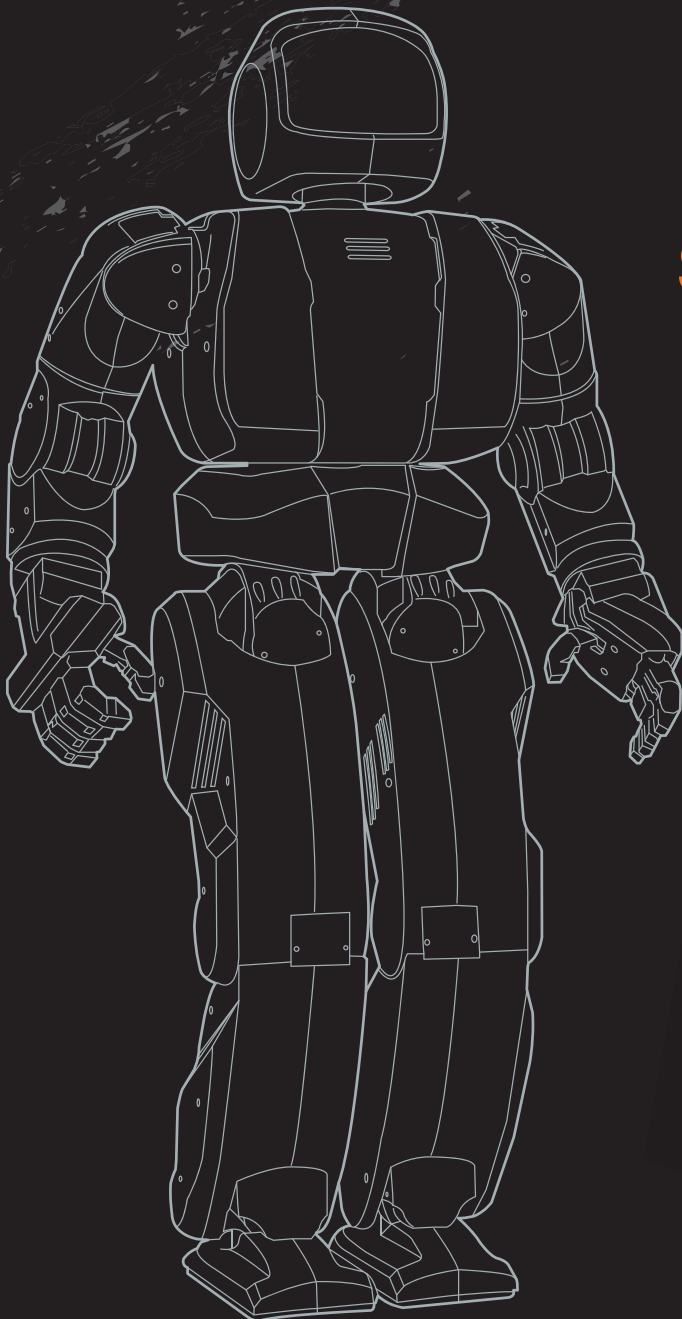
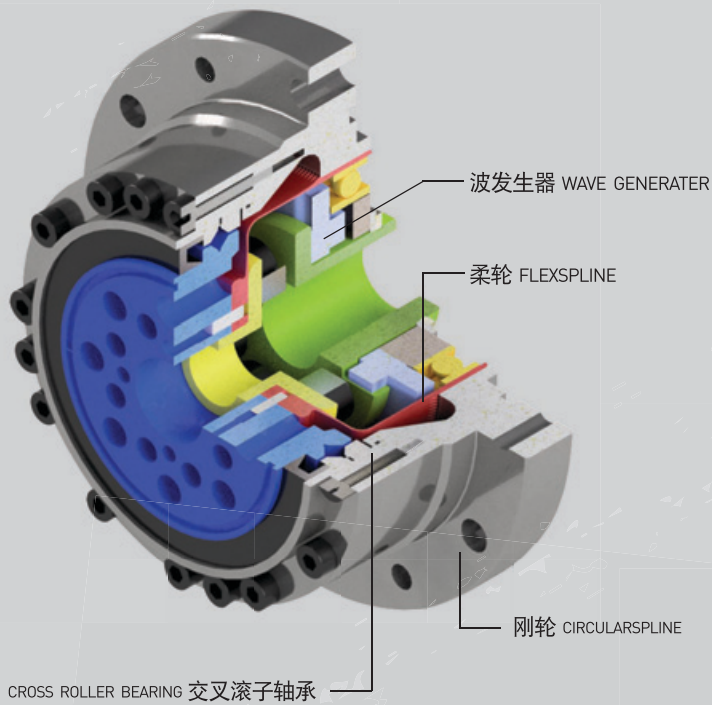




PRECISION REDUCER
SH精密减速机(谐波减速机)



SPG HIGH PRECISION REDUCER



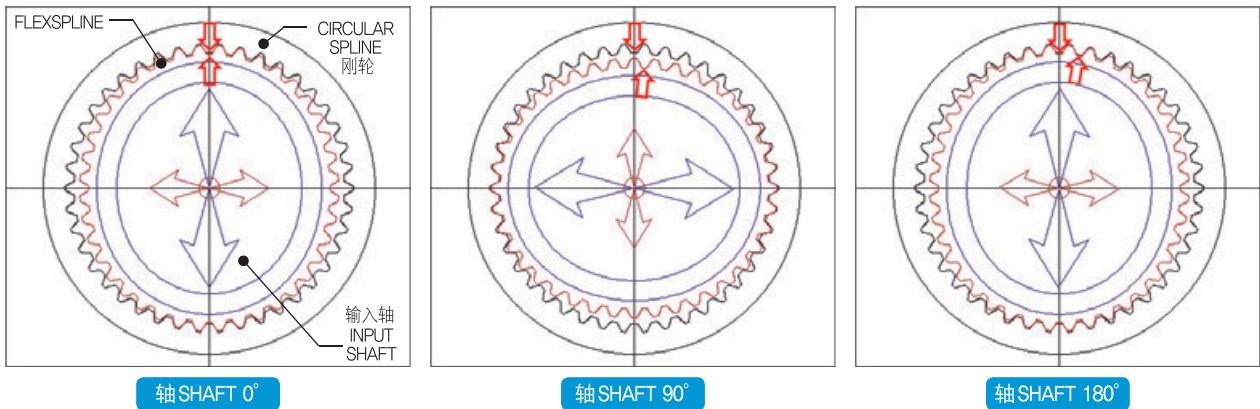
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1. 工作原理

Operating principle

■ 工作原理 Operating principle



- FLEXSPLINE(柔轮)的齿部向上下方向与C/S齿部啮合, 在左右完全分离。
- The teeth of FLEXSPLINE are interlocked with the teeth of C/S at the top and bottom and completely separated from the left and right.

- 将INPUT SHAFT(输入轴)向左(CCW)扭转, F/S弹性变形, 与C/S齿部啮合, 向右(CW)移动。
- When INPUT SHAFT is turned to the left(CCW), the F/S is elastically deformed and engages with the teeth of C/S and moves to the right(CW).

- C/S移向180° CCW方向旋转, F/S的一个齿向右(CW)方向移动。
- When C/S rotates in the direction of 180° CCW, one tooth of F/S moves in the CW direction.

■ 旋转方向及减速比 Rotational direction and reduction ratio

REDUCER 减速装置	① 输出: F/S Output	② 输出: C/S Output	③ 输出: C/S Output
	输入: W/G 固定: C/S Input Fixed	输入: W/G 固定: F/S Input Fixed	输入: F/S 固定: W/G Input Fixed
	$i = \frac{-1}{R}$	$i = \frac{1}{R+1}$	$i = \frac{R}{R+1}$
OVERDRIVE 增速装置	④ 输出: F/S Output	⑤ 输出: W/G Output	⑥ 输出: W/G Output
	输入: C/S 固定: W/G Input Fixed	输入: F/S 固定: C/S Input Fixed	输入: C/S 固定: F/S Input Fixed
	$i = \frac{R+1}{R}$	$i = -R$	$i = R+1$

R : 速度比 Speed ratio i : 减速比 Reduction ratio

■ 型号 Model

K	S	F	25	050	C	H	S	
名称 Series Name	形状 Series Name	转矩 Torque	型号 No.	减速比 Ratio		形式 Type	输入方法 Input option	特殊规格 Special type
	C : 杯型 Cup type S : 丝帽 Silk hat	F : 标准 Normal G : 高转矩 High torque D : 小巧 Compact	14 17 20 25 32	050 080 100 120 160	1/50 1/80 1/100 1/120 1/160	C : 组件 Component U : 单元 Unit S : 简易单元 Simple unit	H : 中空型 Hollow J : 轴型 Input shaft N : 标准型 Normal	

■ 型号例子 Model example

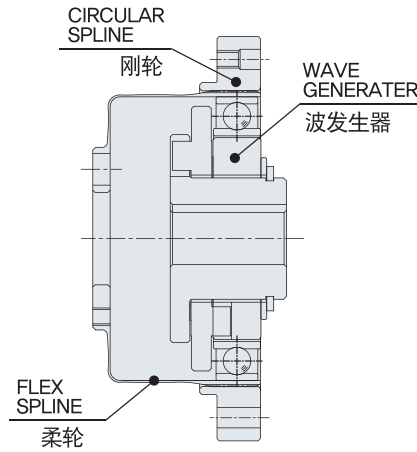
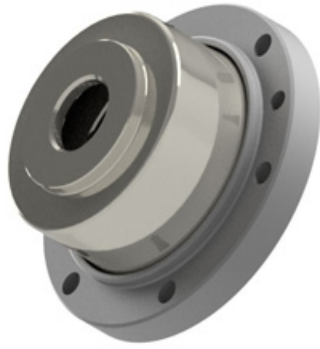
KCF - □ - □ - CN	KSF - □ - □ - CN	KSF - □ - □ - UH	KCD - □ - □ - C
KCF - □ - □ - UN	KSF - □ - □ - SN	KSF - □ - □ - UJ	KSD - □ - □ - S

3. 规格及尺寸

Specifications & Dimensions

■ 组件杯类型 (KCF - □ - □ - CN) Component Cup Type

结构图 Parts configuration



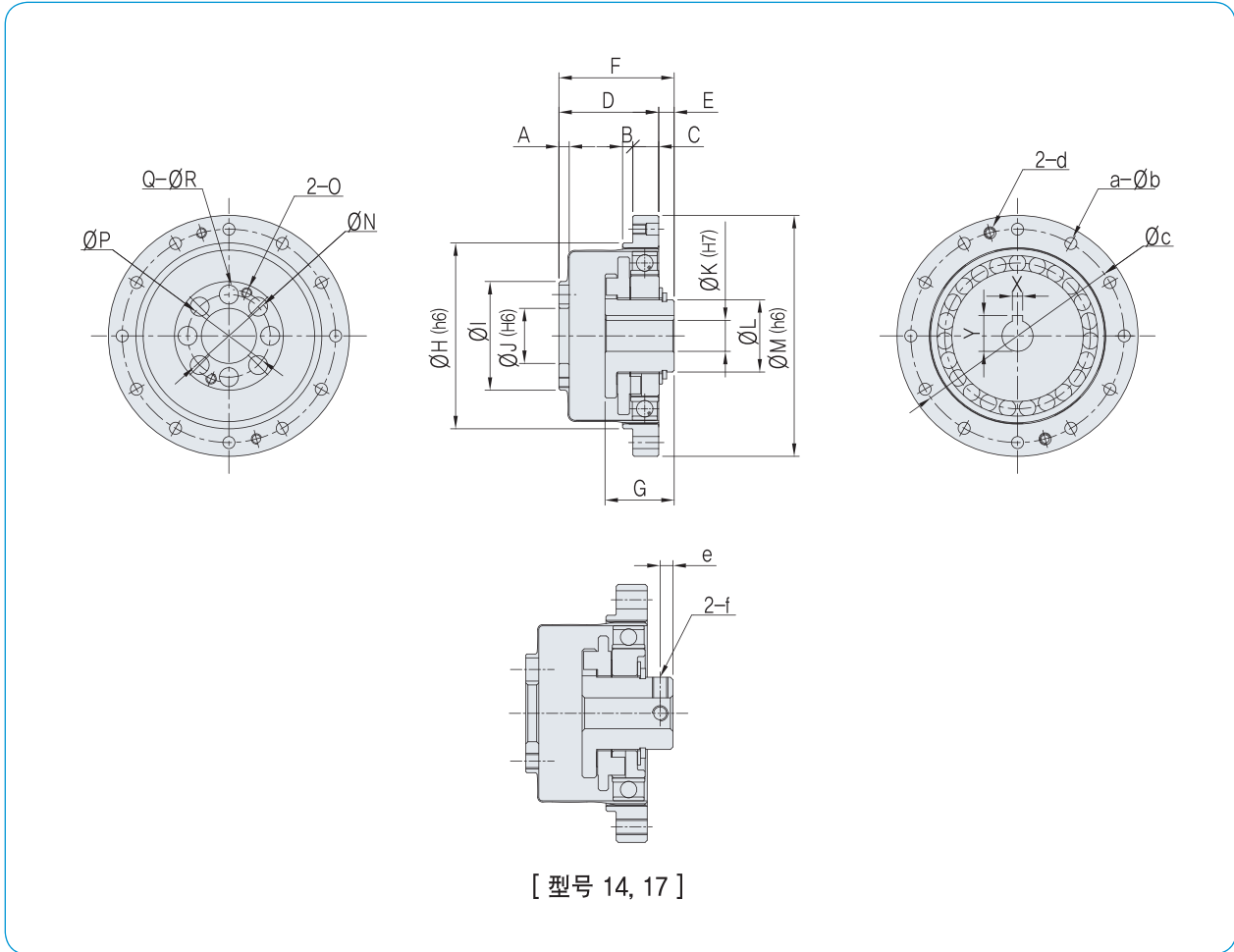
特点 Features

- 轻巧、简单设计
Compact and simple design
- 高转矩
High torque capacity
- 高刚性
High stiffness
- 零背隙(zero backlash)
Non-backlash
- 高定位精度和旋转精度
High positioning and rotational accuracies
- 同轴输入输出
Coaxial input and output

特征表 Specifications

型号 No.	14			17				20				25				32			
	50	80	100	50	80	100	120	50	80	100	120	50	80	100	120	50	80	100	120
额定转矩 Rated torque (Nm)	7	9	9	21	26	28	28	33	40	47	47	51	66	70	70	89	122	142	142
容许转矩 Allowable torque (Nm)	23	27	32	44	50	63	63	73	83	96	96	127	142	163	163	253	316	346	346
瞬间容许最大转矩 Maximum torque (Nm)	46	55	63	91	101	129	129	127	149	172	172	242	266	295	295	447	590	673	673
传动精度 Transmission angular accuracy (arc min)	2.0	1.5	1.5	2.0	1.5	1.5	1.5	1.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
回程误差 Hysteresis loss (arc min)	2.0	1.5	1.5	2.0	1.5	1.5	1.5	2.0	1.0	1.0	1.0	2.0	1.0	1.0	1.0	2.0	1.0	1.0	1.0
额定输入转数 Rated input rotational speed (rpm)	3,000			3,000				3,000				3,000				3,000			
最大输入转数 Permissible max. input rotational speed (rpm)	8,500			7,300				6,500				5,600				4,800			
转动惯量 Inertia moment ($\times 10^{-4}$ kgm ²)	0.038			0.085				0.207				0.544				1.630			
重量(kg) Weight	0.10			0.20				0.26				0.43				0.91			

外观尺寸 Dimensions



[mm]

型号 No.	A	B	C	D	E	F	G	ØH	ØI	ØJ	ØK	ØL	ØM
14	2.5	2	6	23.5	5	28.5	17.6	38	23	11	6	14	50
17	3	2.5	6.5	26.5	6	32.5	19.5	48	26.9	10	8	18	60
20	3	3	7.5	29	4.5	33.5	20.1	54	31.6	16	9	21	70
25	3	3	10	34	3	37	20	67	40	20	11	26	85
32	3.2	3	14	42	2	44	21.8	90	52	26	14	26	110

型号 No.	ØN	O	ØP	Q	ØR	X	Y	a	Øb	Øc	d	e	f
14	18.5	M3	17	6	4.5	-	-	6	3.5	44	M3	2.5	M3
17	21.5	M3	19	6	5.5	-	-	12	3.4	54	M3	3	M3
20	27	M3	24	8	5.5	3	10.4	12	3.5	62	M3	-	-
25	34	M4	30	8	6.5	4	12.8	12	4.5	75	M4	-	-
32	45	M5	40	8	9	5	16.3	12	5.5	100	M5	-	-

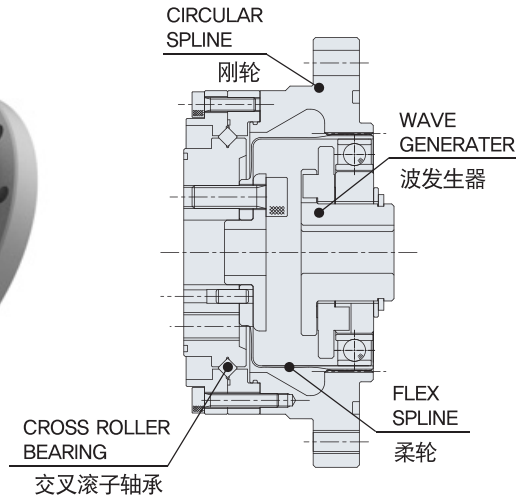
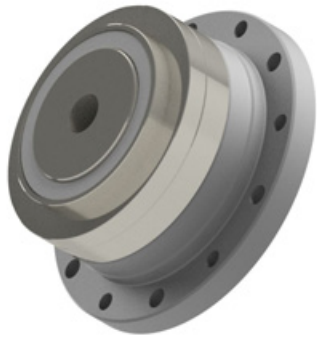
- 注) 1. 为改善产品，可以在无通知下更改尺寸等。
 You can change dimensions without advance notice for product improvement.
 2. 根据输入规格，K、X、Y会变化。
 K, X and Y can vary depending on the input specification.

3. 规格及尺寸

Specifications & Dimensions

■ 单元杯类型 (KCF - □ - □ - UN) Unit Cup Type

结构图 Parts configuration



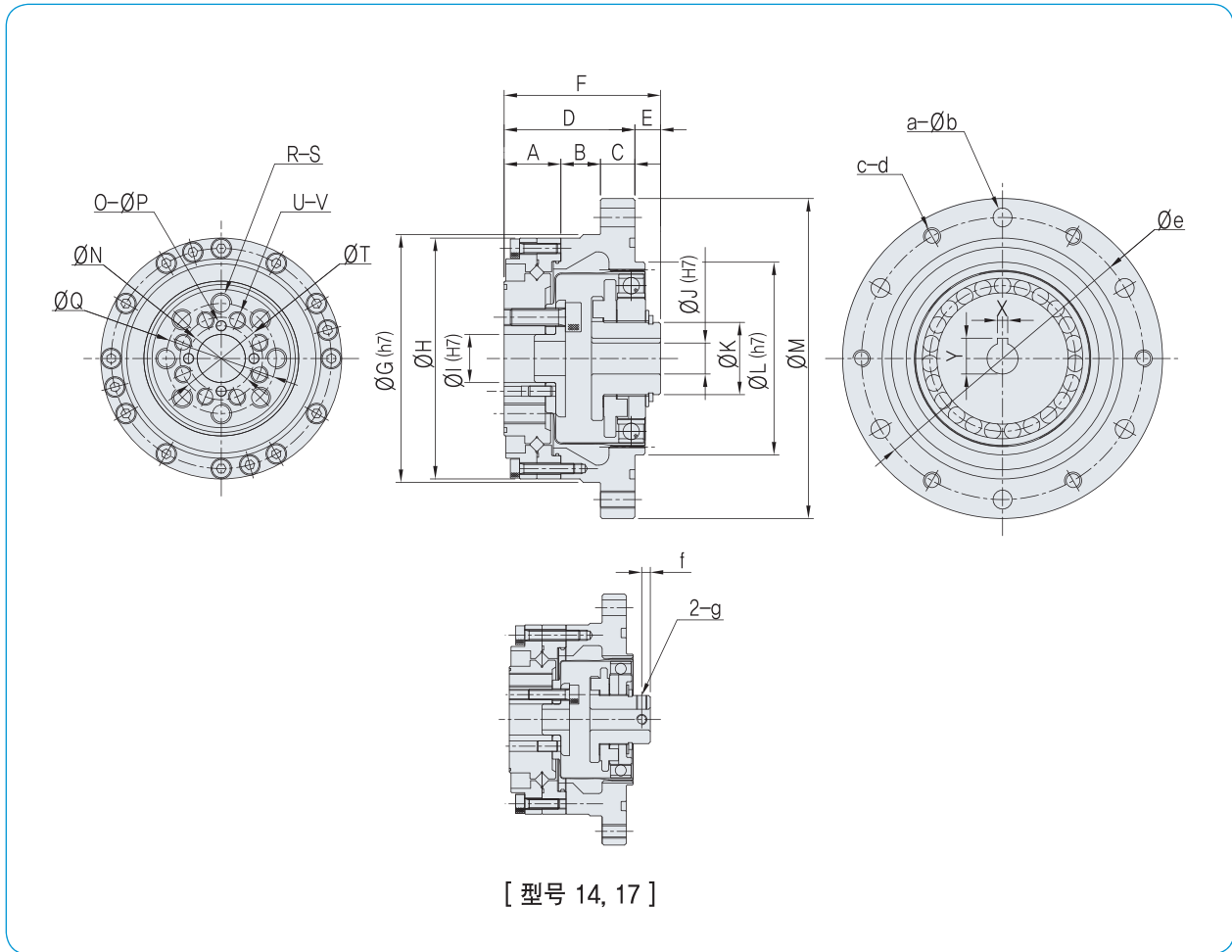
特点 Features

- 轻巧、简单设计
Compact and simple design
- 高转矩
High torque capacity
- 高刚性
High stiffness
- 零背隙(zero backlash)
Non-backlash
- 高定位精度和旋转精度
High positioning and rotational accuracies
- 同轴输入输出
Coaxial input and output

特征表 Specifications

型号 No.	14			17				20				25				32			
	50	80	100	50	80	100	120	50	80	100	120	50	80	100	120	50	80	100	120
额定转矩 Rated torque (Nm)	7	9	9	21	26	28	28	33	40	47	47	51	66	70	70	89	122	142	142
容许转矩 Allowable torque (Nm)	23	27	32	44	50	63	63	73	83	96	96	127	142	163	163	253	316	346	346
瞬间容许最大转矩 Maximum torque (Nm)	46	55	63	91	101	129	129	127	149	172	172	242	266	295	295	447	590	673	673
传动精度 Transmission angular accuracy (arc min)	2.0	1.5	1.5	2.0	1.5	1.5	1.5	1.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
回程误差 Hysteresis loss (arc min)	2.0	1.5	1.5	2.0	1.5	1.5	1.5	2.0	1.0	1.0	1.0	2.0	1.0	1.0	1.0	2.0	1.0	1.0	1.0
额定输入转数 Rated input rotational speed (rpm)	3,000			3,000				3,000				3,000				3,000			
最大输入转数 Permissible max. input rotational speed (rpm)	8,500			7,300				6,500				5,600				4,800			
转动惯量 Inertia moment (x10 ⁻⁴ kgm ²)	0.037			0.085				0.207				0.544				1.630			
重量(kg) Weight	0.50			0.68				0.95				1.5				3.3			

外观尺寸 Dimensions



[mm]

型号 No.	A	B	C	D	E	F	$\varnothing G$	$\varnothing H$	$\varnothing I$	$\varnothing J$	$\varnothing K$	$\varnothing L$	$\varnothing M$	$\varnothing N$	O	$\varnothing P$
14	16.5	10.5	7	34	7	41	56	55	11	6	14	38	73	15.5	2	3
17	16.5	12.5	8	37	8	45	63	62	10	8	18	48	79	17.5	2	3
20	16.5	11.5	10	38	7.5	45.5	72	70	14	12	21	56	93	19	4	3
25	18.5	17.5	10	46	6	52	86	85	20	14	26	67	107	26	4	3
32	22.5	22.5	12	57	5	62	113	112	26	14	26	90	138	34	4	4.6

型号 No.	$\varnothing Q$	R	S	$\varnothing T$	U	V	X	Y	a	$\varnothing b$	c	d	$\varnothing e$	f	g
14	23	6	M4	14.5	6	M3	-	-	6	4.5	6	M4	65	2.5	M3
17	27	6	M5	17.5	6	M4	-	-	6	4.5	6	M4	71	3	M3
20	32	8	M6	24	8	M5	4	13.8	6	5.5	6	M5	82	-	-
25	42	8	M8	30	8	M6	5	16.3	8	5.5	8	M5	96	-	-
32	55	8	M10	40	8	M8	5	16.3	12	6.6	12	M6	125	-	-

注) 1. 为改善产品, 可以在无通知下更改尺寸等。

You can change dimensions without advance notice for product improvement.

2. 根据输入规格, J、X、Y会变化。

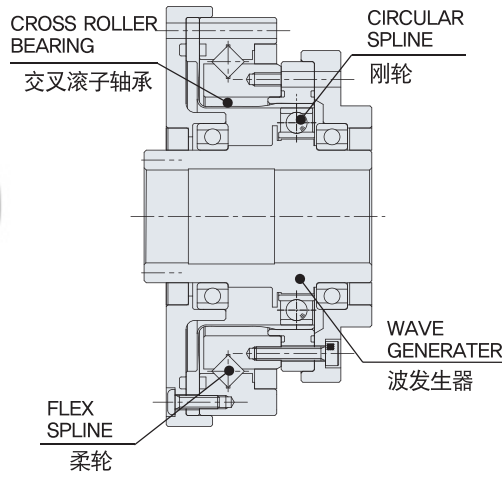
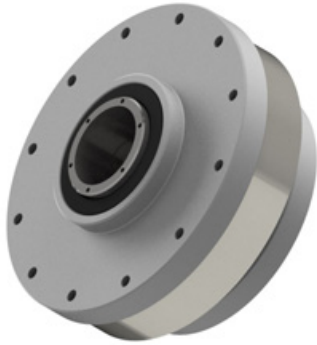
J, X and Y can vary depending on the input specification

3. 规格及尺寸

Specifications & Dimensions

■ 单元丝帽空心轴类型 (KSF - □ - □ - UH) Unit Silk Hat Hollow Shaft Type

结构图 Parts configuration



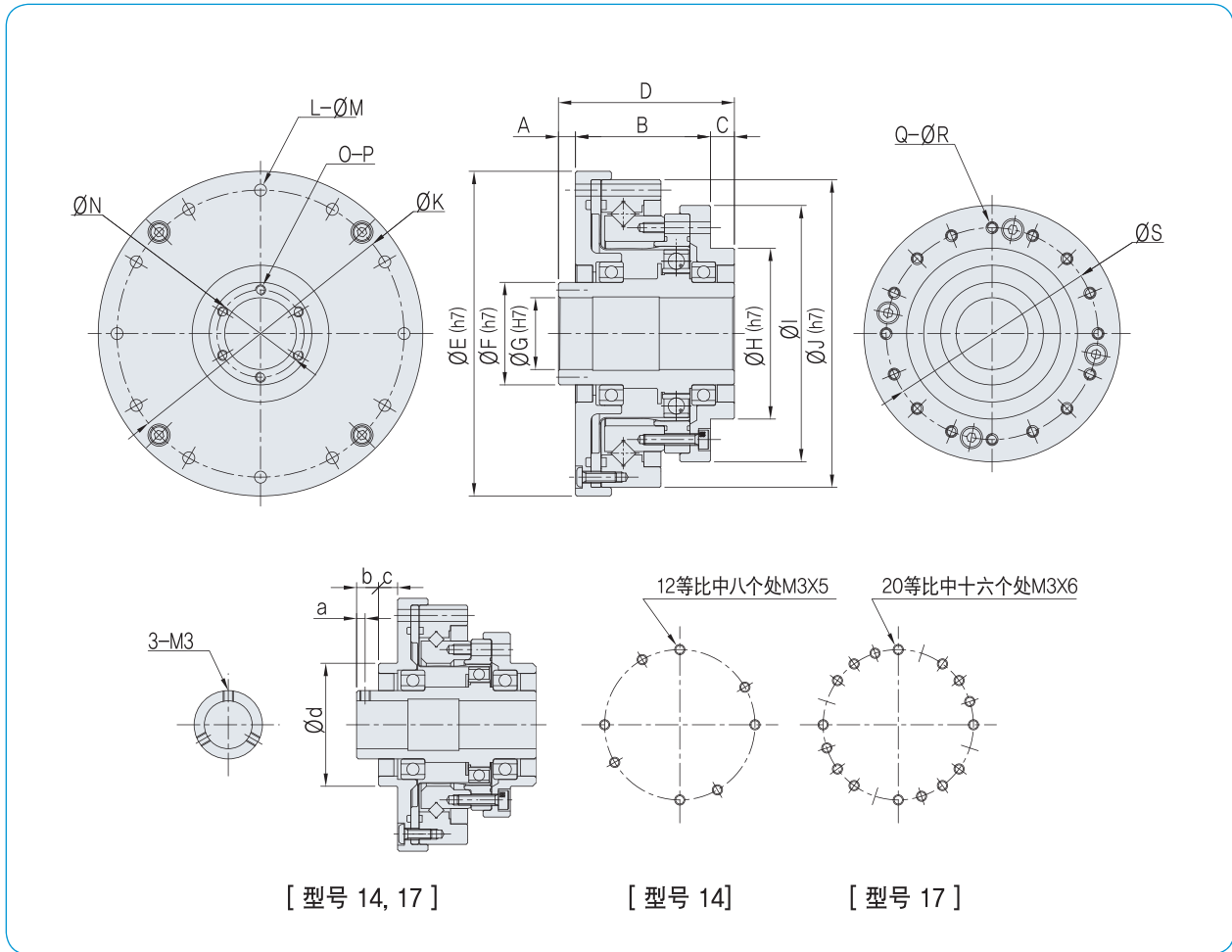
特点 Features

- 轻巧、简单设计
Compact and simple design
- 高转矩
High torque capacity
- 高刚性
High stiffness
- 零背隙(zero backlash)
Non-backlash
- 高定位精度和旋转精度
High positioning and rotational accuracies
- 同轴输入输出
Coaxial input and output

特征表 Specifications

型号 No.	14			17				20				25				32			
	50	80	100	50	80	100	120	50	80	100	120	50	80	100	120	50	80	100	120
额定转矩 Rated torque (Nm)	7	9	9	21	26	28	28	33	40	47	47	51	66	70	70	89	122	142	142
容许转矩 Allowable torque (Nm)	23	27	32	44	50	63	63	73	83	96	96	127	142	163	163	253	316	346	346
瞬间容许最大转矩 Maximum torque (Nm)	46	55	63	91	101	129	129	127	149	172	172	242	266	295	295	447	590	673	673
传动精度 Transmission angular accuracy (arc min)	2.0	1.5	1.5	2.0	1.5	1.5	1.5	1.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
回程误差 Hysteresis loss (arc min)	2.0	1.5	1.5	2.0	1.5	1.5	1.5	2.0	1.0	1.0	1.0	2.0	1.0	1.0	1.0	2.0	1.0	1.0	1.0
额定输入转数 Rated input rotational speed (rpm)	3,000			3,000				3,000				3,000				3,000			
最大输入转数 Permissible max. input rotational speed (rpm)	8,500			7,300				6,500				5,600				4,800			
转动惯量 Inertia moment (x10 ⁻⁴ kgm ²)	0.103			0.230				0.460				1.240				3.180			
重量(kg) Weight	0.57			0.79				1.1				1.7				3.4			

外观尺寸 Dimensions



[型号 14, 17]

[型号 14]

[型号 17]

[mm]

型号 No.	A	B	C	D	ØE	ØF	ØG	ØH	ØI	ØJ	ØK	L
14	12	33	7.5	52.5	74	20	14	36	54	70	64	8
17	12	36	8.5	56.5	84	25	19	45	64	80	74	12
20	5	39.5	7	51.5	95	30	21	50	75	90	84	12
25	6	43.5	6	55.5	115	38	29	60	90	110	102	12
32	7	53.5	5	65.5	147	45	36	85	115	142	132	12

型号 No.	ØM	ØN	O	P	Q	ØR	ØS	a	b	c	Ød
14	3.5	—	3	M3	8	3.5	44	2.5	6.5	5.5	36
17	3.5	—	3	M3	16	3.5	54	2.5	6.5	5.5	45
20	3.5	25.5	6	M3	16	3.5	62	—	—	—	—
25	4.5	33.5	6	M3	16	4.5	77	—	—	—	—
32	5.5	40.5	6	M3	16	5.5	100	—	—	—	—

注) 1. 为改善产品, 可以在无通知下更改尺寸等。

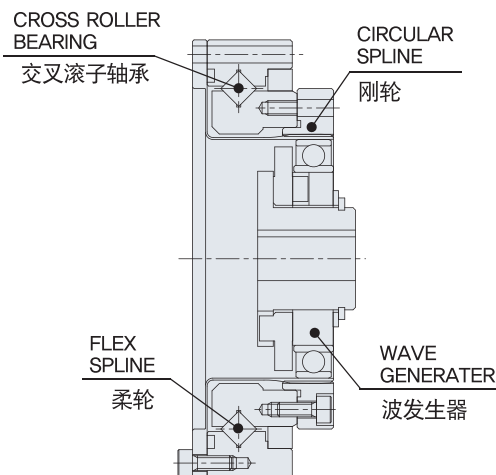
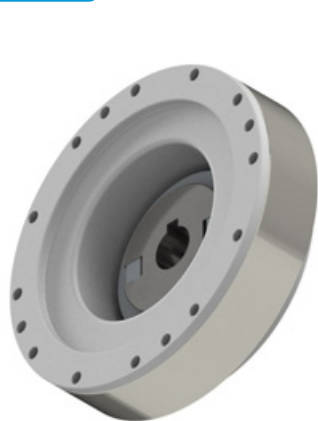
You can change dimensions without advance notice for product improvement.

3. 规格及尺寸

Specifications & Dimensions

■ 简易组合丝帽类型 (KSD - □ - □ - SN) Simple Unit Silk Hat Type

结构图 Parts configuration



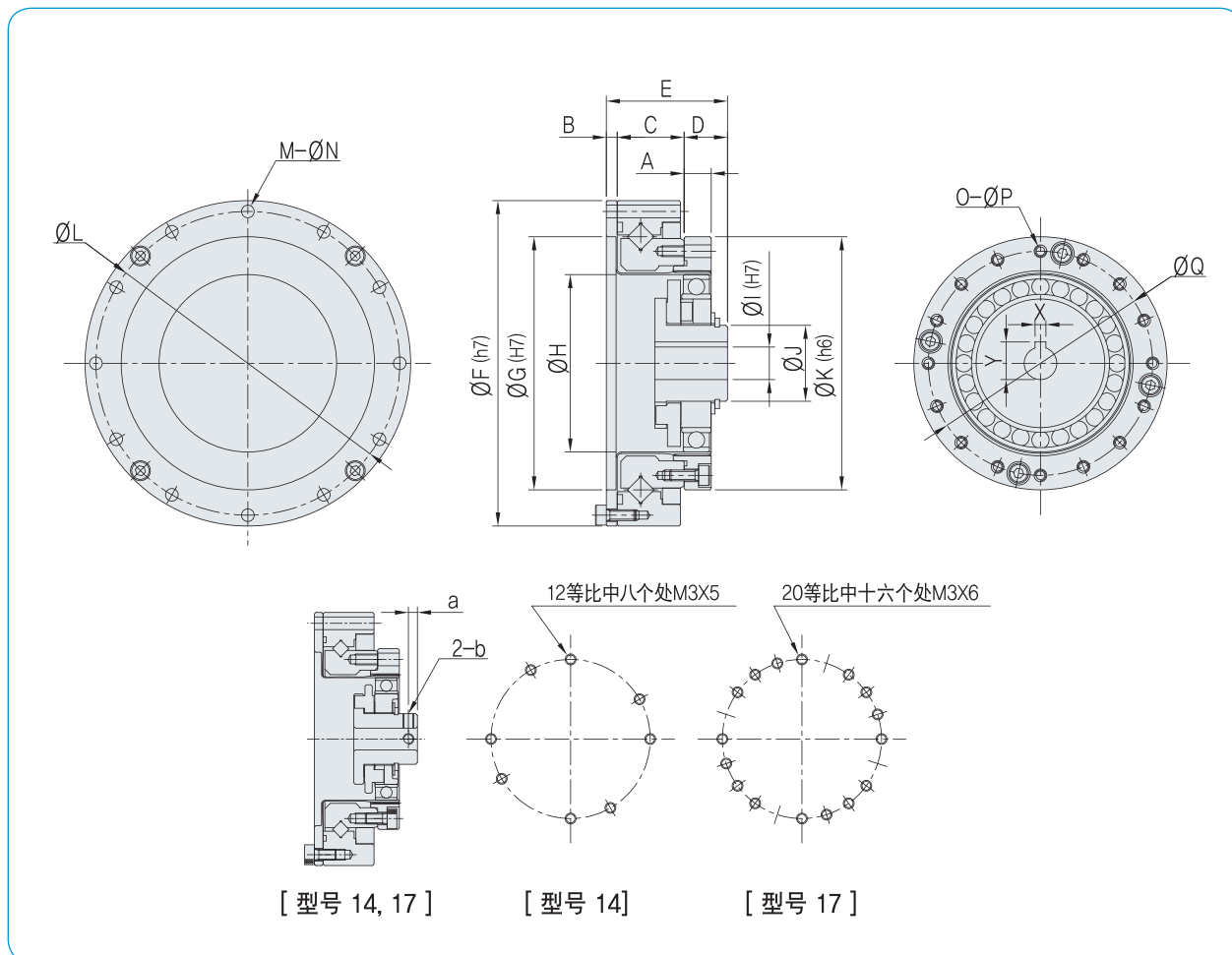
特点 Features

- 轻巧、简单设计
Compact and simple design
- 高转矩
High torque capacity
- 可以变更输入轴
(W/cam 可以一体)
Input shaft changeable
(W/cam can be integrated)

特征表 Specifications

型号 No.	14			17				20				25				32			
	50	80	100	50	80	100	120	50	80	100	120	50	80	100	120	50	80	100	120
额定转矩 Rated torque (Nm)	7	9	9	21	26	28	28	33	40	47	47	51	66	70	70	89	122	142	142
容许转矩 Allowable torque (Nm)	23	27	32	44	50	63	63	73	83	96	96	127	142	163	163	253	316	346	346
瞬间容许最大转矩 Maximum torque (Nm)	46	55	63	91	101	129	129	127	149	172	172	242	266	295	295	447	590	673	673
传动精度 Transmission angular accuracy (arc min)	2.0	1.5	1.5	2.0	1.5	1.5	1.5	1.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
回程误差 Hysteresis loss (arc min)	2.0	1.5	1.5	2.0	1.5	1.5	1.5	2.0	1.0	1.0	1.0	2.0	1.0	1.0	1.0	2.0	1.0	1.0	1.0
额定输入转速 Rated input rotational speed (rpm)	3,000			3,000				3,000				3,000				3,000			
最大输入转速 Permissible max. input rotational speed (rpm)	8,500			7,300				6,500				5,600				4,800			
转动惯量 Inertia moment (x10 ⁻⁴ kgm ²)	0.039			0.087				0.209				0.549				1.650			
重量(kg) Weight	0.39			0.55				0.79				1.3				2.7			

外观尺寸 Dimensions



[mm]

型号 No.	A	B	C	D	E	$\varnothing F$	$\varnothing G$	$\varnothing H$	$\varnothing I$	$\varnothing J$	$\varnothing K$
14	6	2.4	15.1	11	28.5	70	48	33.9	6	14	50
17	6.5	3	17	12.5	32.5	80	60	41.7	8	18	60
20	7.5	3	18.5	12	33.5	90	70	49	9	21	70
25	10	3.3	20.7	13	37	110	88	61.3	11	26	85
32	14	3.6	24.4	16	44	142	114	79.7	14	26	110

型号 No.	$\varnothing L$	M	$\varnothing N$	O	$\varnothing P$	$\varnothing Q$	X	Y	a	b
14	64	8	3.5	8	3.5	44	-	-	2.5	M3
17	74	12	3.5	16	3.5	54	-	-	3	M3
20	84	12	3.5	16	3.5	62	3	10.4	-	-
25	102	12	4.5	16	4.5	77	4	12.8	-	-
32	132	12	5.5	16	5.5	100	5	16.3	-	-

注) 1. 为改善产品, 可以在无通知下更改尺寸等。

You can change dimensions without advance notice for product improvement.

2. 根据输入规格, K、X、Y会变化。

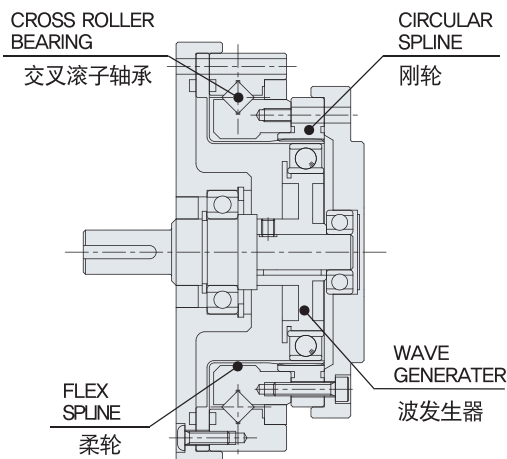
K, X and Y can vary depending on the input specification.

3. 规格及尺寸

Specifications & Dimensions

■ 组合丝帽输入轴类型 (KSF - □ - □ - UJ) Unit Silk Hat Shaft Input Type

结构图 Parts configuration



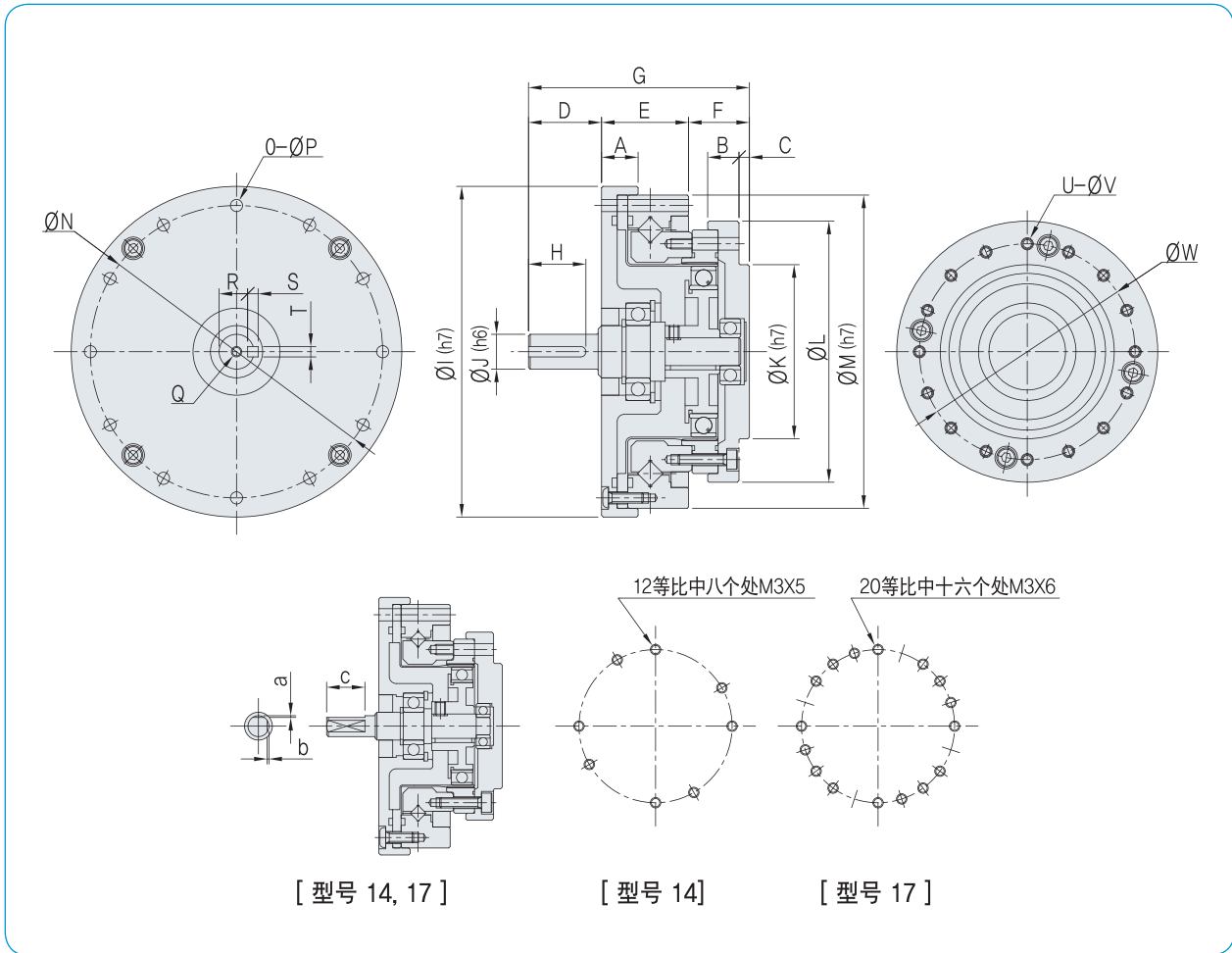
特点 Features

- 轻巧、简单设计
Compact and simple design
- 输入轴使用方便
Easy to use input shaft
- 输入输出同轴
Coaxial input and output

特征表 Specifications

型号 No.	14			17				20				25				32			
减速比 Ratio	50	80	100	50	80	100	120	50	80	100	120	50	80	100	120	50	80	100	120
额定转矩 Rated torque (Nm)	7	9	9	21	26	28	28	33	40	47	47	51	66	70	70	89	122	142	142
容许转矩 Allowable torque (Nm)	23	27	32	44	50	63	63	73	83	96	96	127	142	163	163	253	316	346	346
瞬间容许最大转矩 Maximum torque (Nm)	46	55	63	91	101	129	129	127	149	172	172	242	266	295	295	447	590	673	673
传动精度 Transmission angular accuracy (arc min)	2.0	1.5	1.5	2.0	1.5	1.5	1.5	1.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
回程误差 Hysteresis loss (arc min)	2.0	1.5	1.5	2.0	1.5	1.5	1.5	2.0	1.0	1.0	1.0	2.0	1.0	1.0	1.0	2.0	1.0	1.0	1.0
额定输入转数 Rated input rotational speed (rpm)	3,000			3,000				3,000				3,000				3,000			
最大输入转数 Permissible max. input rotational speed (rpm)	8,500			7,300				6,500				5,600				4,800			
转动惯量 Inertia moment ($\times 10^{-4}$ kgm ²)	0.037			0.089				0.208				0.554				1.740			
重量(kg) Weight	0.48			0.69				1.0				1.6				3.2			

外观尺寸 Dimensions



[型号 14, 17]

[型号 14]

[型号 17]

[mm]

型号 No.	A	B	C	D	E	F	G	H	ØI	ØJ	ØK	ØL	ØM
14	9	8	2.5	15	20.5	15	50.5	-	74	6	36	54	70
17	10	8.5	3	17	23	16	56	-	84	8	45	64	80
20	10.5	9	3	21	25	17.5	63.5	16.5	95	10	50	75	90
25	10.5	8.5	3	26	26	20.5	72.5	22.5	115	14	60	90	110
32	12	9.5	5	26	32	26.5	84.5	22.5	147	14	85	115	142

型号 No.	ØN	O	ØP	Q	R	S	T	U	ØV	ØW	a	b	c
14	64	8	3.5	-	-	-	-	8	3.5	44	0.5	0.5	11
17	74	12	3.5	-	-	-	-	16	3.5	54	0.5	0.5	12
20	84	12	3.5	M3	8.2	3	3	16	3.5	62	-	-	-
25	102	12	4.5	M5	11	5	5	16	4.5	77	-	-	-
32	132	12	5.5	M5	11	5	5	16	5.5	100	-	-	-

- 注) 1. 为改善产品, 可以在无通知下更改尺寸等。
 You can change dimensions without advance notice for product improvement.
 2. 根据输入规格, J、R、S、T会变化。
 J, R, S and T can vary depending on the input specification.

术语说明 Words explain

● 回程误差 Hysteresis Loss

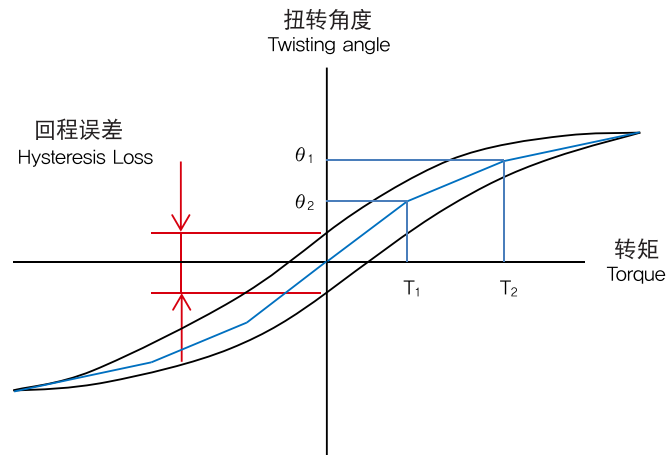
将输入端固定，对输出端施加转矩时，零转矩时的扭转角度之差

The difference in twisting angle at zero torque when the input side is fixed and torque is applied to the output side

● 刚性 Stiffness

将输入端固定，对输出端施加力量时，弹簧定数和扭转角度

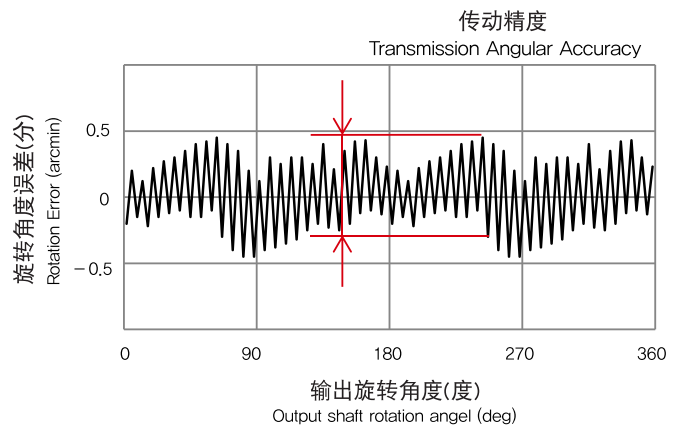
Stiffness is the output shaft twisting angle and the spring coefficient, while torque load is applied to the output shaft with input side fixed



● 传动精度 Transmission Angular Accuracy

在无负载下旋转输入轴时的理论上输出旋转角度和实际输出旋转角度之差

The difference between the theoretical input rotation angle and the actual output rotation angle when the input shaft is rotated at no load



● 最大背隙量 Maximum Backlash

[arc sec]

如果输入部分是花键(spline)类型，输出方的轴端隙(齿轮啮合部分的背隙为0，因此，刚性连接(rigid)类型的背隙为0)

When the input part is a spline type, the clearance on the output side

(Backlash is zero for rigid type input, because gear Engagement backlash is zero)

减速比 Ratio	型号 No.				
	14	17	20	25	32
50	36	20	17	17	14
80	23	13	11	11	9
100	18	10	9	9	7
120	-	8	8	8	6

[cNm]

● 起动转矩 Starting Torque

在输入端旋转时，
输入端开始旋转的转矩
(无负载，周边温度: 25°C)

Output torque needed for output side to start rotating
(no load, ambient temperature : 25°C)

减速比 Ratio	型号 No.				
	14	17	20	25	32
50	3.6	5.6	7.3	13	29
80	2.6	3.6	4.5	8.5	18
100	2.3	3.2	4.1	7.6	17
120	—	3.0	3.6	6.9	14

※ 根据使用条件，数值都不同，这是参考值。

For reference only. Torque value may vary depending on the condition.

[Nm]

● 增速起动转矩 Output Starting Torque

在输出端旋转时，
输入端开始旋转的转矩
(无负载，周边温度: 25°C)

Output torque needed for output side to start rotating
(no load, ambient temperature : 25°C)

减速比 Ratio	型号 No.				
	14	17	20	25	32
50	1.5	2.8	4.4	8.3	18
80	1.5	2.8	4.6	8.5	18
100	1.9	3.1	5.0	9.2	20
120	—	3.4	5.4	10	21

※ 根据使用条件，数值都不同，这是参考值。

For reference only. Torque value may vary depending on the condition.

[%]

● 效率 Efficiency

效率根据减速比、输入旋转速度、负载量、
使用温度、润滑条件等因素有所不同。

Efficiency differs greatly depending on reduction ratio,
input revolution speed, load amount, operating
temperature, lubrication condition, etc.

减速比 Ratio	型号 No.				
	14	17	20	25	32
50	68	72	72	72	72
80	68	75	75	75	75
100	68	75	75	75	75
120	—	73	73	73	73

※ 在额定转矩负载上输入2000rpm, 25°C

Input 2000rpm, 25°C at rated torque.

选型方法 Model selection

```

graph TD
    A[检查负载特性  
Determine load characteristics] --> B[平均负载转矩 (Tm)  
Average load torque  
平均输出转速 (Nm)  
Average output speed]
    B --> C[型号的假选择  
Preliminary selection of model  
Nm } 在特征表中  
Tm } From the ratings table]
    C --> D[寿命计算 (Lh)  
From the ra]
    D --> E{Lh ≥ 需求规格  
Specified life}
    E -- NO --> F[再选择型号  
Re-selection of frame]
    F --> C
    E -- OK --> G[决定减速器型号  
Frame selection]
            
```

$$T_m = \sqrt[10]{\frac{t_1 \cdot N_1 \cdot T_1^{10} + t_2 \cdot N_2 \cdot T_2^{10} + \dots + t_n \cdot N_n \cdot T_n^{10}}{t_1 \cdot N_1 + t_2 \cdot N_2 + \dots + t_n \cdot N_n}}$$

$$N_m = \frac{t_1 \cdot N_1 + t_2 \cdot N_2 + \dots + t_n \cdot N_n}{t_1 + t_2 + \dots + t_n}$$

[占空比图 Duty cycle diagram]

	起动时 For starting (Max)	正常时 For constant	停止时 For stopping (Max)	紧急停止 冲击时 For impact due to emergency stop
负载转矩(kgf·m) Load torque	T ₁	T ₂	T ₃	T _{em}
旋转数(rpm) Speed	N ₁	N ₂	N ₃	N _{em}
时间(sec) Time	t ₁	t ₂	t ₃	t _{em}

- SH减速机被波发生器(Wave Generator Bearing)的寿命决定
The life of SH Reducer is determined by the life of the wave generator bearing,
- $L_h = K \times \frac{N_0}{N_m} \times \left(\frac{T_0}{T_m}\right)^3$
 - L_h : 求的寿命时间 (Hr)
Service life to be obtained
 - N_m : 平均输出转速 (rpm)
Average output speed
 - T_m : 平均负载转矩 (kgf-m)
Average output torque
 - N₀ : 额定输出转速 (rpm)
Rated output speed
 - T₀ : 额定转矩 (kgf-m)
Rated output torque

■ 润滑 Lubricant

润滑脂润滑 Grease lubricant

- 润滑脂的种类：我司开发专用润滑脂，耐久性及效率、润滑特性优秀。

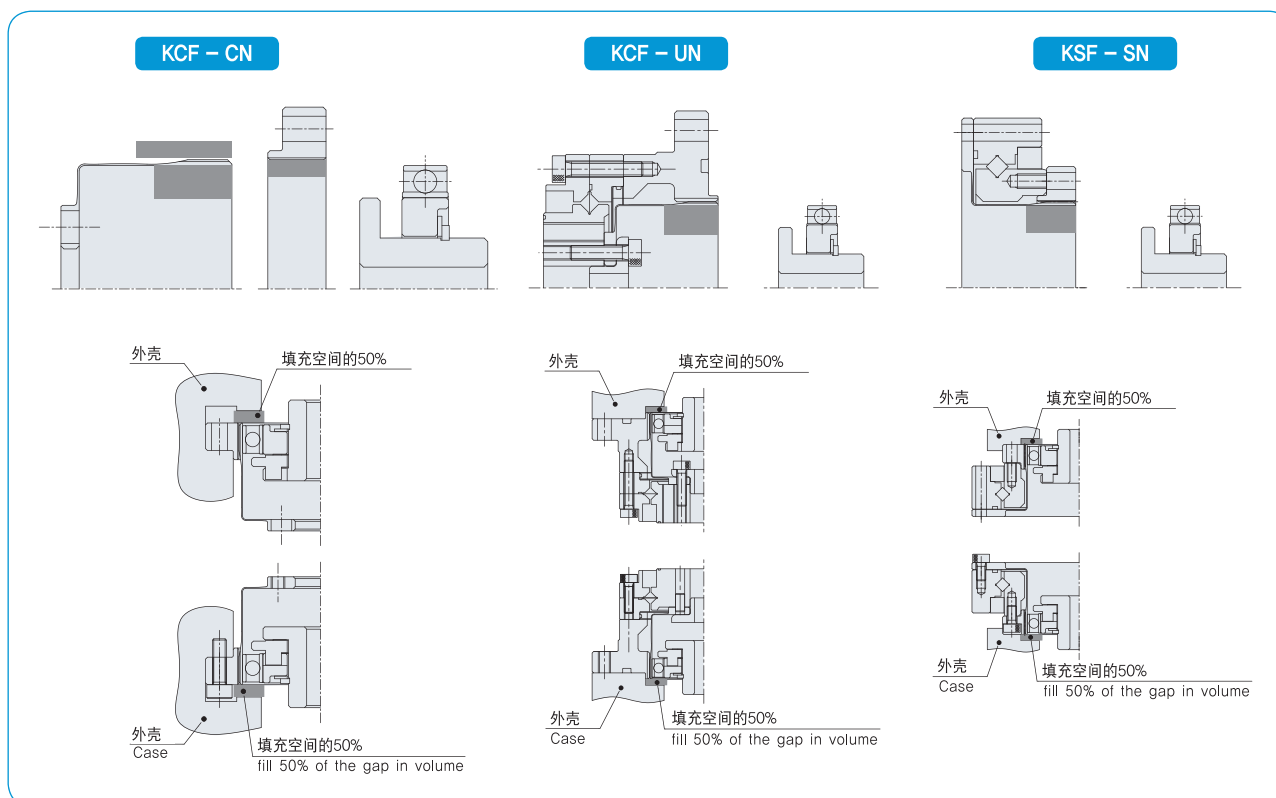
Type of lubricant : Developed exclusively by our company, it has excellent durability, efficiency and lubrication characteristics

- 注入量 Quantity

[单位 Unit : g]

型号系列 Model name	使用方法 Usage		型号 No.				
			14	17	20	25	32
KCF	水平 Horizontal use		5.5	10	16	30	60
	垂直 Vertical use	输出上 Output shaft upward	7	12	18	35	70
		输出下 Output shaft downward	8.5	14	21	40	80
KSF	水平 Horizontal use		5.8	11	18	25	64
	垂直 Vertical use	输出上 Output shaft upward	7.5	13	19	37	74
		输出下 Output shaft downward	8.9	15	22	42	84

- 润滑脂涂布方法 Grease application guide



用油润滑 Oil lubricant

- 油的种类 Type of oil : 齿轮油 ISO UG6 Gear oil ISO UG6

- 更换周期 Exchange cycle : 运行初期100Hr, 下次1,000Hr时更换 First time 100Hr, Second time or later every 1000Hr

- 油量 Oil quantity

[单位 Unit : L]

型号系列 Model name	14	17	20	25	32
KCF	0.01	0.02	0.03	0.07	0.13
KSF	0.01	0.02	0.03	0.07	0.13

■ 组装技术 Assembly technique

组装时的注意事项 Precaution on assembly

波发生器 Wave generator

- ① 注意避免对齿轮部分施加过大的力量。将波发生器旋转，同时轻轻地插进去。
Avoid such assembly where excessive force is applied to the wave generator bearing. You can smoothly insert the wave generator by turning it.
- ② 注意将同心度的允许范围在推荐尺寸内(参考各系列的『组装程度』)。
Pay attention so that the effect of misalignment and turnover is within the recommended value (see "Built-in precision" of each series) for the wave generator.

柔轮 Flexspline

- ① 以规格扭矩的一半的程度进行预拧紧，然后以规格扭矩拧紧。
螺栓的拧紧顺序必须按照对角线方向拧紧。
Tighten the bolts temporarily with about half the specified torque, and then tighten them with the specified torque. Tighten them in an even, crisscross pattern.
- ② 与刚轮(Circular Spline)组装时，必须确认齿部不向一个方向重叠，是否两个部件的中心对称。
When assembling with the circular spline, make sure that they do not overlap on either side and that the center of both parts is correct.
- ③ 在组装柔轮时，切勿敲打开口部先端或用过大的力量按住插入。
Avoid hitting the tip of the teeth on the opening and inserting the circular spline with excessive force in assembling it.

刚轮 Circular spline

- ① 在外框(Housing)上组装刚轮的状态下，必须顺利旋转。
Make the rotation smooth while assembling the circular spline to the housing.
- ② 在将螺栓插入到安装用螺栓孔时，螺栓孔的位置一致，螺栓孔形成直角，避免与刚轮发生干扰。
When inserting the bolt into the mounting bolt hole, make sure that the position of the bolt hole is aligned and that the bolt hole is at right angle so that the bolt does not interfere with the circular spline.
- ③ 螺栓不许一次就以规格扭矩拧紧。
先以规格扭矩的一半进行预拧紧，然后以规格扭矩拧紧。
此外，螺栓的拧紧顺序必须按照对角线方向拧紧。
Do not tighten the bolts with the specified torque all at once. Tighten the bolt temporarily with about half the specified torque, and then tighten them with the specified torque. Tighten them in an even, crisscross pattern.

防锈对策 On anti-rust provision

- ① SH减速器的表面不进行防锈处理。如果需要防锈处理，可以涂布防锈剂。
The surface of SH reducer is not anti-rust treated. Apply anti-rust agent to the surface if required.

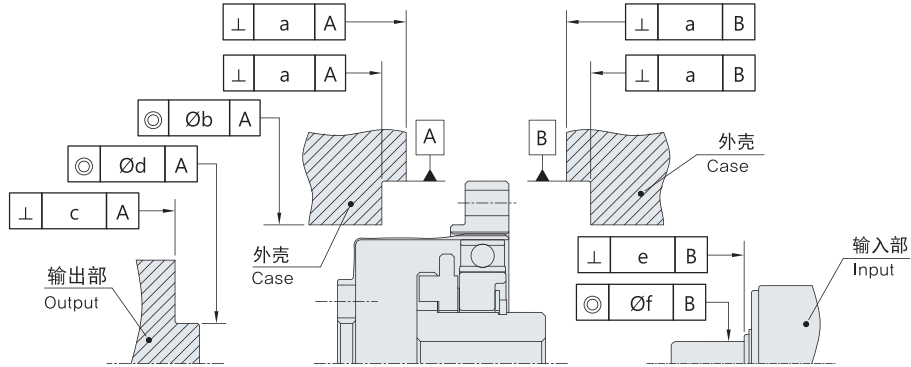
密封 Sealing

- 旋转滑动部分 油封(内置弹簧)，这时，表面是上不应该有刮痕。
Rotating and sliding area Oil seal (with a spring). Take care regarding flaws on the shaft.
- 法兰盘(flange)安装面，装上部分 O型圈，密封，这时，必须避免发生平面变形，与O型圈啮合。
Flange mating face and mating O-ring and seal agent. Take care regarding distortion on the plane and how the O-ring is engaged.
- 螺丝孔部分 使用有密封效果的螺丝固定剂或密封胶带。
Screw hole area Use a screw lock agent (Locktite 242 is recommended) or seal tape.

在组合类型中的密封处和推荐的密封方法 Sealing area and the recommended sealing method for the unit type

需要密封的部分 Area requiring sealing		推荐的密封方法 Recommended sealing method
输出轴 Output side	输出法兰盘(flange)中央的贯通口及输出法兰盘接合面 Pass-through hole in the center of the output flange and the output flange mating face	使用O型圈 Use O-ring
	安装螺丝部位 Spanner screw area	有密封效果的螺丝固定剂 Screw lock agent with sealing effect
输入轴 Input side	法兰盘接合面 Flange mating face	使用O型圈 Use O-ring
	电机输出轴 Motor output shaft	选择油封类型。 在没有油封时，需要在电机安装部分法兰盘上做一个安装孔。 Select one with an oil seal. Those without an oil seal should be structured so that an oil seal is attached to the motor mounting flange.

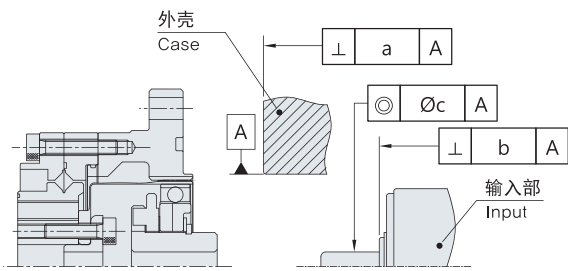
KCF - CN



[mm]

型号 No.	14	17	20	25	32
a	0,015	0,015	0,018	0,018	0,023
b	0,016	0,020	0,020	0,024	0,024
c	0,010	0,012	0,014	0,016	0,020
d	0,013	0,013	0,015	0,018	0,020
e	0,012	0,012	0,014	0,016	0,016
f	0,016	0,020	0,024	0,024	0,024

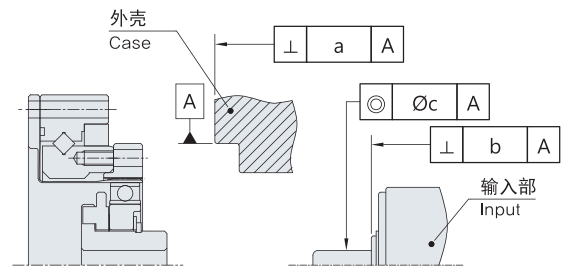
KCF - UN



[mm]

型号 No.	14	17	20	25	32
a	0,020	0,020	0,020	0,025	0,025
b	0,012	0,012	0,014	0,016	0,016
c	0,016	0,020	0,024	0,024	0,024

KSF - SN



[mm]

型号 No.	14	17	20	25	32
a	0,020	0,020	0,020	0,025	0,025
b	0,012	0,012	0,014	0,016	0,016
c	0,016	0,020	0,024	0,024	0,024

■ 注意 Precautions

- 在操作产品时，必须注意。
Be careful of product handling.
- 切勿用锤子对产品施加冲击，注意操作，以避免产品落下造成损坏。
Be careful not to give an impact to the product with a hammer and not to cause damage from a drop at handling.
- 在产品与载荷方直接连接时，需要注意组装。
In case of directly connecting the product to the load side, pay attention to assembling.
- 在产品与带、链子等载荷方连接时，需要注意同心、平行度、张力等直接连接状态。
Be careful of direct connection such as concentricity, parallel level, tension, etc. whenever connecting the product to the load side such as a belt, a chain, etc.
- 需要注意操作产品的棱角和输出轴键槽部分。这会成为造成人身伤害的原因。
Be careful of handing the edge of the product and the key way of the output shaft. It may cause an injury.
- 在产品运行中，切勿将手或其他异物放入旋转中的轴。这会成为造成人身伤害的原因。
Do not put a hand or other foreign substance in a rotating shaft while the product drives. It may cause an injury.
- 切勿对产品施加冲击。
Do not give an impact to the product.
- 在产品上组装滑轮、联轴接头、Key时，需要注意施加过大的冲击。
Be careful not to give an excessive impact whenever assembling a pulley, a coupling, a key, etc. to the product.
- 请注意使用，以避免超出容许转矩。
Do not exceed permissible torque at use.
- 必须注意避免施加超出瞬间容许最大转矩以上的转矩。拧紧部分的螺栓松开、摇动、破损会造成问题。
Do not give more than the instantaneous permissible maximum torque. It may cause troubles by bolts loosened on the tightening part, shaking, damage, etc.
- 切勿拆卸产品。
Do not disassemble the product.
- 切勿随意拆开、再组装产品。这时，无法保证初期性能。
Do neither disassemble nor reassemble the product. Otherwise the original performance may not be guaranteed.
- 如果感到异常现象，必须停止系统。
If any abnormal condition is sensed, stop the system.
- 如果发生异常音、震动、异常发热等，必须迅速停止系统。这会给系统带来恶劣影响。
If abnormal sound, vibration, abnormal heat, etc. occur, immediately stop the system. Otherwise it may adversely influence the system.

■ 质量保证 Warranty

● 产品的质量保证期间及保证范围如下：

A warranty period and a warranty limit of the product is as follows.

1 质保期间 Warranty Period

适用于在以我司规定的运行、组装、润滑状态使用的条件下，交货以后12个月或2000小时的产品运行时间当中。

Either 2,000hour working time or 12 months after the delivery for the product, which reaches earlier, should be applied on condition of use with operation, assembling, and lubrication specified by SPG.

2 保证范围 Warranty Limit

在上述质保期间内，如果因我司的制造缺陷导致故障，对相关产品的维修和交换，由我司负责进行。但，下列情况除外。

For a fault by a defect in SPG manufacturing during the above warranty period, repair or exchange of the product should be conducted under SPG responsibilities. However, the following cases are excluded from the Warranty Limit.

- ① 在将产品与载荷方直接连接时，不注意组装；
When connecting directly to the load side of the product, Not be careful of assembly
- ② 由我司以外的其他地方任意改造或维修；
Remodeling or repair not by SPG without permission
- ③ 故障的原因在于产品本身以外的理由；
A fault resulting from other reasons except the product
- ④ 其他自然灾害引起，不能归咎于我司的情况；
Such fault as attributable to natural disaster etc., which is not SPG responsibility

在此，保证意味着对相关产品的保证。

Warranty herein means warranty for the product.

对相关产品故障引起的其他损失(机械损失造成的机会损失和组装孔数，组装拆卸及安装等费用)不属于我司承担范围。

Other losses (chance loss by loss of the machine & assembly man-hour, assembly & disassembly, and mounting costs) arising out of a failure of the product are beyond the range of SPG burdens.

适用范围

Applications

工业用机器人
Industrial Robot



包装机械
Crating and Packaging Machine



机器人
Robot



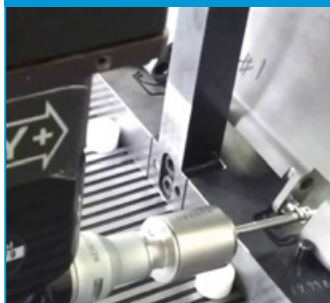
陶瓷制造装置
Ceramic Manufacturing System



航天设备
Space Equipment



测量、分析机器
Measurement and Analytical System



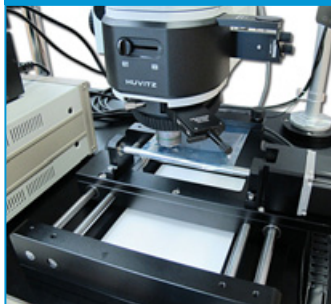
造纸机械
Paper-making Machine



航空装置
Aircraft



光学机器
Optical Machine



打印、装订机器
Printing and Bookbinding Machine



医疗用机器
Medical Equipment



半导体用机器人
Semiconductor Manufacturing



望远镜
Telescopes



金属加工机械
Processing Machine



通信机器
Communication Equipment



仿生机器人
Humanoid Robot

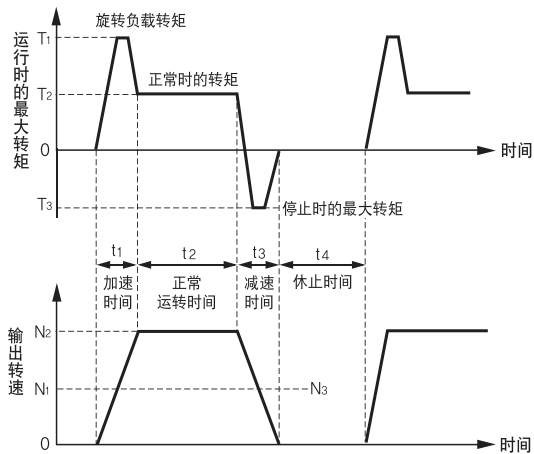


■ 注在订购减速器时, 请确认下列内容。

To submit reducer questions, simply fill out the following form

客户 (Customer)	公司 (Company) :	部门 (Post) :	负责人 (Name) :
	TEL :	FAX :	E-mail :
地址 (Address)			
运行条件 (Operating Conditions)			
设备名称 (Machine Name)			
用途 (Use for)			
减速器规格 (Spec. of the Gearheads)		Reduction Ratio $i =$	Backlash : arcmin

1. 负载条件 / The Conditions of Load



	运行时 Max Starting	正常时 Normal	停止时 Max Stop	休止时间 Pause time
负载转矩(Nm)	T_1	T_2	T_3	—
转速(rpm)	N_1	N_2	N_3	—
时间(sec)	t_1	t_2	t_3	t_4

运转时间 Running Time	Cycle / day	Day / year	year
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3. 安装方向 / The Mounting Direction

水平 Horizontality 向上 Verticality(down) 向下 Verticality(up)

简单安装图 (The Outline figure of Mounting)

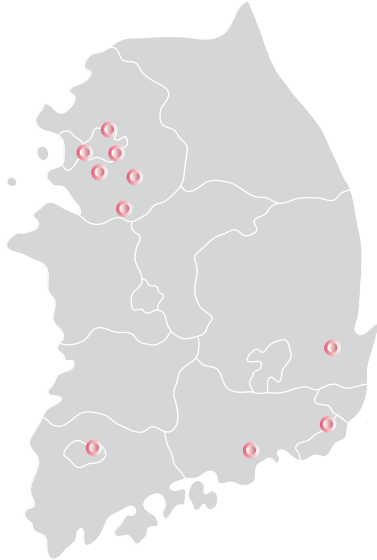
2. 输入方(电机部分)规格 / The Specifications of Input Side

Servo motor other()

容量 (Capacity)	
额定转矩 (Nominal Torque)	
输入速度 (Input Speed)	

4. 其他 / Others

Domestic 韩国国内



- Domestic Distributors
 - For regional distributors information, please visit our website at www.spg.co.kr.

Worldwide 世界范围内

- Global Branch
- Global Agency

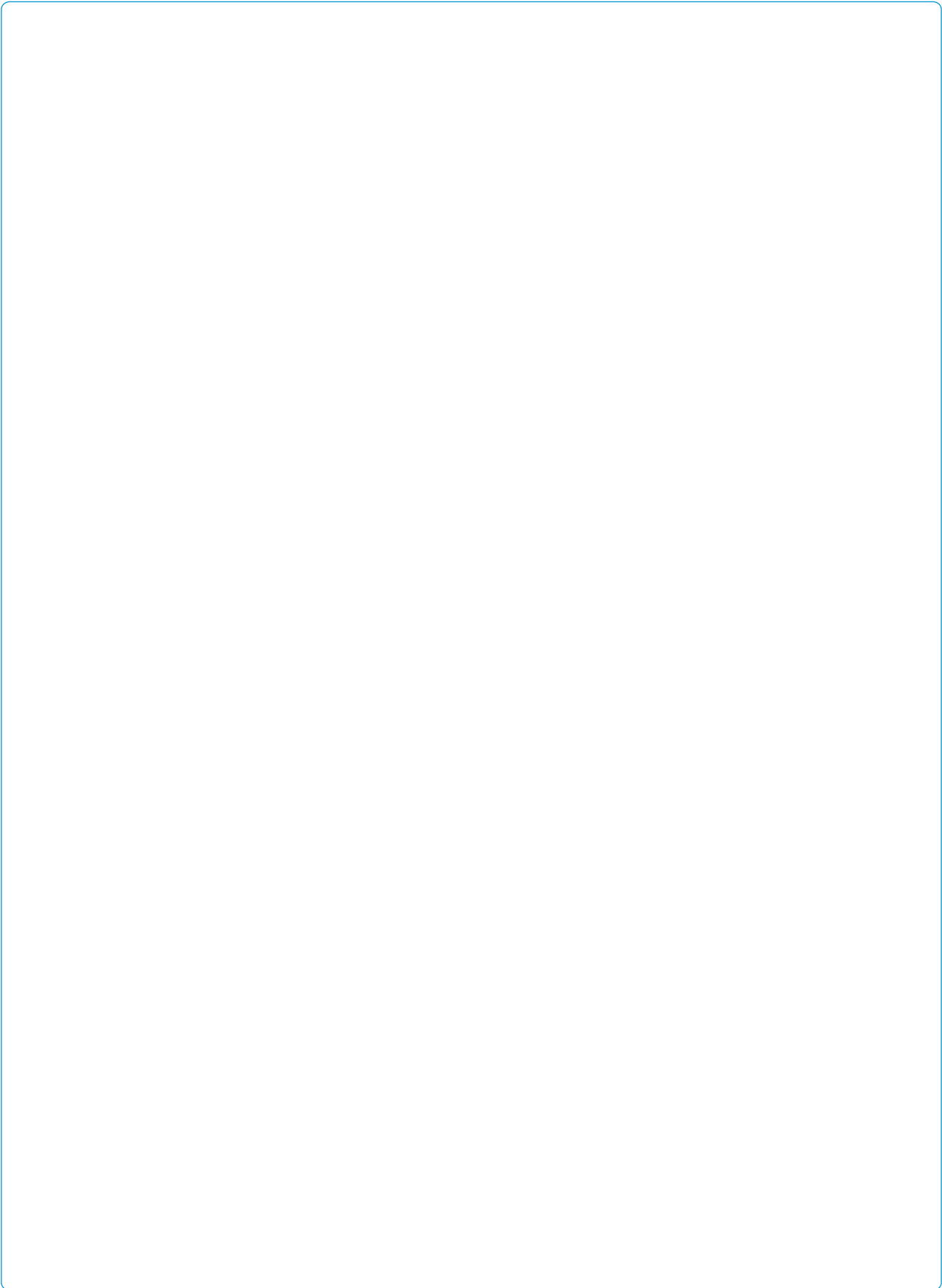


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