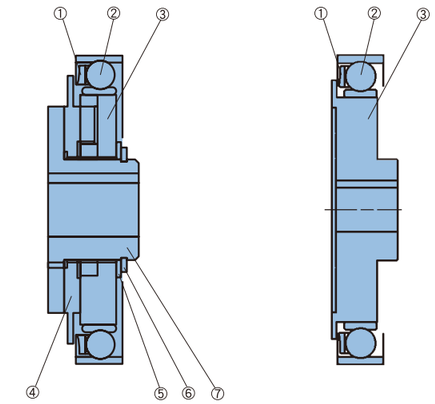
WAVE GENERATOR
波发生器

波发生器包括带自调心结构的欧式联轴节的结构和不带自动调心结构的一体型两种类型，根据各系列的不同也有所差异。详情请参照各系列的外形图。

The wave generator includes a structure of a European-style coupling with a self-aligning structure and an integrated type without an automatic self-aligning structure, and varies depending on the series. For details, please refer to the outline drawing of each series.

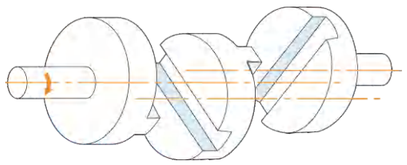
波发生器的基本结构及形状如下所示:
Basic structure and shape of wave generator shown as below



十字滑块型
Cross slider block type

一体式
Unibody

十字滑块型结构——采用欧式联轴节的结构:
Structure of cross sliding block type-using European coupling structure



❶ 柔性轴承保持架	Holder of flexible bearing
❷ 柔性轴承	Flexible baring
❸ 波发生器	Wave generator
❹ 十字滑块	Cross sliding block
❺ 垫圈	Gasket
❻ 轴用挡圈	Ring-shield
❼ 动力输入轴	Power input shaft

波发生器的轴向力与轴的固定
Axial force and axial fixation of wave generator

由于柔轮的弹性形变，运转中波发生器上的轴向力发生运动。
作为减速器使用时的轴向力向柔轮内部方向运动。
作为增速器使用时的轴向力与减速时的方向相反。
无论在何种使用条件下，都需要采用阻止波发生器轴向力的设计。

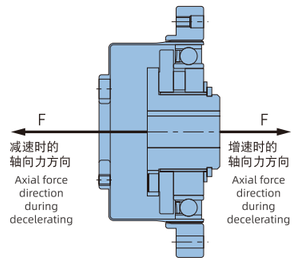
The axial force on wave generator begins to work due to elastic deformation of flexspline.

When used as a reducer. the axial force moves towards to the inside of the flexspline.

When used as a speed increaser, the axial forces movement is opposite to the direction of the deceleration. The design of prevent axial force of wave generator shall be adopted under any conditions of usage.

※在波发生器上设置止动螺钉并与输入轴固定时，请务必咨询授权代理商。
※ Please make sure to consult with the authorized distributor when setting the stop screw and fixing it to the input axial on the wave generator.

波发生器的轴向力方向
Axial force direction of the wave generator



一体式波发生器的最大孔径尺寸
Maximum aperture size of the unibody wave generator

波发生器的标准孔径如各外形尺寸图所示，但可以在表上所示的最大尺寸范围内进行变更。此时的键槽尺寸推荐使用GB规格。键的有效长度尺寸，请设计成可以完全承受传达转矩的值。

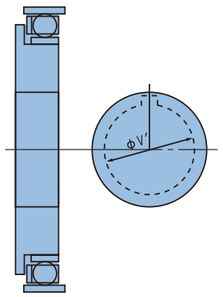
The standard aperture of the wave generator has shown in the outline drawing, the alteration can be made within maximum size range shown in the table.

We suggest to use GB standard for keyway size. The key's effective length dimension should be designed to fully withstand the value of the transmitted torque.

波发生器的孔径
Wave generator aperture

单位unit：mm

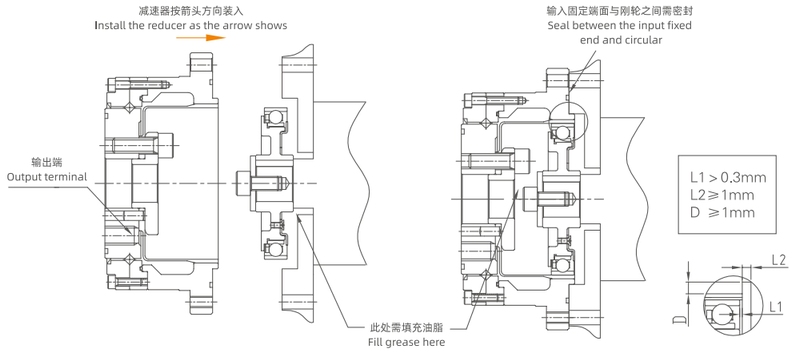
型号 Model	标准尺寸(H7) Standards size(H7)	最小尺寸 Minimum size	最大尺寸 Maximum size
11	5	-	-
14	6	3	8
17	8	4	10
20	9	5	13
25	11	6	15
32	14	6	15
40	14	10	20



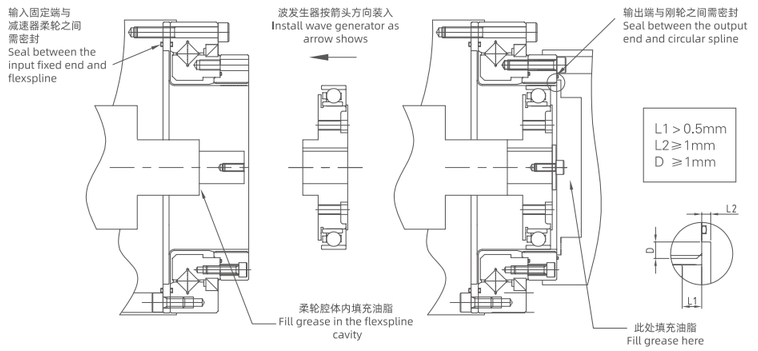
※波发生器的孔径可根据客户要求来进行定制，需要变更请与授权经销商提前进行沟通。
※ The aperture of the wave generator can be customized according to customer requirements. Please contact with the authorized distributor in case of any changes in the table.

INSTALLATION PROCEDURE
安装步骤

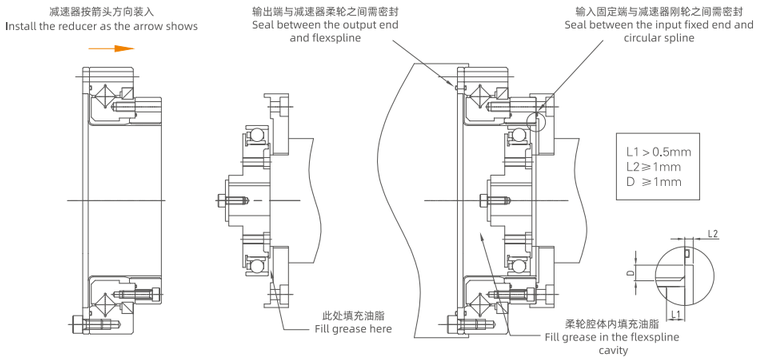
HC系列安装方式 Installation of HC series



HS系列安装方式一 The first method of installation for HS series



HS系列安装方式二 The second method of installation for HS series

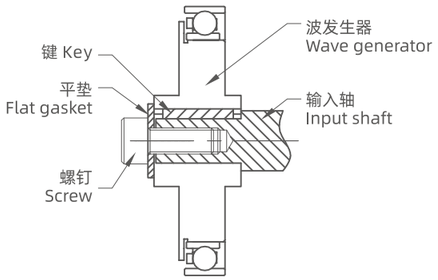


INSTALLATION PROCEDURE
安装步骤

波发生器常用连接固定方式 The connecting and fixing method of wave generator

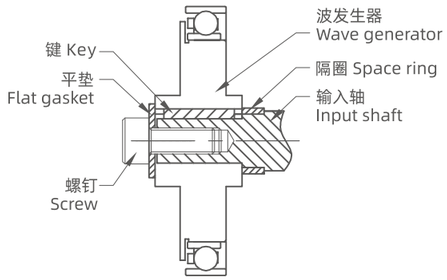
1 输入轴与波发生器直接连接输入轴有轴肩，可以与波发生器直接连接固定。如图

Input shaft has a shaft shoulder, it can be connected with wave generator directly. As shown in the figure.



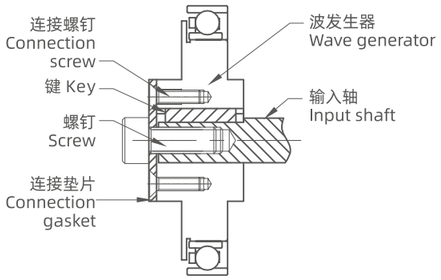
2 输入轴加隔圈后与波发生器连接输入轴有轴肩，但长度过长，可以在轴上加一个隔圈（该隔圈两面平行度需在0.01mm以内）后再与波发生器连接固定。如图

Input shaft has a shaft shoulder, but it 's too long. You can add a space ring on the shaft(the parallelism of space ring should be within 0.01mm),then connect and fix with the wave generator. As shown in the figure.



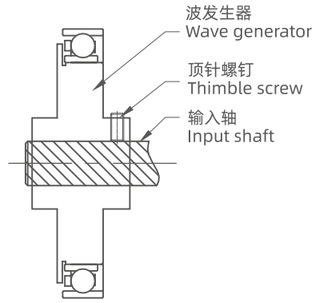
3 用连接垫片固定在波发生器上后与输入轴连接输入轴无轴肩，需用一个连接垫片先固定在波发生器上后再与输入轴连接固定。如图

Input shaft has no shaft shoulder. Fix a connection gasket on the wave generator, then connect and fix with the input shaft. As shown in the figure.



4 此固定方式适用于小机型，光轴输入，输入轴插入波发生器后，通过波发生器上的顶针螺钉将输入轴连接固定。如图

This fixing method is suitable for small models, optical axis input. Input shaft inserted into the wave generator, then connect and fix it through the thimble screw on wave generator. As shown in the figure.



ASSEMBLY CONSIDERATIONS
组装注意事项

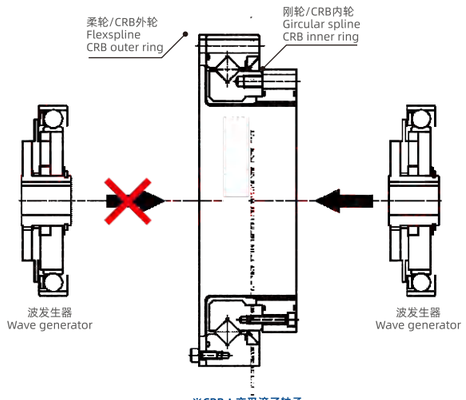
组装步骤
Assembly procedure

将刚轮和柔轮组合安装到装置上后，再组装上波发生器。若使用其他方法进行组装，可能出现齿轮偏移状态。下实施组装或损伤面等情况。请充分注意。

Install the circular spline and flexspline on the device, and then install the wave generator. Otherwise it may cause stuffing damage to the gear teeth or improper eccentric gear mesh, Please pay close attention to it.

正确组装步骤
Correct assembly steps

柔轮/CRB外轮
Flexspline/CRB outer ring



※CRB：交叉滚子轴承
※Cross roller Bearlng

组装注意事项
Precautions on installation

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

The improper assembly may cause vibration and noise during operation. Please assembly base on the following precautions.

波发生器的注意事项
Precautions on wave generator

1.请在组装时避免向波发生器轴承部位施加过度的力。可通过使波发生器旋转顺畅地实施插入。

2.使用无欧氏联轴节结构的波发生器时，请特别注意把中心偏移、歪斜的影响控制在推荐值内。

1.Please avoid applying undue force to the bearing on wave generator during assembly. We suggest to rotate the wave generator while inserting, it will ease the process.

2.If the wave generator does not have an oldham coupling, extra care must be given to ensure that concentricity and inclination are within the specified limits.

刚轮的注意事项
Precautions on circular spline

1.确认安装面的平坦度是否良好、是否有歪斜。

2.确认螺钉孔部是否隆起、有残余毛边或有异物啮入。

3.确认是否对壳体组装部实施了倒角加工以及避让加工，以避免与刚轮干涉。

4.当刚轮组装至外壳后，确认其是否能够旋转，是否有些部位存在干涉，卡紧。

5.朝安装用螺栓孔插入螺栓时，确认螺栓孔的位置是否正确、是否由于螺栓孔歪斜加工等原因致使螺栓与刚轮发生接触，使螺栓旋转变沉重。

6.请不要一次性按照规定转矩拧紧螺栓。请先使用约为规定转矩1/2的力实施暂时拧紧，然后再按照规定转矩拧紧。此外，通常请按照对角线顺序依次拧紧螺栓。

7.向刚轮打销子可能造成旋转精度低下，因此请尽可能避免。

1.Mounting surfaces need to have adequate flatness, smoothness, and no distortion.

2.Especially in the area of the screw holes, burrs or foreign matter should not be present.

3.Please make sure the chamfering and avoidance machining are performed on the housing assembly, to avoid the interference with the circular spline.

4.The circular spline should be rotatable within the housing. Be sure there is no interference and it does not catch on anything.

5. When mounting the bolt, make sure the bolt hole is correct and aligned Bolts should rotate freely when tightening and should not have any irregularity due to the bolt hole being misaligned or oblique.

6. Don't tighten the bolts with the specified torque all at once. 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.

7. Avoid pinning the circular spline if possible as it can reduce the rotational precision and smoothness of operation.

柔轮的注意事项
Precautions on flexspline

1.确认安装面的平坦度是否良好、是否有歪斜。

2.确认螺钉孔部是否隆起、有残余毛边或有异物啮入。

3.确认是否对壳体组装部实施了倒角加工以及避让加工，以避免与柔轮干涉。

4.朝安装用螺栓孔插入螺栓时，确认螺栓孔的位置是否正确、是否由于螺栓孔歪斜加工等原因致使螺栓与柔轮发生接触，使螺栓旋转变沉重。

5.请不要一次性按照规定转矩拧紧螺栓。请先使用约为规定转矩1/2的力实施暂时拧紧，然后再按照规定转矩拧紧。此外，通时，可能是由于两个部件发生中心偏移或歪斜。

6.确认与刚轮组合时，是否存在极端的单侧啮合。发生单侧偏移。

1.Mounting surfaces need to have adequate flatness, smoothness, and no distortion.

2.Especially in the area of the screw holes, burrs or foreign matter should not be present.

3.Please make sure the chamfering and avoidance machining are performed on the housing assembly, to avoid the interference with the circular splin.

4.When mounting the bolt, make sure the bolt hole is correct and aligned. Bolts should rotate freely when tightening and should not have any irregularity due to the bolt hole being misaligned or oblique.

5.Don't tighten the bolts with the specified torque all at once. 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.

6.Avoid unilateral meshing and deviation when assembling with circular spline.

关于防锈措施
Rust prevention

组合型的表面没有实施防锈处理。需要实施防锈时请向表面涂抹防锈剂。此外，需要本公司实施表面防锈处理时，请咨询授权代理商。

The complete assembly unit has no rust prevention on surface.

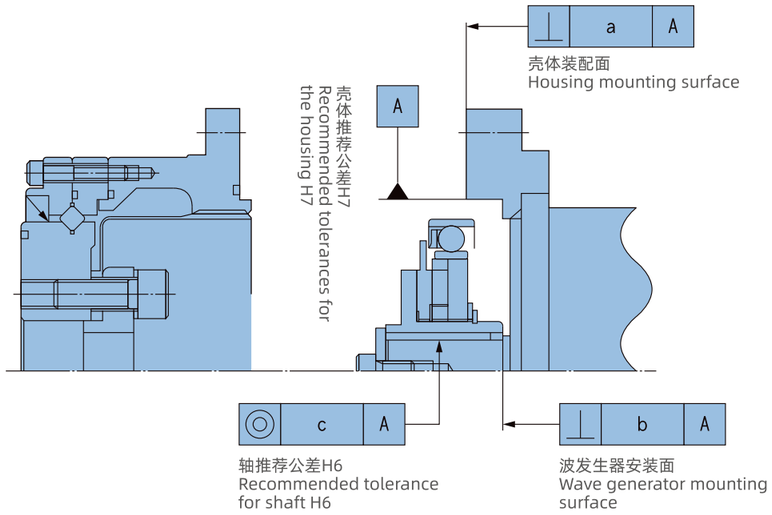
Please daub anti-rust if needed Besides, if an anti-rust product is needed, please contact with the authorized distributor.

PRECAUTIONS ON INSTALLATION
安装时注意事项

HC系列组装精度 Assembly accuracy of HC series

在安装设计时，为充分发挥组合型所具备的优良性能，请确保使用如下图表精度。

To make sure　CS series play its excellent performance when assemble, please make sure to use the following accuracy.



组装壳体的推荐精度 Recommended accuracy of the assembled housing

单位unit：mm

符号 Symbol / 型号 Model	14	17	20	25	32
a	0.011	0.015	0.017	0.024	0.026
b	0.017	0.020	0.020	0.024	0.024
	(0.008)	(0.010)	(0.010)	(0.012)	(0.012)
c	0.030	0.034	0.044	0.047	0.050
	(0.016)	(0.018)	(0.019)	(0.022)	(0.022)

※b、c为盘式发生器（I型）与十字滑块波发生器（II型）的数值。其中（）内的数值是为盘式发生器（I型）的数值。

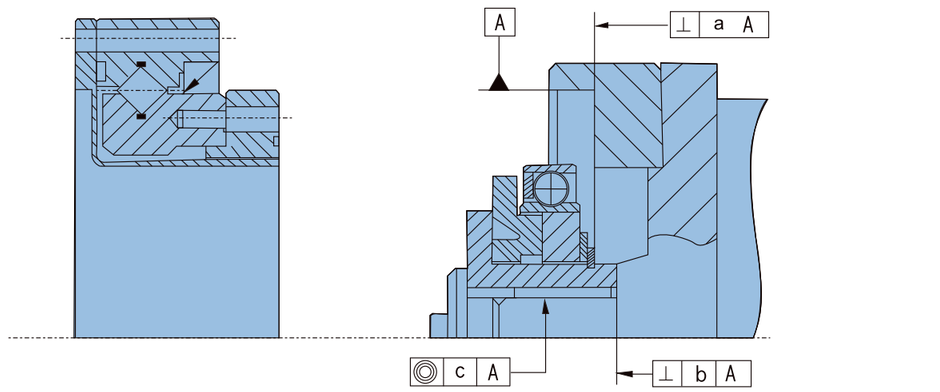
※b.c is the value of the unibody generator(I series)and the cross slider generator(II series). The value in( )is the value of the unibody generator(I series).

PRECAUTIONS ON INSTALLATION
安装时注意事项

HS系列组装精度 Assembly accuracy of HS series

为了充分发挥　ST-I型的优良性能，请确保如下图表所示的推荐精度。

To make sure　ST-I series play its excellent performance when assemble, please make sure to use the following accuracy.



组装壳体的推荐精度 Recommended accuracy of the assembled housing

单位unit：mm

符号 Symbol / 型号 Model	14	17	20	25	32	40
a	0.011	0.015	0.017	0.024	0.026	0.026
b	0.017	0.020	0.020	0.024	0.024	0.032
	(0.008)	(0.010)	(0.010)	(0.012)	(0.012)	(0.012)
c	0.030	0.034	0.044	0.047	0.047	0.050
	(0.016)	(0.018)	(0.019)	(0.022)	(0.022)	(0.024)

※b、c为盘式发生器（I型）与十字滑块波发生器（II型）的数值。其中（）内的数值是为盘式发生器（I型）的数值。

※b.c is the value of the unibody generator(I series)and the cross slider generator(II series). The value in( )is the value of the unibody generator(I series).

LUBRICANT INFORMATION
润滑剂

润滑剂的使用 Grease

Sumiplex MP HW-1（深圳市鸿汇科技有限公司）
Sumiplex MP HW-1 (Shenzhen Homwing Technology Co., Ltd.)

使用温度范围：0 ~ 40℃（环境温度）
Operating temperature range：0-40℃(ambient temperature)

润滑剂的涂抹 Grease application

按照以下要求在减速机各部位涂抹润滑剂。
Please apply grease according to the table below.

润滑剂涂抹量 Grease application

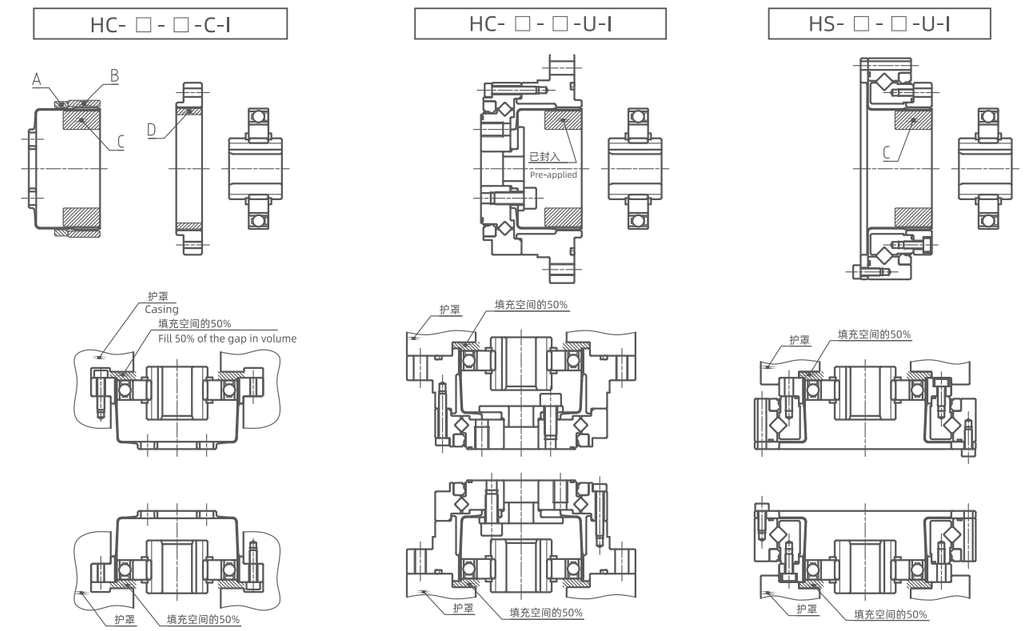
- 根据减速机的安装方向（输出侧为横向、向上、向下）不同，变更涂抹部位C的涂抹量。（已封入润滑油的组合类型，填充了C（横向）的润滑油量。）
- 减速机为向上、向下时，请填充输入ASSY～护罩内壁空间的50%的润滑剂。
- 由于护罩设计造成润滑剂不足时，请咨询本公司。

- The quantity of grease applied to C should be adjusted depending on the mounting direction. C of the unit type product is already filled with the same quantity of grease as horizontal mounting.
- For vertical up/down, 50% of the space between input assy and casing inner wall should be filled with grease.
- If the amount of grease is not sufficient due to case design, please contact us.

（g）

尺寸 Size	涂抹部位 Applied part					
	A	B	C（横向）Horizontal	C（向上）Vertical up	C（向下）Vertical down	D
14	0.3	0.3	6	8	9	0.3
17	0.5	0.5	10	12	14	0.5
20	0.8	0.8	16	18	21	0.8
25	1.5	1.5	30	35	40	1.5
32	3.0	3.0	60	70	80	3.0

润滑剂涂抹部位 Grease application location



TRANSMITTING TORQUE
传导力矩

安装螺丝 Bolting

螺丝紧固力矩如下表所示。
通过螺丝个数及紧固力矩调整，可传导力矩存在差异，所以请注意确认。

Please refer to the table below for the bolt tightening torque.
Please be noted that the transmittable torque varies depending on the bolt count and tightening torque.

螺丝紧固力矩
Tightening torque for bolts

螺丝尺寸	Bolt size	M3	M4	M5	M6	M8	M10
紧固力矩 [Nm]	Tightening torque	1.9	4.3	8.7	15	36	71

建议螺丝：强度区分12.9以上
Recommended bolt :
Strength rating above 12.9

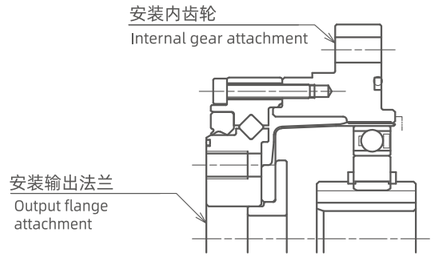
传导力矩（封闭型、组合型）
Bolt specifications and Transmitting torque (Closed type, Unit)

安装输出法兰 Output flange attachment

尺寸	Size	14	17	20	25	32
螺丝尺寸	Bolt size	M4	M5	M6	M8	M10
螺丝个数	Bolt count	6	6	8	8	8
安装PCD [mm]	Bolt PCD	23	27	32	42	55
紧固力矩 [Nm]	Tightening torque	4.3	8.7	15	36	71
传导力矩 [Nm]	Transmitting torque	56	106	238	566	1177

安装内齿轮 Internal Gear Attachment

尺寸	Size	14	17	20	25	32
螺丝尺寸	Bolt size	M4	M4	M5	M5	M6
螺丝个数	Bolt count	8	8	8	10	12
安装PCD [mm]	Bolt PCD	65	71	82	96	125
紧固力矩 [Nm]	Tightening torque	4.3	4.3	8.7	8.7	15
传导力矩 [Nm]	Transmitting torque	210	230	430	629	1392



TRANSMITTING TORQUE
传导力矩

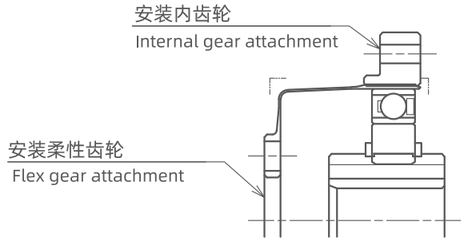
传导力矩（封闭型、部件型）
Bolt specifications and Transmitting torque (Closed type, Component)

安装柔性齿轮 Flex Gear Attachment

尺寸	Size	14	17	20	25	32
螺丝尺寸	Bolt size	M4	M5	M5	M6	M8
螺丝个数	Bolt count	6	6	8	8	8
安装PCD [mm]	Bolt PCD	17	19	24	30	40
紧固力矩 [Nm]	Tightening torque	4.3	8.7	8.7	15	36
传导力矩 [Nm]	Transmitting torque	41	75	126	223	539

安装内齿轮 Internal Gear Attachment

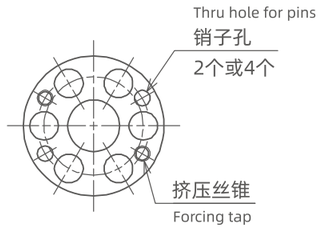
尺寸	Size	14	17	20	25	32
螺丝尺寸	Bolt size	M3	M3	M3	M4	M5
螺丝个数	Bolt count	8	16	16	16	16
安装PCD [mm]	Bolt PCD	44	54	62	75	100
紧固力矩 [Nm]	Tightening torque	1.9	1.9	1.9	4.3	8.7
传导力矩 [Nm]	Transmitting torque	82	200	230	485	1048



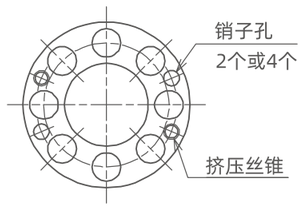
销子孔的追加
Reinforcement

柔性齿轮安装的传导力矩未满足要求时，请同时使用销子。
销子孔可根据需求追加。

Pins can be added if the transmittable torque at the flex gear interface is not sufficient.
As an option, holes can be added.



HC 14,17



HC 20,25,32

TRANSMITTING TORQUE
传导力矩

传导力矩（开放型）
Bolt specifications and Transmitting torque (Open type)

安装柔性齿轮 Flex Gear Attachment

尺寸	Size	14	17	20	25	32
螺丝尺寸	Bolt size	M3	M3	M3	M4	M5
螺丝个数	Bolt count	8	12	12	12	12
安装PCD [mm]	Bolt PCD	64	74	84	102	132
紧固力矩 [Nm]	Tightening torque	1.9	1.9	1.9	4.3	8.7
传导力矩 [Nm]	Transmitting torque	119	206	234	495	1037

安装内齿轮 Internal Gear Attachment

尺寸	Size	14	17	20	25	32
螺丝尺寸	Bolt size	M3	M3	M3	M4	M5
螺丝个数	Bolt count	8	16	16	16	16
安装PCD [mm]	Bolt PCD	44	54	62	77	100
紧固力矩 [Nm]	Tightening torque	1.9	1.9	1.9	4.3	8.7
传导力矩 [Nm]	Transmitting torque	82	200	230	498	1048

