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CATALOGUE OF HARMONIC DRIVE

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www.gigager.net




GIGA Precision Technology Co., Limited High Precision Harmonic Drive Catalog No.EN-25-04 www.gigager.net

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CATALOGUE OF HARMONIC DRIVE

CONTENTS

2023 New Products

Harmonic Drive

Breakthrough Technology Comply with the international standard of leading-performance

High Precision / Large Ratio/ High load-carrying capacity/ Small&light weight /Transmission balance/ Long Life-span

GHS Series- Integated

GHS Series- Self-aligning

GHS Series- Hollow

GHS Series- Shaft Input

■ High Precision:
Adopting advanced design technology, ANSYS software simulation technology, makes the design error less than 1 micron. Flexible bearings, cross bearings, flex spline, circular spline, were produced by the common precision advanced equipment in the industry.

■ Large Ratio:
The design complies with the relevant international standards. The transmission ratio of the single-stage harmonic gear transmission can reach i=50 to 160. The simple structure of the three basic components on the coaxial line can achieve a high reduction ratio.

■ High Workload:
The flex spline and circular spline using circular-arc profile gear, the engagement between teeth are face contact. At the same time, the more teeth engaged, the less load per unit area, and higher load capacity than other transmission forms. The internal cross-bearing is used to increase the load-bearing capacity.

GIGA Harmonic Drive NEW PRODUCT 2023

GHC Series- Integrated

GHC Series- Self-aligning

GHD Series- Dwarf Cup

GHT Series- Dwarf Cup

■ Small and Lightweight :
Integrated design, high-performance materials. The volume and weight significantly reduced when compared with the common gear devices.

■ Smooth Transmission: :
Adopt advanced 3D simulation design technology and high precision machining technology, allows for increased accuracy of key components, low deformation, smooth transmissions. The use of high-performance lubrication to reduce shock and noise.

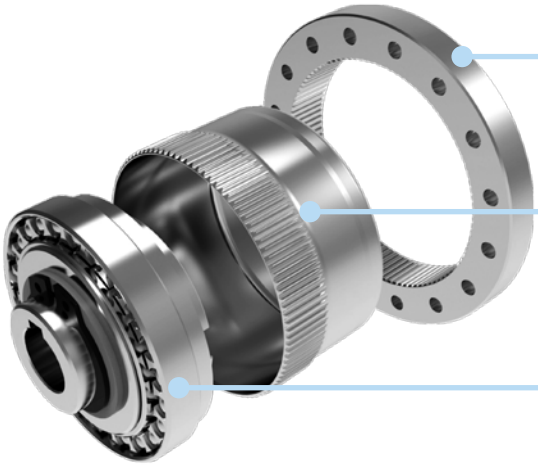
■ Long Lifespan :
High high-strength, high-performance materials, advanced surface heat treatment technology and surface coating technology were adopted which increased more than 3 times the surface wear resistance of key components and increased the service life of the products.

Harmonic Drive Transmission Principle

Gear Transmission Principle

Harmonic gear transmission was invented by the American inventor C.W.Musser in 1955.
It is a new type of transmission that utilizes the elastic deformation of the flexible working member into the motion or power transmission. It breaks through the mechanical transmission using rigid members.
The mechanism's model uses a flexible member to achieve mechanical transmission, resulting in a range of special features that are difficult to achieve with other transmissions.
The deformation process of the intermediate flexible member is basically a symmetrical harmonic.

Component of Harmonic Drive Reducer



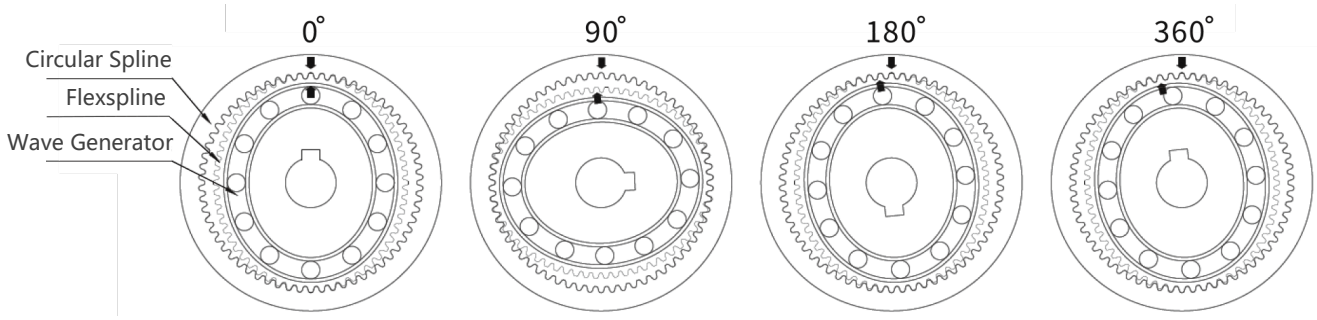
Circular Spline:
It has two more teeth than the flexspline and is generally mounted onto a housing.

Flexspline:
It is a non-rigid, thin cylindrical cup with external teeth on the open end of the cup. It fits over the Wave Generator and takes on its elliptical shape. The flexspline is generally used as the output of th gear.

Wave Generator:
The Wave Generator is a thin, raced-ball bearing fitted onto an elliptical hub. This serves as a high-efficiency torque converter and is generally mounted onto the input or motor shaft.

Harmonic Gear Transmission Principle

The principle of GIGAGER harmonic gear reduction is to use the relative motion of the flexspline, circular spline and the wave generator, mainly the controllable elastic deformation of the flexspline to realize the motion and power transmission.
The elliptical cam in the wave generator rotates in the flexspline to deform the flexspline. When the flexspline teeth and the circular spline teeth enter and mesh with each other which are at the ends of the elliptical cam long axis of the wave generator, the flexspline teeth at short axis ends are disengaged from the circular spline teeth.
For the teeth between the long axis and the short axis of the wave generator, the semi-engaged state which gradually enters the engagement along different sections of the two stages of the flexspline and the circular spline is called a biting. It is in a state of gradual withdrawal from engagement, which is called disengaging. When the wave generator rotates continuously, the flexspline is constantly deformed, so that the teeth of two wheels are constantly changing their original working states during the four movements of meshing, biting, engaging and disengaging, generating a staggering tooth movement and realizing the motion transmission from the wave generator to the flexspline.



The flexible wave generator is bent into an elliptical shape, so in the long axis part of the circular spline and the flexspline mesh, in the short axis part, it's completely disconnected.

Fixed circular spline, so that the wave generator, according to the clockwise rotation, causes the flexspline to deform, and the rigid wheel mesh position moves.

For every 180-degree clockwise movement of the wave generator, the flexspline rotates counter-clockwise by one tooth about the circular spline.

After the wave generator rotates for one week (360 degrees), the flexspline moves 2 teeth counter-clockwise because it has 2 fewer teeth than the circular spline.

G+ Naming Rules of Harmonic Driver

GHS	25	-	100	-	I	-	SP

Series No ①	Spec②	Ratio③						Type④	Special Specifications
		30	50	80	100	120	160		
GHS	08	•	•					I : Integrated A : Self-aligning K : Hollow S : Shaft	Blank: Standard SP: Special Specification in shape and performance
	11		•		•				
	14	•	•	•	•				
	17	•	•	•	•				
	20	•	•	•	•	•			
	25		•	•	•	•			
	32		•	•	•	•			
GHC	08	•	•					I/GI: Integrate Different in mount holes A/GA: Self-aligning Different in mount holes	Blank: Standard S: Special Specification in shape and performance
	11		•		•				
	14	•	•	•	•				
	17	•	•	•	•				
	20	•	•	•	•	•			
	25		•	•	•	•			
	32		•	•	•	•			
	40		•	•	•	•	•		
GHD	14		•	•	•			I: Integrated	Blank: Standard SP: Special Specification in shape and performance
	17		•	•	•				
	20		•	•	•				
	25		•	•	•				
	32		•	•	•				
GHT	14		•	•	•			I: Integrated	Blank: Standard SP: Special Specification in shape and performance
	17		•	•	•				
	20		•	•	•				
	25		•	•	•				
	32		•	•	•				

Note:

①Series No. G is the first letter of our company name in English version (G+), H represent as harmonic driver. The type code of the products decided by the flexspline (the shape, length , whether high torque or not). The shape of flexspline includes cup type (C), hollow type (S), dwarf flexspline(D. T).

Spec Code	08	11	14	17	20	25	32	40
Flexspline pitch diameter	20.3	27.9	35.6	43.2	50.8	63.5	81.3	101.6

③Ratio:

30、50、80、100、120、160.

④Type:

I type: Standard type. The input shaft is matched with the inner hole of the elliptical cam and connected by a flat key.

A type: Cross slider coupling type. Input shaft and cam use the cross slider coupling to connect.

K type: Hollow type. The parts in input end and hollow elliptical cam use the screw to connect.

S type: Shaft input type. The high-speed end of the reducer has its own input shaft.

⑤Special specifications: Blank=Standard, SP= Special Specification in shape and performance.

GHS Series

I Series-Integrated Type

The flexspline is a hollow flanging structure, compact structure and the shaft input is connected to the inner hole of the wave generator by cross slider coupling.

Features:

- Flat shape· Standard structure
- Compacted and simple design
- Backlash-less, coaxial inputs and outputs
- Excellent positioning and rotational accuracy

A Series-Self-aligning Type

The flexspline is a hollow flanging structure, compact structure and the shaft input is connected to the inner hole of the wave generator by cross slider coupling.

Features:

- Flat shape· Standard structure
- Compacted and simple design
- Backlash-less
- Wave generator self-aligning

K Series-Hollow Type

The flexspline is a hollow flanging structure, compact structure, large aperture hollow structure, easy to wiring and piping.

Features:

- Simple type, easy to install and use
- Backlash-less, coaxial inputs and outputs
- Excellent positioning and rotational accuracy

S series-Input Shaft Type

The flexspline is a hollow flanging structure, compact structure, input shaft connection, available for variety of input patterns.

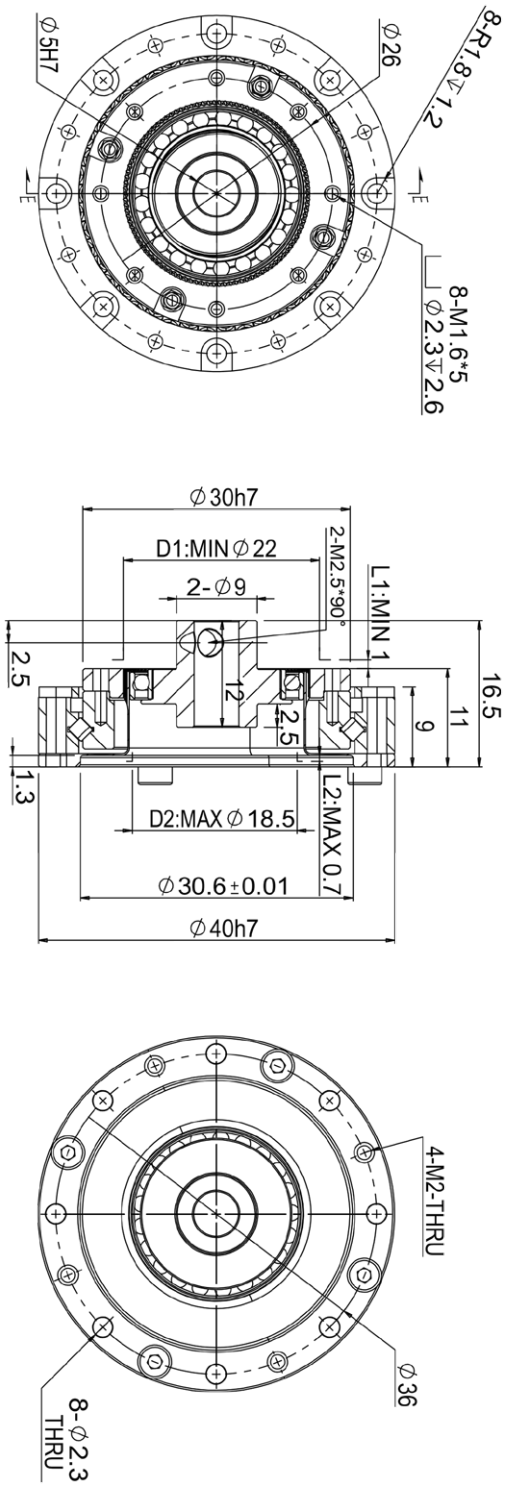
Features:

- Available for variety of input patterns
- Compacted and simple design
- Backlash-less, coaxial inputs and outputs
- Excellent positioning and rotational accuracy

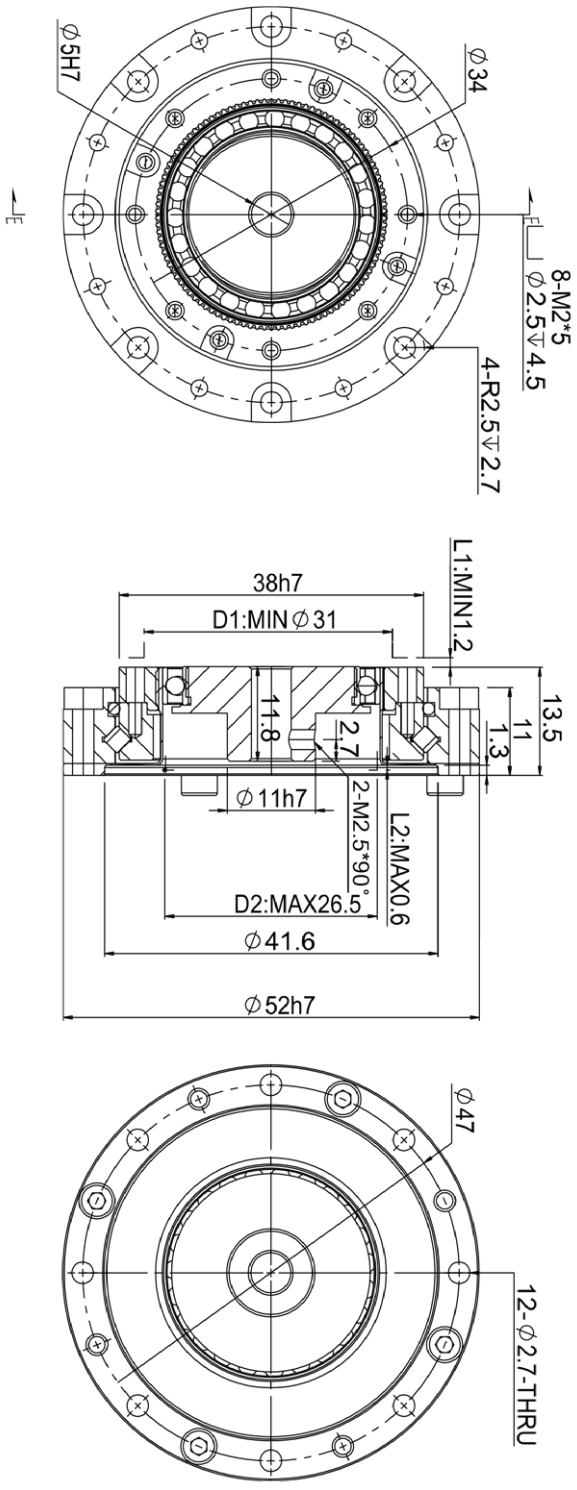
GHS Series Parameter

Items		Rated Torque (Input 2000 rpm)	Start/Stop Allowable Peak Torque	Allowable Max Value of Average Load Torque	Instantaneous Maximum Allowable Torque	Allowable Maximum Input Speed	Allowable Average Input Speed	Starting Torque	Backlash	Weight	Designed Lifespan
Model	Ratio	N.m	N.m	N.m	N.m	r/min	r/min	N.cm	Arc sec	KG	H
08	30	1.08	2.4	1.5	5.5	6000	4500	≤ 2	≤ 15	0.15	12000
	50	1.6	2.9	2	6.1	6000	4500	≤ 2	≤ 15		12000
11	50	4	8.5	7	18	6000	4500	≤ 4	≤ 15	0.3	12000
	100	5.8	12	8.2	27	6000	4500	≤ 4	≤ 15		12000
14	30	3.8	8.5	6.5	16	8000	3500	≤ 10	≤ 20	0.75	11000
	50	5.3	17.5	6.9	26	8000	3500	≤ 9	≤ 15		12000
	80	7.6	22.5	10.5	35	8000	3500	≤ 7	≤ 10		15000
	100	7.8	28	11	47	8000	3800	≤ 7	≤ 10		15000
17	30	8.8	16	12	24	7000	3500	≤ 28	≤ 15	1.1	11000
	50	16	34	26	54	7000	3500	≤ 26	≤ 15		12000
	80	22	43	28	59	7000	3500	≤ 24	≤ 10		15000
	100	24	54	39	98	7000	3800	≤ 24	≤ 10		15000
20	30	15	27	20	50	6000	3000	≤ 42	≤ 15	1.4	11000
	50	25	56	34	98	6000	3000	≤ 38	≤ 15		12000
	80	34	74	47	127	6000	3000	≤ 35	≤ 10		15000
	100	40	82	49	147	6000	3500	≤ 34	≤ 10		15000
	120	40	87	49	147	6000	3500	≤ 34	≤ 10		15000
25	50	39	98	55	186	5500	3000	≤ 60	≤ 15	2.2	12000
	80	63	137	87	255	5500	3000	≤ 51	≤ 10		15000
	100	67	157	108	304	5500	3000	≤ 51	≤ 10		15000
	120	67	167	108	309	5500	3500	≤ 51	≤ 10		15000
32	50	73	205	103	363	4500	3000	≤ 90	≤ 15	4.5	12000
	80	112	289	159	540	4500	3000	≤ 80	≤ 10		15000
	100	130	325	208	635	4500	3000	≤ 78	≤ 10		15000
	120	130	335	208	652	4500	3500	≤ 75	≤ 10		15000

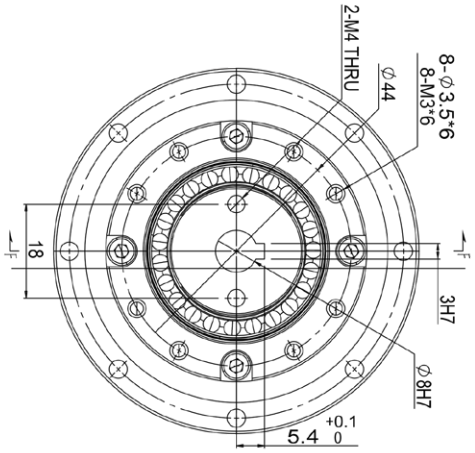
■ GHS08-I

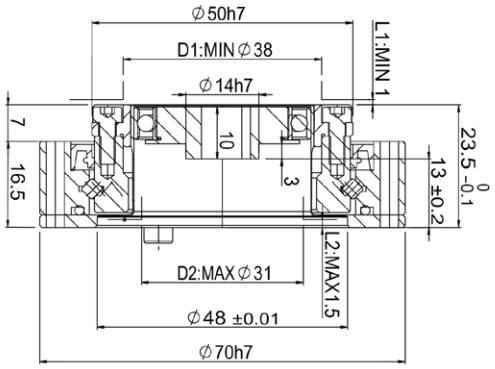

∅5H7
∅26
8-R1.8↧1.2
8-M1.6*5
∅2.3↧2.6
∅30h7
D1:MIN∅22
2-M2.5*90°
2-∅9
L1:MIN 1
2.5
12
2.5
9
11
16.5
1.3
D2:MAX∅18.5
L2:MAX 0.7
∅30.6±0.01
∅40h7
4-M2-THRU
∅36
8-∅2.3
THRU

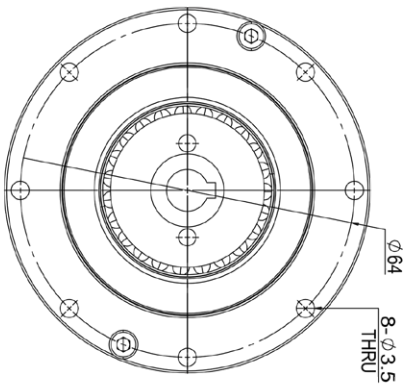
■ GHS11-I


∅5H7
∅34
8-M2*5
∅2.5↧4.5
4-R2.5↧2.7
38h7
D1:MIN∅31
L1:MIN1.2
13.5
11
1.3
11.8
2.7
∅11h7
2-M2.5*90°
L2:MAX0.6
D2:MAX26.5
∅41.6
∅52h7
∅47
12-∅2.7-THRU

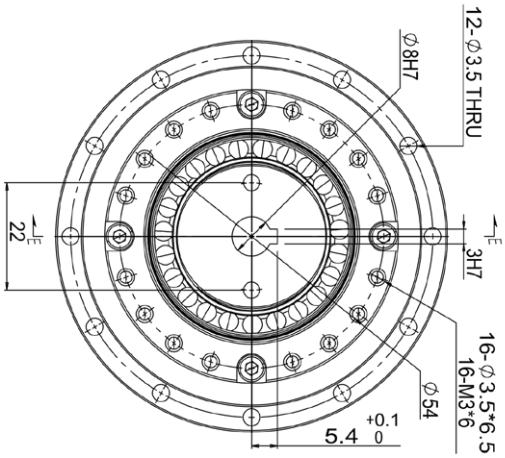
■ GHS14-I

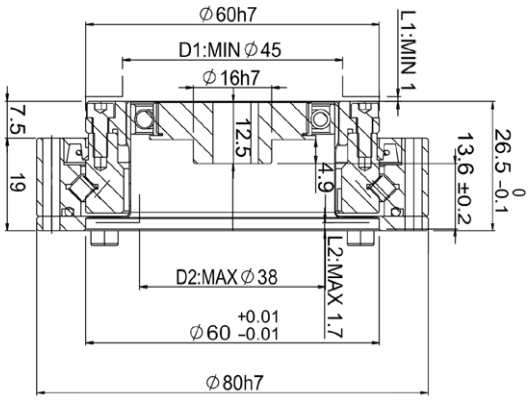

2-M4 THRU
Ø44
8-Ø3.5*6
8-M3*6
18
3H7
Ø8H7
5.4 +0.1 0

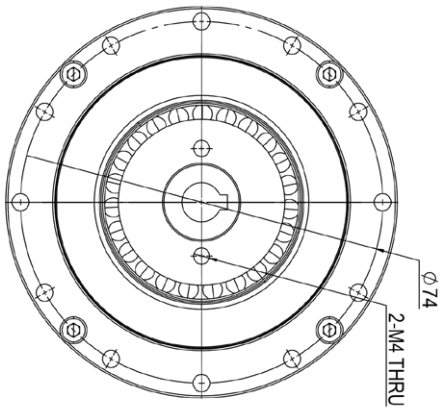

Ø50h7
D1:MIN Ø38
Ø14h7
L1:MIN 1
7
16.5
10
3
23.5 0 -0.1
13 ±0.2
L2:MAX1.5
D2:MAX Ø31
Ø48 ±0.01
Ø70h7


Ø64
8-Ø3.5
THRU

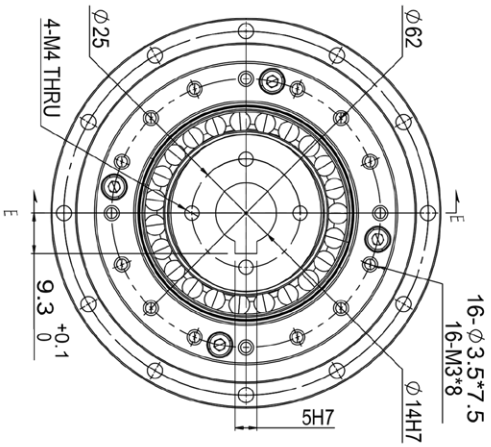
■ GHS17-I

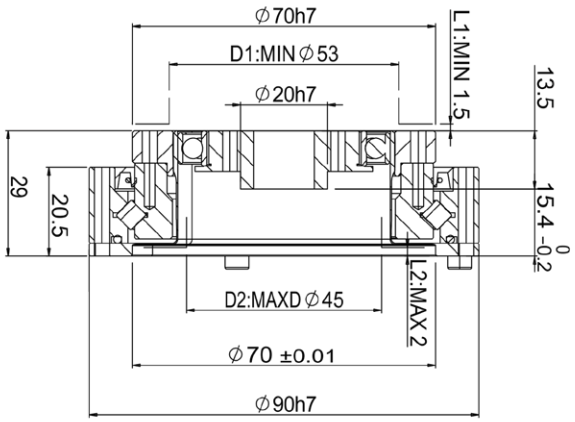

12-Φ3.5 THRU
Φ8H7
22
3H7
16-Φ3.5*6.5
16-M3*6
Φ54
5.4 +0.1 0

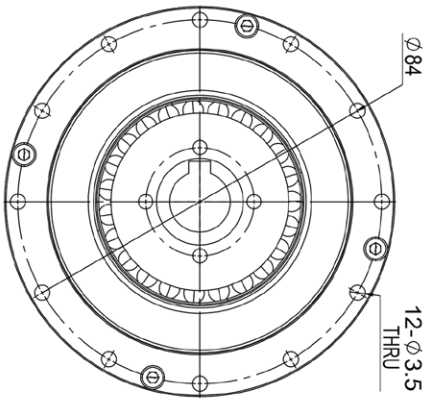

Φ60h7
D1:MIN Φ45
Φ16h7
L1:MIN 1
7.5
19
12.5
4.9
13.6 ±0.2
26.5 0 -0.1
L2:MAX 1.7
D2:MAX Φ38
Φ60 +0.01 -0.01
Φ80h7


Φ74
2-M4 THRU

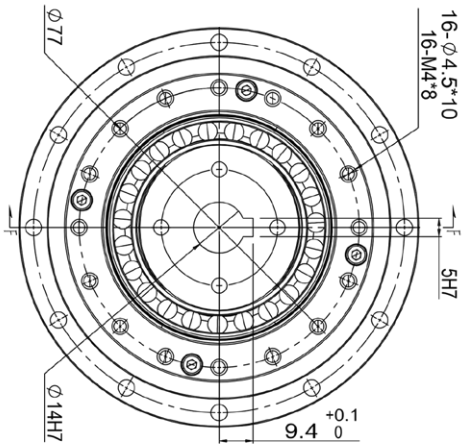
■ GHS20-I

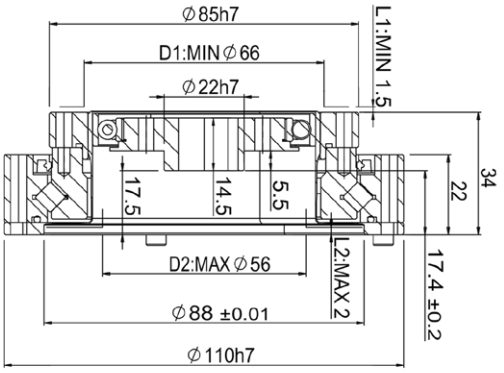

4-M4 THRU
Φ25
Φ62
E
E
9.3 +0.1 0
16-Φ3.5*7.5
16-M3*8
Φ14H7
5H7

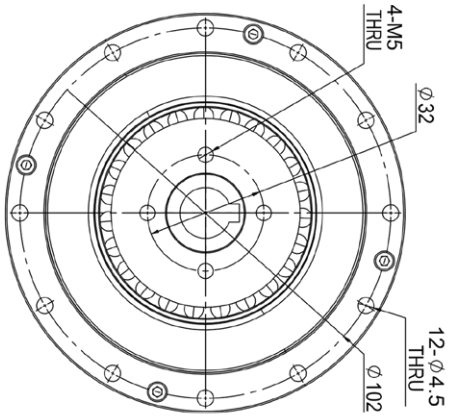

Φ70h7
D1:MIN Φ53
Φ20h7
L1:MIN 1.5
13.5
29
20.5
15.4 0 -0.2
L2:MAX 2
D2:MAXD Φ45
Φ70 ±0.01
Φ90h7


Φ84
12-Φ3.5
THRU

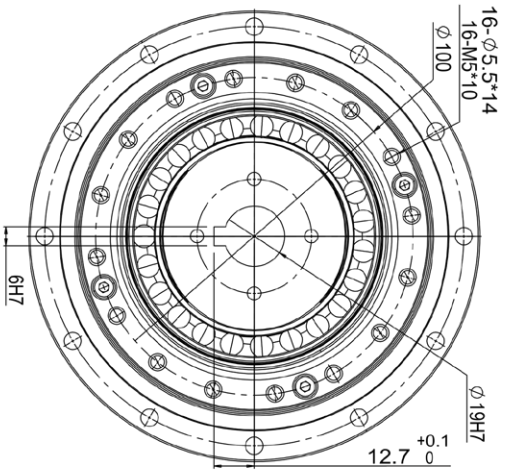
■ GHS25-I

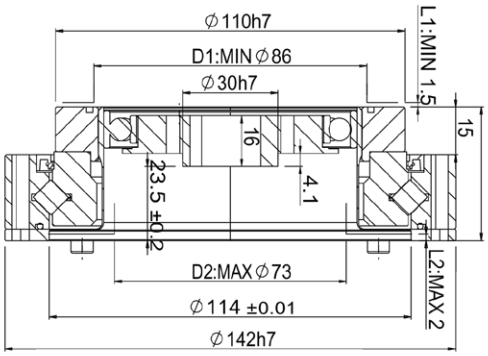

Ø77
16-Ø4.5*10
16-M4*8
5H7
Ø14H7
9.4 +0.1 0

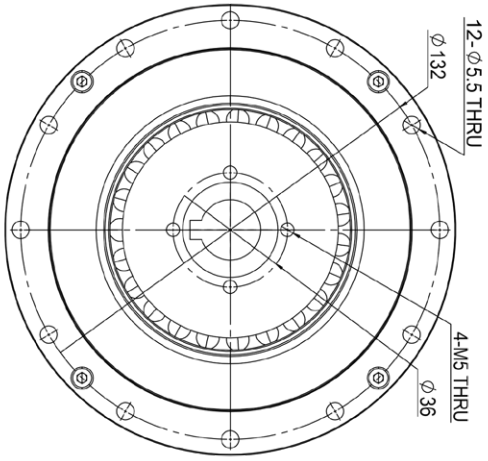

Ø85h7
D1:MIN Ø66
Ø22h7
L1:MIN 1.5
34
22
17.5
14.5
5.5
D2:MAX Ø56
L2:MAX 2
17.4 ±0.2
Ø88 ±0.01
Ø110h7


4-M5
THRU
Ø32
12-Ø4.5
THRU
Ø102

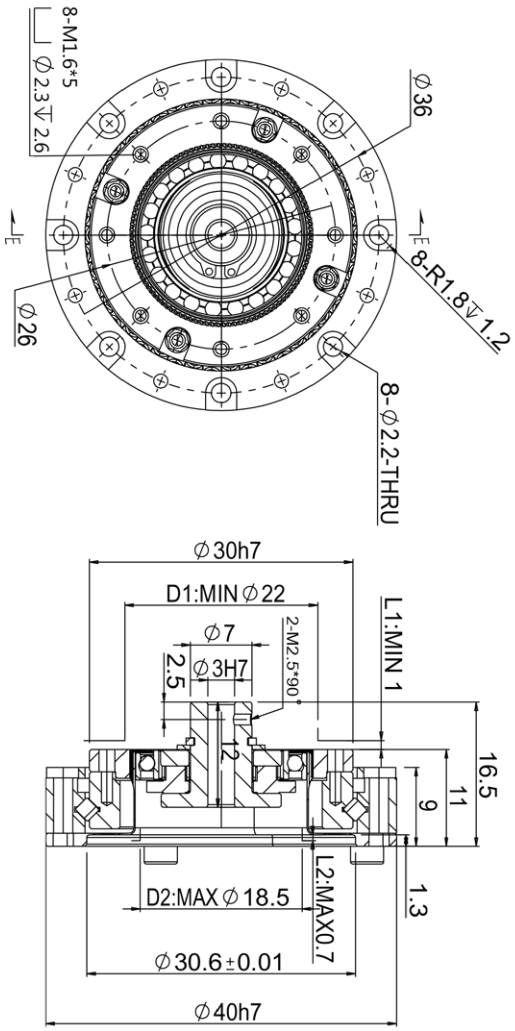
■ GHS32-I


16-∅5.5*14
16-M5*10
∅100
6H7
∅19H7
12.7 +0.1 0

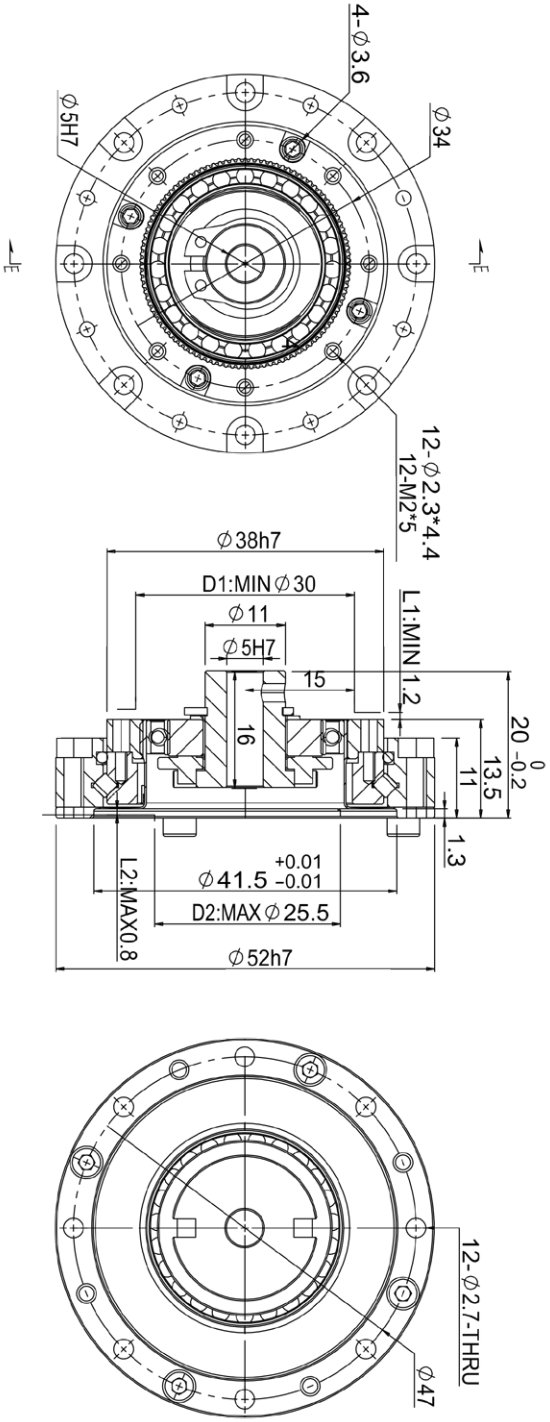

∅110h7
D1:MIN∅86
∅30h7
L1:MIN 1.5
15
16
4.1
23.5 ±0.2
L2:MAX 2
D2:MAX∅73
∅114 ±0.01
∅142h7


12-∅5.5 THRU
∅132
4-M5 THRU
∅36

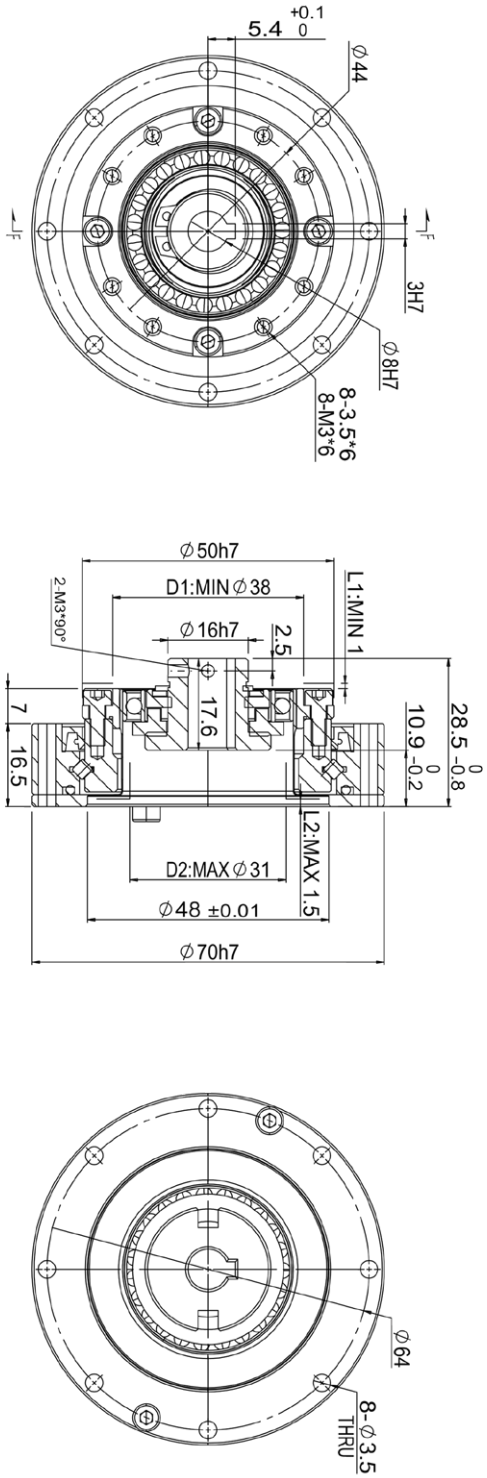
■ GHS08-A


8-M1.6*5
⌴ ⌀2.3▽2.6
⌀36
8-R1.8▽1.2
⌀26
8-⌀2.2-THRU
⌀30h7
D1:MIN⌀22
⌀7
2-M2.5*90°
2.5
⌀3H7
L1:MIN 1
12
16.5
11
9
L2:MAX0.7
1.3
D2:MAX⌀18.5
⌀30.6±0.01
⌀40h7
4-M2-THRU

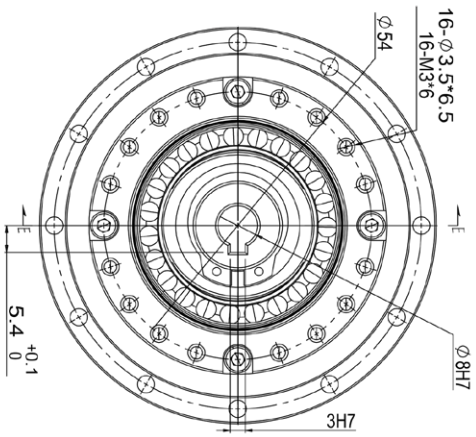
■ GHS11-A

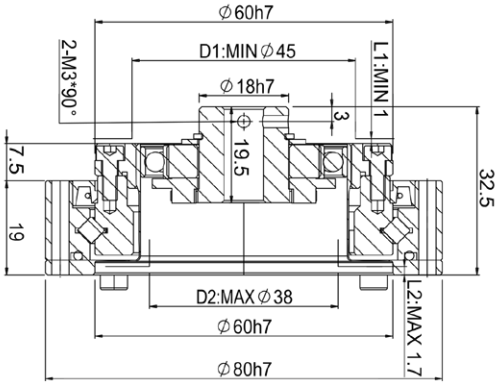

4-Φ3.6
Φ5H7
Φ34
E
E
12-Φ2.3*4.4
12-M2*5
Φ38h7
D1:MIN Φ30
Φ11
Φ5H7
15
L1:MIN 1.2
16
20 0 -0.2
13.5
11
1.3
L2:MAX0.8
Φ41.5 +0.01 -0.01
D2:MAX Φ25.5
Φ52h7
12-Φ2.7-THRU
Φ47

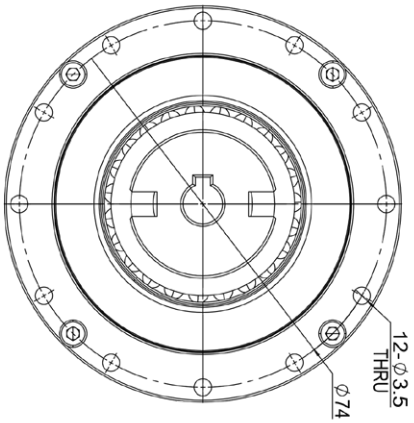
■ GHS14-A


5.4 +0.1 0
Ø44
3H7
Ø8H7
8-3.5*6
8-M3*6
Ø50h7
D1:MIN Ø38
Ø16h7
2.5
L1:MIN 1
2-M3*90°
17.6
7
16.5
10.9 0 -0.2
28.5 0 -0.8
L2:MAX 1.5
D2:MAX Ø31
Ø48 ±0.01
Ø70h7
Ø64
8-Ø3.5
THRU

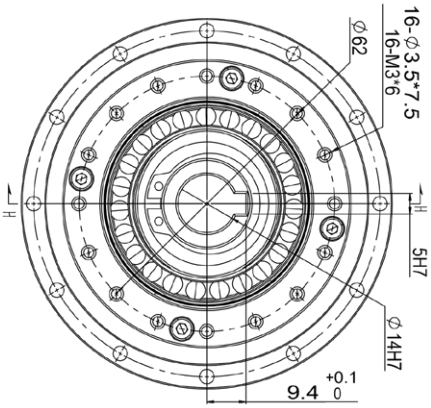
■ GHS17-A

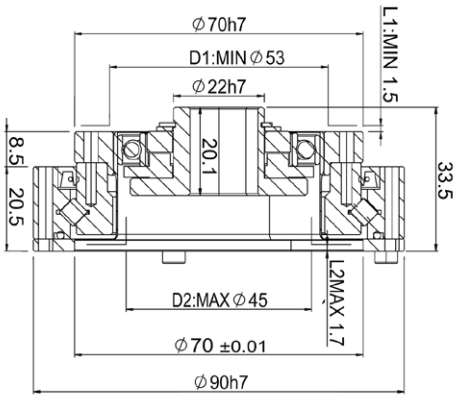

Ø54
16-Ø3.5*6.5
16-M3*6
E
E
5.4 +0.1 0
Ø8H7
3H7

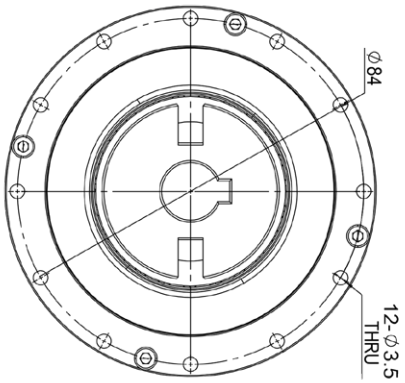

Ø60h7
D1:MIN Ø45
2-M3*90°
Ø18h7
L1:MIN 1
3
Ø19.5
7.5
19
32.5
D2:MAX Ø38
L2:MAX 1.7
Ø60h7
Ø80h7


12-Ø3.5
THRU
Ø74

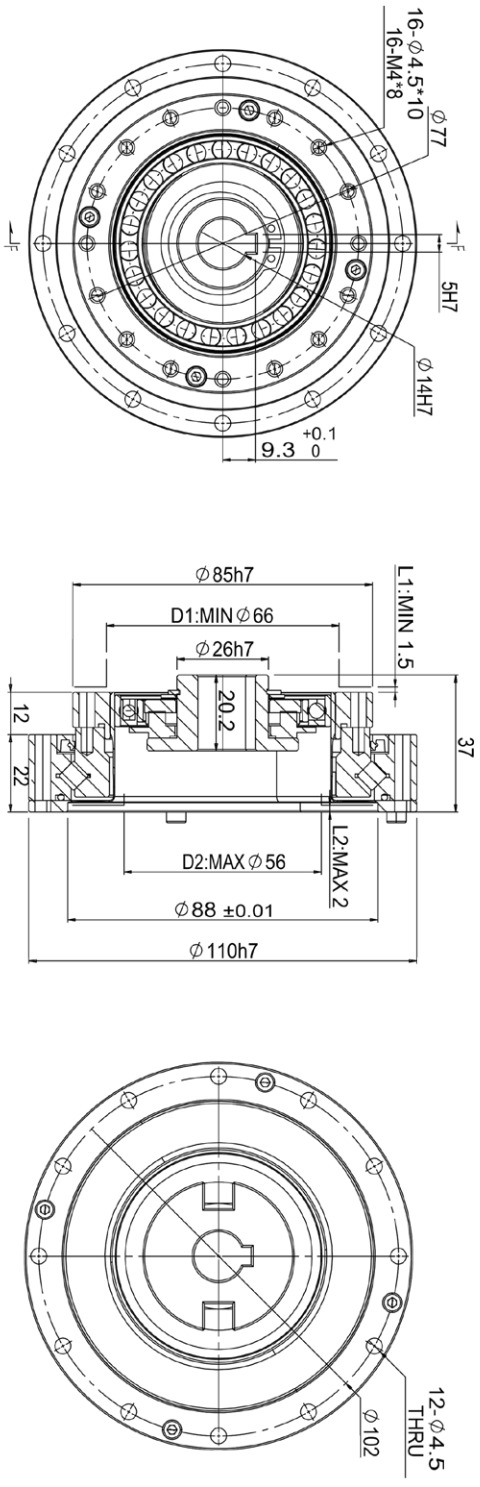
■ GHS20-A


16-∅3.5*7.5
16-M3*6
∅62
H
H
5H7
∅14H7
9.4 +0.1 0

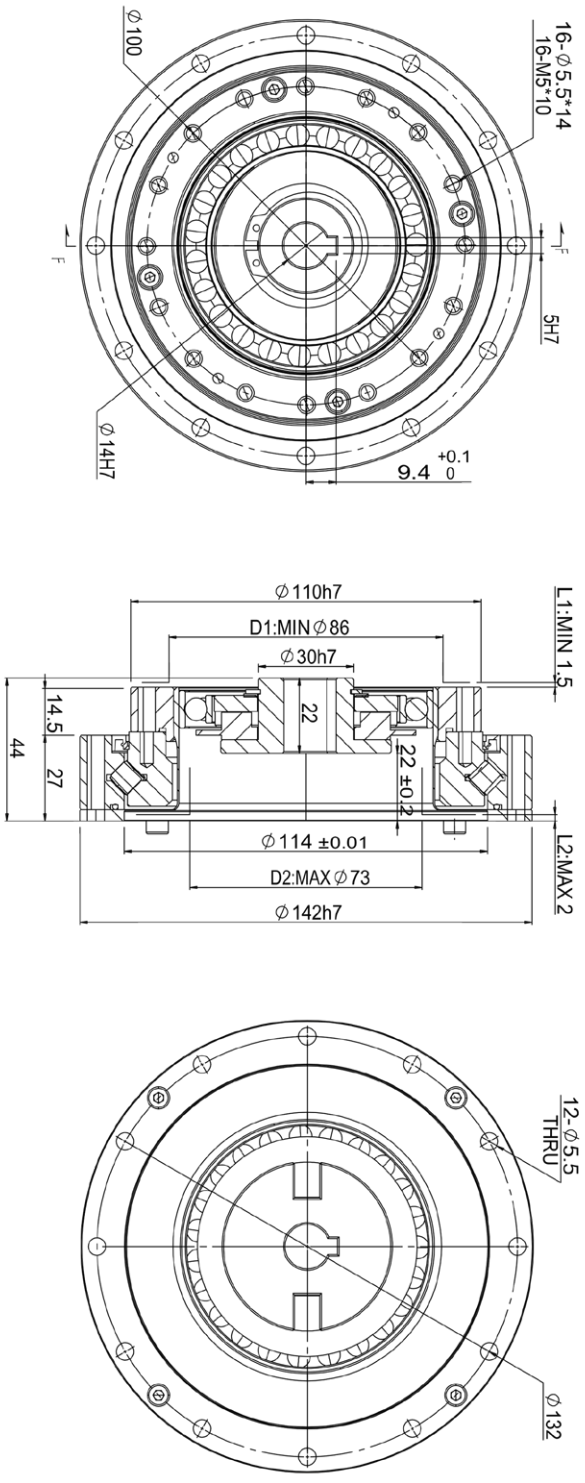

∅70h7
D1:MIN∅53
∅22h7
L1:MIN 1.5
20.1
8.5
20.5
33.5
L2MAX 1.7
D2:MAX∅45
∅70 ±0.01
∅90h7


∅84
12-∅3.5
THRU

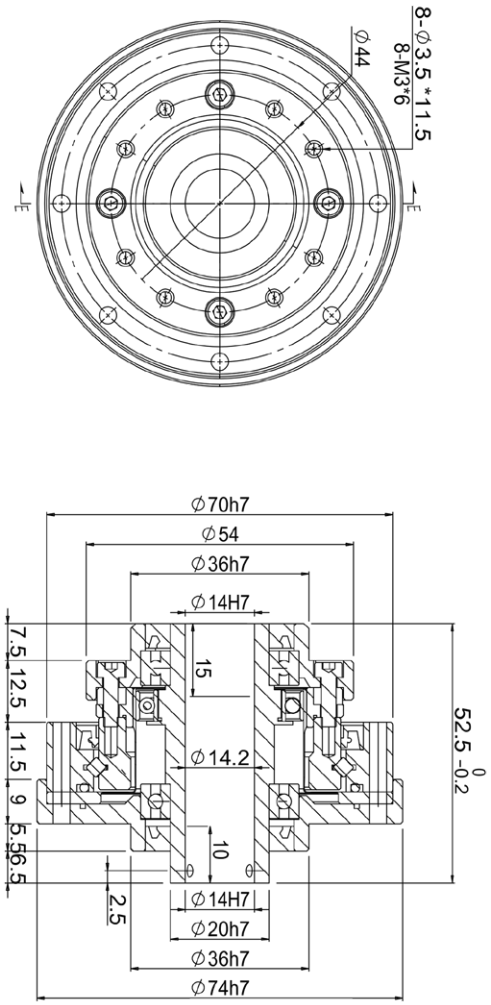
■ GHS25-A


16-⌀4.5*10
16-M4*8
⌀77
5H7
⌀14H7
9.3 +0.1 0
⌀85h7
D1:MIN⌀66
⌀26h7
L1:MIN 1.5
20.2
12
22
37
D2:MAX⌀56
L2:MAX 2
⌀88 ±0.01
⌀110h7
12-⌀4.5
THRU
⌀102

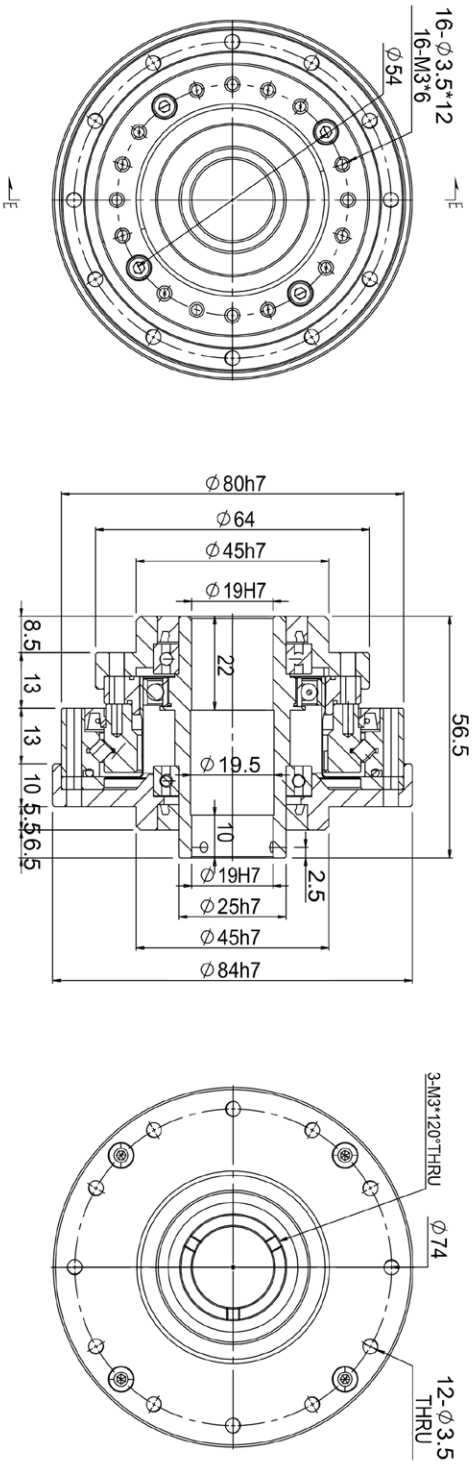
■ GHS32-A


∅100
16-∅5.5*14
16-M5*10
5H7
∅14H7
9.4 +0.1 0
∅110h7
D1:MIN∅86
∅30h7
L1:MIN 1.5
14.5
44
27
22
22 ±0.2
∅114 ±0.01
D2:MAX∅73
∅142h7
L2:MAX 2
12-∅5.5
THRU
∅132

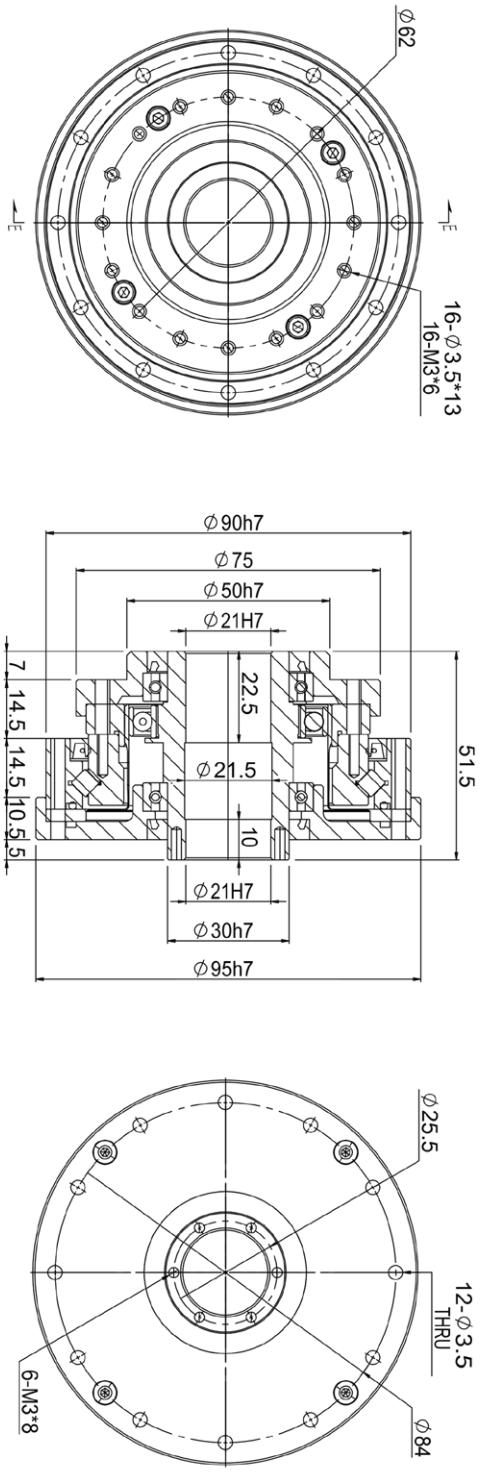
■ GHS14-K


8-∅3.5 *11.5
8-M3*6
∅44
∅70h7
∅54
∅36h7
∅14H7
7.5
12.5
11.5
9
5.5
6.5
15
∅14.2
10
2.5
52.5 0 -0.2
∅14H7
∅20h7
∅36h7
∅74h7
3-M3*120°THRU
8-∅3.5
THRU
∅64

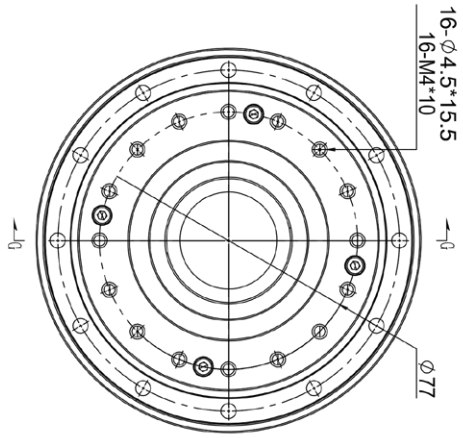
■ GHS17-K

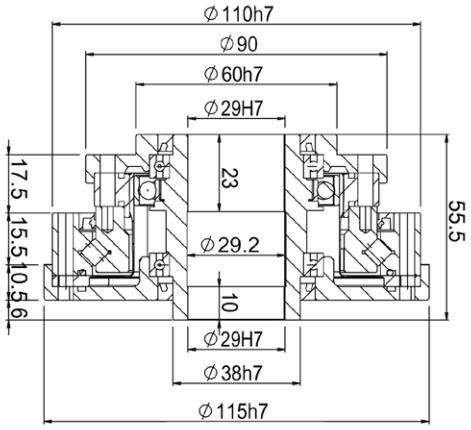

16-Φ3.5*12
16-M3*6
Φ54
E
E
Φ80h7
Φ64
Φ45h7
Φ19H7
8.5
13
13
10
5.5
6.5
22
Φ19.5
10
56.5
Φ19H7
Φ25h7
Φ45h7
Φ84h7
2.5
3-M3*120°THRU
Φ74
12-Φ3.5
THRU

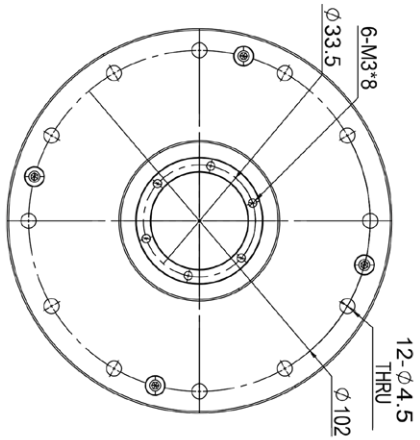
■ GHS20-K


Ø62
16-Ø3.5*13
16-M3*6
Ø90h7
Ø75
Ø50h7
Ø21H7
7
14.5
14.5
10.5
5
22.5
Ø21.5
10
51.5
Ø21H7
Ø30h7
Ø95h7
Ø25.5
12-Ø3.5
THRU
6-M3*8
Ø84

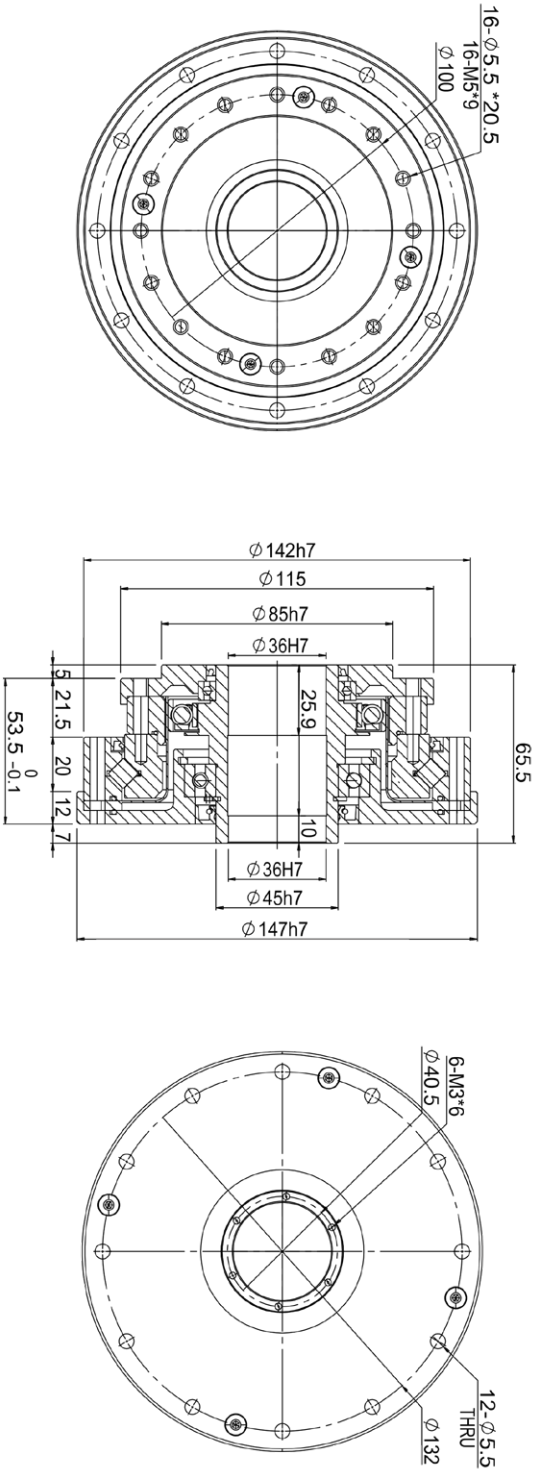
■ GHS25-K


16-Φ4.5*15.5
16-M4*10
Φ77

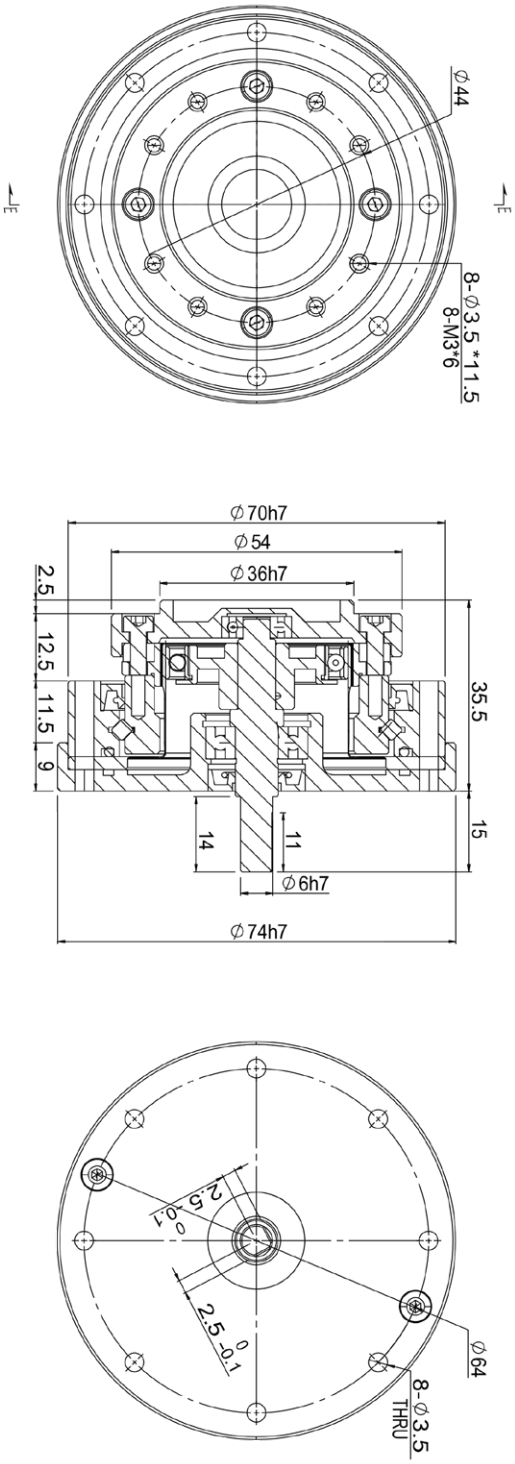

Φ110h7
Φ90
Φ60h7
Φ29H7
23
Φ29.2
10
Φ29H7
Φ38h7
Φ115h7
17.5
15.5
10.5
6
55.5


Φ33.5
6-M3*8
12-Φ4.5
THRU
Φ102

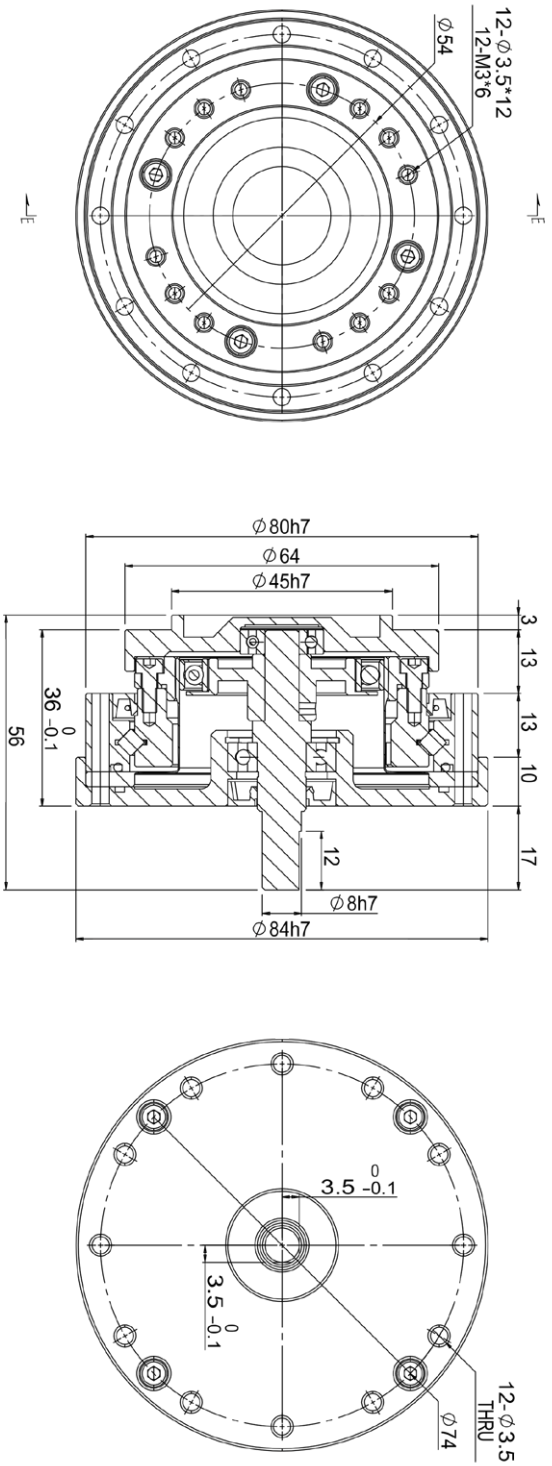
■ GHS32-K


16-⌀5.5 *20.5
16-M5*9
⌀100
⌀142h7
⌀115
⌀85h7
⌀36H7
5
21.5
20
12.7
53.5 0 -0.1
25.9
10
65.5
⌀36H7
⌀45h7
⌀147h7
6-M3*6
⌀40.5
12-⌀5.5
THRU
⌀132

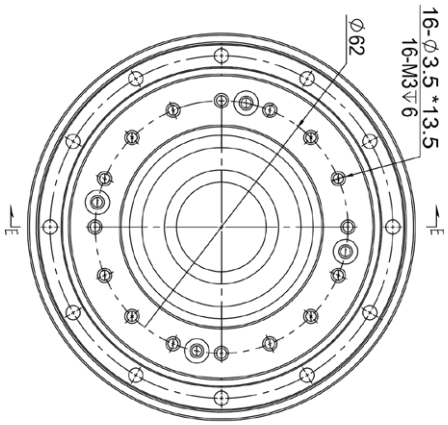
■ GHS14-S

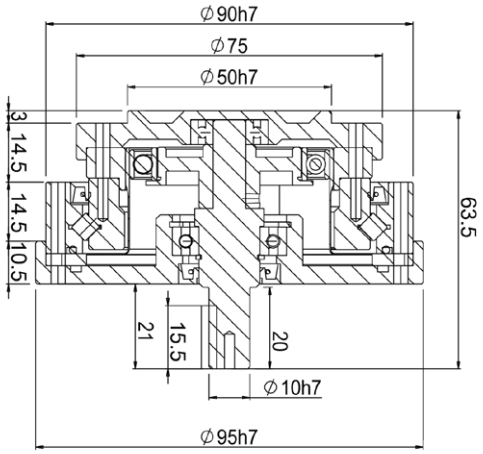

Ø44
8-Ø3.5 *11.5
8-M3*6
Ø70h7
Ø54
Ø36h7
2.5
12.5
11.5
9
35.5
15
14
11
Ø6h7
Ø74h7
2.5 +0.1 0
2.5 +0.1 0
Ø64
8-Ø3.5
THRU

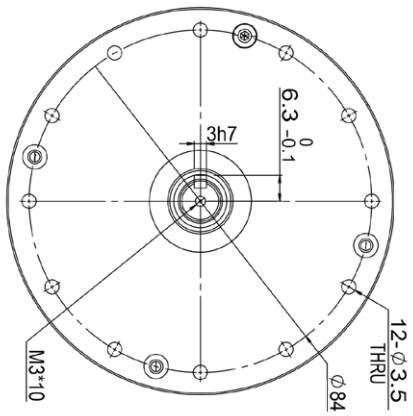
■ GHS17-S


12-Φ3.5*12
12-M3*6
Φ54
Φ80h7
Φ64
Φ45h7
3
13
13
10
17
56
36 0 -0.1
12
Φ8h7
Φ84h7
3.5 0 -0.1
3.5 0 -0.1
12-Φ3.5
THRU
Φ74

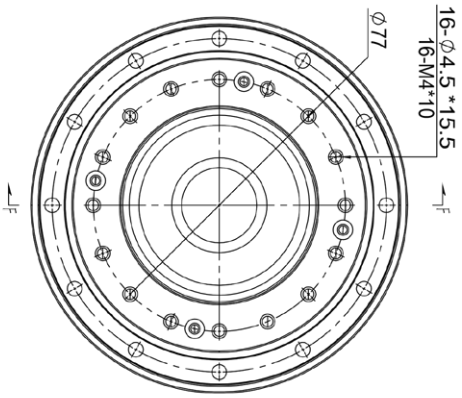
■ GHS20-S

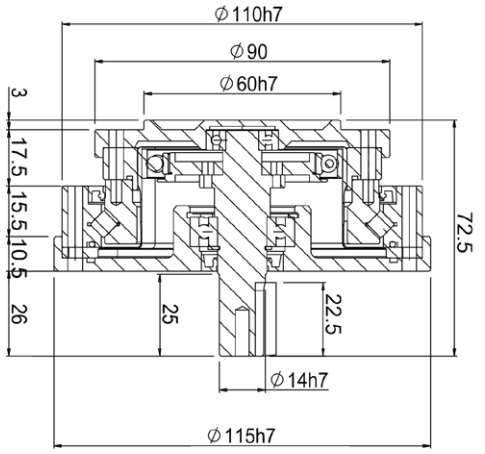

Ø62
16-Ø3.5 *13.5
16-M3↧6

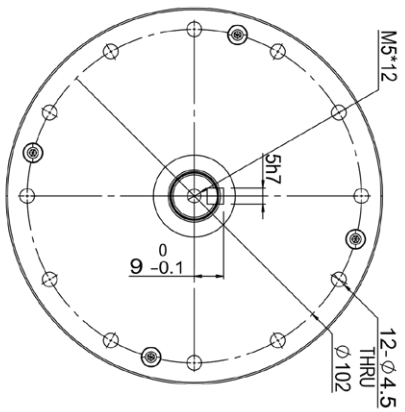

Ø90h7
Ø75
Ø50h7
3
14.5
14.5
10.5
63.5
21
15.5
20
Ø10h7
Ø95h7


3h7
6.3 0 -0.1
M3*10
12-Ø3.5 THRU
Ø84

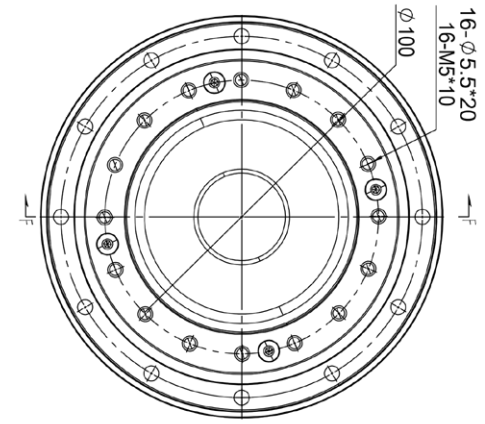
■ GHS25-S

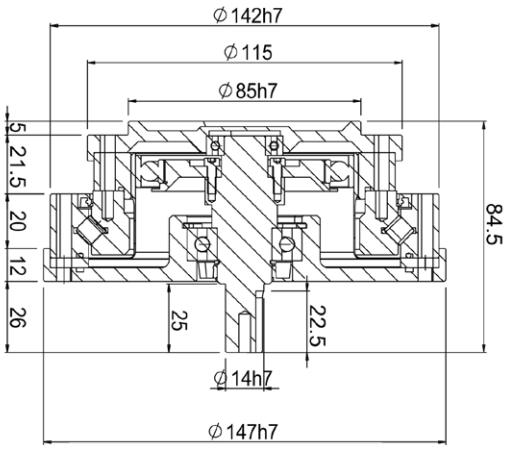

Ø77
16-Ø4.5 *15.5
16-M4*10

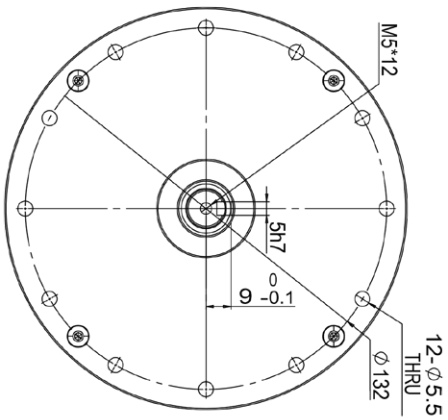

Ø110h7
Ø90
Ø60h7
3
17.5
15.5
10.5
26
25
22.5
72.5
Ø14h7
Ø115h7


M5*12
5h7
9 0 -0.1
12-Ø4.5
THRU
Ø102

■ GHS32-S


Ø100
16-Ø5.5*20
16-M5*10


Ø142h7
Ø115
Ø85h7
5
21.5
20
12
26
25
22.5
84.5
Ø14h7
Ø147h7


M5*12
5h7
9 -0.1
12-Ø5.5
THRU
Ø132

I /GI Series- Integrated Type

The flexspline is a cup-shaped standard structure, and the shaft input is connected to the inner hole of the wave generator by cross slider coupling The circular spline fixed and flexspline end output is commonly used connection method.

Features:

- Cup-shaped standard structure
- Compacted and simple design
- Backlash-less, coaxial inputs and outputs
- Excellent positioning and rotational accuracy

A /GA Series- Self-aligning Type

The flexspline is a cup-shaped standard structure, and the shaft input is connected to the inner hole of the wave generator by cross slider coupling. The circular spline fixed and flexspline end output is commonly used connection method.

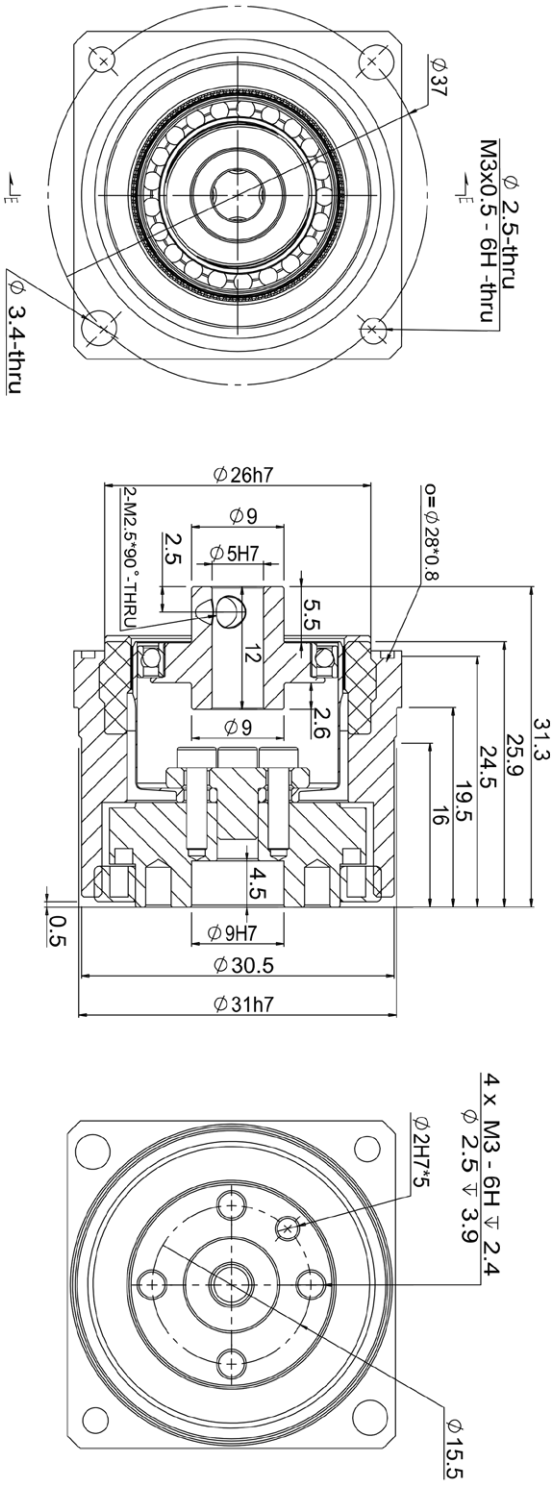
Features:

- Cup-shaped standard structure
- Compacted and simple design
- Backlash-less, coaxial inputs and outputs
- Excellent positioning and rotational accuracy

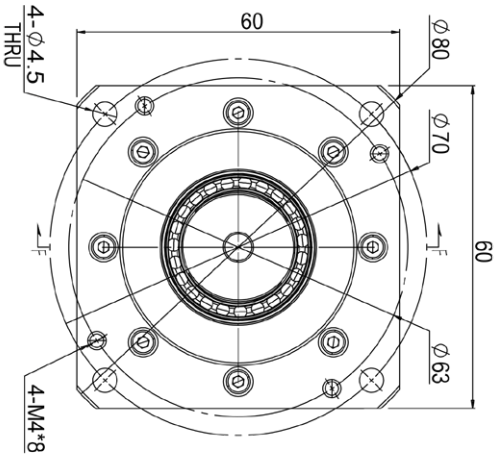
GHC Series Parameter

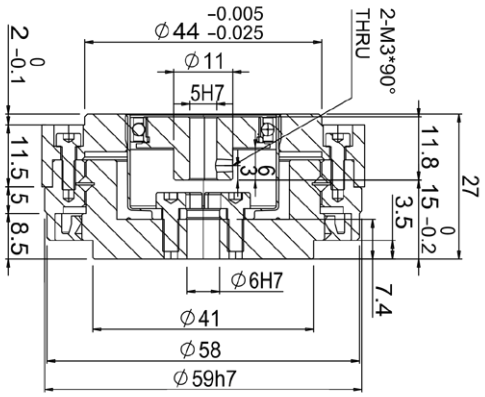
Items		Rated Torque (Input 2000 rpm)	Start/Stop Allowable Peak Torque	Allowable Max Value of Average Load Torque	Instantaneous Maximum Allowable Torque	Allowable Maximum Input Speed	Allowable Average Input Speed	Starting Torque	Backlash	Weight	Designed Lifespan
Model	Ratio	N.m	N.m	N.m	N.m	r/min	r/min	N.cm	Arc sec	KG	H
08	30	1.08	2.4	1.5	5.5	6000	4500	≤ 2	≤ 15	0.15	12000
	50	1.6	2.9	2	6.1	6000	4500	≤ 2	≤ 15		12000
11	50	4	8.5	7	18	6000	4500	≤ 4	≤ 15	0.3	12000
	100	5.8	12	8.2	27	6000	4500	≤ 4	≤ 15		12000
14	30	3.8	9	6.8	17	8000	3500	≤ 5.2	≤ 15	0.54	11000
	50	5.4	18	6.9	27	8000	3500	≤ 4.3	≤ 15		12000
	80	7.8	23	11	35	8000	3500	≤ 2.8	≤ 10		15000
	100	7.8	28	11	47	8000	3800	≤ 2.6	≤ 10		15000
17	30	8.8	16	12	24	7000	3500	≤ 6	≤ 15	0.68	11000
	50	16	34	26	54	7000	3500	≤ 4.2	≤ 15		12000
	80	22	43	28	59	7000	3500	≤ 3.6	≤ 10		15000
	100	24	54	39	98	7000	3800	≤ 3.3	≤ 10		15000
20	30	15	27	20	50	6000	3000	≤ 8.5	≤ 15	0.98	11000
	50	25	56	34	98	6000	3000	≤ 8.1	≤ 15		12000
	80	34	74	47	127	6000	3000	≤ 5.4	≤ 10		15000
	100	40	82	49	147	6000	3500	≤ 4	≤ 10		15000
	120	40	87	49	147	6000	3500	≤ 4	≤ 10		15000
25	50	39	98	55	186	5500	3000	≤ 16	≤ 15	1.5	12000
	80	63	137	87	255	5500	3000	≤ 10	≤ 10		15000
	100	67	157	108	304	5500	3000	≤ 8.8	≤ 10		15000
	120	67	167	108	309	5500	3500	≤ 8.0	≤ 10		15000
32	50	73	205	103	363	4500	3000	≤ 40	≤ 15	3.2	12000
	80	112	289	159	540	4500	3000	≤ 22	≤ 10		15000
	100	130	325	208	635	4500	3000	≤ 20	≤ 10		15000
	120	130	335	208	652	4500	3500	≤ 18	≤ 10		15000
40	50	178	523	255	896	6000	2500	≤ 35	≤ 15	5.0	11000
	80	263	675	367	1275	6000	2500	≤ 35	≤ 15		11000
	100	347	737	490	1400	6000	2500	≤ 35	≤ 15		11000
	120	387	807	586	1539	6000	2500	≤ 35	≤ 15		11000
	160	405	825	600	1580	6000	2500	≤ 35	≤ 15		11000

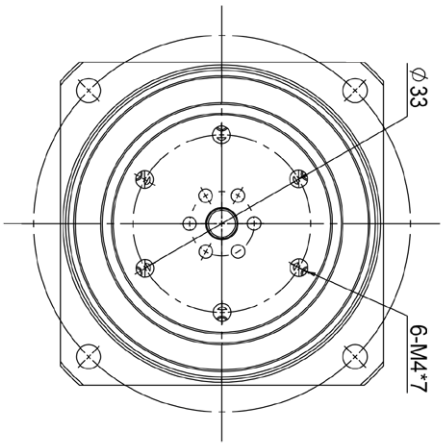
■ GHC08-I


⌀37
⌀ 2.5-thru
M3x0.5 - 6H -thru
⌀ 3.4-thru
⌀26h7
⌀9
⌀5H7
2.5
2-M2.5*90°-THRU
o=⌀28*0.8
5.5
12
2.6
⌀9
31.3
25.9
24.5
19.5
16
4.5
0.5
⌀9H7
⌀30.5
⌀31h7
4 x M3 - 6H ⩛ 2.4
⌀ 2.5 ⩛ 3.9
⌀2H7*5
⌀15.5

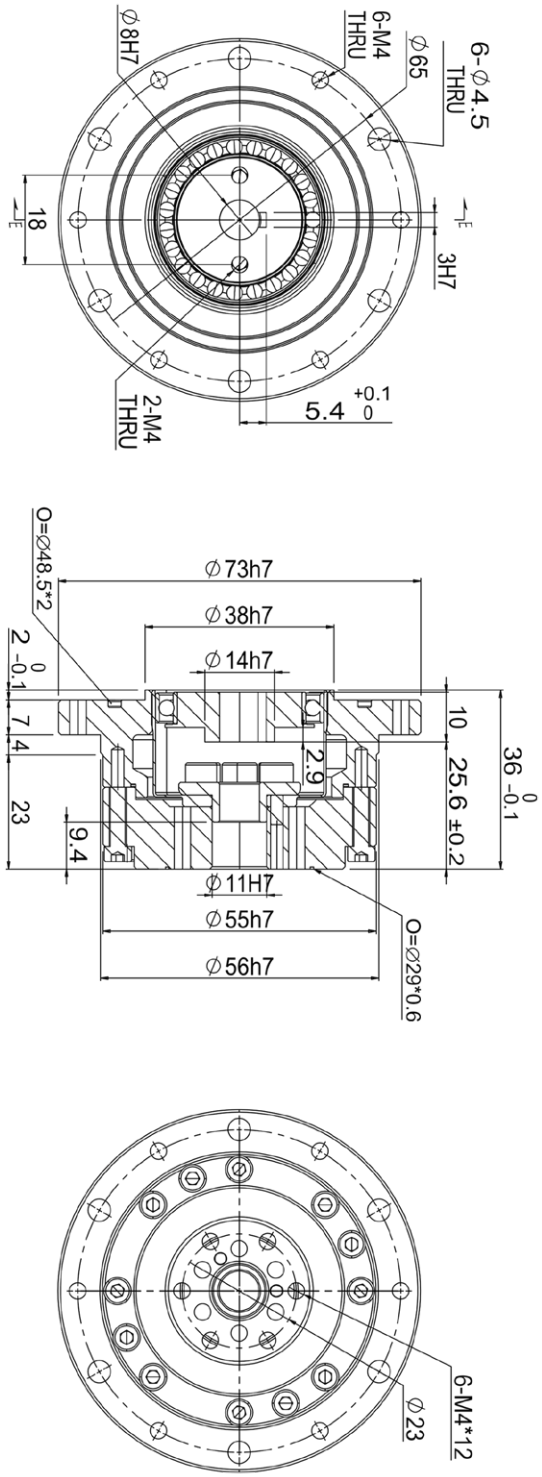
■ GHC11-I


4-Φ4.5
THRU
60
Φ80
Φ70
60
Φ63
4-M4*8

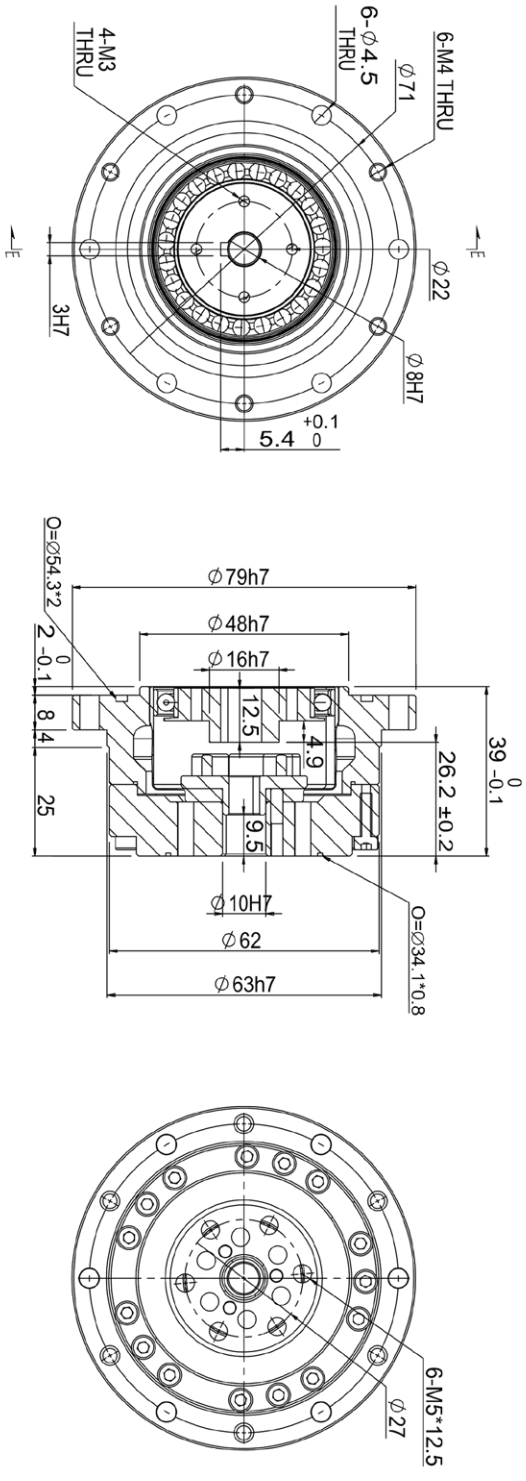

Φ44 -0.005 -0.025
Φ11
5H7
2-M3*90°
THRU
2 0 -0.1
11.5
5
8.5
6
3
5
11.8
15 0 -0.2
3.5
27
Φ6H7
7.4
Φ41
Φ58
Φ59h7


Φ33
6-M4*7

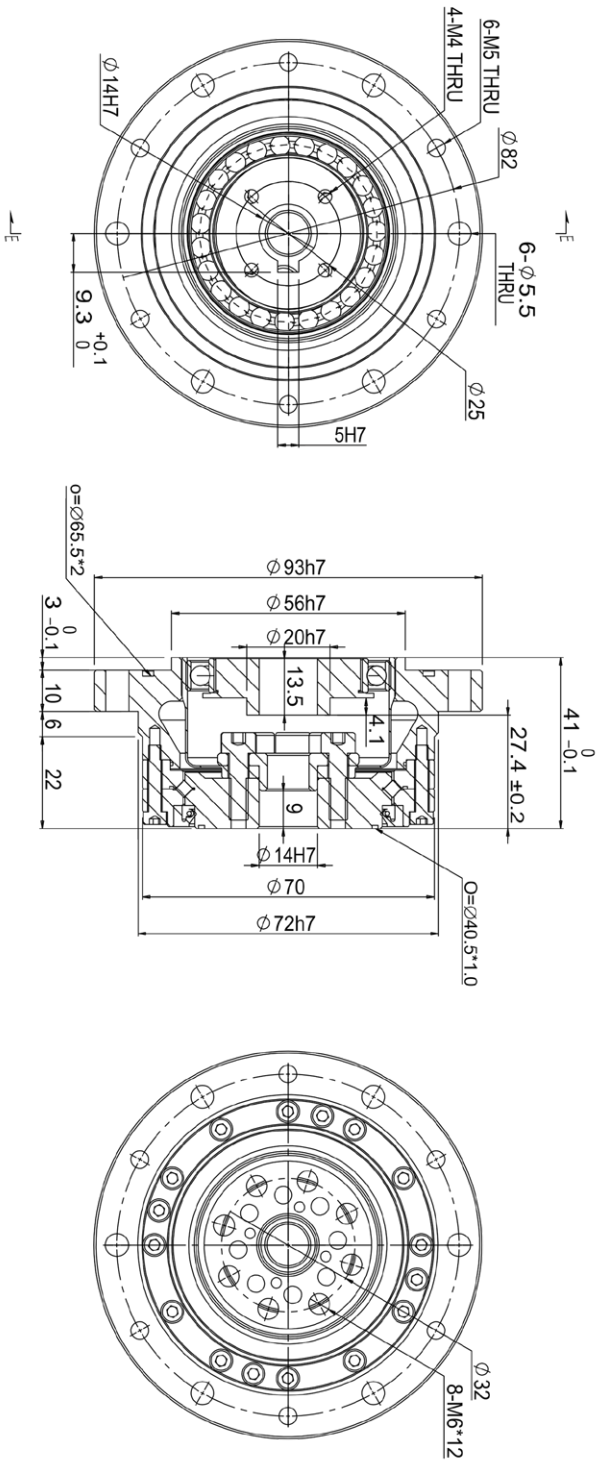
■ GHC14-I


Ø8H7
6-M4 THRU
Ø65
6-Ø4.5 THRU
18
3H7
2-M4 THRU
5.4 +0.1 0
O=Ø48.5*2
2 0 -0.1
Ø73h7
Ø38h7
Ø14h7
7.4
23
9.4
2.9
10
25.6 ±0.2
36 0 -0.1
Ø11H7
Ø55h7
Ø56h7
O=Ø29*0.6
Ø23
6-M4*12

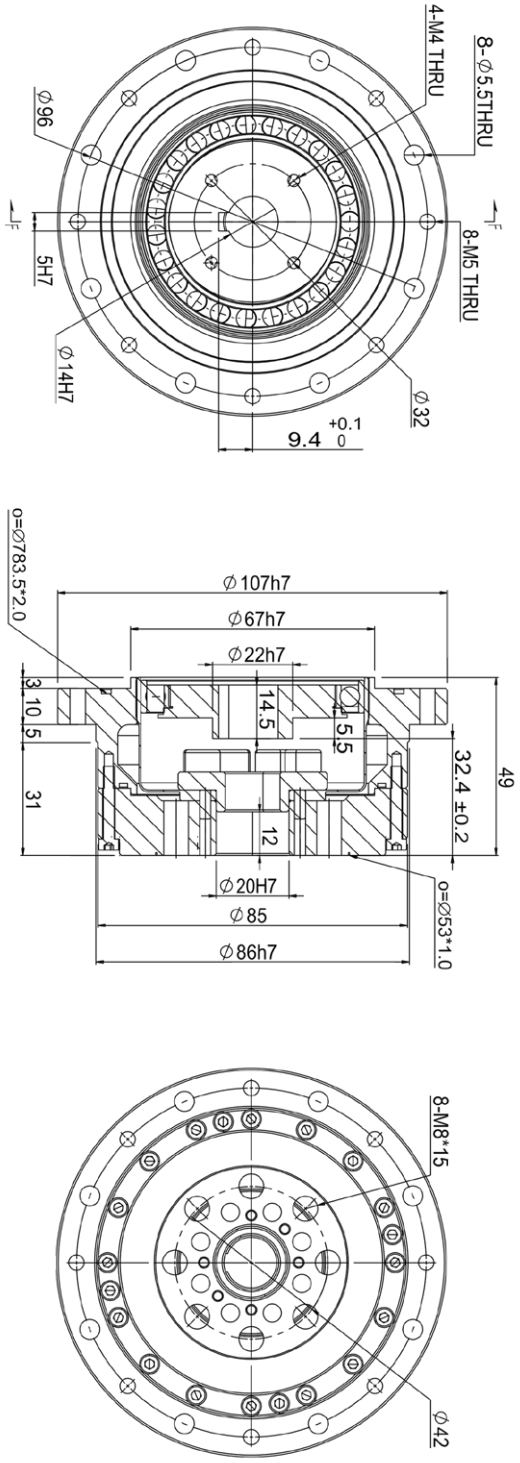
■ GHC17-I


4-M3 THRU
6-Ø4.5 THRU
Ø71
6-M4 THRU
Ø22
3H7
Ø8H7
5.4 +0.1 0
O=Ø54.3*2
2 0 -0.1
8.4
25
Ø79h7
Ø48h7
Ø16h7
12.5
4.9
9.5
39 0 -0.1
26.2 ±0.2
Ø10H7
Ø62
Ø63h7
O=Ø34.1*0.8
Ø27
6-M5*12.5

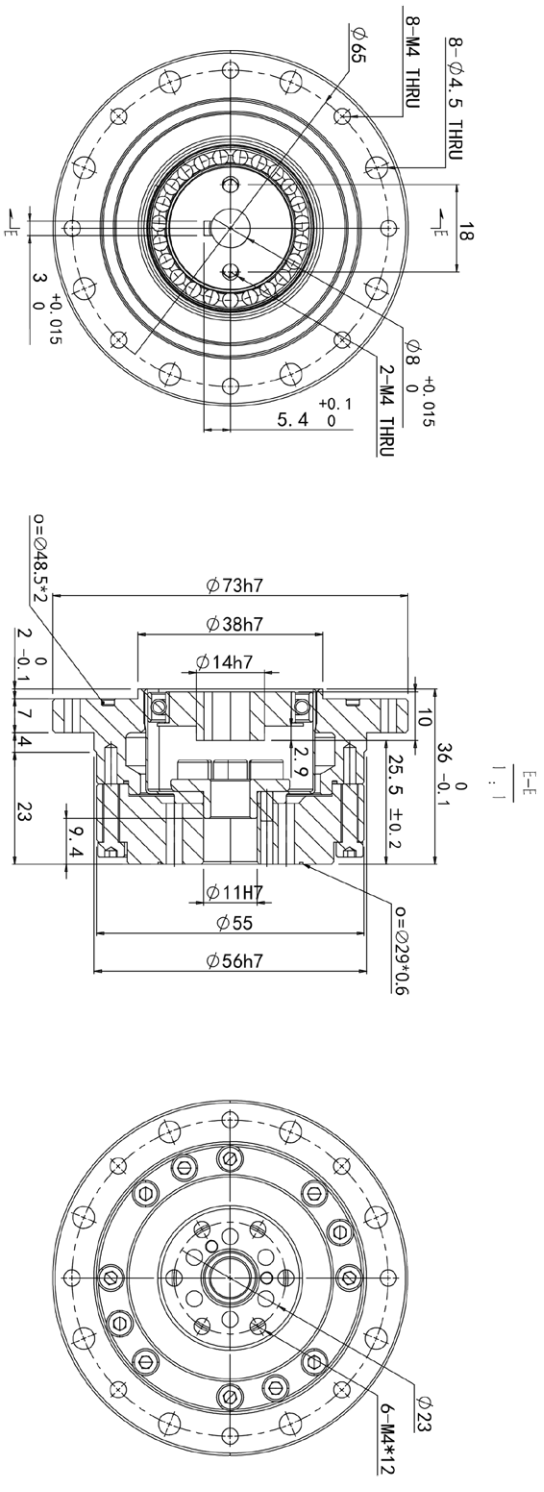
■ GHC20-I


6-M5 THRU
4-M4 THRU
Ø14H7
Ø82
6-Ø5.5 THRU
9.3 +0.1 0
Ø25
5H7
o=Ø65.5*2
Ø93h7
Ø56h7
Ø20h7
3 0 -0.1
10
6
22
13.5
4.1
9
41 0 -0.1
27.4 ±0.2
Ø14H7
Ø70
Ø72h7
O=Ø40.5*1.0
Ø32
8-M6*12

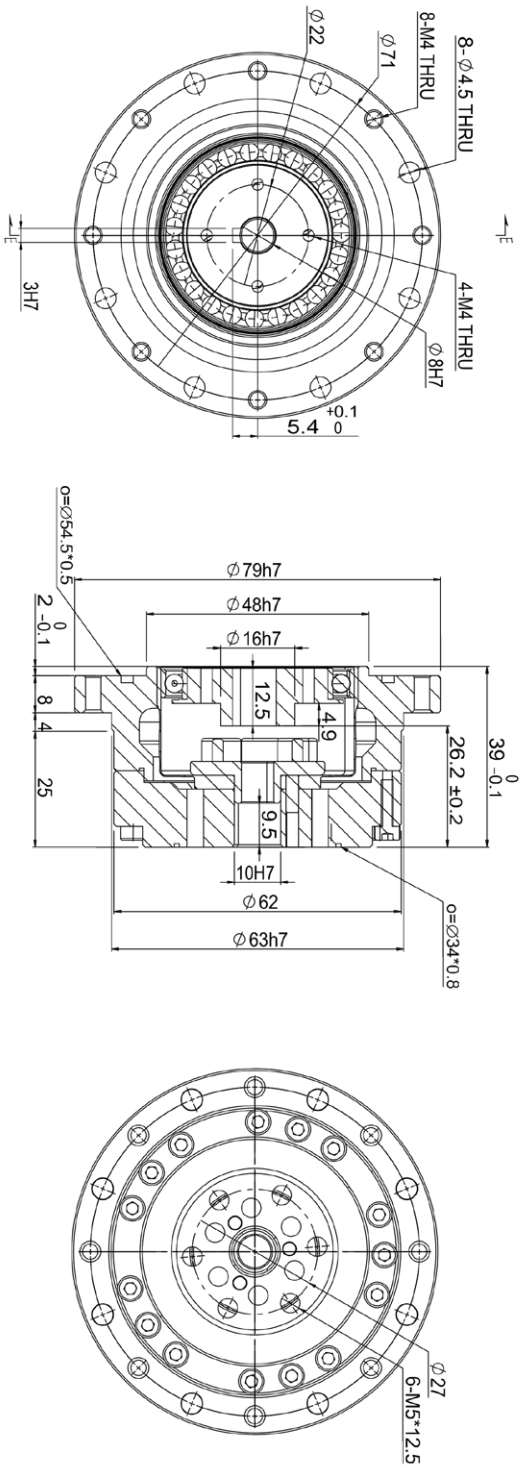
■ GHC25-I


4-M4 THRU
8-∅5.5THRU
∅96
8-M5 THRU
5H7
∅14H7
∅32
9.4 +0.1 0
o=∅83.5*2.0
∅107h7
∅67h7
∅22h7
3
10.5
31
14.5
4-5.5
32.4 ±0.2
49
12
∅20H7
∅85
∅86h7
o=∅53*1.0
8-M8*15
∅42

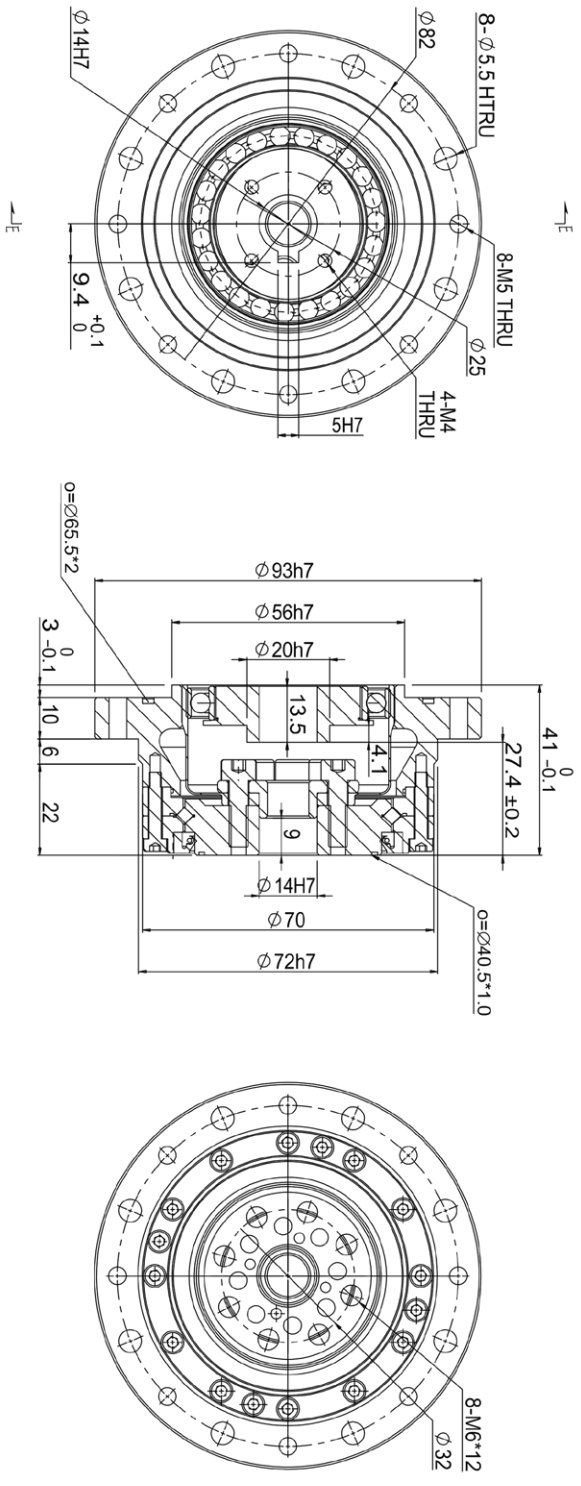
■ GHC14-GI


8-M4 THRU
8-Φ4.5 THRU
Φ65
18
3 +0.015 0
Φ8 +0.015 0
2-M4 THRU
5.4 +0.1 0
o=Φ48.5*2
Φ73h7
Φ38h7
Φ14h7
2 0 -0.1
7.4
10
36 0 -0.1
2.9
25.5 ±0.2
23
9.4
Φ11H7
Φ55
Φ56h7
o=Φ29*0.6
E-E
Φ23
6-M4*12

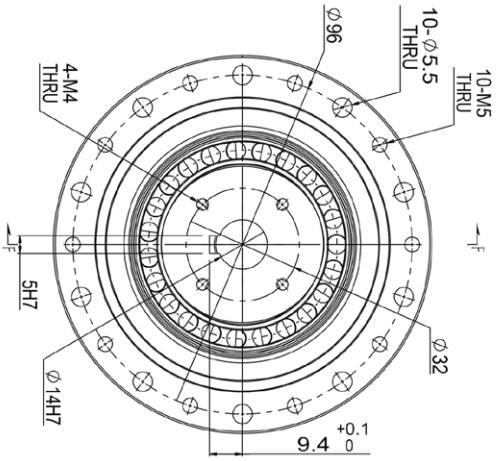
■ GHC17-GI

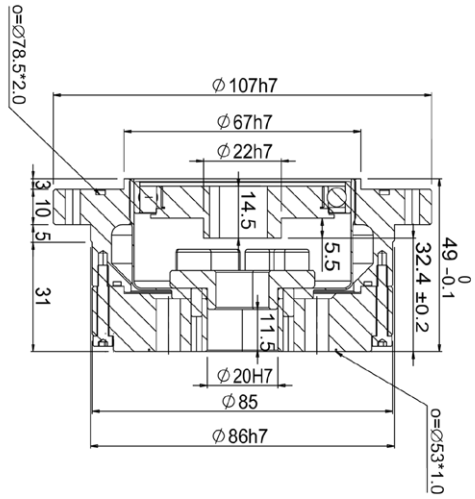

Ø22
Ø71
8-M4 THRU
8-Ø4.5 THRU
3H7
4-M4 THRU
Ø8H7
5.4 +0.1 0
o=Ø54.5*0.5
2 0 -0.1
Ø79h7
Ø48h7
Ø16h7
12.5
4.9
8.4
25
26.2 ±0.2
39 0 -0.1
9.5
10H7
Ø62
Ø63h7
o=Ø34*0.8
Ø27
6-M5*12.5

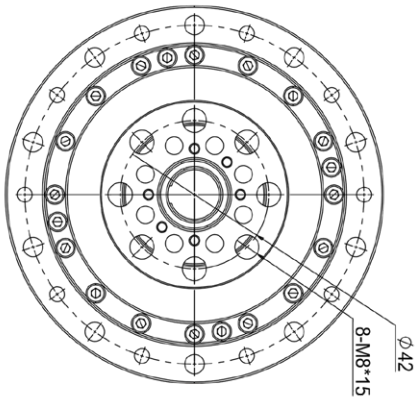
■ GHC20-GI


Ø14H7
Ø82
8-Ø5.5 HTRU
8-M5 THRU
Ø25
4-M4 THRU
5H7
9.4 +0.1 0
o=Ø65.5*2
Ø93h7
Ø56h7
Ø20h7
3 0 -0.1
10
6
22
13.5
4.1
9
41 0 -0.1
27.4 ±0.2
Ø14H7
Ø70
Ø72h7
o=Ø40.5*1.0
8-M6*12
Ø32

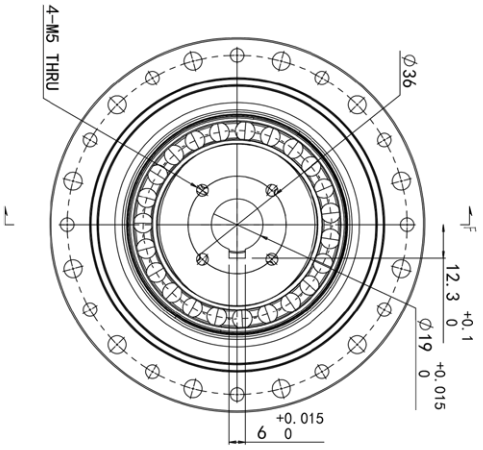
■ GHC25-GI

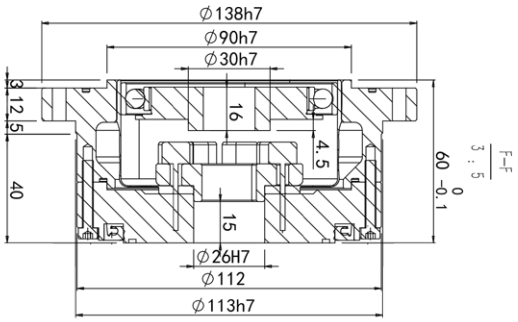

⌀96
10-⌀5.5 THRU
10-M5 THRU
4-M4 THRU
5H7
⌀32
⌀14H7
9.4 +0.1 0

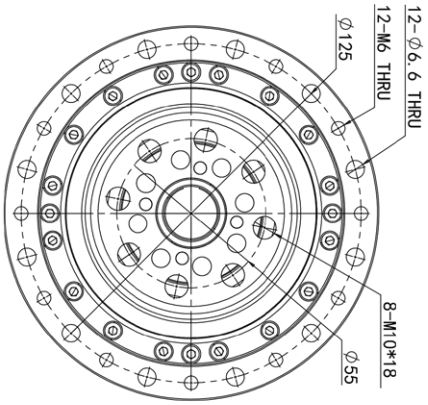

o=⌀78.5*2.0
⌀107h7
⌀67h7
⌀22h7
3
10.5
31
14.5
5.5
11.5
49 0 -0.1
32.4 ±0.2
⌀20H7
⌀85
⌀86h7
o=⌀53*1.0


⌀42
8-M8*15

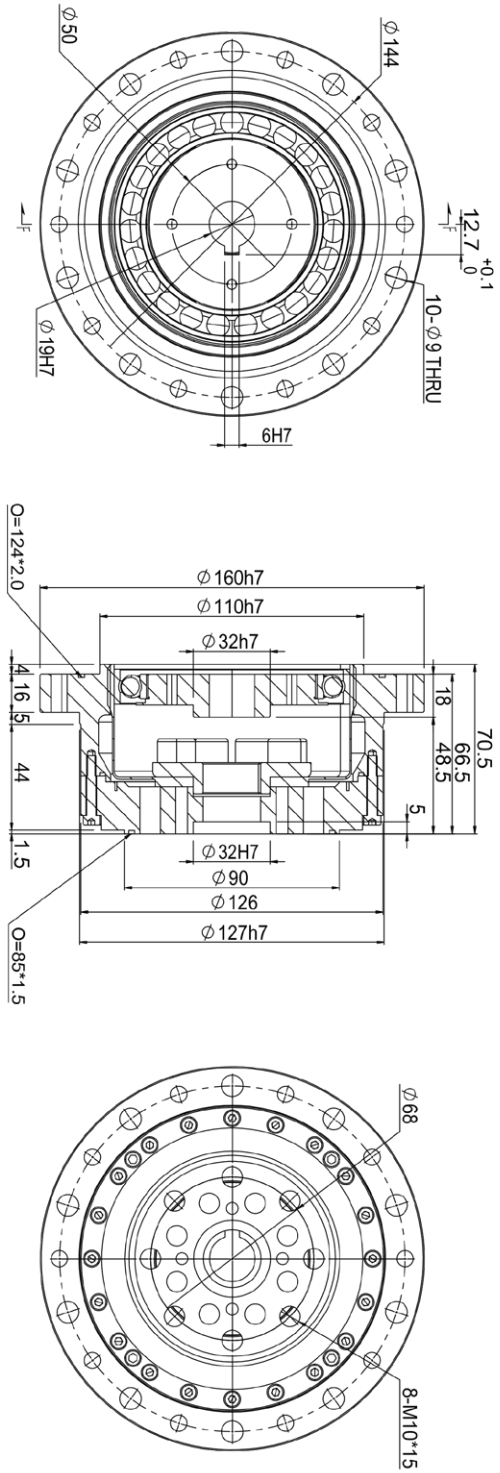
■ GHC32-GI


4-M5 THRU
Ø36
12.3 +0.1 0
Ø19 +0.015 0
6 +0.015 0

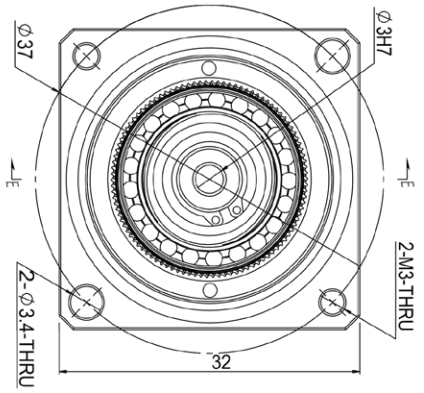

Ø138h7
Ø90h7
Ø30h7
3
12.5
40
16
4.5
15
60 0 -0.1
F-F
Ø26H7
Ø112
Ø113h7

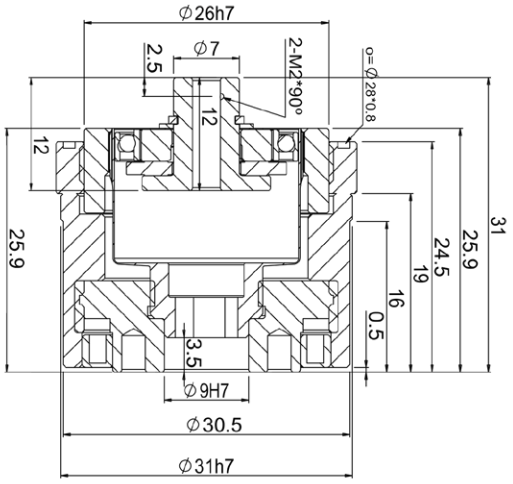

Ø125
12-M6 THRU
12-Ø6.6 THRU
8-M10*18
Ø55

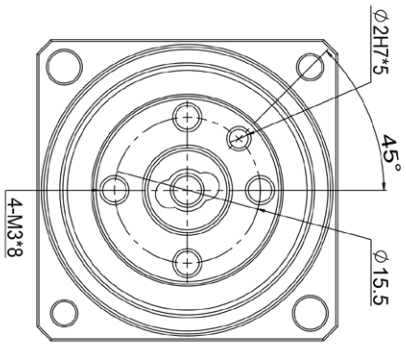
■ GHC40-GI


Ø50
Ø144
12.7 +0.1 0
10-Ø9 THRU
Ø19H7
6H7
O=124*2.0
Ø160h7
Ø110h7
Ø32h7
4
16
5
44
1.5
18
66.5
48.5
70.5
5
Ø32H7
Ø90
Ø126
Ø127h7
O=85*1.5
Ø68
8-M10*15

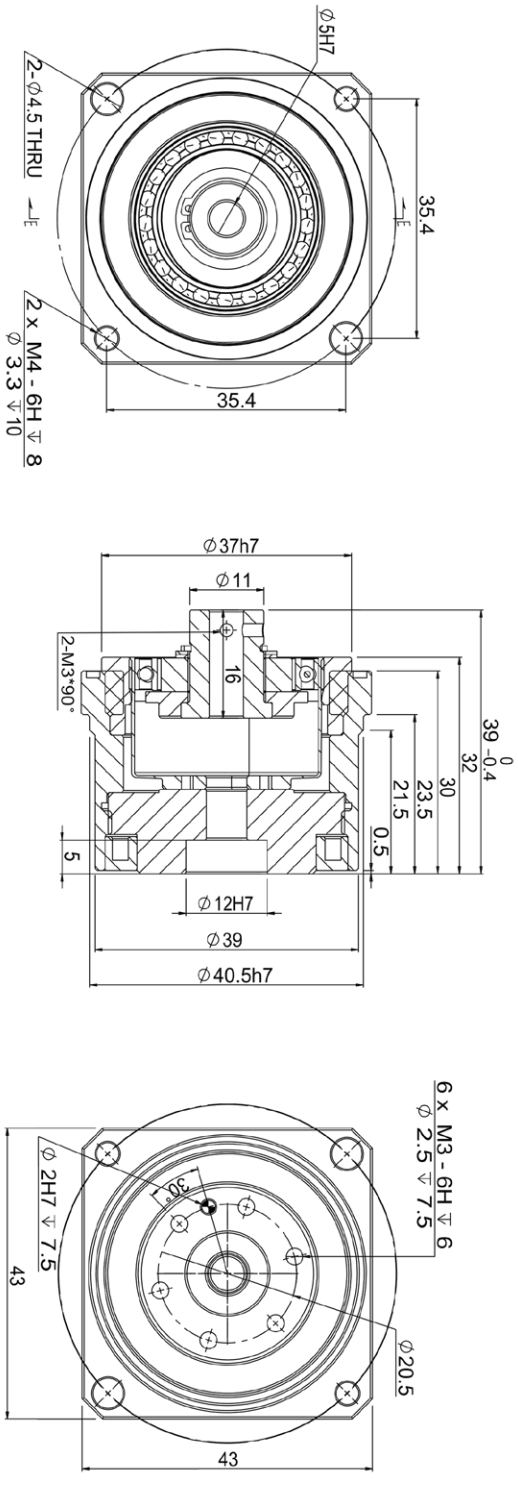
■ GHC08-A


Ø37
Ø3H7
2-Ø3.4-THRU
2-M3-THRU
32

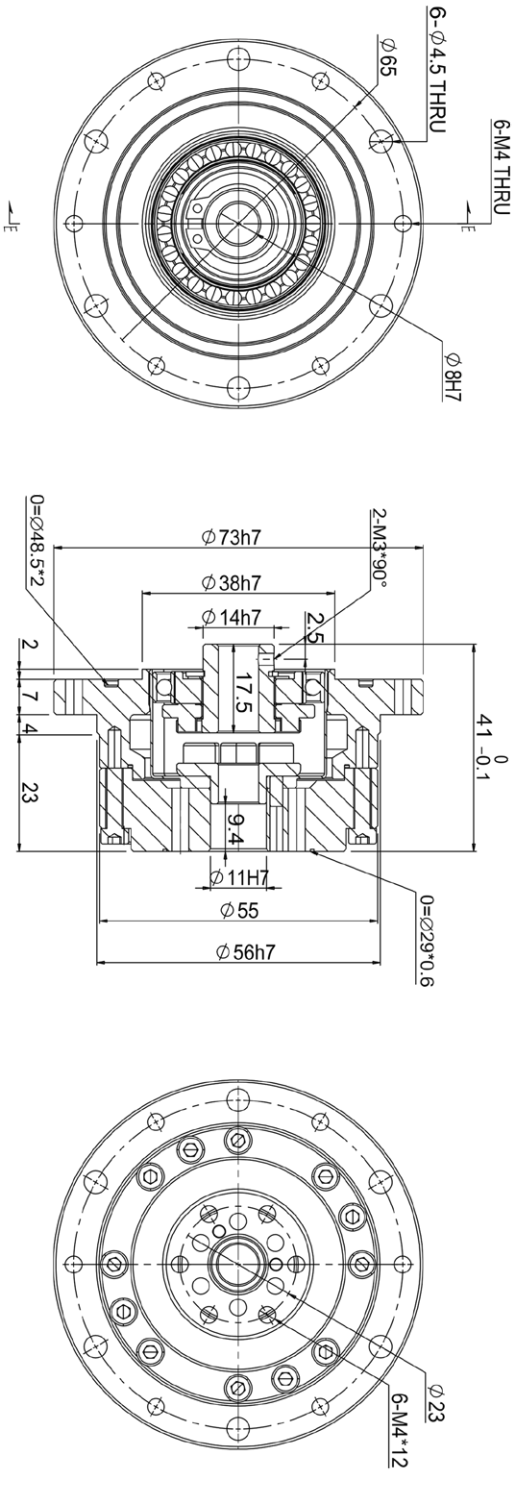

Ø26h7
Ø7
2.5
2-M2*90°
12
12
25.9
31
25.9
24.5
19
16
0.5
3.5
Ø9H7
Ø30.5
Ø31h7


Ø2H7*5
45°
4-M3*8
Ø15.5

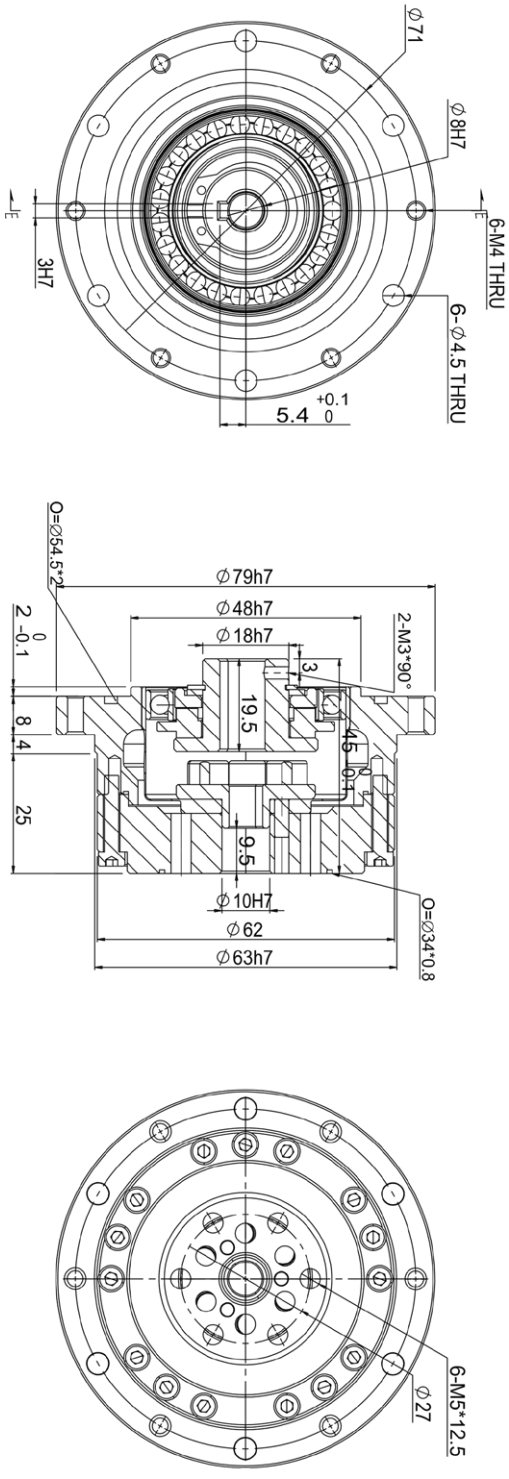
■ GHC11-A


⌀5H7
2-⌀4.5 THRU
35.4
35.4
2 x M4 - 6H ↧ 8
⌀ 3.3 ↧ 10
⌀37h7
⌀11
2-M3*90°
16
39 -0.4
32
30
23.5
21.5
0.5
5
⌀12H7
⌀39
⌀40.5h7
6 x M3 - 6H ↧ 6
⌀ 2.5 ↧ 7.5
⌀ 2H7 ↧ 7.5
30°
43
⌀20.5
43

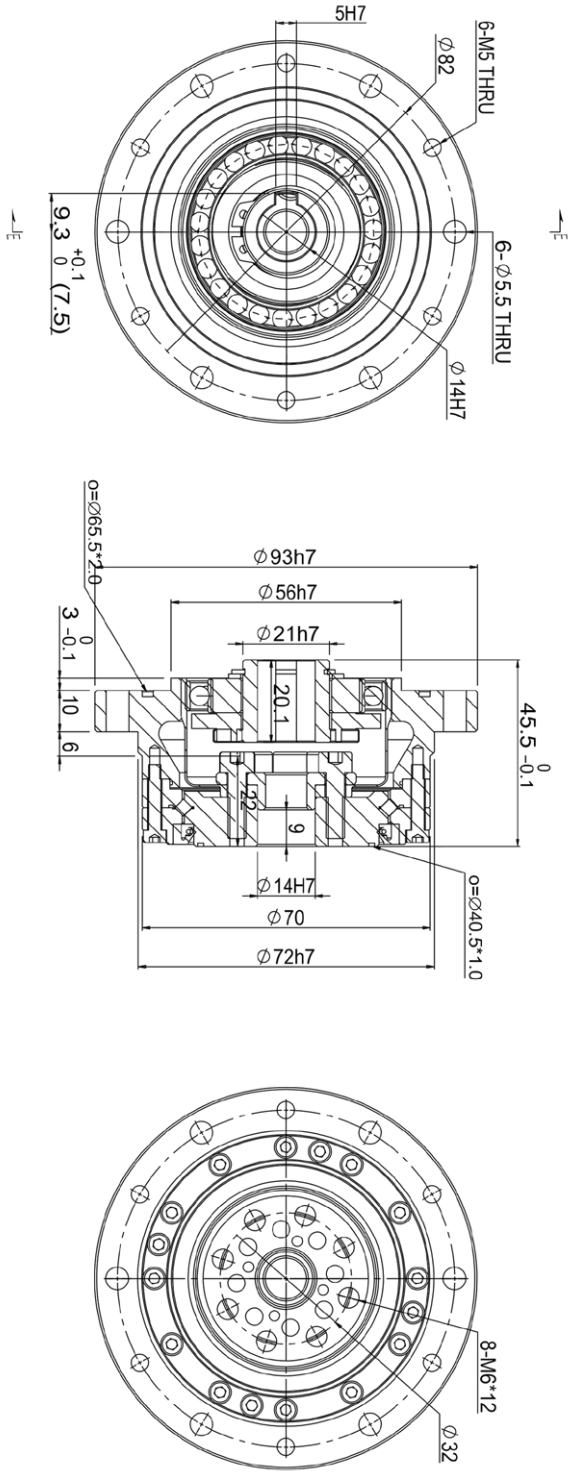
■ GHC14-A


6-∅4.5 THRU
∅65
6-M4 THRU
∅8H7
0=∅48.5*2
∅73h7
2-M3*90°
∅38h7
∅14h7
2.5
2
7
4
23
17.5
9.4
41 0 -0.1
∅11H7
∅55
∅56h7
0=∅29*0.6
∅23
6-M4*12

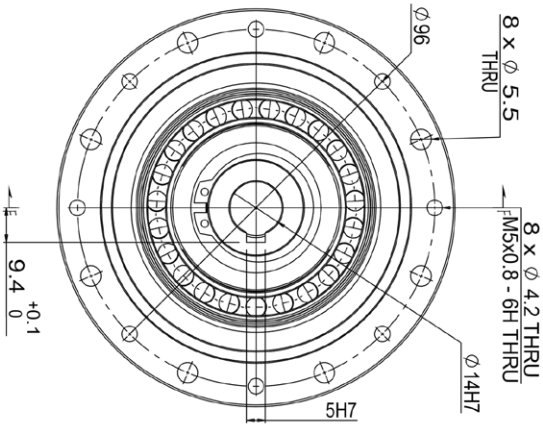
■ GHC17-A

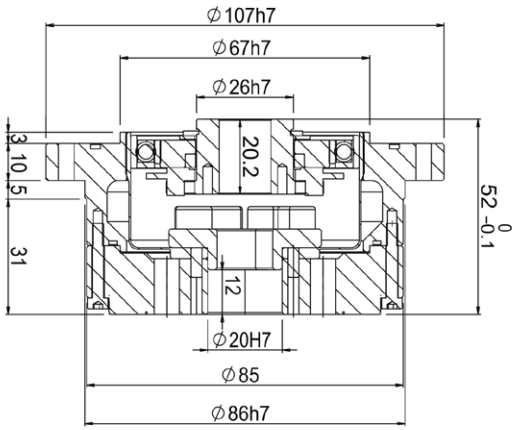

Ø71
Ø8H7
6-M4 THRU
3H7
6-Ø4.5 THRU
5.4 +0.1 0
O=Ø54.5*2
Ø79h7
Ø48h7
Ø18h7
2-M3*90°
2 0 -0.1
3
19.5
8
4
4.5 0 -0.1
25
9.5
Ø10H7
O=Ø34*0.8
Ø62
Ø63h7
6-M5*12.5
Ø27

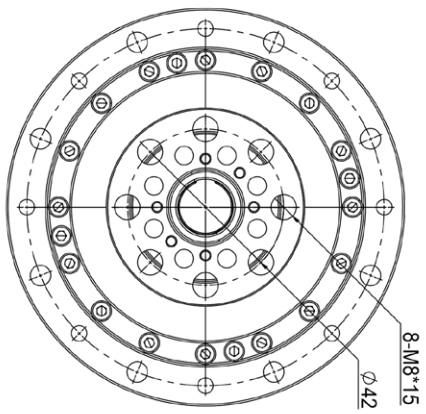
■ GHC20-A


5H7
Ø82
6-M5 THRU
9.3 +0.1 0
(7.5)
6-Ø5.5 THRU
Ø14H7
o=Ø65.5*2.0
Ø93h7
Ø56h7
Ø21h7
3 0 -0.1
20.1
10
6
45.5 0 -0.1
12
9
Ø14H7
Ø70
Ø72h7
o=Ø40.5*1.0
8-M6*12
Ø32

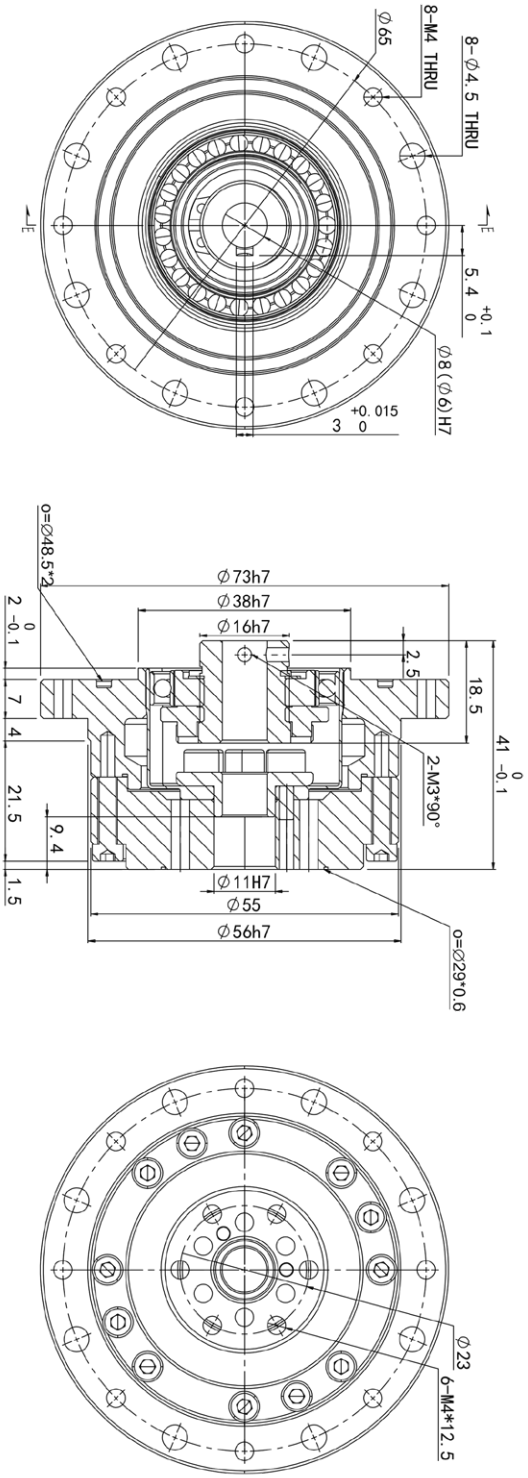
■ GHC25-A


Ø96
8 x Ø 5.5
THRU
8 x Ø 4.2 THRU
M5x0.8 - 6H THRU
9.4 +0.1 0
Ø14H7
5H7

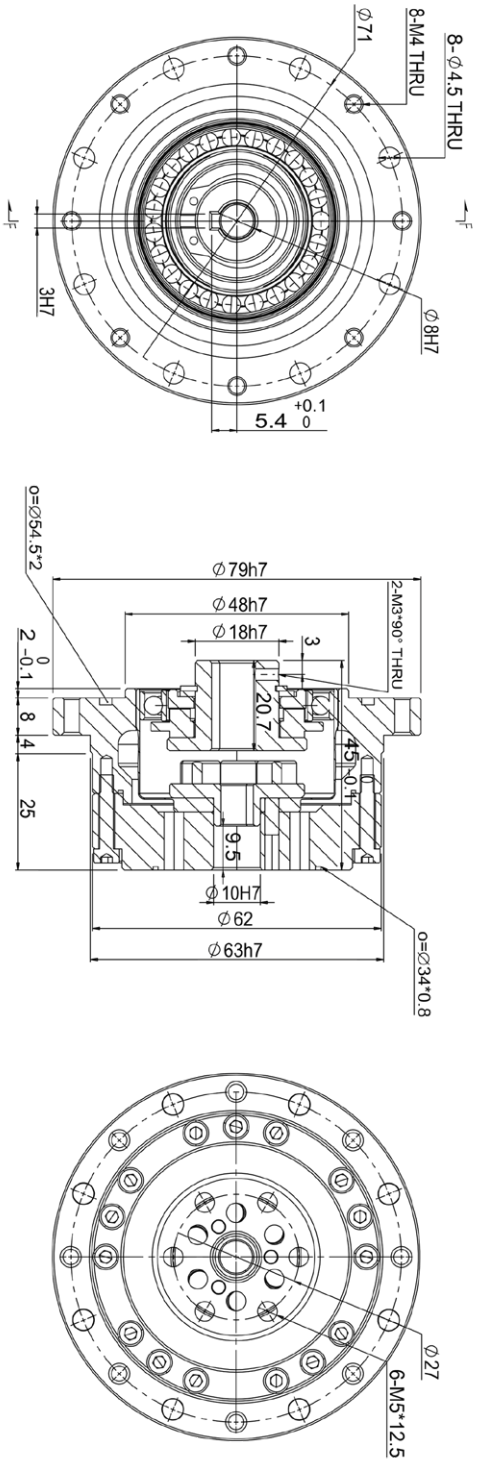

Ø107h7
Ø67h7
Ø26h7
3
10.5
31
20.2
12
52 0 -0.1
Ø20H7
Ø85
Ø86h7


8-M8*15
Ø42

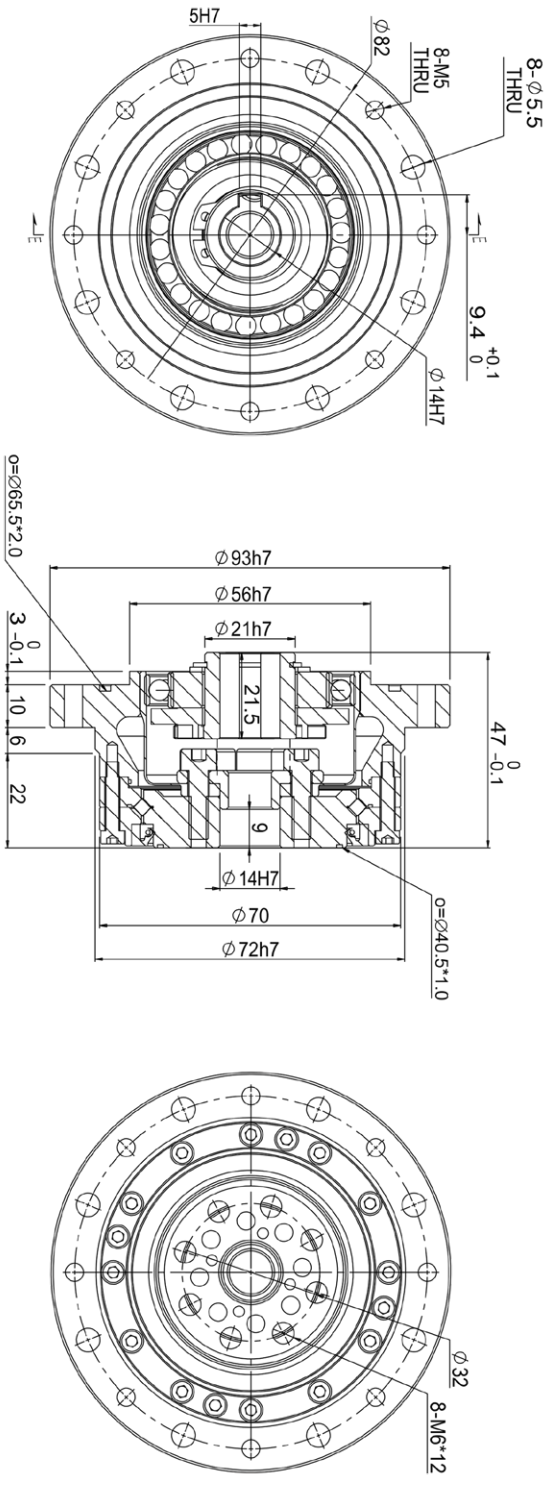
■ GHC14-GA


Ø65
8-M4 THRU
8-Ø4.5 THRU
5.4 +0.1 0
Ø8(Ø6)H7
+0.015 3 0
o=Ø48.5*2
Ø73h7
Ø38h7
Ø16h7
2 0 -0.1
2.5
18.5
41 0 -0.1
7
4
21.5
9.4
1.5
2-M3*90°
Ø11H7
Ø55
Ø56h7
o=Ø29*0.6
Ø23
6-M4*12.5

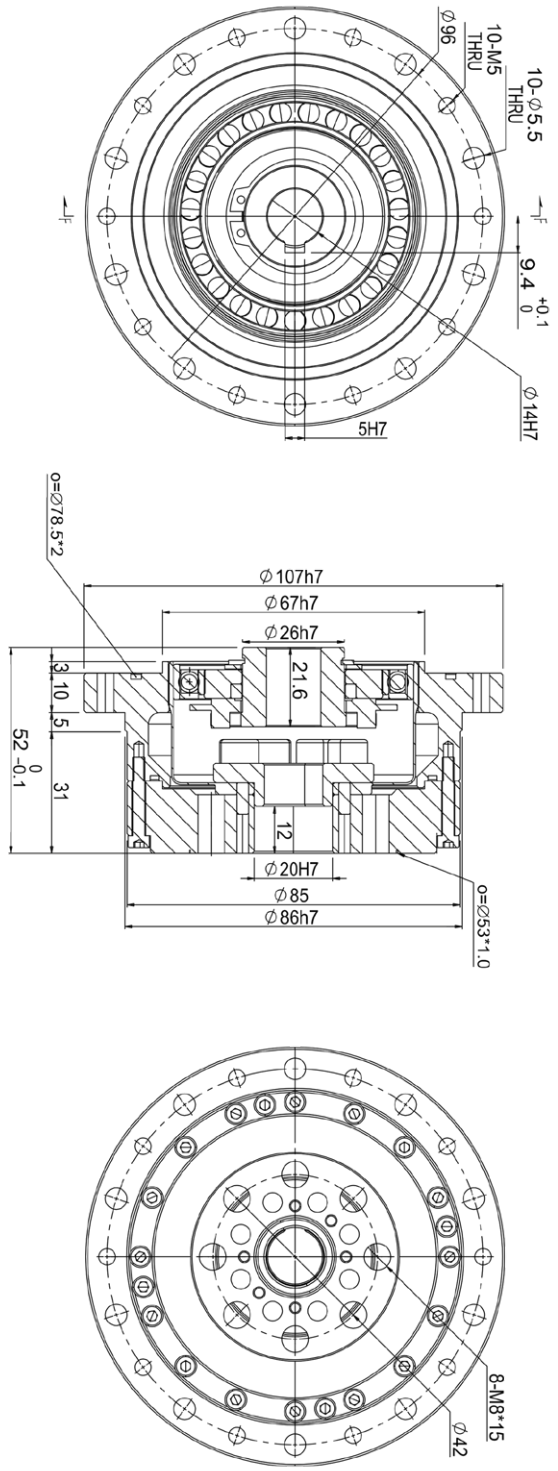
■ GHC17-GA


∅71
8-M4 THRU
8-∅4.5 THRU
3H7
∅8H7
5.4 +0.1 0
o=∅54.5*2
∅79h7
∅48h7
∅18h7
2-M3*90° THRU
3
20.7
45
2 0 -0.1
8
4
25
9.5
∅10H7
∅62
∅63h7
o=∅34*0.8
∅27
6-M5*12.5

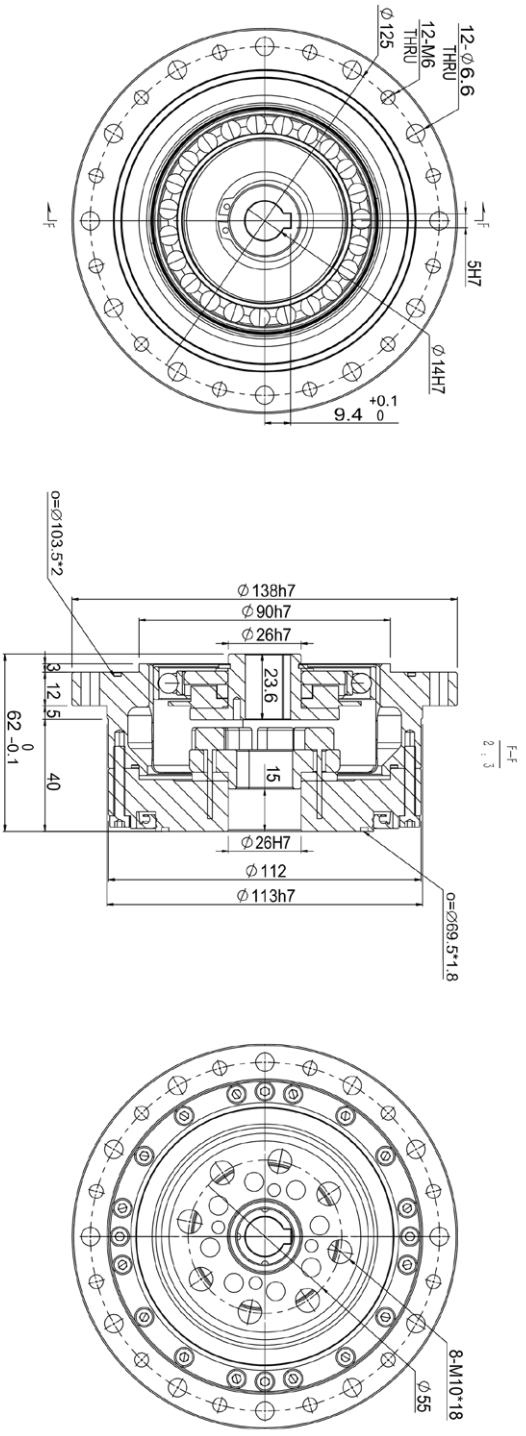
■ GHC20-GA


5H7
Ø82
8-M5
THRU
8-Ø5.5
THRU
9.4 +0.1 0
Ø14H7
o=Ø65.5*2.0
Ø93h7
Ø56h7
Ø21h7
3 0 -0.1
10
6
22
21.5
9
47 0 -0.1
Ø14H7
Ø70
Ø72h7
o=Ø40.5*1.0
Ø32
8-M6*12

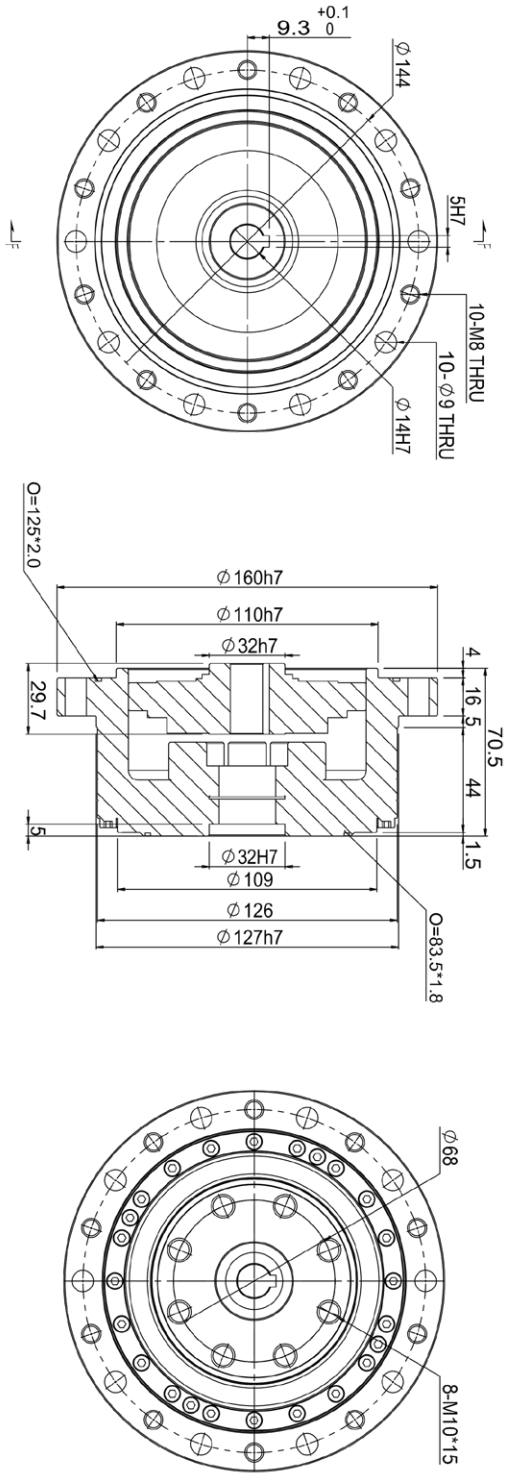
■ GHC25-GA


Ø96
10-M5
THRU
10-Ø5.5
THRU
9.4 +0.1 0
Ø14H7
5H7
o=Ø78.5*2
Ø107h7
Ø67h7
Ø26h7
21.6
3
10
5
52 0 -0.1
31
12
Ø20H7
Ø85
Ø86h7
o=Ø53*1.0
8-M8*15
Ø42

■ GHC32-GA


Ø125
12-M6 THRU
12-Ø6.6 THRU
5H7
Ø14H7
9.4 +0.1 0
o=Ø103.5*2
Ø138h7
Ø90h7
Ø26h7
3
12.5
23.6
62 0 -0.1
40
15
F-F
Ø26H7
Ø112
Ø113h7
o=Ø69.5*1.8
8-M10*18
Ø55

■ GHC40-GA


9.3 +0.1 0
Ø144
5H7
10-M8 THRU
10-Ø9 THRU
Ø14H7
O=125*2.0
Ø160h7
Ø110h7
Ø32h7
4
16
5
70.5
44
1.5
29.7
5
Ø32H7
Ø109
Ø126
Ø127h7
O=83.5*1.8
Ø68
8-M10*15

GHD Series

GHD Series-Dwarf Cup Type

The flexspline is an ultra-thin hollow flanging structure, ultra-thin design, saves more space. Equipped with high-precision and high-rigidity cross roller bearings.

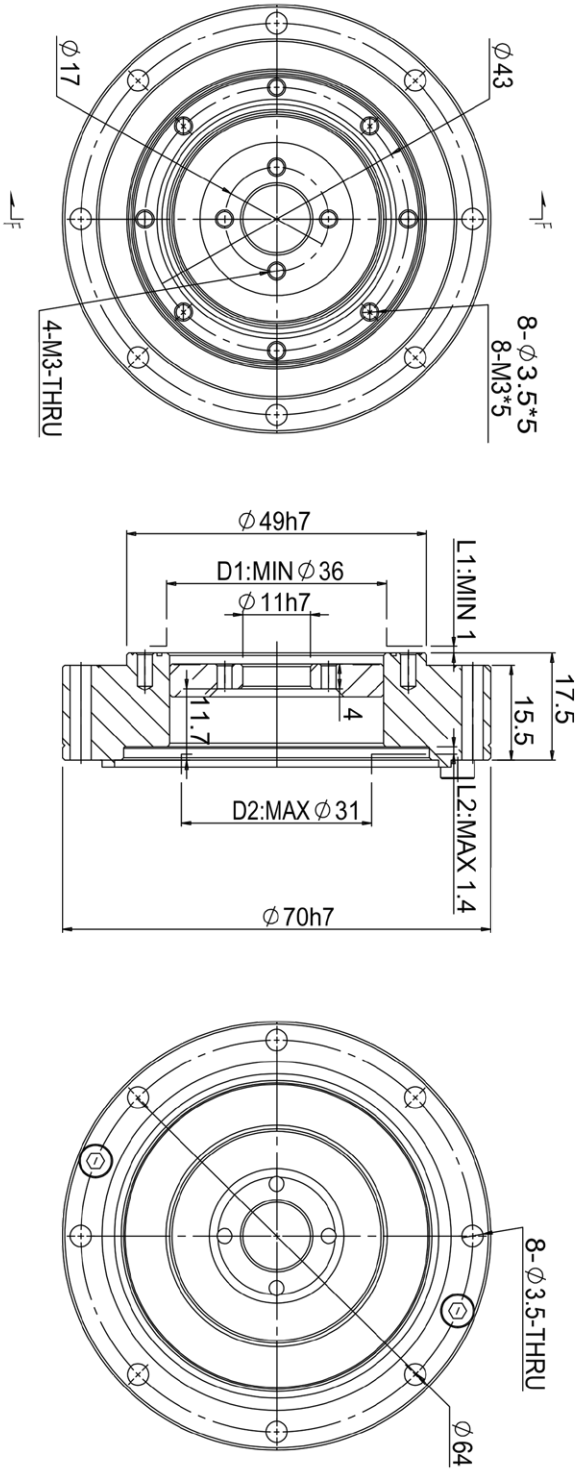
Features:

- Ultra-thin,hollow type structure
- Compacted and simple design
- High-rigidity cross roller bearings
- High torque capacity
- Backlash-less, coaxial inputs and outputs
- Excellent positioning and rotational accuracy

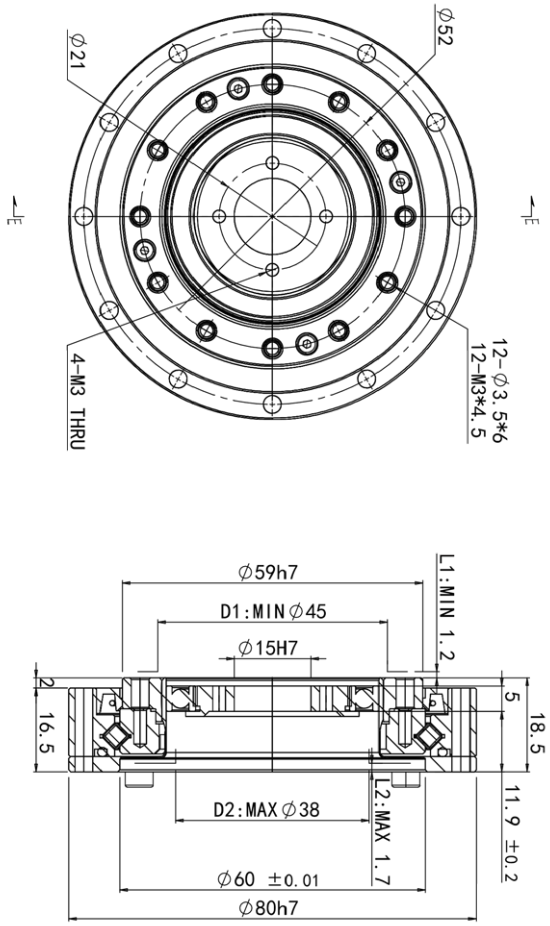
Technical Parameter

Items		Rated Torque (Input 2000 rpm)	Start/Stop Allowable Peak Torque	Allowable Max Value of Average Load Torque	Instantaneous Maximum Allowable Torque	Allowable Maximum Input Speed	Allowable Average Input Speed	Starting Torque	Backlash	Weight	Designed Lifespan
Model	Ratio	N.m	N.m	N.m	N.m	r/min	r/min	N.cm	Arc sec	KG	H
14	50	3.6	11.8	4.7	22.5	8000	3500	≤ 6.5	≤ 15	0.35	10000
	80	5.1	15	6.2	29	8000	3500	≤ 5.5	≤ 10		12000
	100	5.3	18.6	7.5	34	8000	3800	≤ 5	≤ 10		12000
17	50	10.8	22.5	17.6	47	7000	3500	≤ 20	≤ 15	0.45	10000
	80	14	39	21	54	7000	3500	≤ 18	≤ 10		12000
	100	15.7	41	26.5	69.5	7000	3800	≤ 18	≤ 10		12000
20	50	16.7	38	24	68	6000	3000	≤ 36	≤ 15	0.55	10000
	80	23	49	28	78	6000	3000	≤ 28	≤ 10		12000
	100	27	56	34	93	6000	3500	≤ 21	≤ 10		12000
25	50	26.5	68	38	123	5500	3000	≤ 42	≤ 15	0.96	10000
	80	42	91	62	157	5500	3000	≤ 37	≤ 10		12000
	100	46	108	73	180	5500	3000	≤ 36	≤ 10		12000
32	50	52	148	73	263	4500	3000	≤ 63	≤ 15	2.03	10000
	80	79	202	126	350	4500	3000	≤ 55	≤ 10		12000
	100	94	228	148	412	4500	3000	≤ 53	≤ 10		12000

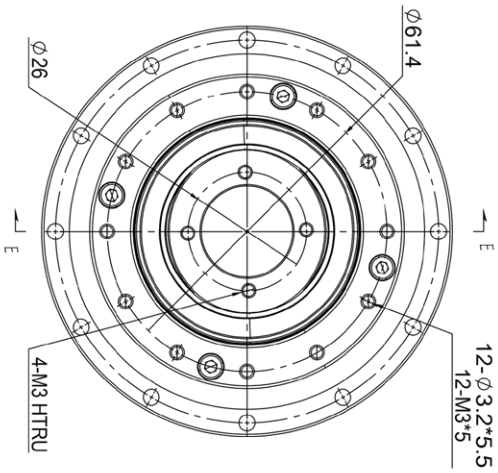
■ GHD14-I

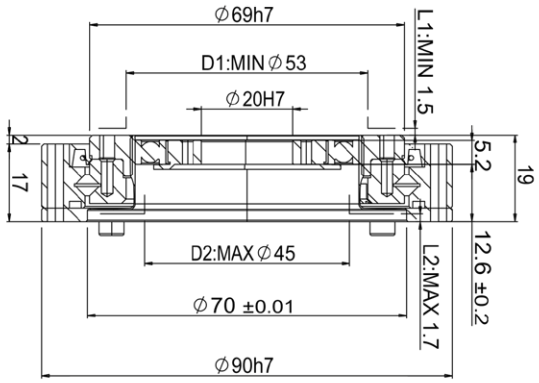

∅17
∅43
4-M3-THRU
8-∅3.5*5
8-M3*5
∅49h7
D1:MIN∅36
∅11h7
L1:MIN 1
17.5
15.5
11.7
4
D2:MAX∅31
L2:MAX 1.4
∅70h7
8-∅3.5-THRU
∅64

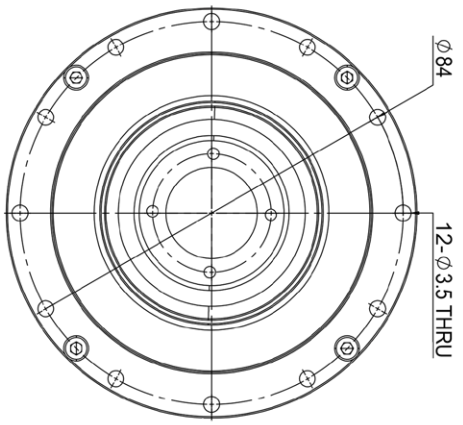
■ GHD17-I


Φ52
Φ21
4-M3 THRU
12-Φ3.5*6
12-M3*4.5
Φ59h7
D1:MIN Φ45
Φ15H7
L1:MIN 1.2
2
16.5
5
18.5
D2:MAX Φ38
L2:MAX 1.7
11.9 ±0.2
Φ60 ±0.01
Φ80h7
12Φ3.5 THRU
Φ74

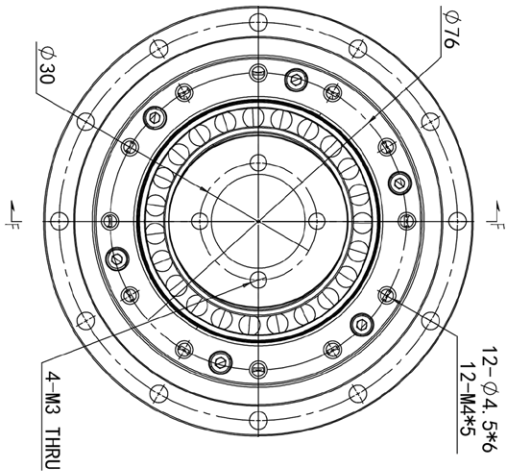
■ GHD20-I

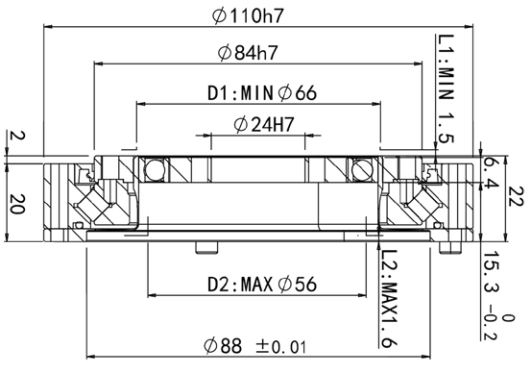

∅61.4
∅26
E
E
4-M3 HTRU
12-∅3.2*5.5
12-M3*5

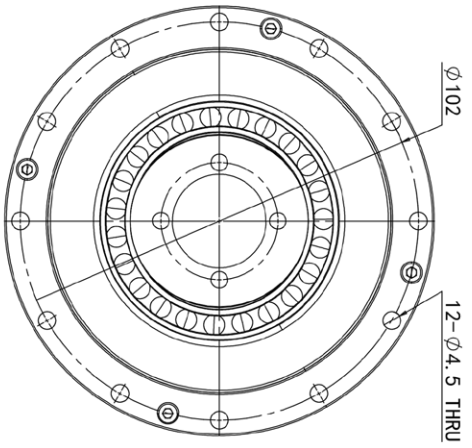

∅69h7
L1:MIN 1.5
D1:MIN ∅53
∅20H7
2
17
5.2
19
D2:MAX ∅45
12.6 ±0.2
L2:MAX 1.7
∅70 ±0.01
∅90h7


∅84
12-∅3.5 THRU

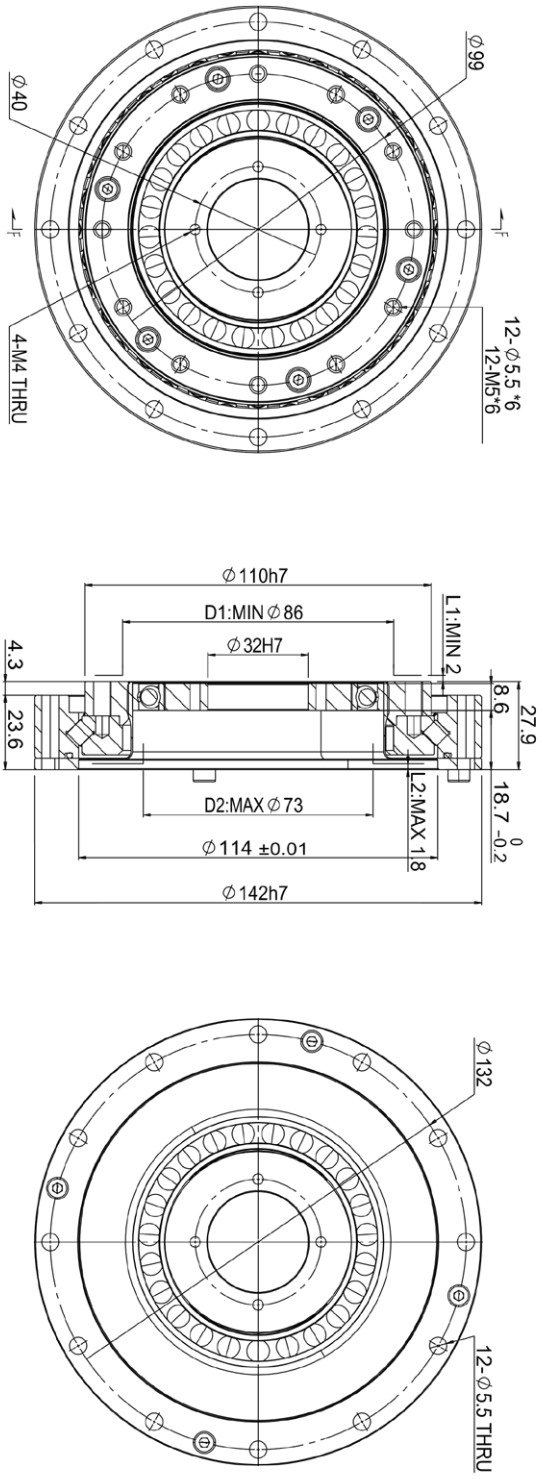
■ GHD25-I


Φ76
Φ30
12-Φ4.5*6
12-M4*5
4-M3 THRU


Φ110h7
Φ84h7
D1:MIN Φ66
Φ24H7
L1:MIN 1.5
2
20
6.4
22
15.3 0 -0.2
L2:MAX1.6
D2:MAX Φ56
Φ88 ±0.01


Φ102
12-Φ4.5 THRU

■ GHD32-I


Ø99
Ø40
4-M4 THRU
12-Ø5.5 *6
12-M5*6
Ø110h7
D1:MIN Ø86
Ø32H7
L1:MIN 2
4.3
23.6
8.6
27.9
D2:MAX Ø73
L2:MAX 18
18.7 0 -0.2
Ø114 ±0.01
Ø142h7
Ø132
12-Ø5.5 THRU

GHT Series

GHT Series Cup Type (Ultra-flat)

It is designed as an ultra-flat structure, lightweight and compact, and it can be used for robot joints and as a speed reducer.

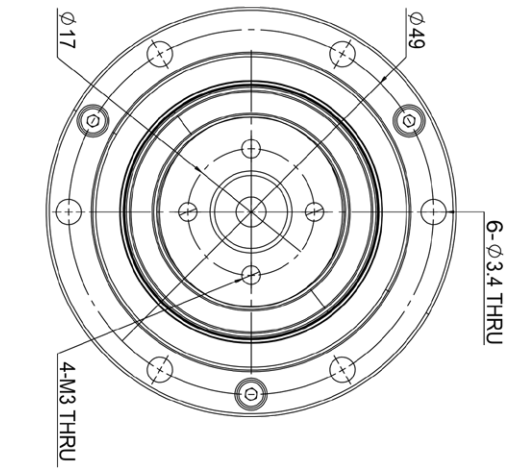
Features :

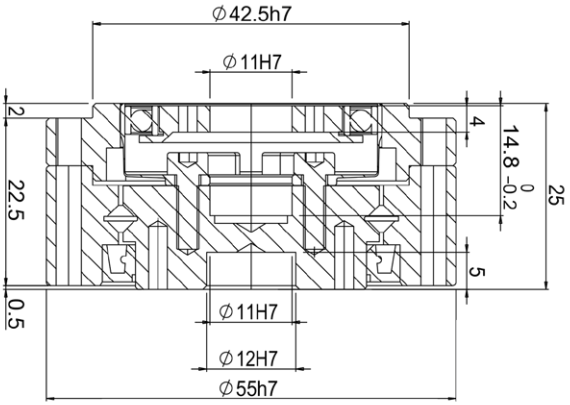
- Ultra-flat
- Lightweight and compact
- High static torque
- Backlash-less, coaxial inputs and outputs
- Excellent positioning and rotational accuracy

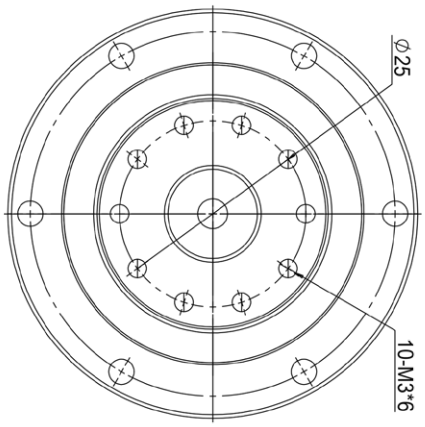
■ Technical Parameter

Items		Rated Torque (Input 2000 rpm)	Start/Stop Allowable Peak Torque	Allowable Max Value of Average Load Torque	Instantaneous Maximum Allowable Torque	Allowable Maximum Input Speed	Allowable Average Input Speed	Starting Torque	Backlash	Weight	Designed Lifespan
Model	Ratio	N.m	N.m	N.m	N.m	r/min	r/min	N.cm	Arc sec	KG	H
14	50	3.6	11.8	4.7	22.5	8000	3500	≤ 4.2	≤ 15	0.52	10000
	80	5.1	15	6.2	29	8000	3500	≤ 4.0	≤ 10		12000
	100	5.3	18.6	7.5	34	8000	3800	≤ 3.0	≤ 10		12000
17	50	10.8	22.5	17.6	47	7000	3500	≤ 7	≤ 15	0.7	10000
	80	14	39	21	54	7000	3500	≤ 5.1	≤ 10		12000
	100	15.7	41	26.5	69.5	7000	3800	≤ 4	≤ 10		12000
20	50	16.7	38	24	68	6000	3000	≤ 9.3	≤ 15	0.95	10000
	80	23	49	28	78	6000	3000	≤ 7	≤ 10		12000
	100	27	56	34	93	6000	3500	≤ 5.4	≤ 10		12000
25	50	26.5	68	38	123	5500	3000	≤ 16	≤ 15	1.7	10000
	80	42	91	62	157	5500	3000	≤ 12.6	≤ 10		12000
	100	46	108	73	180	5500	3000	≤ 10	≤ 10		12000
32	50	52	148	73	263	4500	3000	≤ 33	≤ 15	3.3	10000
	80	79	202	126	350	4500	3000	≤ 26	≤ 10		12000
	100	94	228	148	412	4500	3000	≤ 20	≤ 10		12000

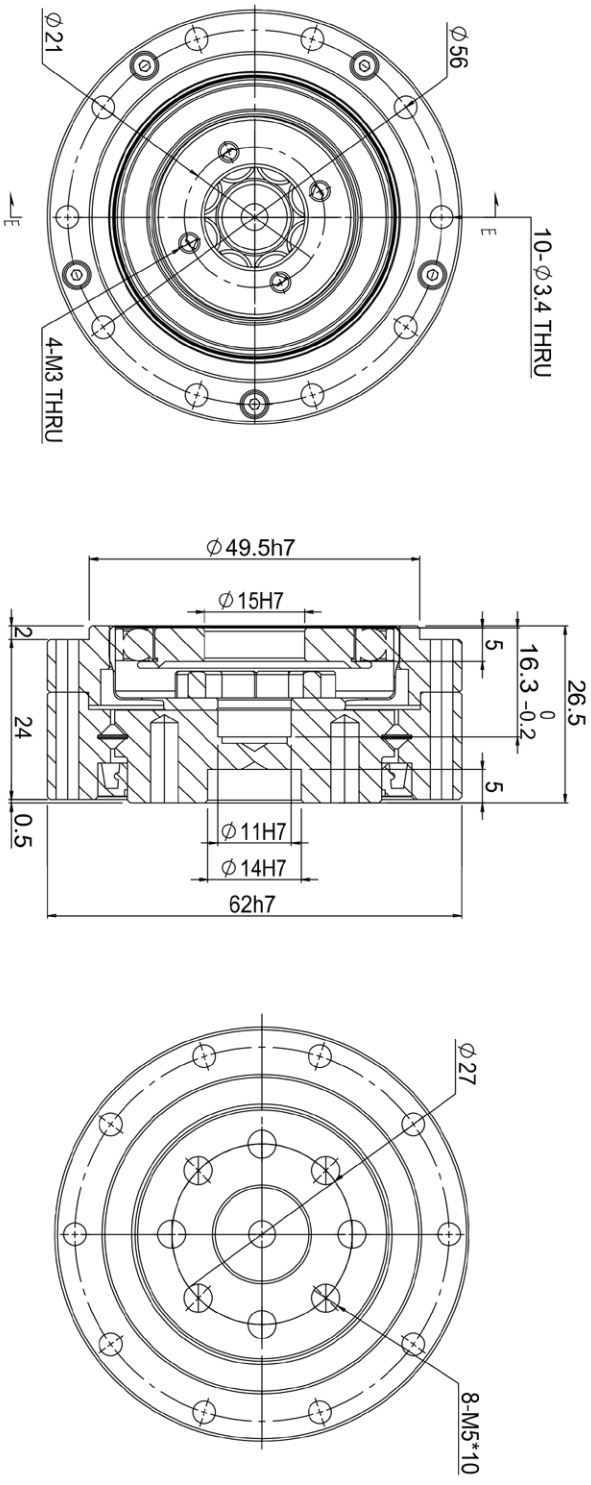
■ GHT14-I


∅17
∅49
6-∅3.4 THRU
4-M3 THRU

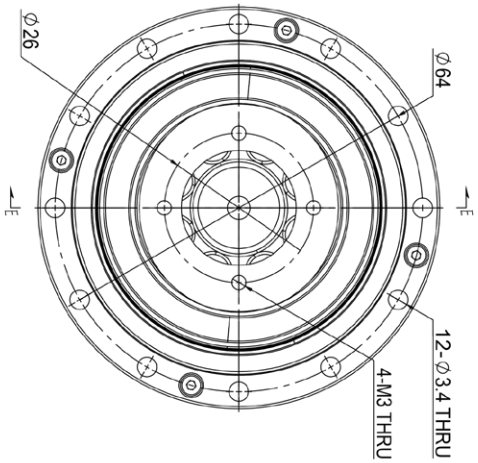

∅42.5h7
∅11H7
2
22.5
0.5
4
14.8 0 -0.2
5
25
∅11H7
∅12H7
∅55h7

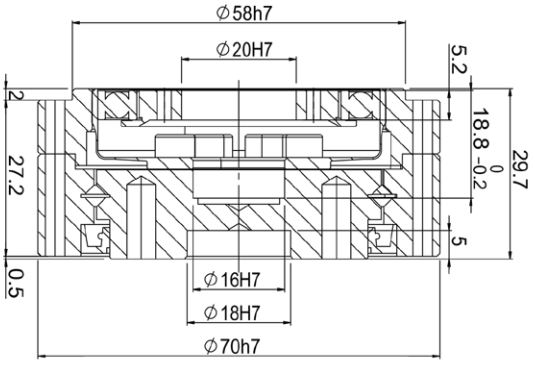

∅25
10-M3*6

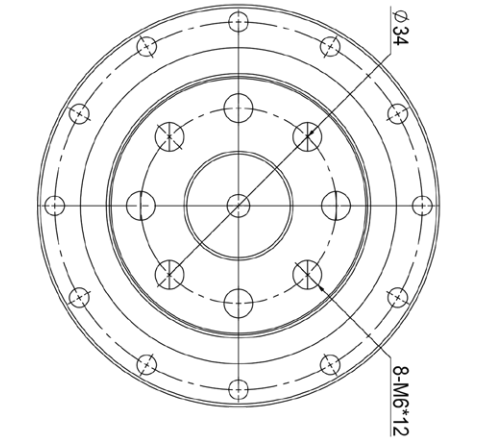
■ GHT17-I


Φ21
Φ56
10-Φ3.4 THRU
4-M3 THRU
Φ49.5h7
Φ15H7
2
24
0.5
5
16.3 0 -0.2
26.5
5
Φ11H7
Φ14H7
62h7
Φ27
8-M5*10

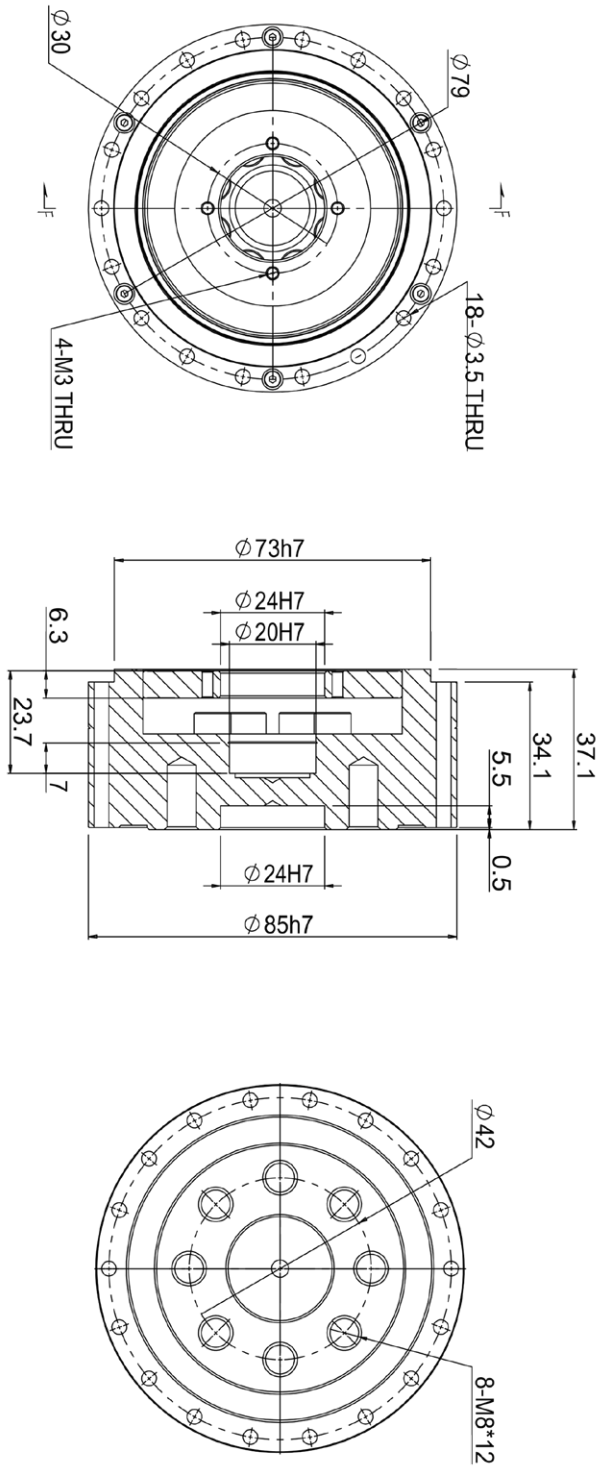
■ GHT20-I


Ø26
Ø64
12-Ø3.4 THRU
4-M3 THRU

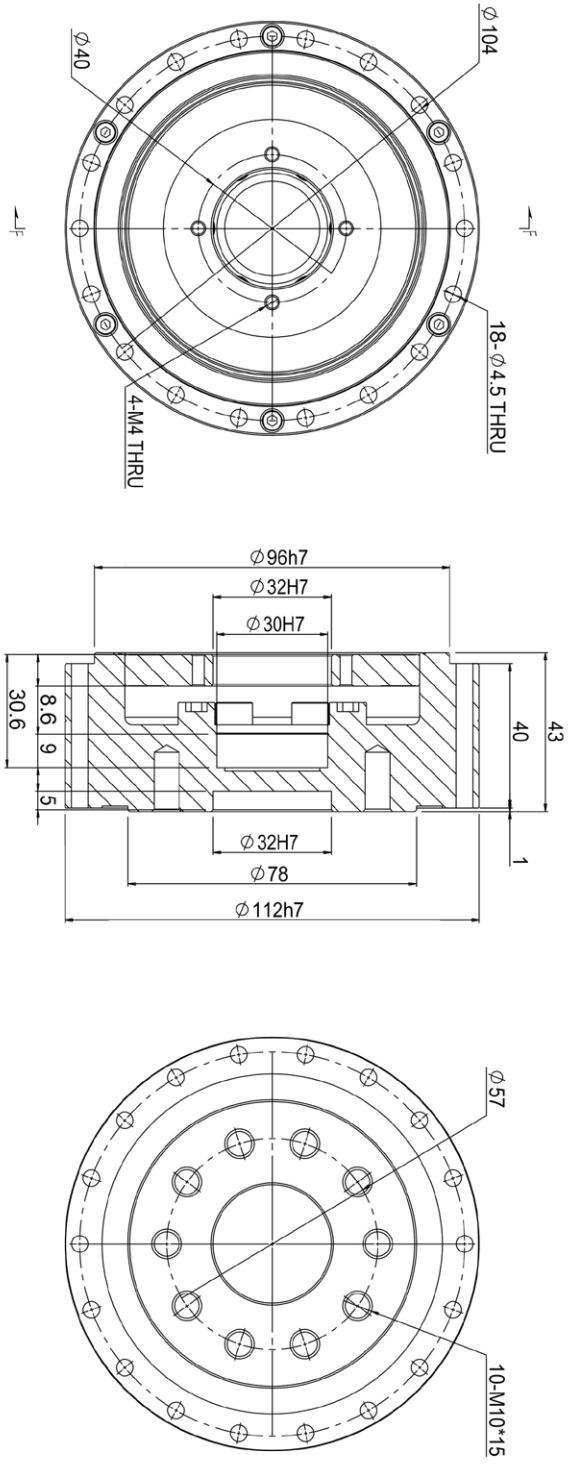

Ø58h7
Ø20H7
5.2
2
27.2
18.8 0 -0.2
29.7
5
0.5
Ø16H7
Ø18H7
Ø70h7


Ø34
8-M6*12

■ GHT25-I


⌀30
⌀79
4-M3 THRU
18-⌀3.5 THRU
⌀73h7
⌀24H7
⌀20H7
6.3
23.7
7
5.5
34.1
37.1
0.5
⌀24H7
⌀85h7
⌀42
8-M8*12

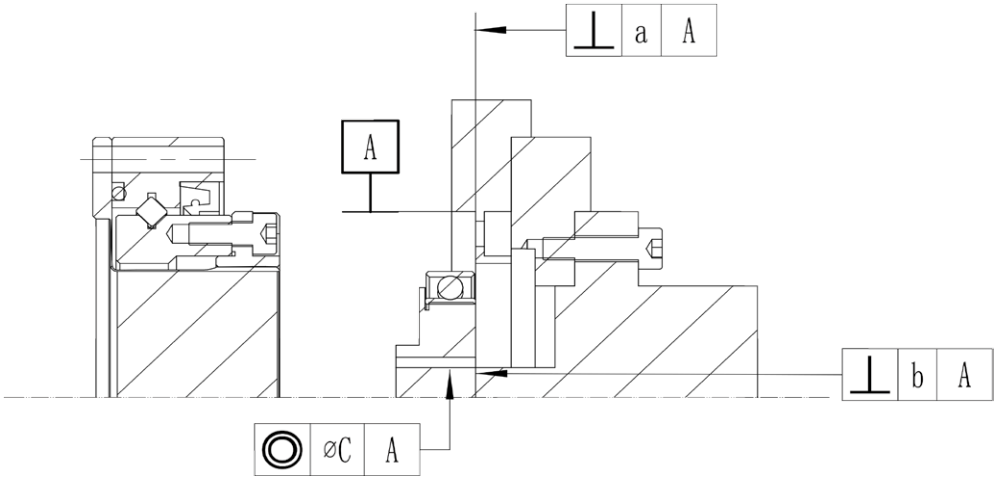
■ GHT32-I


Ø40
Ø104
18-Ø4.5 THRU
4-M4 THRU
Ø96h7
Ø32H7
Ø30H7
30.6
8.6
9
5
40
43
Ø32H7
Ø78
Ø112h7
1
Ø57
10-M10*15

GHS Series Installation Instruction

Assembling Precision

During the assembly, if there are abnormalities such as deformation of the mounting surface and reluctant assembly, the product performance will be degraded or even damaged. As shown in the figure below, the following table is the recommended accuracy of the assembled shell.



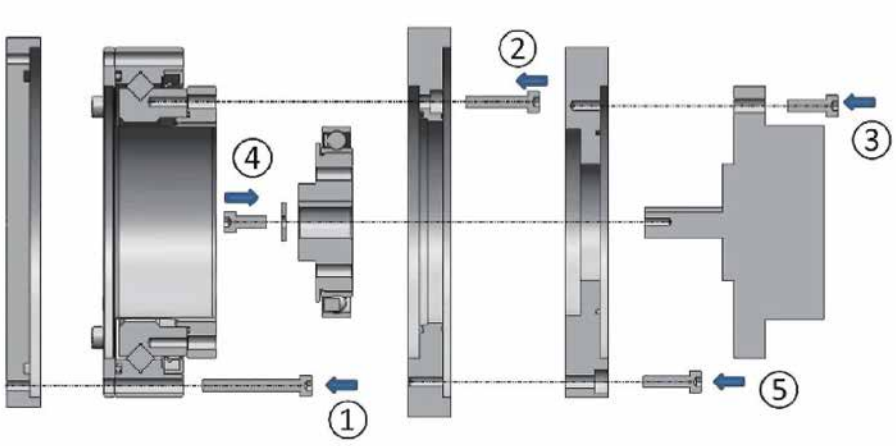
Size	14	17	20	25	32
a	0.011	0.015	0.017	0.024	0.026
b	0.017	0.020	0.020	0.024	0.024
	(0.008)	(0.010)	(0.010)	(0.012)	(0.012)
c	0.030	0.034	0.044	0.047	0.047
	(0.016)	(0.018)	(0.019)	(0.022)	(0.022)

the data in() is the value of the integrated wave generator

Installation Method and Step

Method 1

(Circular spline fixed, flex spin output, the speed ratio is standard ratio)



①Put the speed reducer fixed on the flange.

②Connect the input fixed flange with circular spline.

③Install the flange for motor mounting on the mounting surface of the motor.

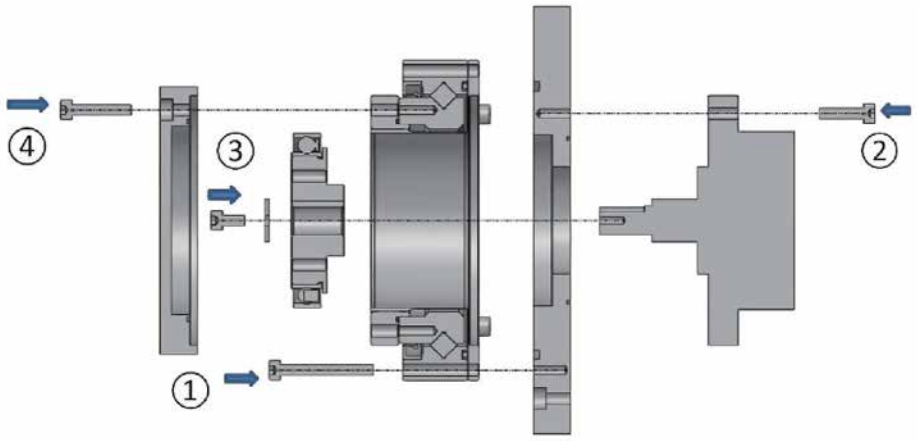
④Mount the wave generator to the input shaft of motor.

⑤Connect the flange for motor mounting with input fixed flange.

⑥Set the speed of the motor around 100r/min. start the motor. Fasten the screw in cross way, increase evenly 4 to 5 times to match the locking force of the screw . To prevent failure or loosening during work, all screws must be grade 12.9 and coated with Loctite 242 thread-locking fluid.

■ Method 2

(Flex spline fixed , circular spline output , the speed ratio is the standard ratio +1)



①Fix the speed reducer on the input fixed flange.

②Mounting the input fixed flange on the mounting surface of the motor.

③Mounting the wave generator on the input shaft of motor.

④Connect the output flange with circular spline.

⑤Set the speed of the motor around 100r/min. start the motor. Fasten the screw in cross way, increase evenly 4 to 5 times to match the locking force of the screw. To prevent failure or loosening during work, all screws must be grade 12.9 and coated with Loctite 242 thread-locking fluid.

Remark

1. When simple combination ex-factory, the outer ring of the cross roller bearing and flex spine are temporarily fixed.
2. Please fill the gap between the wave generator and mounting flange of motor with grease when the wave generator facing up or down.
3. It may cause poor lubrication when the wave generator is in the status of facing upside and use the speed reducer with constant load and low-speed rotation (input speed: low 1000r/min) in a single direction.

■ Installation Precaution

The speed reducer may vibrate and cause abnormal noise when assemble in the wrong way, please comply with the below precautions.

■ Precaution of Wave Generator

1. Avoid overload pressed on the position of wave generator bearing when assembling. The wave generator can be inserted smoothly by rotating.
2. Please pay attention to control the influence of center offset and skew within the recommended value, when using integrated wave generator.

■ Precaution of Circular Spline and Flexspline

1. Make sure the surface of installation is flat, not slanting.
2. Make sure there are no upheaval, rough edges and foreign matters in the hole of the screw.
3. Make sure there are chamfering processing and avoiding processing on the position of case installation, to avoid interfere with circular spline.
4. Make sure the circular spline can be rotated when it assembling to shell, check if there is any position interfere or stuck.
5. Make sure the position of screw holes are exact and check if there is a connection between bolt with circular spline / flexspline due to the skew processing of bolt, which makes the rotation of bolt heavy.
6. Do not tighten the bolts to the specified torque all at once. Please temporarily tighten it with a force of approximately 1/2 of specified torque, and then tighten it to the specified torque. In addition, tighten the bolts in diagonal order usually.
7. Check whether there is extreme unilateral engaged when the flex spline is combined with the circular spline. When a one-sided offset occurs, it may be due to a center offset or skewing of the two components.
8. Pins to the circular may low rotation accuracy, so please avoid is if possible.
9. Please do not tap the front end of the gear at the opening or press it with excessive force when assembling the flexspline.
10. Check whether there is extreme unilateral engaged when the circular spline is combined with the circular spline. When a one-sided offset occurs, it may be due to a center offset or skewing of the two components.

Precautions for Grease

1. The flexible bearing needs to be evenly coated with grease, and the cavity formed by the connection between the motor and the mounting flange needs to be filled with 80% grease.
2. The inner wall of the flexspline needs to be evenly coated with grease, and the cavity formed by the connection between the flex spline and the flange needs to be filled with 80% grease.
3. There is no grease applied to the other parts except the root of the tooth of the simple combination reducer, please apply the remaining parts according to the specific situation.
4. The performance of grease will change by temperature, the higher the temperature, the faster the deterioration. In order to ensure the grease always in good condition, the heat balance temperature of the high temperature section of the reducer should be lower than 70°C, and the temperature rise should be lower than 40°C.
5. The wear of each moving part of the reducer is mainly affected by the performance of the grease. The grease should be replaced every 3000 hours of operation for the harmonic drive if possible.

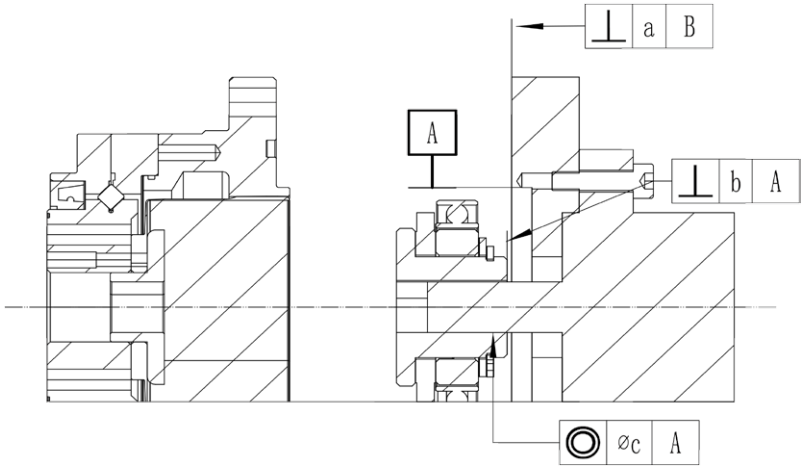
Other Considerations

1. To avoid damage during use, the harmonic drive must be installed under a clean environment, and no foreign matter can enter the reducer during the installation.
2. Please make sure the surface of the gear and flexible bearing of the reducer always fully lubricated. It is not recommended to make the face of the tooth always facing upwards, which will affect the lubrication effects.
3. Install the flexspline and circular spline on the device firstly, then assemble the wave generator.
4. When install the machine, the long axis of the wave generator is aligned with the long axis of the flexspline of the reducer. Then fix the reducer with the corresponding screw, and tighten the it slightly.
5. Please confirm that engagement between the flexspline and circular spline are 180° symmetrical, after assembling of the wave generator.
6. Once finish installation, please run it at a low speed (100rpm) first, if there is abnormal vibration and noise, please stop it immediately, and check whether the installation is correct or not , or contact us .To avoid damage from incorrect installation.
7. The requirements for the installation plane for reducer are: flatness 0.01mm, perpendicularity to the axis 0.01mm, and concentricity of the threaded hole or through hole to the axis 0.1 mm.
8. To prevent grease leakage and maintain the durability of the reducer, corresponding sealing mechanisms must be used for different positions, such as: oil seals for rotating motion, O-rings for mating surfaces of various parts, and screw glue for screw holes.
9. Please strictly follow the pocket hole of the reducer in the drawings to confirm the design of the flange and wave generator. If the exceeded pocket hole, it will cause interference between the flex spline and the flange or the wave generator, affect the service life of the reducer.
10. The installation design of the reducer should be according to the installation depth requirements of the wave generator. The different installation depth of the reducer will affect the starting torque and accuracy of the reducer.
11. There is no anti-rust treatment on the surface of the reducer. If rust prevention required, apply the rust inhibitor to the surface.

GHC Series Installation Instruction

Assembling Precision

During the assembly, if there are abnormalities such as deformation of the mounting surface and reluctant assembly, the product performance will be degraded or even damaged. As shown in the figure below, the following table is the recommended accuracy of the assembled shell.



Size	14	17	20	25	32
a	0.011	0.015	0.017	0.024	0.026
b	0.017	0.020	0.020	0.024	0.024
	(0.008)	(0.010)	(0.010)	(0.012)	(0.012)
c	0.030	0.034	0.044	0.047	0.047
	(0.016)	(0.018)	(0.019)	(0.022)	(0.022)

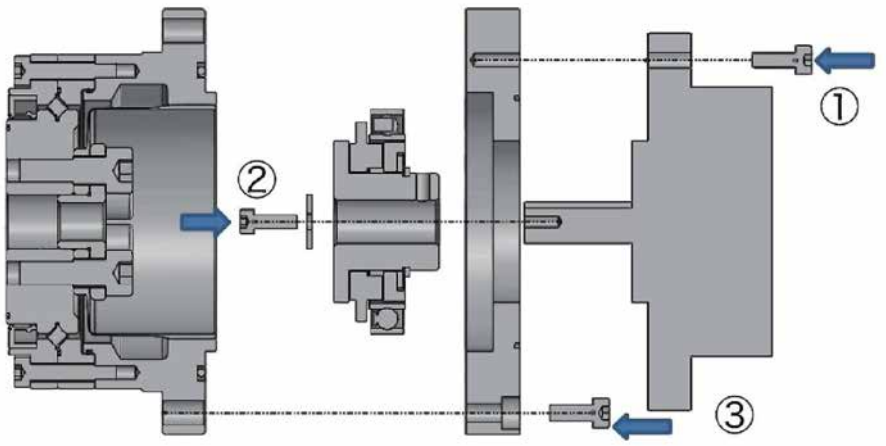
the data in() is the value of the integrated wave generator

Installation Method and Step

The installation method of motor installation must be applied when assembling the motor to speed reducer Installation Method and Step as below

(Circular spline fixed, flex spin output, the speed ratio is standard ratio)

Method 1



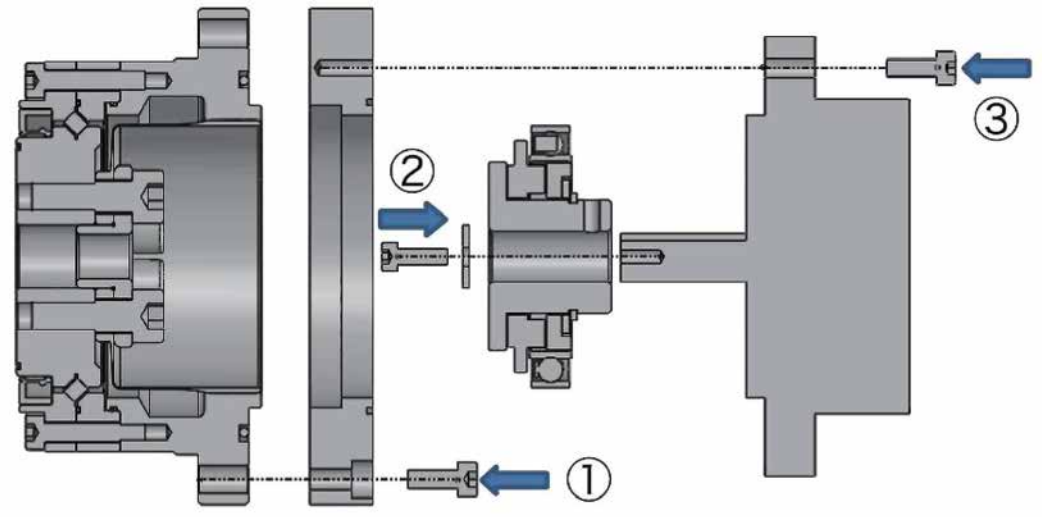
①Install the flange for motor mounting on the mounting surface of the motor.

②Mount the wave generator to the output shaft of motor.

③Assemble the mainframe of the speed reducer.

④Set the speed of the motor around 100 rpm. start the motor. Fasten the screw in cross way, increase evenly 4 to 5 times to match the locking force of the screw. To prevent failure or loosening during work, all screws must be grade 12.9 and coated with Loctite 242 thread-locking fluid.

Method 2



① Install the flange to the mainframe of the speed reducer.

② Install the wave generator to the output shaft of the motor.

③ Install the flange for motor mounting on the mounting surface of the motor.

④ Set the speed of the motor around 100r/min. start the motor. Fasten the screw in cross way, increase evenly 4 to 5 times to match the locking force of the screw . To prevent failure or loosening during work, all screws must be grade 12.9 and coated with Loctite 242 thread-locking fluid.

Remark:
Please fill the gap between the wave generator and mounting flange of motor with grease when the wave generator facing up or down.

Installation Precaution

The speed reducer may vibrate and cause abnormal noise when assemble in the wrong way, please comply with the below precautions.

Precaution of Wave generator

1. Avoid overload pressed on the position of wave generator bearing when assembling. The wave generator can be inserted smoothly by rotating.
2. Please pay attention to control the influence of center offset and skew within the recommended value, when using integrated wave generator.

Precaution of Circular Spline and Flexspline

1. Make sure the surface of installation is flat, not slanting.
2. Make sure there are no upheaval, rough edges and foreign matters in the hole of the screw.
3. Make sure there are chamfering processing and avoiding processing on the position of case installation, to avoid interfere with circular spline.

Precautions for Grease

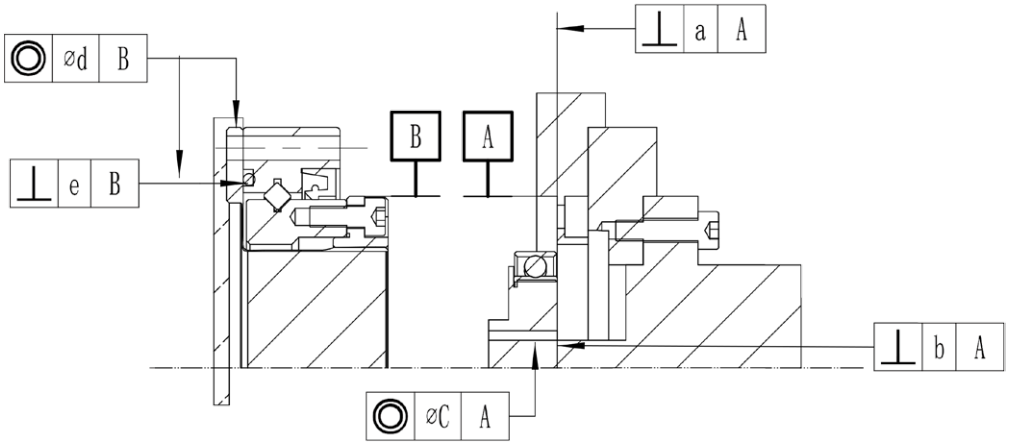
1. The flexible bearing needs to be evenly coated with grease, and the cavity formed by the connection between the motor and the mounting flange needs to be filled with 80% grease.
2. The inner wall of the flexspline needs to be evenly coated with grease, and the cavity formed by the connection between the flexspline and the flange needs to be filled with 80% grease.
3. The performance of grease will change by temperature, the higher the temperature, the faster the deterioration. In order to ensure the grease always in good condition, the heat balance temperature of the high temperature section of the reducer should be lower than 70°C, and the temperature rise should be lower than 40°C.
4. The wear of each moving part of the reducer is mainly affected by the performance of the grease. The grease should be replaced every 3000 hours of operation for the harmonic drive if possible.

Other Considerations

1. To avoid damage during use, the harmonic drive must be installed under a clean environment, and no foreign matter can enter the reducer during the installation.
2. Please make sure the surface of the gear and flexible bearing of the reducer always fully lubricated. It is not recommended to make the face of the tooth always facing upwards, which will affect the lubrication effects.
3. Install the flexspline and circular spline on the device firstly, then assemble the wave generator.
4. When install the machine, the long axis of the wave generator is aligned with the long axis of the flexspline of the reducer. Then fix the reducer with the corresponding screw, and tighten the it slightly.
5. Please confirm that engagement between the flex spline and circular spline are 180° symmetrical, after assembling of the wave generator.
6. Once finish installation, please run it at a low speed (100rpm) first, if there is abnormal vibration and noise, please stop it immediately, and check whether the installation is correct or not , or contact us .To avoid damage from incorrect installation.
7. The requirements for the installation plane for reducer are: flatness 0.01mm, perpendicularity to the axis 0.01mm, and concentricity of the threaded hole or through hole to the axis 0.1 mm.
8. To prevent grease leakage and maintain the durability of the reducer, corresponding sealing mechanisms must be used for different positions, such as: oil seals for rotating motion, O-rings for mating surfaces of various parts, and screw glue for screw holes.
9. Please strictly follow the pocket hole of the reducer in the drawings to confirm the design of the flange and wave generator. If the exceeded pocket hole, it will cause interference between the flexspline and the flange or the wave generator, affect the service life of the reducer.
10. The installation design of the reducer should be according to the installation depth requirements of the wave generator. The different installation depth of the reducer will affect the starting torque and accuracy of the reducer.
11. There is no anti-rust treatment on the surface of the reducer. If rust prevention required, apply the rust inhibitor to the surface.

Assembling Precision

During the assembly, if there are abnormalities such as deformation of the mounting surface and reluctant assembly, the product performance will be degraded or even damaged. As shown in the figure below, the following table is the recommended accuracy of the assembled shell. The picture below takes the simple combination hollow type speed reducer as an example



Size	14	17	20	25	32
a	0.011	0.015	0.017	0.024	0.026
b	0.017	0.020	0.020	0.024	0.024
	(0.008)	(0.010)	(0.010)	(0.012)	(0.012)
c	0.030	0.034	0.044	0.047	0.047
	(0.016)	(0.018)	(0.019)	(0.022)	(0.022)
d	0.015	0.018	0.019	0.022	0.022
e	0.016	0.021	0.027	0.035	0.042

The data in() is the value of the integrated wave generator

Installation Method and Step

The installation Method and steps are the same with GHS.

Installation Precaution

The speed reducer may vibrate and cause abnormal noise when assemble in the wrong way, please comply with the below precaution.

Precaution of Wave Generator

1. Avoid overload pressed on the position of wave generator bearing when assembling. The wave generator can be inserted smoothly by rotating.
2. Please pay attention to control the influence of center offset and skew within the recommended value, when using integrated wave generator.

Precaution of Circular Spline and Flexspline

1. Make sure the surface of installation is flat, not slanting.
2. Make sure there are no upheaval, rough edges and foreign matters in the hole of the screw.
3. Make sure there are chamfering processing and avoiding processing on the position of case installation, to avoid interfere with circular spline.
4. Make sure the circular spline can be rotated when it assembling to shell, check if there is any position interfere or stuck.
5. Make sure the position of screw holes are exact and check if there is a connection between bolt with circular spline / flexspline due to the skew processing of bolt, which makes the rotation of bolt heavy.
6. Do not tighten the bolts to the specified torque all at once. Please temporarily tighten it with a force of approximately 1/2 of specified torque, and then tighten it to the specified torque. In addition, tighten the bolts in diagonal order usually.
7. Check whether there is extreme unilateral engaged when the flex spline is combined with the circular spline. When a one-sided offset occurs, it may be due to a center offset or skewing of the two components.
8. Pins to the circular may low rotation accuracy, so please avoid is if possible.
9. Please do not tap the front end of the gear at the opening or press it with excessive force when assembling the flexspline.
10. Check whether there is extreme unilateral engaged when the circular spline is combined with the circular spline. When a one-sided offset occurs, it may be due to a center offset or skewing of the two components.

Precautions for Grease

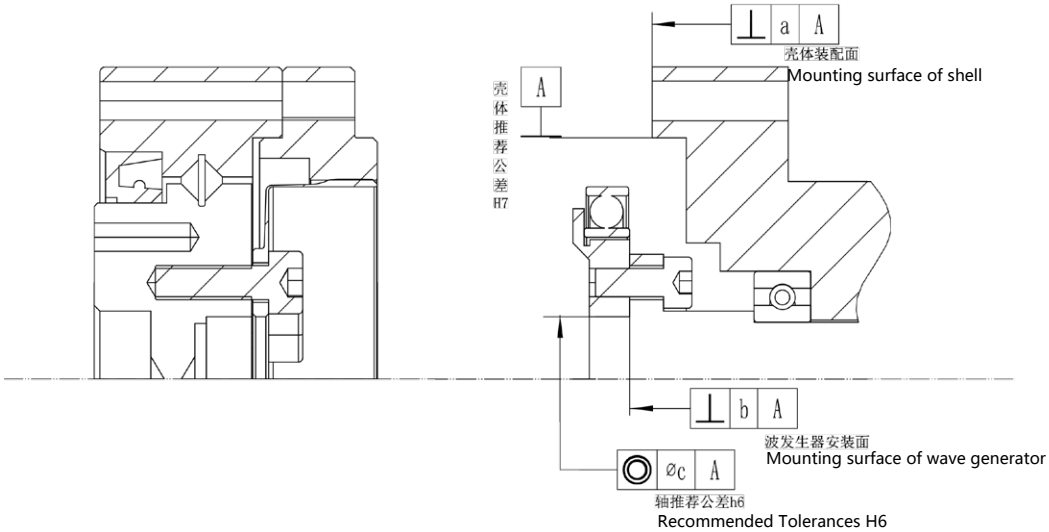
1. The flexible bearing needs to be evenly coated with grease, and the cavity formed by the connection between the motor and the mounting flange needs to be filled with 80% grease.
2. The inner wall of the flex spline needs to be evenly coated with grease, and the cavity formed by the connection between the flex spline and the flange needs to be filled with 80% grease.
3. The performance of grease will change by temperature, the higher the temperature, the faster the deterioration. In order to ensure the grease always in good condition, the heat balance temperature of the high temperature section of the reducer should be lower than 70°C, and the temperature rise should be lower than 40°C.
4. The wear of each moving part of the reducer is mainly affected by the performance of the grease. The grease should be replaced every 3000 hours of operation for the harmonic drive if possible.
5. There is no grease applied to the other parts except the root of the tooth of the simple combination reducer, please apply the remaining parts according to the specific situation.

Other Considerations

1. To avoid damage during use, the harmonic drive must be installed under a clean environment, and no foreign matter can enter the reducer during the installation.
2. Please make sure the surface of the gear and flexible bearing of the reducer always fully lubricated. It is not recommended to make the face of the tooth always facing upwards, which will affect the lubrication effects.
3. Install the flex spline and circular spline on the device firstly, then assemble the wave generator.
4. When install the machine, the long axis of the wave generator is aligned with the long axis of the flexspline of the reducer. Then fix the reducer with the corresponding screw, and tighten the it slightly.
5. Please confirm that engagement between the flex spline and circular spline are 180° symmetrical, after assembling of the wave generator.
6. Once finish installation, please run it at a low speed (100rpm) first, if there is abnormal vibration and noise, please stop it immediately, and check whether the installation is correct or not , or contact us .To avoid damage from incorrect installation.
7. The requirements for the installation plane for reducer are: flatness 0.01mm, perpendicularity to the axis 0.01mm, and concentricity of the threaded hole or through hole to the axis 0.1 mm.
8. To prevent grease leakage and maintain the durability of the reducer, corresponding sealing mechanisms must be used for different positions, such as: oil seals for rotating motion, O-rings for mating surfaces of various parts, and screw glue for screw holes.
9. Please strictly follow the pocket hole of the reducer in the drawings to confirm the design of the flange and wave generator. If the exceeded pocket hole, it will cause interference between the flexspline and the flange or the wave generator, affect the service life of the reducer.
10. The installation design of the reducer should be according to the installation depth requirements of the wave generator. The different installation depth of the reducer will affect the starting torque and accuracy of the reducer.
11. There is no anti-rust treatment on the surface of the reducer. If rust prevention required, apply the rust inhibitor to the surface

Assembling Precision

During the assembly, if there are abnormalities such as deformation of the mounting surface and reluctant assembly, the product performance will be degraded or even damaged. As shown in the figure below, the following table is the recommended accuracy of the assembled shell.



Size	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

Installation Method and Step

The installation method and steps are the same with GHC

Installation Precaution

The speed reducer may vibrate and cause abnormal noise when assemble in the wrong way, please comply with the below precautions.

Precaution of wave generator

1. Avoid overload pressed on the position of wave generator bearing when assembling. The wave generator can be inserted smoothly by rotating.
2. Please pay attention to control the influence of center offset and skew within the recommended value, when using integrated wave generator .

Precaution of circular spline and flex spline

1. Make sure the surface of installation is flat, not slanting.
2. Make sure there are no upheaval, rough edges and foreign matters in the hole of the screw.
3. Make sure there are chamfering processing and avoiding processing on the position of case installation, to avoid interfere with circular spline.

Precautions for Grease

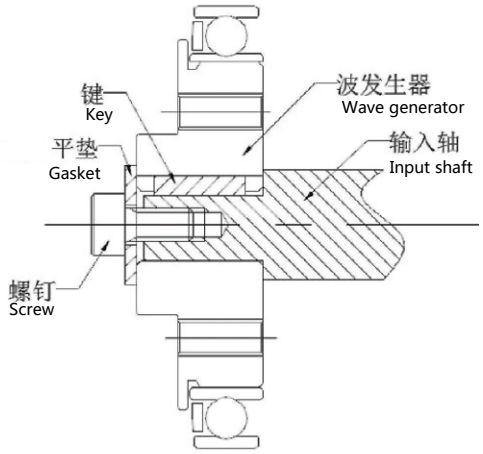
1. The flexible bearing needs to be evenly coated with grease, and the cavity formed by the connection between the motor and the mounting flange needs to be filled with 80% grease.
2. The inner wall of the flex spline needs to be evenly coated with grease, and the cavity formed by the connection between the flex spline and the flange needs to be filled with 80% grease.
3. The performance of grease will change by temperature, the higher the temperature, the faster the deterioration. In order to ensure the grease always in good condition, the heat balance temperature of the high temperature section of the reducer should be lower than 70°C, and the temperature rise should be lower than 40°C.
4. The wear of each moving part of the reducer is mainly affected by the performance of the grease. The grease should be replaced every 3000 hours of operation for the harmonic drive if possible.

Other Considerations

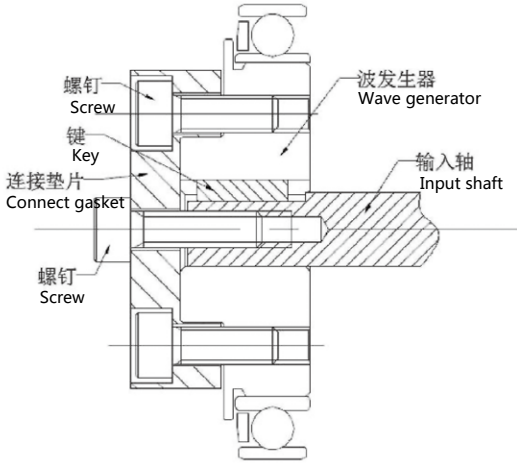
1. To avoid damage during use, the harmonic drive must be installed under a clean environment, and no foreign matter can enter the reducer during the installation.
2. Please make sure the surface of the gear and flexible bearing of the reducer always fully lubricated. It is not recommended to make the face of the tooth always facing upwards, which will affect the lubrication effects.
3. Install the flex spline and circular spline on the device firstly, then assemble the wave generator.
4. When install the machine, the long axis of the wave generator is aligned with the long axis of the flexspline of the reducer. Then fix the reducer with the corresponding screw, and tighten the it slightly.
5. Please confirm that engagement between the flex spline and circular spline are 180° symmetrical, after assembling of the wave generator.
6. Once finish installation, please run it at a low speed (100rpm) first, if there is abnormal vibration and noise, please stop it immediately, and check whether the installation is correct or not , or contact us .To avoid damage from incorrect installation.
7. The requirements for the installation plane for reducer are: flatness 0.01mm, perpendicularity to the axis 0.01mm, and concentricity of the threaded hole or through hole to the axis 0.1 mm.
8. To prevent grease leakage and maintain the durability of the reducer, corresponding sealing mechanisms must be used for different positions, such as: oil seals for rotating motion, O-rings for mating surfaces of various parts, and screw glue for screw holes.
9. Please strictly follow the pocket hole of the reducer in the drawings to confirm the design of the flange and wave generator. If the exceeded pocket hole, it will cause interference between the flexspline and the flange or the wave generator, affect the service life of the reducer.
10. The installation design of the reducer should be according to the installation depth requirements of the wave generator. The different installation depth of the reducer will affect the starting torque and accuracy of the reducer.
11. There is no anti-rust treatment on the surface of the reducer. If rust prevention required, apply the rust inhibitor to the surface.

Connection & fixing method of Wave Generator

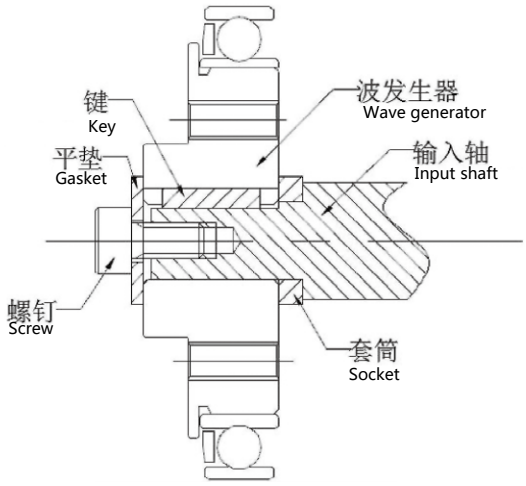
1.The input shaft has a shoulder, which can be connected and fixed with the wave generator directly. As shown below. As shown below



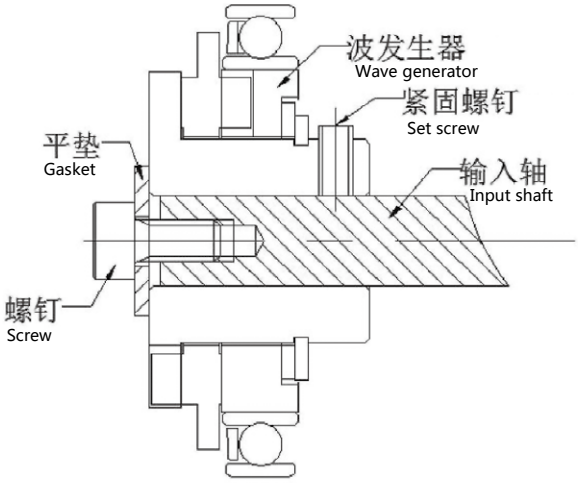
3. No shoulder on input shaft, a connected gasket needed to fix on the wave generator then connect with the input shaft. As shown below



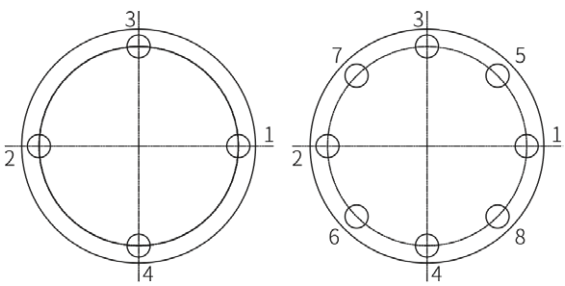
2. The input shaft has a shoulder, but it is long. The socket can be added to the shaft (the parallelism of the two sides of the socket must be within 0.01 mm) and then connected with the wave generator. As shown below



4. For shaft input, insert the wave generator first, and connect the input shaft by tightening screws, which is suitable for small models. As shown below



Screw Locking Method



Screw Locking Method

Screw Performance Grade	12.9 Grade						
Nominal Diameter of Thread mm	3	4	5	6	8	10	12
Tightening Torque N.m	2	4	9	15	35	70	125

Use of Grease

■ Precautions for the Use of Grease

(1)The internal hidden part of the combination type reducer (cup-shaped and hollow shape) has been applied with grease before ex-factory. But grease also needed to applied when assembling the wave generator.

(2)The input and output of the harmonic reducer must be designed with a strict sealing structure. It is recommended to use a skeleton-type self-tightening oil seal grease seal for the dynamic sealing part. It is recommended to use an O-ring or sealant to seal the static seal, and it must be ensured that the sealing surface is not skewed or damaged.

(3)Use the recommended semi-fluid grease for harmonic reducers, and avoid mixing with other greases.

(4)The use of grease must comply with the requirements of the manual. Please note that the amount of grease injected and applied is different for different models.

(5)During the use of the harmonic reducer, if the wave generator is always facing upwards, it may cause poor lubrication. At this time, increase the amount of grease injected or contact us.

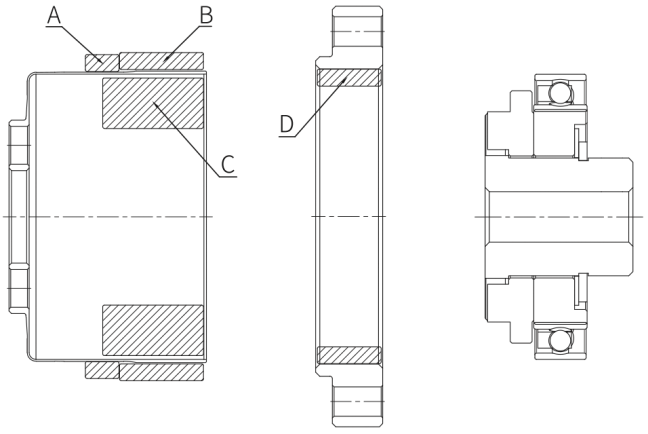
(6)The performance of grease will change by temperature, the higher the temperature, the faster the deterioration. In order to ensure the grease always in good condition, the heat balance temperature of the high temperature section of the reducer should be lower than 70°C, and the temperature rise should be lower than 40°C.

(7)The wear of each moving part of the reducer is mainly affected by the performance of the grease. The grease should be replaced every 3000 hours of operation for the harmonic drive if possible.

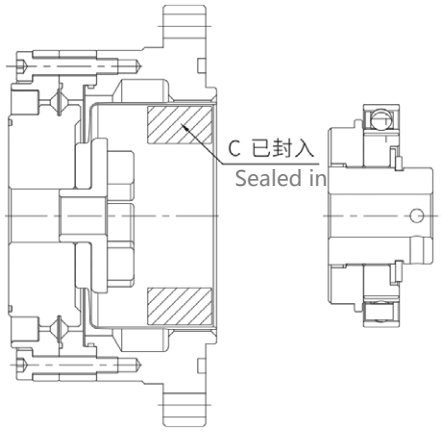
■ GHC、GHS Series Grease Application Volume

SIZE	Application Position					
	A	B	C			D
			Horizontal Use	Vertical Use		
				Up	Down	
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

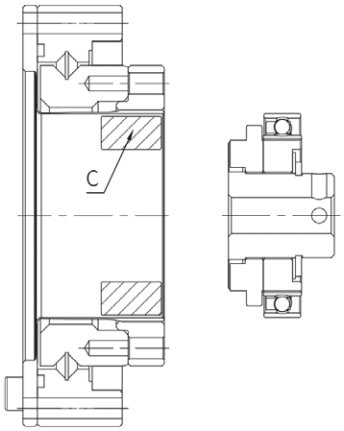
■ GHC-I Series Grease Application Position

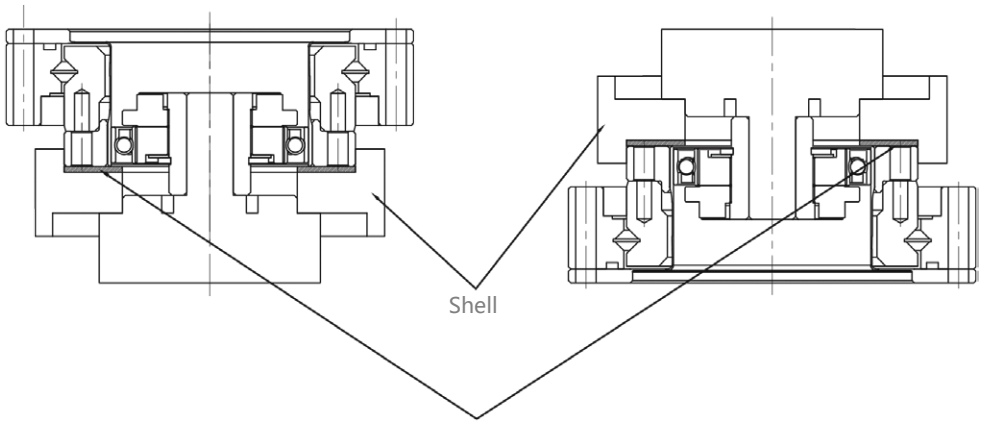


GHC-A Series Grease Application Position



GHS-A Series Grease Application Position

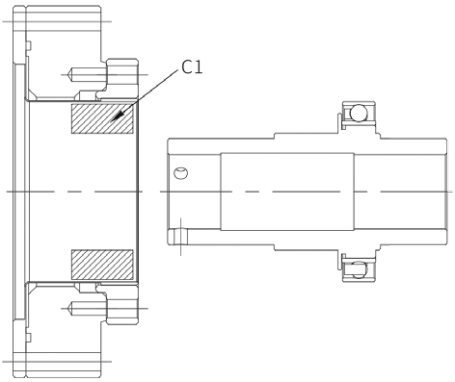




GHS-K Series Grease Application Position

Size	Application Position
	C1
14	5.5
17	9.6
20	10.3
25	16
32	26

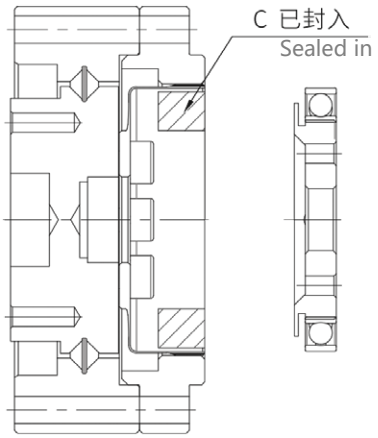
GHC-K Series Grease Application Position



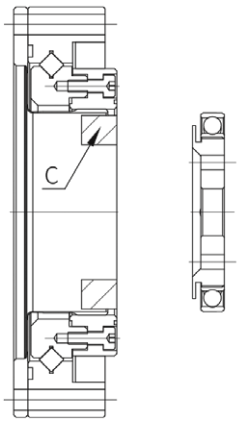
GHD、GHT Series Grease Application Position

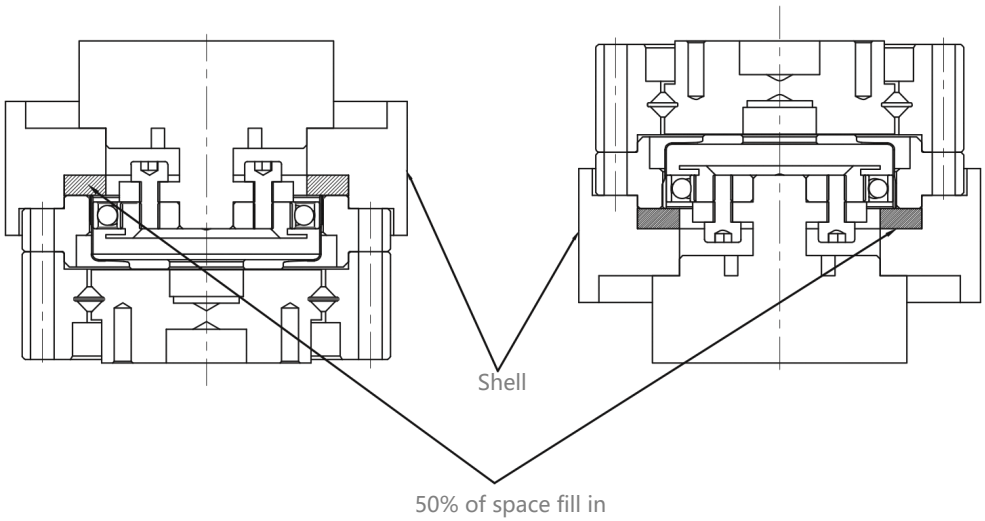
SIZE	Application Position		
	C		
	Horizontal Use	Vertical Use	
		Up	Down
14	3	4	5
17	5	6	7
20	8	9	11
25	16	19	21
32	36	42	48

GHT Series Grease Application Position



GHD Series Grease Application Position





Replace Time of Grease

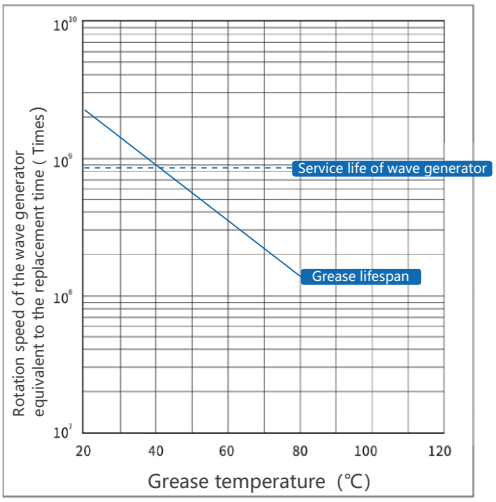
The wear of each moving part of the harmonic reducer is largely affected by the performance of the grease. The performance of grease will change according to temperature. The higher the temperature, the faster it will deteriorate Therefore, it should be better to replace the grease as soon as possible. As shown in the figure below, when the average load torque is lower than the rated torque, the grease replacement time is determined by the relationship between the grease temperature and the total number of revolutions of the wave generator. When the average load torque exceeds the rated torque, the grease change time is calculated by the following formula.

Formula (the average load torque exceeds the rated torque)

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

L_{GT}	Replace time (exceeds the rated torque)	Speed	-
L_{GTn}	Replace time (Lower than the rated torque)	Speed	Reference Picture at right
Tr	rated torque	N.m kgfm	Refer to the parameter table of each series
Tav	Average load torque at output side	-	According to work condition

Grease replace time:
L_{GTn} (the average load torque lower than the rated torque)



The service life of the wave generator indicates a breakage rate of 10%

Additional Notes :

①Please avoid mixing with other greases. In addition, please place the harmonic reducer in a separate housing when assembling it to the device.

②It may cause poor lubrication when the wave generator faces upward and rotates at a low speed(input speed: less than 1000r/min)with a fixed load in one direction. Please contact us when using the harmonic driver in this situation.

③About the grease leakage of the combined type.
Although the combination type has taken measures to prevent grease leakage when designing the structure, please strengthen the sealing structure according to the operating environment.

Precaution of the Use of Harmonic Drive

■ Precaution of design (Please read the specification when start design)

● Please comply with the following requirements when using harmonic driver
Environment temperature: 0 ~ 40℃
Avoid being splashed the water, oil etc.
No corroding, explosive gas, mental powder etc.

● Please design and assemble the various components correctly to ensure that they can meet the recommended installation accuracy in the catalog.
Failure to achieve the specified accuracy may result in vibration and shortened service life.

● Please follow the correct assembly method and steps according to the product catalog. Please follow our recommendations for the screwing method (using bolts, etc.). If not assembled correctly, it may cause vibration, shortened service life, decreased accuracy,damage, and other failures.

● Use the required grease. If not use the grease recommended by the company may shorten the service life of the product. In addition, please change the grease according to the specified conditions. The combination product is pre-applied with grease. Do not mix with other greases.

■ Precautions for use (When running, please read the instruction manual)

● Do not use a hammer or other force to strike components and combination units. In addition, please make sure that there will be no cracks, deflated marks, etc. due to drops, etc. Otherwise, the product may be damaged. The performance can't be ensured due to damage. It may cause malfunctions also.

● The components of this product are processed as a set. When used in combination with other kits, it can not ensure it will perform as intended.

● Applied torque doesn't exceed the maximum allowable instant torque. Otherwise, the tightening bolts may loosen, shake, break, etc., resulting in malfunction.

● It is not allowed to disassemble and reassemble. Otherwise, the original performance will not be restored.

■ About Scrapping

When scrapping, please treat it as industrial waste.

■ Use of Grease

● **Precaution**

It may cause inflammation if splashed into the eyes. Please wear protective glasses.
It may cause inflammation if skin contact. Please wear protective gloves etc . to avoid skin contact.
Do not swallow (may cause diarrhea, vomiting, etc.).
Wear a protective glove to avoid fingers hurt when opening the container.
Keep out of reach of children.

● **Storage Method**

After use, please seal it well to prevent dust and moisture from mixing in. Please keep it in a shady place and avoid direct sunlight. For long-term storage of products, it is recommended to check the performance and rust prevention. For surface treatment, please refer to the delivery drawing in detail.

● **Emergency Treatment:**

In case of eye contact, wash immediately with water for 15 minutes and receive medical attention.
In case of skin contact, wash well with water and soap.
In case of swallowing, please do not vomit and receive medical attention immediately.

● **Treatment of waste oil and waste containers**

Comply with the law stipulated treatment method. If not clear, please contact with us.
Do not apply pressure to an empty container. it may cause a burst.
Do not weld, heat, open or cut the container or an explosion may occur and the inside residue may catch fire and burn.

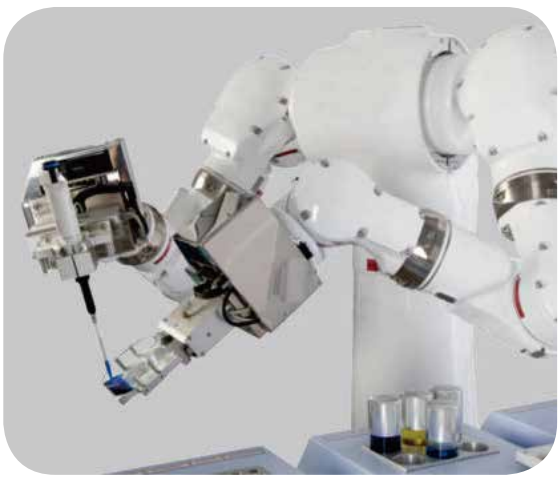
Application of Harmonic Drive

Aerospace

Medical Equipment

Robots

Communication Device



Inspection Machine

Semiconductor Processing Equipment