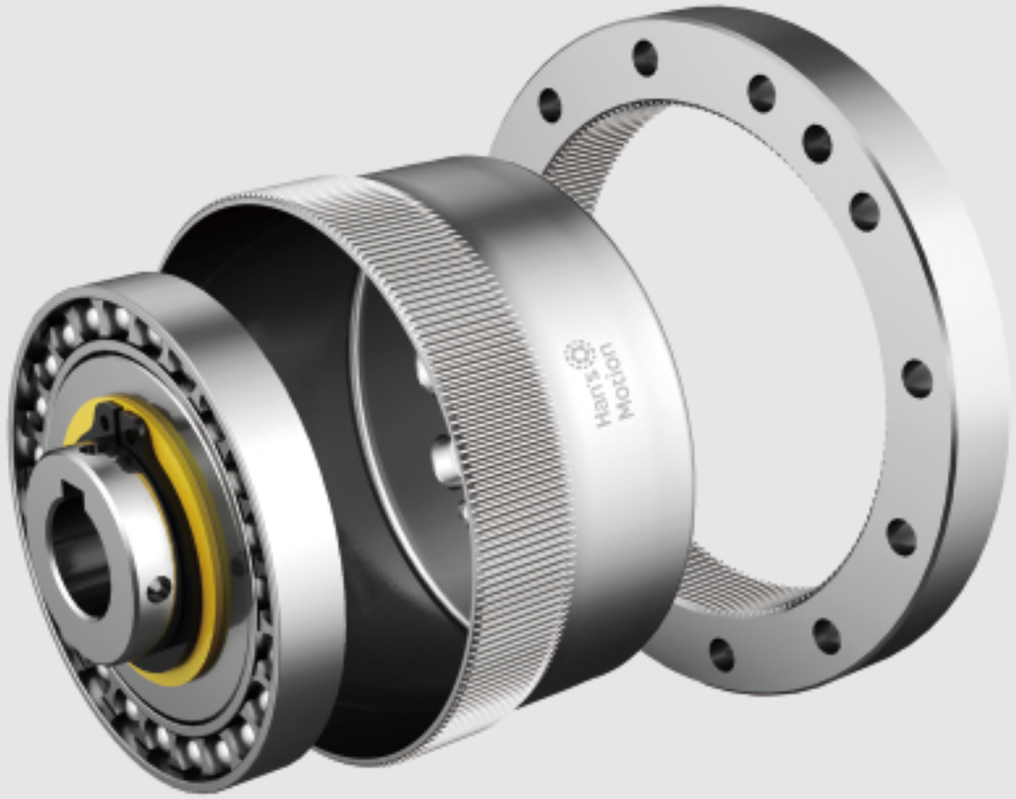
Han's Motion

Professional Manufacturer of
Precision Harmonic Drive



大族激光
HAN'S LASER

Motivated by a corporate philosophy of "artisanal spirit",
we will continuously enhance product value and improve our service.
We strive to become the most reliable expert of precision harmonic drive in the world.

Contents

Company profile

Shenzhen Han's Motion Technology Co., Ltd. (or Han's Motion for short) is a subsidiary of Han's Laser Technology Industry Group Co., Ltd. The company's registered capital is 50 million. Han's Motion is specialized in the R&D, production and sale of precision speed reducer and device, robotic systems and electromechanical equipment.

We have strong professional technology, excellent R & D and management teams, and we imported a batch of world first-class processing and testing equipment from abroad. We built an industrial robot engineering laboratory. Besides, our company has established close Industry-University-Research Collaboration with Tokyo University, Tsukuba University, etc.

Currently our company has a number of software copyrights and patents for utility models. We have won many awards, such as the 4th Industrial Design Red Sail Award, the Golden Finger Awards·2018 China International Robots Annual-Innovation Product Award and the 2018 World Robot Conference-Most Innovative Product Award.

Our products are for both domestic and foreign markets. We have over 300 clients, and our products are mainly used in robots, aerospace, communication equipment, semi-conductor processing equipment, medical equipment, testing and analytical equipment, etc. We strive to become the most reliable expert of precision harmonic drive in the world.

Company culture

Leading fast service sharing

Business philosophy

Virya & Ingenuity

Virya : Diligent Vigorous Positive
Ingenuity : Modest Careful Persistent

Values

Customer First
Embrace changes
Self-criticism
Persistent striving
Responsible
Results-oriented

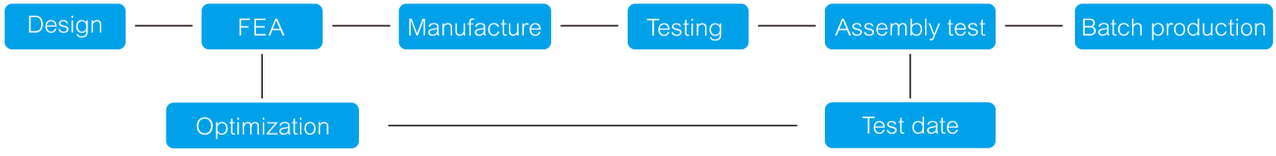
Our mission

Aim to provide our customers with first-class product and professional services;
we strive to become the most reliable expert of precision harmonic drive in the world.

R & D manufacturing

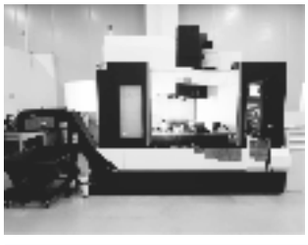
R&D process

Based on theoretical calculation and finite element analysis, combined with the sophisticated detection system to obtain massive measured data, and by means of multi-objective regression optimization, Han's Motion team successfully broke through the non-standard design difficulties of double arc tooth profile and developed a breakthrough harmonic deceleration product.

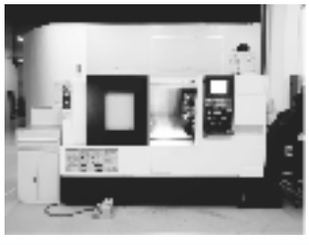


Equipment investment

We imported a batch of world first class processing and manufacturing equipment, so we can provide strong guarantee for production team to produce high quality products.

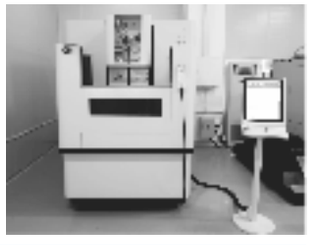


Machining center



High precision lathe

High precision grinding machine

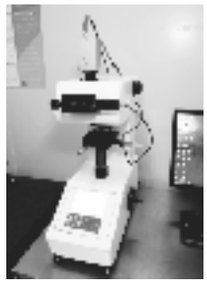


High precision wire cutting machine

Fabrication processing

The key component flexspline is made of imported high - quality materials, and adopts unique multi - process technology for heating processing. By optimizing the mechanical properties of the material, the precision of products can be guaranteed and the service life of the flexspline can be greatly improved.

Material heat treatment



Durometer

Metallurgical microscope

Quality control

As a key component of industrial production automation, the harmonic reducer must pass a series of stringent tests before it can be delivered.
Each finished product of Han's Motion harmonic drive, each process before leaving the factory is subjected to high standard and high quality control. After strict rigorous testing, it will eventually reach the customer.

Technical service

Service: drive value improvement

With the tenet of “provide customers with first-class products and professional service” and the service ideal of “customer first, professional and considerable, fast and efficient, and full life circle”, Han’s Motion has been providing customers with considerable full-life-circle services including presales, sales and aftersales services since its establishment.

Presales service

Customer service center

This is the information center for us communicating with you. In order to deliver the service information correctly and efficiently, we divide it into several parts, including product consultancy center, technical support center, equipment maintenance center and complaint and advice center.

We are always prepared for your calling and providing one-stop professional services including product introduction, price inquiring, technical support, customization needs and solutions, troubleshooting, repair, parts consultancy and sales, product complaint and service complaint.

Comprehensive customized technical solution

Han’s Motion owns mature solution team, senior engineers and rich experience. They can provide high-efficient and professional comprehensive customized solution based on customer’s needs.

Selling service

Consultative selling

Differentiated technical demands always exist, but we will try our best to help you optimize the option for product and realize the value optimization of product purchased.

Simplified Transportation

We provide professional on-door service. We will, to a large extent, make sure the product is delivered to you correctly and quickly through choosing convenient and quick transportation way.

Considerate installation

We provide customer with detailed product installation information and quickly solve the problem caused during installation through communication with and guidance of technical engineer and sometimes they will go to the installation site when necessary so as to realize the quick use of equipment.

After-sales service

Technical hotline

Han’s Motion team engineers provides customers with all - year - around comprehensive and extensive technical support, quickly responds to customer’s feedback and handles the help information in time.

On-site service

Make sure shortest responding time, quickly arrive in service site, provide installation guide, operation debugging, troubleshooting, product maintenance and technical upgrading services, provide preventative maintenance service to product in time to avoid fault during normal operation, and improve the equipment production capacity to the maximum.

Spare parts in-time delivery

We have complete product spare parts center that ensures we can send what you need in time when there is a fault in equipment so as to shorten the production interruption time because of equipment fault.

Principle of harmonic drive

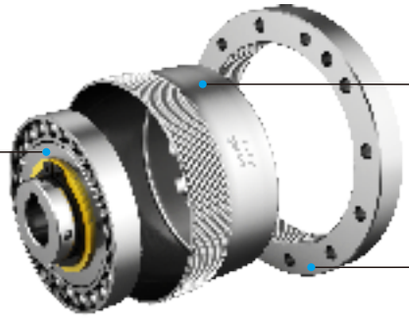
Principle of Harmonic drive

The harmonic gear drive invented by an American inventor, C· W· Musser in 1955,It is a new type of transmission , which uses the elastic deformation of flexible components for motion or power transmission . It breaks through the mode of using the rigid component to realize mechanical drive, but with a flexible component instead,thus obtaining a series of special functions that other transmission cannot reach. Its name comes from the deformation process of the intermediate flexible component, which is a symmetrical harmonic. Except that the Former Soviet Union called this kind of transmission"Wave Transmission" or "Flexible Gear Drive", other countries like America, England, Germany, and Japan all called it "Harmonic Drive''.

The composition of the harmonic gear assembly

Wave generator

The wave generator is an assembly of a thin-raced ball bearing fitted onto the periphery of an elliptical cam. The inner ring of the bearing is fixed around the cam causing the outer ring of the bearing to conform to the same elliptical shape of the assembly. The wave generator is usually attached to the input shaft.



Flexspline

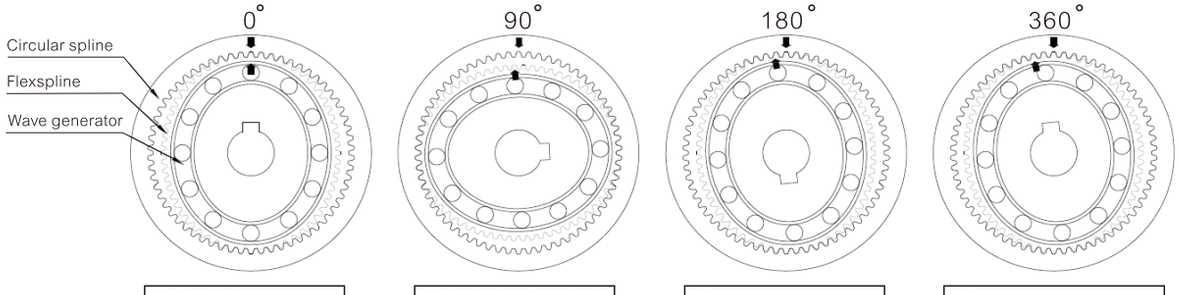
The flexspline is a thin-walled cup with outer teeth.The bottom of the flexspline (cup bottom) is called diaphram.The diaphragm is usually mounted onto the output shaft.

Circular spline

The circular spline is a rigid steel ring with teeth on the inside diameter. The circular spline has two more teeth than the flexspline. The circular spline is usually fixed to a casing.

Deceleration principle

The principle of harmonic gear transmission deceleration is to use the relative motion of the flexspine, circular spline and wave generator (mainly the controllable elastic deformation of the flexspline), to realize the motion and powertransmission. The elliptical cam in the wave generator rotates in the flexspline, causing the flexspline to deform.When the flexspline teeth and the circular spline teeth at both ends of the long shaft of the elliptical cam in the wave generator enter the engagement, the flexspline teeth at both ends of the short shaft are disengaged from the circular spline teeth. For the teeth between the long shaft and the short shaft of the wave generator, the half meshing state is gradually entering into the meshing along the different parts of the circumference of the flexspline and the circular spline, is called meshing and the half meshing state that is gradually disengaging is called engaging-out.The continuous rotation of elliptical cam in wave generator makes the flexspline deform constantly, which causes the teeth at the flexspline and circular spline to shift between the states of engaging-in, meshing, engaging-out and disengagement,thus realizing motion transmission from active wave generator to the flexspline.



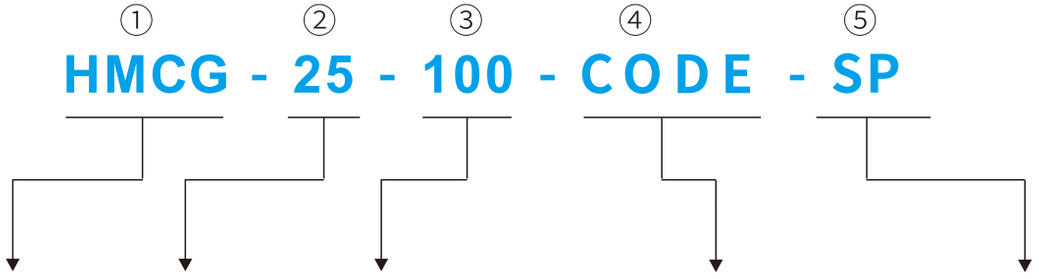
The flexspline in wave generator is bent into an elliptical shape, so the circular spline and the flexspline engage in the long shaft part, and that on the short shaft part is completely disengaged.

Fix the circular spline, when the wave generator rotates in clockwise, elastic deformation of flexspline occurs and come into engagement with circular spline.

After wave generator rotates 180 degrees, the flexspline only moves one tooth in counterclockwise.

After wave generator rotates (360 degrees), the flexspline anticlockwise moves 2 teeth due to the flexspline has 2 teeth less than the circular spline.

Product coding rules



Model name	Model No.	Reduction ratio				Code (standard)	Special specification
HMCG	14	50	80	100	-	Ⅰ : Component type Ⅱ : Combination type Ⅱ-E : Combination type (integral cam)	SP: Special None=Standard
	17	50	80	100	-		
	20	50	80	100	120		
	25	50	80	100	120		
	32	50	80	100	120		
	40	50	80	100	120		
HMCD	14	50	80	100	-	Ⅱ : Combination type (super flat)	
	17	50	80	100	-		
	20	50	80	100	-		
	25	50	80	100	-		
	32	50	80	100	-		
HMHG	14	50	80	100	-	Ⅰ : Combination type (hollow shaft) Ⅱ : Simple combination type (standard type) Ⅱ-E : Simple combination type (integral cam) Ⅲ : Simple combination type (hollow shaft) Ⅳ : Combination type (input shaft) Ⅴ : Combination type (hollow & long shaft)	
	17	50	80	100	-		
	20	50	80	100	120		
	25	50	80	100	120		
	32	50	80	100	120		
	40	50	80	100	120		
HMHD	14	50	80	100	-	Ⅰ : Combination type (hollow shaft) Ⅲ : Simple combination type (super flat hollow shaft)	
	17	50	80	100	-		
	20	50	80	100	-		
	25	50	80	100	-		
	32	50	80	100	-		

Note 1 : Model name

HM is short for Hans Motion
Flexspline ' shapes are divided into cup and hat,“C” refers to cup and “H” refers to hat.
Flexspline' lengths are divided into standard and dwarf, “S” refers to standard and “D” refers to dwarf.
“G”refers to high torque.

Note 2 : Specifications code

Specifications code	14	17	20	25	32	40
Pitch diameter of Flexspline	35.6	43.2	50.8	63.5	81.3	101.6

Technical characteristics

Han's Motion Technical team realized the tooth shape optimization design through the big data theory modeling, simulation optimization and performance verification, broke the constraint of experience accumulation and correction in the transmission design. We are seeking improvement and innovation been constantly in technical performance, product structure, processing technology, materials and features of harmonic drive. Through long-term technical accumulation, the key technologies of our harmonic drive has reached international level of similar products in the product accuracy, longevity, stability, noise control, and the technical indicators are in the forefront.

Innovative technologies

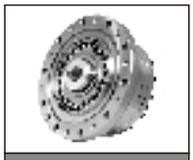
- Unique tooth profile
  Circular arc tooth shape, the number of teeth in meshing is up to 30%.
- Steady transmission
  The number of teeth in meshing at same time is large and the movement is stable.
- High accurate transmission
  Transmission error ≤ 1 arc min, backlash ≤ 10 arc sec.
- High torque capacity
  2 times higher than the conventional involute harmonic drive.
- Small size and light weight
  The length-diameter ratio of the flexspline is up to 1/2.

Product features

- Zero side clearance, small backlash design, back clearance less than 10 arc-sec.
- With adoption of high-quality imported material and specially optimized heat treatment technology, its service life is greatly improved.
- Standardized connection size, good universality.
- Low noise, low vibration,smooth operation, stable performance, safe and reliable.

At present, the company has independently developed and produced 11 product series, over 300 models of harmonic drive. Cover the intelligent manufacturing industry and meet the requirements of different markets and application fields, such as industrial robots.


HMCG-I


HMCG- II


HMCG- II -E


HMCD-II


HMHD-III


HMHG-I


HMHG- II


HMHG- II -E


HMHG-III


HMHG-IV


HMHG-V

Performance parameter

Model	Reduction ratio	Rated torque at input 2000r/min	Permissible peak torque at start / stop	Permissible max. value of ave. load torque	Instantaneous permissible max. torque	Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash (arc sec)	Transmission accuracy (arc sec)
		Nm	Nm	Nm	Nm	r/min	r/min	⩽	⩽
HMCD、HMHD series									
14	50	3.5	11.4	4.6	23	8000	3500	20	90
	80	5.1	15	6.2	29			20	90
	100	5.1	18	7	33			20	90
17	50	10.5	22	17	46	7000	3500	20	90
	80	14	29	21	54			20	90
	100	15	35	26	67			20	90
20	50	16	37	23	66	6000	3500	20	90
	80	23	49	28	78			10	90
	100	27	54	32	90			10	90
25	50	26	66	36	121	5500	3500	20	60
	80	42	91	62	157			10	60
	100	45	105	71	175			10	60
32	50	50	143	71	255	4500	3500	20	60
	80	79	202	126	350			10	60
	100	91	221	143	399			10	60

Starting torque (N·cm)

Model	14			17			20				25				32			
Reduction Ratio	50	80	100	50	80	100	50	80	100	120	50	80	100	120	50	80	100	120
HMCD	4.4	3.5	2.8	6.7	4.5	3.8	8.9	5.5	5.1	-	16	10	9.1	-	32	20	20	-
HMHD	6.2	5.2	4.8	10	9	9	13	12	11	-	20	18	17	-	30	28	25	-

Performance parameter

Model	Reduction ratio	Rated torque at input 2000r/min	Permissible peak torque at start / stop	Permissible max. value of ave. load torque	Instantaneous permissible max. torque	Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash (arc sec)	Transmission accuracy (arc sec)
		Nm	Nm	Nm	Nm	r/min	r/min	⩽	⩽
HMCG、HMHG series									
14	50	7	23	9	46	8000	3500	20	90
	80	10	30	14	51			20	90
	100	10	36	14	70			10	90
17	50	21	44	34	91	7000	3500	20	90
	80	29	56	35	113			20	90
	100	31	70	51	143			10	90
20	50	33	73	44	127	6000	3500	20	60
	80	44	96	61	165			20	60
	100	52	107	64	191			10	60
	120	52	113	64	161			10	60
25	50	51	127	72	242	5500	3500	20	60
	80	82	178	113	332			20	60
	100	87	204	140	369			10	60
	120	87	217	140	395			10	60
32	50	99	281	140	497	4500	3500	20	60
	80	153	395	217	738			10	60
	100	178	433	281	841			10	60
	120	178	459	281	892			10	60
40	50	178	523	255	892	4000	3000	10	60
	80	268	675	369	1270			10	60
	100	345	738	484	1400			10	60
	120	382	802	586	1530			10	60

Starting torque (N·cm)

Model	14			17			20				25				32				40			
Reduction Ratio	50	80	100	50	80	100	50	80	100	120	50	80	100	120	50	80	100	120	50	80	100	120
HMCG-I	3.6	2.6	2.3	5.6	3.6	3.2	7.3	4.5	4.1	3.6	13	8.5	7.6	6.9	29	18	17	14	51	32	29	26
HMCG- II HMHG- II / III	4.5	3.1	2.8	6.7	4.4	3.7	8.6	5.4	4.7	4.2	17	10	8.8	8	34	21	20	17	61	39	34	31
HMHG- I	8.8	7.5	6.9	27	25	24	36	33	32	31	56	50	49	48	85	74	72	68	136	117	112	110
HMHG-IV	5.7	4.4	3.7	9.7	7.2	6.5	14	11	9.9	9.3	22	15	14	13	41	29	27	24	72	52	47	44
HMHG-V	7.9	6.4	6	11.9	9.4	8.6	16	12.7	12	11.4	30.2	23.3	21.8	21	61.2	46.8	45.6	42	-	-	-	-

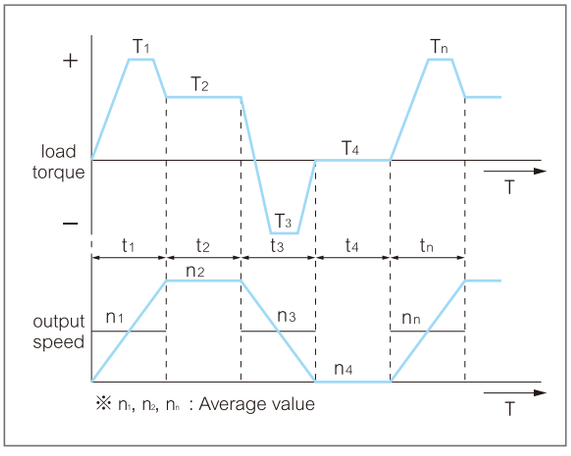
Selection process

Please select the model according to the following flow chart. Whenever a value exceeds the rating table, reconsider a larger model or consider to reduce the load torque and other conditions.

In general, the servo system can nearly impossible operate continuously with a certain amount of load. Input speed and load torque will change, and there will be a large torque effect when starting and stopping. In addition, there will be unexpected impact torque.

Confirmation of load torque mode

First, the mode of load torque must be mastered, please confirm the specifications shown below.



Calculate the values of each load torque mode

The load torque	Tn (Nm)
Time	tn (sec)
The output speed	nn (r/min)

Normal mode of operation

When starting	T1, t1, n1
In normal operation	T2, t2, n2
When stop (slow down)	T3, t3, n3
When stop	T4, t4, n4

The highest speed

Maximum output speed	no *max*
Maximum input speed	ni *max*

(be limited by motor and so on)

Impact torque

When impact torqueis applied	Ts, ts, ns

Calculate the average load torque applied to the output side of the harmonic drive according to the load torque model: T*av* (Nm)

$$Tav = \sqrt[3]{\frac{n_1 \cdot t_1 \cdot |T_1|^3 + n_2 \cdot t_2 \cdot |T_2|^3 + \cdots n_n \cdot t_n \cdot |T_n|^3}{n_1 \cdot t_1 + n_2 \cdot t_2 + \cdots n_n \cdot t_n}}$$

Select the model temporarily according to the following conditions
T*av* ≤ Maximum permissible value of average load torque (refer to the rated tables of each series)

- Calculate the average output speed: no *av* (r/min)

$$no\ av = \frac{n_1 \cdot t_1 + n_2 \cdot t_2 + \cdots n_n \cdot t_n}{t_1 + t_2 + \cdots t_n}$$

- Confirm the reduction ratio (R)
  ni *max* Will be restricted according to the motor

$$\frac{ni\ max}{no\ max} \geq R$$

- Calculate the average input speed(ni *av* (r/min))according to the average output speed(no *av*) and reduction ratio(R)

$$ni\ av = no\ av \cdot R$$

- Calculate the maximum input speed(no *max* (r/min))according to the maximum output speed(no *max*) and reduction ratio(R)

$$ni\ max = no\ max \cdot R$$

NO — Verify that the temporarily selected model is within value of the rated table.
ni *av* ≤ Permissible average input rotational speed(r/min)
ni *max* ≤ Permissible maximum input rotational speed(r/min)

NO — Confirm whether T1,T3 is within the allowable peak torque value of the rated table(Nm) when start or stop.

NO — Confirm whether T3 is within the permissible maximum momentary torque value(Nm) of the rated table.

NO — According to the output speed(ns)and time(ts) when impact torque is applied, calculate the allowable number and confirmed whether it is in accordance with the operating conditions.

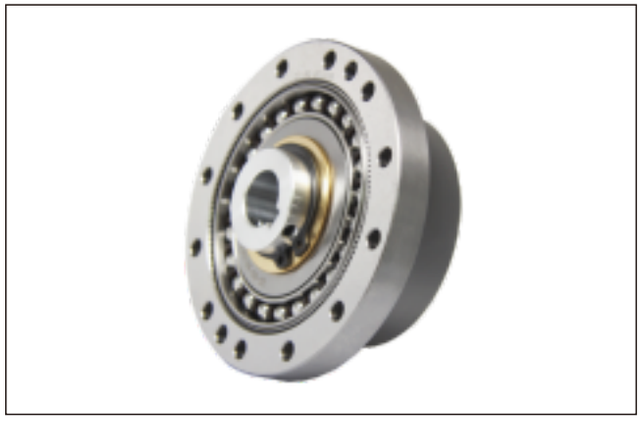
$$Ns = \frac{10^4}{2 \cdot \frac{ns \cdot R}{60} \cdot t}\ (r) \cdots Ns \leq 1.0 \times 10^4\ (r)$$

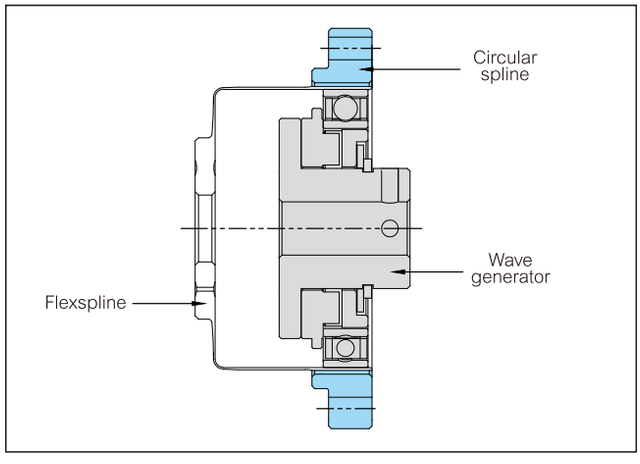
Study working condition or model again

Model is selected

HMCG-I series Harmonic drive

HMCG-I series product details





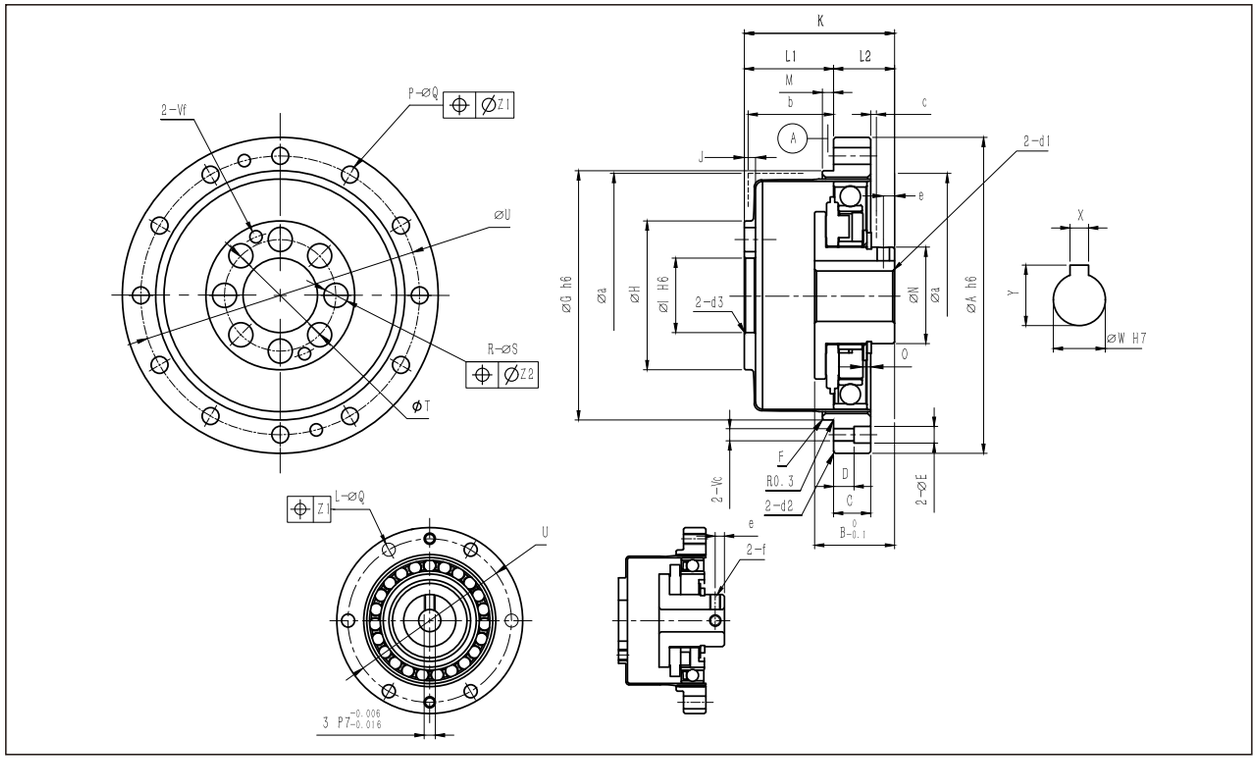
Component type

HMCG-I series consists of three basic components: flexspline, circular spline and wave generator. The flexspline is a cup-shaped standard structure, and its input shaft directly cooperates with the inner hole of wave generator and connects with it through flat key or fastening screw.

Product features

1. Three basic components
2. Compact design
3. Zero backlash
4. Input/output coaxial
5. Excellent positioning accuracy and rotation accuracy
6. 30%higher torque capacity than HMCS series
7. 43%longer lifetime than HMCS series

HMCG-Iseries dimension drawing



HMCG-I series Harmonic drive

HMCG-I series dimension table

unit : mm

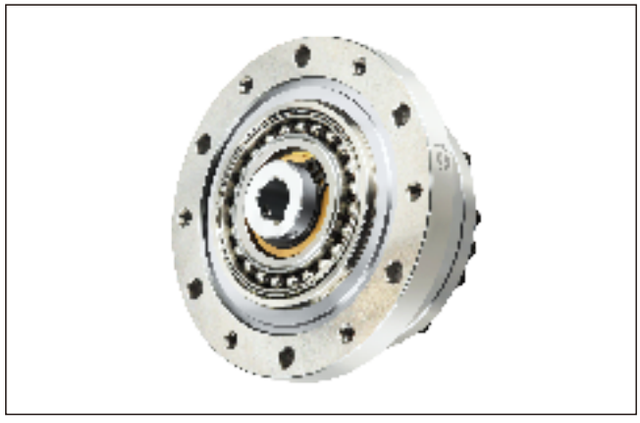
symbol \ model	14	17	20	25	32	40
∅A h6	50	60	70	85	110	135
$B_{-0.1}^{0}$	18.5	20.7	21.5	21.6	23.6	29.7
C	6	6.5	7.5	10	14	17
D	-	-	4	6	7	7
∅E	-	-	3.5	4.5	5.5	6.6
F	C0.3	C0.4	C0.4	C0.4	C0.4	C0.4
∅G h6	38	48	54	67	90	110
∅H	23	27.2	32	40	52	64
∅I H6	11	10	16	20	26	32
J	2.4	3	3	3	3.2	4.1
K	28.6±0.2	32.2±0.2	33.5±0.2	37.2±0.2	44±0.2	53±0.2
L1	17.5	20	21.5	24	28	34
L2	11.1	12.2	12	13.2	16	19
M	2	2.5	3	3	3	4
∅N	14	18	21	26	26	32
O	0.4	0.3	0.1	2.1	2.5	3.3
P	8	16	16	16	16	16
∅Q	3.5	3.4	3.5	4.5	5.5	6.6
R	6	6	8	8	8	8
∅S	4.5	5.5	5.5	6.6	9	11
T(PCD)	17	19	24	30	40	50
U(PCD)	44	54	62	75	100	120
Vc	M3	M3	M3	M4	M5	M6
Vf	M3	M3	M3	M4	M5	M6
∅W standard (H7)	6	8	11	14	14	14
∅W maximum size	8	10	13	15	15	15
XJS9	-	-	4	5	5	5
Y	-	-	$12.8^{+0.1}_{0}$	$16.3^{+0.1}_{0}$	$16.3^{+0.1}_{0}$	$16.3^{+0.1}_{0}$
∅Z1	0.25	0.2	0.25	0.25	0.25	0.25
∅Z2	0.25	0.25	0.25	0.3	0.5	0.25
∅a	38	45	53	66	86	106
b	17.1	19	20.5	23	26.8	33
c	1	1	1.5	1.5	1.5	2
Cd1	0.4	0.4	0.4	0.4	0.4	0.5
Cd2	0.4	0.4	0.4	0.4	0.4	0.5
Cd3	0.5	0.5	0.5	0.5	0.5	0.5
e	2.5	3	-	-	-	-
f	M3X4	M3X6	-	-	-	-
weight(kg)	0.100	0.17	0.26	0.43	0.91	1.8

HMCG-I series performance parameter

Model	Reduction ratio	Rated torque at input 2000r/min	Permissible peak torque at start / stop	Permissible max.value of ave.load torque	Instantaneous permissible max. torque	Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash (arc sec)	Transmission accuracy (arc sec)
		Nm	Nm	Nm	Nm	r/min	r/min	⩽	⩽
14	50	7	23	9	46	8000	3500	20	90
	80	10	30	14	51			20	90
	100	10	36	14	70			10	90
17	50	21	44	34	91	7000	3500	20	90
	80	29	56	35	113			20	90
	100	31	70	51	143			10	90
20	50	33	73	44	127	6000	3500	20	60
	80	44	96	61	165			20	60
	100	52	107	64	191			10	60
	120	52	113	64	161			10	60
25	50	51	127	72	242	5500	3500	20	60
	80	82	178	113	332			20	60
	100	87	204	140	369			10	60
	120	87	217	140	395			10	60
32	50	99	281	140	497	4500	3500	20	60
	80	153	395	217	738			10	60
	100	178	433	281	841			10	60
	120	178	459	281	892			10	60
40	50	178	523	255	892	4000	3000	10	60
	80	268	675	369	1270			10	60
	100	345	738	484	1400			10	60
	120	382	802	586	1530			10	60

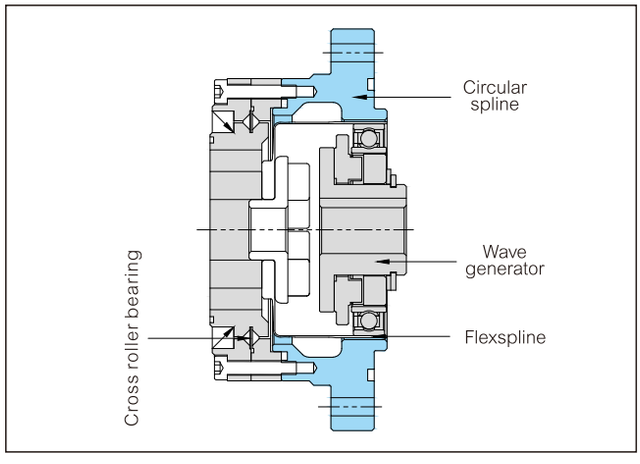
HMCG-II series Harmonic drive

HMCG -II series product details



Combination type

HMCG-II series flexspline belongs to cup-shaped standard structure and its input shaft connects with the inner hole of wave generator through Oldham coupling. Generally, the circular spline is fixed and flexspline does output.



Product features

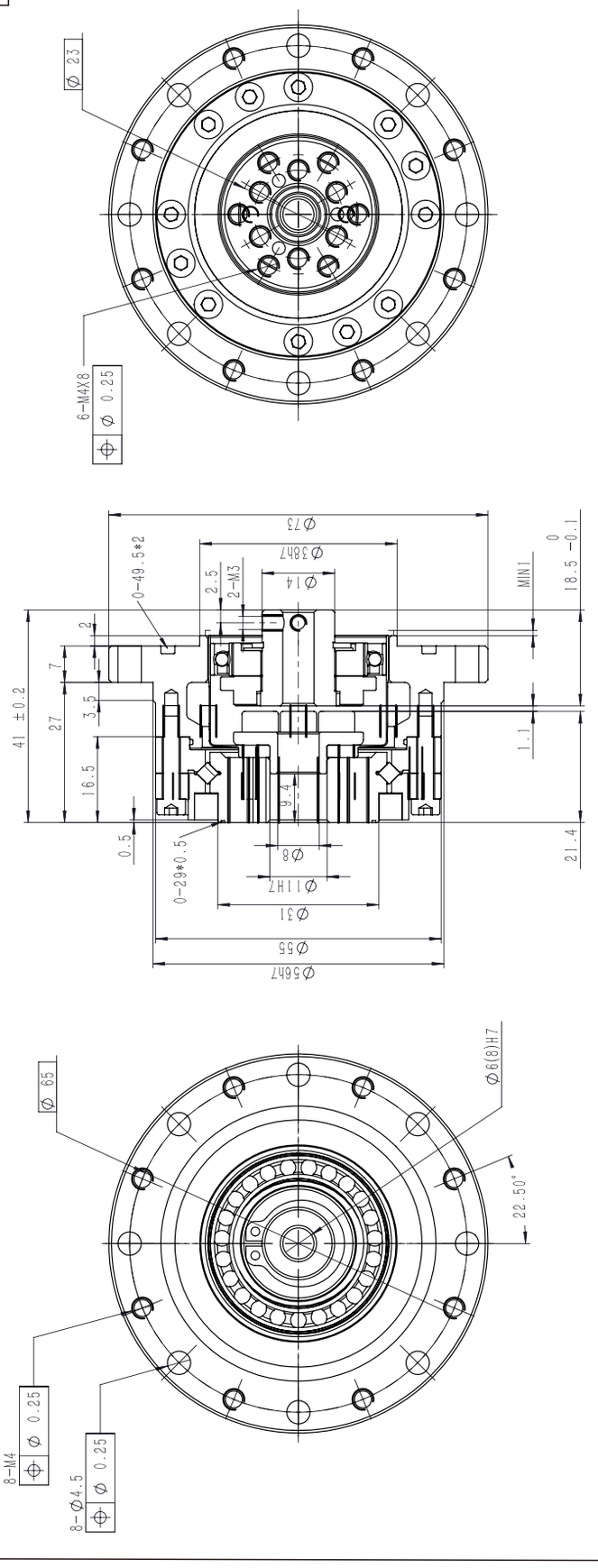
1. Cup-shaped standard structure
2. Compact design
3. Zero backlash
4. Input/output coaxial
5. Excellent positioning accuracy and rotation accuracy
6. 30%higher torque capacity than HMCS series
7. 43%longer lifetime than HMCS series

HMCG-II series performance parameter

Model	Reduction ratio	Rated torque at input 2000r/min	Permissible peak torque at start / stop	Permissible max.value of ave.load torque	Instantaneous permissible max. torque	Permissible max.input rotational speed	Permissible ave.input rotational speed	Backlash (arc sec)	Transmission accuracy (arc sec)
		Nm	Nm	Nm	Nm	r/min	r/min	⩽	⩽
14	50	7	23	9	46	8000	3500	20	90
	80	10	30	14	51			20	90
	100	10	36	14	70			10	90
17	50	21	44	34	91	7000	3500	20	90
	80	29	56	35	113			20	90
	100	31	70	51	143			10	90
20	50	33	73	44	127	6000	3500	20	60
	80	44	96	61	165			20	60
	100	52	107	64	191			10	60
	120	52	113	64	161			10	60
25	50	51	127	72	242	5500	3500	20	60
	80	82	178	113	332			20	60
	100	87	204	140	369			10	60
	120	87	217	140	395			10	60
32	50	99	281	140	497	4500	3500	20	60
	80	153	395	217	738			10	60
	100	178	433	281	841			10	60
	120	178	459	281	892			10	60
40	50	178	523	255	892	4000	3000	10	60
	80	268	675	369	1270			10	60
	100	345	738	484	1400			10	60
	120	382	802	586	1530			10	60

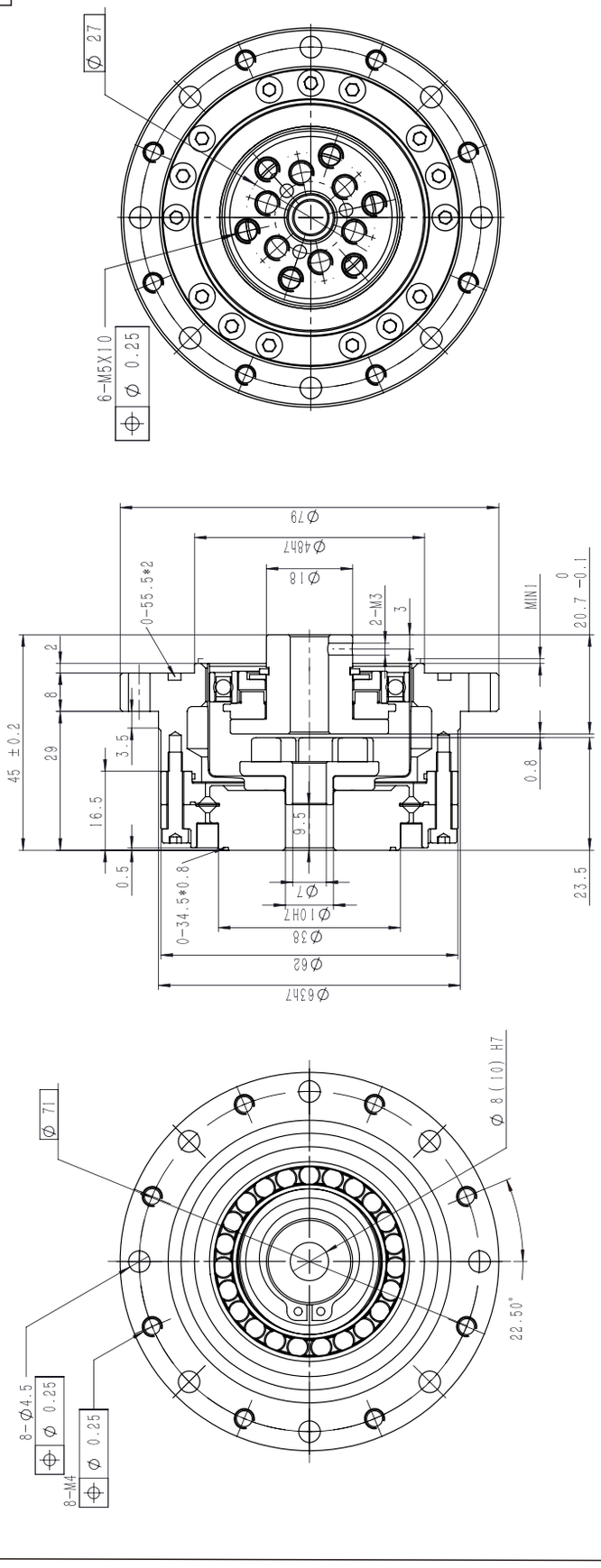
HMCG-II series Harmonic drive

HMCG-14-XX-II



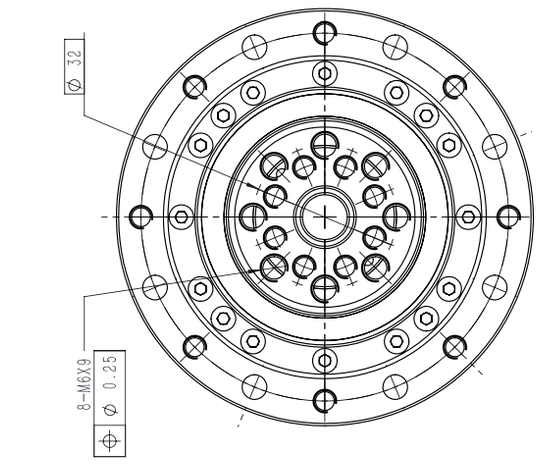
HMCG-II series Harmonic drive

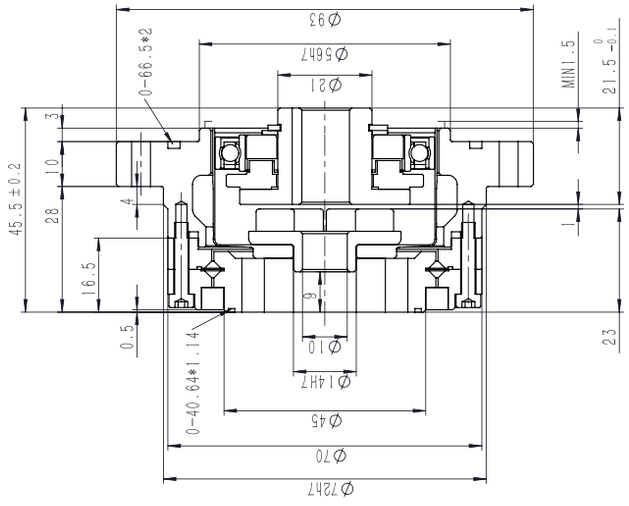
HMCG-17-XX-II

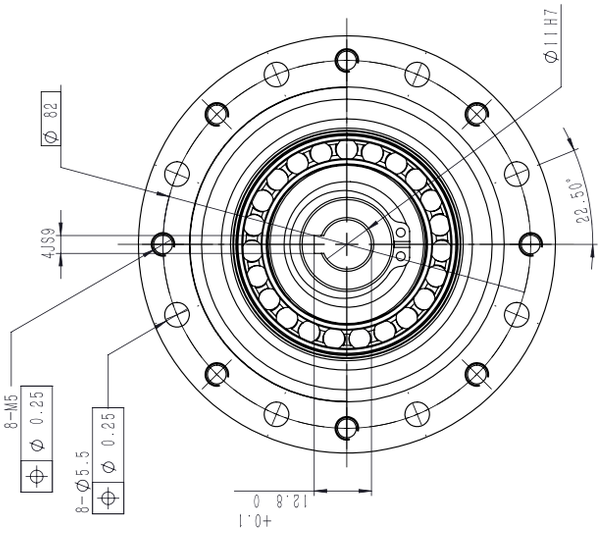


HMCG-II series Harmonic drive

HMCG-20-XX-II

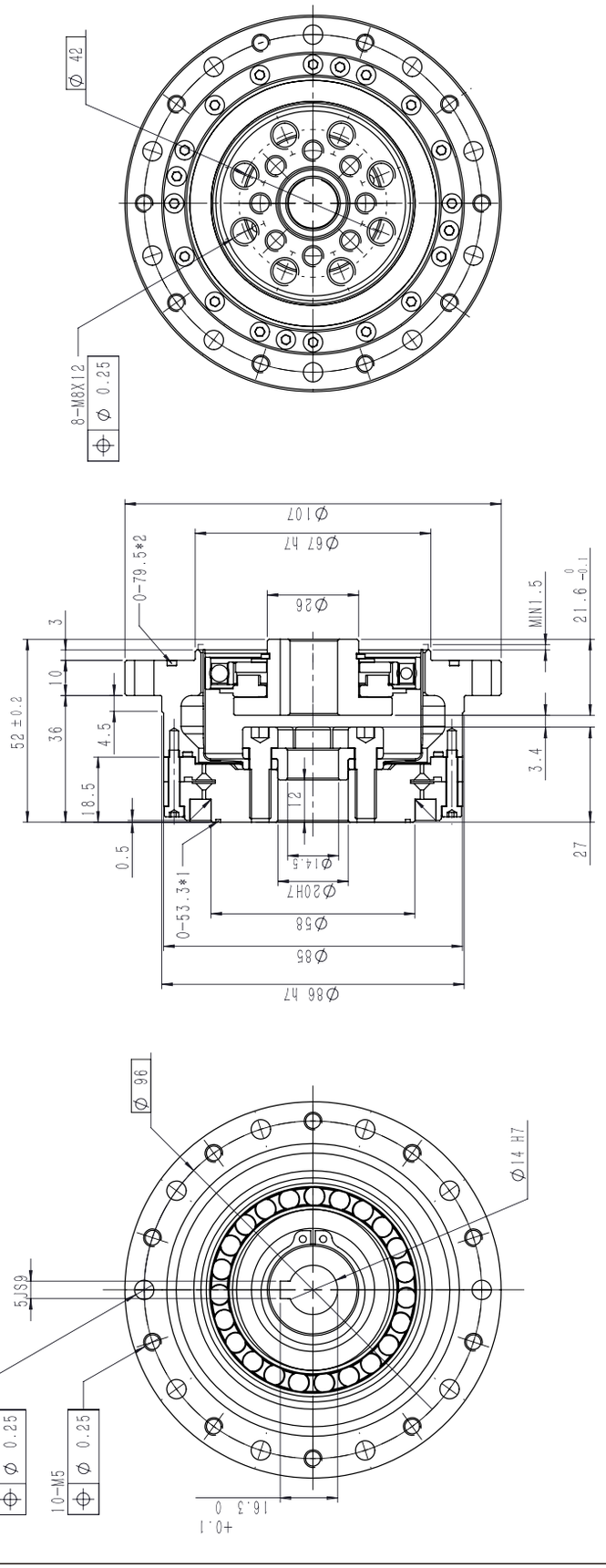






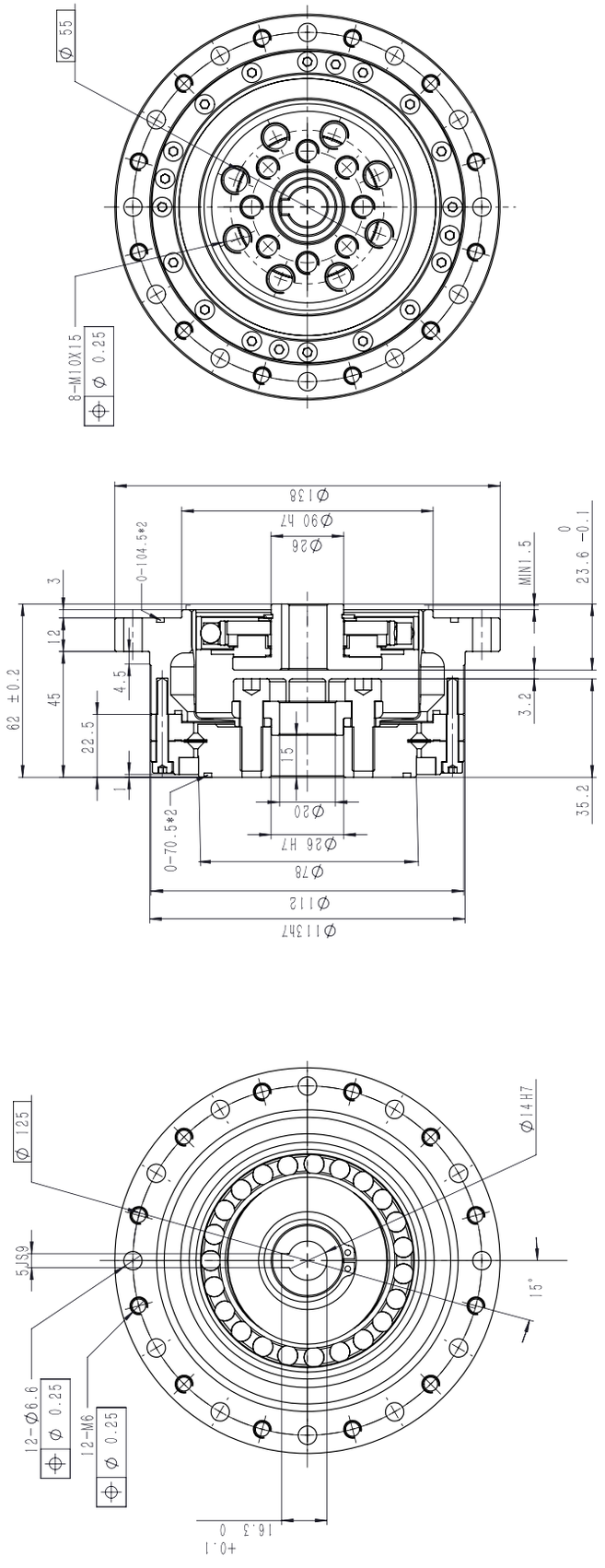
HMCG-II series Harmonic drive

HMCG-25-XX-II



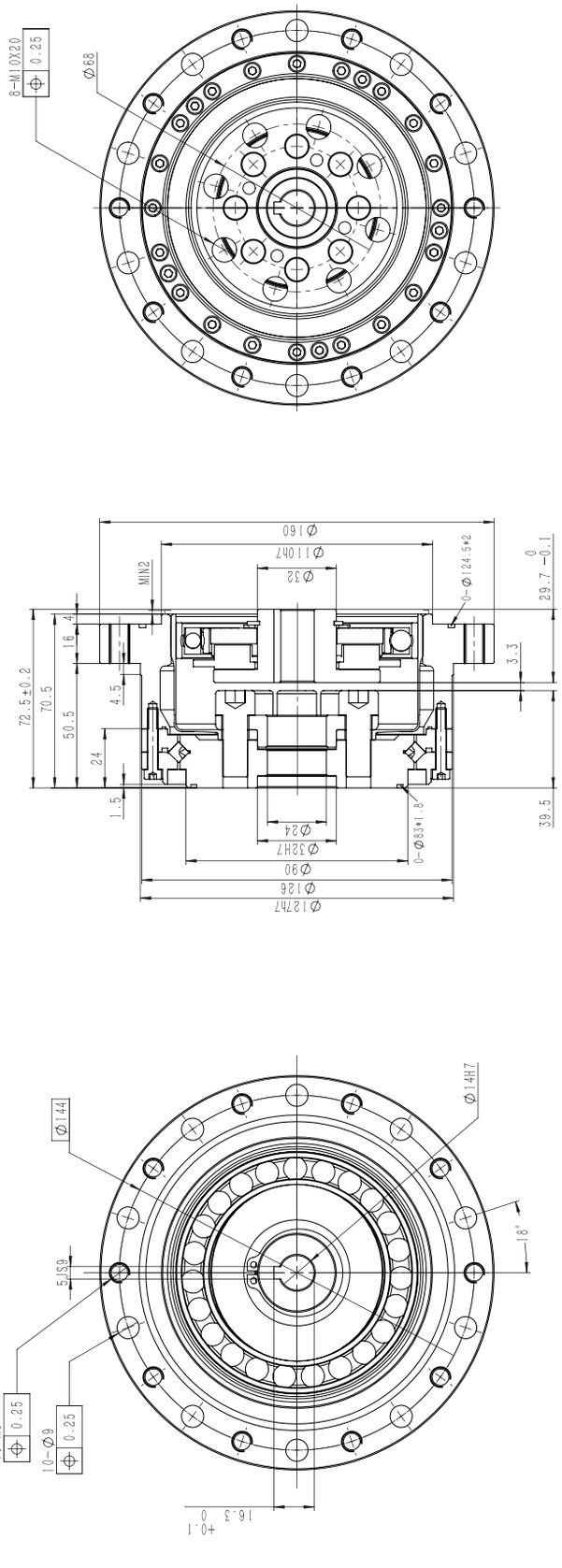
HMCG-II series Harmonic drive

HMCG-32-XX-II



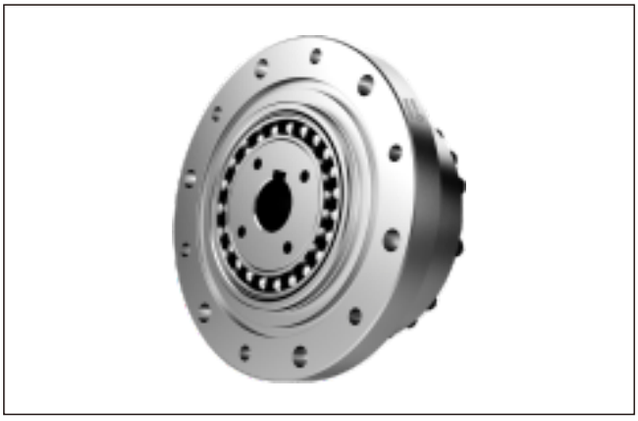
HMCG-II series Harmonic drive

HMCG-40-XX-II



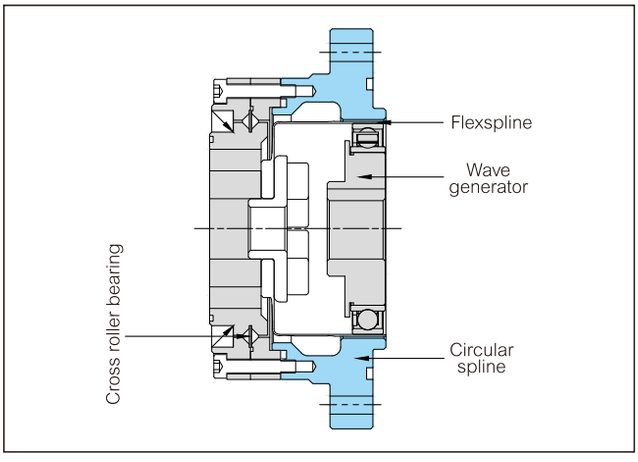
HMCG- II -E series Harmonic drive

HMCG- II -E series product details



Combination type (integral cam)

HMCG-II-E series flexspline is cup-shaped standard structure, input shaft connect with wave generator inner hole directly, fixed through a flat key connection. Generally the circular spline is fixed, and the flexspline is connected to the output end.



Product features

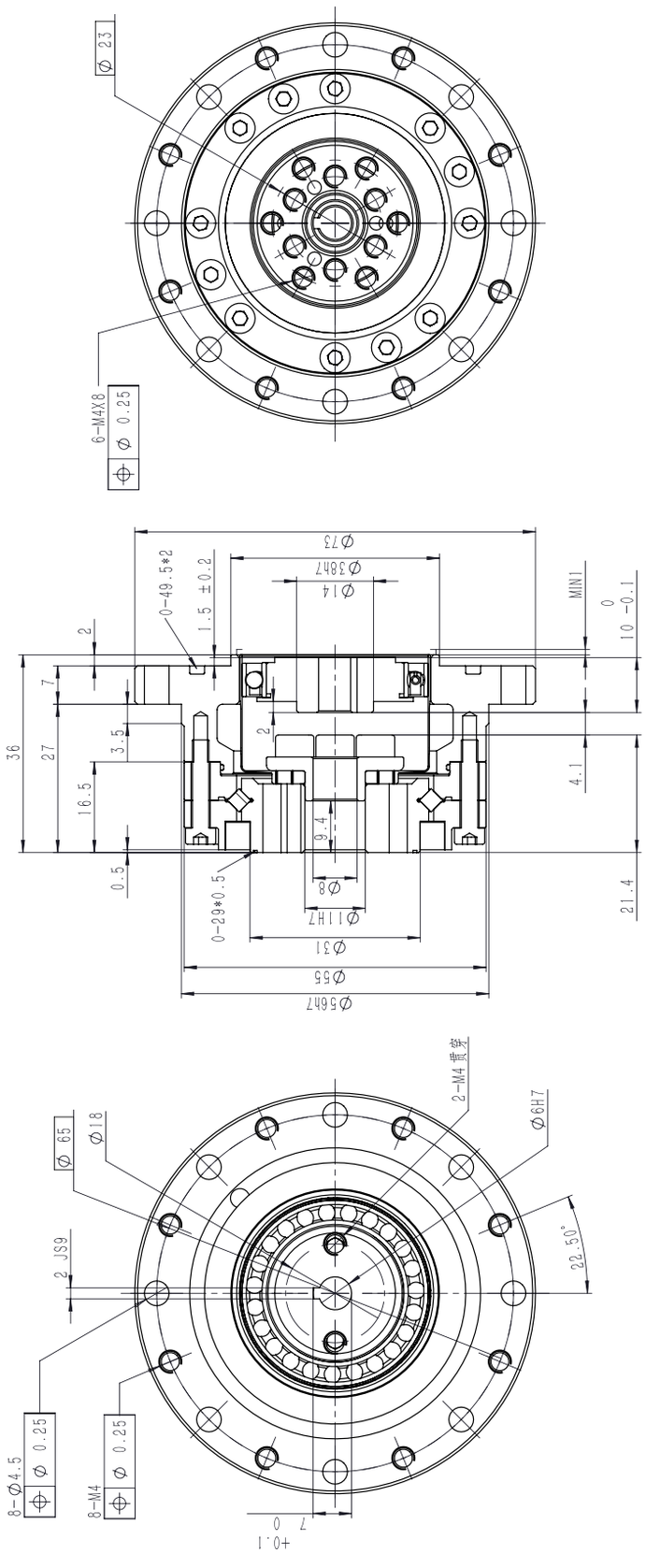
1. Cup-shaped integral cam structure
2. Compact design
3. Zero backlash
4. Input/output coaxial
5. Excellent positioning accuracy and rotation accuracy
6. 30%higher torque capacity than HMCS series
7. 43%longer lifetime than HMCS series

HMCG- II -E series performance parameter

Model	Reduction ratio	Rated torque at input 2000r/min	Permissible peak torque at start / stop	Permissible max.value of ave.load torque	Instantaneous permissible max. torque	Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash (arc sec)	Transmission accuracy (arc sec)
		Nm	Nm	Nm	Nm	r/min	r/min	⩽	⩽
14	50	7	23	9	46	8000	3500	20	90
	80	10	30	14	51			20	90
	100	10	36	14	70			10	90
17	50	21	44	34	91	7000	3500	20	90
	80	29	56	35	113			20	90
	100	31	70	51	143			10	90
20	50	33	73	44	127	6000	3500	20	60
	80	44	96	61	165			20	60
	100	52	107	64	191			10	60
	120	52	113	64	161			10	60
25	50	51	127	72	242	5500	3500	20	60
	80	82	178	113	332			20	60
	100	87	204	140	369			10	60
	120	87	217	140	395			10	60
32	50	99	281	140	497	4500	3500	20	60
	80	153	395	217	738			10	60
	100	178	433	281	841			10	60
	120	178	459	281	892			10	60
40	50	178	523	255	892	4000	3000	10	60
	80	268	675	369	1270			10	60
	100	345	738	484	1400			10	60
	120	382	802	586	1530			10	60

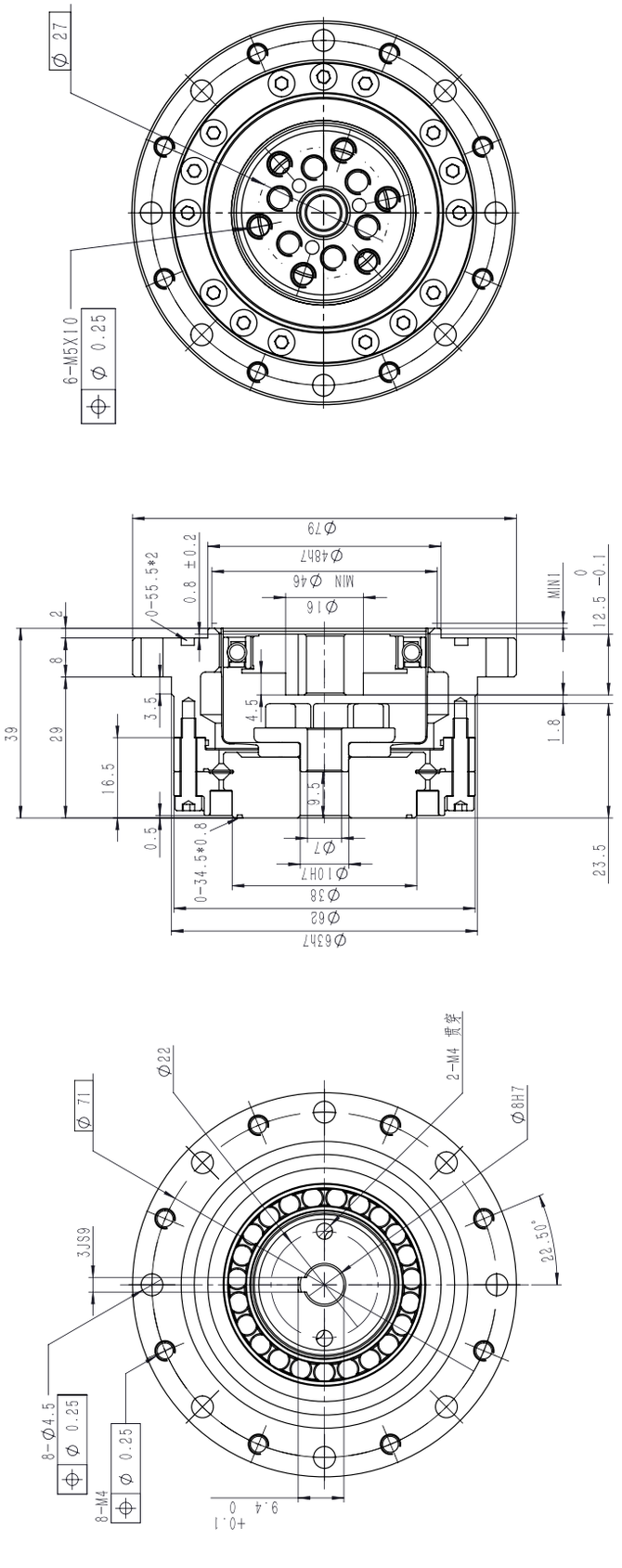
HMCG- II -E series Harmonic drive

HMCG-14-XX-II-E



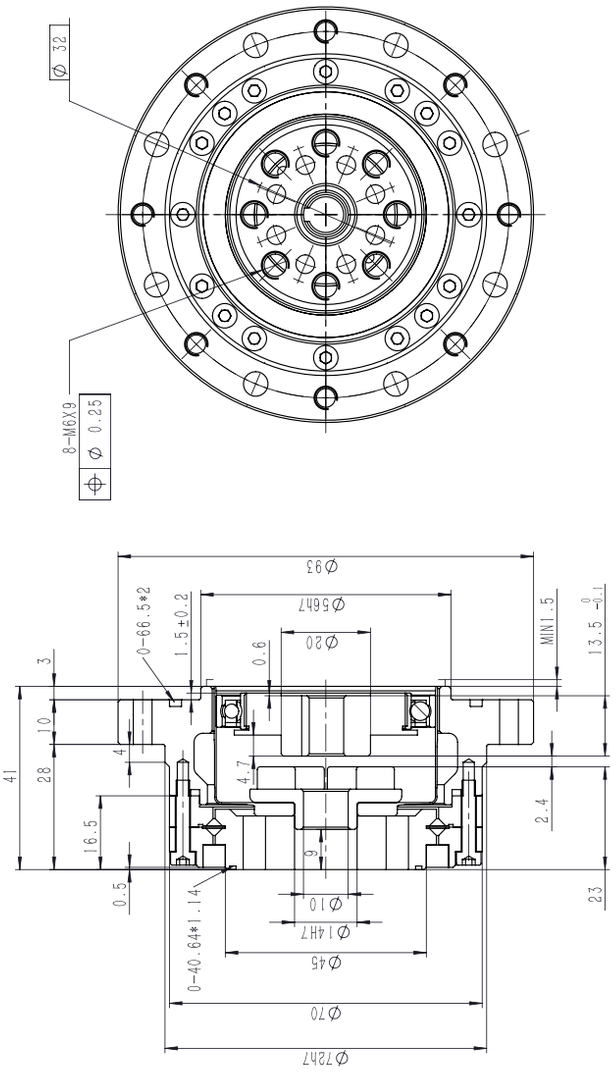
HMCG- II -E series Harmonic drive

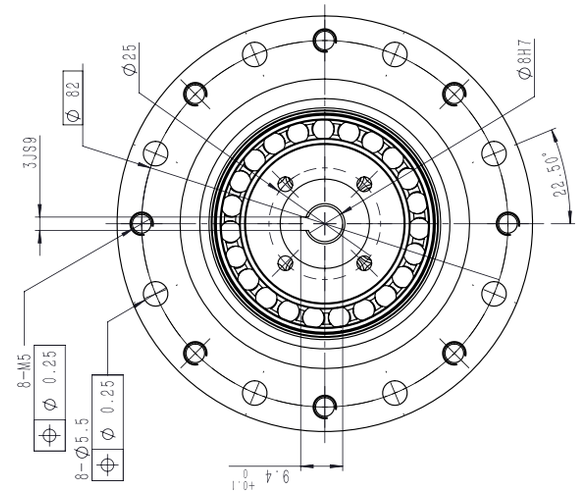
HMCG-17-XX-II-E



HMCG- II -E series Harmonic drive

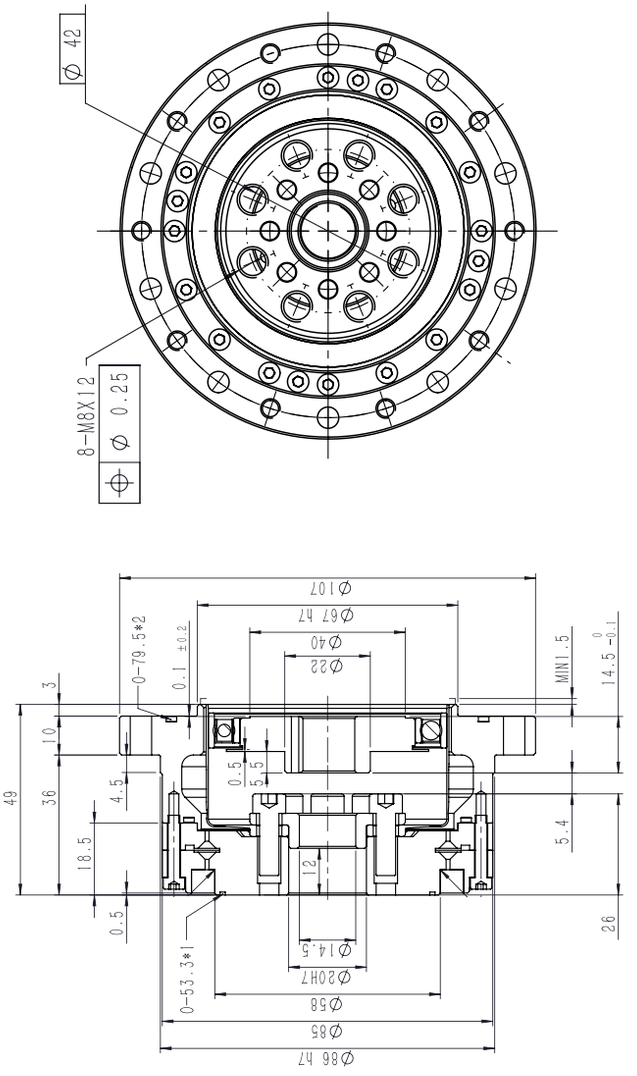
HMCG-20-XX-II-E





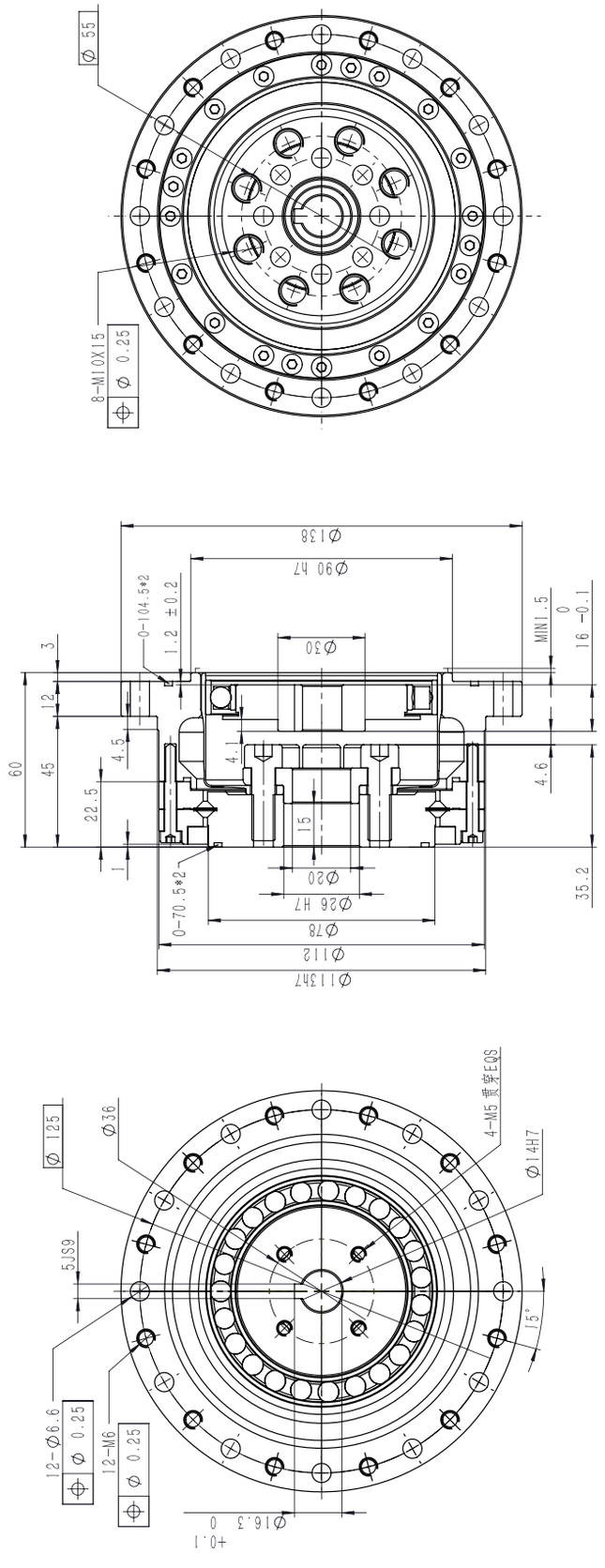
HMCG- II -E series Harmonic drive

HMCG-25-XX-II-E



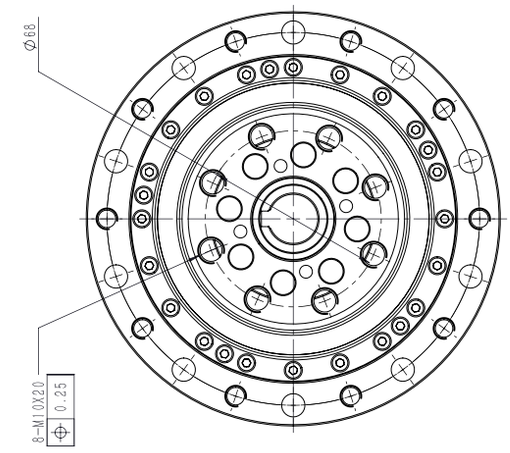
HMCG- II -E series Harmonic drive

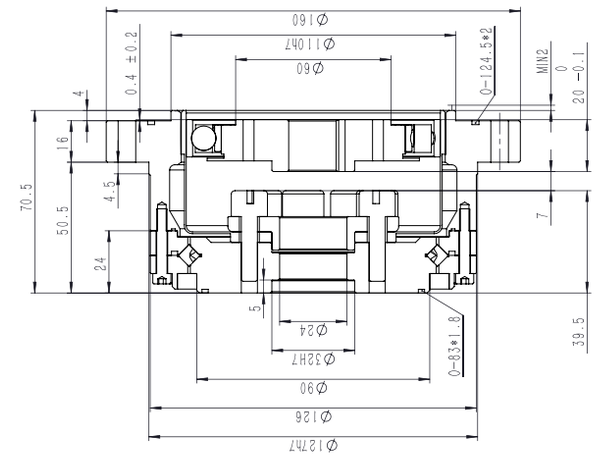
HMCG-32-XX-II-E

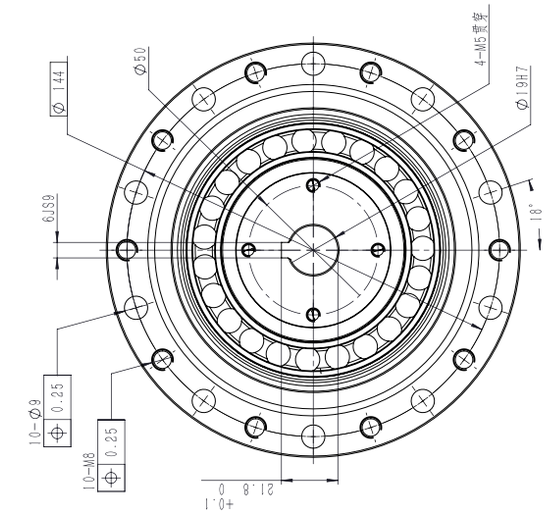


HMCG- II -E series Harmonic drive

HMCG-40-XX-II-E





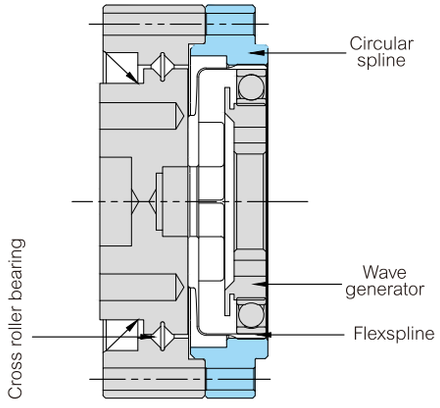


HMCD- II series Harmonic drive

HMCD- II series product details

Combination type (super flat)

HMCD-II series, with a commitment to light weight and compact size of harmonic gear transmission, not only inherits the advantages of traditional products, but also realizes bold shape design based on the market demands. The overall machine adopts super - flat structure that is light and compact, so it is very suitable to be used as robot end joint and client reducer.



Product features

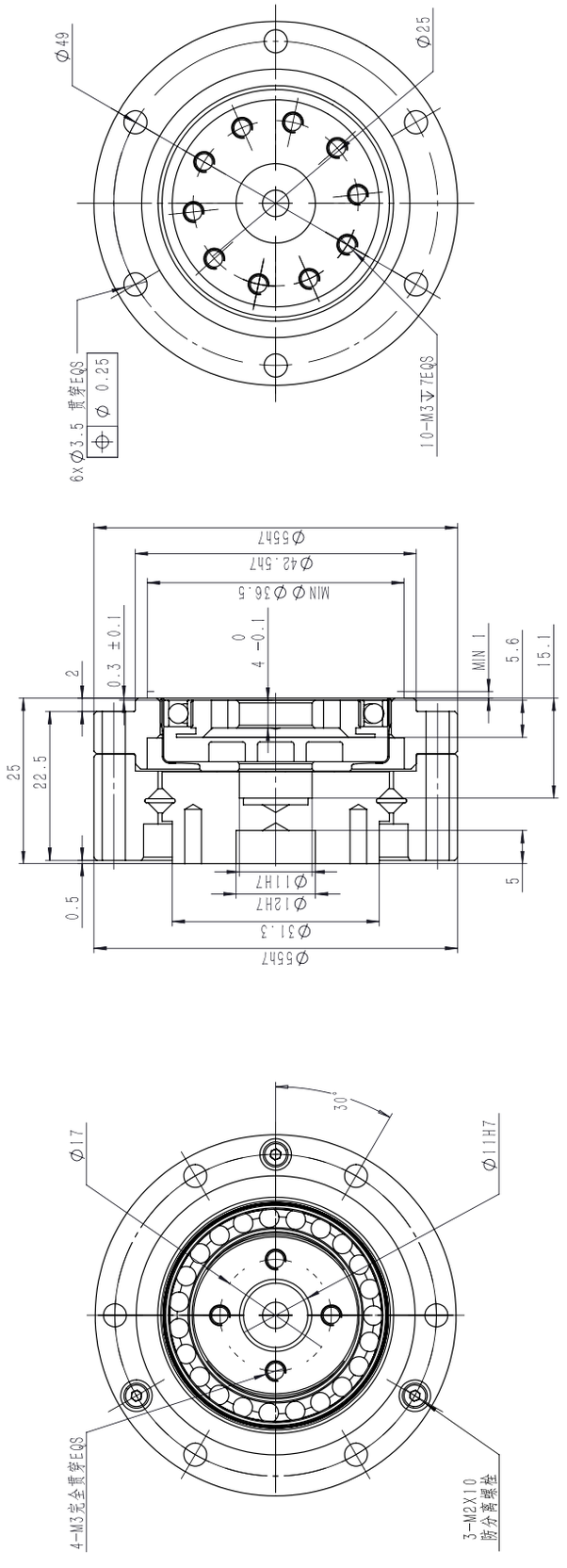
1. Superflat structure
2. Lightweight and compact
3. High static torque capacity
4. Input/output coaxial
5. Excellent positioning accuracy and rotation accuracy

HMCD- II series performance parameter

Model	Reduction ratio	Rated torque at input 2000r/min	Permissible peak torque at start / stop	Permissible max.value of ave.load torque	Instantaneous permissible max. torque	Permissible max.input rotational speed	Permissible ave.input rotational speed	Backlash (arc sec)	Transmission accuracy (arc sec)
		Nm	Nm	Nm	Nm	r/min	r/min	⩽	⩽
14	50	3.5	11.4	4.6	23	8000	3500	20	90
	80	5.1	15	6.2	29			20	90
	100	5.1	18	7	33			20	90
17	50	10.5	22	17	46	7000	3500	20	90
	80	14	29	21	54			20	90
	100	15	35	26	67			20	90
20	50	16	37	23	66	6000	3500	20	90
	80	23	49	28	78			10	90
	100	27	54	32	90			10	90
25	50	26	66	36	121	5500	3500	20	60
	80	42	91	62	157			10	60
	100	45	105	71	175			10	60
32	50	50	143	71	255	4500	3500	20	60
	80	79	202	126	350			10	60
	100	91	221	143	399			10	60

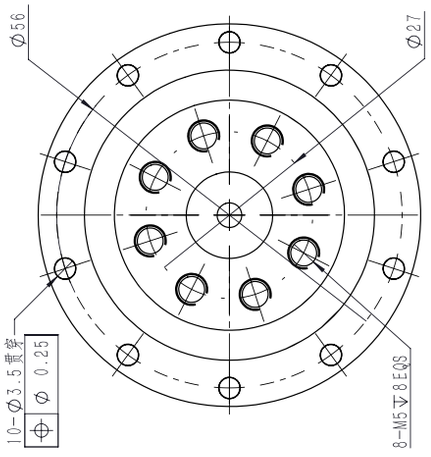
HMCD- II series Harmonic drive

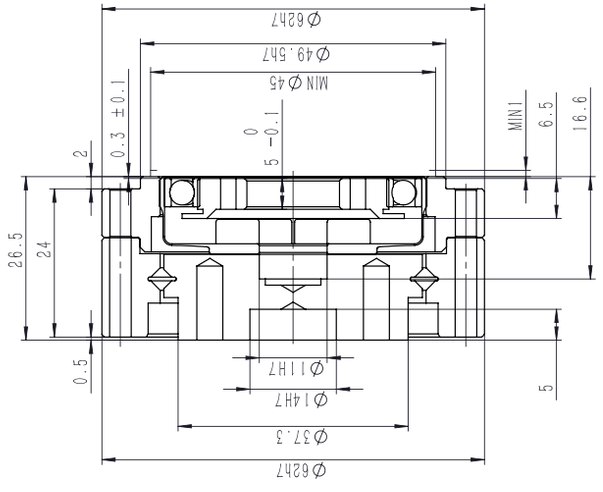
HMCD-14-XX-II

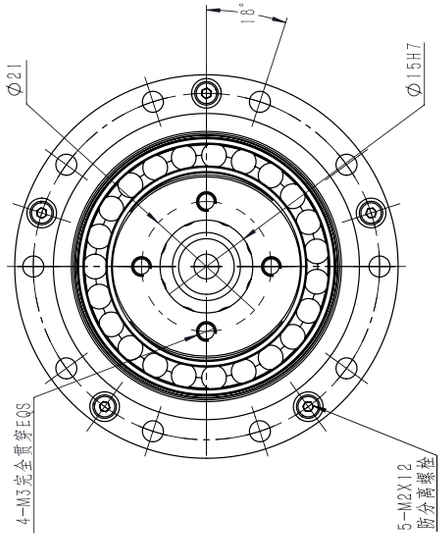


HMCD- II series Harmonic drive

HMCD-17-XX- II

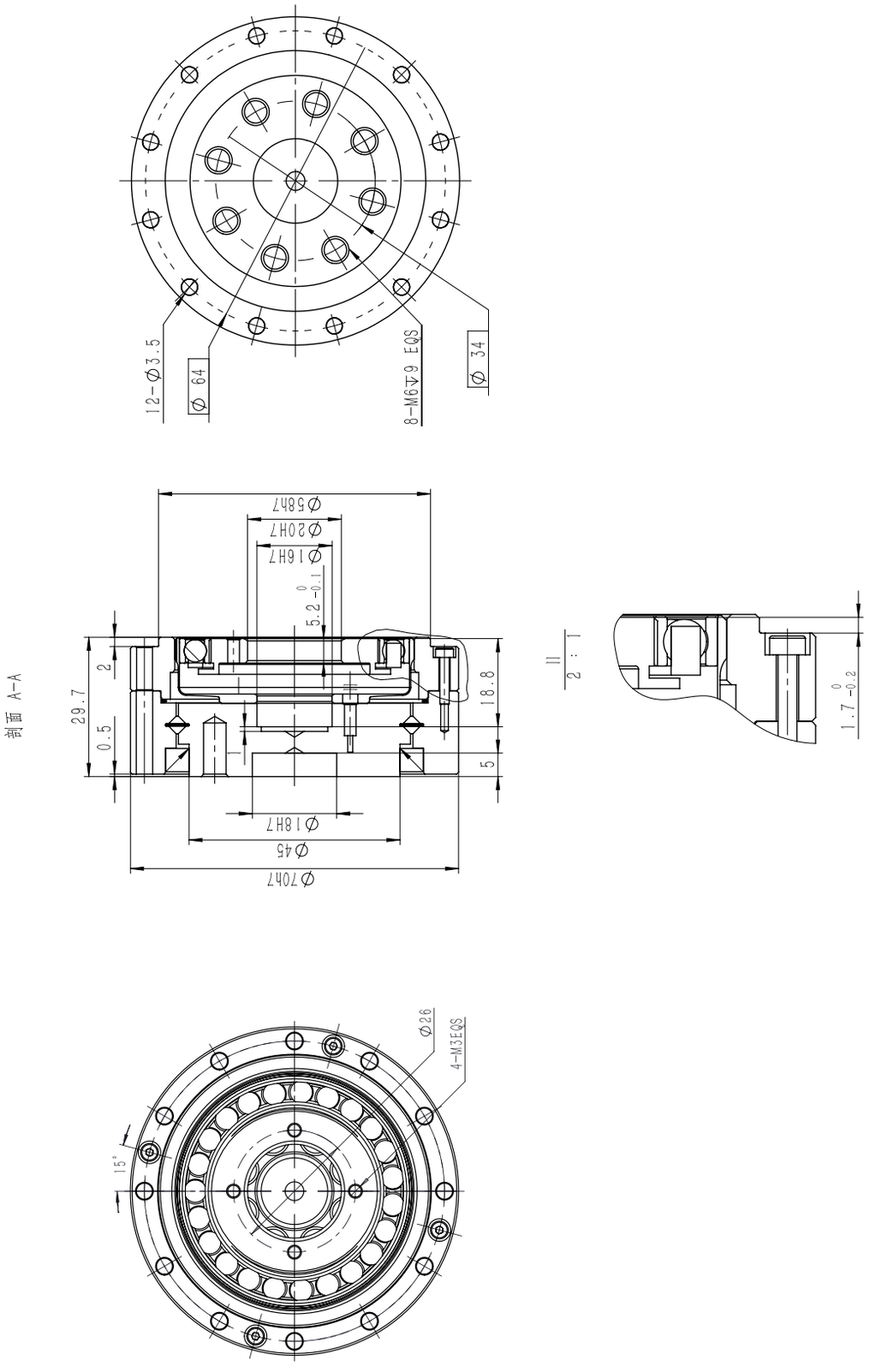






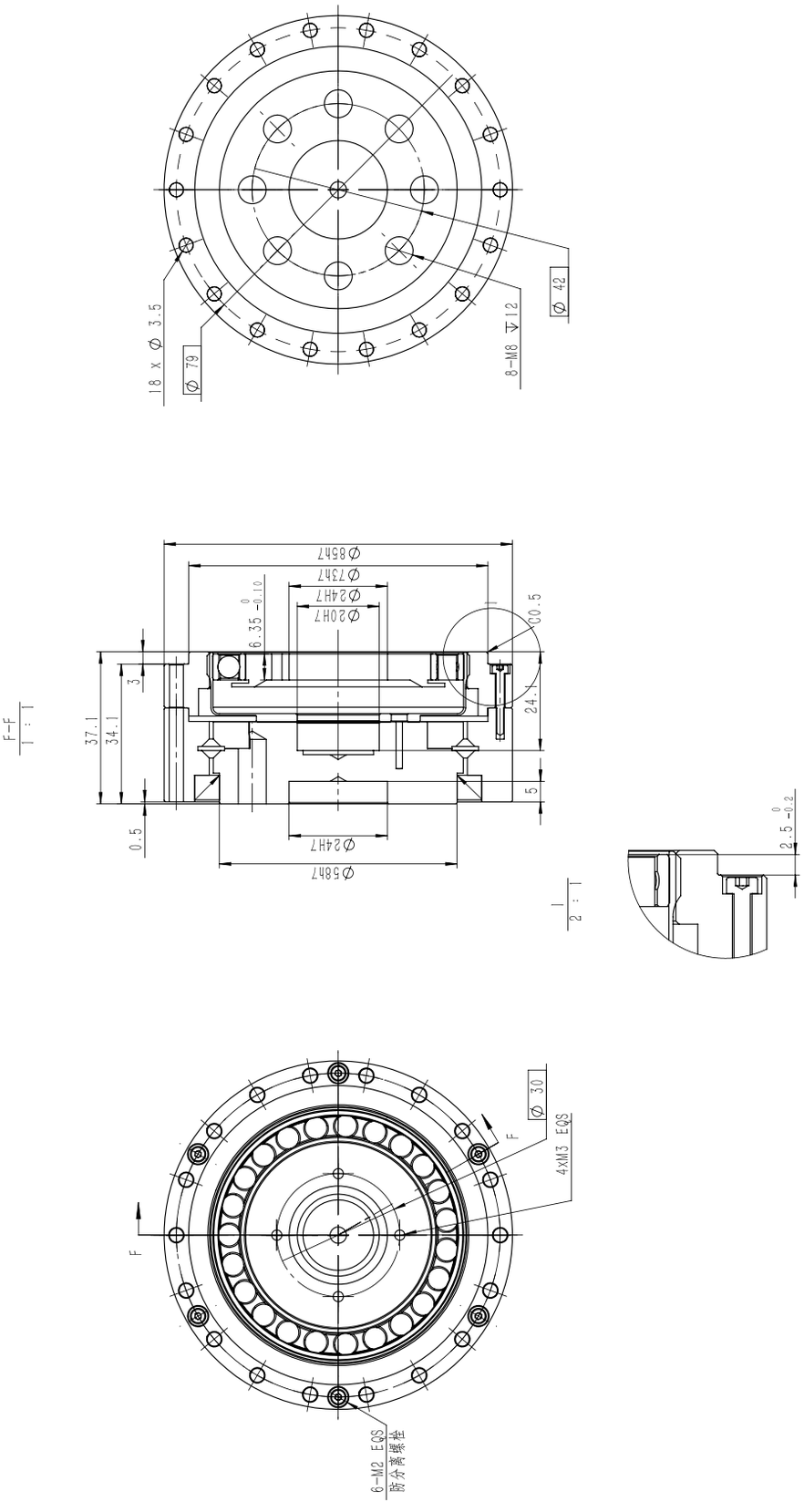
HMCD- II series Harmonic drive

HMCD-20-XX-II



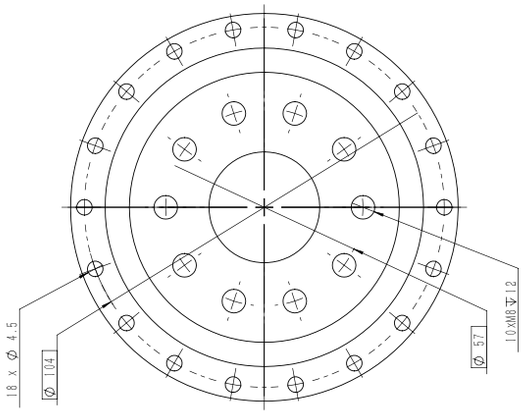
HMCD- II series Harmonic drive

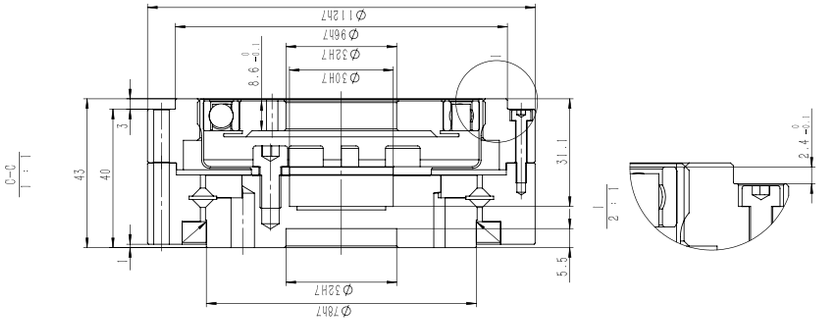
HMCD-25-XX- II

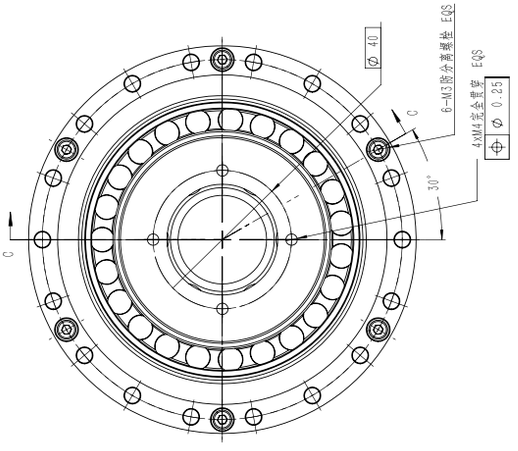


HMCD- II series Harmonic drive

HMCD-32-XX-II

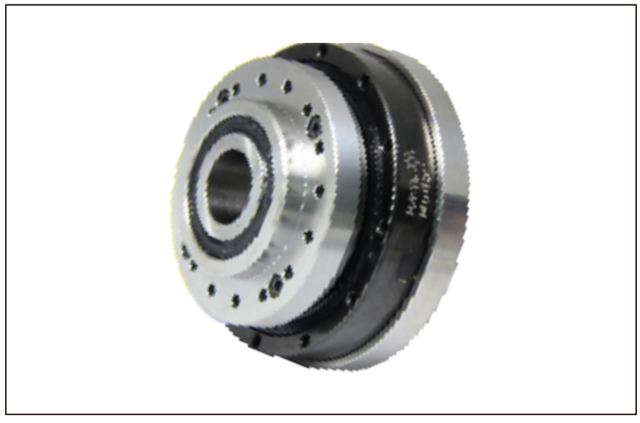






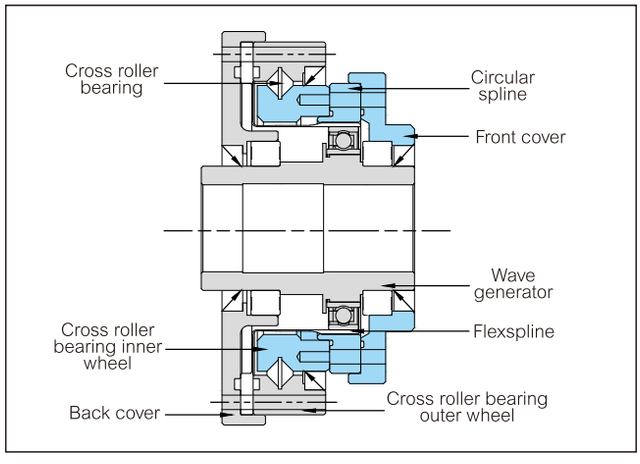
HMHG- I series Harmonic drive

HMHG-I series product details



Combination type (hollow shaft)

HMHG-I series flexspline belongs to hollow flanging standard structure and there are large-caliber hollow shaft hole in the middle of wave generator cam. And support bearing is also designed inside the reducer. The reducer is fully sealed easy to install, especially suitable for the situation where there is a need to thread through the reducer center.



Product features

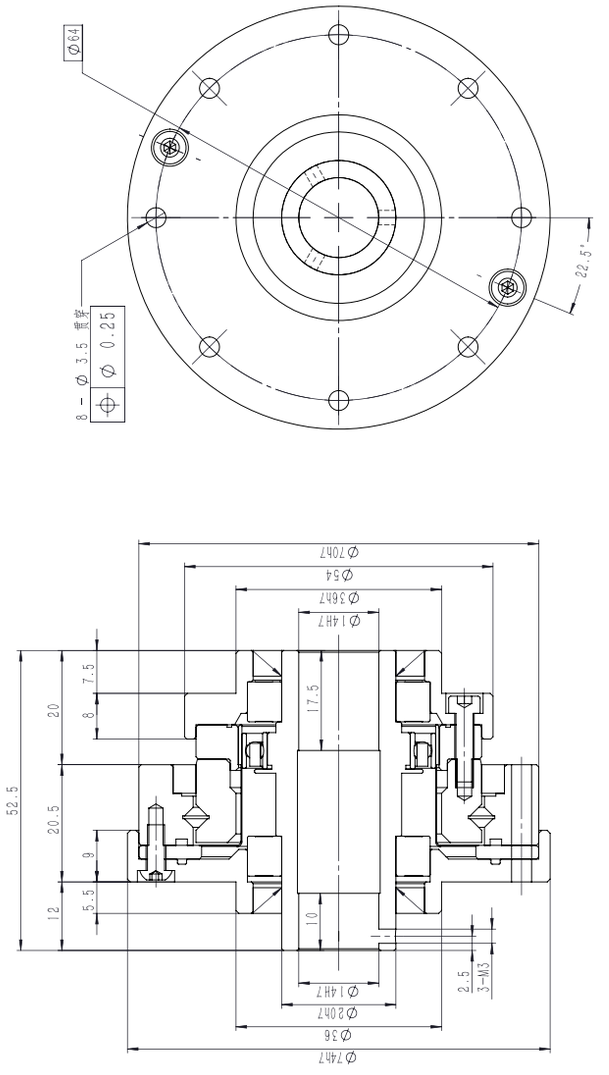
1. Large diameter · Hollow structure
2. Compact design
3. Zero backlash
4. Input/output coaxial
5. Excellent positioning accuracy and rotation accuracy
6. 30%higher torque capacity than HMHS series
7. 43%longer lifetime than HMHS series

HMHG-I series performance parameter

Model	Reduction ratio	Rated torque at input 2000r/min	Permissible peak torque at start / stop	Permissible max.value of ave.load torque	Instantaneous permissible max. torque	Permissible max.input rotational speed	Permissible ave.input rotational speed	Backlash (arc sec)	Transmission accuracy (arc sec)
		Nm	Nm	Nm	Nm	r/min	r/min	⩽	⩽
14	50	7	23	9	46	8000	3500	20	90
	80	10	30	14	51			20	90
	100	10	36	14	70			10	90
17	50	21	44	34	91	7000	3500	20	90
	80	29	56	35	113			20	90
	100	31	70	51	143			10	90
20	50	33	73	44	127	6000	3500	20	60
	80	44	96	61	165			20	60
	100	52	107	64	191			10	60
	120	52	113	64	161			10	60
25	50	51	127	72	242	5500	3500	20	60
	80	82	178	113	332			20	60
	100	87	204	140	369			10	60
	120	87	217	140	395			10	60
32	50	99	281	140	497	4500	3500	20	60
	80	153	395	217	738			10	60
	100	178	433	281	841			10	60
	120	178	459	281	892			10	60
40	50	178	523	255	892	4000	3000	10	60
	80	268	675	369	1270			10	60
	100	345	738	484	1400			10	60
	120	382	802	586	1530			10	60

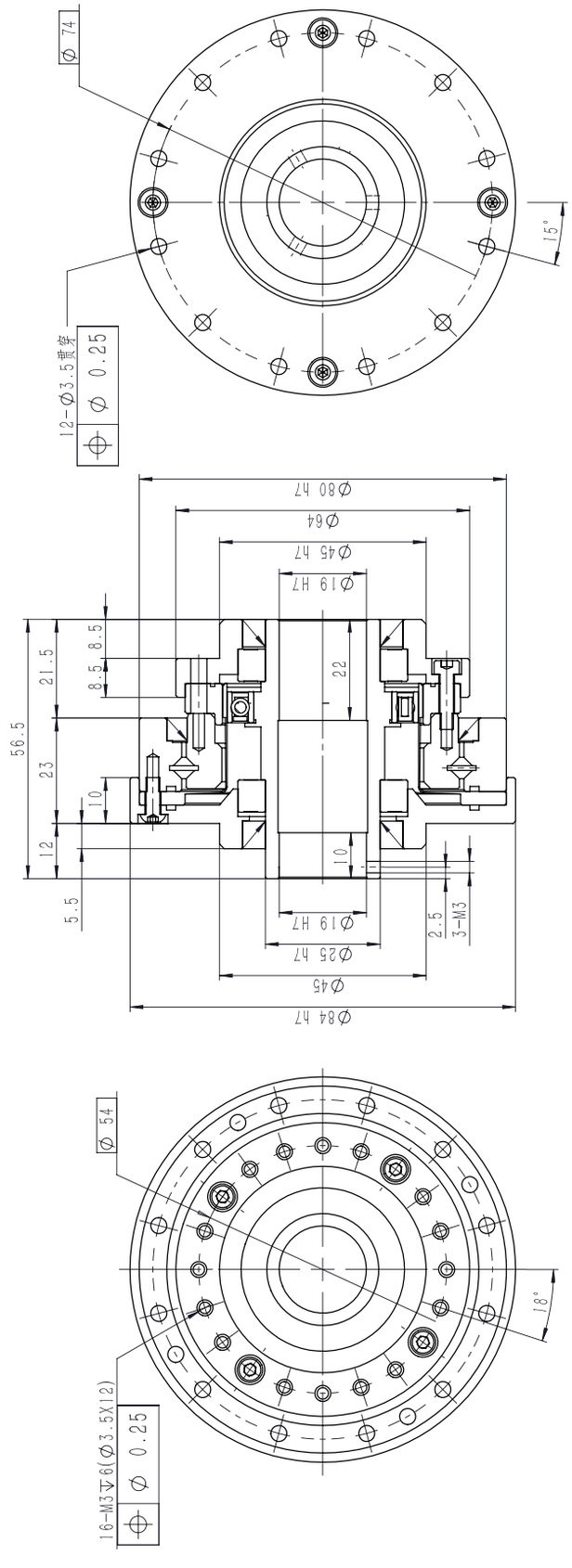
HMHG- I series Harmonic drive

HMHG-14-XX-I



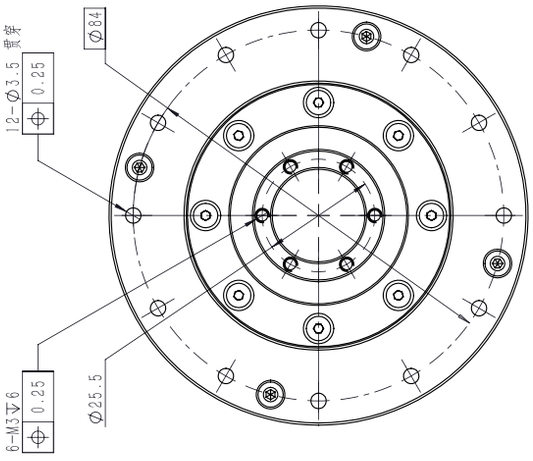
HMHG- I series Harmonic drive

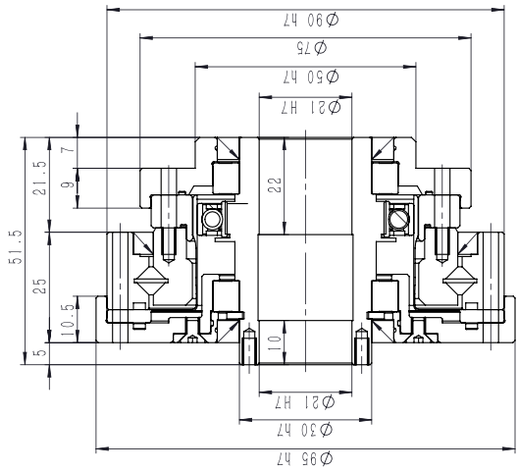
HMHG-17-XX-I

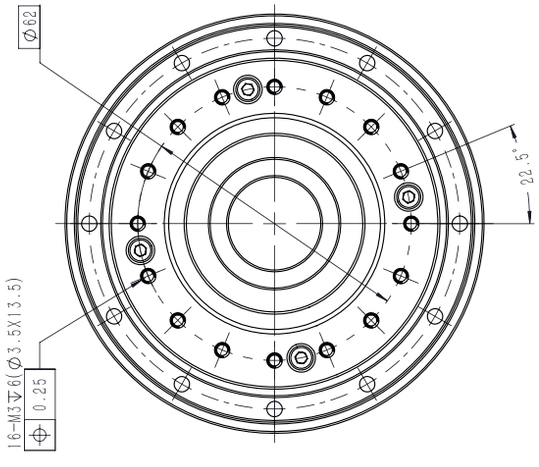


HMHG- I series Harmonic drive

HMHG-20-XX-I

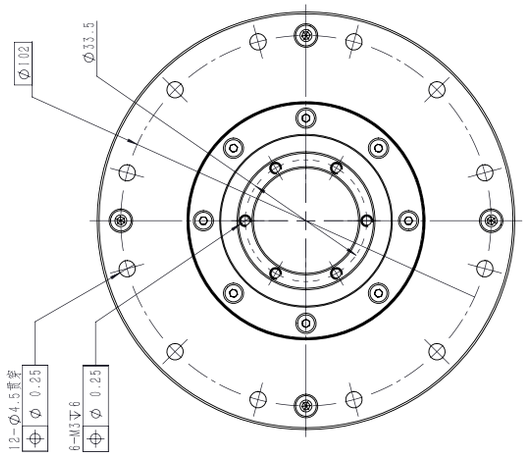


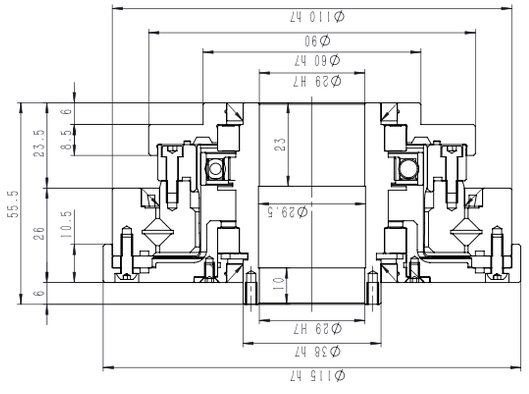


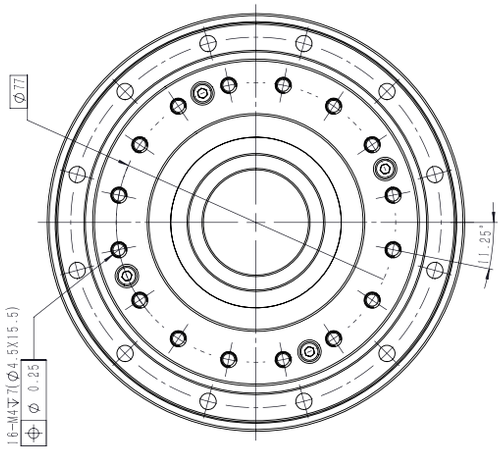


HMHG- I series Harmonic drive

HMHG-25-XX-I

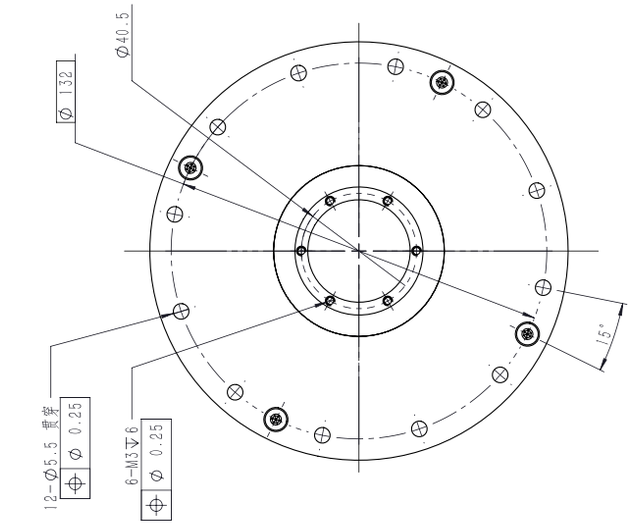


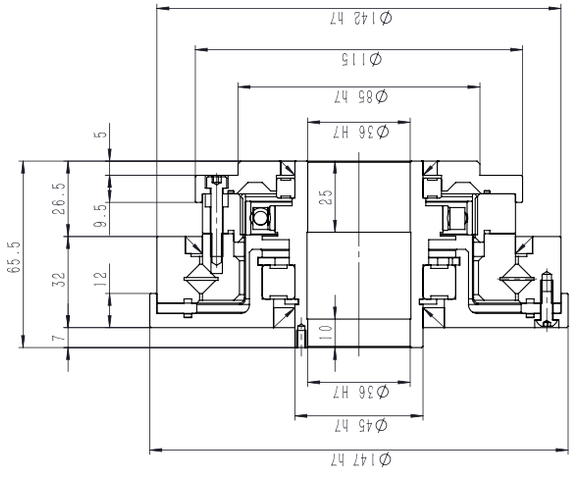


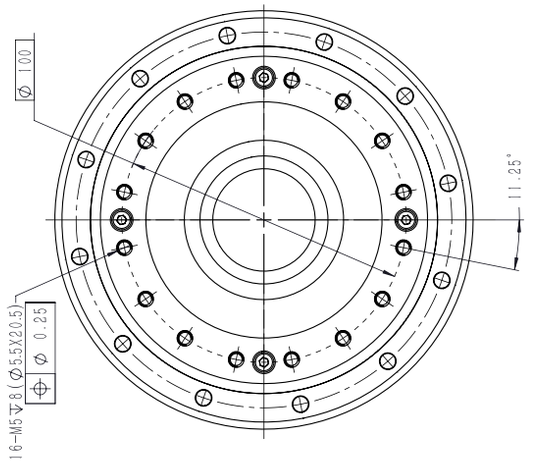


HMHG- I series Harmonic drive

HMHG-32-XX-I

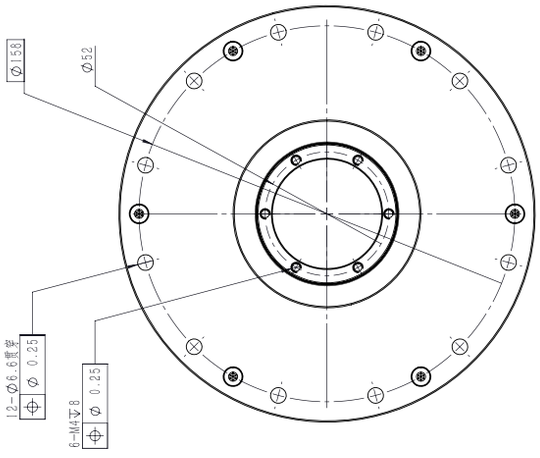


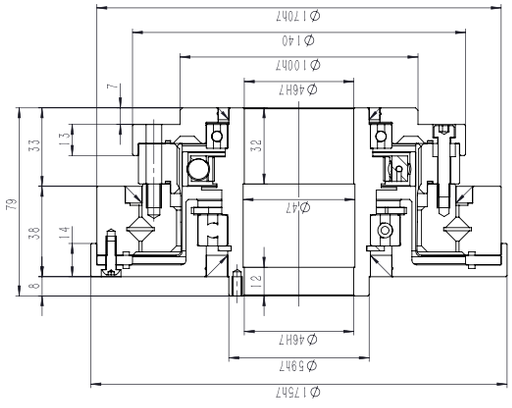


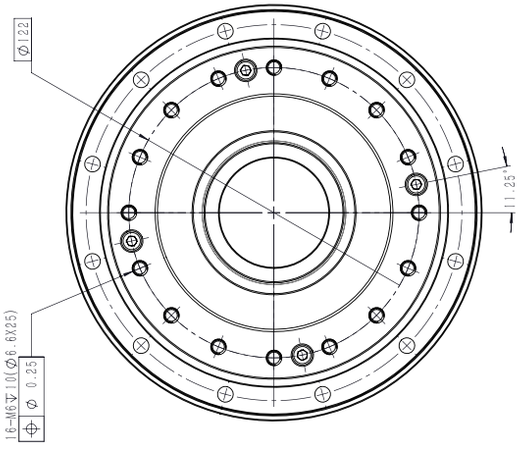


HMHG- I series Harmonic drive

HMHG-40-XX-I





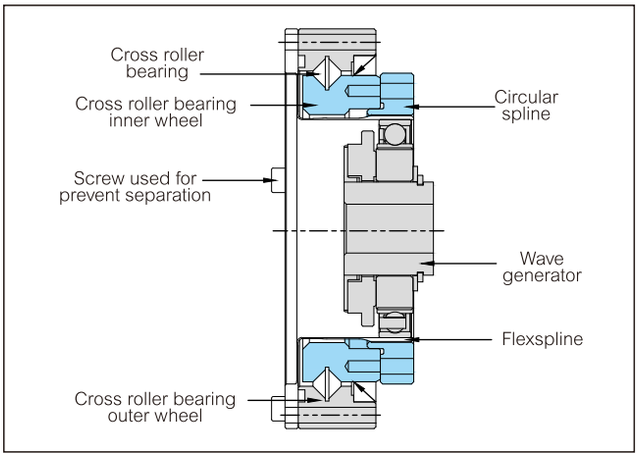


HMHG- II series Harmonic drive

HMHG- II series product details

Simple combination type (standard type)

HMHG-II series flexspline belongs to hollow flanging standard structure and the whole structure is compact. Its input shaft connects with inner hole of wave generator through Oldham coupling. The reducer can be used in two methods : rigid gear is fixed and flexspline doesoutput; or flexspline is fixed and circular spline does output.



Product features

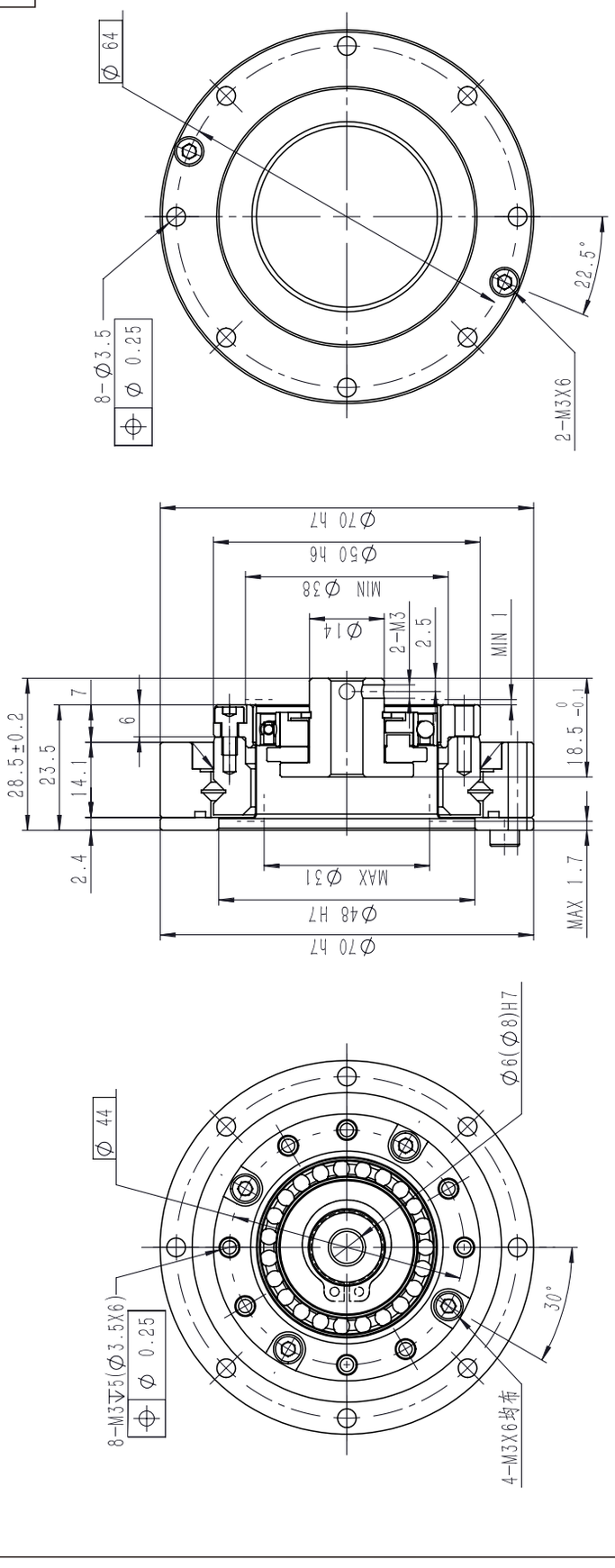
1. Flat shape · Standard structure
2. Compact design
3. Zero backlash
4. Input/output coaxial
5. Excellent positioning accuracy and rotation accuracy
6. 30%higher torque capacity than HMHS series
7. 43%longer lifetime than HMHS series

HMHG- II series performance parameter

Model	Reduction ratio	Rated torque at input 2000r/min	Permissible peak torque at start / stop	Permissible max.value of ave.load torque	Instantaneous permissible max. torque	Permissible max.input rotational speed	Permissible ave.input rotational speed	Backlash (arc sec)	Transmission accuracy (arc sec)
		Nm	Nm	Nm	Nm	r/min	r/min	⩽	⩽
14	50	7	23	9	46	8000	3500	20	90
	80	10	30	14	51			20	90
	100	10	36	14	70			10	90
17	50	21	44	34	91	7000	3500	20	90
	80	29	56	35	113			20	90
	100	31	70	51	143			10	90
20	50	33	73	44	127	6000	3500	20	60
	80	44	96	61	165			20	60
	100	52	107	64	191			10	60
	120	52	113	64	161			10	60
25	50	51	127	72	242	5500	3500	20	60
	80	82	178	113	332			20	60
	100	87	204	140	369			10	60
	120	87	217	140	395			10	60
32	50	99	281	140	497	4500	3500	20	60
	80	153	395	217	738			10	60
	100	178	433	281	841			10	60
	120	178	459	281	892			10	60
40	50	178	523	255	892	4000	3000	10	60
	80	268	675	369	1270			10	60
	100	345	738	484	1400			10	60
	120	382	802	586	1530			10	60

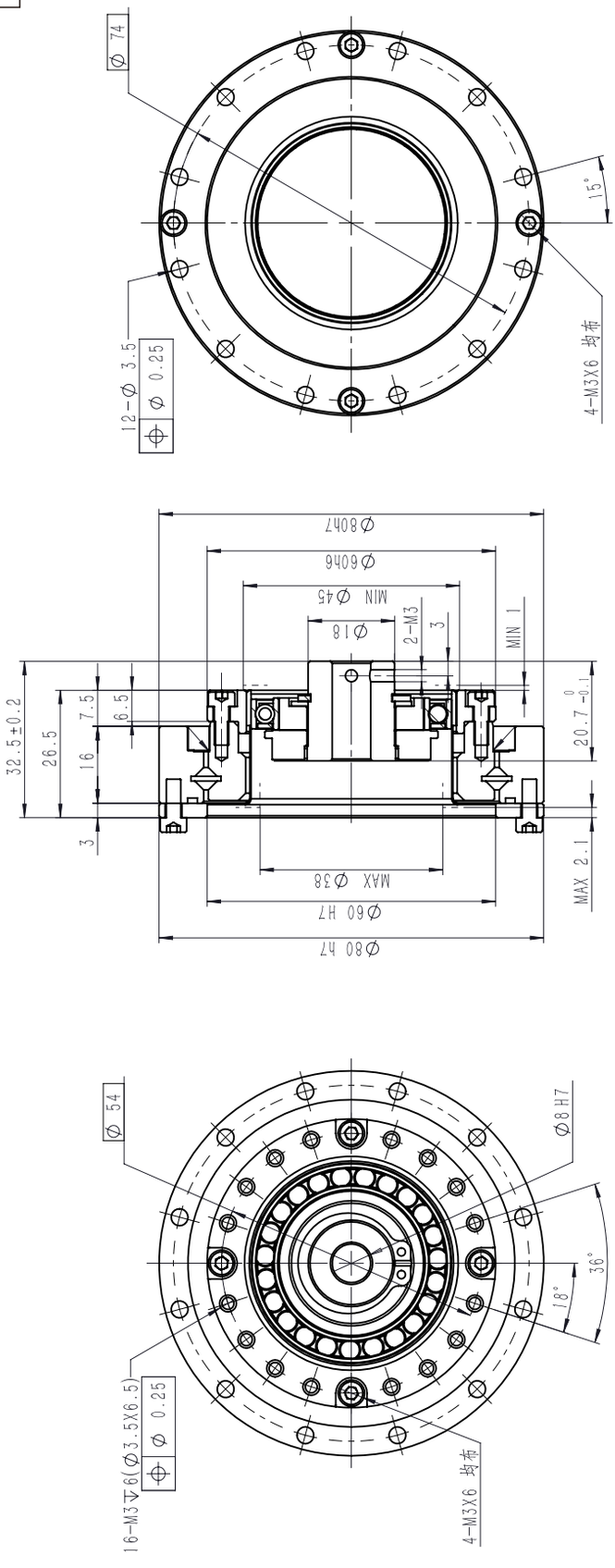
HMHG- II series Harmonic drive

HMHG-14-XX-II



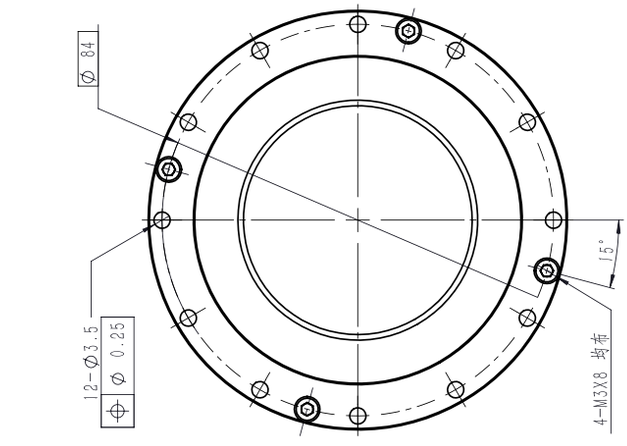
HMHG- II series Harmonic drive

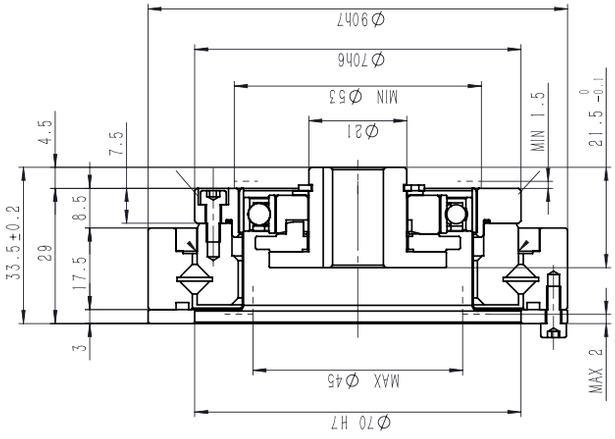
HMHG-17-XX-II

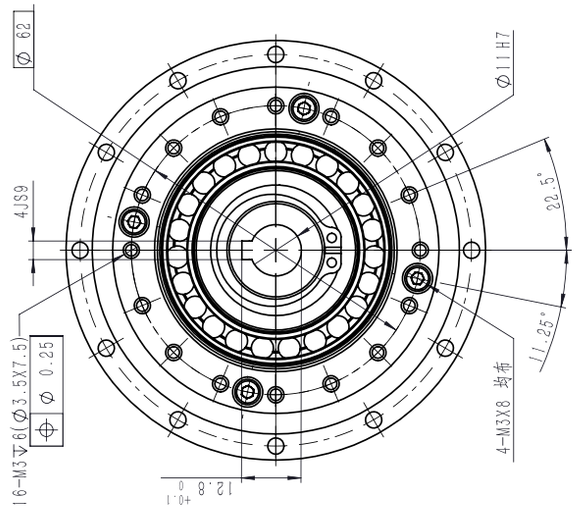


HMHG- II series Harmonic drive

HMHG-20-XX-II

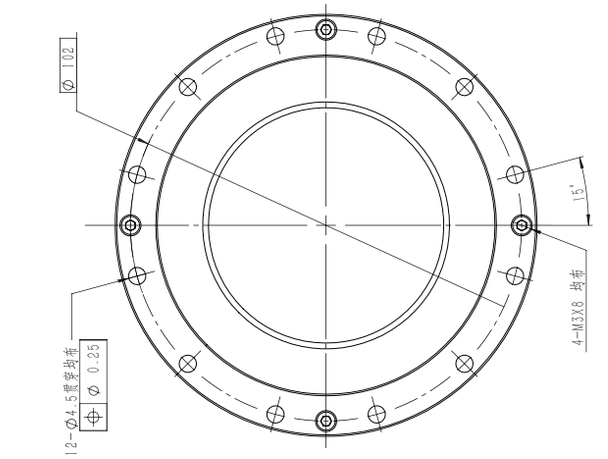


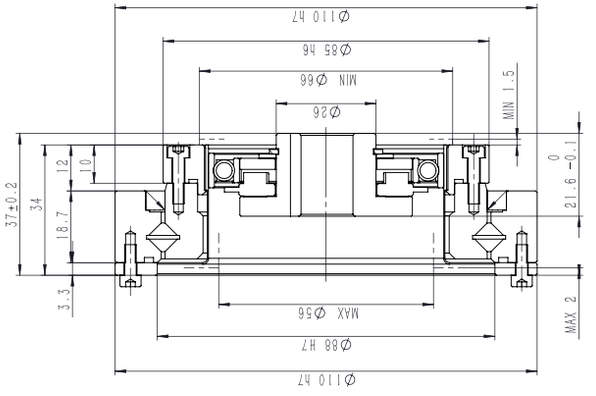


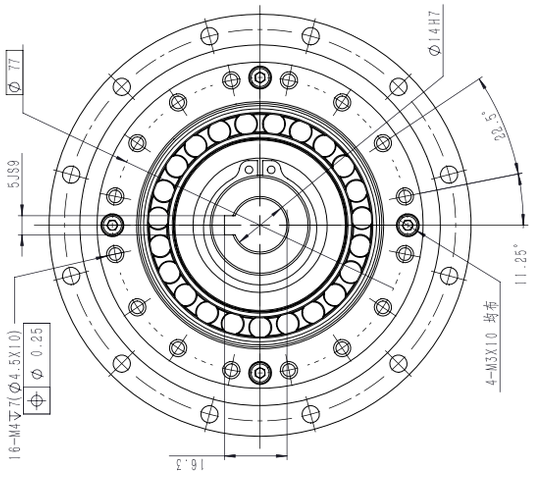


HMHG- II series Harmonic drive

HMHG-25-XX-II

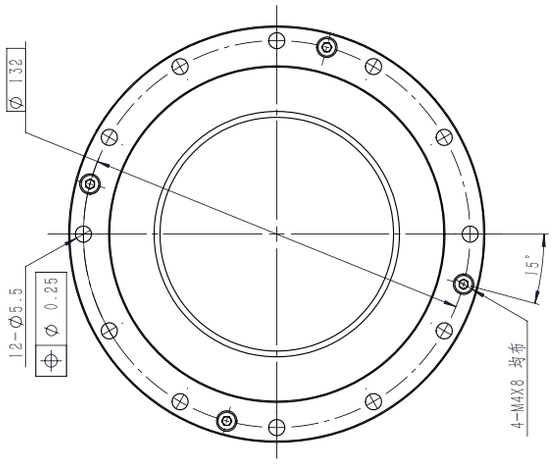


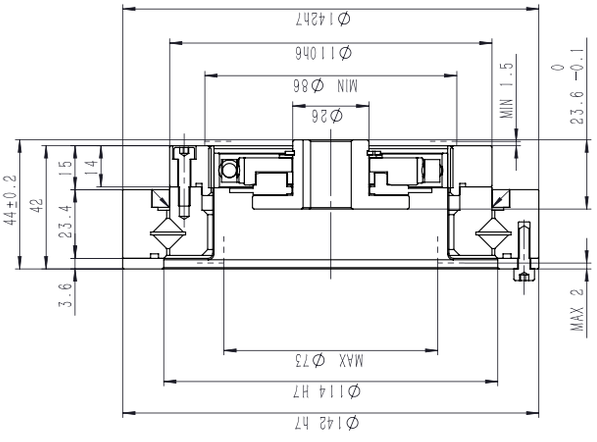


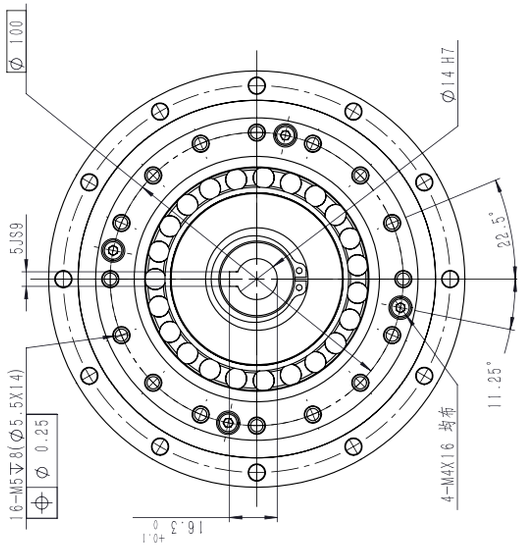


HMHG- II series Harmonic drive

HMHG-32-XX-II

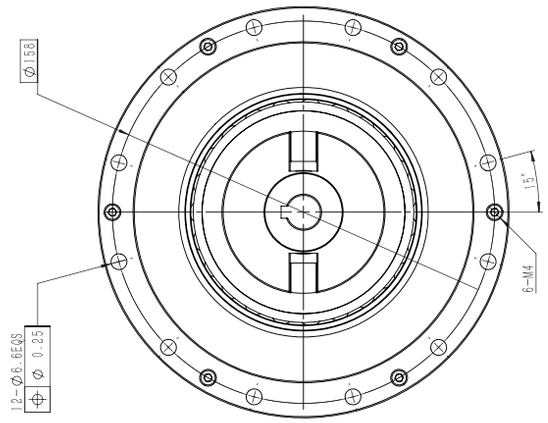


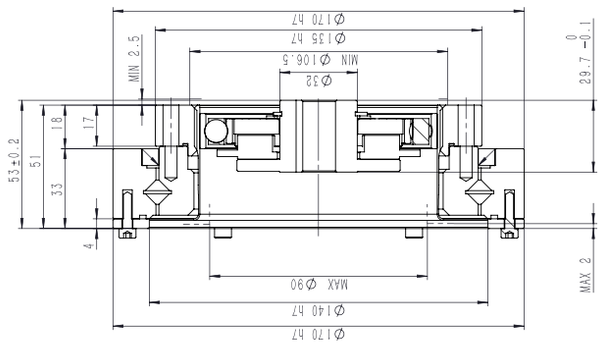


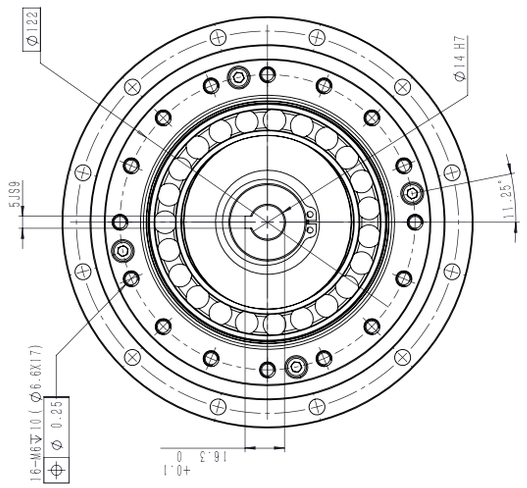


HMHG- II series Harmonic drive

HMHG-40-XX-II





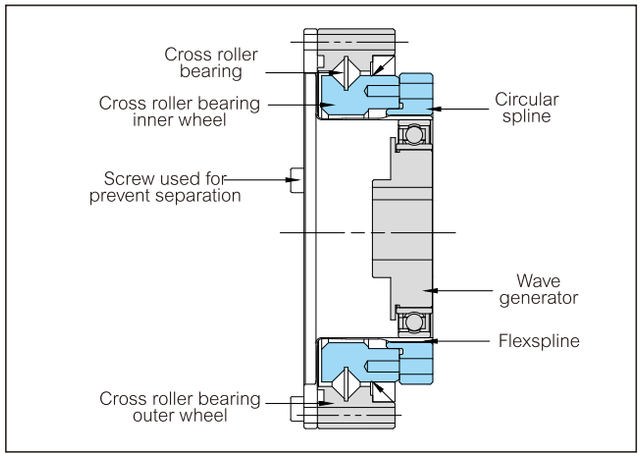


HMHG- II -E series Harmonic drive

HMHG- II -E series product details

Simple combination type (integral cam)

HMHG-II-E series flexspline is hollow, hat - shaped standard structure, the whole structure is compact. Input shaft is connected to wave generator inner hole through integral cam. It can adopt the connection mode with circular spline fixed and flexspline as the output end. And it also can adopt the connection mode with the flexspline fixed, the circular spline as the output end.



Product features

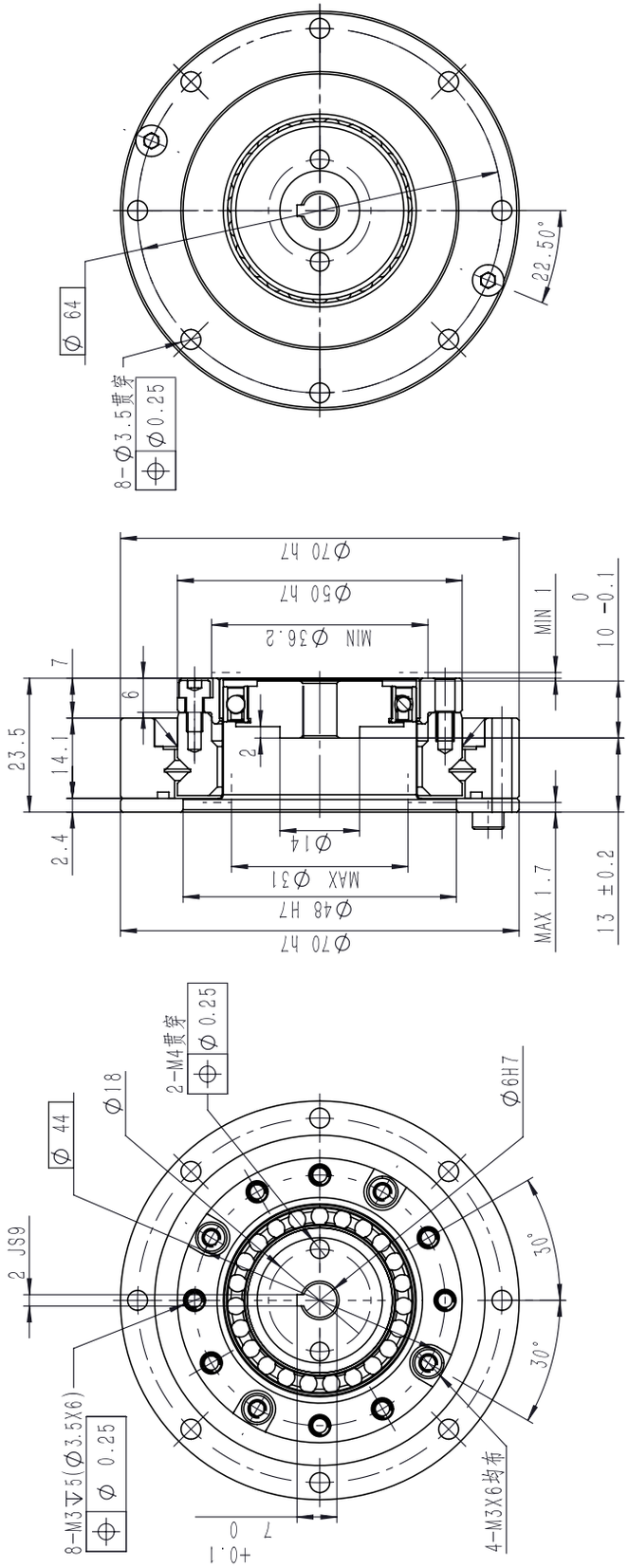
1. Flat shape · Integral cam structure
2. Compact design
3. Zero backlash
4. Input/output coaxial
5. Excellent positioning accuracy and rotation accuracy
6. 30%higher torque capacity than HMHS series
7. 43%longer lifetime than HMHS series

HMHG- II -E series performance parameter

Model	Reduction ratio	Rated torque at input 2000r/min	Permissible peak torque at start / stop	Permissible max.value of ave.load torque	Instantaneous permissible max. torque	Permissible max.input rotational speed	Permissible ave.input rotational speed	Backlash (arc sec)	Transmission accuracy (arc sec)
		Nm	Nm	Nm	Nm	r/min	r/min	⩽	⩽
14	50	7	23	9	46	8000	3500	20	90
	80	10	30	14	51			20	90
	100	10	36	14	70			10	90
17	50	21	44	34	91	7000	3500	20	90
	80	29	56	35	113			20	90
	100	31	70	51	143			10	90
20	50	33	73	44	127	6000	3500	20	60
	80	44	96	61	165			20	60
	100	52	107	64	191			10	60
	120	52	113	64	161			10	60
25	50	51	127	72	242	5500	3500	20	60
	80	82	178	113	332			20	60
	100	87	204	140	369			10	60
	120	87	217	140	395			10	60
32	50	99	281	140	497	4500	3500	20	60
	80	153	395	217	738			10	60
	100	178	433	281	841			10	60
	120	178	459	281	892			10	60
40	50	178	523	255	892	4000	3000	10	60
	80	268	675	369	1270			10	60
	100	345	738	484	1400			10	60
	120	382	802	586	1530			10	60

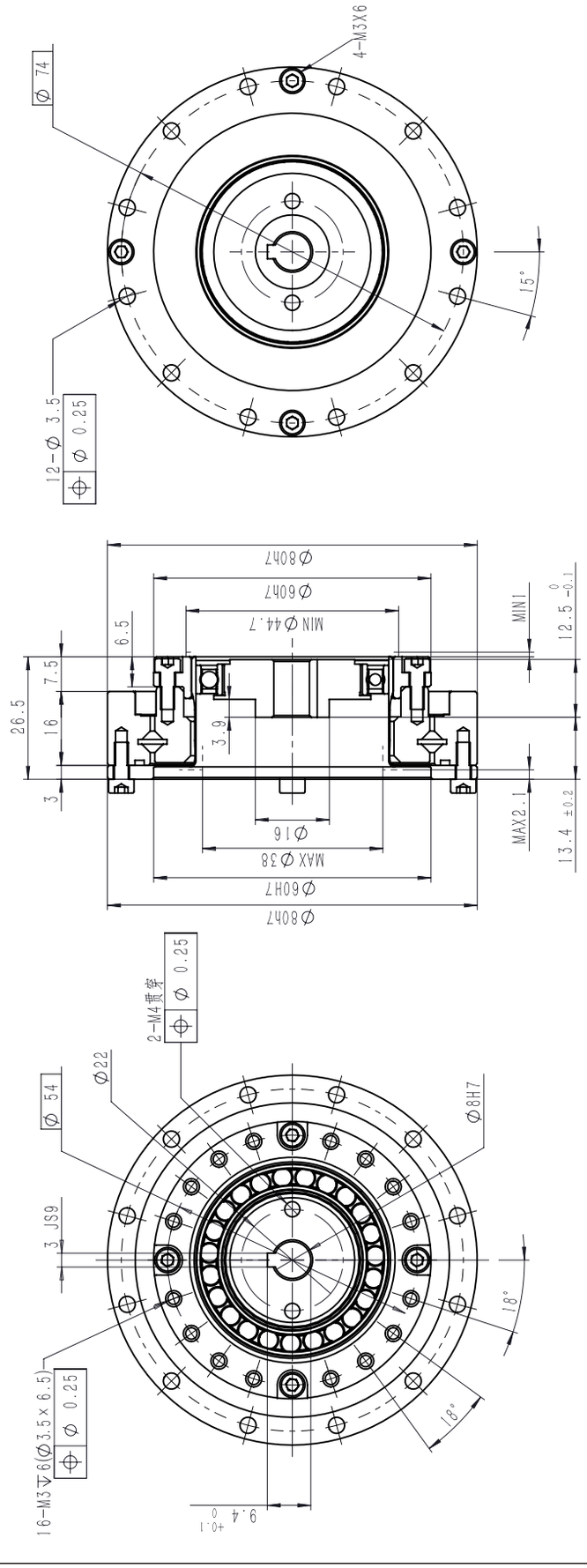
HMHG- II -E series Harmonic drive

HMHG-14-XX-II-E



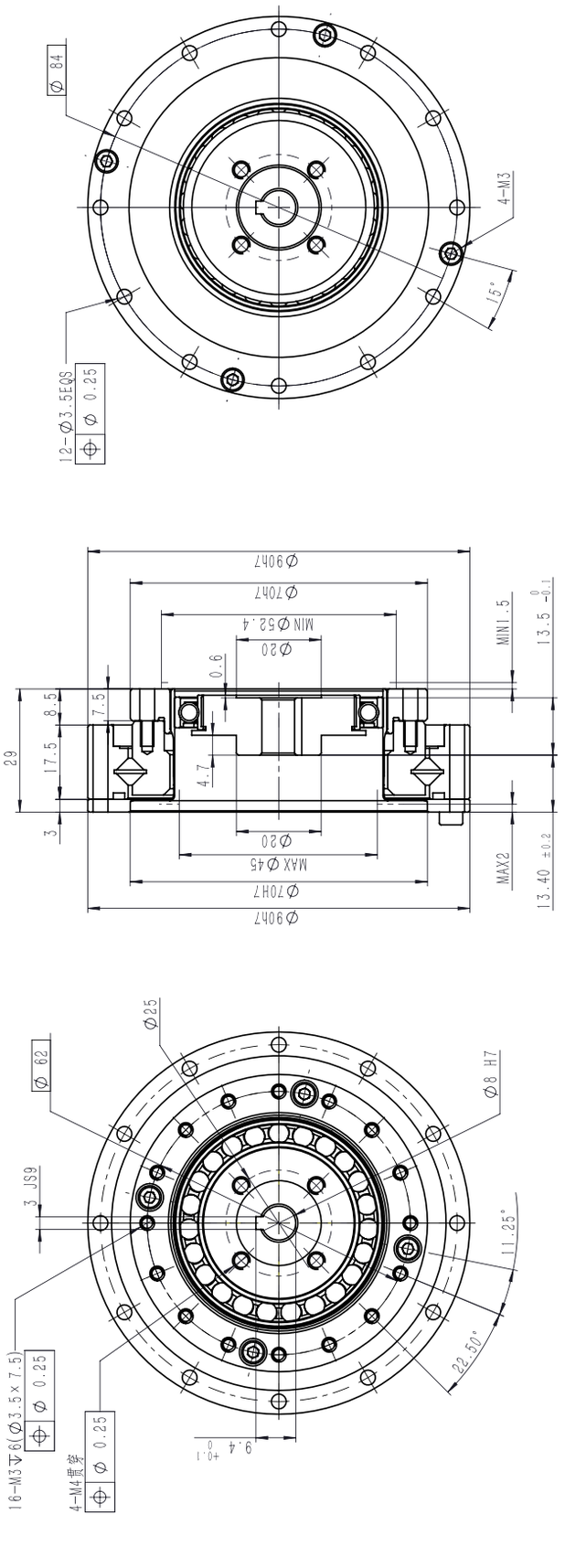
HMHG- II -E series Harmonic drive

HMHG-17-XX-II-E



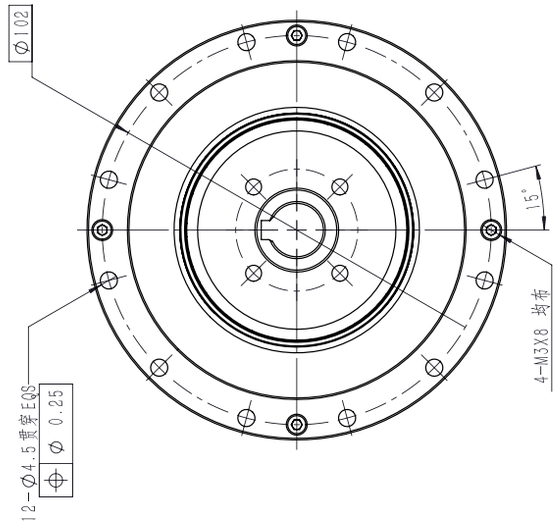
HMHG- II -E series Harmonic drive

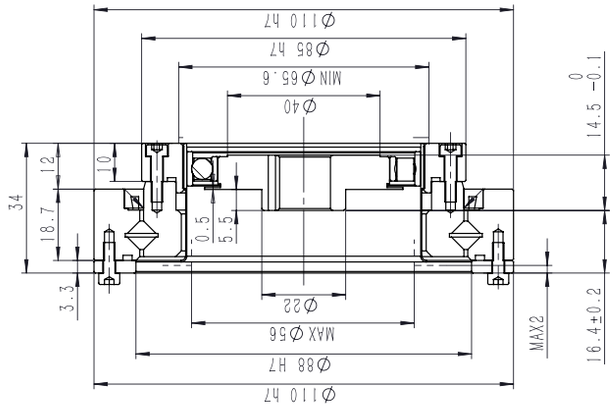
HMHG-20-XX-II-E

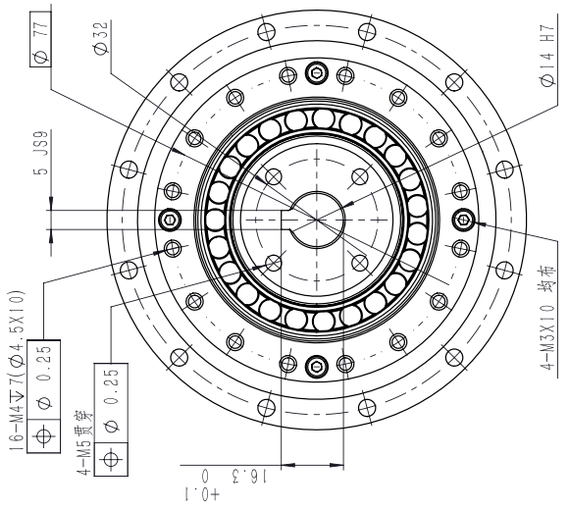


HMHG- II -E series Harmonic drive

HMHG-25-XX-II-E

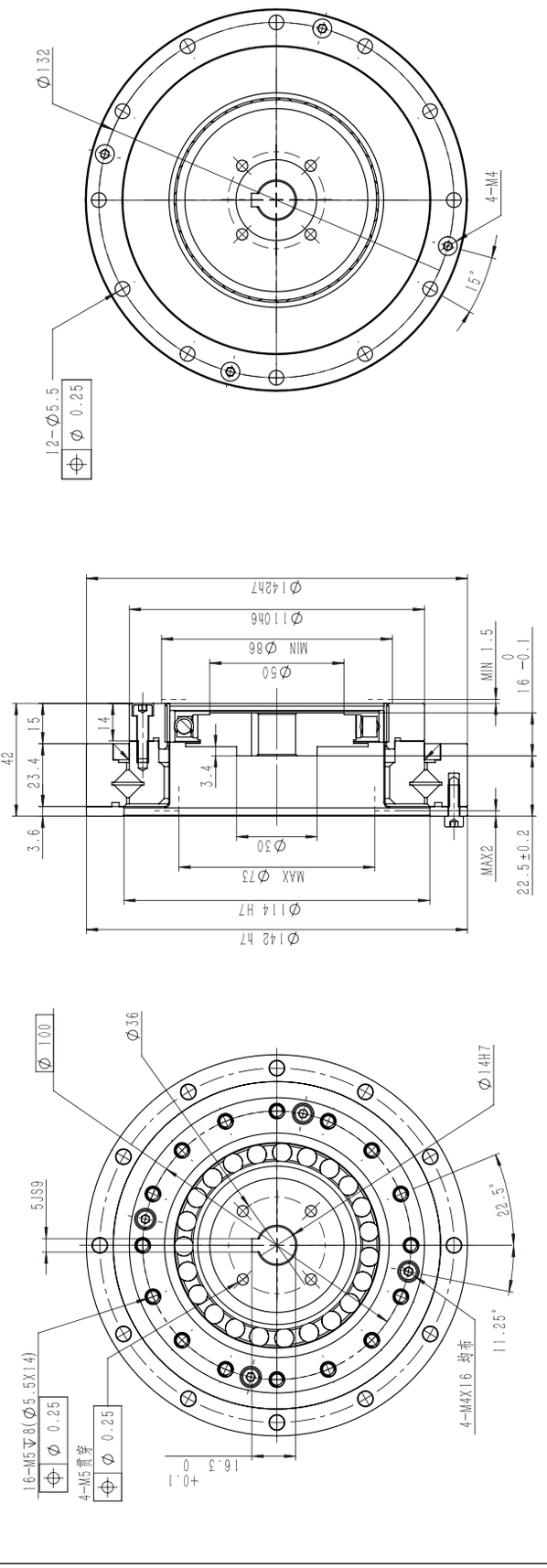






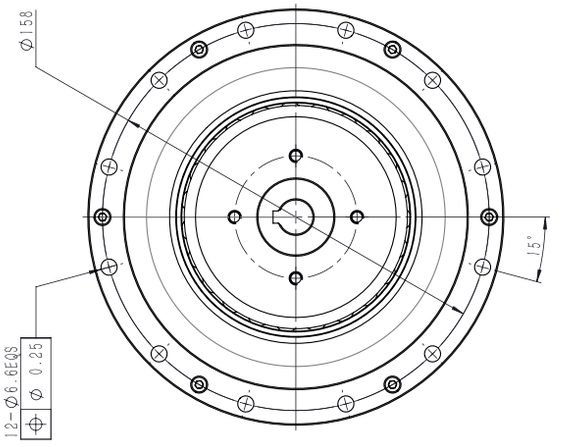
HMHG- II -E series Harmonic drive

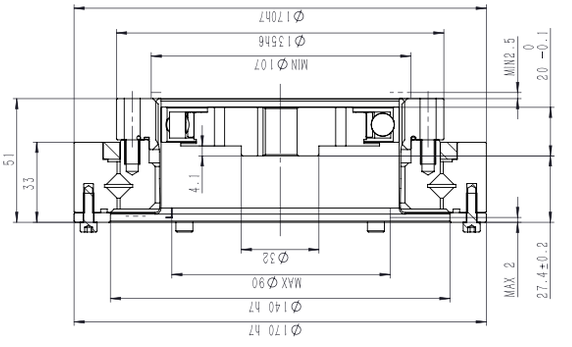
HMHG-32-XX-II-E

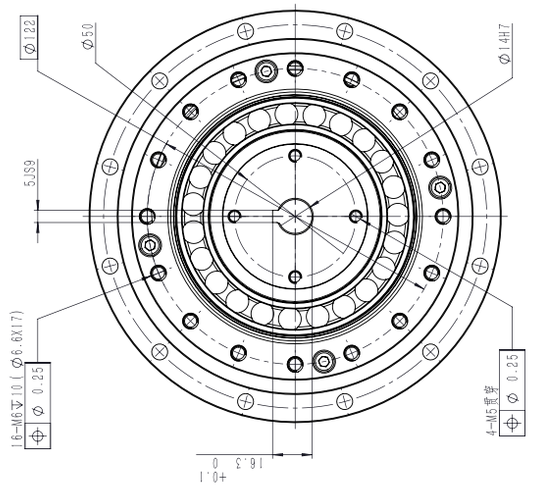


HMHG- II -E series Harmonic drive

HMHG-40-XX-II-E

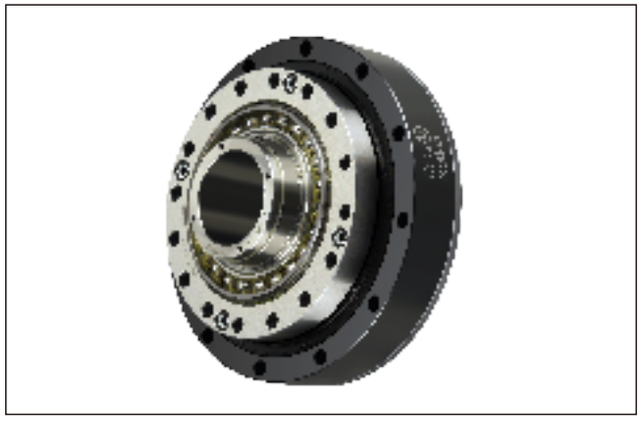






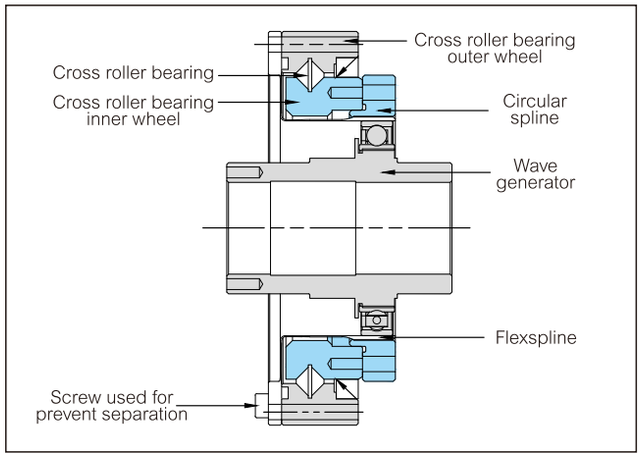
HMHG-III series Harmonic drive

HMHG-III series product details



Simple combination type (hollow shaft)

HMHG-III series flexspline belongs to hollow flanging standard structure and the whole structure is compact. The wave generator adopts large - caliber hollow shaft and crossed roller bearing to bear loads in radial and axial directions. The structure is simple, convenient for user's customization and installation.



Product features

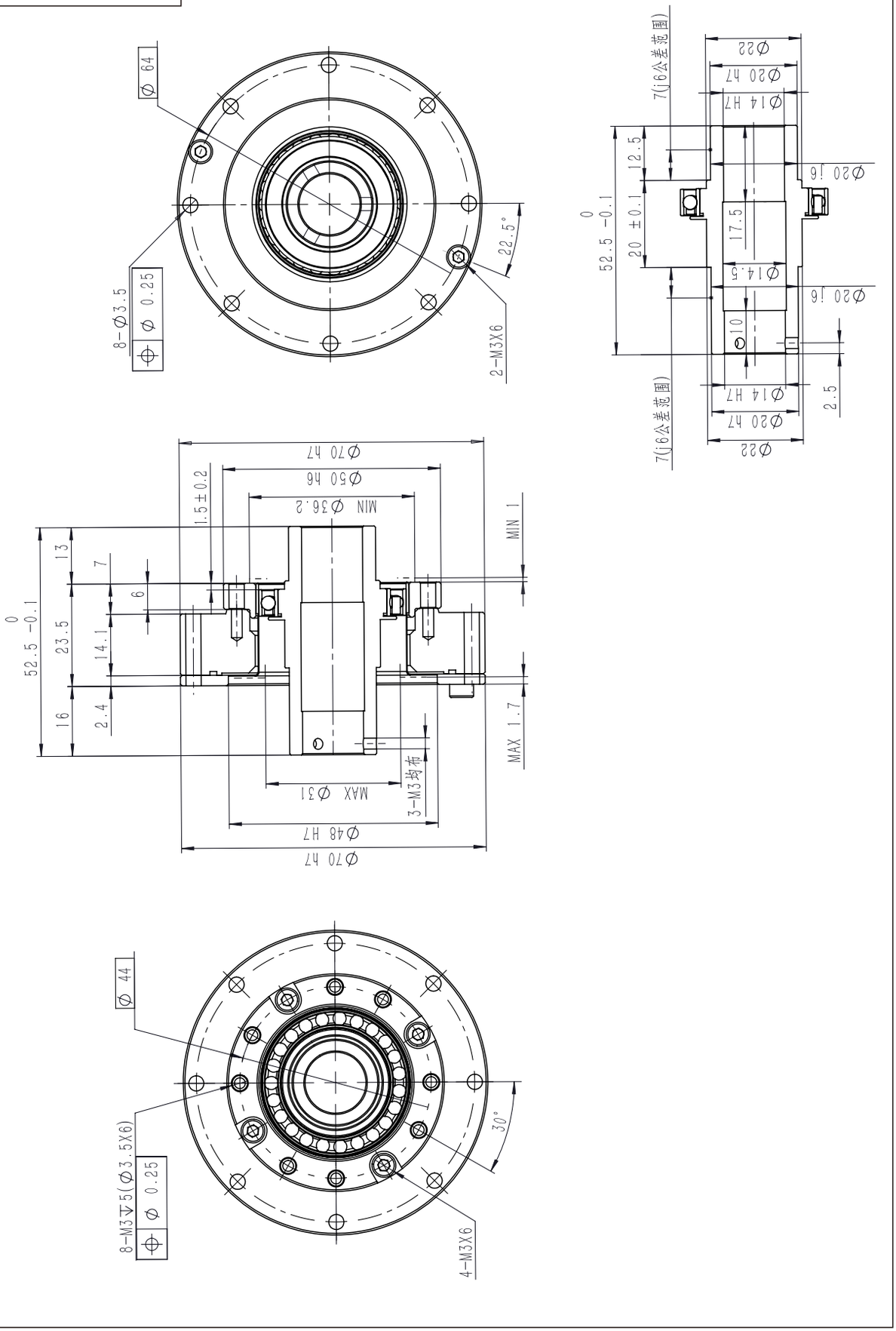
1. Easy to install and use
2. Compact design
3. Zero backlash
4. Input/output coaxial
5. Excellent positioning accuracy and rotation accuracy
6. 30%higher torque capacity than HMHS series
7. 43%longer lifetime than HMHS series

HMHG-III series performance parameter

Model	Reduction ratio	Rated torque at input 2000r/min	Permissible peak torque at start / stop	Permissible max.value of ave.load torque	Instantaneous permissible max. torque	Permissible max.input rotational speed	Permissible ave.input rotational speed	Backlash (arc sec)	Transmission accuracy (arc sec)
		Nm	Nm	Nm	Nm	r/min	r/min	⩽	⩽
14	50	7	23	9	46	8000	3500	20	90
	80	10	30	14	51			20	90
	100	10	36	14	70			10	90
17	50	21	44	34	91	7000	3500	20	90
	80	29	56	35	113			20	90
	100	31	70	51	143			10	90
20	50	33	73	44	127	6000	3500	20	60
	80	44	96	61	165			20	60
	100	52	107	64	191			10	60
	120	52	113	64	161			10	60
25	50	51	127	72	242	5500	3500	20	60
	80	82	178	113	332			20	60
	100	87	204	140	369			10	60
	120	87	217	140	395			10	60
32	50	99	281	140	497	4500	3500	20	60
	80	153	395	217	738			10	60
	100	178	433	281	841			10	60
	120	178	459	281	892			10	60
40	50	178	523	255	892	4000	3000	10	60
	80	268	675	369	1270			10	60
	100	345	738	484	1400			10	60
	120	382	802	586	1530			10	60

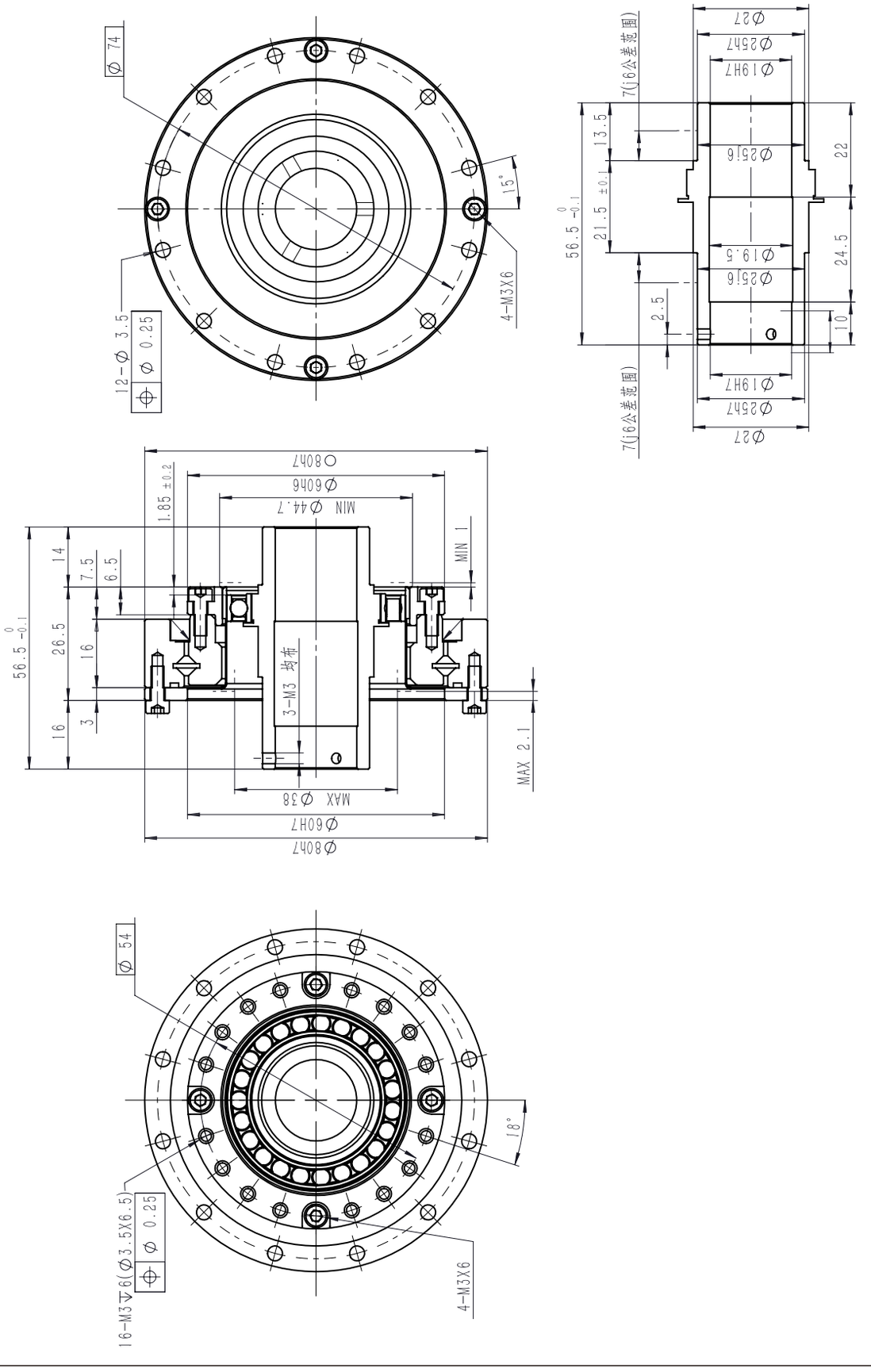
HMHG-III series Harmonic drive

HMHG-14-XX-III



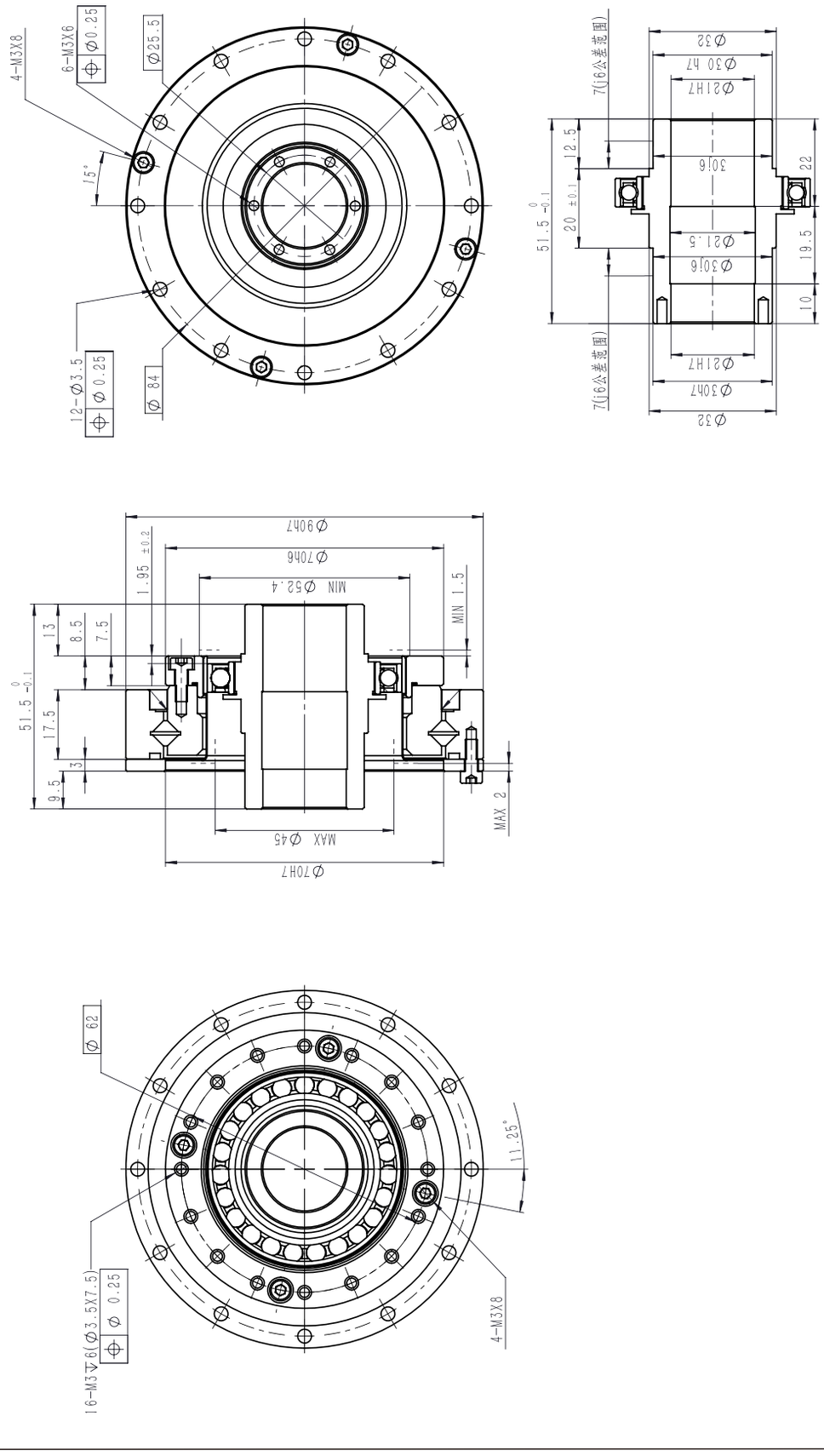
HMHG-III series Harmonic drive

HMHG-17-XX-III



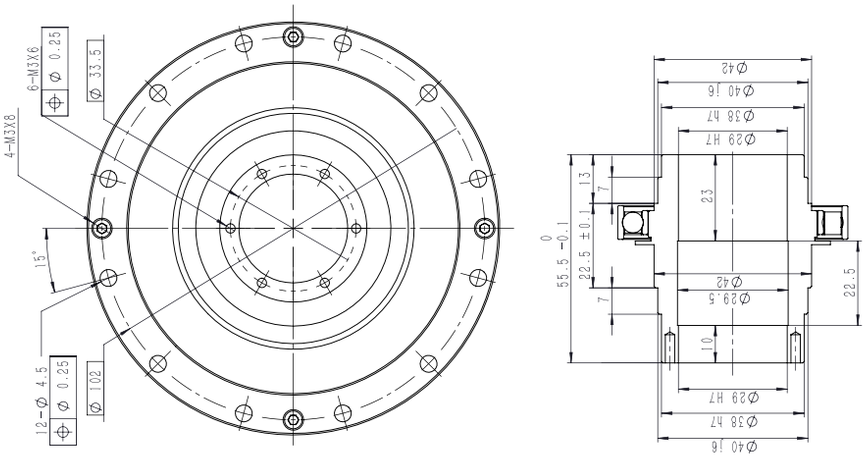
HMHG-III series Harmonic drive

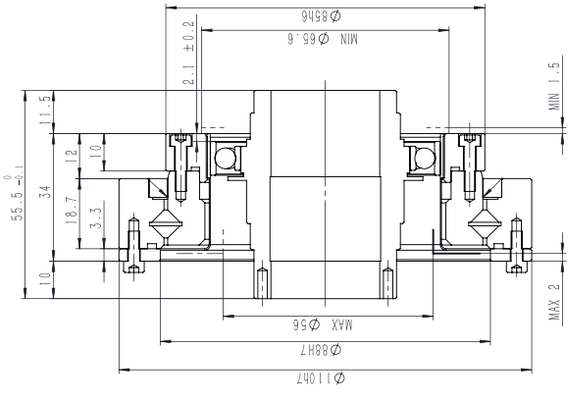
HMHG-20-XX-III

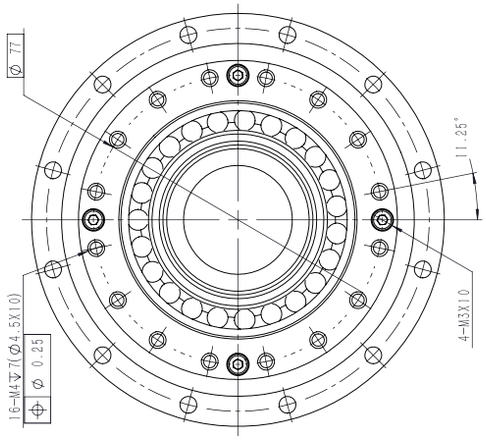


HMHG-III series Harmonic drive

HMHG-25-XX-III

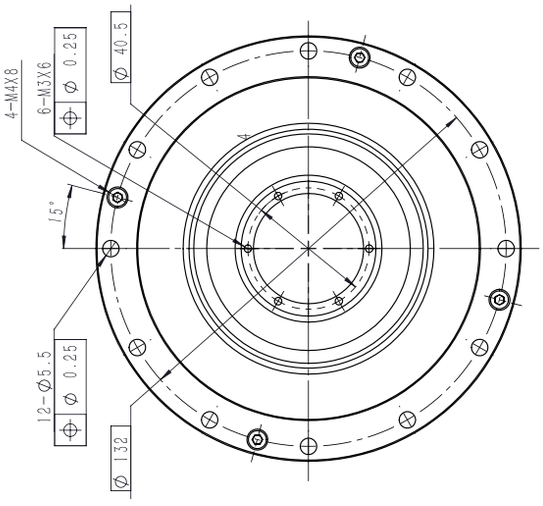


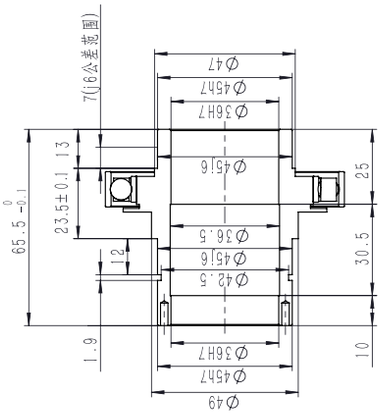


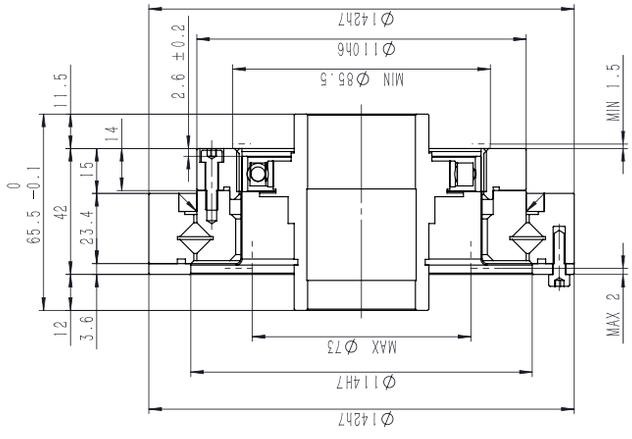


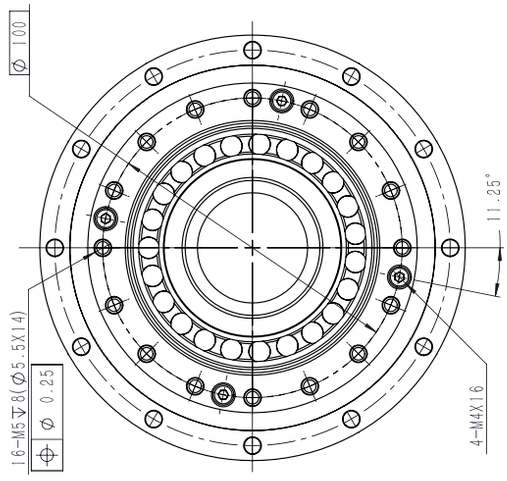
HMHG-III series Harmonic drive

HMHG-32-XX-III



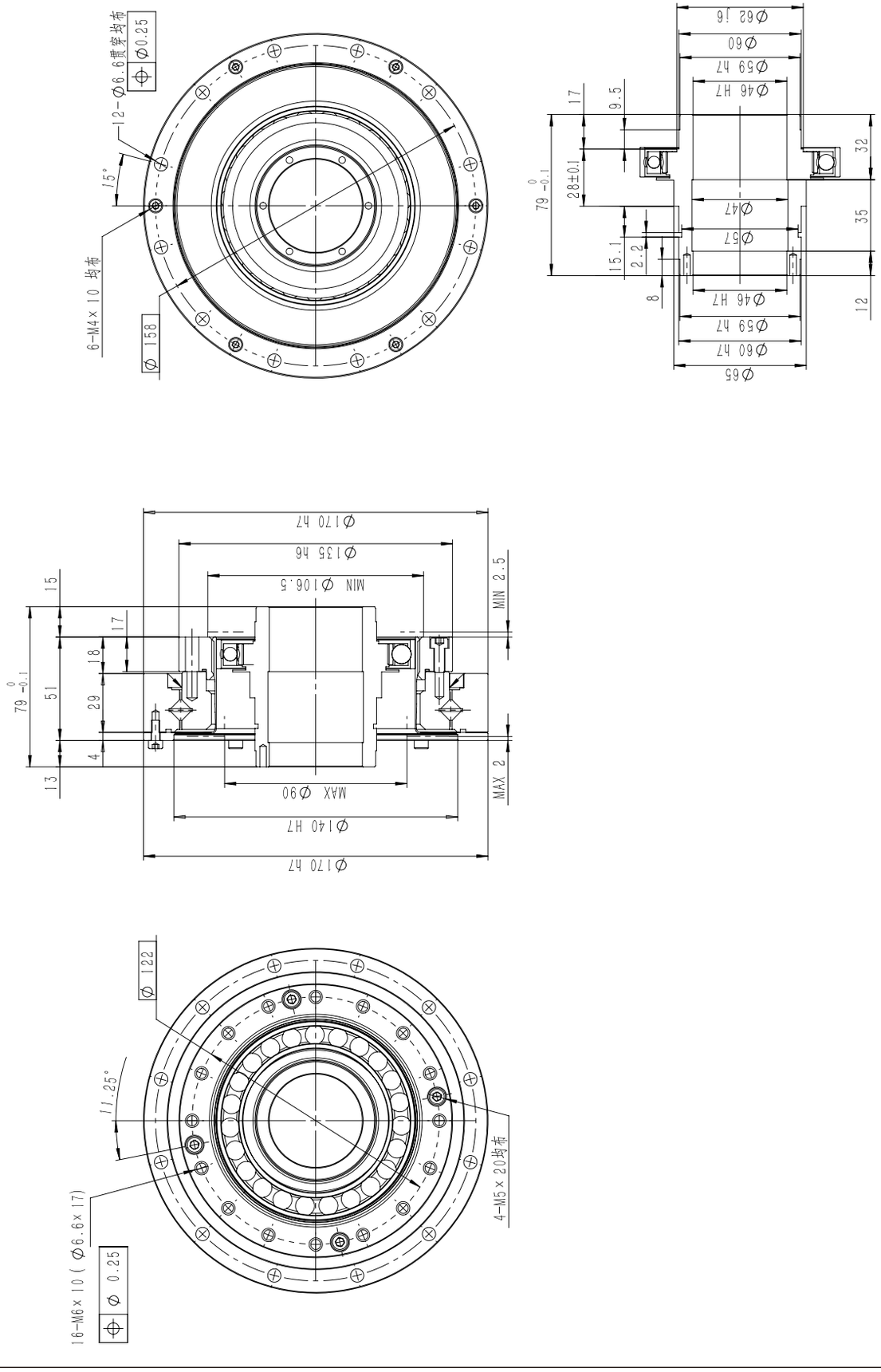






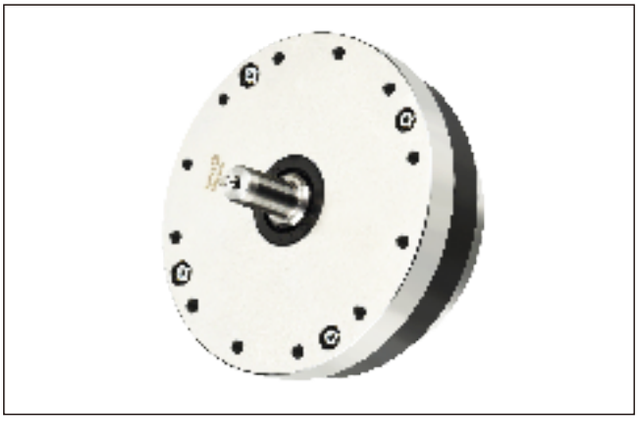
HMHG-III series Harmonic drive

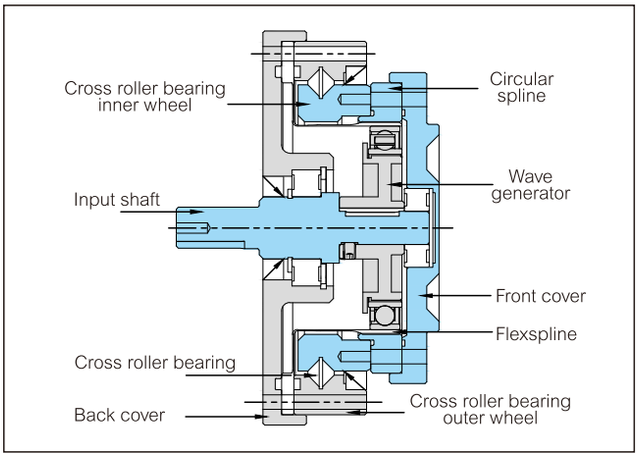
HMHG-40-XX-III



HMHG-IV series Harmonic drive

HMHG-IV series product details





Combination type (input shaft)

HMHG-IV series flexspline belongs to hollow flanging standard structure. The wave generator cam has its own Input shaft and here is support bearing inside the reducer. The reducer is fully sealed and easy to install, especially suitable for the situation where there is a need to install bevel gear or synchronous belt drive on input end.

Product features

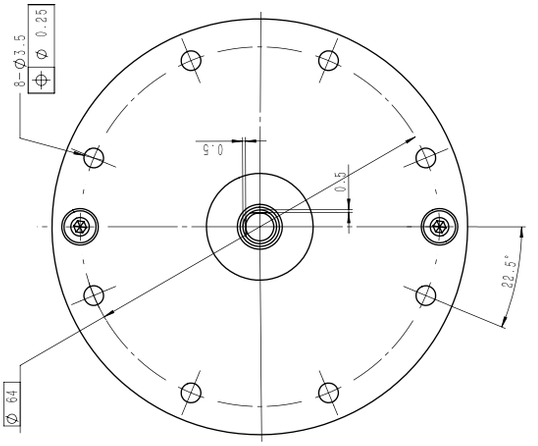
1. Suitable for different input options.
2. Compact design
3. Zero backlash
4. Input/output coaxial
5. Excellent positioning accuracy and rotation accuracy
6. 30%higher torque capacity than HMHS series
7. 43%longer lifetime than HMHS series

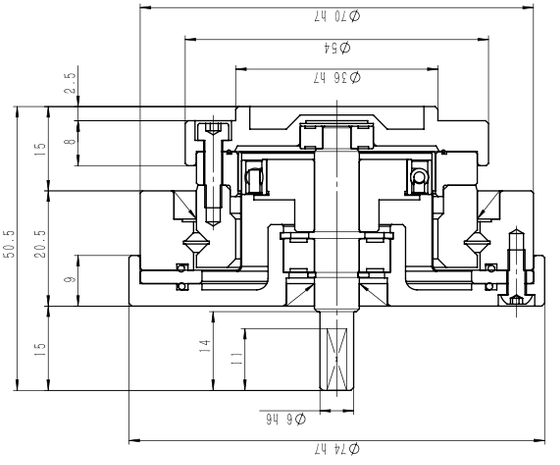
HMHG-IV series performance parameter

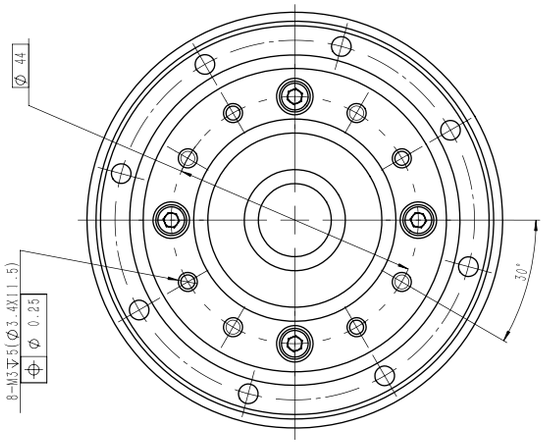
Model	Reduction ratio	Rated torque at input 2000r/min	Permissible peak torque at start / stop	Permissible max.value of ave.load torque	Instantaneous permissible max. torque	Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash (arc sec)	Transmission accuracy (arc sec)
		Nm	Nm	Nm	Nm	r/min	r/min	⩽	⩽
14	50	7	23	9	46	8000	3500	20	90
	80	10	30	14	51			20	90
	100	10	36	14	70			10	90
17	50	21	44	34	91	7000	3500	20	90
	80	29	56	35	113			20	90
	100	31	70	51	143			10	90
20	50	33	73	44	127	6000	3500	20	60
	80	44	96	61	165			20	60
	100	52	107	64	191			10	60
	120	52	113	64	161			10	60
25	50	51	127	72	242	5500	3500	20	60
	80	82	178	113	332			20	60
	100	87	204	140	369			10	60
	120	87	217	140	395			10	60
32	50	99	281	140	497	4500	3500	20	60
	80	153	395	217	738			10	60
	100	178	433	281	841			10	60
	120	178	459	281	892			10	60
40	50	178	523	255	892	4000	3000	10	60
	80	268	675	369	1270			10	60
	100	345	738	484	1400			10	60
	120	382	802	586	1530			10	60

HMHG-IV series Harmonic drive

HMHG-14-XX-IV

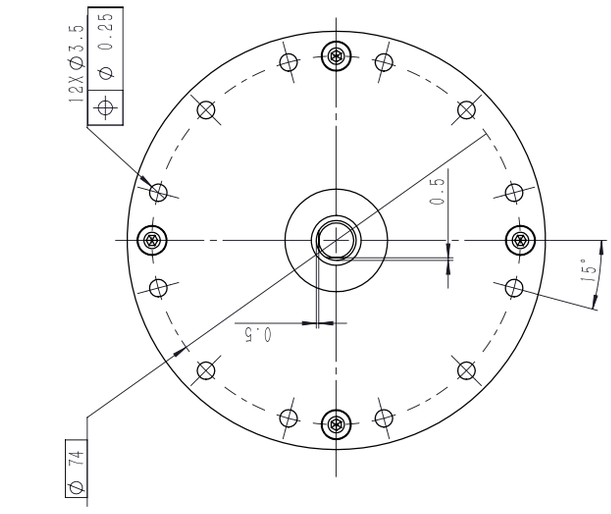


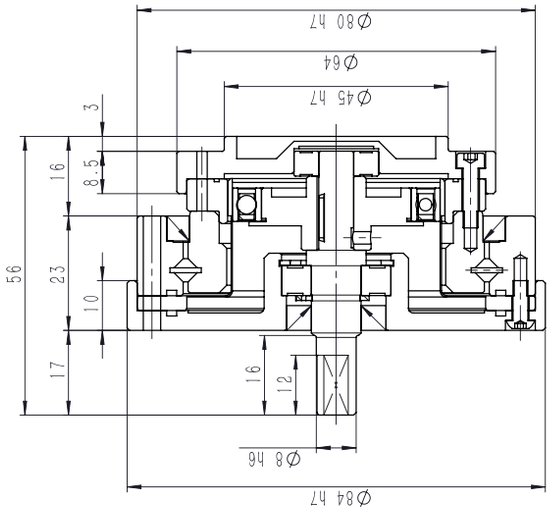


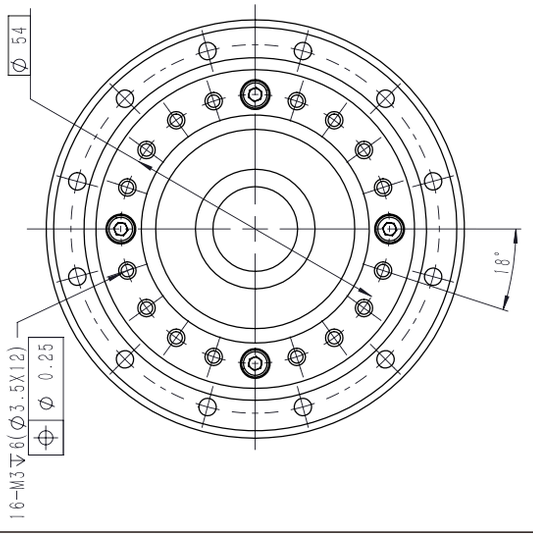


HMHG-IV series Harmonic drive

HMHG-17-XX-IV

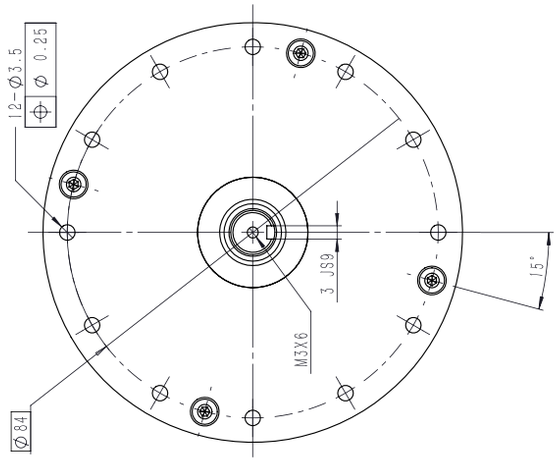


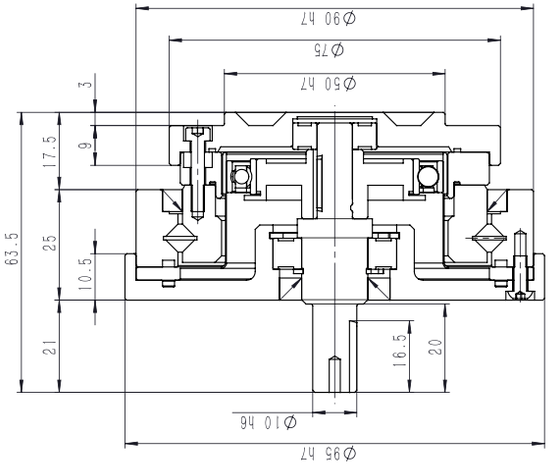


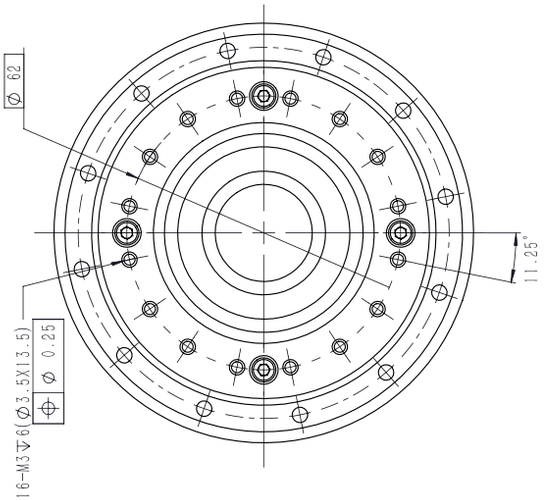


HMHG-IV series Harmonic drive

HMHG-20-XX-IV

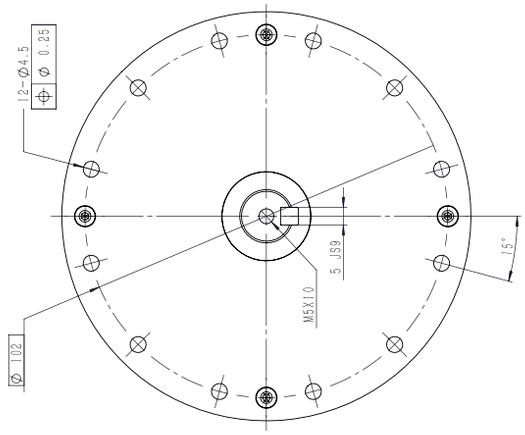


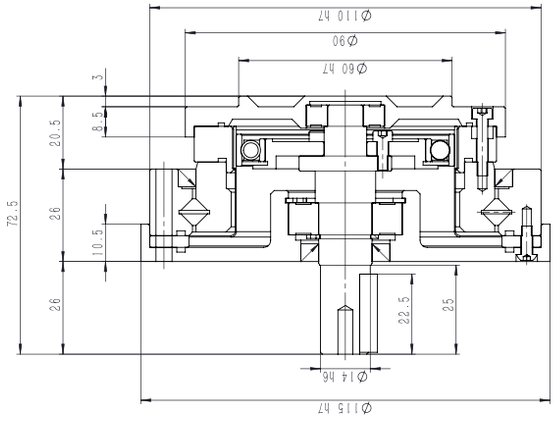


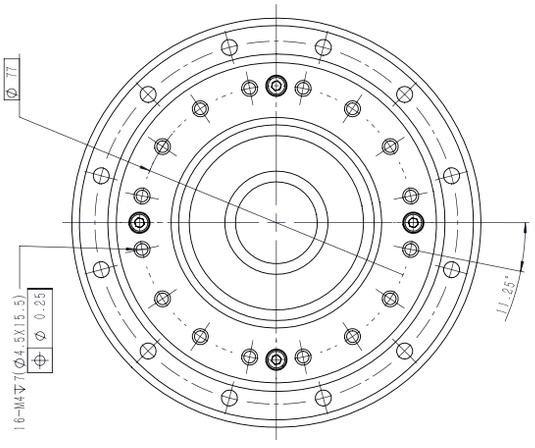


HMHG-IV series Harmonic drive

HMHG-25-XX-IV

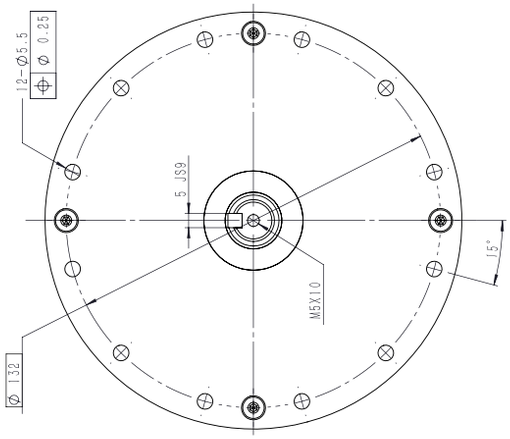


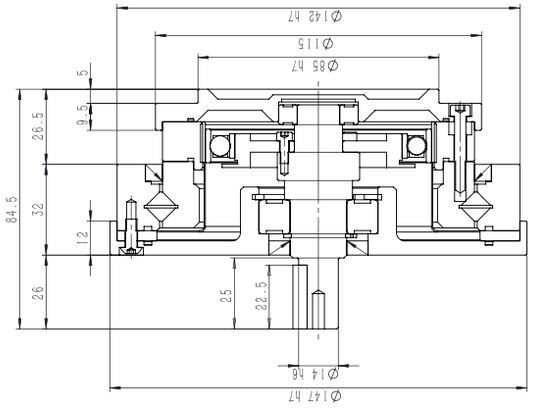


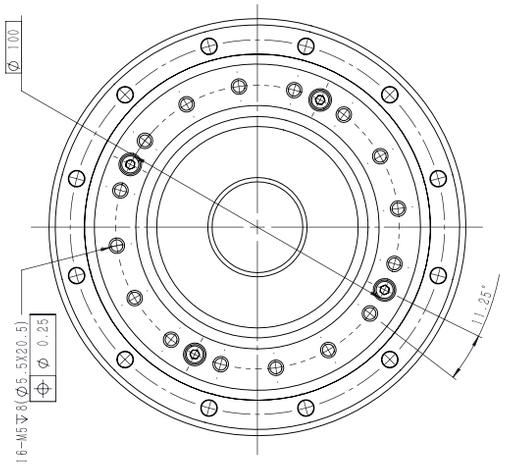


HMHG-IV series Harmonic drive

HMHG-32-XX-IV

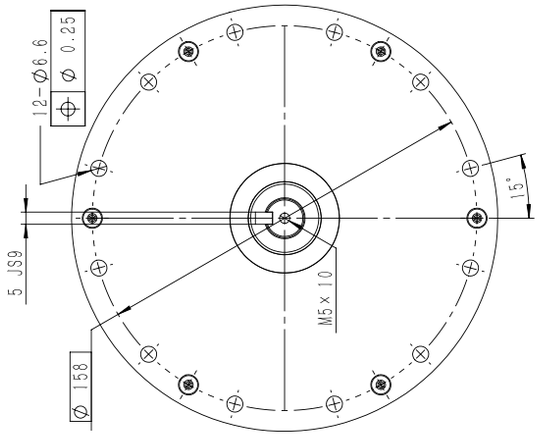


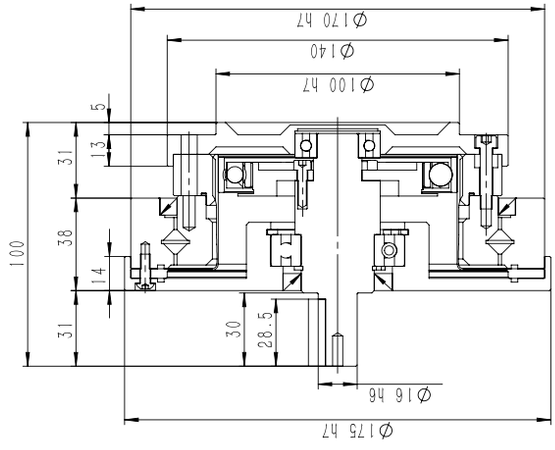


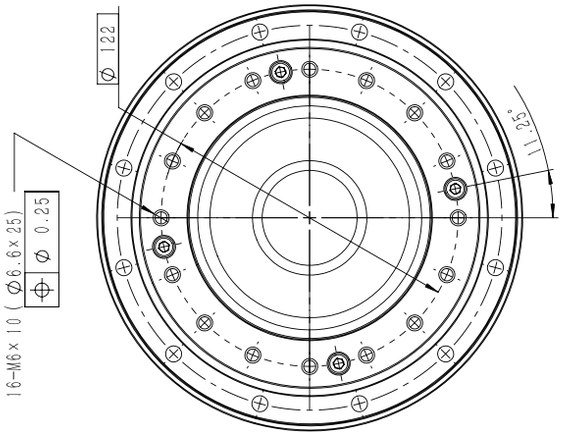


HMHG-IV series Harmonic drive

HMHG-40-XX-IV





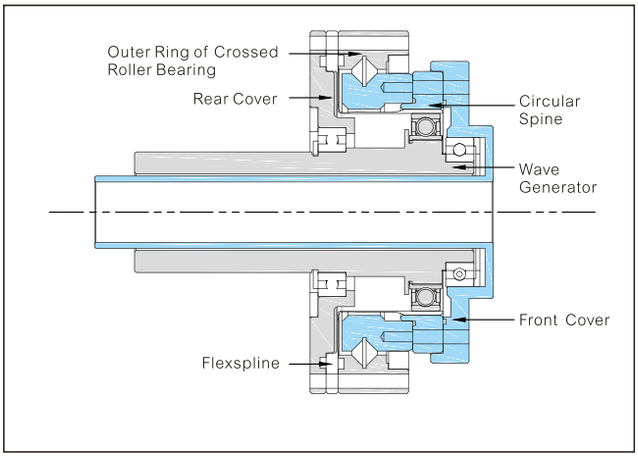


HMHG-V series Harmonic drive

HMHG-V series product details

Combination Type (Hollow & Long Shaft)

HMHG-V Series with hat-combination standard stucture.
Input shaft can connect with motor directly,
The cable can go through the low speed hollow shaft
Encoder can be installed on both input and output shaft
Especially for Cobot and Joint modular.



Product features

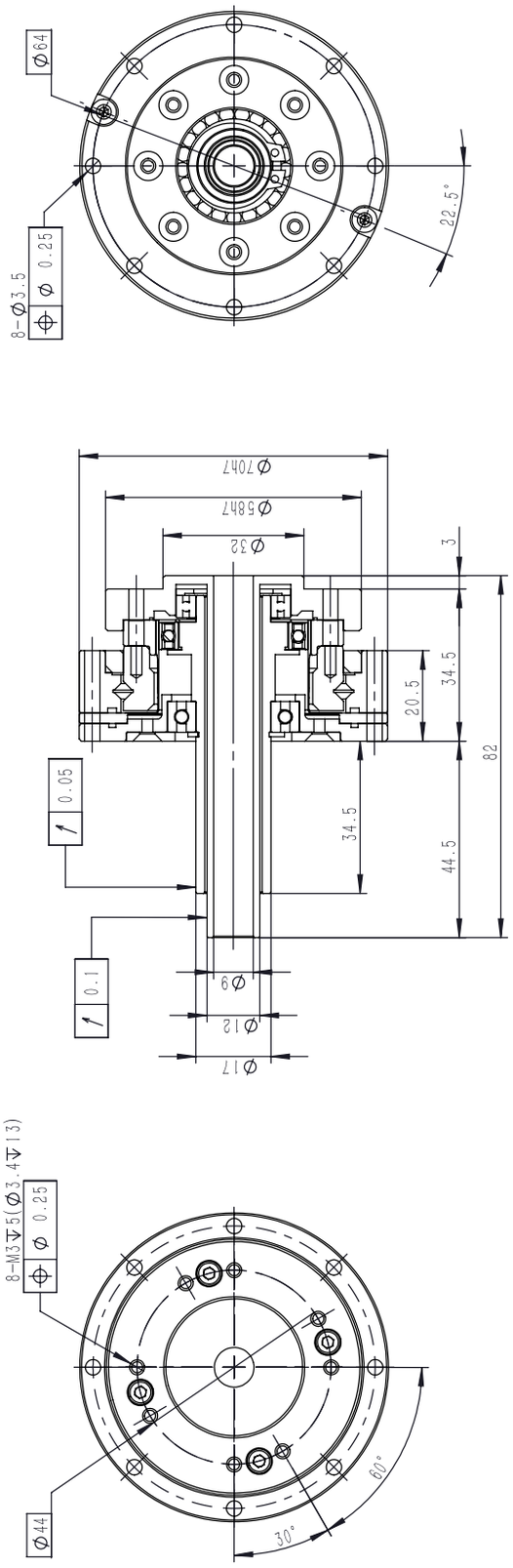
1. Cable can go through the hollow shaft, safer and reliable
2. Doubled torque/volume ratio, as well as modular design, make it more compact with motor
3. No Backlash
4. Excellent positioning accuracy and rotation accuracy
5. Run out is smaller for install position of motor and encoder
6. 30%higher torque capacity than HMHS series
7. 43%longer lifetime than HMHS series

HMHG-V series performance parameter

Model	Reduction ratio	Rated torque at input 2000r/min	Permissible peak torque at start / stop	Permissible max.value of ave.load torque	Instantaneous permissible max. torque	Permissible max.input rotational speed	Permissible ave.input rotational speed	Backlash (arc sec)	Transmission accuracy (arc sec)
		Nm	Nm	Nm	Nm	r/min	r/min	⩽	⩽
14	50	7	23	9	46	8000	3500	20	90
	80	10	30	14	51			20	90
	100	10	36	14	70			10	90
17	50	21	44	34	91	7000	3500	20	90
	80	29	56	35	113			20	90
	100	31	70	51	143			10	90
20	50	33	73	44	127	6000	3500	20	60
	80	44	96	61	165			20	60
	100	52	107	64	191			10	60
	120	52	113	64	161			10	60
25	50	51	127	72	242	5500	3500	20	60
	80	82	178	113	332			20	60
	100	87	204	140	369			10	60
	120	87	217	140	395			10	60
32	50	99	281	140	497	4500	3500	20	60
	80	153	395	217	738			10	60
	100	178	433	281	841			10	60
	120	178	459	281	892			10	60
40	50	178	523	255	892	4000	3000	10	60
	80	268	675	369	1270			10	60
	100	345	738	484	1400			10	60
	120	382	802	586	1530			10	60

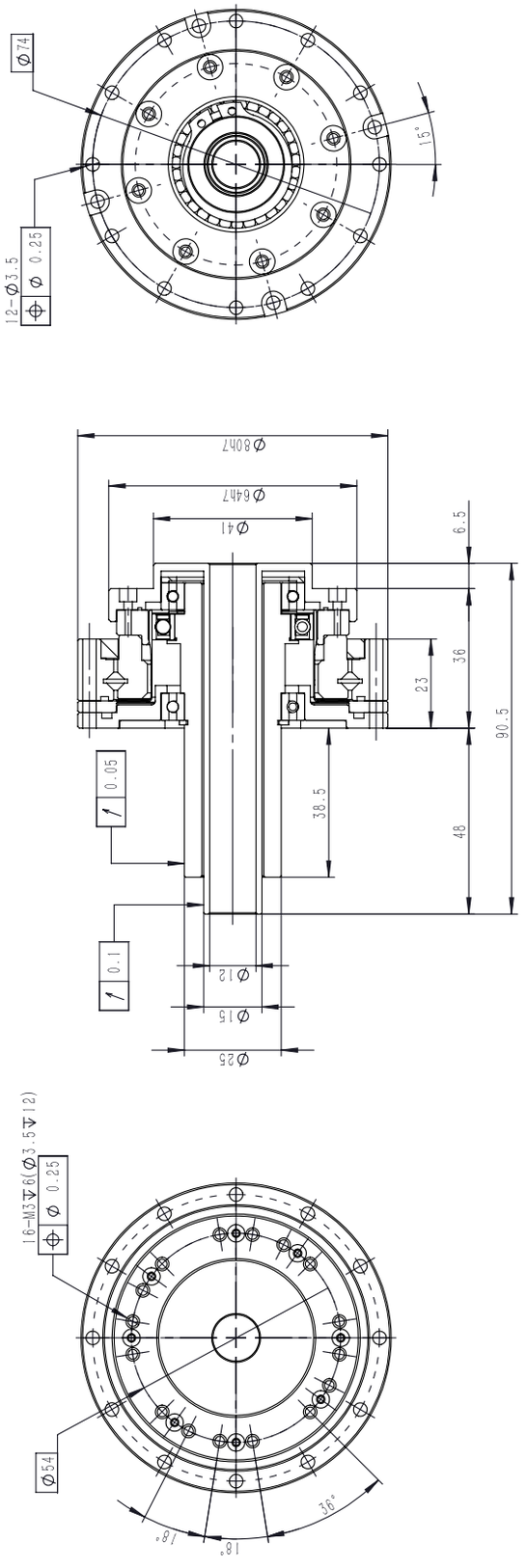
HMHG-V series Harmonic drive

HMHG-14-XX-V



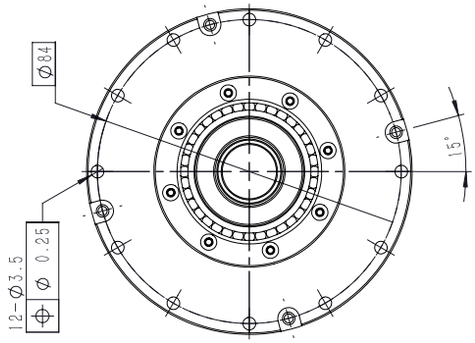
HMHG-V series Harmonic drive

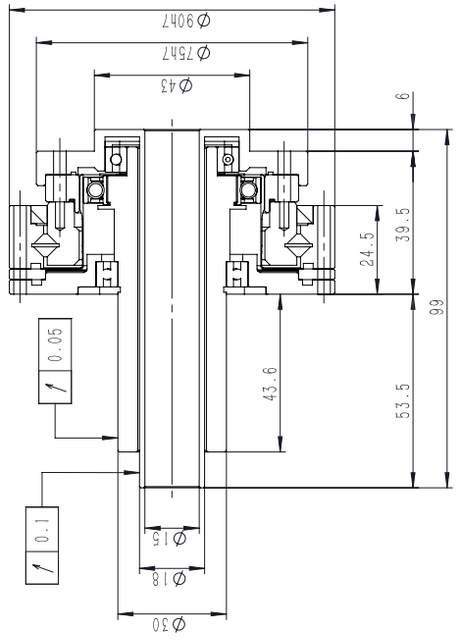
HMHG-17-XX-V

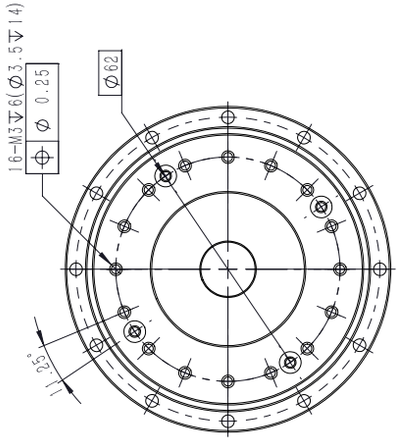


HMHG-V series Harmonic drive

HMHG-20-XX-V

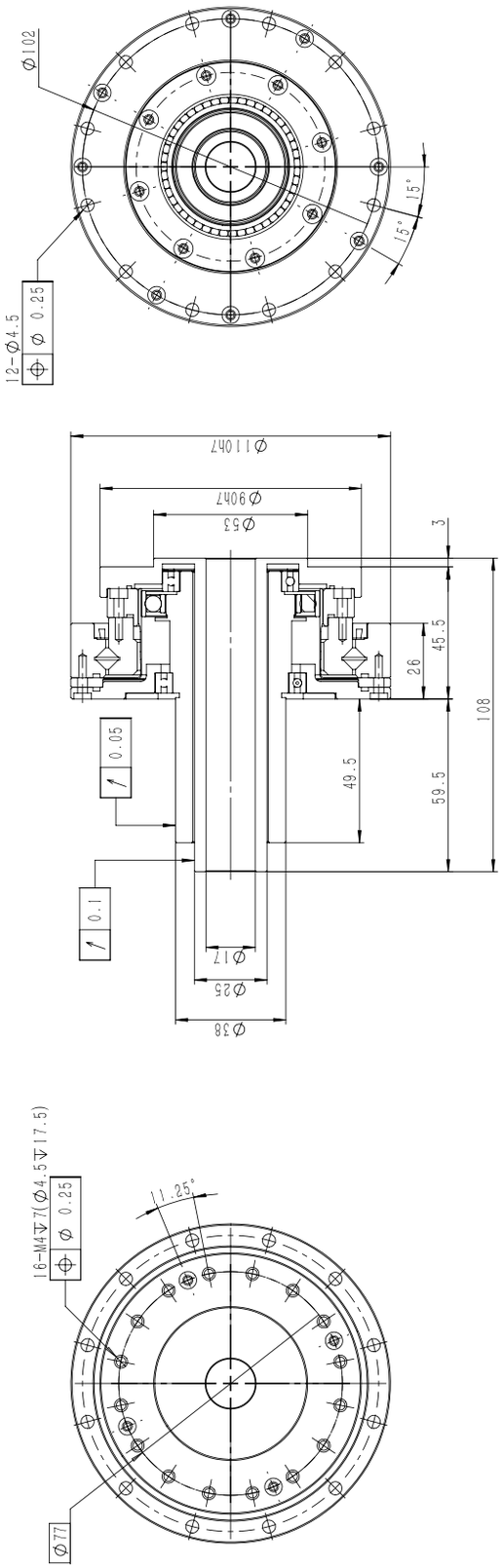






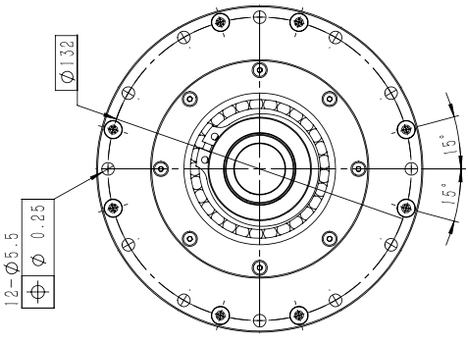
HMHG-V series Harmonic drive

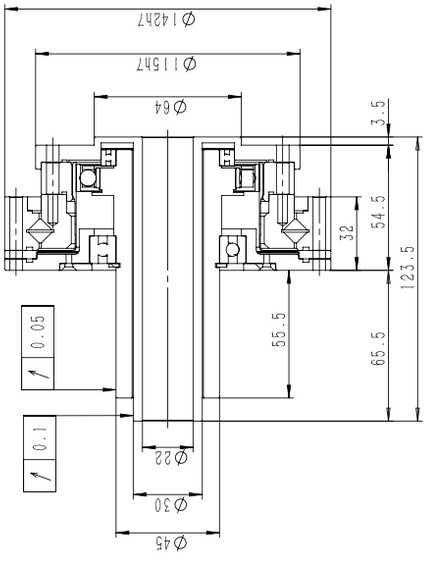
HMHG-25-XX-V

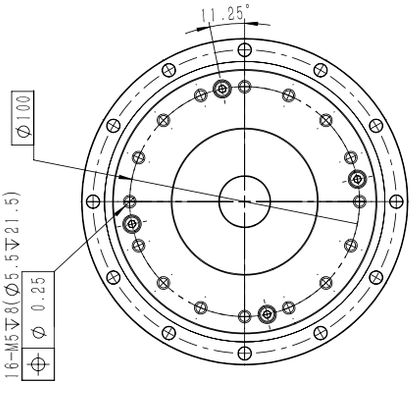


HMHG-V series Harmonic drive

HMHG-32-XX-V

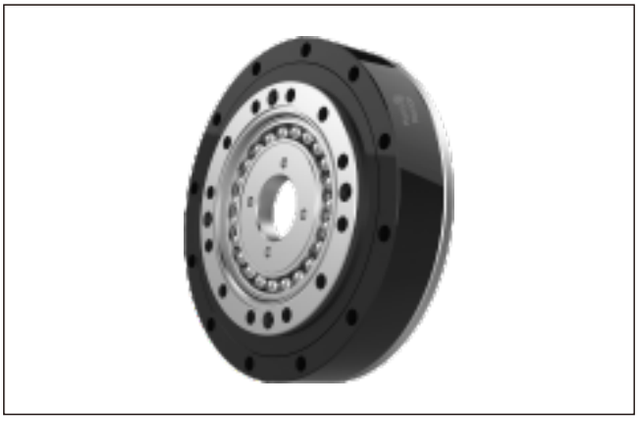






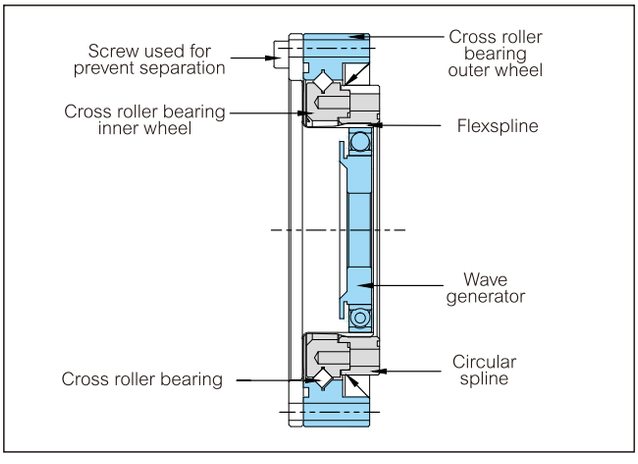
HMHD-III series Harmonic drive

HMHD-III series product details



Simple combination type
(super flat hollow shaft)

HMHD-III series is the type pursuing flat structure to the extreme. Its axial length is half of that of HMHS series. The flexspline adopts ultrathin hollow flanging structure and its output side is installed with high rigid crossed roller bearing.Suitable for the application with requirement on flat design.



Product features

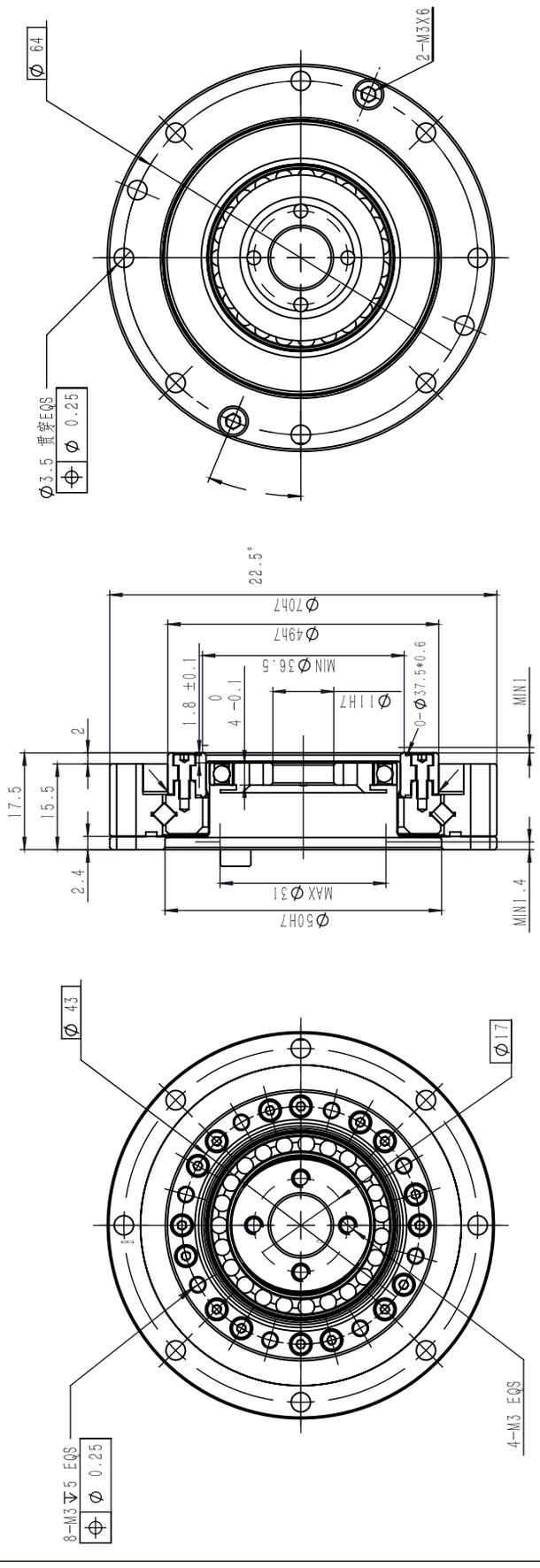
1. Ultra thin · Hollow structure
2. High rigidity
3. High torque capacity
4. Input/output coaxial
5. Excellent positioning accuracy and rotation accuracy

HMHD-III series performance parameter

Model	Reduction ratio	Rated torque at input 2000r/min	Permissible peak torque at start / stop	Permissible max.value of ave.load torque	Instantaneous permissible max. torque	Permissible max. input rotational speed	Permissible max. input rotational speed	Backlash (arc sec)	Transmission accuracy (arc sec)
		Nm	Nm	Nm	Nm	r/min	r/min	⩽	⩽
14	50	3.5	11.4	4.6	23	8000	3500	20	90
	80	5.1	15	6.2	29			20	90
	100	5.1	18	7	33			20	90
17	50	10.5	22	17	46	7000	3500	20	90
	80	14	29	21	54			20	90
	100	15	35	26	67			20	90
20	50	16	37	23	66	6000	3500	20	90
	80	23	49	28	78			10	90
	100	27	54	32	90			10	90
25	50	26	66	36	121	5500	3500	20	60
	80	42	91	62	157			10	60
	100	45	105	71	175			10	60
32	50	50	143	71	255	4500	3500	20	60
	80	79	202	126	350			10	60
	100	91	221	143	399			10	60

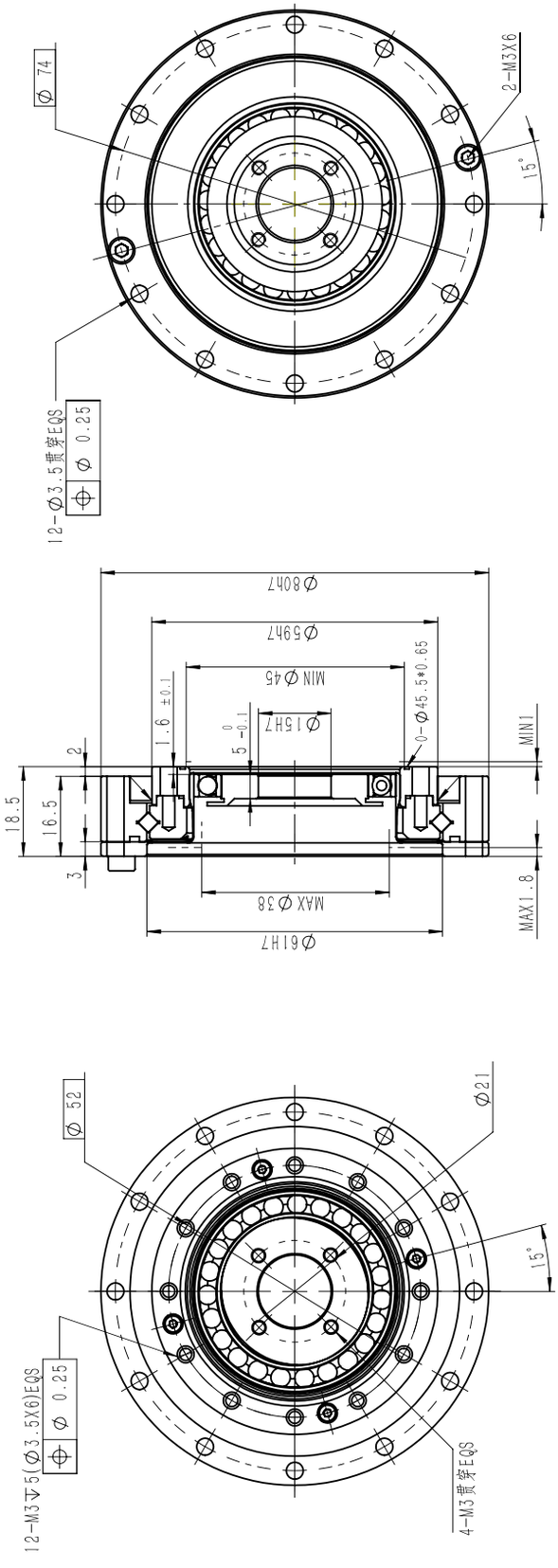
HMHD-III series Harmonic drive

HMHD-14-XX-III



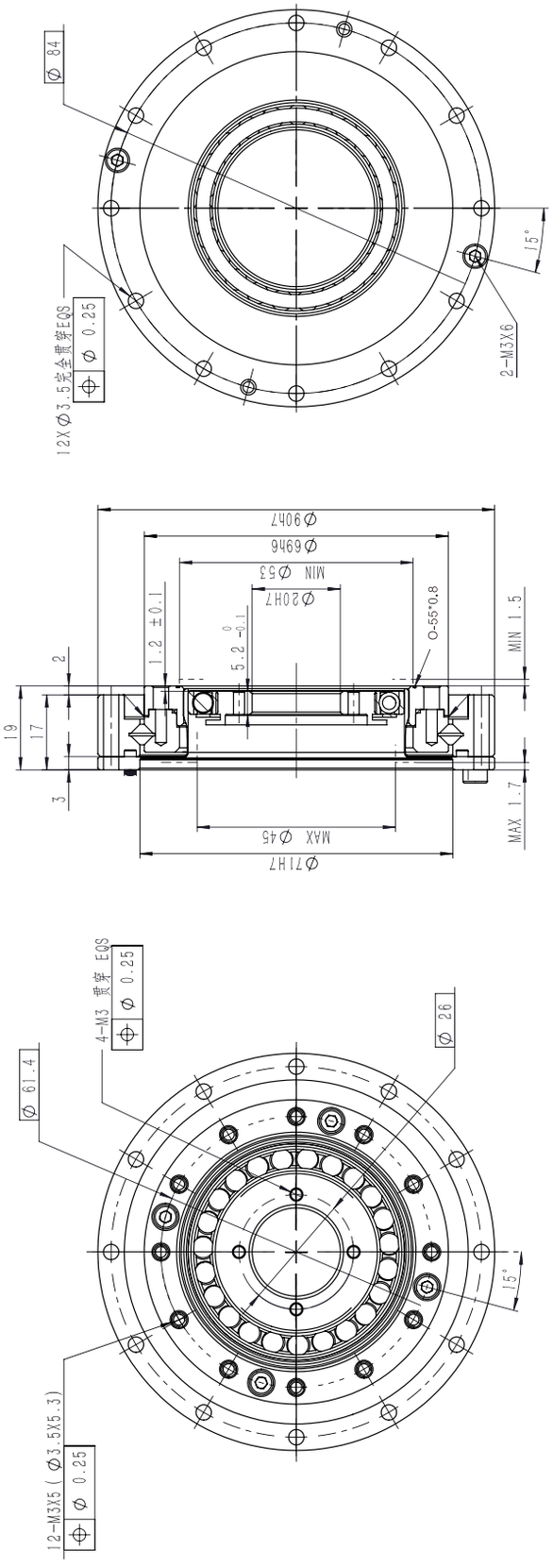
HMHD-III series Harmonic drive

HMHD-17-XX-III



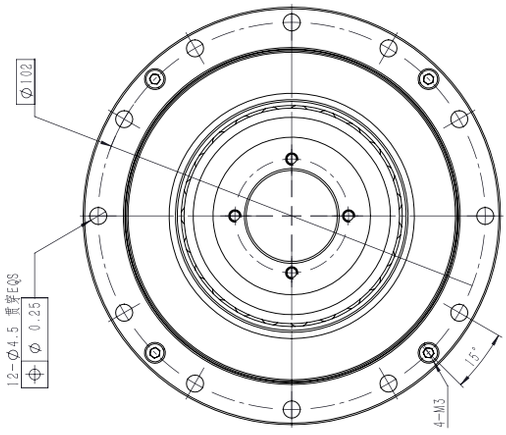
HMHD-III series Harmonic drive

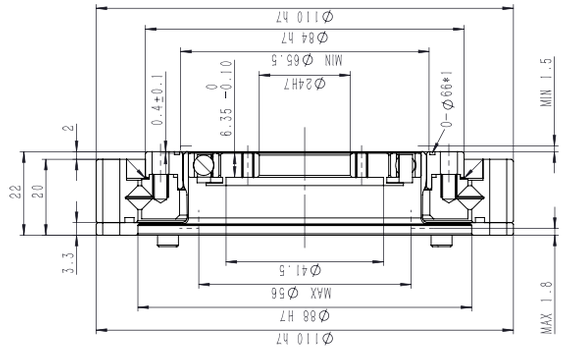
HMHD-20-XX-III

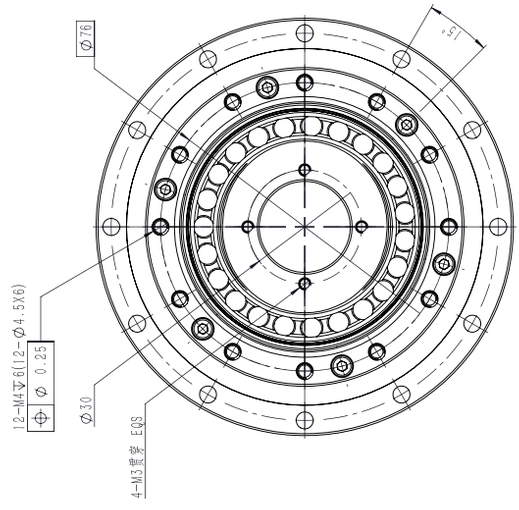


HMHD-III series Harmonic drive

HMHD-25-XX-III

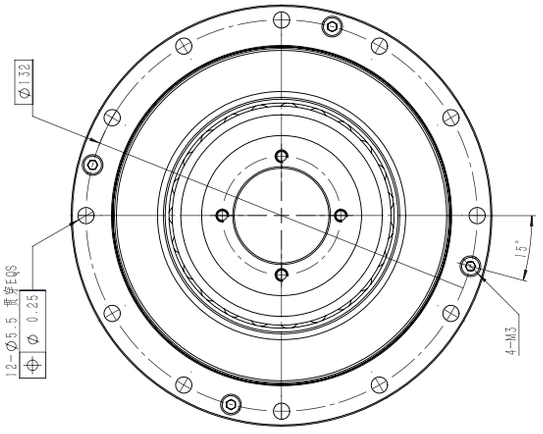


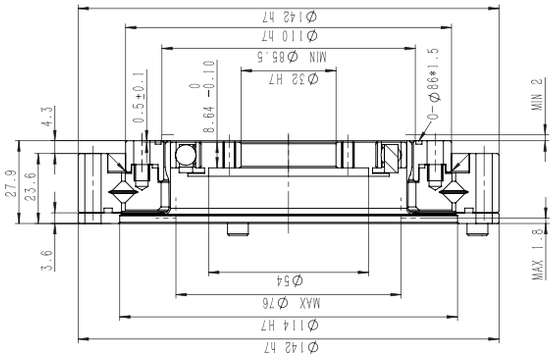


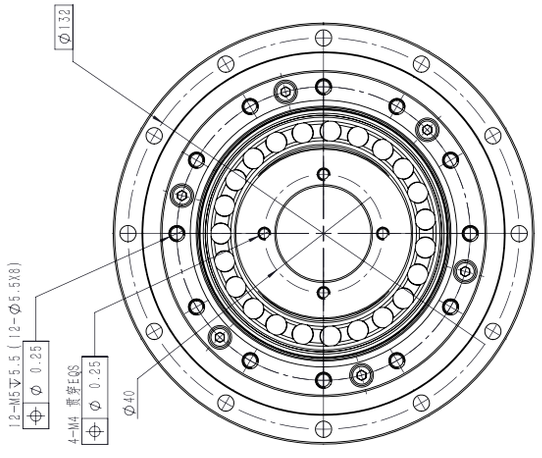


HMHD-III series Harmonic drive

HMHD-32-XX-III







Reducer Installation

Design guide

In order to give full play to the performance of harmonic reducer, please pay attention to the followings.

① Make the input shaft, circular spline,output shaft and shell concentric.

② Wave generator can produce axial force. Please make the input shaft into some structure that can support the force.

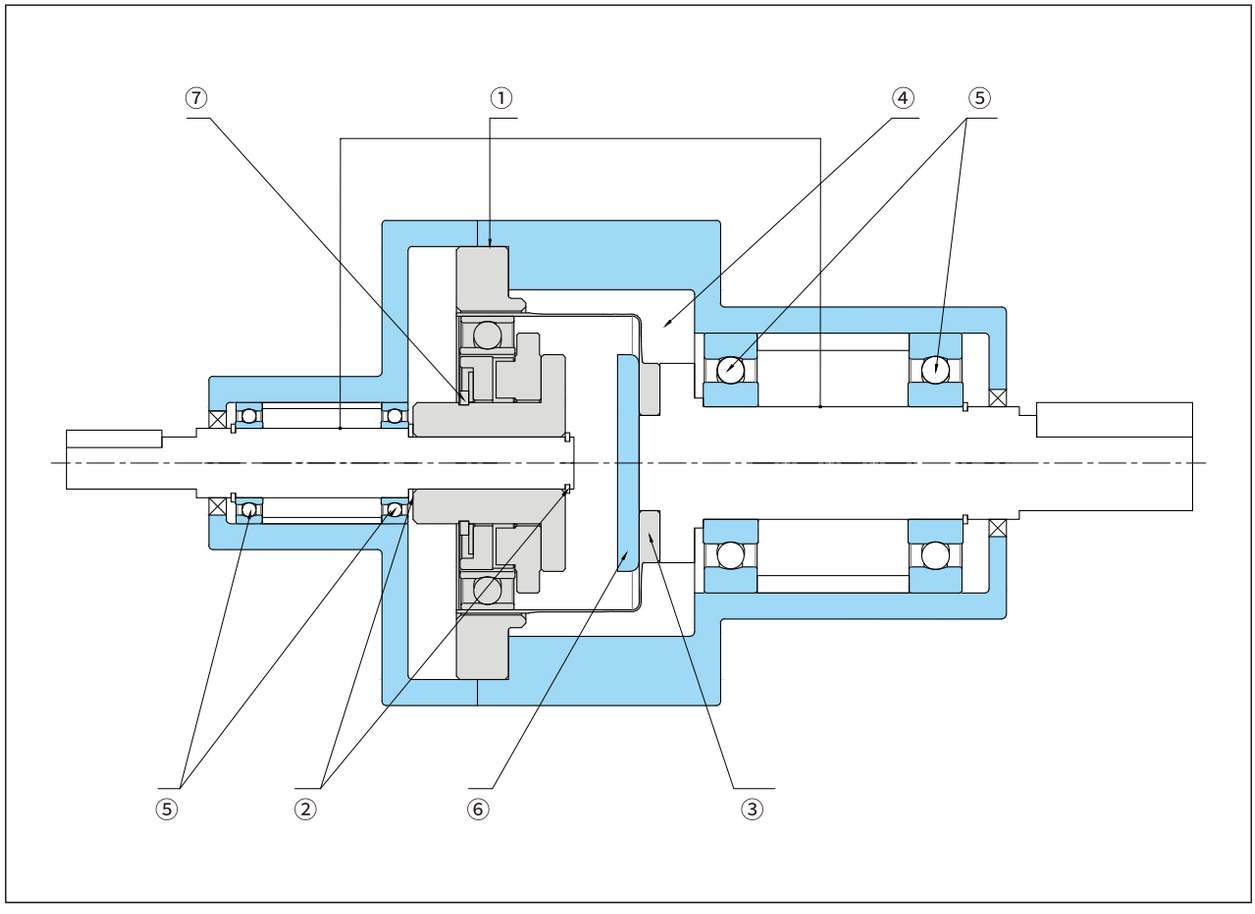
③ Since the harmonic reducer is a small device that can transmit larger torque, please adopt suitable tightening torque to tighten the screw that connects the flexspline with output shaft.

④ Flexspilne can have elastic deformation, so please adopt the recommended size to design the inner wall of shell.

⑤ Input shaft and output shaft must adopt matched bearings (leave space for 2 - point support) and the structure that can bear radial load and axial load. Please do not exert too much force on wave generator and flexspline

⑥ Make sure the flange diameter of flexspline does not exceed the wheel bore diameter of flexspline and process fillet on the flange that connects diaphragm. Please adopt the recommended size to design all parts.

⑦ Use C-shape clamp ring to fix the hub of wave generator and make sure the hook of clamp ring does not touch the shell.



Reducer Installation

Sealing mechanism

In order to prevent lubricating grease from leaking and keep the high durability of harmonic reducer, the following sealing mechanisms must be used.

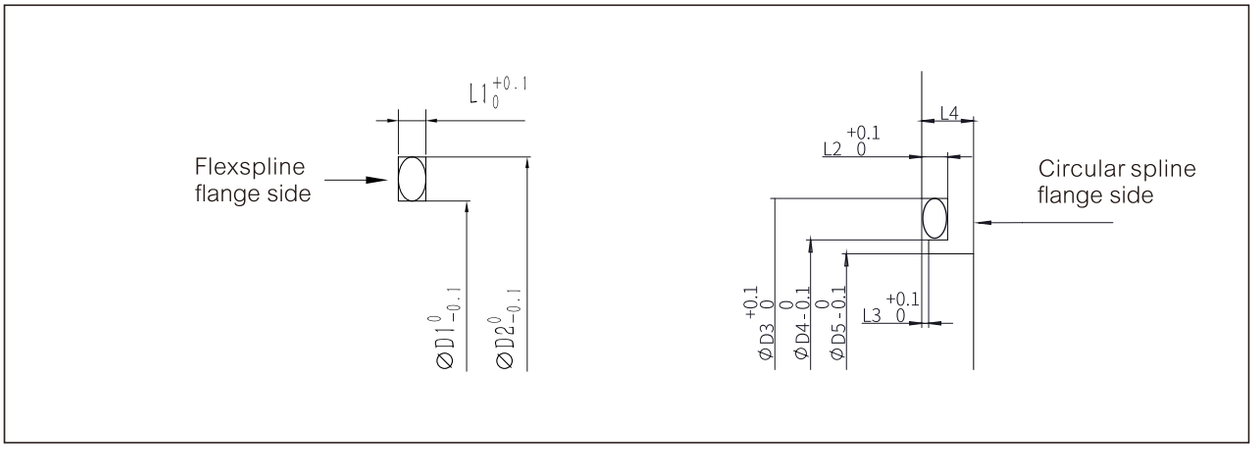
1. Rotational motion part: oil seal (build-in spring). Please notice whether there is scratch on shaft side;
2. Flange mounting face, chimera: O-ring and sealant. Please notice whether the plane is skewed or the meshing of O-ring; (for the O-ring and O-groove for reducer installation, See chart below)
3. Screw hole part: use the screw locking agent with sealing effect (Loctite 243 is recommended) or sealing tape.

Parts requiring sealing		Recommended sealing method
Output side	Through hole in the center of output flange or the mounting face of output flange	Using O-ring (the company product is attached)
	Part for installing screw	Screw locking agent with sealing effect (Loctite 243 is recommended)
Input side	Flange mounting face	Using O-ring (the company product is attached)
	Motor output shaft	Please choose the motor with oil seal. If it does not have oil seal, please install oil seal on motor installing flange.

Measurement chart of O-ring and O-groove for reducer installation

Product model	Flexspline side				Circular spline teeth						
	O-ring	O-groove			O-ring	O-groove					
		∅D1	∅D2	L1		∅D3	∅D4	∅D5	L2	L3	L4 MIN
HMHG-14-XX-II/III	55*1.5 (Outer dia*Wire dia)	51.1	55.5	1.2	37.8*0.6 (Outer dia*Wire dia)	38	36.5	36.2	0.45	0.15	1
HMHG-17-XX-II/III	64*1.5 (Outer dia*Wire dia)	60.5	64.5	1.2	47*1 (Outer dia*Wire dia)	48	45.5	44.7	0.75	0.2	1
HMHG-20-XX-II/III	72*1.5 (Outer dia*Wire dia)	70	74	1.2	56*1 (Outer dia*Wire dia)	56.2	53.8	52.4	0.75	0.2	1.5
HMHG-25-XX-II/III	93.6*1.8 (Outer dia*Wire dia)	89.8	94.6	1.4	70*1.5 (Outer dia*Wire dia)	70.5	66.8	65.6	1.2	0.3	1.5
HMHG-32-XX-II/III	119.5*2 (Inner dia*Wire dia)	117.6	123	1.5	86*1.5 (Inner dia*Wire dia)	90	86	85.5	1.1	0.3	1.5
HMHG-40-XX-II/III	114.5*2 (Inner dia*Wire dia)	148	142.6	1.5	109.5*1.5 (Inner dia*Wire dia)	112.4	108	106	1.2	0.4	2
HMHD-14-XX-III	55*1.5 (Outer dia*Wire dia)	51.5	55.5	1.2	37.5*0.6 (Inner dia*Wire dia)	O-ring groove is equipped in HMHD circular spline.					
HMHD-17-XX-III	64*1.5 (Outer dia*Wire dia)	60.5	64.5	1.2	45.5*0.65 (Inner dia*Wire dia)						
HMHD-20-XX-III	72*1.5 (Outer dia*Wire dia)	70	74	1.2	55*0.8 (Outer dia*Wire dia)						
HMHD-25-XX-III	93.6*1.8 (Outer dia*Wire dia)	89.8	94.6	1.4	66*1 (Inner dia*Wire dia)						
HMHG-32-XX-III	119.5*2 (Inner dia*Wire dia)	117.6	123	1.5	86*1.5 (Inner dia*Wire dia)						

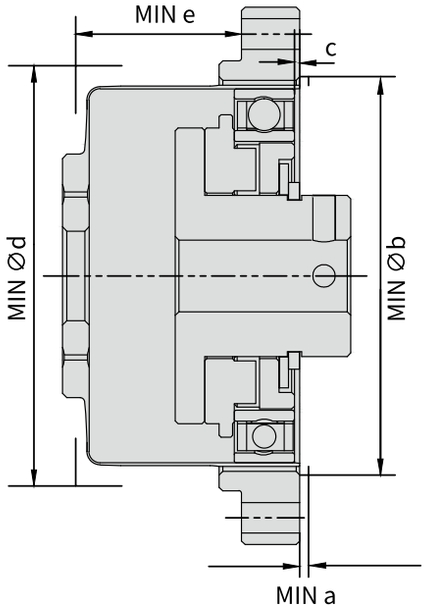
Dimensional drawing of O-ring and O-groove for reducer installation



Reducer Installation

The clearance size of reducer and the installation depth of wave generator

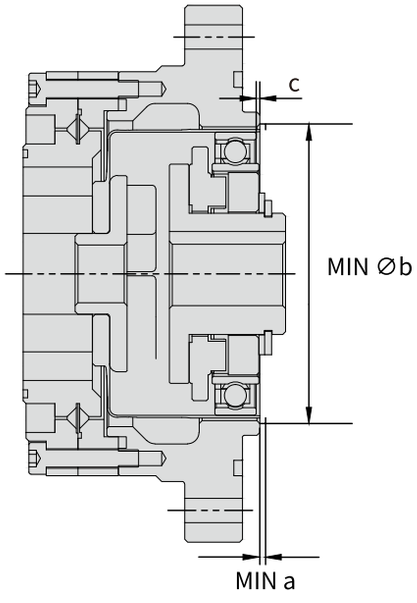
1. The clearance size of HMCG-I series harmonic drive and the installation depth of wave generator



HMCG-I Series unit:mm

Model	a	b	c	d	e
14	1	38	1.5±0.2	38	17.1
17	1	45	1.85±0.2	45	19
20	1.5	53	1.95±0.2	53	20.5
25	1.5	66	2.1±0.2	66	23
32	1.5	86	2.6±0.2	86	26.8
40	2	106	3.45±0.2	106	33

2. The clearance size of HMCG-II series harmonic drive and the installation depth of wave generator



HMCG-II Series unit:mm

Model	a	b	c
14	1	38	1.5±0.2
17	1	45	1.85±0.2
20	1.5	53	1.95±0.2
25	1.5	66	2.1±0.2
32	1.5	86	2.6±0.2
40	2	106	3.45±0.2

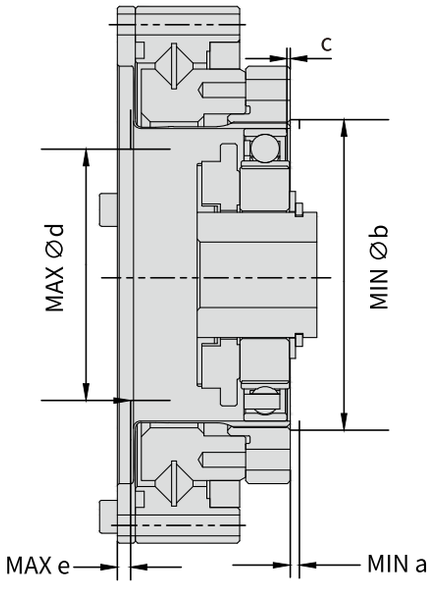
Note:① C refers to the distance between the end face of the outer ring of the flexible bearing and the end face of the circular spline.

② Please confirm the design size of the flange and wave generator in strict accordance with the clearance dimension of the harmonic drive. If the size exceeds the clearance dimension, it will cause interference of the flexspline and flange or wave generator and affect the service life of the harmonic drive.

③ The installation of the harmonic drive shall be designed according to the installation depth requirement of the wave generator. The different installation depth of the reducer will affect the parameters, such as the starting torque and precision of the reducer.

Reducer Installation

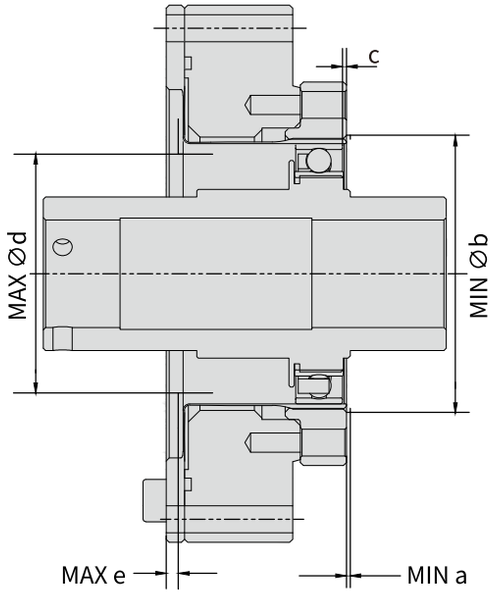
3. The clearance size of HMHG-II series harmonic drive and the installation depth of wave generator.



HMHG-II Series unit:mm

型号	a	b	c	d	e
14	1	36.2	1.5±0.2	31	1.7
17	1	44.7	1.85±0.2	38	2.1
20	1.5	52.4	1.95±0.2	45	2
25	1.5	65.6	2.1±0.2	56	2
32	1.5	85.5	2.6±0.2	73	2
40	2	106	3.45±0.2	90	2

4. The clearance size of HMHG-III series harmonic drive and the installation depth of wave generator.



HMHG-III Series unit:mm

型号	a	b	c	d	e
14	1	36.2	1.5±0.2	31	1.7
17	1	44.7	1.85±0.2	38	2.1
20	1.5	52.4	1.95±0.2	45	2
25	1.5	65.6	2.1±0.2	56	2
32	1.5	85.5	2.6±0.2	73	2
40	2	106	3.45±0.2	90	2

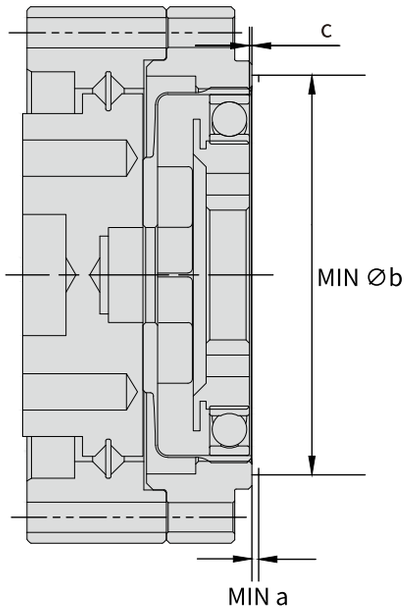
Note:① C refers to the distance between the end face of the outer ring of the flexible bearing and the end face of the circular spline.

② Please confirm the design size of the flange and wave generator in strict accordance with the clearance dimension of the harmonic drive. If the size exceeds the clearance dimension, it will cause interference of the flexspline and flange or wave generator and affect the service life of the harmonic drive.

③ The installation of the harmonic drive shall be designed according to the installation depth requirement of the wave generator. The different installation depth of the reducer will affect the parameters, such as the starting torque and precision of the reducer.

Reducer Installation

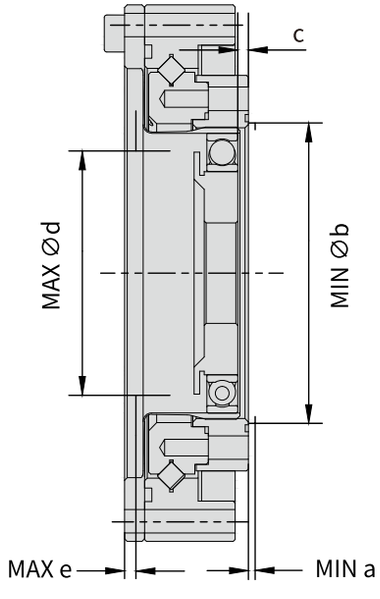
5. The clearance size of HMCD-II series harmonic drive and the installation depth of wave generator.



HMHD-II Series unit:mm

型号	a	b	c
14	1	36.5	0.3±0.1
17	1	45	0.3±0.1
20	1.5	53	0.3±0.1
25	1.5	66	0.4±0.1
32	2	86	0.5±0.1

6. The clearance size of HMHD-III series harmonic drive and the installation depth of wave generator.



HMHD-III Series unit:mm

型号	a	b	c	d	e
14	1	36.5	1.8±0.1	31	1.4
17	1	45	1.6±0.1	38	1.8
20	1.5	53	1.2±0.1	45	1.7
25	1.5	66	0.4±0.1	56	1.8
32	2	86	0.6±0.1	73	1.8

Note:① C refers to the distance between the end face of the outer ring of the flexible bearing and the end face of the circular spline.

② Please confirm the design size of the flange and wave generator in strict accordance with the clearance dimension of the harmonic drive. If the size exceeds the clearance dimension, it will cause interference of the flexspline and flange or wave generator and affect the service life of the harmonic drive.

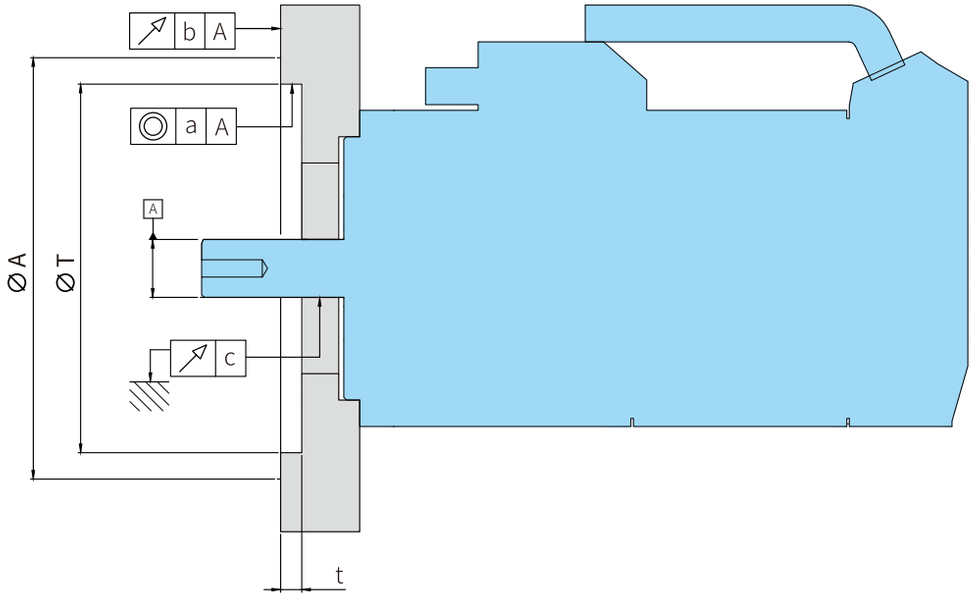
③ The installation of the harmonic drive shall be designed according to the installation depth requirement of the wave generator. The different installation depth of the reducer will affect the parameters, such as the starting torque and precision of the reducer.

Reducer Installation

The installation accuracy of the harmonic drive

1. The installation of motor

Motor mounting flange: when mounting the motor to the combined type, the motor mounting flange must be used for mounting. The recommended dimensions and accuracy of the basic flanges for motor installation are shown below.



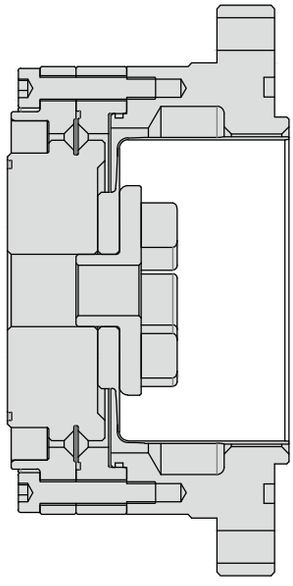
unit:mm

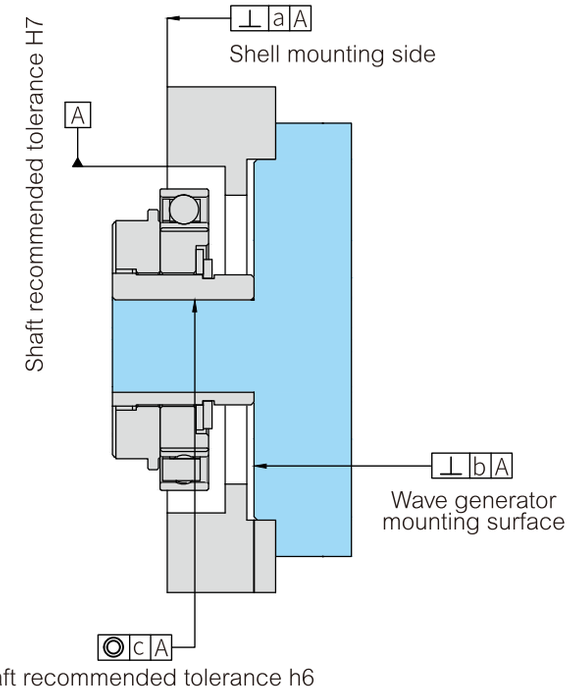
model / symbol	14	17	20	25	32	40
a	0.03	0.04	0.04	0.04	0.04	0.05
b	0.03	0.04	0.04	0.04	0.04	0.05
c	0.015	0.015	0.018	0.018	0.018	0.018
∅A	73	79	93	107	138	160
t	3	3	4.5	4.5	4.5	6
∅T	38H7	48H7	56H7	67H7	90H7	110H7

Reducer Installation

2. The assembly precision of HMCG-II series

In the assembly design, to give full play to the excellent performance of the combination type, please make sure to use the recommended accuracy of the shell shown in the following figure and table.





unit:mm

model / symbol	14	17	20	25	32	40
a	0.011	0.015	0.017	0.024	0.026	0.0026
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	0.050	0.063
	(0.016)	(0.018)	(0.019)	(0.022)	(0.022)	(0.024)

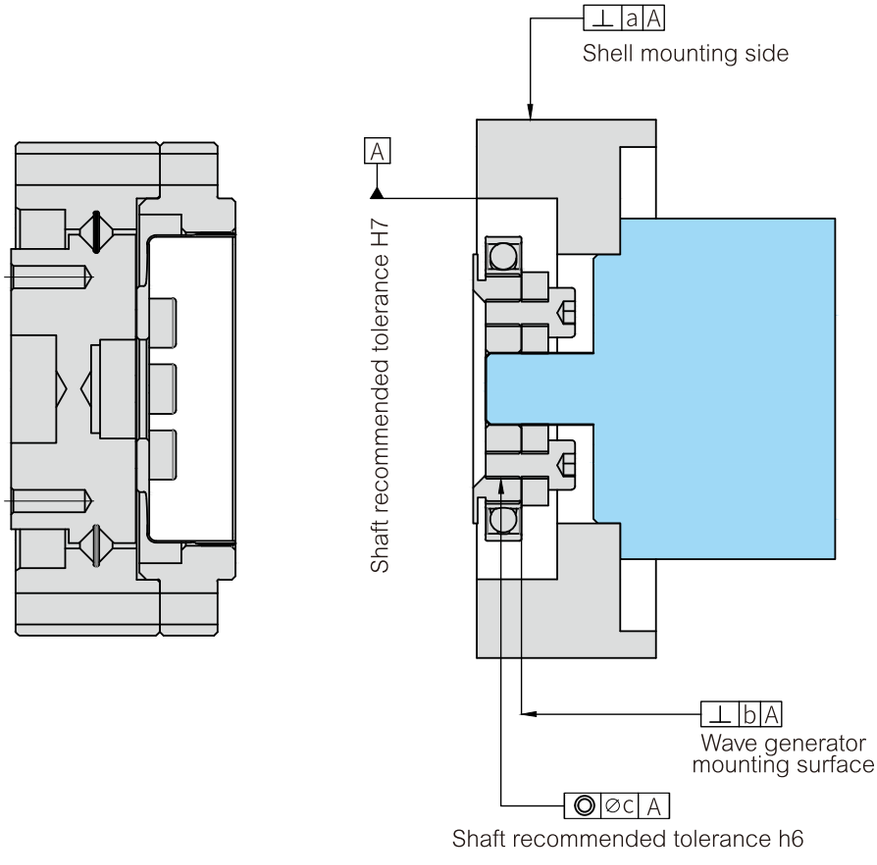
※ The value in () is the value when the input part (wave generator) is Integrated. (the European coupling structure is not adopted).

Reducer Installation

3. The assembly precision of HMCD-II series

In the assembly design, if there are abnormalities and forced assembly such as mounting surface deformation, product performance will be reduced.
To give full play to the excellent performance of the harmonic drive, please pay attention to the following matters and ensure the recommended accuracy of the assembly housing as shown in the following figure and the table below.

① Mounting surface deflection and deformation.
② Foreign substance occurs.
③ The surrounding rough edges, uplift and abnormal position of screw holes on the mounting holes.
④ Chamfer of the recessed circle is insufficient.
⑤ The degree of roundness of the recessed circle is abnormal.



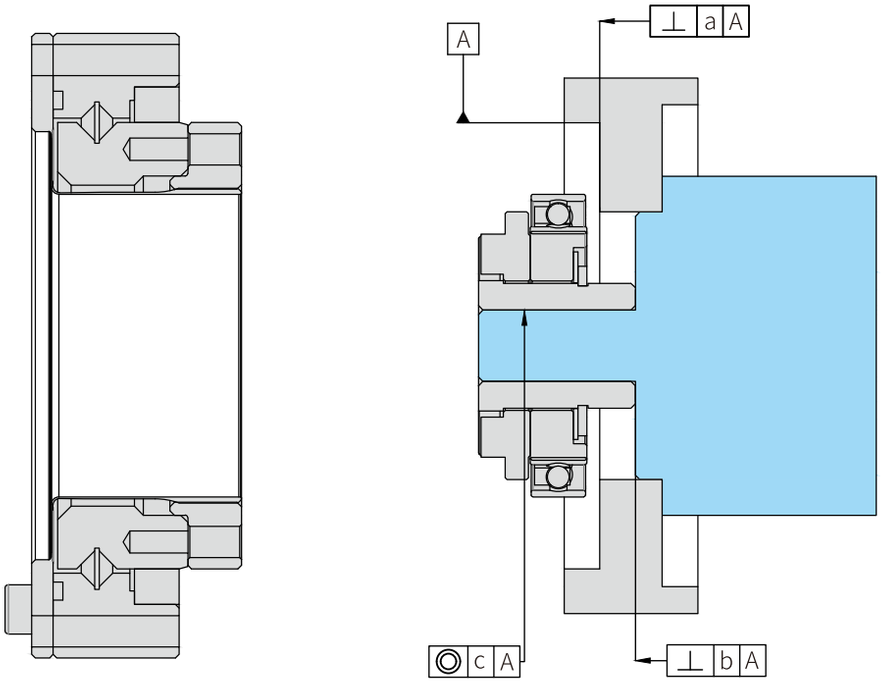
unit:mm

model / symbol	14	17	20	25	32
a	0.011	0.015	0.017	0.024	0.026
b	0.008	0.010	0.012	0.012	0.012
⌀c	0.016	0.018	0.019	0.022	0.022

Reducer Installation

4. The assembly precision of HMHG-II series

In the assembly design, to give full play to the excellent performance of the combination type, please ensure the recommended accuracy of the assembly housing as shown in the following figure and the table below.



unit:mm

型号 / 符号	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	0.050	0.063
	(0.016)	(0.018)	(0.019)	(0.022)	(0.022)	(0.024)

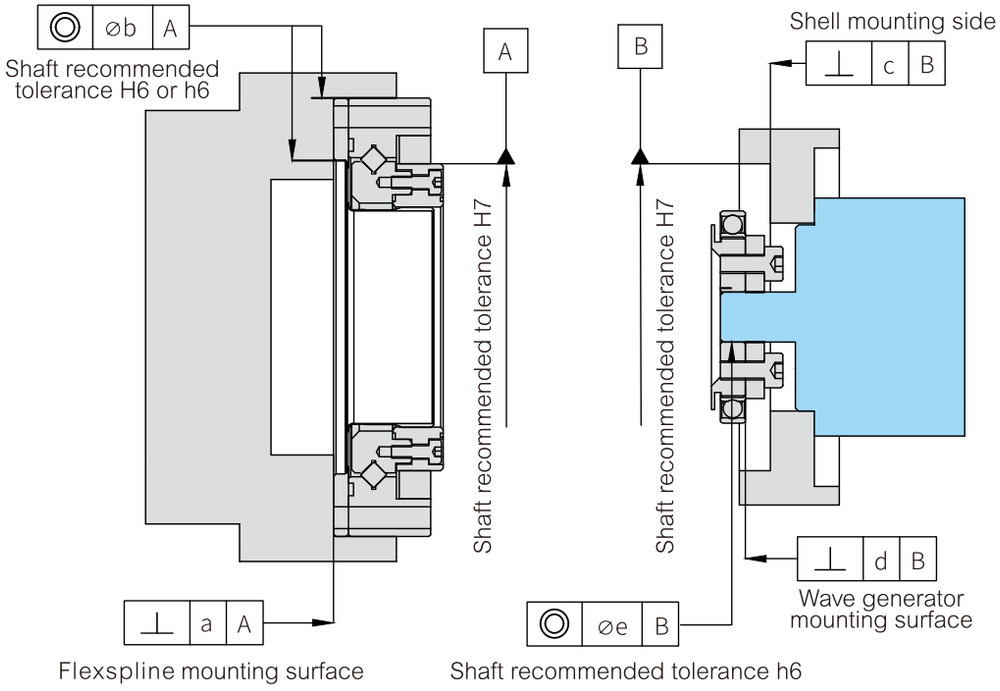
※ The value in () is the value when the input part (wave generator) is Integrated. (the European coupling structure is not adopted).

Reducer Installation

5. The assembly precision of HMHD-III series

In the assembly design, if there are abnormalities and forced assembly such as mounting surface deformation, product performance will be reduced.
To give full play to the excellent performance of the harmonic drive, please pay attention to the following matters and ensure the recommended accuracy of the assembly housing as shown in the following figure and the table below.

① Mounting surface deflection and deformation.
② Foreign matter bites in.
③ The surrounding rough edges, uplift and abnormal position of screw holes on the mounting holes.
④ Chamfer of the recessed circle is insufficient.
⑤ The degree of roundness of the recessed circle is abnormal.



unit:mm

model / symbol	14	17	20	25	32
a	0.016	0.021	0.027	0.035	0.042
⌀b	0.015	0.018	0.019	0.022	0.022
c	0.011	0.012	0.013	0.014	0.016
d	0.008	0.010	0.012	0.012	0.012
⌀e	0.016	0.018	0.019	0.022	0.022

Reducer Installation

Assembly precautions

Due to the error caused during assembly, the harmonic reducer may cause vibration and abnormal sounds during operation. Please observe the followings to do the assembly.

1. Wave generator precaution
   - ① Do not exert excess force on the bearing part of wave generator during assembly. Make it insert smoothly through rotation.
   - ② When using the integrated wave generator, please make the off - centering and skewing influence within the recommended range.

2. Circular spline precaution
   - ① Check whether the flatness of installing surface is good and whether there is skewing;
   - ② Check whether screw hole is uplift and whether there is residual burr or foreign body in it;
   - ③ Check whether there is chamfering processing and yielding processing on shell assembly part so as not to interfere with rigid gear;
   - ④ When the rigid gear is assembled on shell, please check whether the rigid gear can rotate, and whether there is interference and chucking;
   - ⑤ When inserting the bolt to bolt hole for installing, please check whether the position of bolt hole is correct, or whether the bolt touches the rigid gear because of skewing processing of bolt hole so that it is difficult for bolt to rotate;
   - ⑥ Do not use the required torque to tighten the bolt at one time. Please use half of the required torque to tighten the bolt temperately and then tighten it according to the required torque. Besides, please tighten the bolts one by one along the diagonal direction;
   - ⑦ The action of pegging at rigid gear may cause low rotation precision, so please try to avoid it.

3. Flexspline precaution
   - ① Check whether the flatness of installing surface is good and whether there is skewing;
   - ② Check whether screw hole is uplift and whether there is residual burr or foreign body in it;
   - ③ Check whether there is chamfering processing and yielding processing on shell assembly part so as not to interfere with flexible gear;
   - ④ When inserting the bolt to bolt hole for installing, please check whether the position of bolt hole is correct, or whether the bolt touches the flexible gear because of skewing processing of bolt hole so that it is difficult for bolt to rotate;
   - ⑤ Do not use the required torque to tighten the bolt at one time. Please use half of the required torque to tighten the bolt temperately and then tighten it according to the required torque. Besides, please tighten the bolts one by one along the diagonal direction;
   - ⑥ Check whether there is extreme unilateral meshing when flexible gear combines with rigid gear. Unilateral skewing may be caused by the off-centering or skewing of two parts;
   - ⑦ When assembling flexible gear, please do not knock the gear front end on opening or use excess force to press it.

4. Other precaution
   - ① The harmonic reducer must be installed in a very clean environment and no foreign substances is allowed to enter into the reducer during installing so as to avoid damage caused during using;
   - ② Please make sure the reducer teeth surface and flexible bearing part are always kept lubricated enough. It is not recommended to make the teeth surface face up all the time, which will affect the lubricating effect;
   - ③ After the wave generator is installed, please make sure the meshing of flexspline and circular splin are symmetric by 180° (as shown in Figure 1). If it is close to one side (as shown in Figure 2), the abnormal vibration may be caused and the flexspline will be damaged quickly.

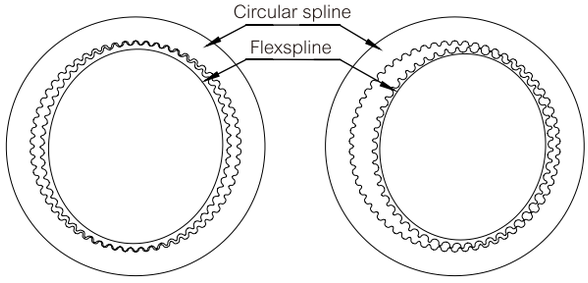


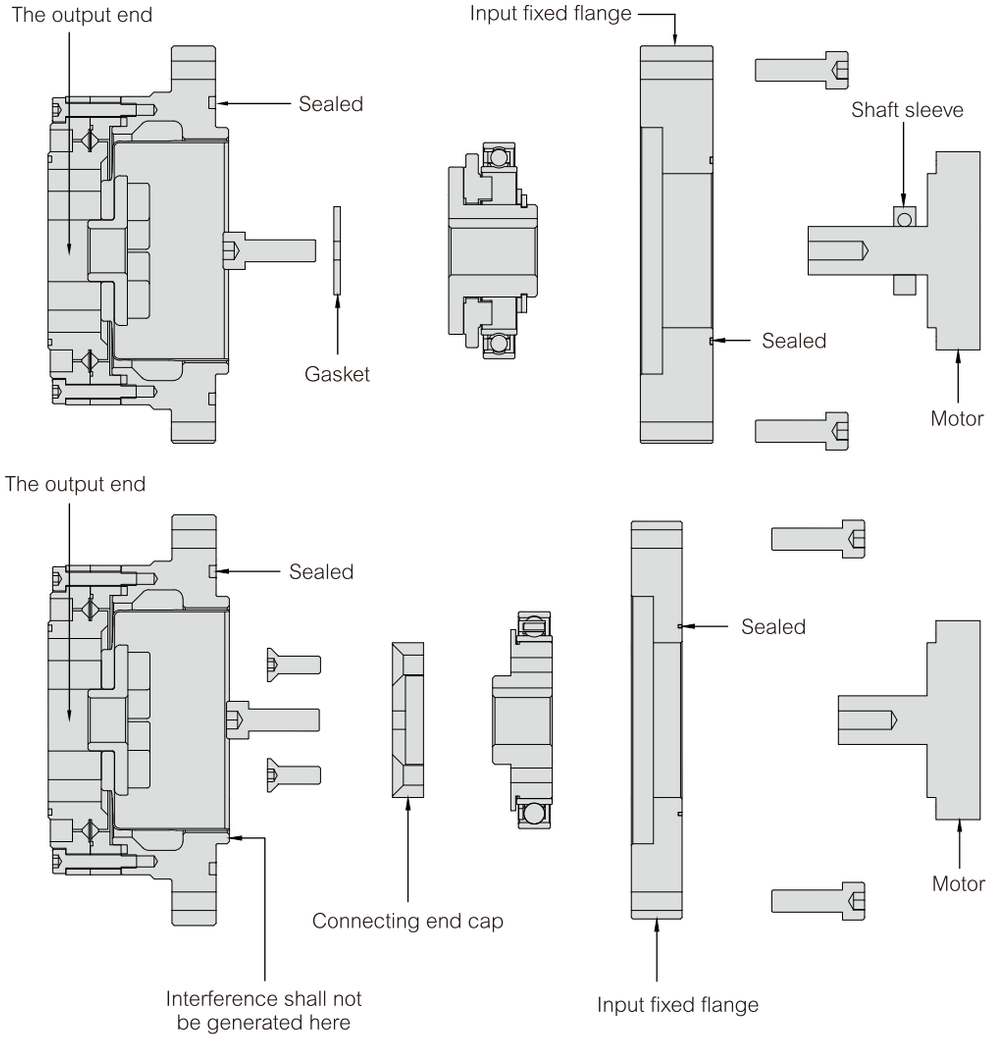
Figure 1 Figure 2

   - ④ After installation, make it run in a low speed (100rpm). If abnormal vibration or sounds occurs, please stop it immediately. Then recheck whether the installation is correct or contact us to avoid the damage of reducer because of incorrect installation.

Reducer Installation

The installation of harmonic drive

1. Connection method 1 of HMCG series (The circular spline is fixed and the flexspline is fitted to the output shaft)



① Daub the lubricating grease on the flexible bearing evenly, fill the cavity between the input fixed flange and motor with lubricating grease (Please use the specified grease and do not change the grease casually to avoid damage to the harmonic drive), install the wave generator on the input shaft of motor or connecting shaft, fixed it with screw and flat gasket or washers or connecting end cap.

② Daub the lubricating grease evenly on the inner wall of the flexspline, inject lubricating grease into the cavity of the flexspline until fill about the 80% of the space (Please use the specified grease and do not change the grease casually to avoid damage to the harmonic drive). Install the harmonic drive as the direction shown. When installing, the long axis of the wave generator should be aligned with the long axis of the flexspline. When in place, fix the reducer with the corresponding screw. The pre-tightening force is 0.5Nm.

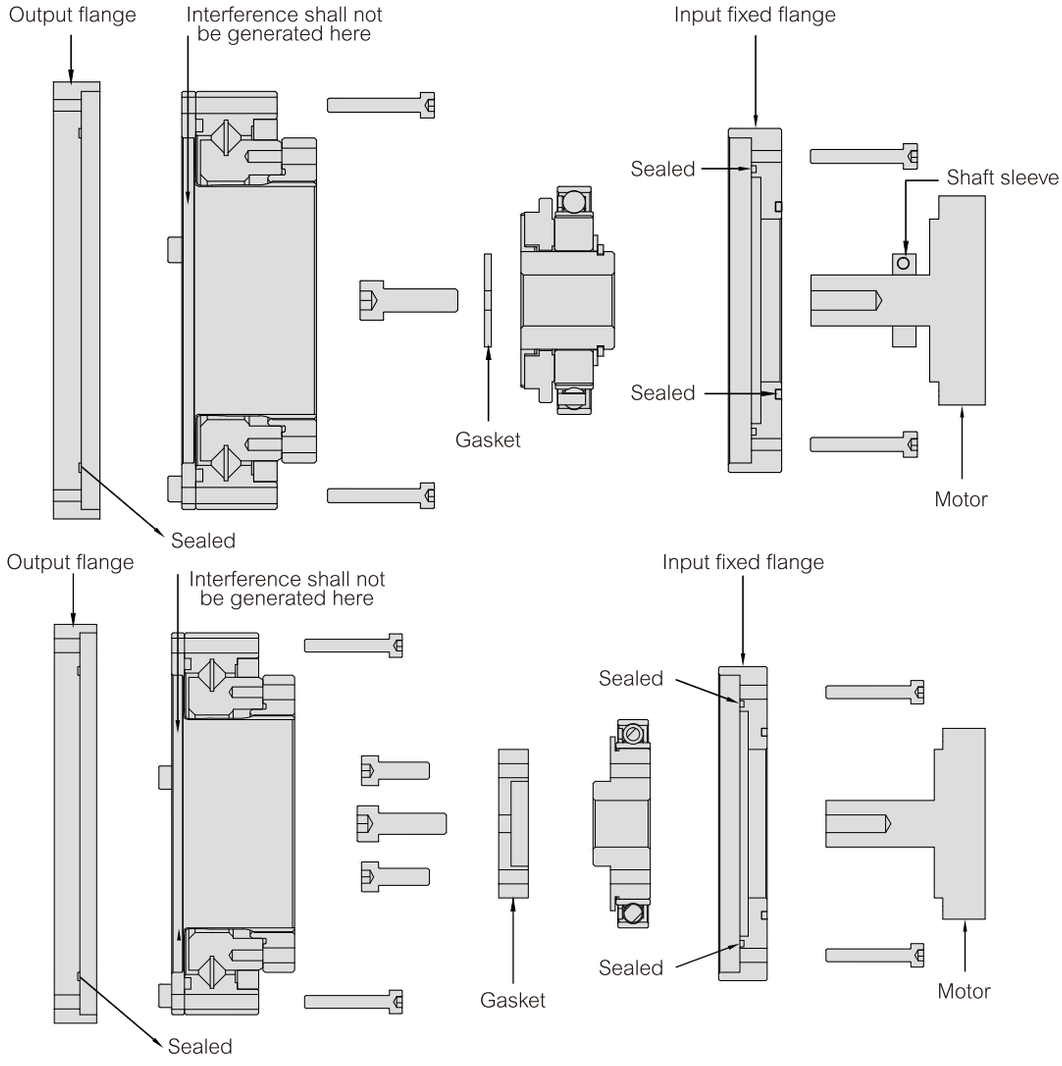
③ Set the motor speed at about 100 RPM. Start the motor. The screws are locked in a cross-section way and increase equally four to five times to the locking force corresponding to the screws. (See page 87 for the corresponding locking force of screws.) All the screws connected and fixed shall be of level 12.9 and shall be coated with Loctite 243 thread glue to prevent the failure of the screws or loose in operation.

④ Processing requirements of mounting surface which is connected and fixed with the harmonic drive: planar degree: 0.01mm, perpendicular to axis: 0.01mm.

Note:When the harmonic drive is in use, if the output end is always horizontal and downward (not recommended), the lubricating grease injected into the space on the inner wall of the flexspline should exceed the meshing surface or you should contact us. Please use the specified grease and do not change the grease casually to avoid damage to the harmonic drive. Static seal shall be used between the circular spline of the reducer and the mounting plane of the input end to ensure that the lubricating grease will not leak during the operation of the harmonic drive and avoid damage of the harmonic drive when operating with little lubricating grease or no lubricating grease at all.

Reducer Installation

2. Connection method 1 of HMHG series (The circular spline is fixed and the flexspline is fitted to the output shaft)



① Daub the lubricating grease on the flexible bearing evenly, fill the cavity between the input fixed flange and motor with lubricating grease (Please use the specified grease and do not change the grease casually to avoid damage to the harmonic drive), install the wave generator on the input shaft of motor or connecting shaft, fixed it with screw and flat gasket or washers or connecting end cap.

② Install the harmonic drive as the direction shown. When installing, the long axis of the wave generator should be aligned with the long axis of the flexspline. When in place, fix the harmonic drive with the corresponding screw. The pre-tightening force is 0.5Nm.

③ Set the motor speed at about 100 RPM. Start the motor. The screws are locked in a cross-section way and increase equally four to five times to the locking force corresponding to the screws. (See page 87 for the corresponding locking force of screws.) All the screws connected and fixed shall be of level 12.9 and shall be coated with Loctite 243 thread glue to prevent the failure of the screws or loose in operation.

④ Daub the lubricating grease evenly on the inner wall of the flexspline, inject lubricating grease into the cavity of the flexspline until fill about the 80% of the space (Please use the specified grease and do not change the grease casually to avoid damage to the harmonic drive).

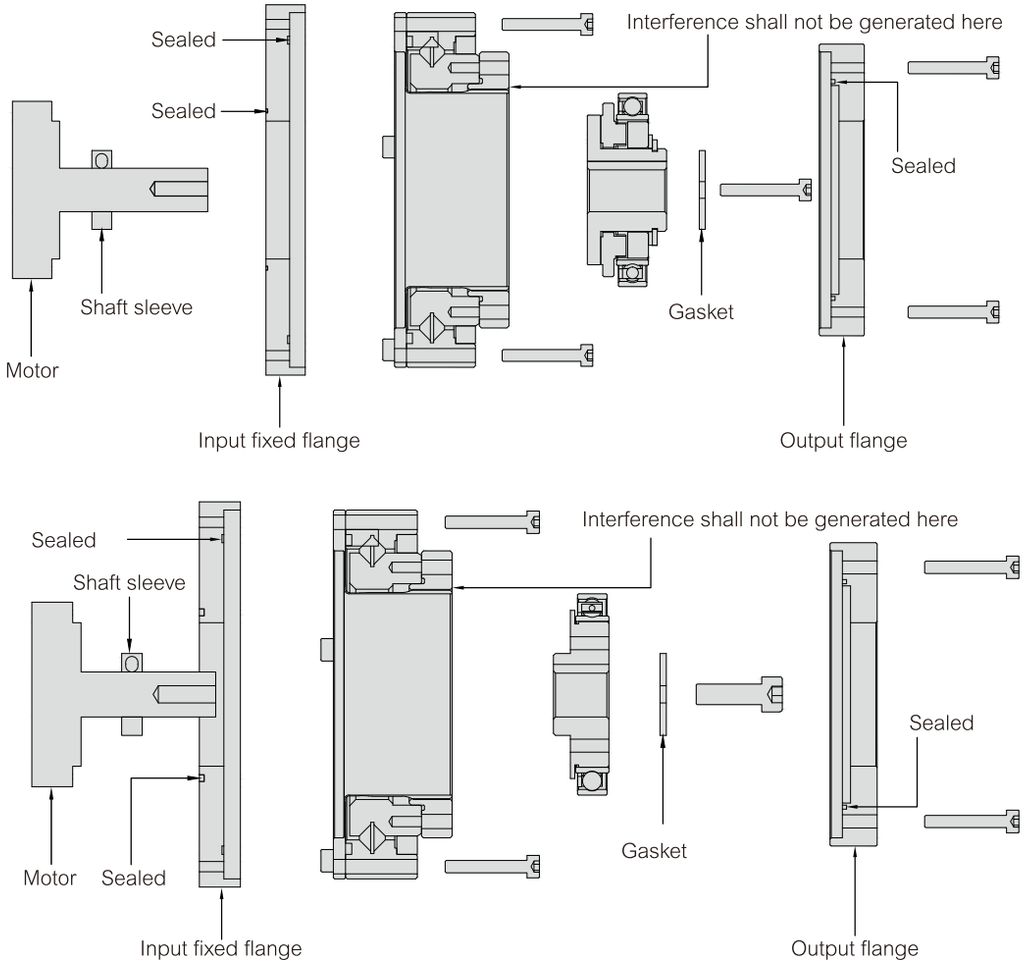
⑤ The output end is also fixed according to step 3. All the screws connected and fixed shall be of level 12.9 and shall be coated with Loctite 243 thread glue to prevent the failure of the screws or loose in operation.

⑥ Processing requirements of mounting surface which is connected and fixed with the harmonic drive: planar degree: 0.01mm, perpendicular to axis: 0.01mm.

Note:When the harmonic drive is in use, if the output end is always horizontal and downward (not recommended), the lubricating grease injected into the space on the inner wall of the flexspline should exceed the meshing surface or you should contact us. Please use the specified grease and do not change the grease casually to avoid damage to the harmonic drive. Static seal shall be used between the circular spline of the reducer and the mounting plane of the input end to ensure that the lubricating grease will not leak during the operation of the harmonic drive and avoid damage of the harmonic drive when operating with little lubricating grease or no lubricating grease at all.

Reducer Installation

3. Connection method 2 of HMHG series (The flexspline is fixed and the circular spline is fitted to the output shaft)



① Install the harmonic drive at the input end and fix it with the corresponding screw. The pre-tightening force is 0.5Nm.

② Daub the lubricating grease evenly on the inner wall of the flexspline, inject lubricating grease into the cavity B of the flexspline until fill about the 80% of the space (Please use the specified grease and do not change the grease casually to avoid damage to the harmonic drive).

③ Install the wave generator as the direction shown. When installing, the long axis of the wave generator should be aligned with the long axis of the flexspline. When in place, rotate the wave generator to align the keyway on the cam with the keyway on the input shaft, and install the key (the key is coated with the Loctite 638 glue), and fix the wave generator on the shaft with screws and big pads.

④ Daub the lubricating grease on the flexible bearing evenly, fill the cavity A with lubricating grease (Please use the specified grease and do not change the grease casually to avoid damage to the harmonic drive).

⑤ Set the motor speed at about 100 RPM. Start the motor. The screws are locked in a cross-section way and increase equally four to five times to the locking force corresponding to the screws. (See page 87 for the corresponding locking force of screws.) All the screws connected and fixed shall be of level 12.9 and shall be coated with Loctite 243 thread glue to prevent the failure of the screws or loose in operation.

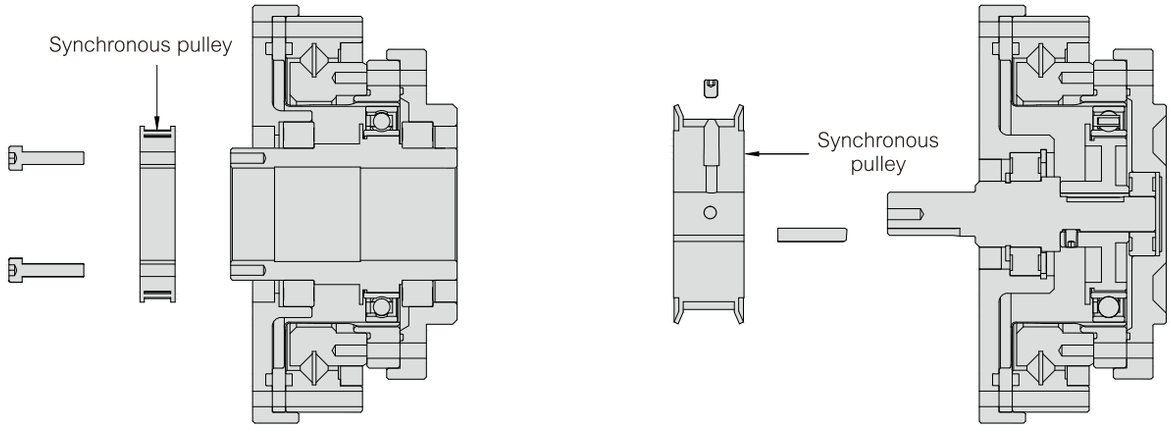
⑥ The output end is also fixed according to step 5. All the screws connected and fixed shall be of level 12.9 and shall be coated with Loctite 243 thread glue to prevent the failure of the screws or loose in operation.

⑦ Processing requirements of mounting surface which is connected and fixed with the harmonic drive: planar degree: 0.01mm, perpendicular to axis: 0.01mm.

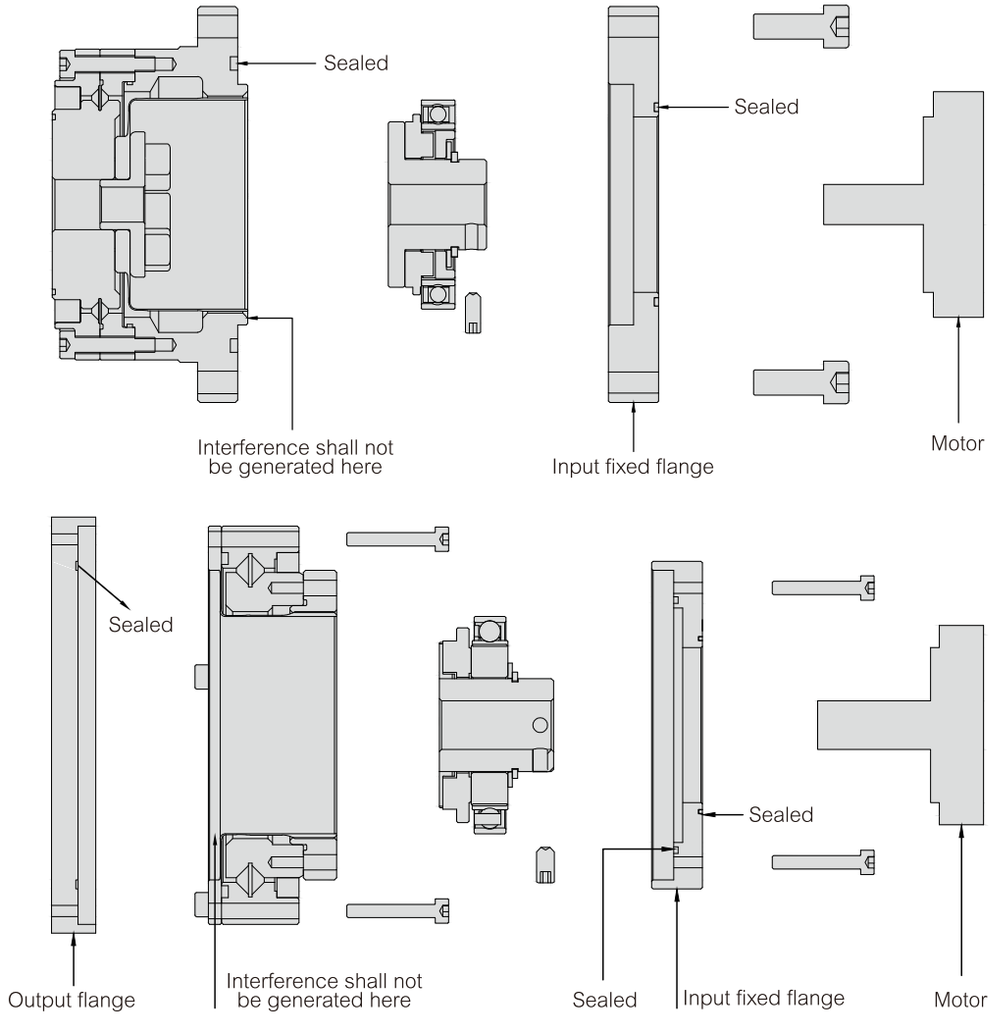
Note:When the harmonic drive is in use, if the output end (as shown in the picture above) is always horizontal and upward (not recommended), the lubricating grease injected into the space on the inner wall of the flexspline should exceed the meshing surface (cavity A and cavity B should be filled with lubricating grease) or you should contact us. Static seal shall be used between the circular spline of the reducer and the mounting plane of the input end to ensure that the lubricating grease will not leak during the operation of the harmonic drive and avoid damage of the harmonic drive when operating with little lubricating grease or no lubricating grease at all.

Reducer Installation

4. Connection method 3,4 of HMHG series



5.The connection method with the harmonic drive when the motor shaft is optical axis

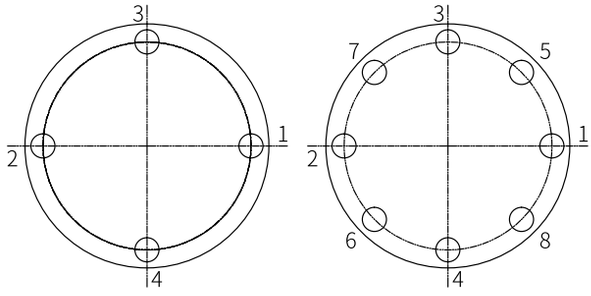


Reducer Installation

6. Screw locking mode

(1) Set motor speed to about 100rpm, start motor and tightly lock screw by way of cross and increase the locking force (for the corresponding locking force of screw, refer to attached table 1) to the desired value that screw needs through equal amount of four to five times;

(2) Processing requirement for installation plane connected with reducer: flatness: 0.01mm; verticality to axis: 0.01mm.



Corresponding locking force of screw

Screw performance level		12.9						
Screw nominal diameter	mm	3	4	5	6	8	10	12
Locking torque	N·m	2	4	9	15	35	70	125

Use of grease

Precautions for use of grease

(1) Grease has been sealed into inner invisible part of cup-shaped combination and cap hollow combination drive before they leave the plant. Inject and paint grease when installing wave generator;
(2) Input end and output end of harmonic drive must be designed with strict sealing structure. It is suggested the dynamic sealing part be sealed with skeleton oil seal and static sealing part be sealed with O-ring or sealant. Please make sure the sealing surface is straight and not damaged;
(3) It is suggested to use special semi-fluid grease for harmonic drive and avoid using it together with other grease;
(4) Use the grease strictly following the steps stipulated in the using instruction. Please notice injection and painting amount for different grease is different;
(5) During harmonic drive's using, if wave generator is facing up all the time, grease failure would be caused. please increase the grease injection amount or consult our company;
(6) Grease's performance will change as temperature changes. The higher the temperature rises, the faster the degradation becomes. To ensure the grease stays in good status all the time, heat - balance temperature of harmonic drive high temperature end should be less than 70°C and temperature rise should be less than 40°C;
(7) Motion part wearing of harmonic drive is mainly affected by grease performance. If it allows, please replace grease after harmonic drive operates 3000 hours.

Requirements for the use of grease

1. The HMCG-I HMCG-II and HMHG-II series should be coated with grease as required in the table below.

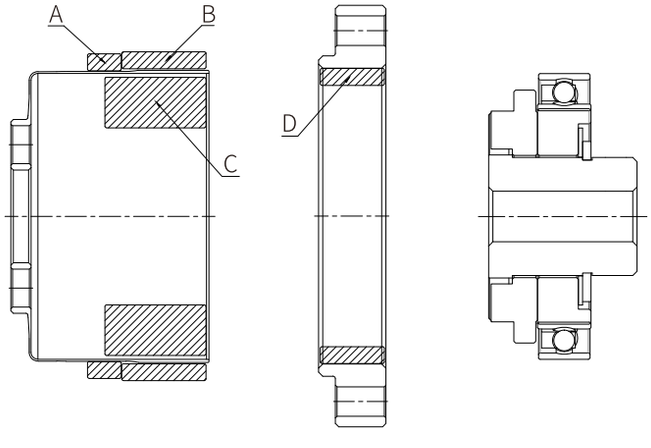
(1) Amount of grease used

unit : g

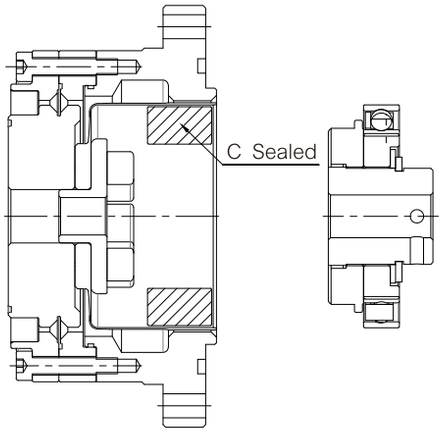
Size	Daubing place					
	A	B	C			D
			When use horizontally	When use vertically		
				Upward	Downward	
14	0.3	0.3	6	8	9	0.3
17	0.5	0.5	10	12	14	0.5
20	0.8	0.8	16	18	21	0.8
25	1.5	1.5	30	35	40	1.5
32	3	3	60	70	80	3
40	6	6	120	130	150	6

(2) Daubing place of lubricating grease

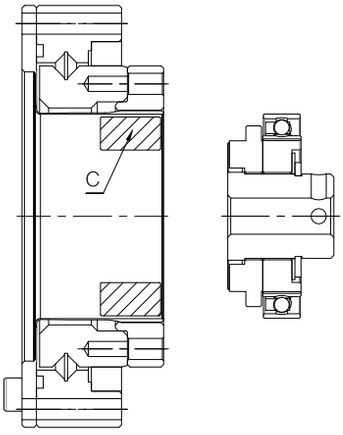
HMCG-I series



Use of grease



HMCG-II series



HMHG-II series

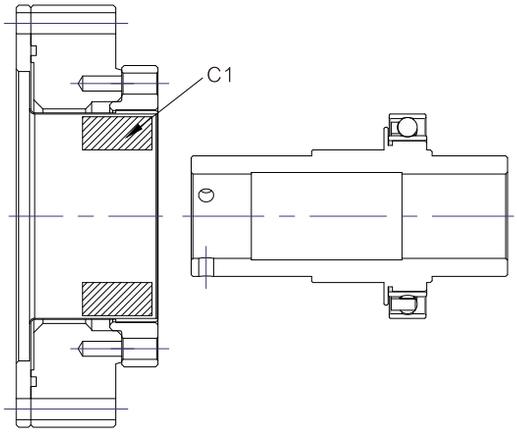
2. HMHG-III series should be coated with grease as required in the table below.

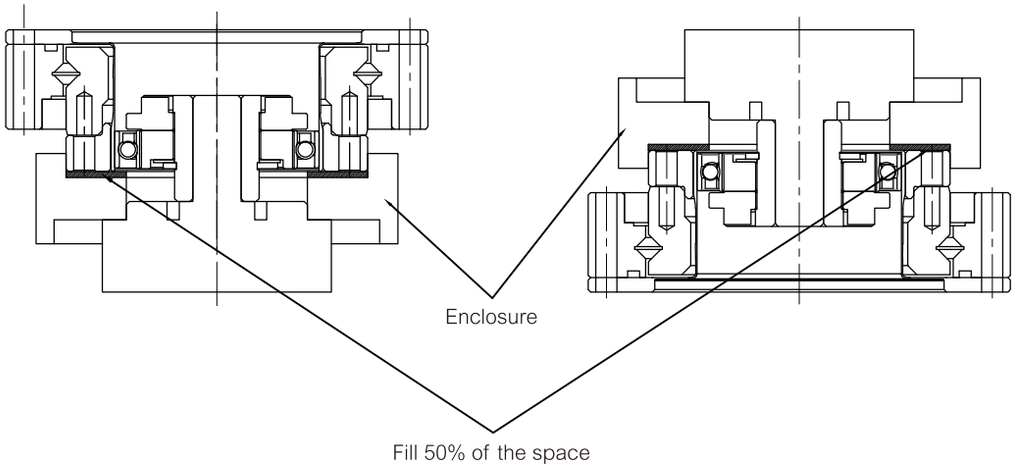
(1) Amount of grease used

unit : g

Size	Daubing place
	C1
14	5.5
17	9.6
20	10.3
25	16
32	26
40	60

(2) Daubing place of lubricating grease





Use of grease

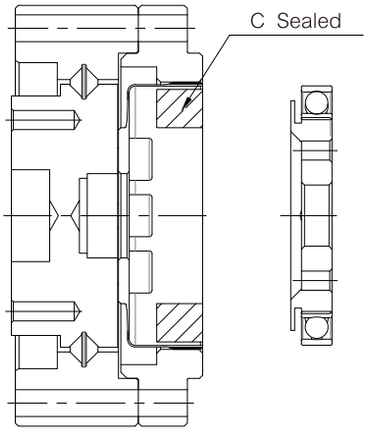
3. HMCD-II、HMHD-III series should be coated with grease as required in the table below.

(1) Amount of grease used

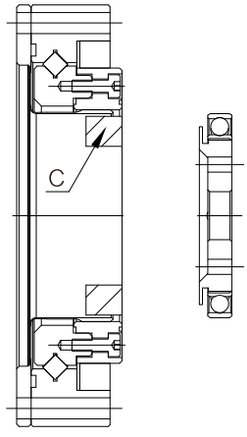
unit : g

Size	Daubing place		
	C		
	When use horizontally	When use vertically	
		Upward	Downward
14	3	4	5
17	5	6	7
20	8	9	11
25	16	19	21
32	36	42	48

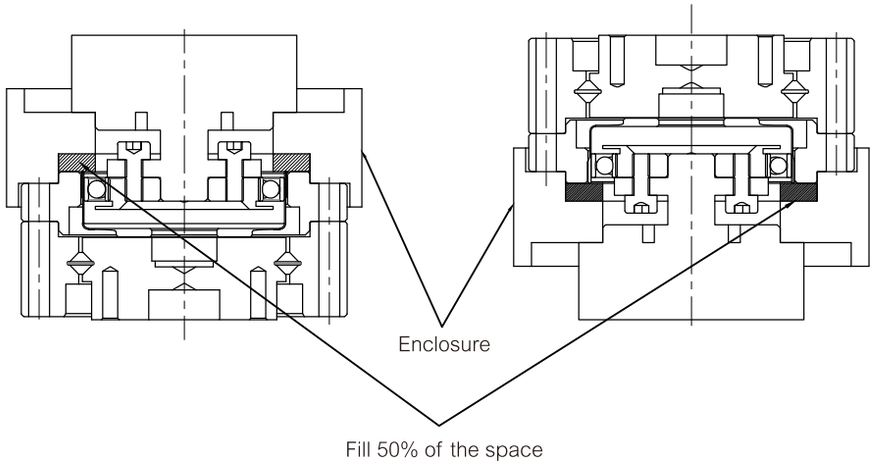
(2) Daubing place of lubricating grease



HMCD-II series



HMHD-III series



Use of grease

Lubricating grease replacing time

The wearing of all motion parts of harmonic reducer will be, to a large extent, influenced by the performance of lubricating grease.

The performance of lubricating grease is influenced by temperature. The higher the temperature is, the worse the lubricating grease becomes. So it is best to replace the lubricating grease at an early stage. As shown in the following figure, when the average load torque is smaller than rated torque, the replacing time reference for lubricating grease can be determined based on the relation of lubricating grease temperature and the total rotation number of wave generator; when the average load torque is larger than the rated torque, the replacing time reference for lubricating grease can be determined based on the following formula.

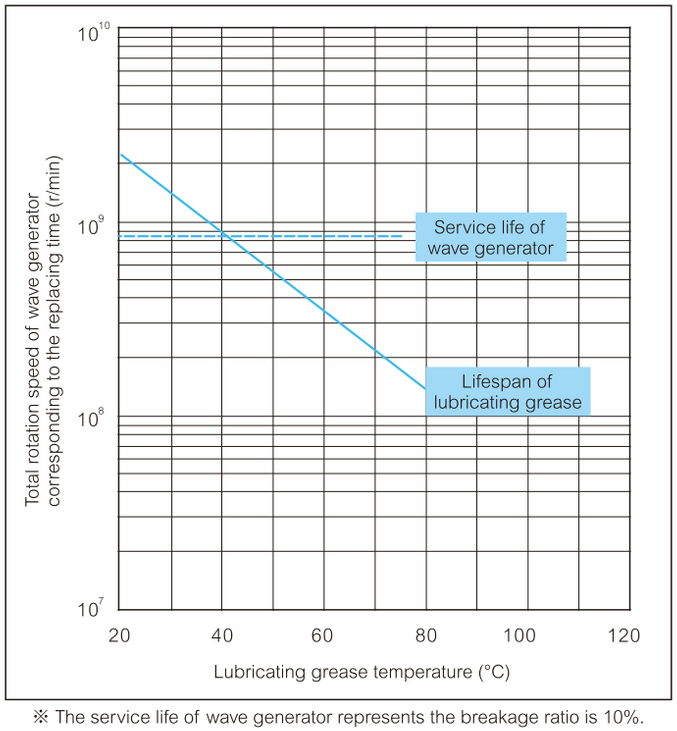
The formula when average load torque is larger than the rated torque

$$L_{GT}=L_{GTn}\times\left(\frac{Tr}{Tav}\right)^3$$

L_{GT}	The replacing time when it is larger than the rated torque	Rotation speed	–
L_{GTn}	The replacing time when it is smaller than the rated torque	Rotation speed	Refer to the figure on the following
Tr	Rated torque	Nm, kgfm	Refer to the "Parameter Table" of all series
Tav	The average load torque on output side	–	Determined based on use condition

Symbols in formula

Lubricating grease replacing time: L_{GTn}
(when average load torque is smaller than rated torque)



※ The service life of wave generator represents the breakage ratio is 10%.

Other precaution

① Do not mix it with other lubricating greases. In addition, put the harmonic reducer in the separate shell when installing it onto the device;

② When the wave generator faces up and faces towards single direction to make the load rotate in a low speed (input rotation speed: <1000r/min), the using of harmonic reducer may cause bad lubricating. Please consult our company in this situation;

③ Lubricating grease leakage about combination type Although the design of combination type has taken measures for lubricating grease leakage, you still need to strengthen the sealing mechanism according to the using environment.

About the warranty

The warranty period and scope of Han’ s Motion harmonic drive are as follows:

The warranty period

The warranty period shall be one year after delivery or the product running time reaches 8000 hours in the condition of normal assembly and lubrication as stated in the product operation manual, taking the lesser one.

The warranty scope

During the warranty period, our company shall be responsible for the maintenance or replacement of the product in case of failure caused by the manufacturing defects.However, the following conditions are not covered by the warranty.
(1)Failure caused by customer’s improper operation or illegal use.
(2) Failure caused by any modification or repair not carried out by our company.
(3) Failure is not caused by our product.
(4) Failure caused by natural disaster or other reasons, which are not our company's responsibility.

Meanwhile, the warranty mentioned here refers to the warranty of our product.
The company is not responsible for other losses caused by the failure of our product, such as man-hours and expenses related to the disassembly and installation of the equipment.

Precautions for safe use

⚠ Warning	An operation mistake may result in death or serious injury.
⚠ Attention	An operation mistake may lead to injury and property damage.

About scrapping	
⚠ Attention	Please dispose of according to industrial waste standards. ● Please treat according to the standards of industrial waste when scrapping.

Matters needing attention in design (please must read the instruction when designing)		
⚠ Attention	Please use under specified circumstances. ● When using our harmonic drive, please follow the following conditions. Ambient temperature: 0 ~ 40°C No splashing water, oil, etc No corrosive or explosive gas No metal powder and other dust	Please install as required. ● Please follow the correct assembly method and order as the requirements of the product catalog. ● Please follow our recommendations about tightening method (use bolts, etc.). ● If is not assembled properly, it may cause vibration, shortening of service life, precision decline, damage and other failures during operation.
	Please install according to the specified precision. ● Please design and assemble the components correctly to ensure that they meet the recommended installation accuracy in our product catalog. ● Failure to reach specified accuracy may result in vibration, shortening of service life, precision decline, damage and other failures during operation.	Please use the specified grease ● Not using the grease recommended by our company may shorten the service life of the product. In addition, please replace the grease according to the specified conditions. ● The combination type product has been pre-sealed with grease. Please do not mix in other greases.

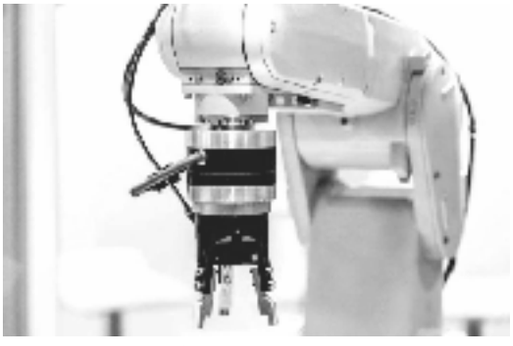
Precautions for use (please must read the instruction before operating)		
⚠ Attention	Please use the products and parts carefully. ● Do not use hammers, etc., to pound various parts and units. In addition, please ensure that the cause of the fall, such as crack, dent, etc. Otherwise, the product will be damaged. ● Performance cannot be guaranteed when used in a corrupted state. Failures such as damage can also be caused.	Please do not exceed the allowable torque when using. ● Please do not apply torque which exceeds the moment allowable maximum torque. Otherwise, the bolts of the tightening part may become loose, rock and damage, which may lead to product failure. ● If the output shaft is directly connected to the joint arm, it may be damaged due to the collision of the joint arm, and the output shaft cannot be controlled.
	Do not change the matching components. ● Parts of this product are manufactured in conjunction with processing. When used in combination with other suites, there is no guarantee that they will perform well.	Do not disassemble combined products. ● Disassembly and reassembly of composite products is strictly prohibited. Otherwise, its original performance cannot be restored.

Use of grease	
⚠ Warning	Installation precautions ● Splashing into the eyes can cause inflammation. When operating, please wear protective glasses to avoid splashing into the eyes. ● Touching the skin can cause inflammation. Please wear protective gloves to avoid contact with the skin. ● Don't swallow it (It can cause diarrhea, vomiting, etc.). ● Be careful not to scratch your finger when opening the container. Please wear protective gloves. ● Keep it out of children's reach. Emergency treatment: ●In case of splashing into the eyes, please rinse immediately with water for 15 minutes and receive medical treatment. ●In case of contacting with skin, rinse thoroughly with water and soap. ●In case of swallowing, please do not vomit, and should be treated by a doctor immediately.
⚠ Attention	Preservation methods ● After use, please seal it to prevent dust, moisture and other mixing. Please keep in the shade to avoid direct sunlight. ● For long - term inventory of products, it is recommended to confirm the performance and rust prevention. ● Please refer to the delivery drawings for details of surface processing. Treatment of waste oil and waste containers ● The law stipulates the treatment method that the user is obligated to implement. ● Please follow the relevant laws and regulations to deal with it correctly. If you are not clear, please consult our company first and then deal with it. ● Do not apply pressure on empty containers. Pressure can cause it to break. ● Please do not weld, heat, hole or cut the container. Otherwise there could be an explosion, and the remnants inside could burn up.

Product applications

▲ Aerospace

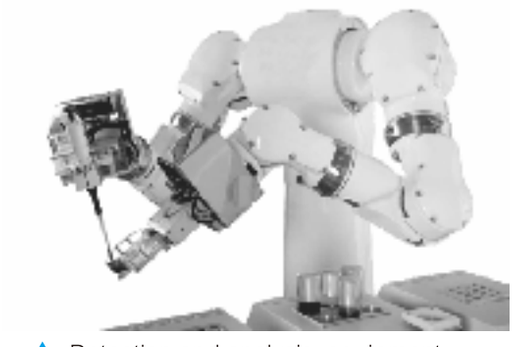
▲ Communication equipment



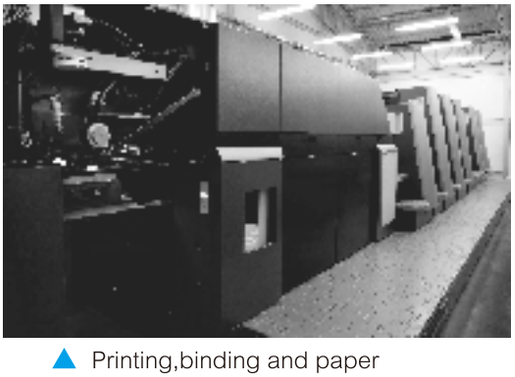
▲ Robot

▲ Semiconductor equipment

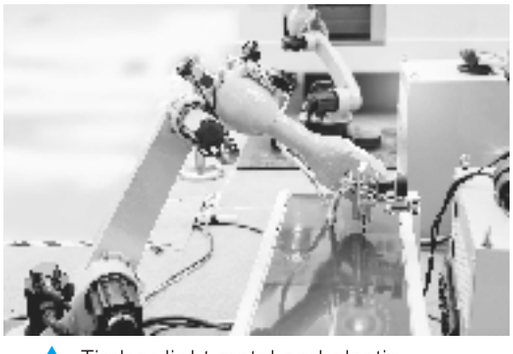
▲ Medical equipment



▲ Detection and analysis equipment



▲ Printing,binding and paper processing machine



▲ Timber, light metal and plastic processing machine

Han's Motion

Professional Manufacturer of
Precision Harmonic Drive

VER.2021.04

SHENZHEN HAN'S MOTION TECHNOLOGY CO.,LTD

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