

- ◎ PCB电主轴系列
PCB electric spindle series
- ◎ 玻璃磨削电主轴系列
Electric spindle glass grinding series
- ◎ 高光及超精加工电主轴系列
High-gloss and superfinishing electric spindle series
- ◎ 超声波主轴系列
Ultrasonic spindle series
- ◎ 加工中心主轴系列
Machining center spindle series
- ◎ 钻攻中心电主轴系列
Drilling and tapping center electric spindle series
- ◎ 雕铣电主轴系列
Engraving and milling electric spindle series
- ◎ 磨削产品系列
Grinding solutions
- ◎ 车床主轴系列
Lathe spindle series
- ◎ 木工电主轴系列
Woodworking electric spindle series
- ◎ 牙雕电主轴系列
Dental electric spindle series
- 减速器系列
Reducer series
- ◎ 直线电机系列
Linear motor series
- ◎ 转台及摆头系列
Turntable and swivel rotary head series
- ◎ 刀柄夹头系列
Tool holder and collet series
- ◎ 夹具系列
Clamping series
- ◎ 昊志氢电空压机
Haozhi hydrogen electric air compressor

减速器系列

Reducer Series



www.haozhihs.com

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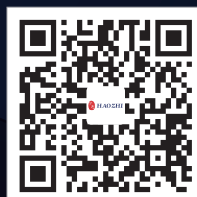
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广州市昊志机器人有限公司
Guangzhou Haozhi Robot Co., Ltd.

高精 · 高效 · 高稳定性

昊志机电产品之道

High precision · High efficiency · High stability

Haozhi Product Philosophy

为助力全球先进装备制造,
提升人类良好体验
而奋斗不止

keeps on striving for global advanced
manufacturing industry,for improving
human experience.

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关于我们 About us

公司成立于 2024 年，2014 年开始进行谐波减速器研发，历经 10 年的发展，机器人领域业务逐步构建了完善的研发、生产和销售体系。2018 年正式成立机器人事业部，2024 年分拆成子公司。业务范围涵盖机器人产业上、中、下游。

昊志机器人有限公司秉承着“立足自主技术创新、服务全球先进制造”的发展战略，依托校企合作与企业技术关联的优势，深度聚焦减速器、控制器、驱动器、电机、编码器、力矩传感器及一体化关节模组等核心零部件研发，不断突破核心零部件的关键技术，向高端迈进。

昊志以场景化的需求为导向，以技术创新、智能制造为支撑，为客户提供横向一体化的产品解决方案。

Guangzhou Haozhi Robotics Co., Ltd. was established in 2024, with harmonic reducer R&D initiated in 2014. After ten years of development, the company has gradually built a comprehensive R&D, production, and sales system in the robotics field. In 2018, the Robotics Division was officially established and was spun off into a subsidiary in 2024. Its business scope covers the upstream, midstream, and downstream of the robotics industry value chain.

Adhering to the strategy of independent technological innovation and serving global advanced manufacturing, Haozhi Robotics leverages the advantages of industry-academia collaboration and technological synergies within the group. The company focuses deeply on the R&D of harmonic reducers, controllers, drivers, motors, encoders, torque sensors, and integrated joint modules, continuously breaking through key technologies in core components and advancing toward high-end applications.

Driven by scenario-based customer needs, and supported by technological innovation and intelligent manufacturing, Haozhi provides customers with comprehensive and integrated product solutions.



禾丰厂 Hefeng Factory



江东厂 Jiangdong Factory



田园厂 Tianyuan Factory



湖南显隆厂 Hunan Xianlong Factory



瑞士工厂 Swiss Factory



汇聚全球顶尖的加工设备
最高加工精度可达0.1 μ m

Gathering world-class cutting-edge processing equipments

Featuring Asia's first fully automated production line, machining precision up to 0.1 μ m.

全球知名的生产基地

厂房建筑面积18.9万平方米, 产能达约200,000支/年

Global Manufacturing Base

Covering an area of 189,000m², capacity: about 200,000pcs spindles per year



雄踞世界级技术研究中心

300余人研发团队, 近三年研发投入占销售额8%以上

Haozhi has world-class technology research center

More than 300 R&D investment in the past three years accounted for more than 8% of sales



西班牙厂 Spanish Factory

上海工厂 Shanghai Factory

法国工厂 French Factory



国际一流检测仪器及设备
具备纳米级检测精度

Ultra-precision Measuring and Inspection Instruments

With nanoscale precision

CRAFTMANSHIP 工匠精神

他们说 They Said
他说 He Said
她说 She Said

坚持做一件事，
聚焦做一件事，
简单的事情做到极致。
Stick with one thing.
Concentrate on one thing.
Make the best of simple thing.



第二部分 Part II

产品信息 Product information



1. 基本信息 Basic Information

1.1 产品组成 Product composition

谐波齿轮传动由三个基本件组成：波发生器、柔轮及刚轮，如图所示。
The harmonic gear drive consists of three basic components: Wave generator, FS and CS, as shown.

波发生器 一般由凸轮与柔性轴承组成，作为谐波减速器的输入端。柔性轴承内圈与凸轮固定，外圈通过滚动体产生弹性变形而呈椭圆状。

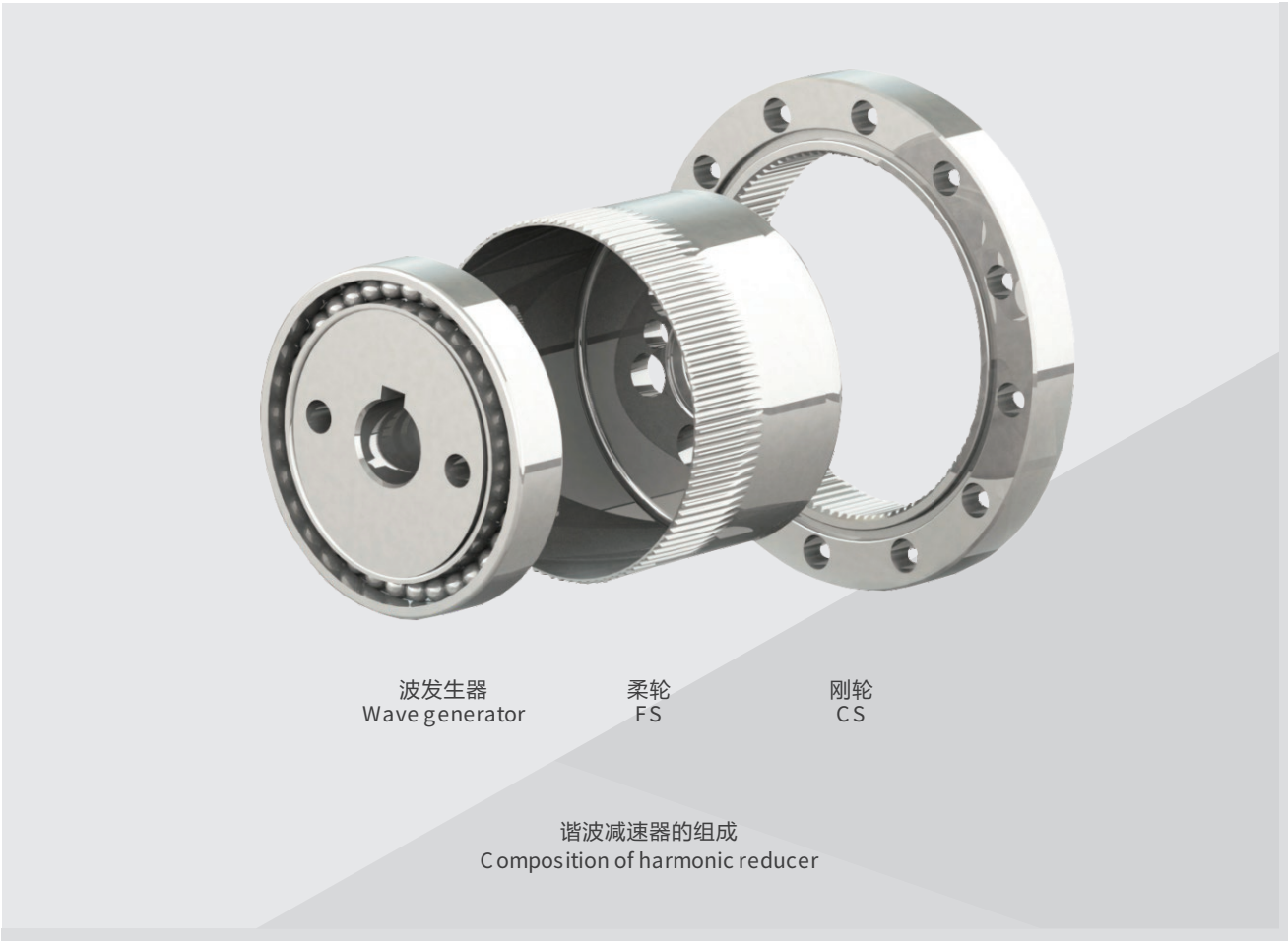
柔轮 具有外齿圈的柔性薄壁零件，其内圈与柔性轴承的外圈配合，一般安装在减速器的输出端。

刚轮 具有内齿圈的刚性环状零件，一般比柔轮多两个齿，固定在减速器的机架上。

WAVEGENERATOR As the input end of the harmonic reducer, the wave generator is generally composed of a cam and a flexible bearing. The inner ring of the flexible bearing is fixed to the cam. The outer ring is elastically deformed by the rolling elements to have an elliptical shape.

FS Generally installed at the output end of the reducer, FS has an outer ring gear with flexible thin-walled parts, and its inner ring is matched with the outer ring of the flexible bearing.

CS The CS is fixed on the body of the reducer. It has an inner ring gear with rigid annular parts, which is generally two teeth more than the FS.



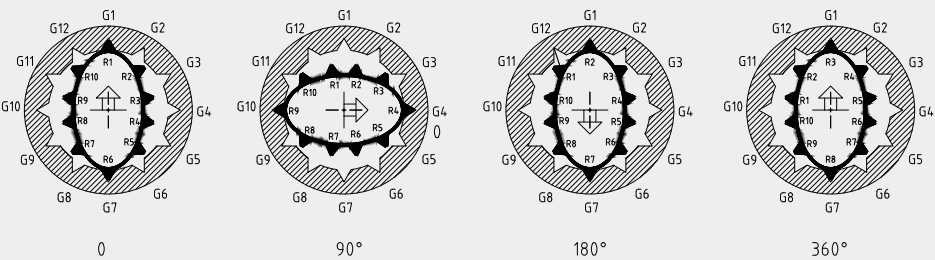
1.2工作原理 Working principle

谐波齿轮传动通常作为减速器使用。在工作过程中,柔轮被迫产生弹性变形而呈椭圆状,其长轴处柔轮的轮齿插入到刚轮的轮齿槽内,成为完全啮合状态;而其短轴处两轮轮齿则完全不接触,处于脱开状态。轮齿由啮合到脱开的过程中则处于啮入或啮出状态。当波发生器连续转动时,迫使柔轮不断产生弹性变形,使两轮轮齿在进行啮入、啮合、啮出及脱开的过程中不断改变各自的工作状态,产生了错齿运动,从而实现了主动波发生器与柔轮的运动传递。

波发生器旋转一周,柔轮向逆时针方向移动2个齿,其错齿过程如图所示。

Harmonic gear drives are often used as reducers. During the working process, as the FS is forced to produce an elastic deformation into an elliptical shape, and the fully engaged state occurs in which the teeth of the FS at the long axis are inserted into the tooth grooves of the CS; While the two-wheel teeth at the short axis are completely out of contact and are in a disengaged state. The teeth are engaging-in or engaging-out during the process of meshing to disengagement. When the wave generator rotates continuously, the FS is forced to generate elastic deformation continuously, so that the two-wheel teeth change their working states continuously during the process of engaging-in, meshing, engaging-out and disengaged, and the staggered teeth movement is generated. Thereby, the motion transmission between the active wave generator and the FS is realized.

谐波减速器错齿过程 Staggered teeth process of harmonic reducer



谐波齿轮传动的主要特点

1. 传动比大而且范围广。
2. 传动时同时参与啮合的齿对数多。
3. 齿面磨损小且均匀, 传动效率高。
4. 传动精度高, 寿命长。
5. 传动平稳, 无冲击, 噪音小。

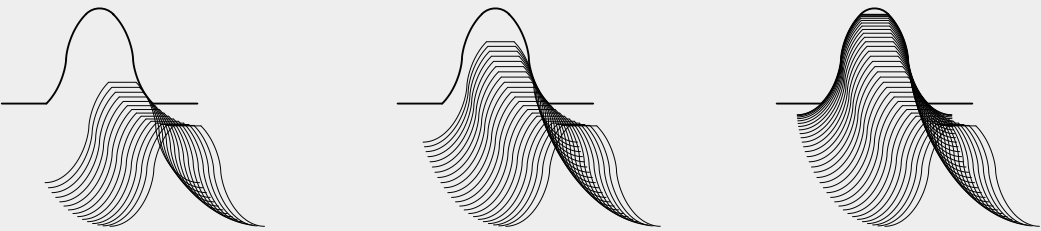
Staggered teeth process of harmonic reducer

1. Large transmission ratio with a wide range.
2. Large number of pairs of teeth participating in the meshing at the same time.
3. Small and uniform wear to the tooth surface with high transmission efficiency.
4. High transmission accuracy and long life.
5. Stable transmission with no impact and low noise.

1.3关于齿形 About the tooth profile

本司齿形是在对IH齿形及《谐波齿轮传动》、《谐波齿轮传动的理论和设计》充分研究的基础上,基于曲线映射理论所设计而成。并已取得发明专利:CN104819267A。本齿形的谐波齿轮在工作时同时啮合的齿数可达总齿数的30%,相比之下,传统渐开线齿形的谐波齿轮在受力的情况下,同时啮合的齿数不会超过15%。同时啮合齿数的增加,能够直接大幅度提升谐波齿轮在刚性、传动精度、输出转矩等方面的性能,提升幅度在30%以上。

The tooth profile of the company is designed based on the curve mapping theory, after the IH tooth shape and the Harmonic Gear Transmission and Theory and Design of Harmonic Gear Transmission are studied thoroughly. We have applied for invention patent: CN104819267A. The number of teeth that the toothed harmonic gear meshes at the same time during operation can reach 30% of the total number of teeth. In contrast, the traditional involute toothed harmonic gear does not exceed 15% of the teeth when it is stressed. At the same time, by the increase of the number of meshing teeth, the performance of the harmonic gear in stiffness, transmission accuracy, output torque and the like can be greatly improved, and the increase range is above 30%.

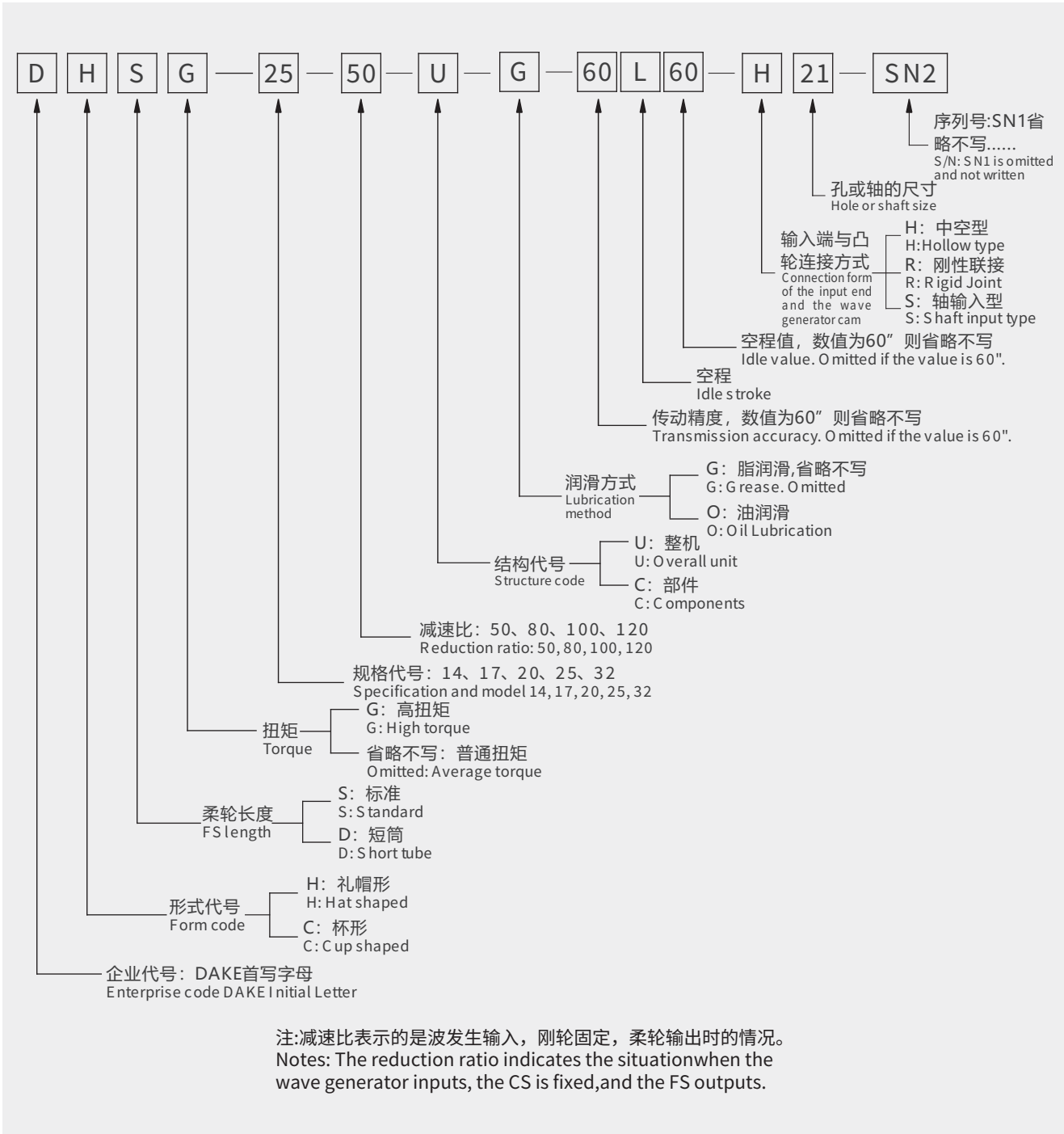


柔轮齿与刚轮齿运动啮合示意图
Schematic diagram of the movement of the FS and the CS

1.4产品型号 Product model

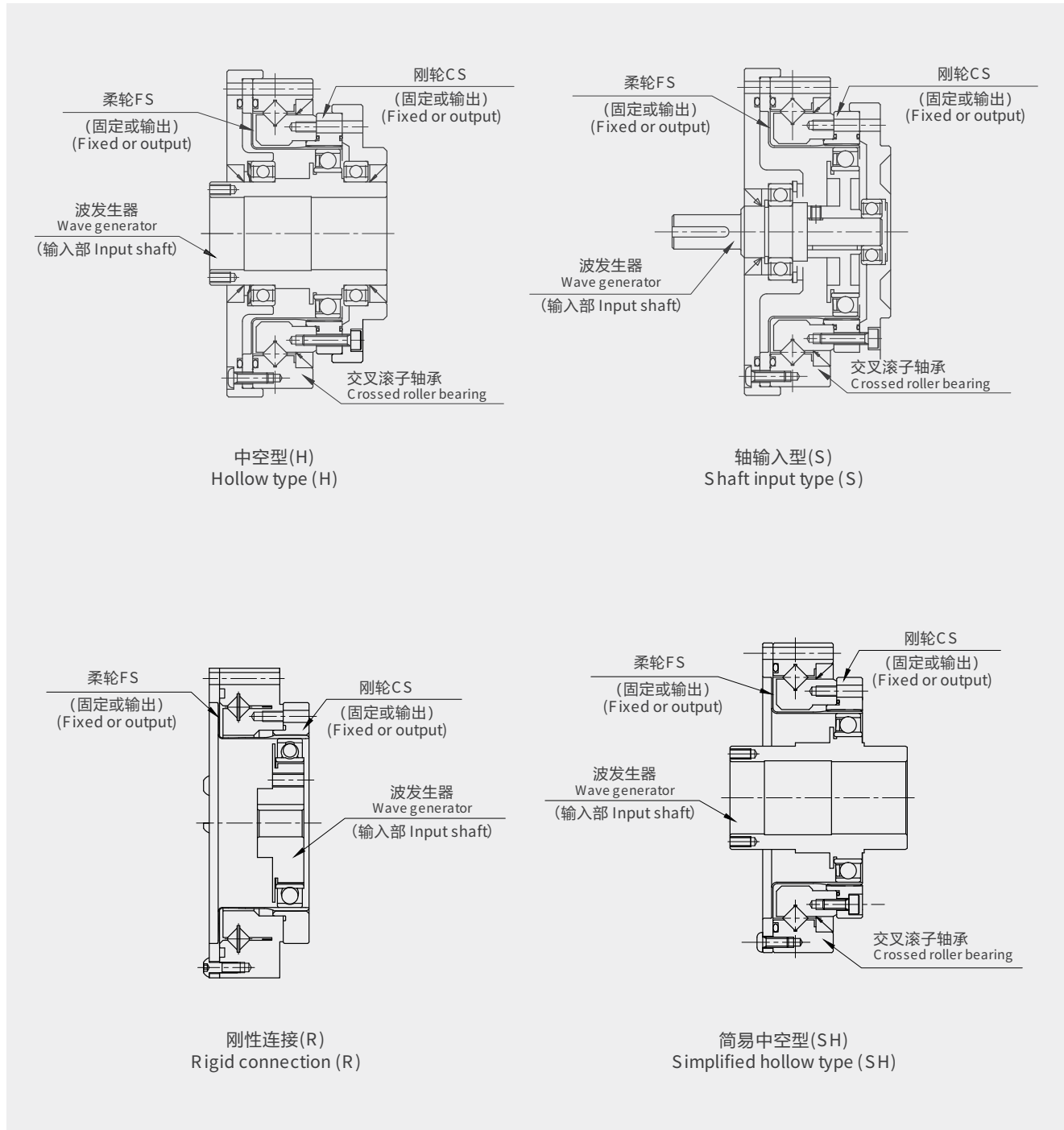
产品型号由企业代号、产品形式代号、规格代号、减速比、结构代号及输入端与波发生器凸轮连接形式等构成，如下所示。

The product model consists of the company code, product form code, specification code, reduction ratio, structure code and the connection form of the input end and the wave generator cam, which is as shown below.



2.产品详细信息 Product details

2.1DHSG系列谐波减速器
DHSG Series Harmonic Reducer



2.1 DHSG系列谐波减速器

DHSG Series Harmonic Reducer

2.1.1技术数据 Technical data

2.1.1.1额定表 Rating table

型号 Size	减速比 Ratio	输入2000r/min 时的额定输出转 矩(Nm) Rated torque at 2000rpm(Nm)	启动/停止时的容 许最大转矩(Nm) Limit for repeated peak torque(Nm)	平均负载转矩 的容许最大值 (Nm) Limit for average torque(Nm)	瞬间容许最 大转矩(Nm) Limit for momentary peak torque(Nm)	容许最高输入 转速 (r/min) Maximum input speed(r/min)	容许平均输入 转速 (r/min) Limit for average input speed(r/min)
14	50	7	23	9	46	8500	3500
	80	10	30	14	61		
	100	10	36	14	70		
17	50	21	44	34	91	7300	3500
	80	29	56	35	113		
	100	31	70	51	143		
	120	31	70	51	112		
20	50	33	73	44	127	6500	3500
	80	44	96	61	165		
	100	52	107	64	191		
	120	52	113	64	191		
	160	52	120	64	191		
25	50	51	127	72	242	5600	3500
	80	82	178	113	332		
	100	87	204	140	369		
	120	87	217	140	395		
	160	87	229	140	408		
32	50	99	281	140	497	4800	3500
	80	153	395	217	738		
	100	178	433	281	841		
	120	178	459	281	892		
	160	178	484	281	892		
40	50	178	523	255	892	4000	3000
	80	268	675	369	1270		
	100	345	738	484	1400		
	120	382	802	586	1530		
	160	382	841	586	1530		
45	50	229	650	345	1235	3800	3000
	80	407	918	507	1651		
	100	459	982	650	2041		
	120	523	1070	806	2288		
	160	523	1147	819	2483		

2.1 DHSG系列谐波减速器

DHSG Series Harmonic Reducer

2.1.1技术数据 Technical data

2.1.1.2角度传动精度 Positional accuracy

		单位 Unit: arc sec					
型号 Size 减速比 Ratio	14	17	20	25	32	40	45
30	90	60	/	/	/	/	/
50以上	45	45	30	30	30	30	30

2.1.1.3滞后损失 Hysteresis loss

型号 Size	单位 Unit	14	17	20	25	32	40	45
减速比 Ratio								
50	arc min	2.0	2.0	2.0	2.0	2.0	2.0	2.0
80以上 80 or more	arc min	1.0	1.0	1.0	1.0	1.0	1.0	1.0

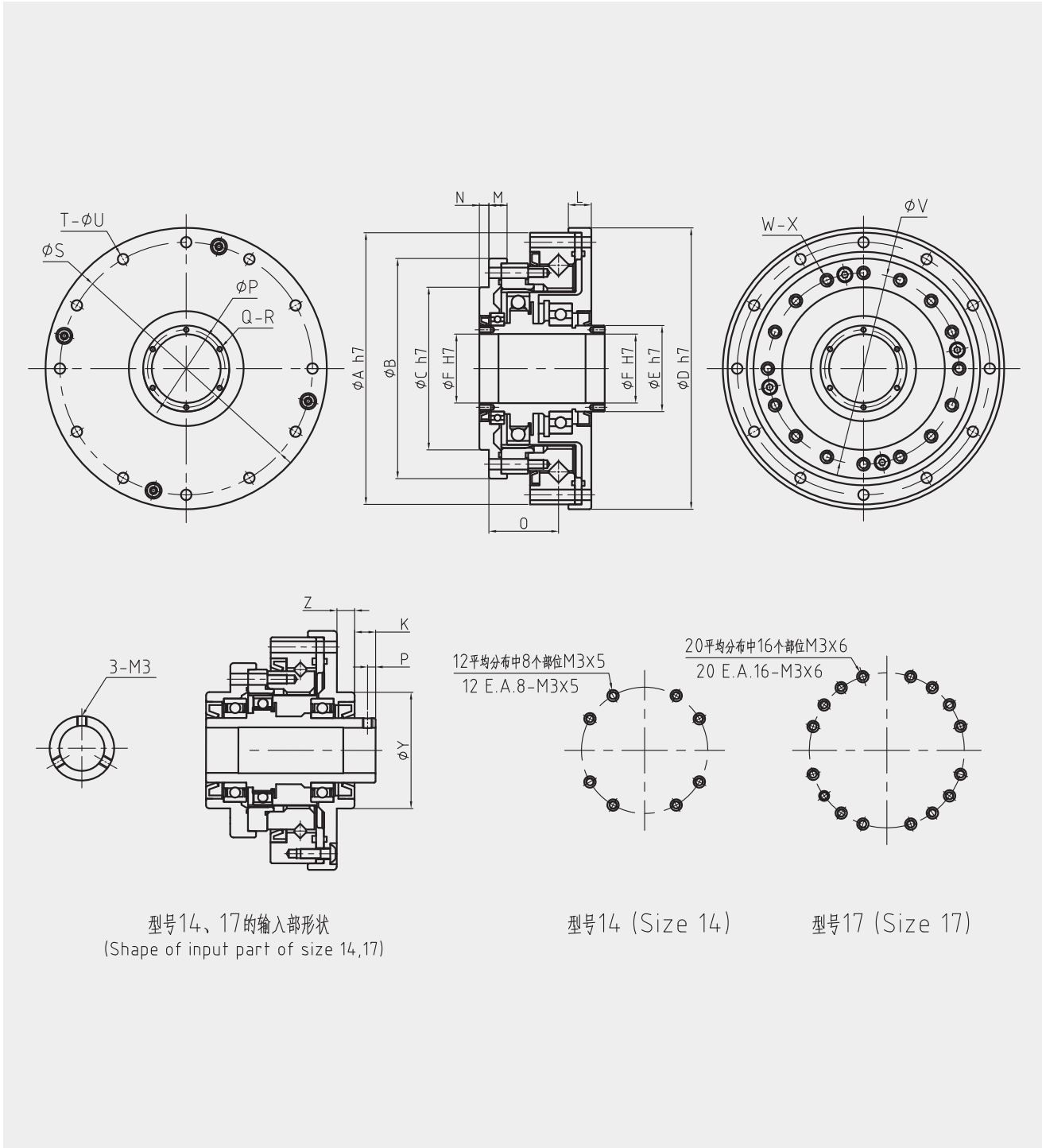
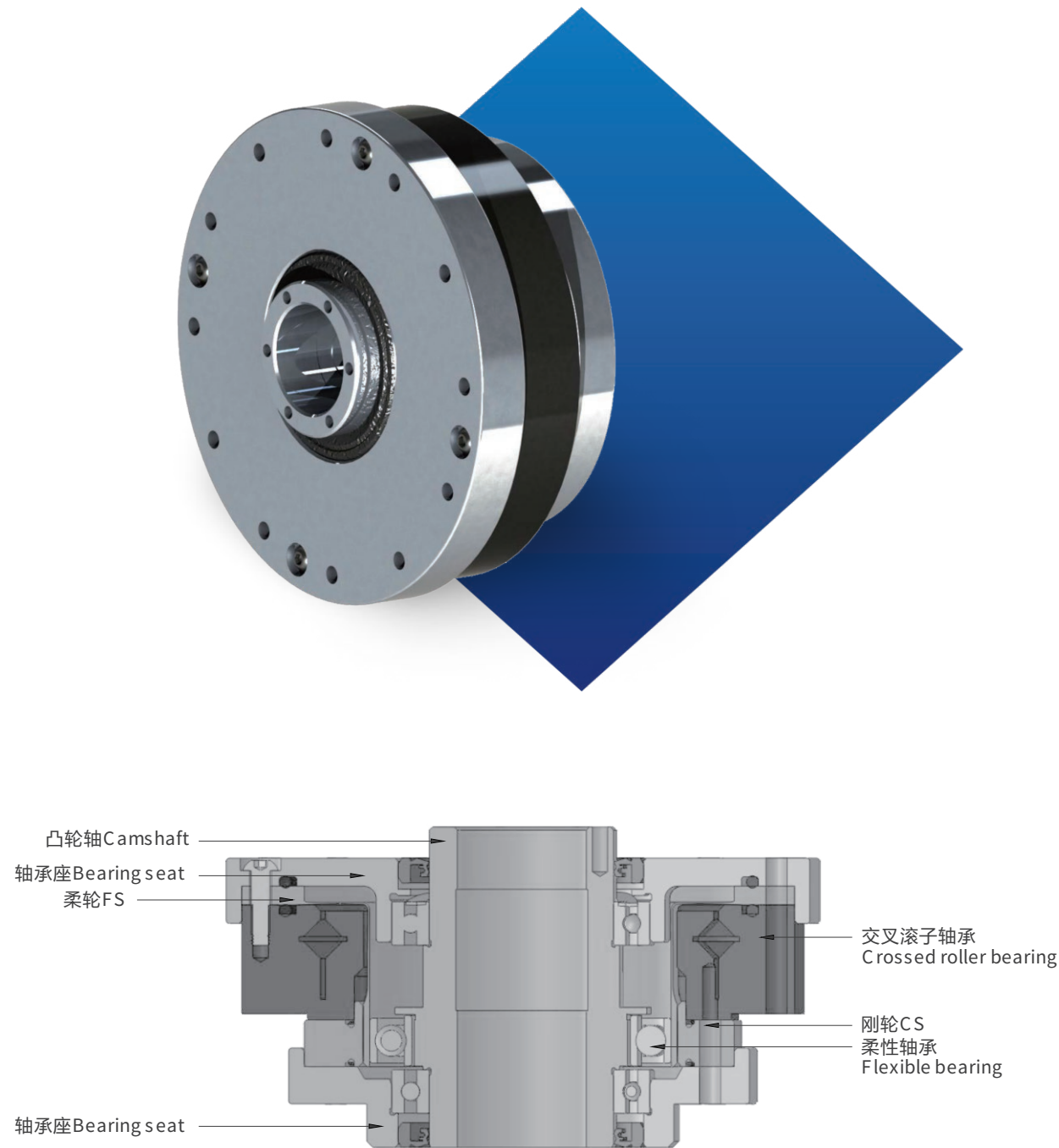
2.1.1.4刚性（弹簧常数） Torsional stiffness

		型号 Size	14	17	20	25	32	40	45
减速比 Ratio									
T ₁		Nm	2.0	3.9	7.0	14	29	54	76
T ₂		Nm	6.9	12	25	48	108	196	275
减速比50 Reduction ratio 50	K ₁	Nm/arc min	1.05	2.55	4.1	7.9	17.2	32.3	46.4
	K ₂	Nm/arc min	1.5	3.4	5.6	10.7	24.7	45.3	64.7
	K ₃	Nm/arc min	1.8	4.3	7.2	14	31.2	57.2	82
减速比80以上 Reduction ratio 80 or more	K ₁	Nm/arc min	1.5	3.2	5.0	9.9	21.5	41	58.3
	K ₂	Nm/arc min	1.9	4.3	8.0	16.1	34.5	64.7	91.7
	K ₃	Nm/arc min	2.2	4.9	9.1	18.3	39.8	73.4	104.6

2.1 DHSG系列谐波减速器
DHSG Series Harmonic Reducer
2.1.2DHSG-H系列 DHSG-H Series

2.1 DHSG系列谐波减速器
DHSG Series Harmonic Reducer
2.1.2DHSG-H系列 DHSG-H Series

2.1.2.1外形图 Outside dimensions



2.1 DHSG系列谐波减速器

DHSG Series Harmonic Reducer

2.1.2DHSG-H系列 DHSG-H Series

2.1.2.2尺寸表 Dimensions

单位Unit:mm

符号 Symbol	型号 Size	14	17	20	25	32	40	45
φA h 7		70	80	90	110	142	170	190
φB		54	64	75	90	115	140	160
φC h 7		36	45	50	60	85	100	120
φD h 7		74	84	95	115	147	175	195
φE h 7		20	25	30	38	45	59	64
φF H 7		14	19	21	29	36	46	52
G		52.5	56.5	51.5	55.5	65.5	79	85
H		—	—	5	6	7	8	8
I		20.5	23	25	26	32	38	42
J		20	21.5	21.5	23.5	26.5	33	35
K		6.5	6.5	—	—	—	—	—
L		9	10	10.5	10.5	12	14	15
M		8	8.5	9	8.5	9.5	13	12
N		7.5	8.5	7	6	5	7	7
O		21.7	23.9	25.5	29.6	36.4	44	47.5
φ P (P)		(2.5)	(2.5)	25.5	33.5	40.5	52	58
Q		3	3	6	6	6	6	6
R		M3	M3	M3×6	M3×6	M3×6	M4×8	M4×8
φS		64	74	84	102	132	158	180
T		8	12	12	12	12	12	18
φU		3.5	3.5	3.5	4.5	5.5	6.6	6.6
φV		44	54	62	77	100	122	140
W		12平均分布中8 12E.A.8	20平均分布中16 20E.A.16	16	16	16	16	12
X		M3×6	M3×6	M3×6	M4×7	M5×8	M6×10	M8×10
		φ3.5×11.5	φ3.5×12	φ3.5×13.5	φ4.5×15.5	φ5.5×20.5	φ6.6×25	φ9×27
φY		36	45	—	—	—	—	—
z		5.5	5.5	—	—	—	—	—
重量 weight(kg)		0.71	1	1.38	2.1	4.5	7.7	10

2.1 DHSG系列谐波减速器

DHSG Series Harmonic Reducer

2.1.2DHSG-H系列 DHSG-H Series

2.1.2.3转动惯量 M oment of inertia

参数 Parameter	型号 Size	14	17	20	25	32	40	45
转动惯量 Moment of inertia (×10 ⁻⁴ kgm ²)		0.091	0.193	0.404	1.070	2.850	9.280	13.800

2.1.2.4启动转矩 Starting torque

单位Unit:cNm

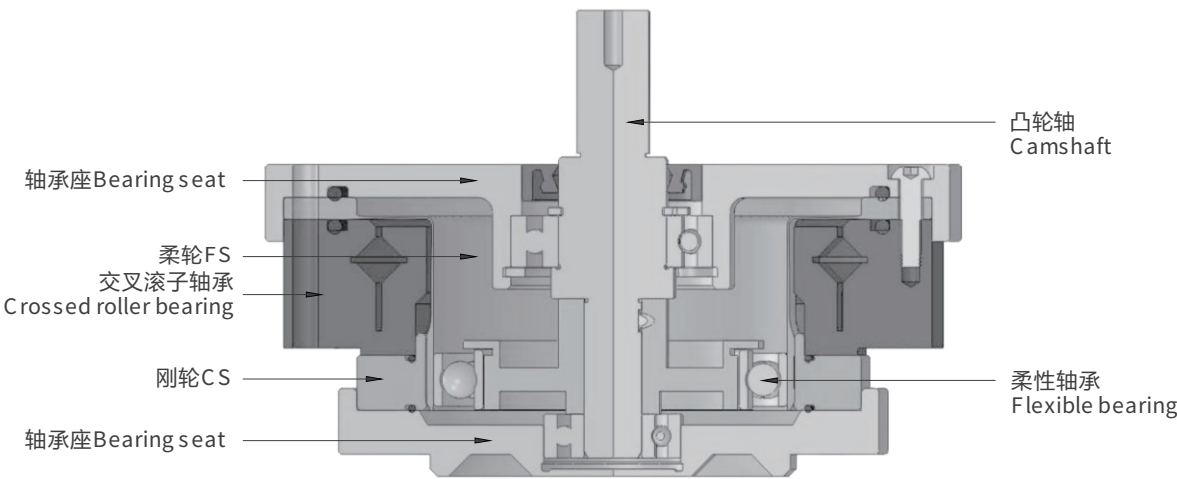
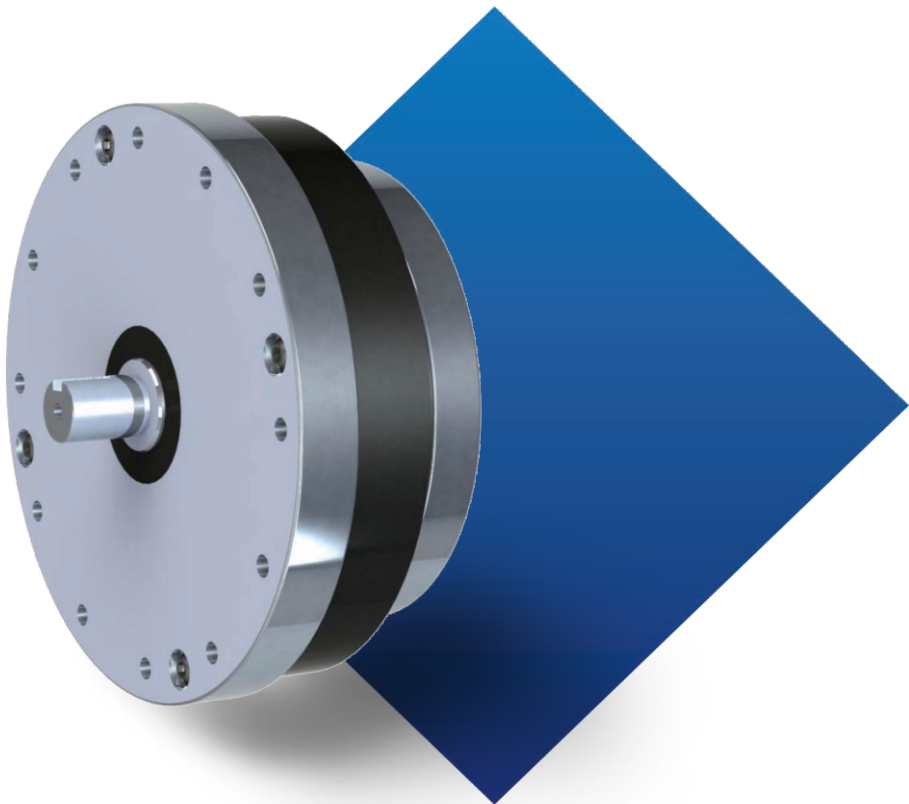
减速比 Ratio	型号 Size	14	17	20	25	32	40	45
50		8.5	16.7	22.6	37	60	165	165
80		7.1	14.4	19.4	30	47	117	138
100		6.8	13.7	18.7	28.8	46	112	131
120		-	13.4	18.2	28	43	110	126
160		-	-	17.6	26.9	41	105	122

2.1.2.5增速启动转矩 Backdriving t orque

单位Unit:Nm

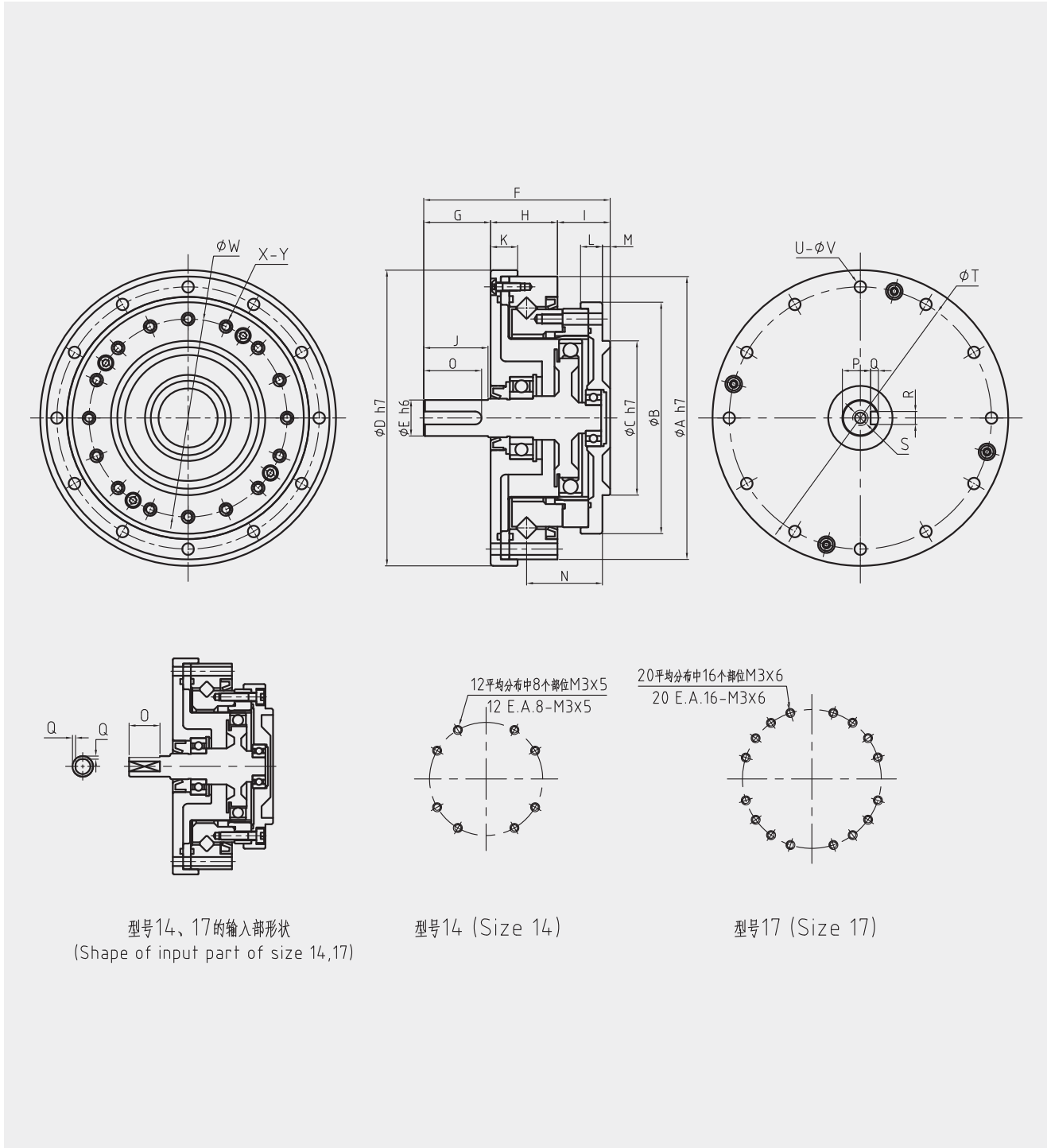
减速比 Ratio	型号 Size	14	17	20	25	32	40	45
50		5.3	16	22	34	51	82	99
80		7.2	24	31	48	70	112	133
100		8.2	29	38	59	86	134	158
120		-	34	45	69	97	158	182
160		-	-	59	90	128	201	233

2.1 DHSG系列谐波减速器
DHSG Series Harmonic Reducer
2.1.3DHSG-S系列 DHSG-S S series



2.1 DHSG系列谐波减速器
DHSG Series Harmonic Reducer
2.1.3DHSG-S系列 DHSG-S S series

2.1.3.1外形图 Outside dimensions



2.1 DHSG系列谐波减速器

DHSG Series Harmonic Reducer

2.1.3DHSG-S系列 DHSG-S S series

2.1.3.2尺寸表 Dimensions

单位Unit:mm

符号 Symbol	14	17	20	25	32	40	45
φA h 7	70	80	90	110	142	170	190
φB	54	64	75	90	115	140	160
φC h 7	36	45	50	60	85	100	120
φD h 7	74	84	95	115	147	175	195
φE h 6	6	8	10	14	14	16	19
F	50.5	56	63.5	72.5	84.5	100	108
G	15	17	21	26	26	31	31
H	20.5	23	25	26	32	38	42
I	15	16	17.5	20.5	26.5	31	35
J	14	16	20	25	25	30	30
K	9	10	10.5	10.5	12	14	15
L	8	8.5	9	8.5	9.5	13	12
M	2.5	3	3	3	5	5	7
N	21.7	23.9	25.5	29.6	36.4	44	47.5
O	11	12	16.5	22.5	22.5	27.5	28
P	—	—	8.2 ⁰ _{-0.1}	11 ⁰ _{-0.1}	11 ⁰ _{-0.1}	13 ⁰ _{-0.1}	15.5 ⁰ _{-0.1}
Q	0.5	0.5	-	-	-	-	-
RP 9	—	—	3	5	5	5	6
S	M3×6	M3×6	M3×6	M5×10	M5×10	M5×10	M6×12
φT	64	74	84	102	132	158	180
U	8	12	12	12	12	12	18
φV	3.5	3.5	3.5	4.5	5.5	6.6	6.6
φW	44	54	62	77	100	122	140
X	12平均分布中8 12 E.A.8	20平均分布中16 20 E.A.16	16	16	16	16	12
Y	M3×6 φ3.5×11.5	M3×6 φ3.5×12	M3×6 φ3.5×13.5	M4×7 φ4.5×15.5	M5×8 φ5.5×20.5	M6×10 φ6.6×25	M8×10 φ9×28
重量 weight(kg)	0.66	0.73	1.05	1.64	3.6	7.3	9.8

2.1 DHSG系列谐波减速器

DHSG Series Harmonic Reducer

2.1.3DHSG-S系列 DHSG-S S series

2.1.3.3转动惯量 M oment of inertia

参数 Parameter	14	17	20	25	32	40	45
转动惯量 Moment of inertia (×10 ⁻⁴ kgm ²)	0.025	0.059	0.137	0.320	1.200	3.410	5.800

2.1.3.4起动转矩 Starting torque

单位Unit:cNm

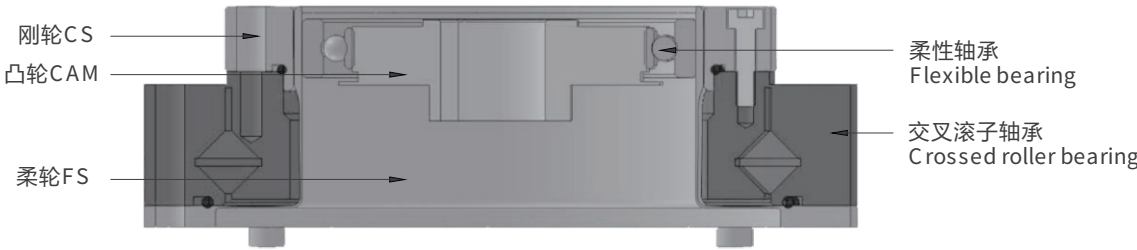
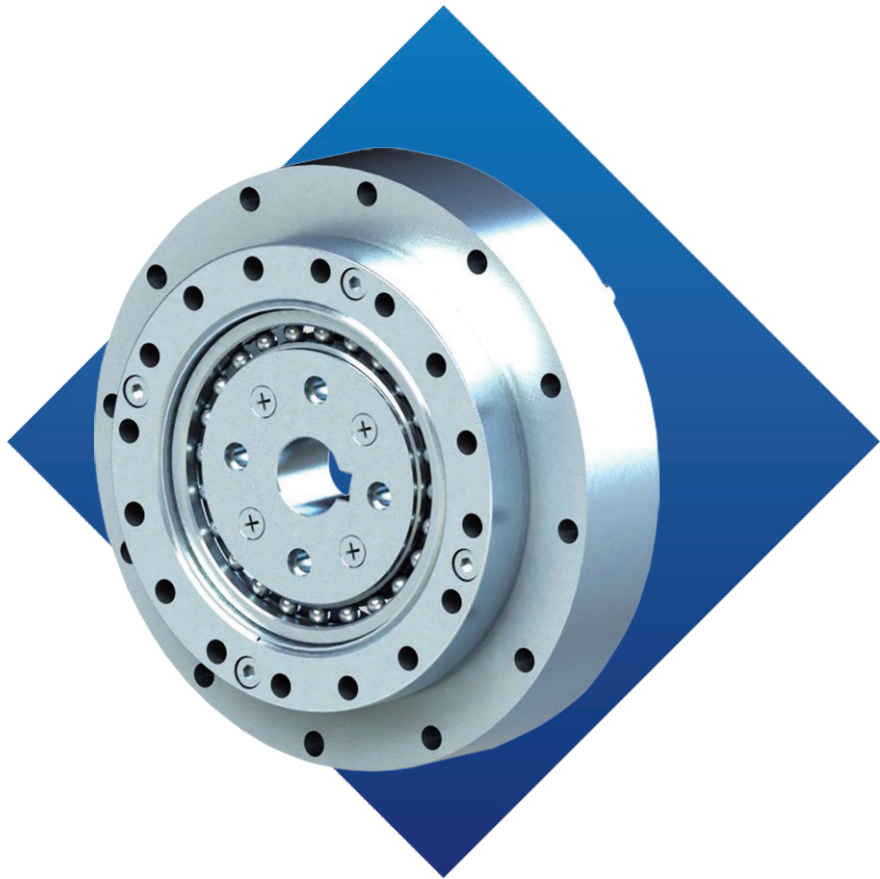
减速比 Ratio	14	17	20	25	32	40	45
50	5.5	8.2	11.1	19.5	38	72	94
80	4.1	5.9	7.9	12.5	25	52	68
100	3.8	5.2	7.2	11.3	24	47	60
120	-	4.9	6.7	10.5	21	44	55
160	-	-	6.1	9.4	19	39	50

2.1.3.5增速起动转矩 Backdriving t orque

单位Unit:Nm

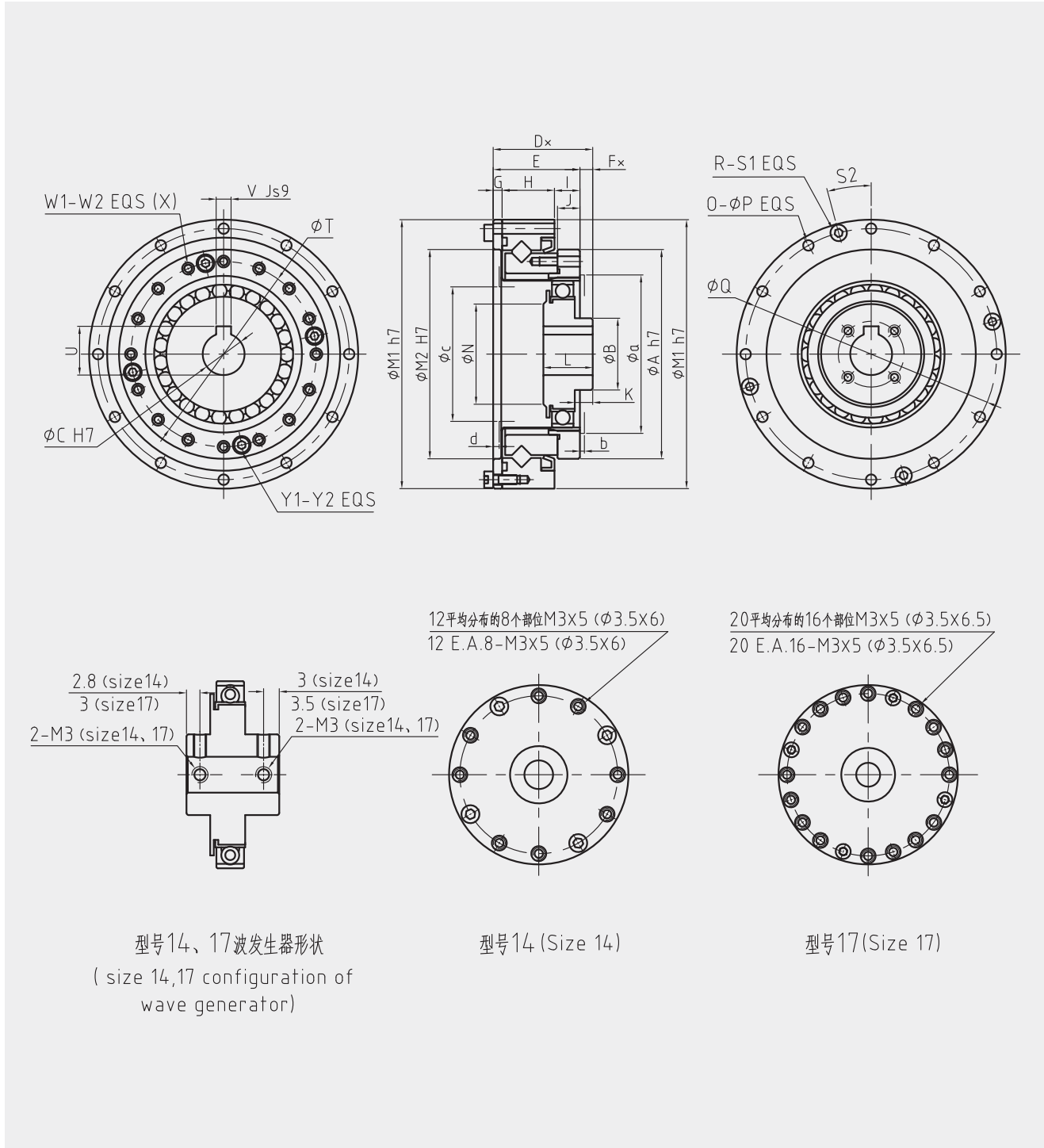
减速比 Ratio	14	17	20	25	32	40	45
50	3.4	5.8	8.4	13	25	43	56
80	4.2	6.9	10	15	28	50	65
100	4.5	7.8	12	17	33	56	72
120	-	8.9	13	19	34	63	79
160	-	-	17	23	43	75	96

2.1 DHSG系列谐波减速器
DHSG Series Harmonic Reducer
2.1.4 DHSG-R系列DHSG-R Series



2.1 DHSG系列谐波减速器
DHSG Series Harmonic Reducer
2.1.4 DHSG-R系列DHSG-R Series

2.1.4.1外形图 Outside dimensions



2.1 DHSG系列谐波减速器

DHSG Series Harmonic Reducer

2.1.4 DHSG-R系列DHSG-R Series

2.1.4.2尺寸表 Dimensions

单位Unit:mm

型号 Symbol	14	17	20	25	32	40	45
φ A h6	50	60	70	85	110	135	155
φ B h7	16	18	24	30	32	32	32
φ C H7	8	8	14	14	19	14	19
D *	28.3±0.2	32.3±0.2	33.3±0.2	36.7 ^{+0.3} _{-0.2}	43.7±0.3	53 ⁰ _{-0.6}	58 ⁰ _{-0.6}
E	23.5	26.5	29	34	42	51	56.5
F *	4.8±0.2	5.8±0.2	4.3±0.2	2.7 ^{+0.3} _{-0.2}	1.7±0.3	2±0.2	1.5±0.2
G	2.4	3	3	3.3	3.6	4	4.5
H	14.1	16	17.5	18.7	23.4	29	32
I	7	7.5	8.5	12	15	18	20
J	6	6.5	7.5	10	14	17	19
K	6.4	7.6	6	6.4	6.2	7.6	7.6
L	18.5	20.7	16.5	16.5	18.6	29.7	30.5
φ M 1 h7	70	80	90	110	142	170	190
φ M 2 H7	48	60	70	88	110	140	158
φ N	18	18	33.5	39.5	42.5	75	75
O	8	12	12	12	12	12	18
φ P	3.5	3.5	3.5	4.5	5.5	6.6	6.6
φ Q	64	74	84	102	132	158	180
R	2	4	4	4	4	6	6
S 1	M 3×8	M 3×8	M 3×8	M 3×8	M 4×10	M 4×10	M 4×8
S2(角度 Angle)	22.5	15	15	15	15	15	10
φ T	44	54	62	77	100	122	140
U	-	-	16.3 ^{+0.1} ₀	16.3 ^{+0.1} ₀	21.8 ^{+0.2} ₀	16.3 ^{+0.1} ₀	21.8 ^{+0.2} ₀
V Js9	-	-	5	5	6	5	6
W 1	12 均布中 8 12 E.A.8	20 均布中 16 20 E.A.16	16	16	16	16	12
W 2	M 3×6	M 3×6	M 3×6	M 4×7	M 5×8	M 6×10	M 8×10
X	φ 3.5×6	φ 3.5×6.5	φ 3.5×7.5	φ 4.5×10	φ 5.5×14	φ 6.6×17	φ 9×19
Y 1	4	4	4	4	4	4	4
Y 2	M 3×8	M 3×8	M 3×8	M 3×12	M 4×16	M 5×20	M 5×20
φ a	38	45	53	66	86	106	119
b	1	1	1.5	1.5	1.5	2	2
φ c	31	38	45	56	73	90	101
d	1.7	2.1	2	2	2	2	2.3
重量 weight(kg)	0.41	0.57	0.81	1.31	2.94	5.1	6.5

注：1.尺寸F会对性能及强度造成影响，因此请严格遵守。2、由于柔轮会发生弹性形变，为防止其与壳体接触，请注意φ a，b，φ c,d这四个尺寸。
Notes: 1. As size F s hall affect the performance and strength, so please strictly observe it. 2. Since the F S will be deformed elastically, in order to prevent it from coming into contact with the housing, please pay attention to the four sizes φ a, b, φ c, and d.

2.1 DHSG系列谐波减速器

DHSG Series Harmonic Reducer

2.1.4 DHSG-R系列DHSG-R Series

2.1.4.3 转动惯量 M oment of inertia

型 号 Size	14	17	20	25	32	40	45
转动惯量 Moment of inertia (×10 ⁻⁴ kgm ²)	0.033	0.079	0.193	0.413	1.690	3.663	8.23

2.1.4.4 启动转矩 Starting torque

单位Unit:cNm

型号 Size	14	17	20	25	32	40	45
50	4.5	6.7	8.6	17	34	61	85
80	3.1	4.4	5.4	10	21	39	54
100	2.8	3.7	4.7	8.8	20	34	47
120	-	3.4	4.2	8.0	17	31	43
160	-	-	3.6	6.9	15	26	36

2.1.4.5 增速启动转矩 Backdriving torque

单位Unit:Nm

型号 Size	14	17	20	25	32	40	45
50	1.8	3.3	5.2	9.9	20	36	52
80	1.8	3.3	5.3	10	21	36	53
100	2.2	3.6	5.6	11	22	40	56
120	-	3.9	6.1	12	24	43	61
160	-	-	7	14	29	51	70

2.2DHD系列谐波减速器 DHD Harmonic Reducer

2.2.1技术数据 Technical data

2.2.1.1额定表 Rating table

型号 Size	减速比 Ratio	输入2000r/min 时的额定输出转 矩(Nm) Rated torque at 2000rpm(Nm)	起动/停止时的容 许最大转矩(Nm) Limit for repeated peak torque(Nm)	平均负载转矩 的容许最大值 (Nm) Limit for average torque(Nm)	瞬间容许最 大转矩(Nm) Limit for momentary peak torque(Nm)	容许最高输入 转速 (r/min) Maximum input speed(r/min)	容许平均输入 转速 (r/min) Limit for average input speed(r/min)
14	50	3.7	12	4.8	23	8500	3500
	80	5.4	16	7.7	35		
	100	5.4	19	7.7	35		
17	50	11	23	18	48	7300	3500
	80	15	29	19	61		
	100	16	37	27	71		
	120	16	37	27	71		
20	50	17	39	24	69	6500	3500
	80	24	51	33	89		
	100	28	57	34	95		
	120	28	60	34	95		
	160	28	64	34	95		
25	50	27	69	38	127	5600	3500
	80	44	96	60	179		
	100	47	110	75	184		
	120	47	117	75	204		
	160	47	123	75	204		
32	50	53	151	75	268	4800	3500
	80	83	213	117	398		
	100	96	233	151	420		
	120	96	247	151	445		
	160	96	261	151	445		

2.2DHD系列谐波减速器 DHD Harmonic Reducer

2.2.1技术数据 Technical data

2.2.1.2角度传动精度 Positional accuracy

型号Size	单位Unit	14	17	20	25	32
减速比 Ratio						
全减速比 Reduction ratio	arc s ec	90	90	60	60	60

2.2.1.3滞后损失 Hysteresis loss

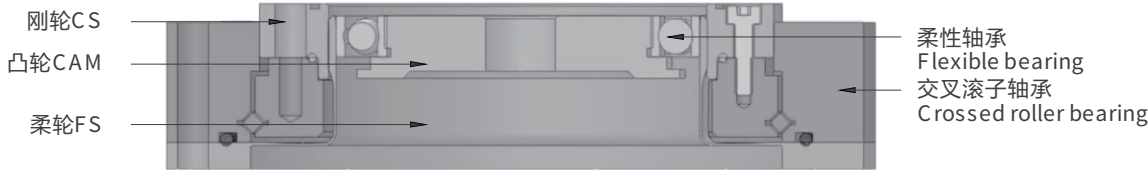
型号Size	单位Unit	14	17	20	25	32
减速比 Ratio						
50	arc min	2. 5	2.0	2.0	2.0	2.0
80以上 80 or more	arc min	2. 0	1. 0	1. 0	1. 0	1. 0

2.2.1.4刚性（弹簧常数） Torsional stiffness

型号Size		14	17	20	25	32
减速比Ratio						
T ₁	Nm	2.0	3.9	7.0	14	29
T ₂	Nm	6.9	12	25	48	108
减速比50 Reduction ratio 50	K ₁	Nm/arc min	0.9	2.1	3.4	6.4
	K ₂	Nm/arc min	1.15	2.8	4.3	8.6
	K ₃	Nm/arc min	1.5	3.6	6.4	11.8
减速比80以上 Reduction ratio 80 or more	K ₁	Nm/arc min	1.25	2.7	4.3	8.6
	K ₂	Nm/arc min	1.4	3.0	5.3	11.8
	K ₃	Nm/arc min	1.9	4.2	8.0	15.0

2.2DHD系列谐波减速器
DHD Harmonic Reducer

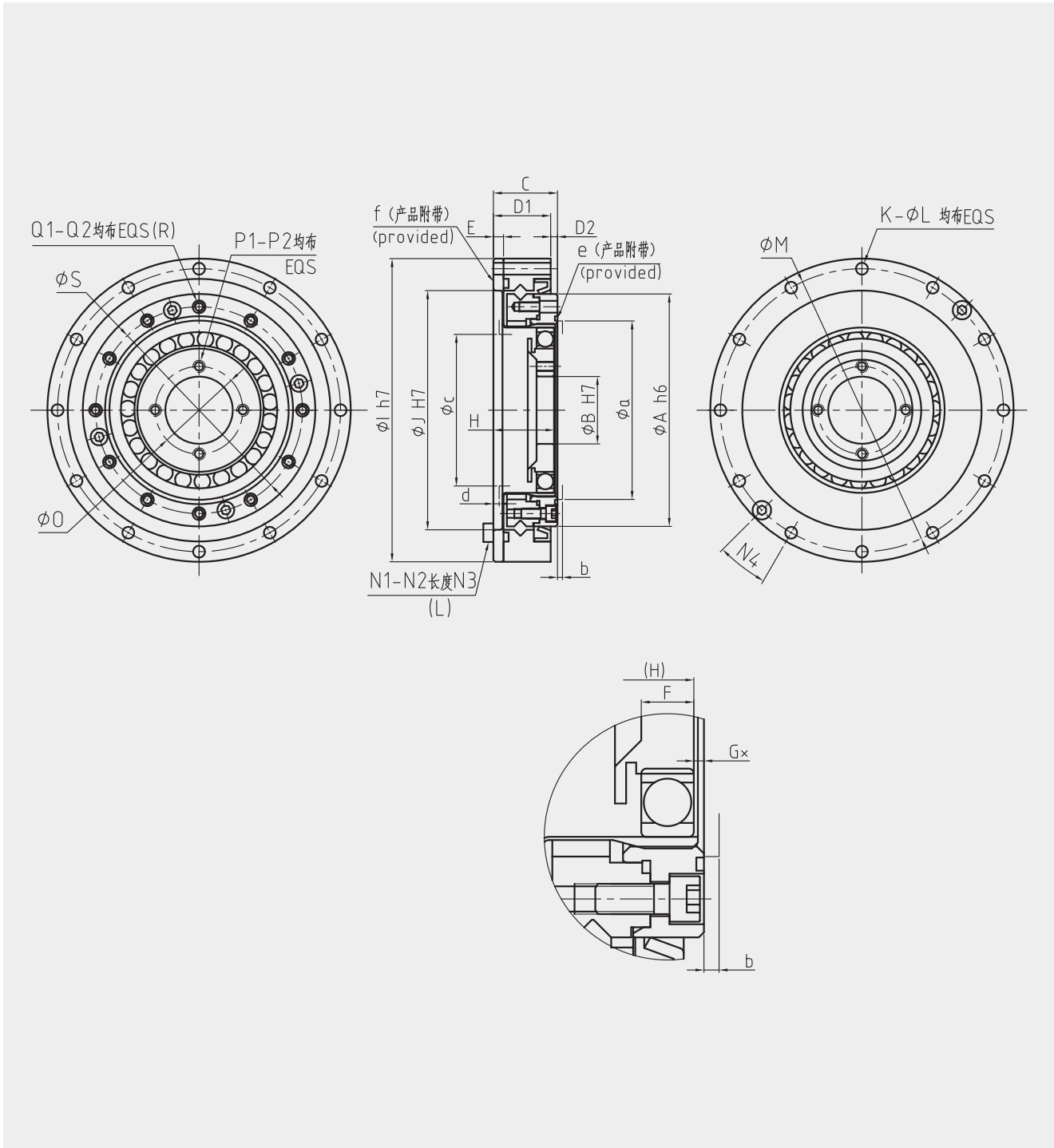
2.2.2 DHD-R系列 DHD-R Series



2.2DHD系列谐波减速器
DHD Harmonic Reducer

2.2.2DHD-R系列 DHD-R Series

2.2.2.1外形图 Outside dimensions



2.2DHD系列谐波减速器 DHD Harmonic Reducer

2.2.2 DHD-R系列 DHD-R S eries

2.2.2.2尺寸表 Dimensions

单位Unit:mm

型号Size 符号Symbol	14	17	20	25	32
φ A h6	49	59	69	84	110
φ B H7	11	15	20	24	32
C	17.5	18.5	19	22	27.9
D 1	15.5	16.5	17	20	23.6
D 2	2	2	2	2	4.3
E	2.4	3	3	3.3	3.6
F	4	5	5.2	6.3	9.6
G *	1.9±0.1	1.7±0.1	1±0.1	0.5±0.1	0.6±0.1
H *	15.6	16.8	18	21.5	27.2
φ I h7	70	80	90	110	142
φ J H7	50	61	71	88	114
K	8	12	12	12	12
φ L	3.5	3.5	3.5	4.5	5.5
φ M	64	74	84	102	132
N 1	2	2	2	4	4
N 2	M 3	M 3	M 3	M 3	M 4
N 3	6	6	6	8	10
N 4	22.5°	15°	15°	15°	15°
φ O	17	21	26	30	40
P 1	4	4	4	4	4
P 2	M 3	M 3	M 3	M 3	M 4
Q 1	8	12	12	12	12
Q 2	M 3×5	M 3×6	M 3×6	M 4×6	M 5×8
R	-	φ 3.5×5.5	φ 3.5×5.5	φ 4.5×6	φ 5.5×10.8
φ S	43	52	61.4	76	99
φ a	36.5	45	53	66	86
b	1	1	1.5	1.5	2
φ c	31	38	45	56	73
d	1.4	1.8	1.7	1.8	1.8
e	O 形圈 O - ring 37*0.6	O 形圈 O - ring 45*0.5	O 形圈 O - ring 52*0.7	O 形圈 O - ring 66.5*1.3	O 形圈 O - ring 85*2
f	O 形圈 O - ring 53*1	O 形圈 O - ring 63.5*1	O 形圈 O - ring 74*1	O 形圈 O - ring 91*1	O 形圈 O - ring 118*1
重量 weight(kg)	0.33	0.42	0.52	0.91	1.87

注：1.尺寸G会对性能及强度造成影响，因此请严格遵守。2、由于柔轮会发生弹性形变，为防止其与壳体接触，请注意φ a，b,φ c,d这四个尺寸。

Notes: 1. As size G shall affect the performance and strength, so please strictly observe it. 2. Since the FS will be deformed elastically, in order to prevent it from coming into contact with the housing, please pay attention to the four sizes φa, b, φc, and d.

2.2DHD系列谐波减速器 DHD Harmonic Reducer

2.2.2DHD-R系列 DHD-R S eries

2.2.2.3转动惯量 Moment of inertia

型 号Size 参数 Parameter	14	17	20	25	32
转动惯量 Moment of inertia (×10 ⁻⁴ kgm ²)	0.021	0.054	0.090	0.282	1.090

2.2.2.4起动转矩 Starting torque

单位Unit:cNm

型号Size 减速比 Ratio	14	17	20	25	32
50	6.2	10	13	26	51
80	5	8.8	10.8	20	42
100	4.8	7.4	9.4	17.6	40
120	-	6.8	8.4	16	34
160	-	-	7.2	13.8	30

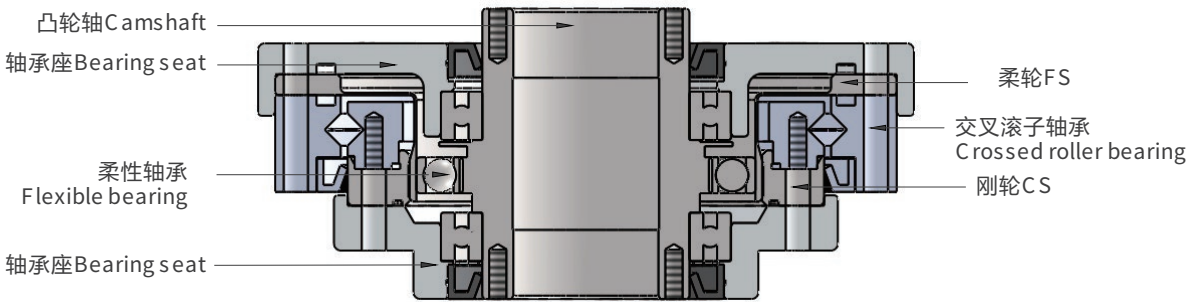
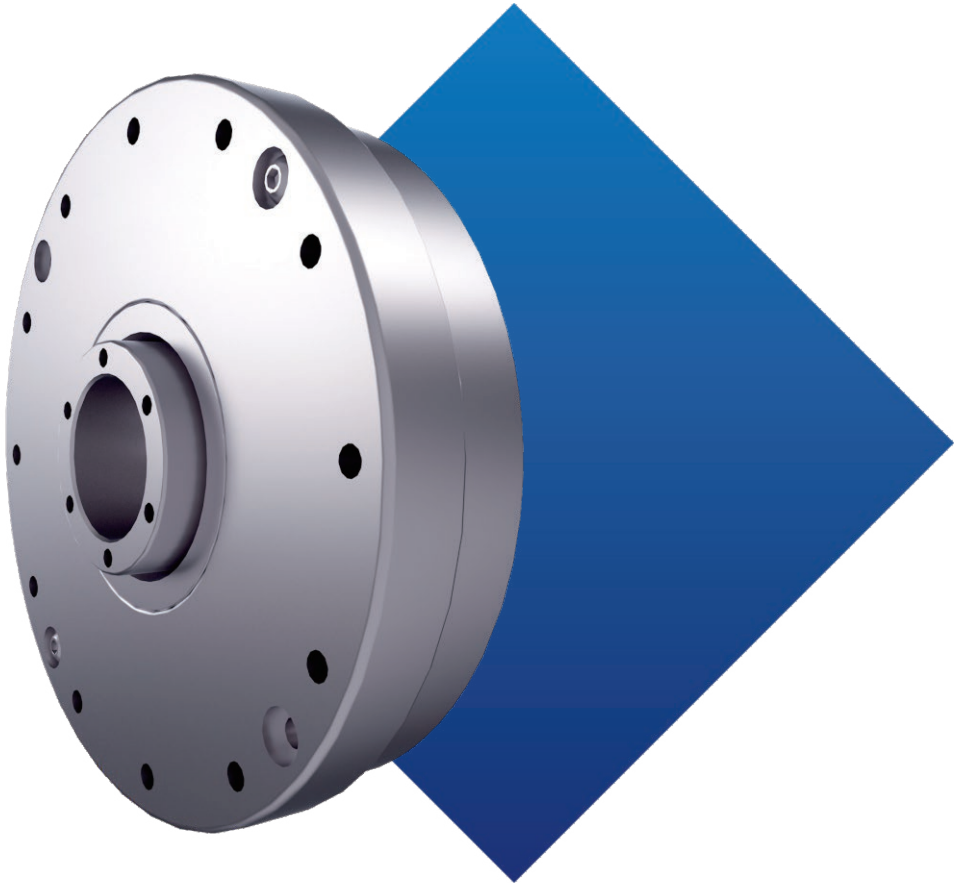
2.2.2.5增速起动转矩 Backdriving torque

单位Unit:Nm

型号Size 减速比 Ratio	14	17	20	25	32
50	3.7	11	15	24	36
80	4.3	15	21	32	46
100	5.8	21	27	41	60
120	-	28	33	51	68
160	-	-	42	64	91

2.2DHD系列谐波减速器
DHD Harmonic Reducer

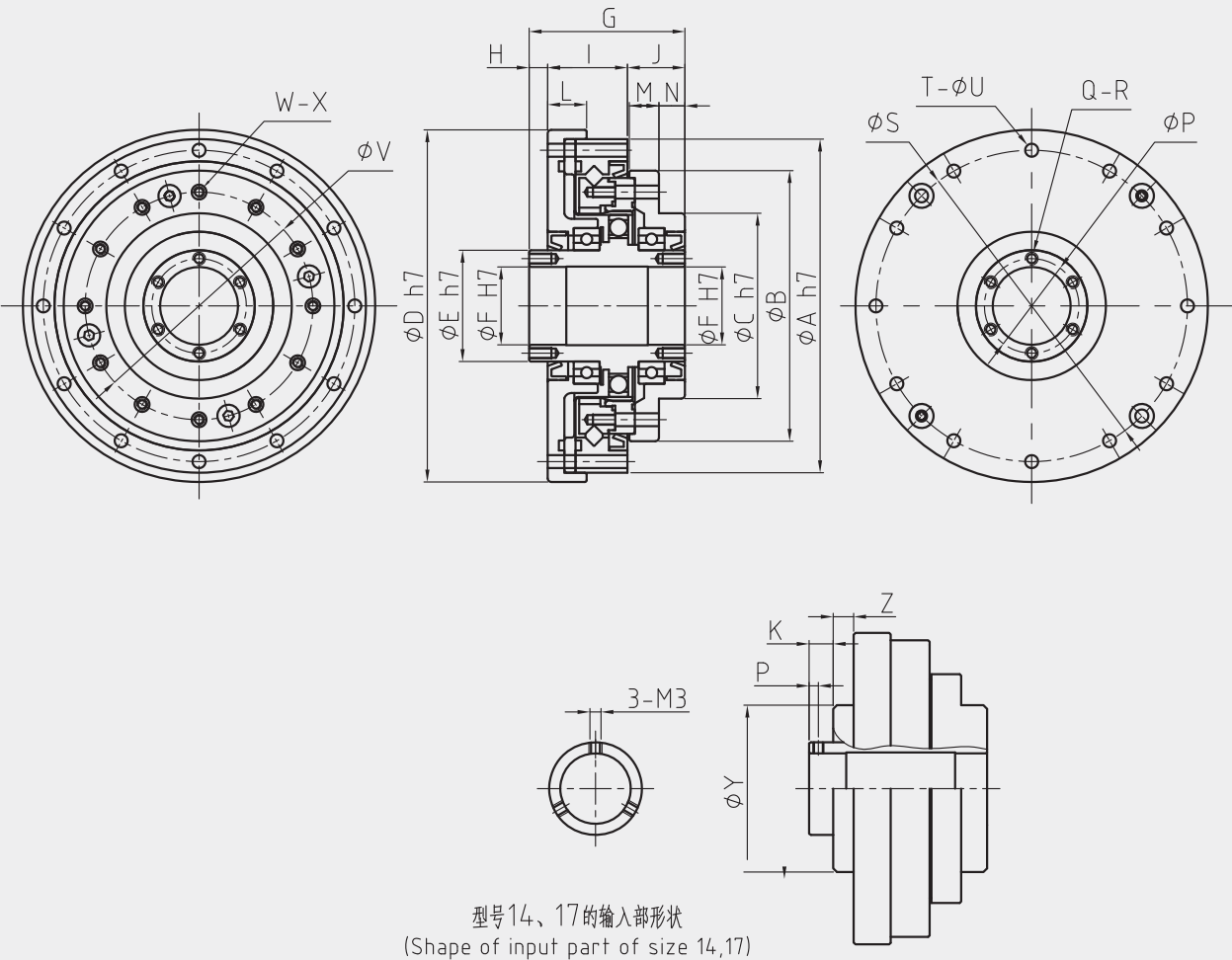
2.2.3 DHD-H系列 DHD-H Series



2.2DHD系列谐波减速器
DHD Harmonic Reducer

2.2.3 DHD-H系列 DHD-H Series

2.2.3.1外形图 Outside dimensions



2.2DHD系列谐波减速器 DHD Harmonic Reducer

2.2.3 DHD-H系列 DHD-HSeries

2.2.3.2尺寸表Dimensions

单位Unit:mm

型号 Size 符号 Symbol	14	17	20	25	32
φ A h7	70	80	90	110	142
φ B	52	62	73	87	114
φ C h7	36	45	50	60	75
φ D h7	74	84	95	115	147
φ E h7	20	25	30	38	54
φ F H7	14	19	21	29	41
G	45.5	48	42	46.5	55
H	-	-	5	6	7
I	19.5	20.5	21.5	24	28.6
J	14	15.5	15.5	16.5	19.4
K	6.5	6.5	-	-	-
L	9	10	10.5	10.5	12
M	7	8	8	10	11
N	6.5	7	7	6	7.5
φ P (P)	(2.5)	(2.5)	25.5	33.5	48
Q	3	3	6	6	6
R	M3	M3	M3×6	M3×6	M3×6
φ S	64	74	84	102	132
T	8	12	12	12	12
φ U	3.5	3.5	3.5	4.5	5.5
φ V	43	52	61.4	76	99
W	8	12	12	12	12
X	M3×5	M3×5	M3×6	M4×6	M5×8
	φ 3.5×5.5	φ 3.5×12.5	φ 3.5×11.8	φ 4.5×14.5	φ 5.5×19.7
φ Y	36	45	-	-	-
Z	5.5	5.5	-	-	-
重量 weight(kg)	0.49	0.66	0.84	1.4	2.7

2.2DHD系列谐波减速器 DHD Harmonic Reducer

2.2.3DHD-H系列 DHD-H Series

2.2.3.3转动惯量 Moment of inertia

型 号Size 参数 Parameter	14	17	20	25	32
转动惯量 Moment of inertia (×10 ⁻⁴ kgm ²)	0.064	0.141	0.271	0.793	2.900

2.2.3.4起动转矩 Starting torque

单位Unit:cNm

型号Size 减速比 Ratio	14	17	20	25	32
50	10.2	20	27	46	78
80	9	18.8	25	40	69
100	8.8	17.4	24	38	67
120	-	16.8	23	36	61
160	-	-	21	34	57

2.2.3.5增速起动转矩 Backdriving torque

单位Unit:Nm

型号Size 减速比 Ratio	14	17	20	25	32
50	6	21	29	44	63
80	7.1	28	41	60	84
100	9.7	41	54	80	111
120	-	51	65	99	126
160	-	-	84	126	171

2.3DCS(G)系列谐波减速器

DCS(G) Series Harmonic Reducer

2.3.1技术数据 Technical data

2.3.1.1额定表 Rating table

型号 Size	减速比 Ratio	输入2000r/min 时的额定输出转 矩(Nm) Rated torque at 2000rpm(Nm)	启动/停止时的容 许最大转矩(Nm) Limit for repeated peak torque(Nm)	平均负载转矩 的容许最大值 (Nm) Limit for average torque(Nm)	瞬间容许最 大转矩(Nm) Limit for momentary peak torque(Nm)	容许最高输入 转速 (r/min) Maximum input speed(r/min)	容许平均输入 转速 (r/min) Limit for average input speed(r/min)
14	50	7	23	9	46	8500	3500
	80	10	30	14	61		
	100	10	36	14	70		
17	50	21	44	34	91	7300	3500
	80	29	56	35	113		
	100	31	70	51	143		
	120	31	70	51	112		
20	50	33	73	44	127	6500	3500
	80	44	96	61	165		
	100	52	107	64	191		
	120	52	113	64	191		
	160	52	120	64	191		
25	50	51	127	72	242	5600	3500
	80	82	178	113	332		
	100	87	204	140	369		
	120	87	217	140	395		
	160	87	229	140	408		
32	50	99	281	140	497	4800	3500
	80	153	395	217	738		
	100	178	433	281	841		
	120	178	459	281	892		
	160	178	484	281	892		
40	50	178	523	255	892	4000	3000
	80	268	675	369	1270		
	100	345	738	484	1400		
	120	382	802	586	1510		
	160	382	841	586	1510		
45	50	229	650	345	1235	3800	3000
	80	407	918	507	1651		
	100	459	982	650	2041		
	120	523	1070	806	2288		
	160	523	1147	819	2483		

2.3DCS(G)系列谐波减速器

DCS(G) Series Harmonic Reducer

2.3.1技术数据 Technical data

2.3.1.2角度传动精度 Positional accuracy

型号 Size		14	17	20	25	32	40	45
减速比 Ratio								
30		90	60	/	/	/	/	/
50以上		45	45	30	30	30	30	30

2.3.1.3滞后损失 Hysteresis loss

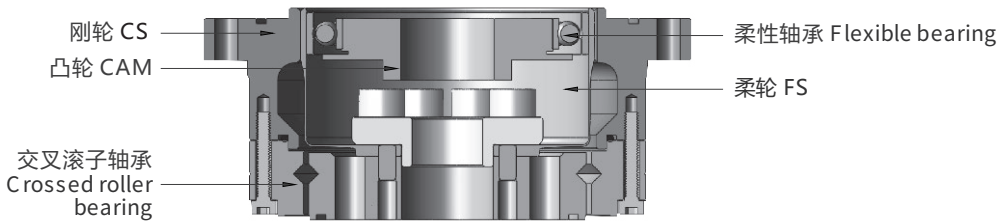
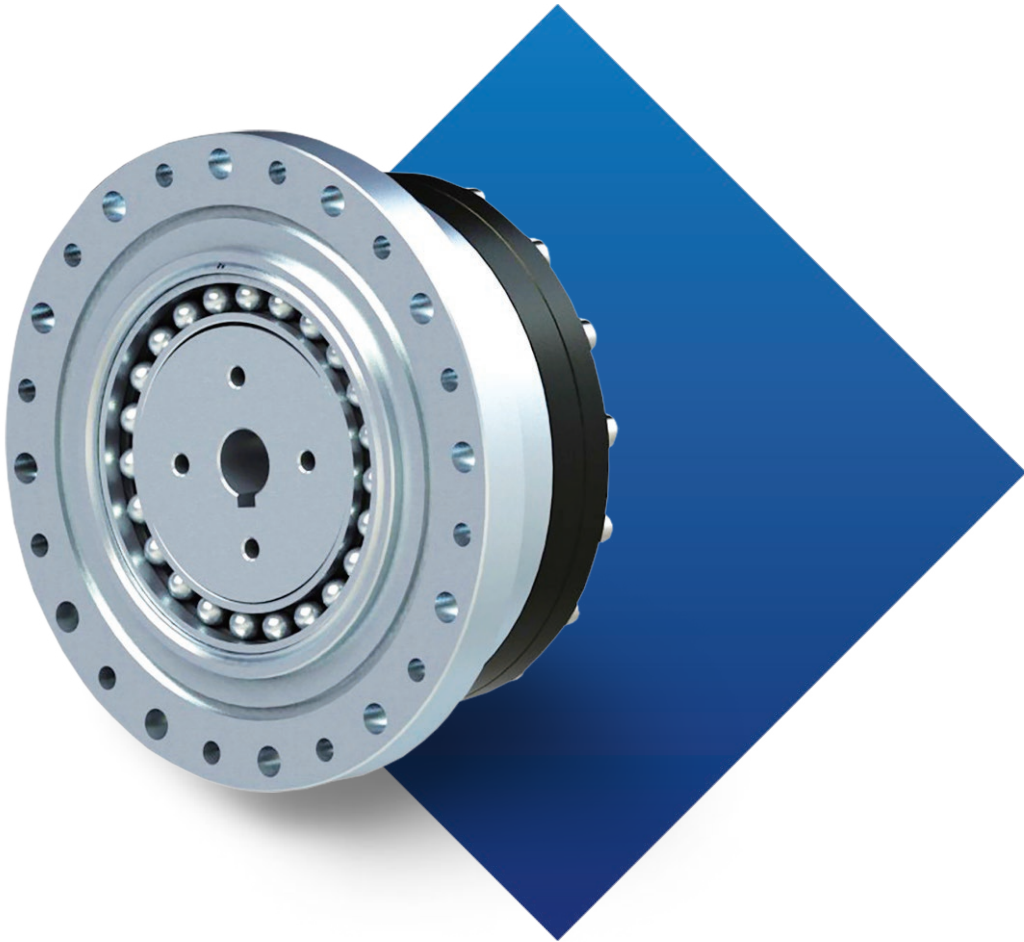
型号 Size	单位 Unit	14	17	20	25	32	40	45
减速比 Ratio								
50	arc min	2.0	2.0	2.0	2.0	2.0	2.0	2.0
80以上 80 or more	arc min	1.0	1.0	1.0	1.0	1.0	1.0	1.0

2.3.1.4刚性 (弹簧常数) Torsional stiffness

型号 Size		14	17	20	25	32	40	45
减速比 Ratio								
T ₁	Nm	2.0	3.9	7.0	14	29	54	76
T ₂	Nm	6.9	12	25	48	108	196	275
减速比50 Reduction ratio 50	K ₁	Nm/arc min	1.05	2.55	4.1	7.9	17.2	32.4
	K ₂	Nm/arc min	1.5	3.4	5.6	10.7	24.7	45.3
	K ₃	Nm/arc min	1.8	4.3	7.2	14	31.2	57.2
减速比80以上 Reduction ratio 80 or more	K ₁	Nm/arc min	1.5	3.2	5.0	9.9	21.5	41
	K ₂	Nm/arc min	1.9	4.3	8.0	16.1	34.5	64.7
	K ₃	Nm/arc min	2.2	4.9	9.1	18.3	39.8	73.4

2.3DCS(G)系列谐波减速器 DCS(G) Series Harmonic Reducer

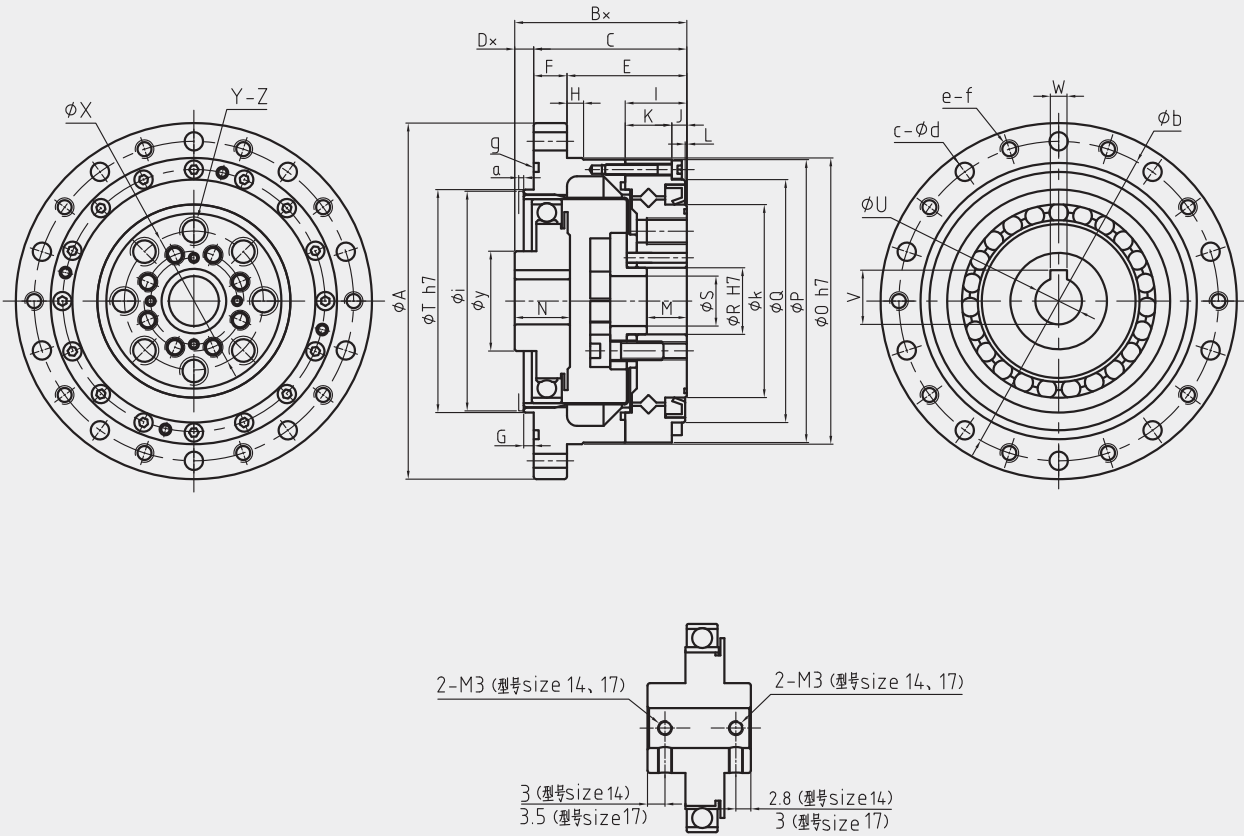
2.3.2 DCS(G)系列 DCS(G) Series



2.3DCS(G)系列谐波减速器 DCS(G) Series Harmonic Reducer

2.3.2 DCS(G)系列 DCS(G) Series

2.3.2.1外形图 Outside dimensions



2.3DCS(G)系列谐波减速器

DCS(G) Series Harmonic Reducer

2.3.2 DCS(G)系列 DCS(G) Series

2.3.2.2尺寸表 Dimensions

型号Size		14	17	20	25	32	40	45
符号Symbol								
Φ A		73	79	93	107	138	160	180
B *		40.8 ± 0.2	44.8 ± 0.2	45.3 ± 0.2	51.7 ± 0.3	61.7 ± 0.3	71.5 ± 0.3	79.5 ± 0.3
C		34	37	38	46	57	67.5	74
D *		6.8 ± 0.2	7.8 ± 0.2	7.3 ± 0.2	5.7 ± 0.3	4.7 ± 0.3	5.9 ± 0.3	5.5 ± 0.3
E		27	29	28	36	45	51.5	58
F		7	8	10	10	12	16	16
G		2	2	3	3	3	4	4
H		3.5	4	5	5	5	4.5	6
I		16.5	16.5	16.5	18.5	22.5	24	-
J		4.5	4.5	4	4.5	5.5	7.5	-
K		12	12	12.5	14	17	16.5	-
L		0.5	0.6	0.5	0.5	1	1.5	-
M		9.4	9.5	9	12	15	16.5	6
N		18.5	20.7	16.5	16.6	18.6	20	30.5
Φ O h7		56	63	72	86	113	127	148
Φ P		55	62	70	85	112	126	147
Φ Q		42.5	49.5	58	73	96	109	127
Φ R h7		11	10	14	20	26	32	32
Φ S		8	7	10	15	20	24	25
Φ T h7		38	48	56	67	90	110	124
Φ U H7		8	8	14	14	19	22	19
V		-	-	16.3	16.3	21.8	24.8	21.8
W		-	-	5	5	6	6	6
Φ X		23	27	32	42	55	68	82
Y		6	6	8	8	8	8	8
Z		M 4 x 8	M 5 x 10	M 6 x 12	M 8 x 13	M 10 x 15	M10 x 15	M12 x 18
a		1	1	1.5	1.5	1.5	2	0.5
Φ b		65	71	82	96	125	144	164
c	CSG 系列 CSG Series	8	8	8	10	12	10	12
	CS 系列 CS Series	6	6	6	8	12	10	12
Φ d		4.5	4.5	5.5	5.5	6.5	9	9
e	CSG 系列 CSG Series	8	8	8	10	12	10	12
	CS 系列 CS Series	6	6	6	8	12	10	12
F		M 4	M 4	M 5	M 5	M 6	M8	M8
G		O形圈 O-ring 28*0.5	O形圈 O-ring 34.5*0.8	O形圈 O-ring 40*1	O形圈 O-ring 54*1	O形圈 O-ring 69*2	O形圈 O-ring 128*2	O形圈 O-ring 144*2
H		O形圈 O-ring 50*1.5	O形圈 O-ring 56*1.5	O形圈 O-ring 65*2	O形圈 O-ring 78*2	O形圈 O-ring 103*2	O形圈 O-ring 82.5*1.8	O形圈 O-ring 98*2
Φ i		38	45	53	66	86	106	119
Φ k		38	48	56	58	78	90	107
R		21.4	23.5	23	29	37	32	32
Φ y h7		16	18	24	30	32	32	32
重量 weight(kg)		0.52	0.68	0.98	1.5	3.2	4.79	7

注：1.尺寸D会对性能及强度造成影响，因此请严格遵守。2、由于柔轮会发生弹性形变，为防止其与壳体接触，请注意a，Φ i这两个尺寸。
Notes: 1. As size D shall affect the performance and strength, so please strictly observe it.
2. Since the FS will be deformed elastically, in order to prevent it from coming into contact with the housing, please pay attention to the two sizes a,Φ i.

2.3DCS(G)系列谐波减速器

DCS(G) Series Harmonic Reducer

2.3.2 DCS(G)系列 DCS(G) Series

2.3.2.3转动惯量 Moment of inertia

Size	14	17	20	25	32	40	45
参数 Parameter							
转动惯量 Moment of inertia (×10 ⁻⁴ kgm ²)	0.033	0.079	0.193	0.413	1.690	5.490	8.230

2.3.2.4启动转矩 Starting torque

单位Unit:cNm

型号 Size	14	17	20	25	32	40	45
减速比 Ratio							
50	4.5	6.7	8.6	17	34	61	85
80	3.1	4.4	5.4	10	21	39	54
100	2.8	3.7	4.7	8.8	20	34	47
120	-	3.4	4.2	8.0	17	31	43
160	-	-	3.6	6.9	15	26	36

2.3.2.5增速启动转矩 Backdriving torque

单位Unit:Nm

型号 Size	14	17	20	25	32	40	45
减速比 Ratio							
50	1.8	3.3	5.2	9.9	20	36	52
80	1.8	3.3	5.3	10	21	36	53
100	2.0	3.6	5.6	11	22	40	56
120	-	3.9	6.1	12	24	43	61
160	-	-	7	14	29	51	70

2.4DCD系列谐波减速器 DCD Series Harmonic Reducer

2.4.1技术数据 Technical data

2.4.1.1额定表 Rating table

型号 Size	减速比 Ratio	输入2000r/min 时的额定输出转 矩(Nm) Rated torque at 2000rpm(Nm)	启动/停止时的容 许最大转矩(Nm) Limit for repeated peak torque(Nm)	平均负载转矩 的容许最大值 (Nm) Limit for average torque(Nm)	瞬间容许最 大转矩(Nm) Limit for momentary peak torque(Nm)	容许最高输入 转速 (r/min) Maximum input speed(r/min)	容许平均输入 转速 (r/min) Limit for average input speed(r/min)
14	50	3.7	12	4.8	24	8500	3500
	80	5.4	16	7.7	35		
	100	5.4	19	7.7	35		
17	50	11	23	18	48	7300	3500
	80	15	29	19	61		
	100	16	37	27	71		
	120	16	37	27	71		
20	50	17	39	24	69	6500	3500
	80	24	51	33	89		
	100	28	57	34	95		
	120	28	60	34	95		
	160	28	64	34	95		
25	50	27	69	38	127	5600	3500
	80	44	96	60	179		
	100	47	110	75	184		
	120	47	117	75	204		
	160	47	123	75	204		
32	50	53	151	75	268	4800	3500
	80	83	213	117	398		
	100	96	233	151	420		
	120	96	247	151	445		
	160	96	261	151	445		

2.4DCD系列谐波减速器 DCD Series Harmonic Reducer

2.4.1技术数据 Technical data

2.4.1.2角度传动精度 Positional accuracy

型号Size	单位Unit	14	17	20	25	32
减速比 Reduction ratio						
全减速比 Reduction ratio	arc s ec	90	90	60	60	60

2.4.1.3滞后损失 Hysteresis loss

型号Size	单位Unit	14	17	20	25	32
减速比 Ratio						
50	arc min	2. 5	1.5	1.5	1.5	1.5
80以上 80 or more	arc min	2. 0	1. 0	1. 0	1. 0	1. 0

2.4.1.4刚性（弹簧常数） Torsional stiffness

型号Size		14	17	20	25	32
减速比Ratio						
T ₁	Nm	2.0	3.9	7.0	14	29
T ₂	Nm	6.9	12	25	48	108
减速比50 Reduction ratio 50	K ₁	Nm/arc min	0.9	2.1	3.4	6.4
	K ₂	Nm/arc min	1.15	2.8	4.3	8.6
	K ₃	Nm/arc min	1.5	3.6	6.4	11.8
减速比80以上 Reduction ratio 80 or more	K ₁	Nm/arc min	1.25	2.7	4.3	8.6
	K ₂	Nm/arc min	1.4	3.0	5.3	11.8
	K ₃	Nm/arc min	1.9	4.2	8.0	15.0

2.4DCD系列谐波减速器 DCD Series Harmonic Reducer

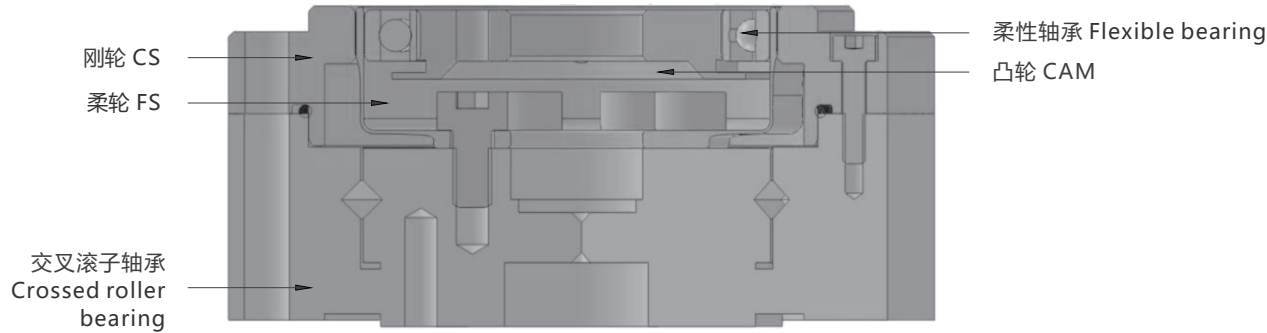
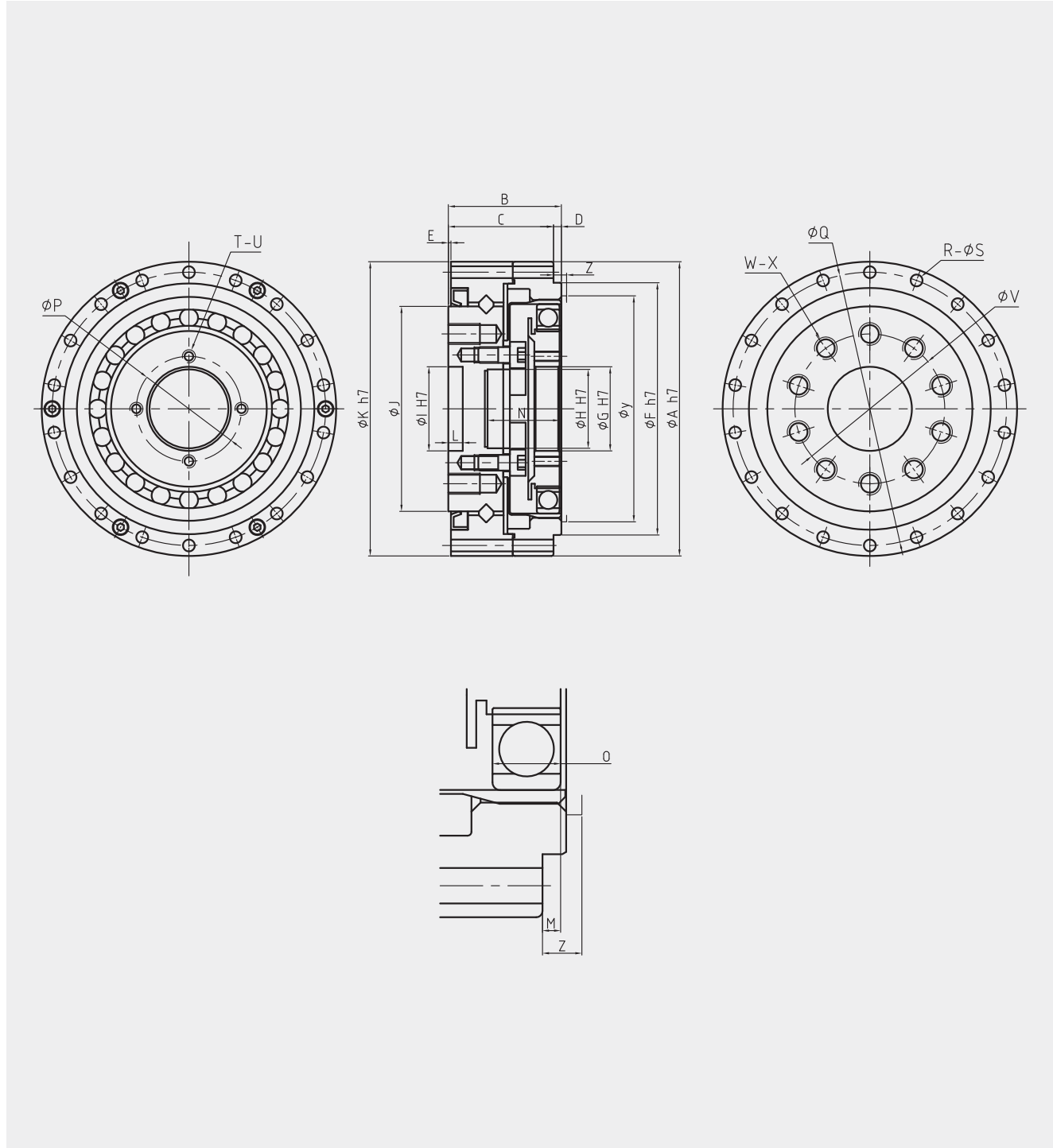
2.4.2 DCD系列 DCD Series



2.4DCD系列谐波减速器 DCD Series Harmonic Reducer

2.4.2 DCD系列 DCD Series

2.4.2.1外形图 Outside dimensions



2.4DCD系列谐波减速器 DCD Series Harmonic Reducer

2.4.2 DCD系列 DCD Series

2.4.2.2尺寸表 Dimensions

单位Unit:mm

型号 Size 符号 Symbol	14	17	20	25	32
φ A h7	55	62	70	85	112
B	25	26.5	29.7	37.1	43
C	23	24.5	27.5	34.1	40
D	2	2	2	3	3
E	0.5	0.5	0.5	0.5	1
φ F h7	42.5	49.5	58	73	96
φ G H7	11	15	20	24	32
φ H H7	11	11	16	20	30
φ I H7	12	14	18	24	32
φ J	31	37.3	44	58	78
φ K h7	55	62	70	85	112
L	5	5	5	5.5	5.5
M	1.5±0.1	1.5±0.1	1.5±0.1	2.5±0.1	2.3±0.1
N	14.6	16.1	18.6	23.7	27.4
O	4	5	5.2	6.3	9.6
φ P	17	21	26	30	40
φ Q	49	56	64	79	104
R	6	10	12	18	18
φ S	3.5	3.5	3.5	3.4	4.5
T	4	4	4	4	4
U	M3	M3	M3	M3	M4
φ V	25	27	34	42	57
W	10	8	8	8	10
X	M3X7	M5X8	M6X9	M8X12	M8X12
φ y	38	45	53	66	86
Z	3	3	3.5	4.5	5
重量 weight(kg)	0.35	0.46	0.65	1.2	2.4

注：1.尺寸M会对性能及强度造成影响，因此请严格遵守。2、由于柔轮会发生弹性形变，为防止其与壳体接触，请注意Z,φ y这两个尺寸。
Notes: 1. As size M shall affect the performance and strength, so please strictly observe it. 2. Since the FS will be deformed elastically, in order to prevent it from coming into contact with the housing, please pay attention to the two sizes Z,φ y.

2.4DCD系列谐波减速器 DCD Series Harmonic Reducer

2.4.2 DCD系列 DCD Series

2.4.2.3转动惯量 Moment of inertia

型 号Size 参数 Parameter	14	17	20	25	32
转动惯量 Moment of inertia (×10 ⁻⁴ kgm ²)	0.021	0.054	0.090	0.282	1.090

2.4.2.4启动转矩 Starting torque

单位Unit:cNm

型号Size 减速比 Ratio	14	17	20	25	32
50	4.4	6.7	8.9	16	32
80	3.2	4.4	5.7	10	22
100	2.8	3.8	5.1	9.1	20
120	-	3.6	4.5	8.2	17
160	-	-	3.9	7.2	15

2.4.2.5增速启动转矩 Backdriving torque

单位Unit:Nm

型号Size 减速比 Ratio	14	17	20	25	32
50	2.9	4.3	5.2	9.5	19
80	2.9	4.1	5.7	10	21
100	3.5	4.6	6	11	23
120	-	5.1	6.4	12	24
160	-	-	7.4	13	30

2.5DCDF系列谐波减速器 DCDF Series Harmonic Reducer

2.5.1技术数据 Technical data

2.5.1.1额定表 Rating table

型号 Size	减速比 Ratio	输入2000r/min 时的额定输出转 矩(Nm) Rated torque at 2000rpm(Nm)	启动/停止时的容 许最大转矩(Nm) Limit for repeated peak torque(Nm)	平均负载转矩 的容许最大值 (Nm) Limit for average torque(Nm)	瞬间容许最 大转矩(Nm) Limit for momentary peak torque(Nm)	容许最高输入 转速 (r/min) Maximum input speed(r/min)	容许平均输入 转速 (r/min) Limit for average input speed(r/min)
14	50	3.7	12	4.8	24	8500	3500
	80	5.4	16	7.7	35		
	100	5.4	19	7.7	35		
17	50	11	23	18	48	7300	3500
	80	15	29	19	61		
	100	16	37	27	71		
	120	16	37	27	71		
20	50	17	39	24	69	6500	3500
	80	24	51	33	89		
	100	28	57	34	95		
	120	28	60	34	95		
	160	28	64	34	95		
25	50	27	69	38	127	5600	3500
	80	44	96	60	179		
	100	47	110	75	184		
	120	47	117	75	204		
	160	47	123	75	204		
32	50	53	151	75	268	4800	3500
	80	83	213	117	398		
	100	96	233	151	420		
	120	96	247	151	445		
	160	96	261	151	445		

2.5DCDF系列谐波减速器 DCDF Series Harmonic Reducer

2.5.1技术数据 Technical data

2.5.1.2角度传动精度 Positional accuracy

型号Size	单位Unit	14	17	20	25	32
减速比 Ratio						
全减速比 Reduction ratio	arc s ec	90	90	60	60	60

2.5.1.3滞后损失 Hysteresis loss

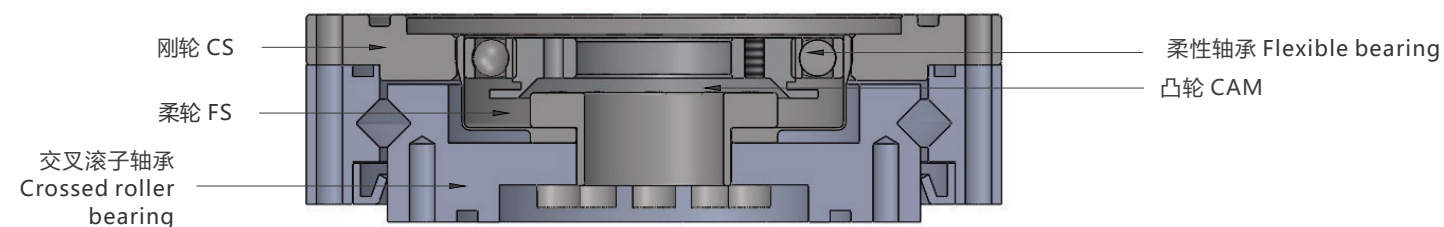
型号Size	单位Unit	14	17	20	25	32
减速比 Ratio						
50	arc min	2.5	1.5	1.5	1.5	1.5
80以上 80 or more	arc min	2.0	1.0	1.0	1.0	1.0

2.5.1.4刚性（弹簧常数） Torsional stiffness

型号 Model		14	17	20	25	32
减速比 Ratio						
T ₁	Nm	2.0	3.9	7.0	14	29
T ₂	Nm	6.9	12	25	48	108
减速比50 Reduction ratio 50	K ₁	Nm/arc min	0.9	2.1	3.4	6.4
	K ₂	Nm/arc min	1.15	2.8	4.3	8.6
	K ₃	Nm/arc min	1.5	3.6	6.4	11.8
减速比80以上 Reduction ratio 80 or more	K ₁	Nm/arc min	1.25	2.7	4.3	8.6
	K ₂	Nm/arc min	1.4	3.0	5.3	11.8
	K ₃	Nm/arc min	1.9	4.2	8.0	15.0

2.5DCDF系列谐波减速器 DCDF Series Harmonic Reducer

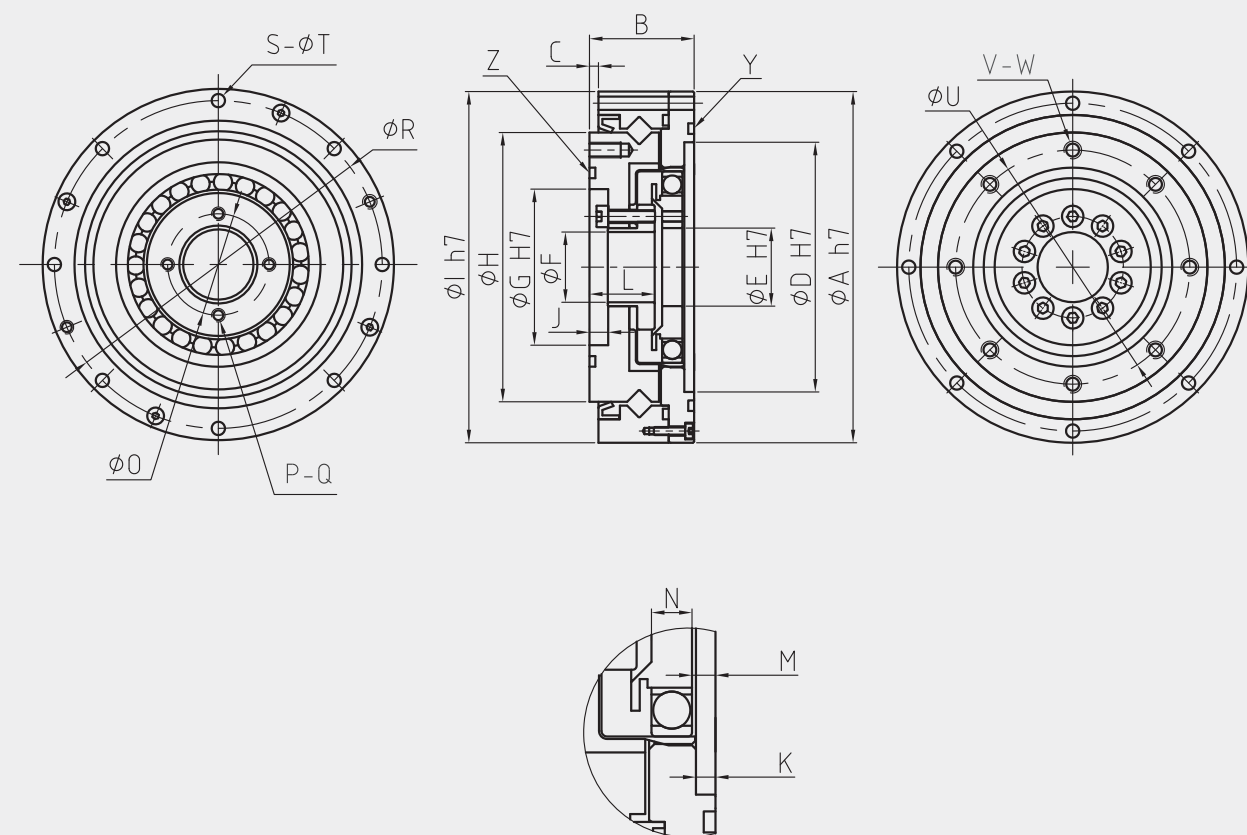
2.5.2 DCDF系列 DCDF Series



2.5DCDF系列谐波减速器 DCDF Series Harmonic Reducer

2.5.2 DCDF系列 DCDF Series

2.5.2.1外形图 Outside dimensions



2.5DCDF系列谐波减速器 DCDF Series Harmonic Reducer

2.5.2 DCDF系列 DCDF Series

2.5.2.2尺寸表 Dimensions

单位Unit:mm

型号 Size 符号 Symbol	14	17	20	25	32
φ A h7	70	80	90	110	142
B	22	22.7	26.8	31.5	37
C	0.5	1.5	2.3	2.1	2.8
φ D H7	48	56	64	80	106
φ E H7	11	15	20	24	32
φ F	9	9	18	22	29
φ G H7	30	34	40	52	70
φ H	49	59	69	84	110
φ I h7	70	80	90	110	142
J	4.9	5.4	4.8	5.5	6
K	2.5	2.5	2.5	3	3
L	12.8	13.3	16.7	19.4	21.9
M	3±0.1	3±0.1	3±0.1	3.6±0.1	3.7±0.1
N	4	5	5.2	6.3	9.6
φ O	17	21	26	30	40
P	4	4	4	4	4
Q	M3	M3	M3	M3	M4
φ R	64	74	84	102	132
S	6	8	8	10	10
φ T	3.4	3.4	3.4	4.5	5.5
φ U	42	50	60	73	96
V	8	10	8	8	8
W	M3×5	M3×6	M4×8	M5×8	M6×10
X	O 形圈 O- ring 34.5*0.8	O 形圈 O- ring 38*1.5	O 形圈 O- ring 46*2	O 形圈 O- ring 58.8*1.8	O 形圈 O- ring 80*2
Y	O 形圈 O- ring 51*1.5	O 形圈 O- ring 61*1.5	O 形圈 O- ring 69*2	O 形圈 O- ring 83.5*1.8	O 形圈 O- ring 115*2
φ Z	38	45	53	66	86
重量 weight(kg)	0.50	0.66	0.94	1.7	3.3

2.5DCDF系列谐波减速器 DCDF Series Harmonic Reducer

2.5.2 DCDF系列 DCDF Series

2.5.2.3转动惯量 Moment of inertia

型 号Size 参数 Parameter	14	17	20	25	32
转动惯量 Moment of inertia (×10 ⁻⁴ kgm ²)	0.021	0.054	0.090	0.282	1.090

2.5.2.4启动转矩 Starting torque

单位Unit:cNm

型号Size 减速比 Ratio	14	17	20	25	32
50	5.3	7.5	9.7	17	34
80	3.0	4.9	6.2	11	23
100	3.2	4.2	5.5	9.6	21
120	-	4	4.8	8.6	18
160	-	-	4.1	7.4	16

2.5.2.5增速启动转矩 Backdriving torque

单位Unit:Nm

型号Size 减速比 Ratio	14	17	20	25	32
50	3.3	4.7	5.6	10	20
80	3.3	4.5	6.1	10	22
100	3.9	5.0	6.4	11	24
120	-	5.6	6.8	12	25
160	-	-	7.8	14	31

3.技术资料Technical Information

3.1术语及定义 Terms and Definitions

额定转矩 输入转速为2000r/min时的容许连续负载转矩。	Rated torque Rated torque indicates allowable continuous load torque at rated input speed.
平均负载转矩的容许最大值 负载转矩、输入转速变化时,需计算出负载转矩的平均值。额定表的数值表示的是此时平均负载转矩的容许值。平均负载转矩超过额定表数值时,会因发热而造成润滑剂早起劣化及齿轮磨损异常,请注意。	Limit for Average Torque In cases where load torque and input speed vary, it is necessary to calculate an average value of load torque. The table indicates the limit for average torque. The average torque calculated must not exceed this limit.
容许最高输入转速容许平均输入转速 在使用时请注意,不要使输入转速超过额定表所示的容许值。	Maximum Average Input Speed Maximum Input Speed Do not exceed the allowable rating.
起动与停止时的容许峰值转矩 起动停止时,由于负载转动惯量的存在,会有大于正常转矩的负载转矩作用在减速器上。额定表的数值是此时峰值转矩的容许值。	Limit for Repeated Peak Torque During acceleration and deceleration the Harmonic Drive® gear experiences a peak torque as a result of the moment of inertia of the output load. The table indicates the limit for repeated peak torque.
瞬间容许最大转矩 除通常负载转矩、起动停止时的负载转矩以外,还存在来自外部、无法预期的冲击转矩。额定表的数值是此时的容许值。此外,还应对这种转矩的作用频度设定限制。	Limit for Momentary Peak TorquePeak Torque The gear may be subjected to momentary peak torques in the event of a collision or emergency stop . The magnitude and frequency of occurrence of such peak torques must be kept to a minimum and they should, under no circumstance , occur during normal operating cycle. In addition, a limit of frequency of such torque action shall be set.
角度传动精度 指将任意的旋转角传递至输入时,理论上旋转输出的旋转角度与实际旋转输出的旋转角度之间的差值。	Psitional Accuracy Positional Accuracy values represent the difference between the theoretical angle and the actual angle of output for any given input.The values shown in the table are maximum values.

3.技术资料Technical Information

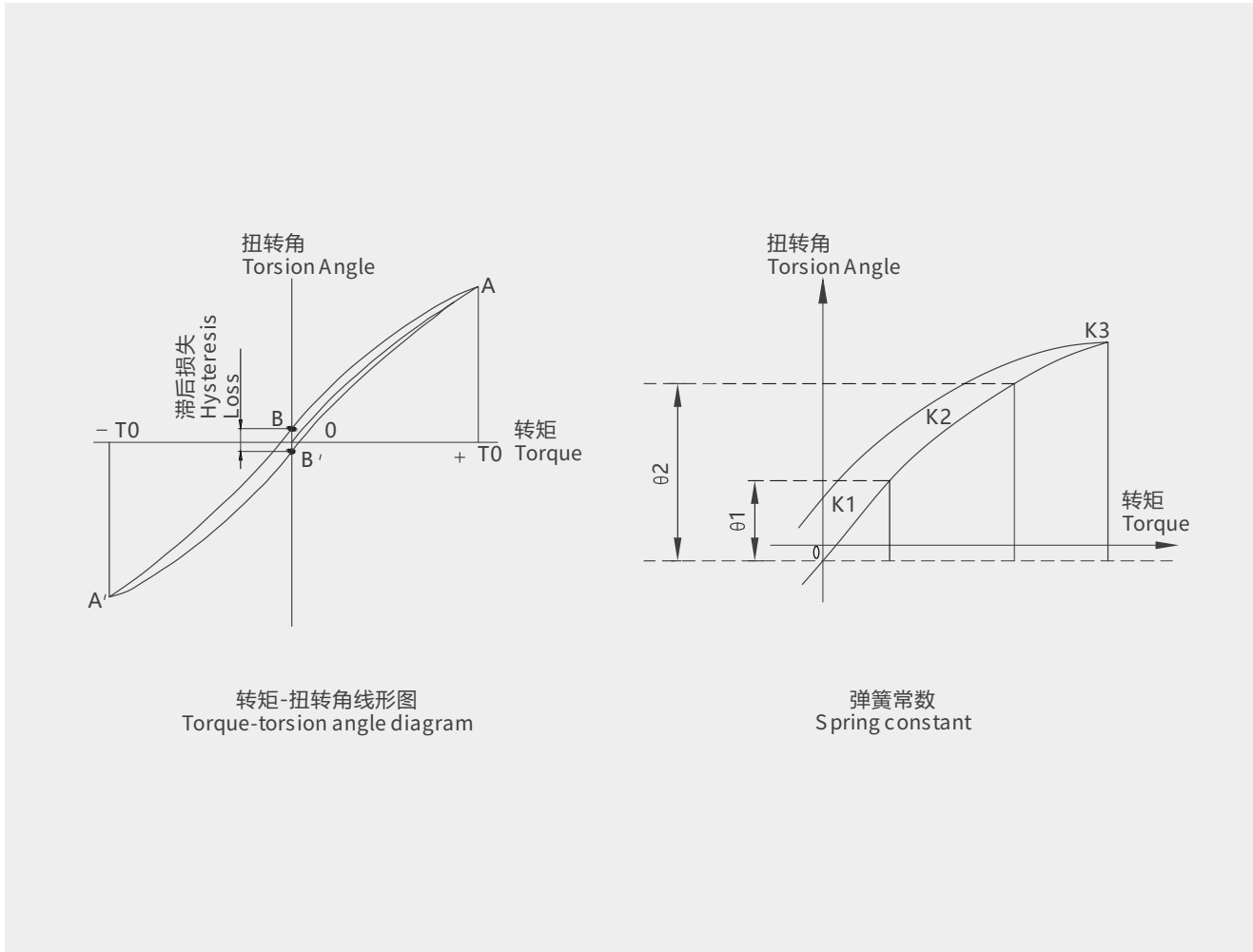
3.1术语及定义 Terms and Definitions

刚性 将输入侧（波发生器）固定，向输出侧（柔轮）施加转矩后，输出轴会产生几乎与转矩呈正比的扭转。

Stiffness Fixing the input side (wave generator) and applying torque to the output side (flexspline) generates torsion almost proportional to the torque on the output side.

下图是根据在输出轴施加的转矩从0开始，在正负侧分别增减到+T0/-T0时输出侧的扭转角变化绘制而成的。将其称为“转矩-扭转角线形图”，通常描绘为0-A-B-A'-B'-A的环线。

The following figure is drawn based on the changes in the torsion angle on the output side when the torque applied to the output shaft increases or decreases to +T0/-T0 on the positive and negative sides starting from 0. It is referred to as a "torque-torsion angle diagram" and is generally depicted as a loop of 0-A-B-A'-B'-A.



3.技术资料Technical Information

3.1术语及定义 Terms and Definitions

使用寿命 谐波减速器的使用寿命取决于波发生器轴承的使用寿命。与普通滚珠轴承相同，可通过转速和负载转矩计算出来。

Life The life of a gear is determined by the life of the wave generator bearing. The life may be calculated by using the input speed and the output load torque.

	使用寿命	
系列 (series)	DCD\DHD\DCDF	DCS(G)、DHSG
L ₁₀ (10%受损精度Damage Accuracy)	7000	10000
L ₅₀ (平均寿命Average Life)	35000	50000

备注：使用寿命为额定转速、额定转矩时的寿命。
Remark: Life is based on the input speed and output load torque from the rating table.

实际运转条件下使用寿命（Lh）的计算公式：
Calculation formula for Rated Lifetime

$$Lh = Ln * \left(\frac{Tr}{Tav}\right)^3 * \frac{Nr}{Nav}$$

Ln— —L₁₀或L₅₀时的使用寿命时间

Ln— —Life of L₁₀ or L₅₀

Tr— —额定转矩

Tr— —Rated torque

Nr— —额定转速

Nr— —Rated input speed

Tav— —输出侧的平均负载转矩

Tav— —Average load torque on the output side

Nav— —平均输入转速

Nav— —Average input speed

4.型号选定 Product Sizing & S election

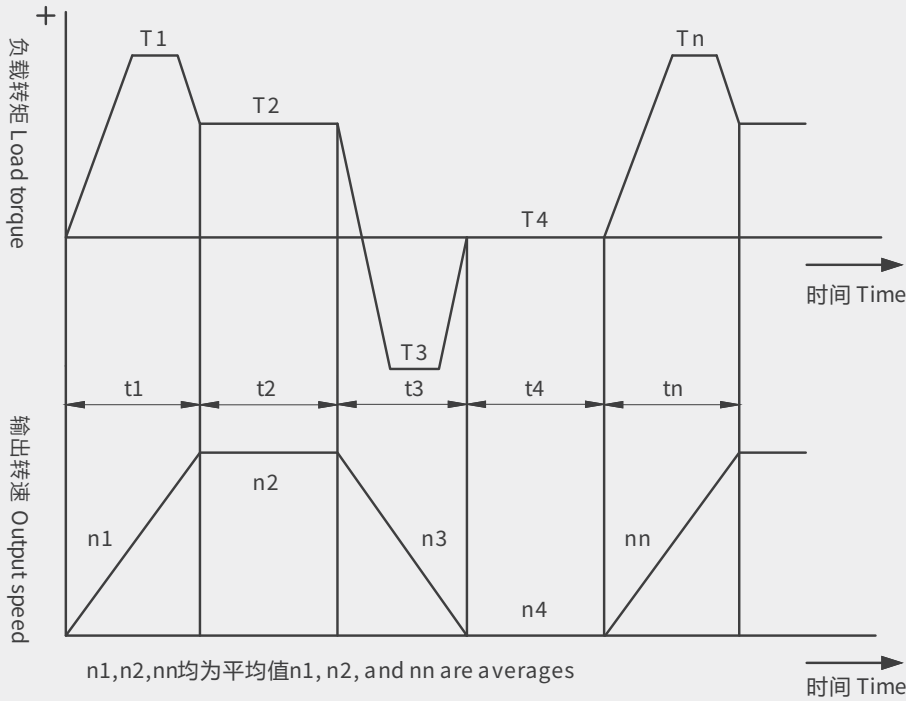
一般来说，伺服系统几乎没有带着一定的负载连续运转的状态。输入转速和负载转矩会发生变化，起动/停止时也会有较大的转矩作用。此外，还会出现无法预期的冲击转矩。通过将这些变动负载转矩换算为平均负载转矩，实施型号的选定

In general, a servo system rarely operates at a continuous load and speed. The input rotational speed, load torque change and comparatively large torque are applied at start and stop.Unexpected impact torque may be applied. These fluctuating load torques should be converted to the average load torque when selecting a model number.

4.1负载转矩模式确认 Checking the application motion profile

在组装设计时，为充分发挥组合型所具备的优良性能，请确保使用以下所示壳体的推荐值。

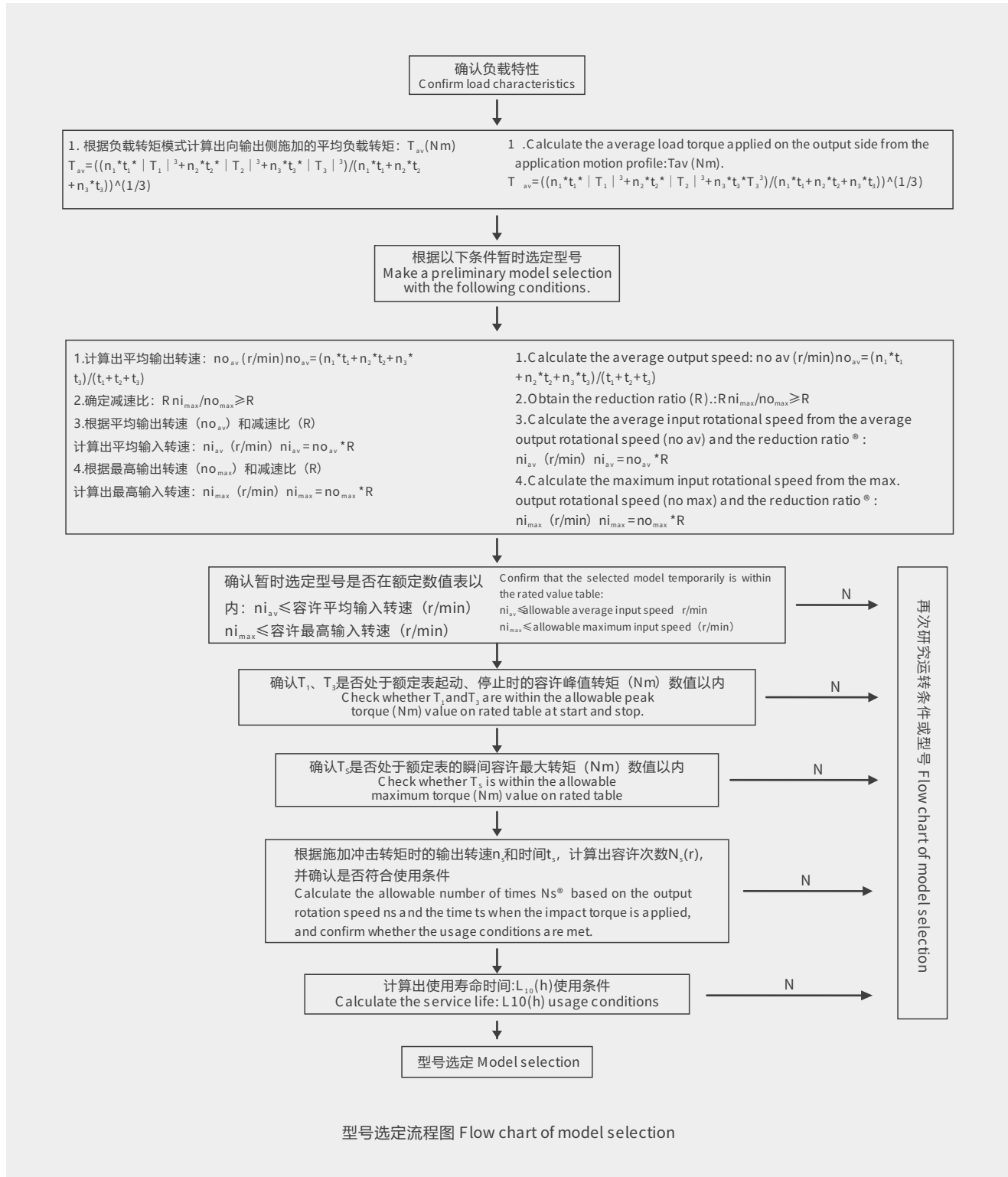
Be sure to use the recommended values for the housing shown below to achieve the best performance of the combination type when assembling the design. Checking the application motion profile



负载周期图
Load cycle diagram

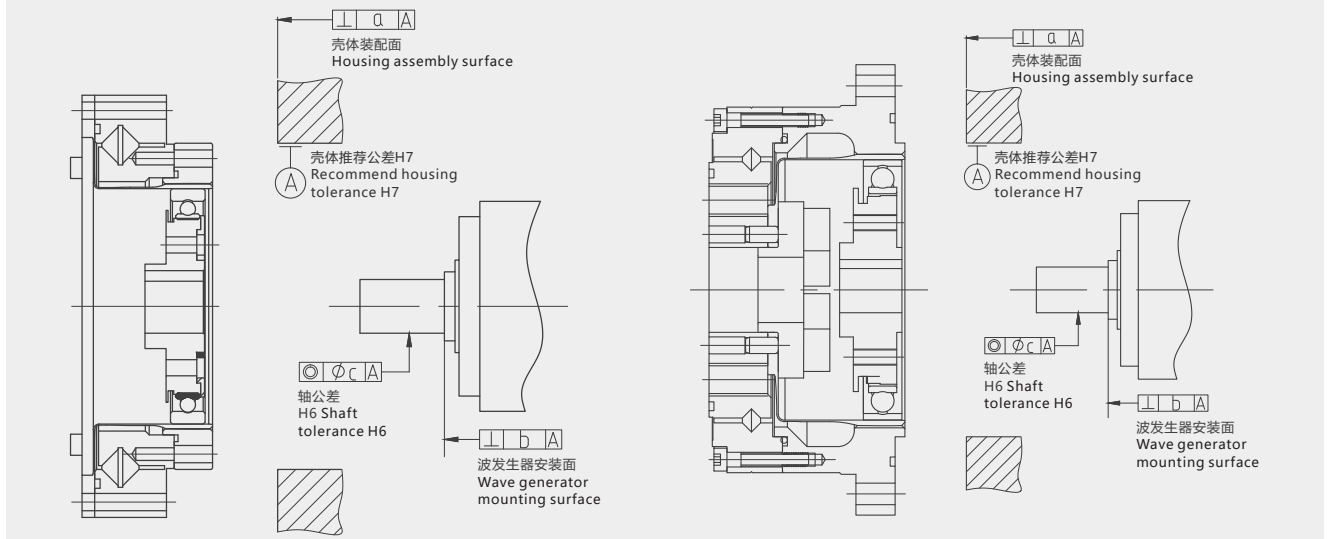
4.2选定型号的流程图
Flowchart for selecting a size

请根据下图的流程图进行型号的选定。任何一个数值超过额定表的数值时，都请重新考虑大一个的型号或考虑降低负载转矩等条件。
Please use the flowchart shown below for selecting a size. Operating conditions must not exceed the performance ratings.



5.使用说明 Instruction for Use
5.1组装精度 Assembly precision

在组装设计时，为充分发挥组合型所具备的优良性能，请确保使用以下所示壳体的推荐值。
Be sure to use the recommended values for the housings shown below to achieve the best performance of the combination type when assembling the design.

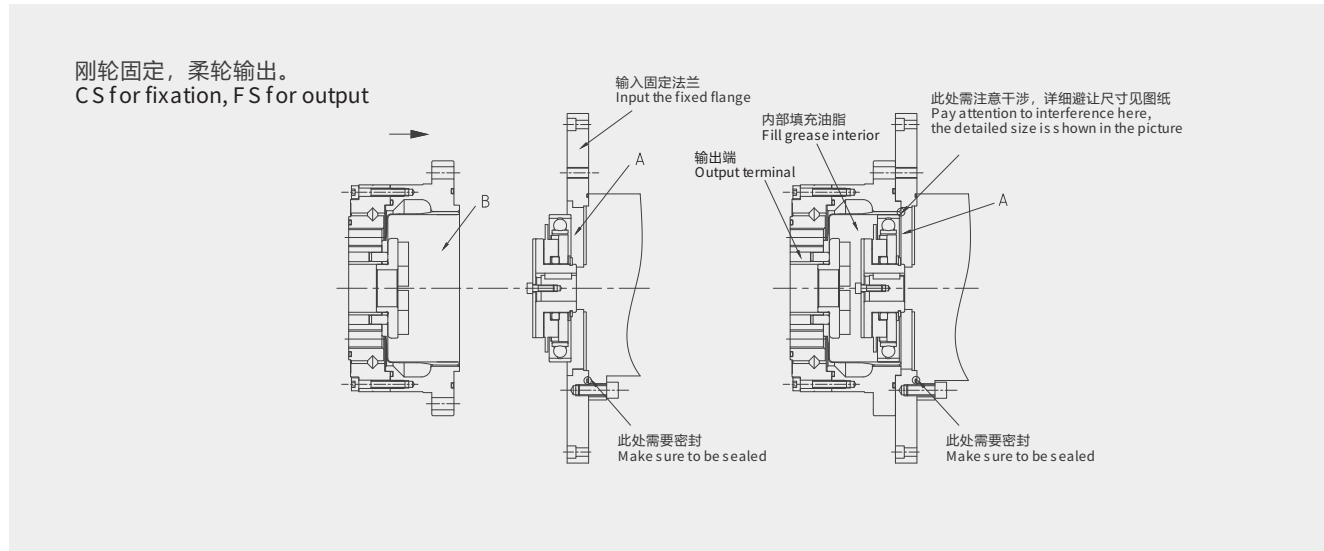


单位Unit:mm

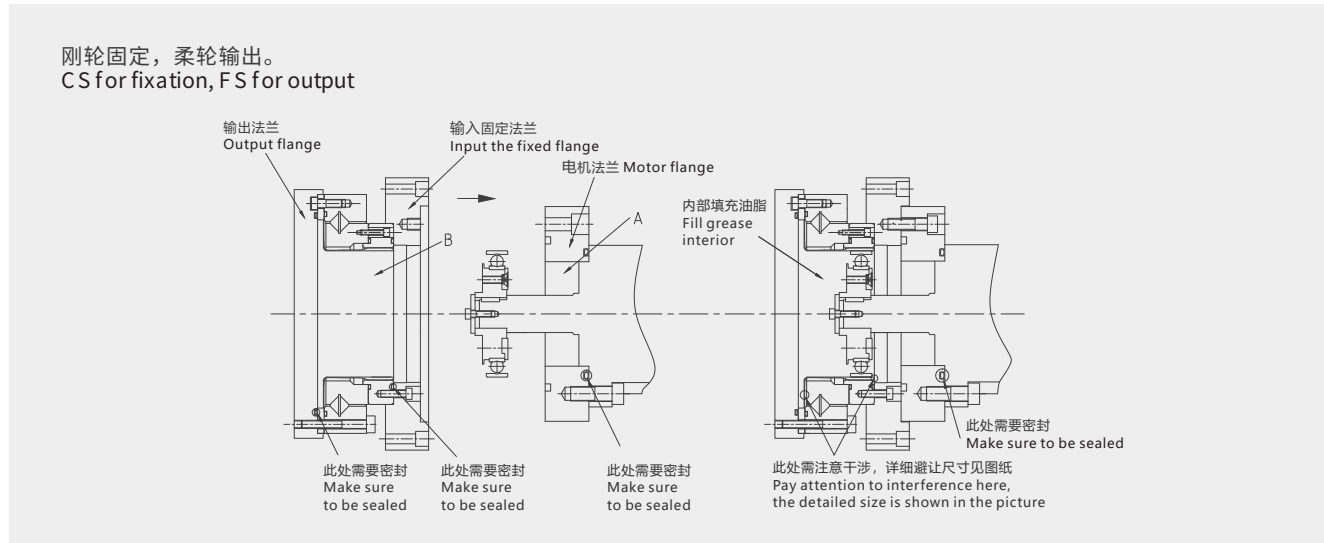
符号 Symbol	型号 Size	14	17	20	25	32	40	45
a		0.011	0.015	0.017	0.024	0.026	0.026	0.027
b		0.008	0.010	0.010	0.012	0.012	0.012	0.013
c		0.016	0.018	0.019	0.022	0.022	0.024	0.027

5.2 安装说明 Installation description

DCS(G)系列安装示意 DCS(G) Series Installation



DHS(G)系列安装示意一 DHS(G) Series Installation Example 1



1. 电机固定到法兰上，波发生器固定到电机轴上；2. 将柔轮、刚轮及交叉滚子轴承的组合体安装到法兰上。

注意： a. 装配时请勿用力过大，可通过波发生器与柔轮的相互旋转实施波发生器的装入； b. 安装时请勿倾斜。

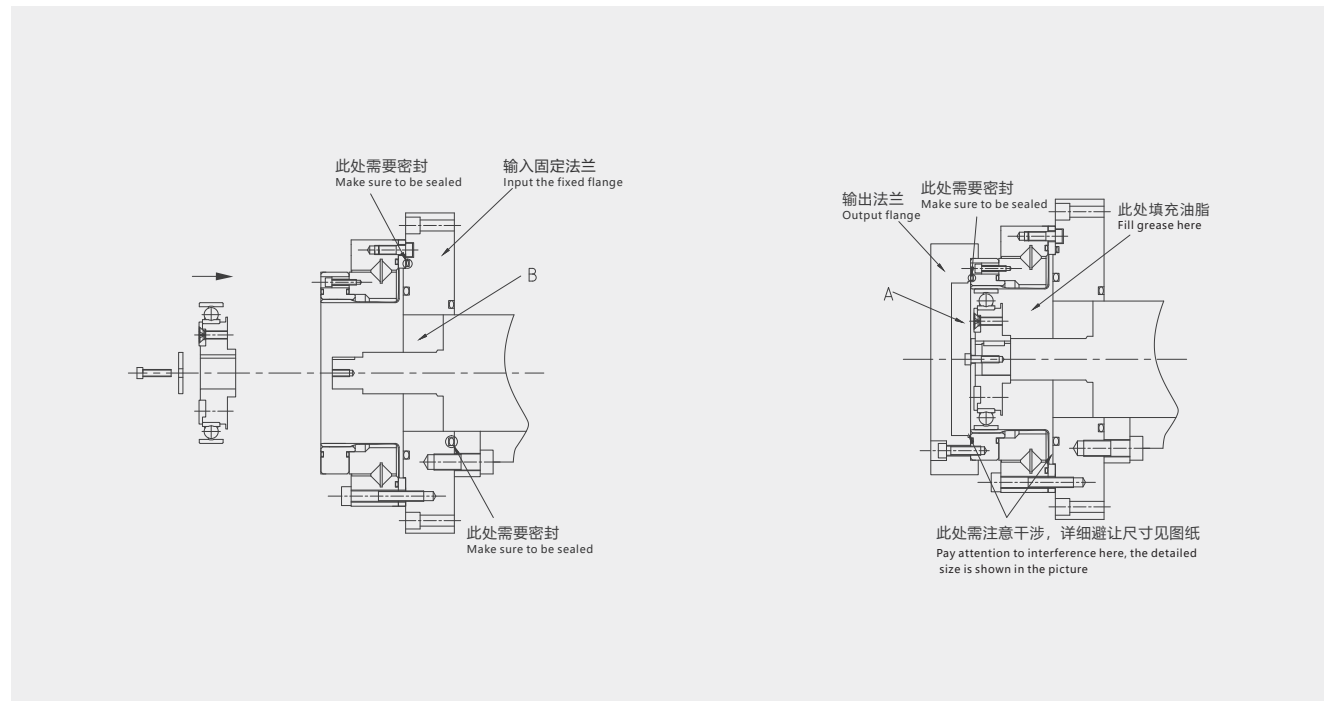
1. The motor is fixed to the flange, and the wave generator is fixed to the motor shaft;
2. Install the combination of the FS, the CS and the crossed roller bearing onto the flange.

Notes: a. Do not use excessive force when assembling. The loading of the wave generator can be performed by the mutual rotation of the wave generator and the FS; b. Tilting forbidden when installing.

5.2 安装说明 Installation description

DHS(G)系列安装示意二 DHS(G) Series Installation Example 2

柔轮固定，刚轮输出，此时减速比为标示减速比+1。
When the FS is fixed and the CS output, the reduction ratio is the indicated reduction ratio +1.



1. 电机固定到法兰上，柔轮、刚轮及交叉滚子轴承组合体固定到法兰上；

2. 将波发生器安装到电机轴上。

注意：

a. 装配时请勿用力过大，可通过波发生器与柔轮的相互旋转实施波发生器的装入；

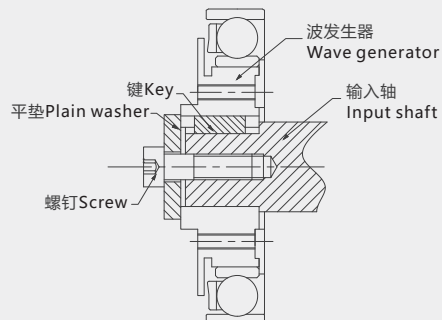
b. 安装时请勿倾斜。

1. Fix the motor to the flange and fix the combination of the FS, the CS and the crossed roller bearing to the flange;
2. Install the wave generator on the motor shaft.

Notes:

a. Do not use excessive force when assembling. The loading of the wave generator can be performed by the mutual rotation of the wave generator and the FS;
b. Tilting forbidden when installing.

5.3波发生器常用连接方式 Common Connection Mode of Wave Generator



波发生器
Wave generator

键Key

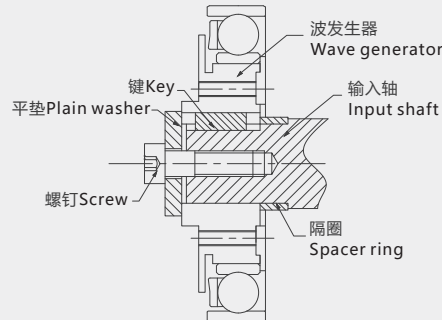
平垫Plain washer

螺钉Screw

输入轴
Input shaft

1. 输入轴有轴肩，可以与波发生器直接连接固定。

1. The input shaft has a shoulder that can be directly attached to the wave generator.



波发生器
Wave generator

键Key

平垫Plain washer

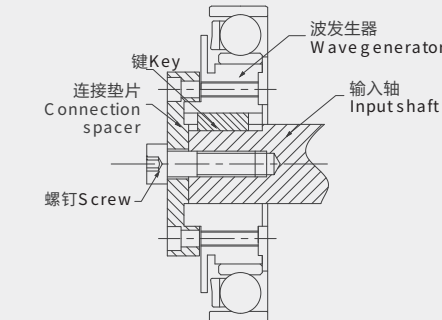
螺钉Screw

输入轴
Input shaft

隔圈
Spacer ring

2. 输入轴加隔圈后与波发生器连接输入轴有轴肩，但长度过长，可以在轴上加一个隔圈（该隔圈两面平行度需在0.01mm以内）后再与波发生器连接固定。

2. The input shaft is connected to the wave generator after adding the spacer ring. The input shaft has a shoulder with a length too long, and a spacer (the parallelism of the two sides of the spacer ring shall be within 0.01mm) can be applied to the shaft and then the shaft can be fixed to the wave generator.



波发生器
Wave generator

键Key

连接垫片
Connection spacer

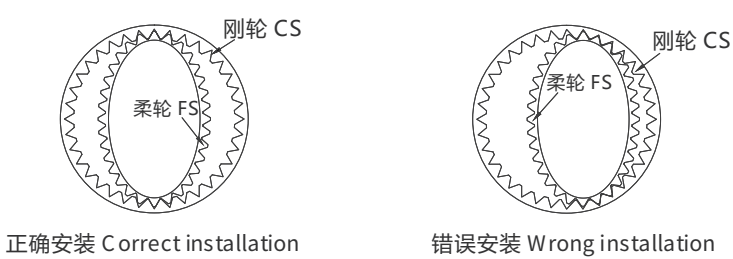
螺钉Screw

输入轴
Input shaft

3. 用连接垫片固定在波发生器上后与输入轴连接输入轴无轴肩，需用一个连接垫片先固定在波发生器上后再与输入轴连接固定。

3. Attached to the wave generator with a connection spacer and connected to the input shaft. The input shaft has no shoulder, and it needs to be fixed to the wave generator with a connection spacer, and then fixed to the input shaft.

5.4安装注意事项 Precautions for installation



- 谐波减速器必须在足够清洁的环境下安装，安装过程中不能有任何异物进入减速器内部，以避免使用过程中造成减速器的损坏。
 - 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。
 - 请勿改变产品零件组合，组件成套才能够保证其性能，因此，请勿更换组合零件。
 - 请注意避免产品掉落，波发生器及柔轮掉落，即使表面没有出现伤痕，内部应力改变仍可能会降低疲劳强度，请勿使用掉落的产品。
 - 请在组装时避免使波发生器及柔轮承受过度的力，可通过使波发生器旋转顺畅的实施插入。
 - 安装波发生器后，请确认柔轮与刚轮啮合是180度对称的，如偏向一边，则会引起振动并使柔轮很快损坏。装配是否啮合正常可通过以下两种方法判别：
a、输出端不带负载的情况下用手转动输入轴，若转动过程中所需的力极不均匀，则有可能安装错误。
b、输出端不带负载的情况下使用电机旋转，当电机的平均电流值为正常情况下的2~3倍时，则有可能安装错误。
 - 安装完成后请先低速（100r/min）运行，如有异常振动或响声，请立即停止使用并联系我司，避免因安装不正确造成减速器的损坏。
- The harmonic reducer shall be installed in a sufficiently clean environment, and no foreign matter is allowed to enter the inside of the reducer during installation to avoid damage to the reducer during use.
 - Make sure that the gear face and flexible bearing parts of the reducer are always lubricated adequately. It is not recommended that the tooth surface be always facing up, which affects the lubrication effect.
 - Do not change the product part combination. As the complete set guarantees their performance, do not replace the combined parts.
 - Please take care to avoid product falling. Even if there are no scratches on the surface, internal stress changes may reduce the fatigue strength, when the wave generator and the FS falls. Do not use dropped products.
 - Please avoid excessive force on the wave generator and the FS during assembly. A smooth insertion occurs by rotating the wave generator.
 - After installing the wave generator, make sure that the FS and the CS are 180 degrees symmetrical. If it is biased to one side, it causes vibration and the FS shall be damaged quickly. The following two methods are used to determine whether the assembly is meshed properly:
a. Turn the input shaft by hand when the output end is not loaded, if the force required during the rotation is extremely uneven, there is a possibility of installation error.
b. Make the motor rotates when the output end does not have a load, if the average current value of the motor is 2-3 times under normal conditions, there may be an installation error.
 - Please run at low speed (100r/min) after installation. If there is abnormal vibration or noise, please stop using it immediately and contact us to avoid damage to the reducer due to improper installation.

5.5 润滑脂 Greases

我司产品在出厂前，其内部均已封入润滑脂，但在组装波发生器时须注入、涂抹润滑脂。

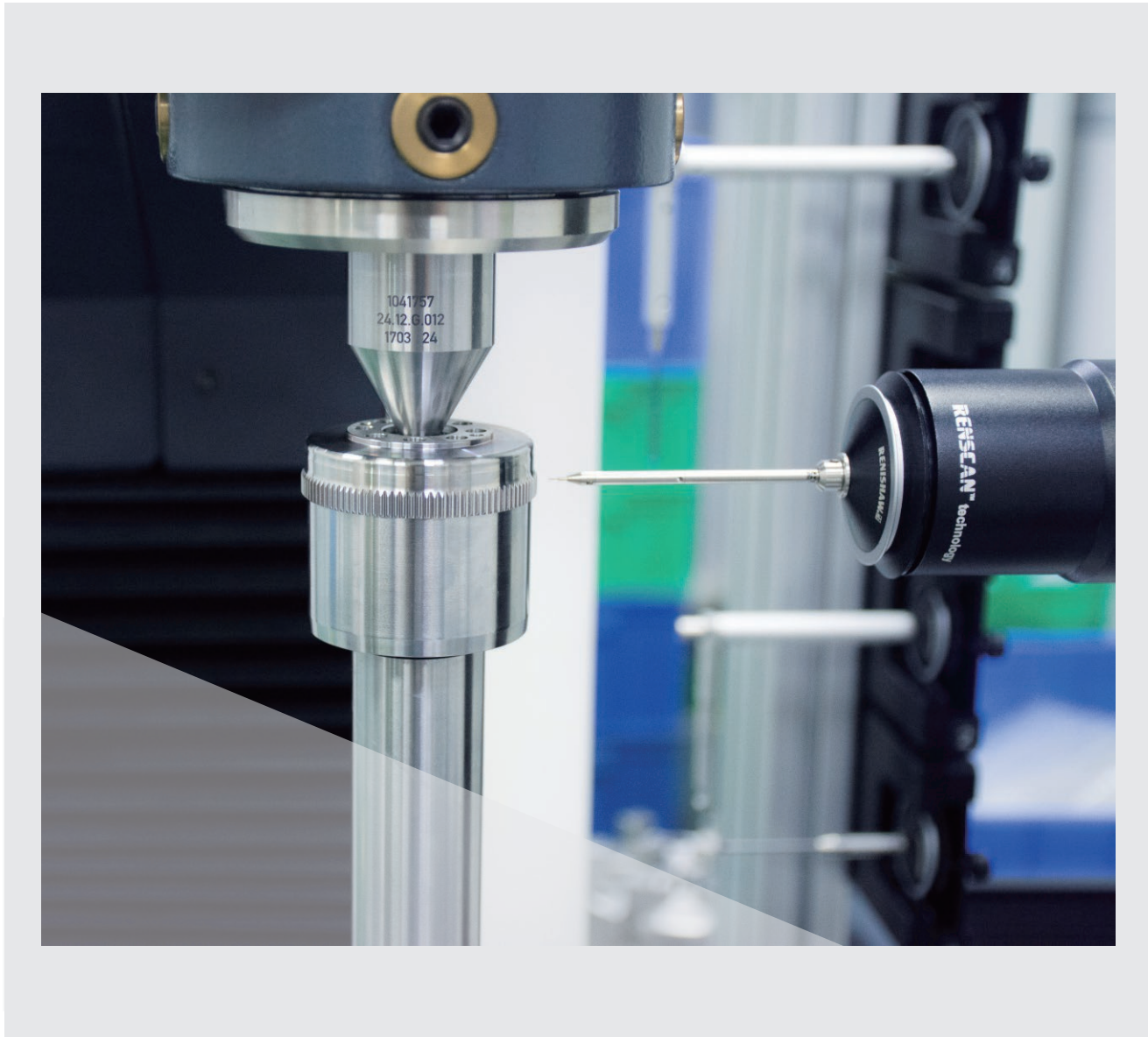
使用润滑脂的注意事项：

1. 谐波减速器的输入、输出端必须设计严格的密封机构。
2. 必须使用我司专用谐波润滑脂，并避免与其他润滑脂混用。
3. 润滑脂的使用方法必须按照我们的安装说明书的要求进行，请注意不同机型润滑脂的注入和涂抹量不同。
4. 谐波减速器在使用过程中，如果波发生器始终处于朝上的状态，可能会引起润滑不良，此时应增加润滑脂注入量或咨询本司。
5. 润滑脂的性能会随温度发生变化，温度越高劣化越快。为了保证润滑脂始终处于良好状态，谐波减速器高温端的热平衡温度应低于60℃，温升小于40℃。
6. 谐波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。

Our products have been sealed with grease inside before delivery. However, grease must be injected and applied when the wave generator is assembled.
Precautions for grease use:

1. Strict sealing mechanism must be designed at the input and output of the harmonic reducer
2. Dedicated harmonic grease of our company shall be used and mixing with other greases shall be avoided.
3. The grease must be used in accordance with the requirements of our installation instructions. Pay attention that different greases are injected and applied in different amounts.
4. If the wave generator is always facing up during the harmonic reducer is in use, it may cause poor lubrication. In this case, increase the amount of grease injected or consult with us.
5. The performance of the grease changes as the temperature changes, and the higher the temperature, the faster the degradation. In order to ensure that the grease is always in good condition, the heat balance temperature at the high temperature end of the harmonic reducer should be lower than 60℃, and the temperature rise should be less than 40℃.
6. The wear of the moving parts of the harmonic reducer is mainly affected by the performance of the grease. If it is possible, the harmonic reducer should be replaced with grease for every 3,000 hours of operation.

第三部分 Part III 质量管控 Quality Control



1.质量管控Quality Control

致力于打造智能制造无人生产车间，严格执行ISO9001质量管理体系、ISO14001环境管理体系并配备世界顶级加工、检测设备，为产品加工提供坚实质量保障。

Haozhi is committed to building smart manufacturing workshops with no staff, implementing strictly ISO9001 quality management system, and ISO 14001 environmental management system, which in combination with world top processing equipment and testing equipment surely guarantee the quality of product processing.

谐波减速器上的柔轮和刚轮分别采用国际最先进的滚齿机、插齿机等先进的高精度设备加工，齿形的精度更高，质量更有保证。

The flexible wheel and the rigid wheel of the harmonic reducer are respectively processed by a series of advanced highprecision equipment such as the most advanced gear hobbing machine machine and gear shaping machine in the world, and the tooth shape has higher precision and better quality.

所有关键零部件原材料坚持选用国际一流品牌作为供应商，从原材料开始，层层管控零部件的质量。为了保证产品质量，所有零部件所有工序严格执行三检制度（首检、专检、互检）。

All key spare parts and components of our products are supplied by international first class brands. The quality of the parts and components has been controlled since the choosing of raw materials. In order to ensure product quality, all parts and components are strictly in accordance with the three inspection system (first inspection, special inspection, mutual inspection).

1.1柔轮加工质量管控 FS Processing quality control

优选材料采用独特的热处理及表面处理工艺；公司自主开发专用探伤检测仪器，克服行业检测技术壁垒，确保产品品质。

Preferred materials with unique heat treatment and surface treatment process; Dedicated flaw detector was developed independently by the company to overcome the technical barriers of the industry and ensure product quality.



柔轮无损探伤检测 Nondestructive testing for FS



柔轮无损探伤检测 Nondestructive testing for FS

1.2轴承选择及监控 Bearing selection and monitoring

公司建有全国领先的轴承测试技术中心，选用的每一颗轴承均经过严格的技术检测，产品装机后，对每一台减速器进行振动频谱故障监控与诊断，严把产品质量关，避免不良产品流入客户端，真正实现产品的全闭环控制。

Our company has a national leading bearing testing technology center. Every bearing we choose is subject to rigorous technical testing. After the product is installed, the spectrum monitoring and diagnosis of vibration faults is performed for each reducer, so that the quality of the product is strictly controlled to prevent the bad products from flowing into the client-side, and the full closed-loop control of the product is truly realized.



轴承实验室 Bearing laboratory

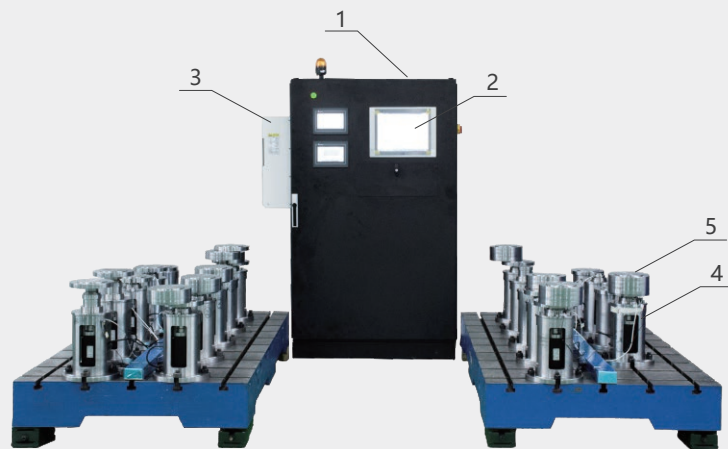


轴承频谱 Bearing frequency spectrum

1.3测试平台 Test platform

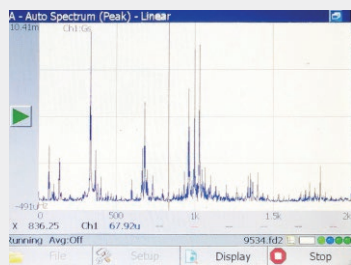
自2014年开发谐波减速器至今，经过多年的理论与实践摸索，开发设计了专业的谐波减速器测试平台，完善并建立谐波减速器测试标准及检测体系。所有规格的产品均经过严格的、专业的空载、额定负载、超载实验，对起动转矩、扭转刚性、传递精度、精度保持性能、温升、噪声等重要参数进行专检专测。昊志设计研发了专业设备对产品全生命周期的噪声、温升、振动、频谱等进行全面监控，其建立的快速评价体系可大大缩短产品横向评价周期（30天完成所有项目评价）。

Since the development of the harmonic reducer in 2014, we have developed and designed a professional harmonic reducer test platform, and improved and established test standards and test system for harmonic reducer after years of theoretical research and practice. Strict and professional no-load, rated load, and overload tests are carried out for products of all specifications. Special inspections and tests are carried out to measure important parameters such as starting torque, torsional rigidity, transmission accuracy, accuracy stability, temperature rise, and noise, etc. Haozhi designed and developed professional equipment to monitor the noise, temperature rise, vibration and spectrum of the whole life cycle of the product comprehensively. The rapid evaluation system established by it can shorten the horizontal evaluation period of the product greatly (all project evaluations can be completed in 30 days).

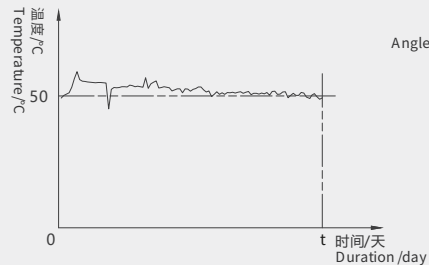


1-控制柜 2-显示器 3-冷却装置 4-测试台组件 5-负载
1-control cabinet 2-monitor 3-cooling unit 4-test bench assembly 5-load

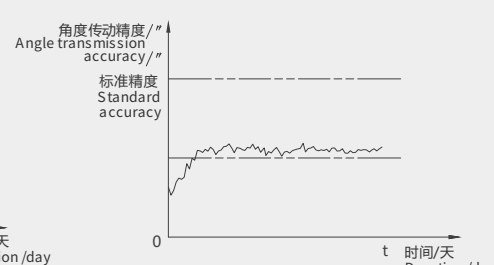
测试设备 Test equipment



频谱测试结果
Spectrum test results

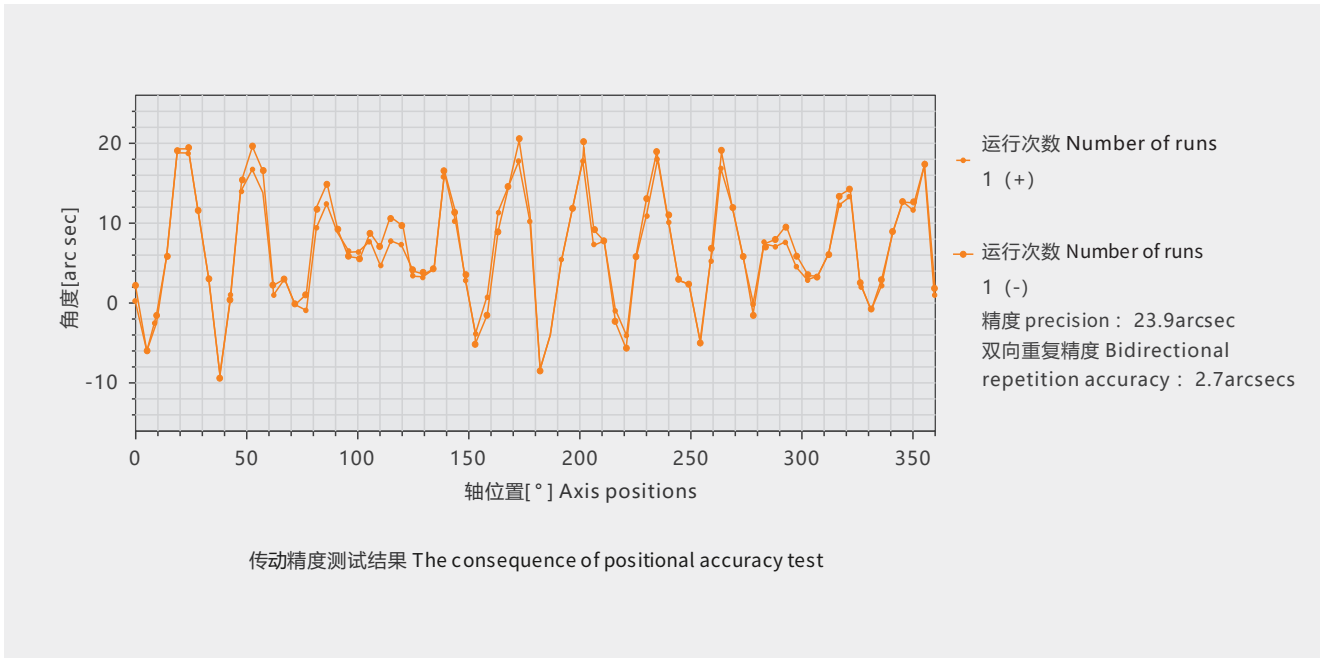


额定负载壳体温度变化情况
Housing temperature changes
of rated load



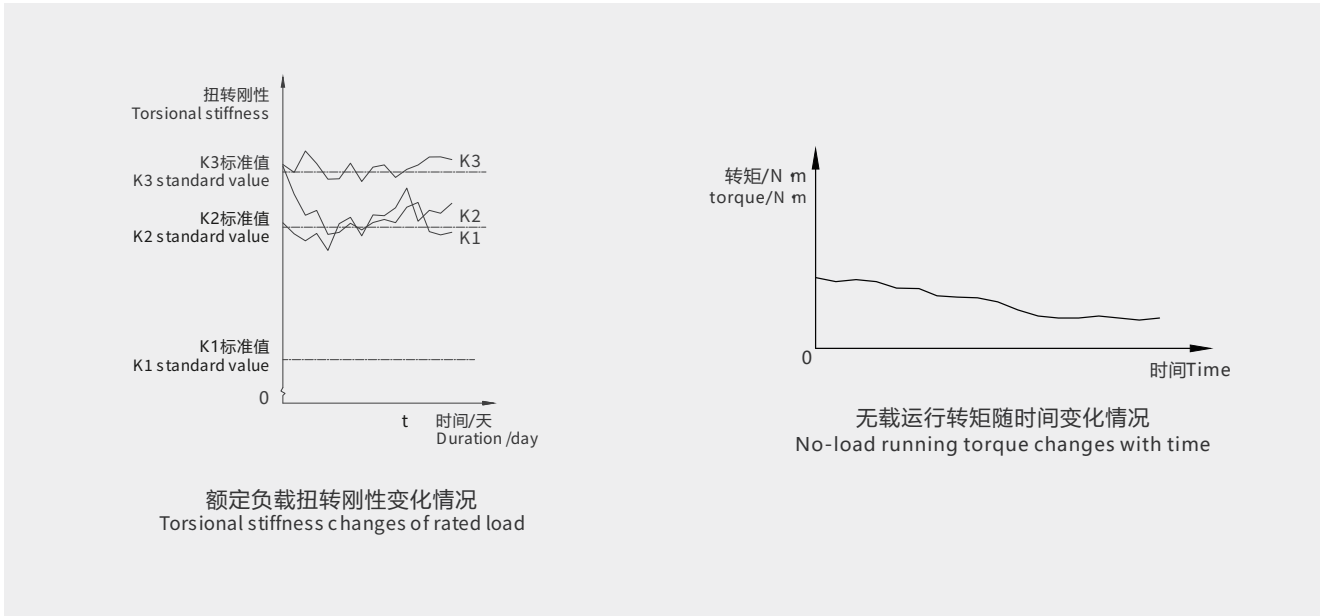
额定负载角度传动精度变化情况
Angle transmission accuracy changes
of rated load

1.4传动精度测试 Positional accuracy test



传动精度测试结果 The consequence of positional accuracy test

1.5无载运行转矩及扭转刚性测试 No-load running torque and torsional rigidity test



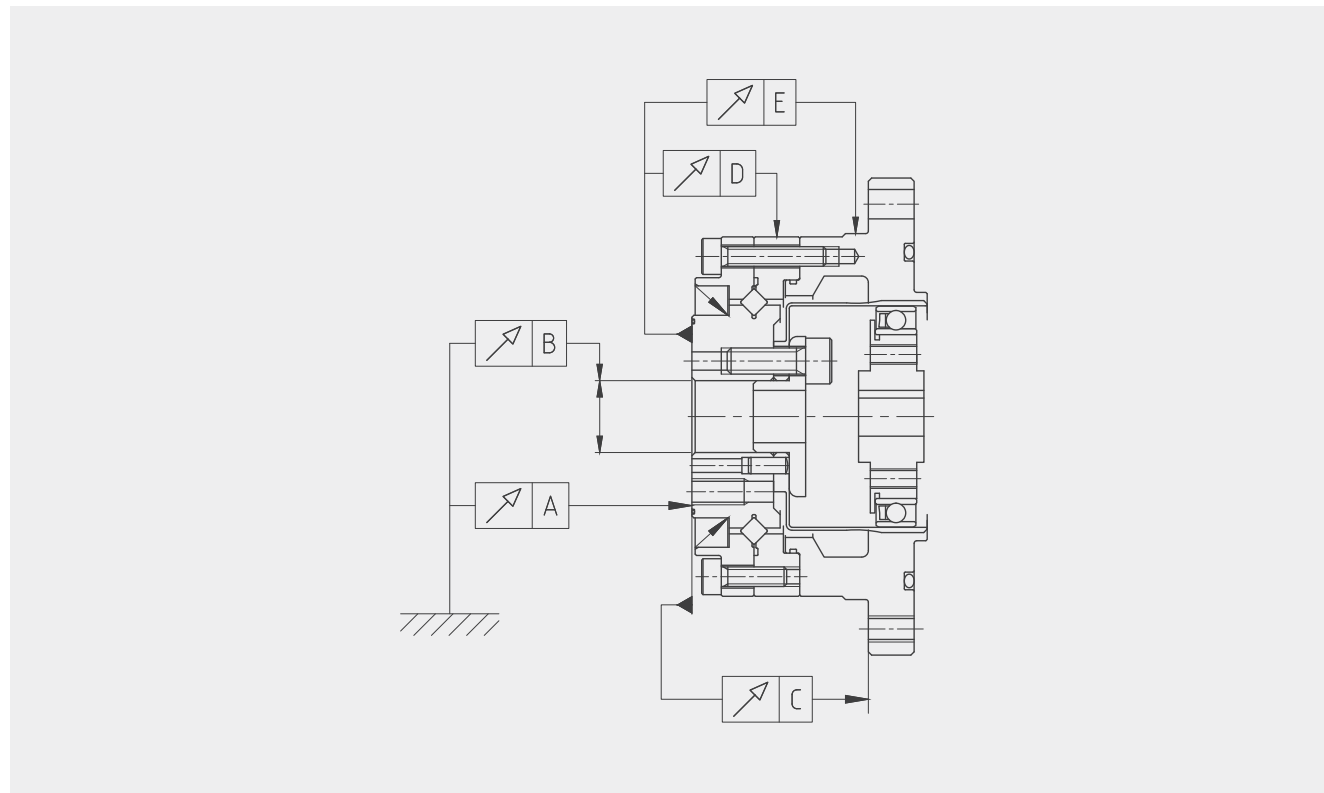
额定负载扭转刚性变化情况
Torsional stiffness changes of rated load

无载运行转矩随时间变化情况
No-load running torque changes with time

2.机械精度 Mechanical precision

本司所有产品均执行严格的出厂检验，为保证整机精度，本司对谐波减速器的机械精度做出如下要求。
All products of the company are subject to strict factory inspection. In order to ensure the accuracy of the whole machine, the following requirements are made to the mechanical precision of the harmonic reducer.

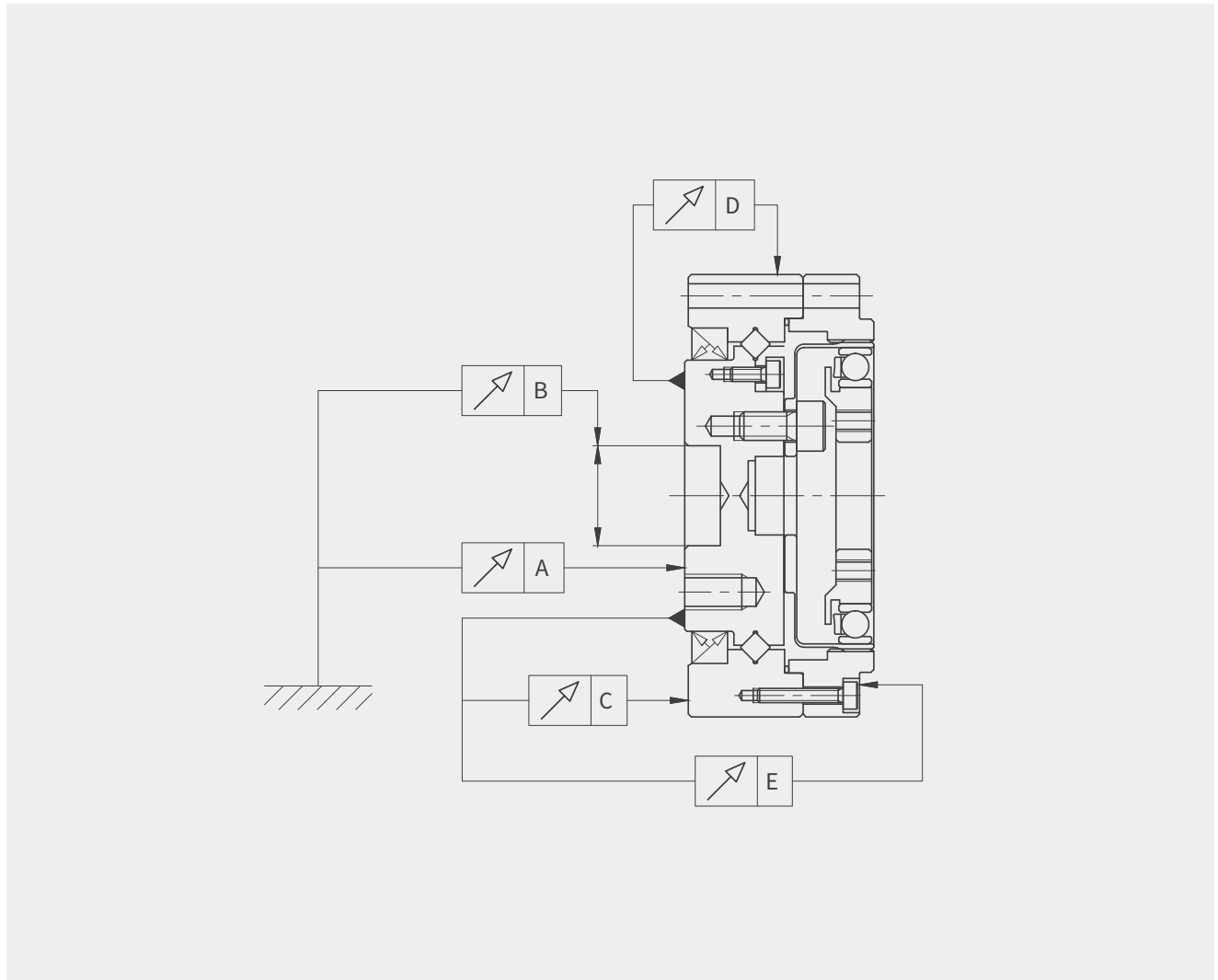
2.1DCS(G)系列 DCS(G) Series



单位Unit:mm

符号 Symbol	型号 Size	14	17	20	25	32	40	45
A		0.010	0.010	0.010	0.015	0.015	0.015	0.018
B		0.010	0.012	0.012	0.013	0.013	0.015	0.015
C		0.024	0.026	0.038	0.045	0.056	0.060	0.068
D		0.010	0.010	0.010	0.010	0.010	0.015	0.015
E		0.038	0.038	0.047	0.049	0.054	0.060	0.065

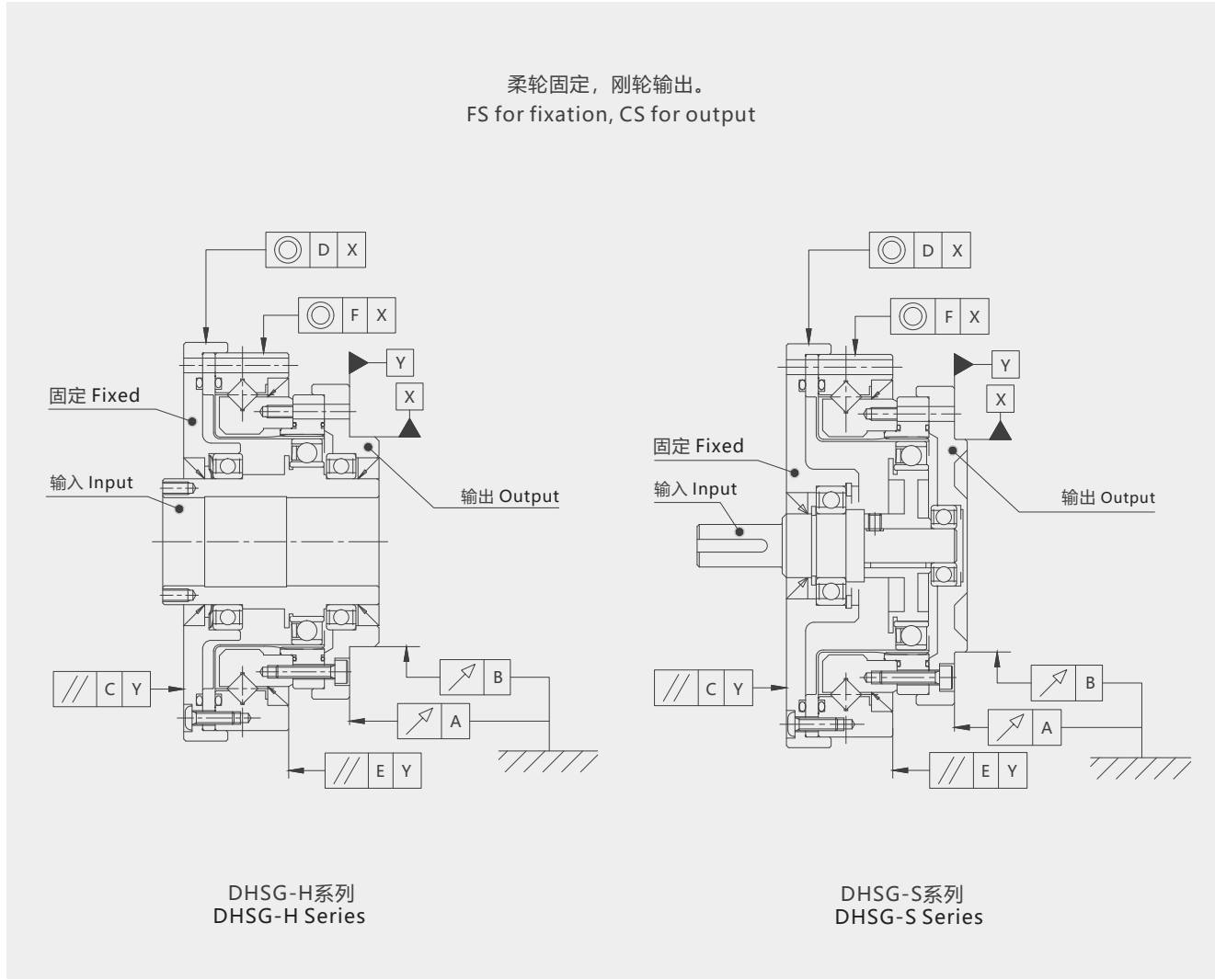
2.2DCD系列 DCD Series



单位Unit:mm

符号 Symbol	型号 Size	14	17	20	25	32
A		0.010	0.010	0.010	0.015	0.015
B		0.010	0.012	0.012	0.013	0.013
C		0.007	0.007	0.007	0.007	0.007
D		0.010	0.010	0.010	0.010	0.010
E		0.025	0.025	0.025	0.035	0.037

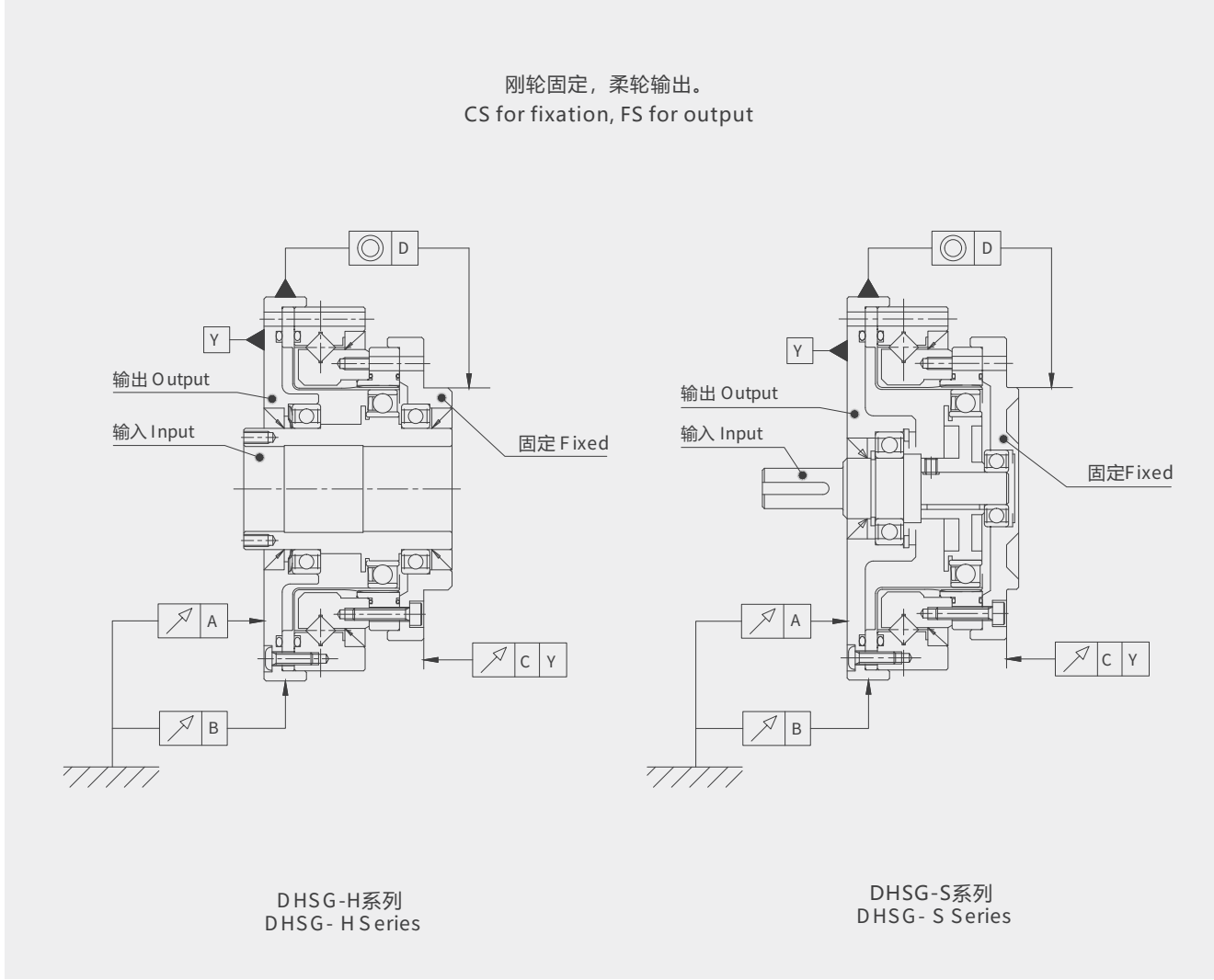
2.3DHSG-H/S系列 DHSG-H/S Series



单位Unit:mm

符号 Symbol	型号 Size	14	17	20	25	32	40	45
A		0.033	0.038	0.040	0.046	0.054	0.057	0.057
B		0.035	0.035	0.039	0.041	0.047	0.050	0.053
C		0.064	0.071	0.079	0.085	0.104	0.111	0.118
D		0.053	0.050	0.059	0.061	0.072	0.075	0.078
E		0.040	0.045	0.051	0.057	0.065	0.071	0.072
F		0.038	0.038	0.047	0.049	0.054	0.060	0.065

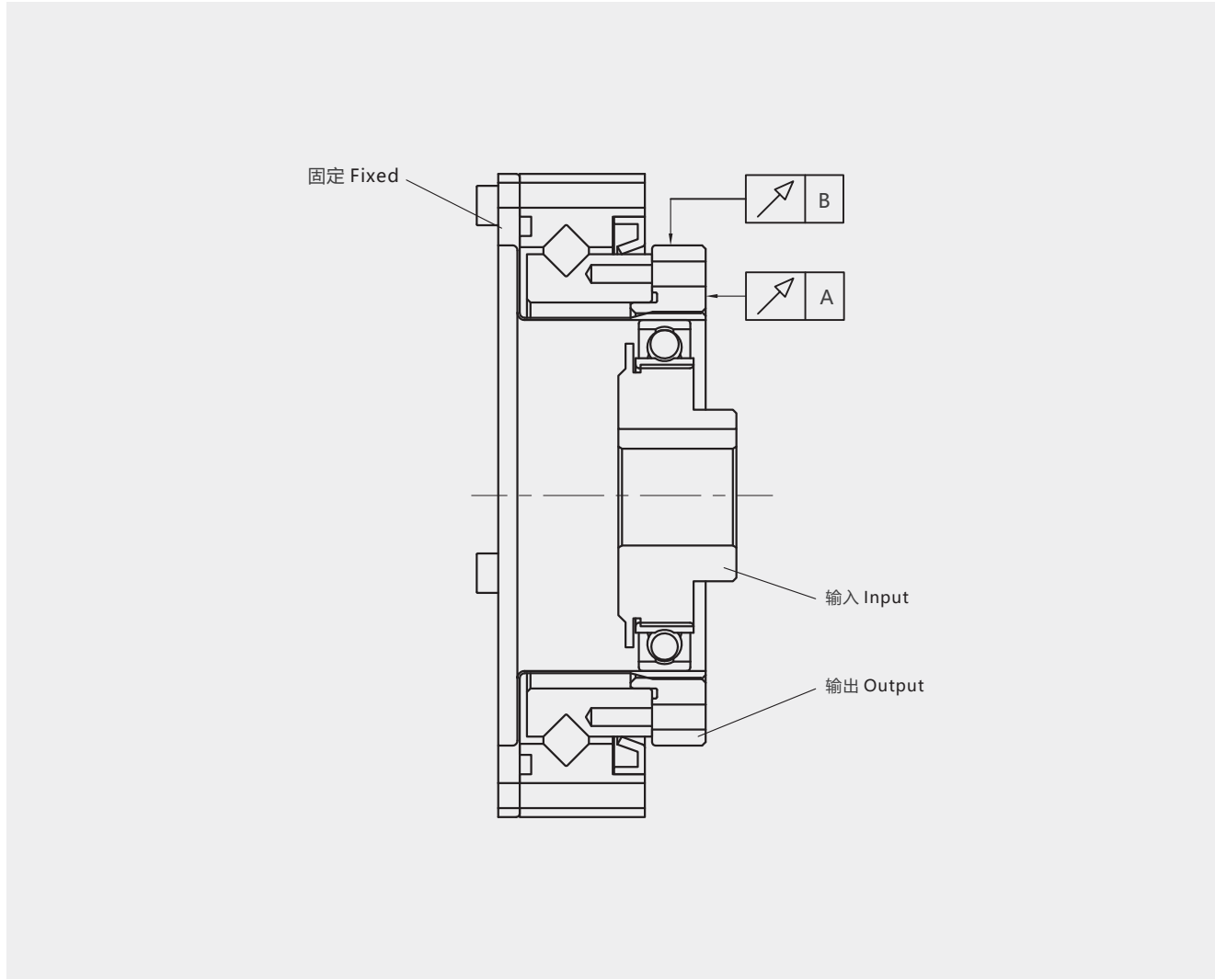
2.3DHSG-H/S系列 DHSG-H/S Series



单位Unit:mm

符号 Symbol	型号 Size	14	17	20	25	32	40	45
A		0.037	0.039	0.046	0.047	0.059	0.060	0.070
B		0.031	0.031	0.038	0.038	0.045	0.048	0.050
C		0.064	0.071	0.079	0.085	0.104	0.111	0.118
D		0.053	0.053	0.059	0.061	0.072	0.075	0.078

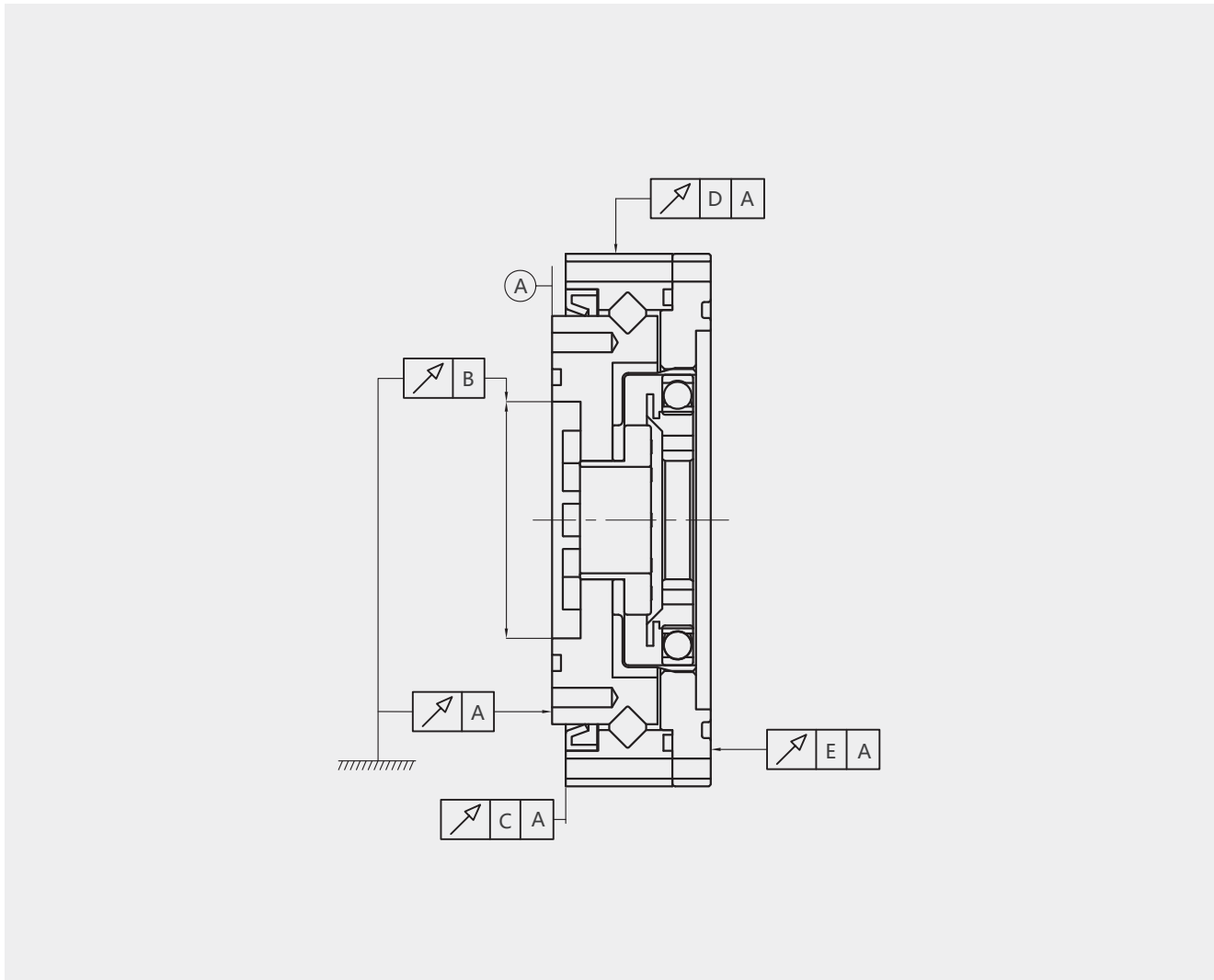
2.4DHSR-R系列& DHD-R系列
DHSR-R Series&DHD -R Series



单位Unit:mm

型号 Size 符号 Symbol	14	17	20	25	32
A	0.033	0.038	0.040	0.046	0.054
B	0.035	0.035	0.039	0.041	0.047

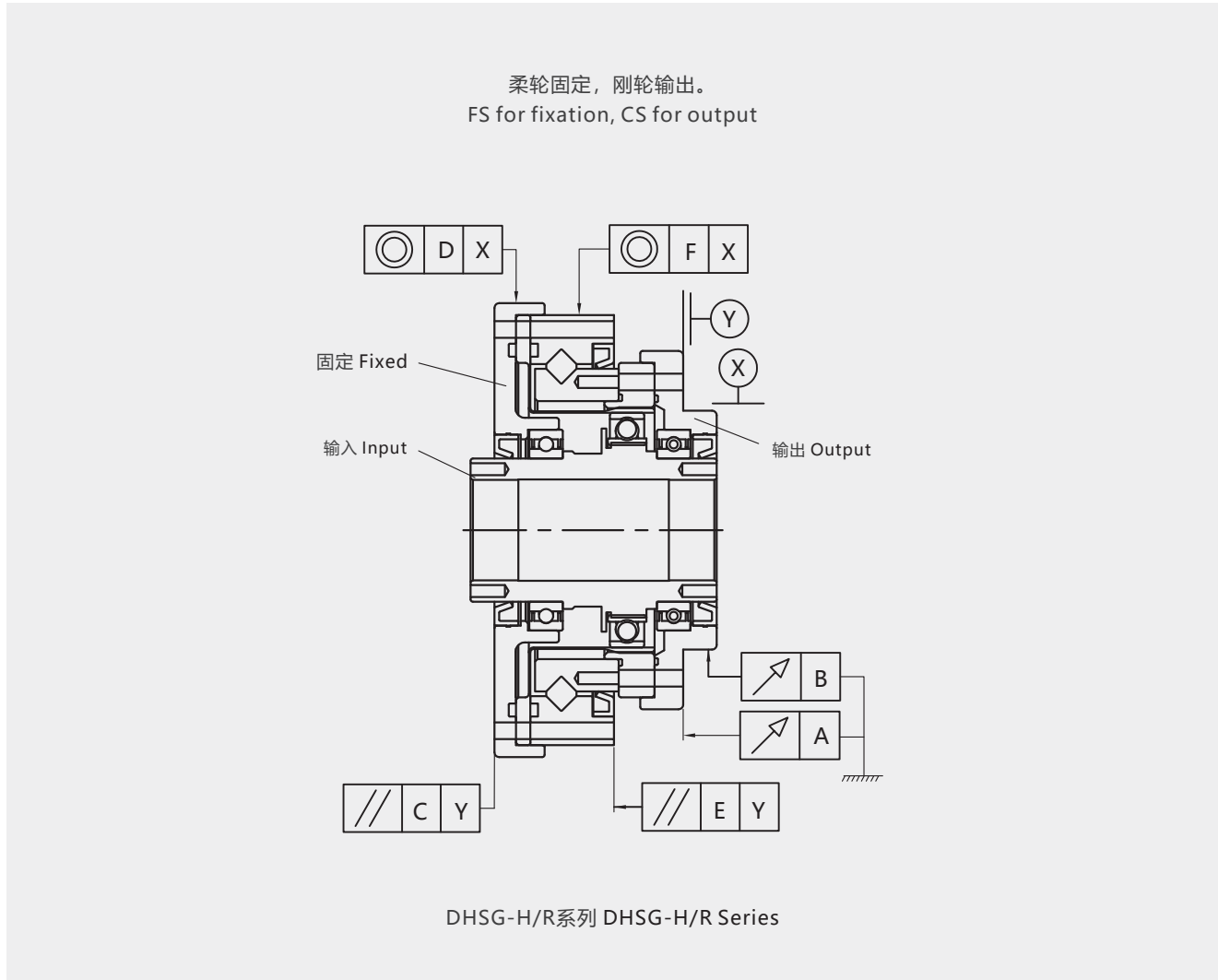
2.5DCDF系列 DCDF Series



单位Unit:mm

型号 Size 符号 Symbol	14	17	20	25	32
A	0.010	0.010	0.010	0.015	0.015
B	0.010	0.010	0.010	0.010	0.013
C	0.010	0.010	0.010	0.010	0.013
D	0.010	0.010	0.010	0.010	0.013
E	0.031	0.031	0.031	0.041	0.047

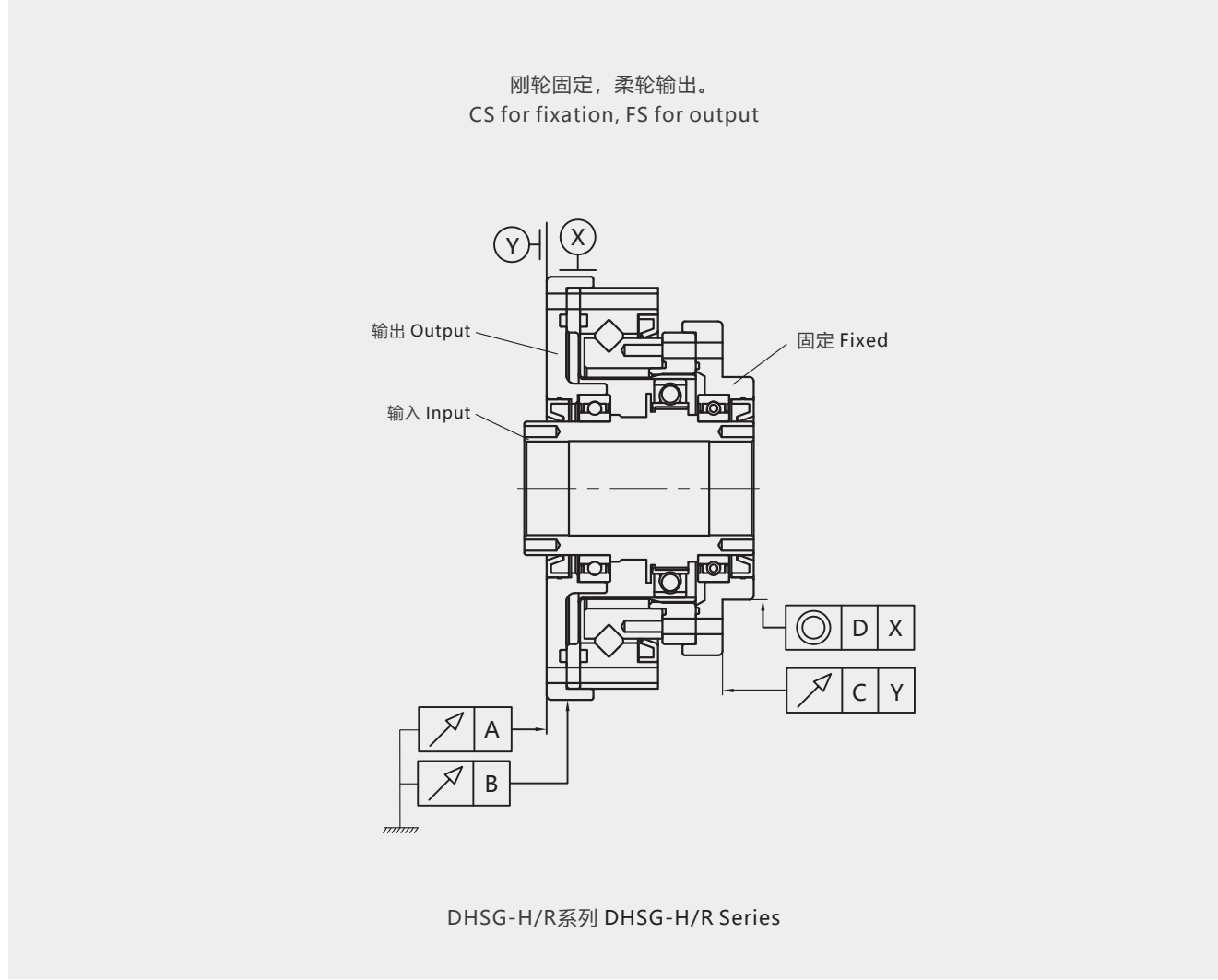
2.6DHD-H/R系列 DHD -H/R Series



单位Unit:mm

型号 Size 符号 Symbol	14	17	20	25	32
A	0.033	0.038	0.040	0.046	0.054
B	0.035	0.035	0.039	0.041	0.047
C	0.064	0.071	0.079	0.085	0.104
D	0.053	0.050	0.059	0.061	0.072
E	0.040	0.045	0.051	0.057	0.065
F	0.038	0.038	0.047	0.049	0.054

2.6DHD-H/R系列 DHD -H/R Series



单位Unit:mm

型号 Size 符号 Symbol	14	17	20	25	32
A	0.037	0.039	0.046	0.047	0.059
B	0.031	0.031	0.038	0.038	0.045
C	0.064	0.071	0.079	0.085	0.104
D	0.053	0.053	0.059	0.061	0.072

第四部分 Part IV

昊志服务 Service of HaoZhi



1.昊志服务 Service of HaoZhi

公司通过坚持不懈的技术攻关和持之以恒的品质管理，构建了“整机-配件-服务”紧密结合的完整业务链。面向国内市场迅速扩张的机器人行业，与客户建立长期、稳定的合作共赢关系同时，将为客户提供全方位的服务。

It builds a complete business chain integrating "overall unit-accessory-service" through making technological breakthroughs and quality management in a persistent way. The robot industry is expanding rapidly in the domestic market. At the same time as establishing long-term and stable cooperation and win-win relationship with customers, we will provide customers with a full range of services.

拥有昊志，您将获得： With HaoZhi, you will receive:



1.1 特色服务： Characteristic s services:

1、公司免费面向下游本体厂家开放谐波减速器快速横向评价测试服务；2、建立用户专属信息库，免费提供机器人国标性能检测及标定服务；3、客户享有两年质保期。

1. The company provides service of rapid lateral evaluation test for harmonic reducer with no charge, facing downstream body manufacturers; 2. Establish a user-specific information base and provide robot national standard performance testing and calibration services; 3. The customer enjoys a warranty period of two years.

1.2 售前服务： Characteristic s services:

1、根据客户需求，提供专业化建议和定制化服务；2、提供专家顾问式的售前服务，帮助客户选购最合适需求的产品。

1. Provide professional advice and customized services according to customer needs; 2. Provide expert consultant-style pre-sales s service to help customers select and purchase the product most suitable.

1.3 售中服务： In-sales s service:

根据客户的需求，从设计、装配、测试的角度为客户提供整体方案服务。

Provide customers with overall solution services from the perspective of design, assembly and testing according to customer needs.

1.4 售后服务： After-sales s service:

设有全天24小时400服务热线，执行4小时内响应，24小时内提供备品，72小时内维修好的本地化服务。

Localization services are provided. You will experience 400 service hotlines available 24 hours, be responded within 4 hours, spare parts available within 24 hours, and repair within 72 hours.

为客户带去超值 · 为股东创造所值
为员工体现价值 · 为社会营造增值

Deliver Extra Value To Customers.
Create Lucrative Value For Shareholders.
Help Employees Realize Their Values.
Bring Added-Value To Society.

市场布局 Market Layout



 Manufacturing Sites  Sales & Service Locations

Europe

- | | | |
|---|--|--|
|  Barcelona, Spain
MAVILOR MOTORS S.A.U. |  Yverdon-les-Bains, Switzerland
CYBELEC SA |  Lourdes, France
INFRANOR SAS |
|  Hanau, Germany
INFRANOR GERMANY |  Arese (MI), Italy
INFRANOR ITALY |  Barcelona, Spain
INFRANOR SPAIN |
|  Regensdorf, Switzerland
INFRANOR SWITZERLAND |  Lourdes, France
INFRANOR SAS | |

North America

-  Wilmington, MA, USA
INFRANOR USA

ASIA

- | | |
|---|--|
|  Guangzhou, China
Guangzhou Haozhi Industrial Co., Ltd. |  Yueyang, Hunan, China
KLKJ |
|  Shanghai, China
CNCT |  Yueyang, Hunan, China
Hunan Linear Motion |
|  Suzhou, China
Guangzhou Haozhi Industrial Co., Ltd. |  Shanghai, China
IMCT |
|  Bac Ninh Province, Vietnam
Haozhi Industrial (Vietnam) Co., Ltd. | |