel is a cup-shaped structure with an ultra-thin design. The input shaft is directly matched with the inner hole of the wave generator and connected by a flat key or a set screw.

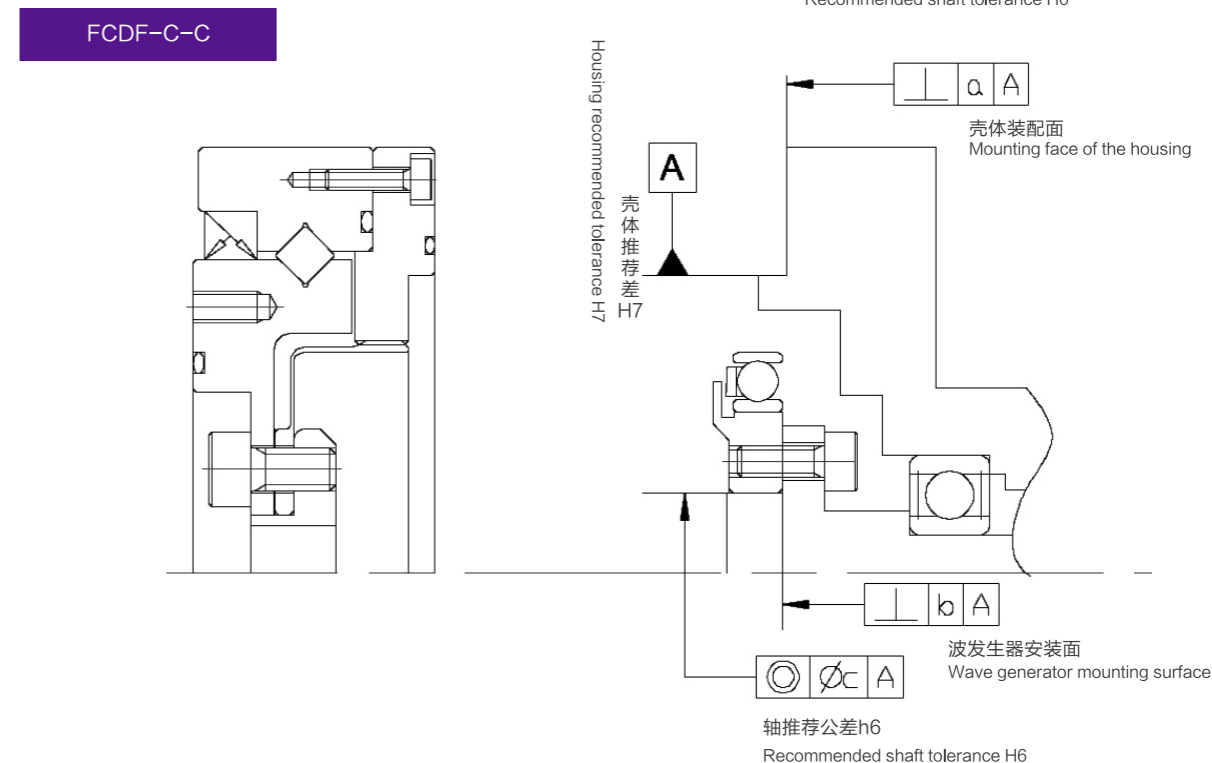
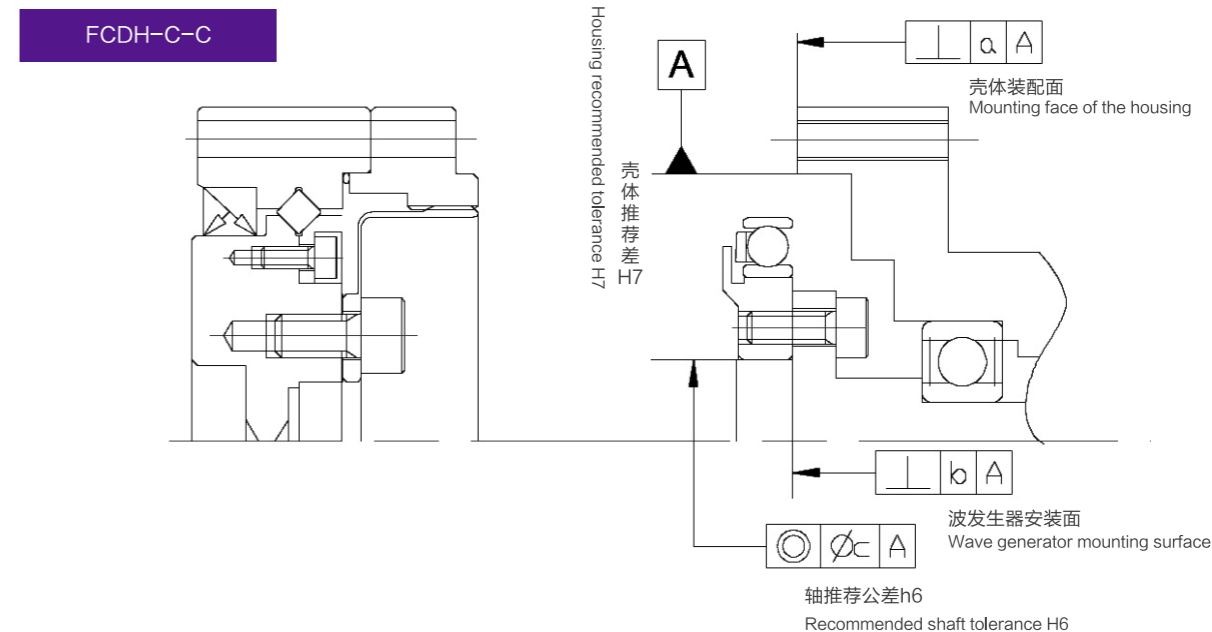
产品特点/Product characteristics

- 超扁平结构
 - 紧凑简洁的设计
 - 优良的定位精度和旋转精度
- Super flat structure
 - Compact and simple design
 - Excellent positioning accuracy and rotation accuracy

装配精度 ASSEMBLY ACCURACY REQUIREMENTS

组装设计时, 如果存在安装面变形等异常及勉强组装, 会降低产品性能。如下图所示, 以下表格为组装壳体的推荐精度。

When assembling the design, if there is abnormality such as deformation of the mounting surface and bare assembly, the performance of the product will be degraded. As shown in the figure below, the following table shows the recommended accuracy of the assembled housing.



尺寸/ Size	14	17	20	25	32
a	0.011	0.015	0.017	0.024	0.026
d	0.008	0.010	0.012	0.012	0.012
e	0.016	0.018	0.019	0.022	0.022

安装注意事项 INSTALLATION PRECAUTIONS

安装方式及步骤 INSTALLATION METHOD AND STEPS

与FCS减速器的安装方式及步骤一致

It is consistent with the installation method and steps of the FCS reducer.

安装注意事项 INSTALLATION PRECAUTIONS

由于组装时的错误, 减速器在运转时可能发生振动、异响等。请遵守下述注意事项实施组装。

Due to an error in assembly, the reducer may vibrate, abnormally sound, etc. during operation. Please follow the precautions below to implement the assembly.

波发生器的注意事项

Precautions for wave generator:

- 请在组装时避免向波发生器轴承部位施加过度的力。可通过旋转使波发生器顺畅地实施插入。
- 使用一体式波发生器时, 请注意把中心偏移、歪斜的影响控制在推荐值内。

- Please avoid applying excessive force to the bearing part of the wave generator during assembly. The wave generator can be smoothly inserted by rotation.
- When using the integrated wave generator, be careful to control the influence of the center offset and skew within the recommended values.

刚轮、柔轮的注意事项

Precautions for Circular spline and Flexspline:

- 确认安装面的平坦度是否良好、是否歪斜
- 确认螺丝孔部是否隆起、有残余毛边或异物啮入。
- 确认是否对壳体组装部实施了倒角加工以及避让加工, 以避免与刚轮干涉。

- Confirm that the flatness of the mounting surface is good, skewed or not
- Check if the screw hole is raised, has residual burrs or foreign objects.
- Confirm whether chamfering and avoidance machining are performed on the housing assembly to avoid interference with the rigid wheel.

润滑脂的注意事项

Precautions for Grease:

- 柔性轴承上需要均匀涂抹润滑脂, 电机与安装用法兰连接形成的腔体需注入80%润滑脂。
- 柔轮内壁上需均匀涂抹一层润滑脂, 柔轮与法兰连接形成的腔体需注入80%的润滑脂。
- 润滑脂的性能会随温度产生变化, 温度越高劣化越快。为了保证润滑脂始终处于良好状态, 减速器高温段的热平衡温度应低于70°C, 温升小于40°C。
- 减速器各运动部位的磨损主要受到润滑脂性能的影响, 在具备条件的情况下, 谐波减速器每运行3000小时应更换润滑脂。

- The grease should be evenly coated on the flexible bearing. The cavity formed by connecting the motor to the mounting flange should be filled with 50 % grease.
- Apply a layer of grease evenly on the inner wall of the flexible wheel. 50% of the grease should be injected into the cavity formed by the flexible wheel and the flange.
- The performance of the grease changes with temperature, and the higher the temperature, the faster the deterioration. In order to ensure that the grease is always in good condition, the heat balance temperature of the high temperature section of the reducer should be lower than 70 °C, and the temperature rise should be less than 40 °C.
- The wear of each moving part of the reducer is mainly affected by the performance of the grease. Under the condition of the condition, the harmonic reducer should be replaced every 3,000 hours of operation.

安装注意事项 INSTALLATION PRECAUTIONS

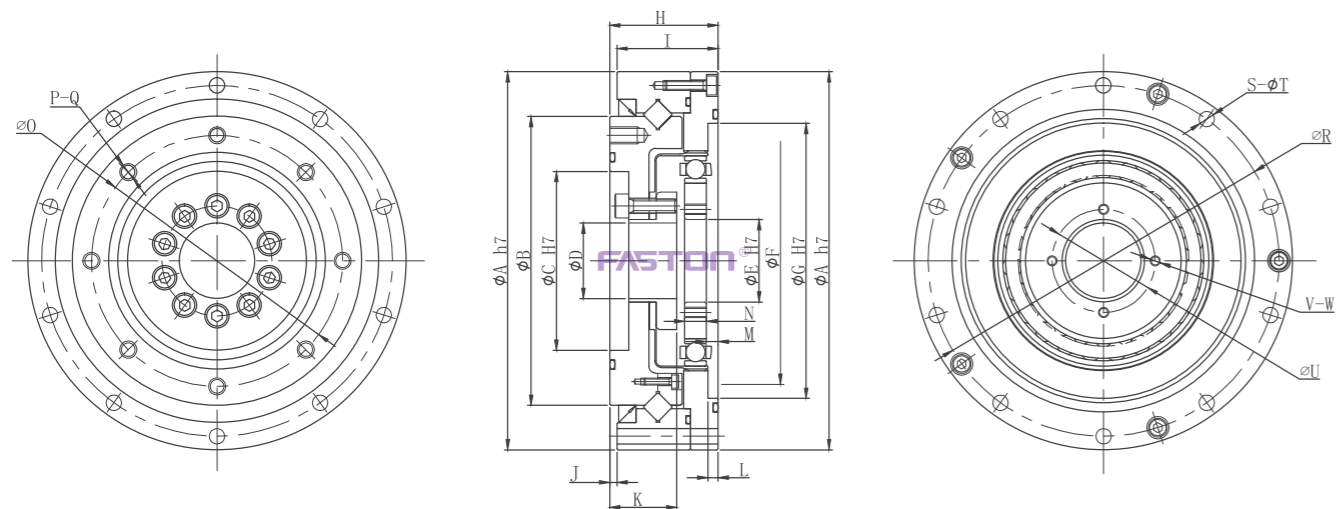
其他注意事项

Other considerations

- 谐波减速器必须在足够清洁的环境下安装, 安装过程不能有任何异物进入减速器内部, 以免使用过程中造成损坏。
- 请确认减速器齿面及柔性轴承部分始终保持充分润滑。不建议齿面始终朝上使用, 会影响润滑效果。
- 组装时, 需先将刚轮和柔轮组合安装到装置上后, 再组装上波发生器。
- 装机时, 波发生器长轴对准减速器柔轮的长轴方向, 到位后用对应的螺钉将减速器固定, 螺钉稍微带紧。
- 安装波发生器后, 请确认柔轮与刚轮啮合是180°对称。
- 安装完成后请先低速(100rpm)运行, 如有异常振动或异常响声, 请立即停止, 重新检查安装是否正确或与我司联系, 以免因安装不正确造成减速器的损坏。
- 与减速器连接固定的安装平面加工要求: 平面度0.01mm, 与轴线垂直度0.01mm, 螺纹孔或通孔与轴线同心度0.1mm。
- 为防止润滑脂泄露, 以及维持减速机的耐久性, 必须针对不同的位置使用相应的密封机构, 例如: 旋转运动处使用油封、各零件配合面使用O型圈、螺孔使用螺丝胶。
- 请严格按照图纸中减速器的避空尺寸来确定法兰和波发生器的设计尺寸, 如果超过避空尺寸, 会造成柔轮和法兰或者波发生器干涉, 影响减速器的使用寿命。
- 请按照波发生器的安装深度要求设计减速器的安装, 减速器安装深度不同会影响到减速器的启动转矩和精度等参数。
- 减速器表面没有实施防锈处理。需要实施防锈时请向表面涂抹防锈剂。

- The harmonic reducer must be installed in a sufficiently clean environment. During the installation process, no foreign matter can enter the inside of the reducer to avoid damage during use.
- Please confirm that the gear face and flexible bearing parts of the reducer are always fully lubricated. It is not recommended that the tooth surface be always facing up, which will affect the lubrication effect.
- When assembling, the circular spline and the flexspline must be assembled on the device before assembling the upper wave generator.
- When installing the machine, the long axis of the wave generator is aligned with the long axis direction of the reducer. When it is in place, fix the reducer with the corresponding screw and tighten the screw slightly.
- After installing the wave generator, make sure that the flex wheel and the rigid wheel are 180° symmetrical.
- Please run at low speed (100 rpm) after installation. If there is abnormal vibration or abnormal noise, please stop immediately, re-check whether the installa
- Mounting plane machining requirements fixed with the reducer: flatness 0.01mm, perpendicular to the axis 0.01mm, threaded hole or through hole and axis concentricity 0.1mm.
- In order to prevent grease leakage and maintain the durability of the reducer, the corresponding sealing mechanism must be used for different positions. For example, the oil seal is used for the rotary motion, the O-ring is used for the mating surface of each part, and the screw rubber is used for the screw hole.
- Please strictly follow the dimensions of the reducer in the drawing to determine the design dimensions of the flange and wave generator. If it exceeds the size of the avoidance, it will cause interference between the flexible wheel and the flange or wave generator, affecting the service life of the reducer.
- Please design the reducer according to the installation depth requirement of the wave generator. The installation depth of the reducer will affect the starting torque and accuracy of the reducer.
- The surface of the reducer is not rust-proof. When rust prevention is required, apply a rust inhibitor to the surface.

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FCD-C-C



FCD-C-S尺寸表 (The dimension form of FCD-C-S) Unit/单位: mm

Model Dimension	14	17	20	25	32
ΦA h7	70	80	90	110	142
ΦB H7	49	59	69	84	110
ΦC H7	30	34	40	52	70
ΦD	9	9	18	22	29
ΦEH7	11	15	20	24	32
ΦGH7	48	56	64	80	106
ΦH	22	22.7	26.8	31.5	37
I	21.5	22.2	24.5	29.4	34.2
J	4.9	5.4	4.8	5.5	6
K	12.9	13.4	16.8	19.5	22
L	2.5	2.5	2.5	3	3
M	2.8 ^{+0.2} ₀	2.8 ^{+0.2} ₀	2.8 ^{+0.2} ₀	3.4 ^{+0.2} ₀	3.5 ^{+0.2} ₀
N	4.0 ⁰ _{-0.1}	5.0 ⁰ _{-0.1}	5.2 ⁰ _{-0.1}	6.3 ⁰ _{-0.1}	8.6 ⁰ _{-0.1}
ΦO	42	50	60	73	96
P	8	10	8	8	8
Q	M3x5	M3x6	M4x8	M5x8	M6x10
ΦR	64	74	84	102	132
S	6	8	8	10	10
ΦT	3.4	3.4	3.4	4.5	5.5
ΦU	17	21	26	30	40
V	4	4	4	4	4
W	M3	M3	M3	M3	M4
ΦF	38	45	53	66	86
Weight/kg	0.5	0.66	0.95	1.7	3.3

注: 尺寸及其详细情况, 按我司的交货图纸为准。
Remark: The dimension and other details are subject to the drawing of delivery.