Main Drive

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HSINCHU SCI. PARK

2F., No. 11, R&D Rd. I, Hsinchu Science Park, Hsinchu City 30076, Taiwan

TONGLUO SCI. PARK

No. 20, Tongke 6th Rd., Tongluo Science Park, Miaoli 36645, Taiwan
Tel: +886-37-983936 Fax: +886-37-983988
Email: maindrive2018@maindrive.com.tw
Website: www.maindrive.com.tw

WEBSITE

2022.10.A1A

HARMONIC REDUCERS

MAIN DRIVE CORPORATION

Main Drive

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About Main Drive

Specializing In Manufacturing Harmonic Reducer And Joint Module

Main Drive Corporation was established in October 2018, which specializes in manufacturing Robot Joint Module and Harmonic Reducers, with features of "High precision, High load capacity, Small size, Stable transmission" symbolize our products, etc., which are mainly used in the applications of multi-Joint Robot Arms, collaborative robots with medium and low loading, and various automated equipment. Through vertical integration and cooperation, we will provide customers with the most complete solutions towards the goals of electromechanical integration, customized design and intelligent production of Harmonic Reducer.

Main Drive
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CONTENTS

Characteristic

Product Features

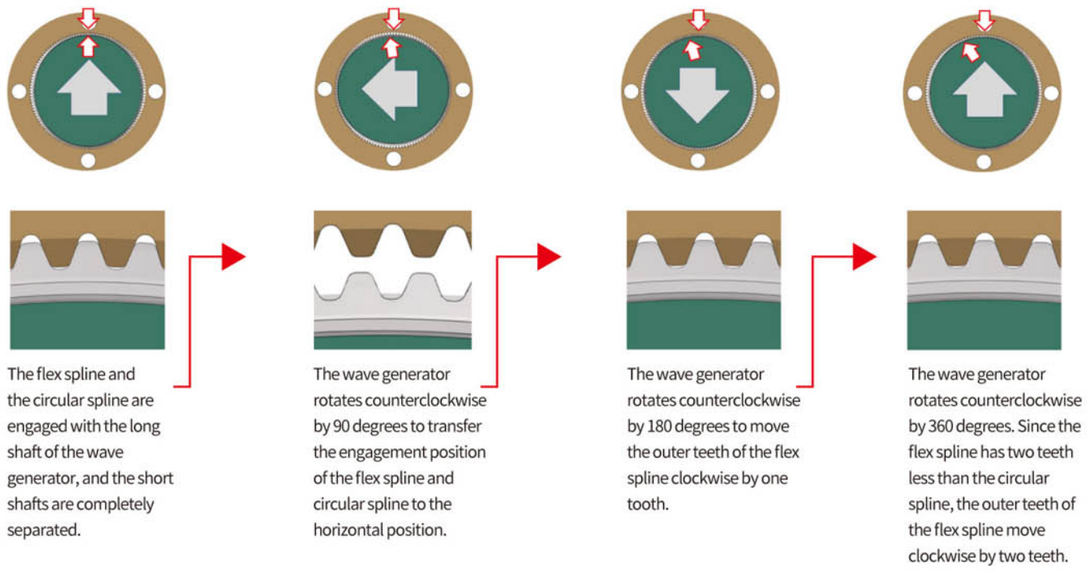
- Compact, light weight
- Simple structure, mainly composed of three components
- High speed reduction ratio
- High capacity, can transmit large torque
- High rotation accuracy
- High efficiency and low noise

Application Scope

- Robot / Robot arm
- Metal processing machinery
- Semiconductor equipment
- Flat panel display production equipment
- Optical equipment
- Printing machinery
- Woodworking machinery
- PCB machinery
- Medical machinery

Transmission Principle Of Reducer

The transmission principle of harmonic reducer is a transmission mode that uses flex splines to generate elastic deformation and transmit power. It breaks through the original mechanical mode of using a rigid mechanism. Because the deformation process of the intermediate flexible member is basically a symmetrical harmonic, it is named "harmonic transmission".



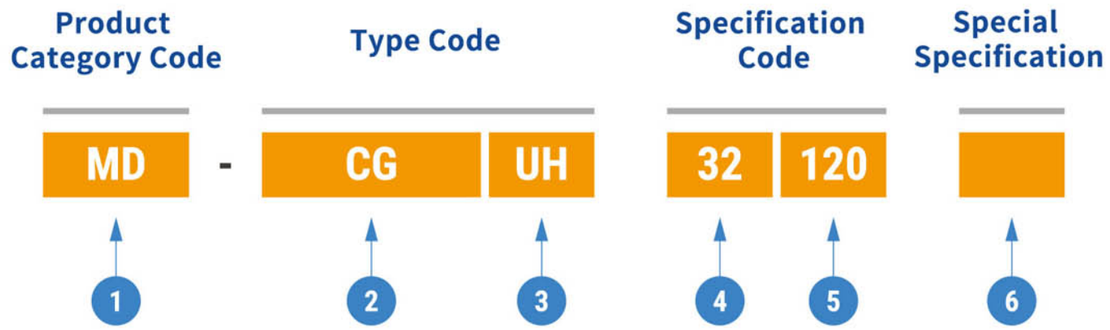
The flex spline and the circular spline are engaged with the long shaft of the wave generator, and the short shafts are completely separated.

The wave generator rotates counterclockwise by 90 degrees to transfer the engagement position of the flex spline and circular spline to the horizontal position.

The wave generator rotates counterclockwise by 180 degrees to move the outer teeth of the flex spline clockwise by one tooth.

The wave generator rotates counterclockwise by 360 degrees. Since the flex spline has two teeth less than the circular spline, the outer teeth of the flex spline move clockwise by two teeth.

Product Coding Principle



No.	Indication	Description
1	Product category	MD：Harmonic reducer
2	Flex spline Form	CG：Cup type / HG：Hollow type
3	Combining method	AA：Component type
		UJ：Input shaft type
		UH：Unit type, with cross roller bearing or hollow shaft
		GH：Flange type
		SO：Simple type, hollow type flex spline combined with oldham coupling
		SH：Simple type, Hollow type flex spline combined with hollow shaft
4	Size of flex spline	14、17、20、25、32、40
5	Speed reduction ratio	50、80、100、120、160
6	Special specification	

Product List

Cup Type - CG

AA
Component type

UH
Unit type

GH
Flange type

Hollow Type - HG

AA
Component type

UH
Unit type

SO
Simple type
(Combined with Oldham coupling)

UJ
Input shaft type

SH
Simple type
(Combined with hollow shaft)

Characteristic Data

Transmission Error

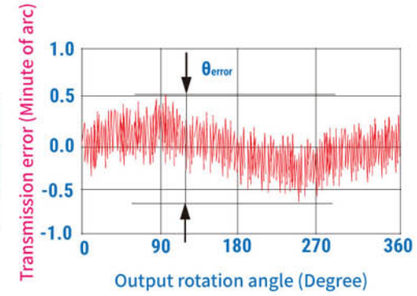
Difference between actual output angle and theoretical output angle when no torque is applied

$\theta_{error} = \theta_{output} - \theta_{input} / R$

θ_{error} : Transmission error
θ_{output} : Output angle
θ_{input} : Input angle
R : Speed reduction ratio

• Transmission Error (arc-min)

Speed reduction ratio	Specification					
	14	17	20	25	32	40
≥50	1.5	1.5	1	1	1	1



Vibration

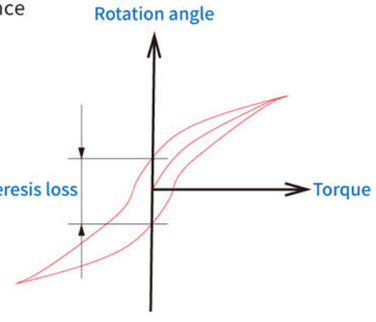
The vibration at the load end of the harmonic reducer is often caused by abnormal transmission error curves, especially when the natural frequency of the harmonic reducer is different from the body or inertial rotational vibration. The resonance effect caused by the overlapping of the horizontal rotational vibration amplifies the vibration caused by the transmission error. In addition, due to the two tooth difference design of the harmonic reducer, the transmission error frequency is twice the input frequency.

$$f = \frac{1}{2\pi}\sqrt{\frac{K}{J}} \qquad N = \frac{f}{2} \times 60$$

f : Natural vibration frequency of harmonic reducer (ZH)
K : Spring constant of harmonic reducer (Nm/rad)
J : Load inertial (kgm2)
N : Input rotational speed (rpm)

Hysteresis Loss

The input is fixed, and the torque at the output end is respectively rotated forward and backward to the rated torque to obtain the intercept difference between the hysteresis curve and the torsion angle axis.



• Transmission Error (arc-min)

Speed reduction ratio	Specification					
	14	17	20	25	32	40
50	2					
≥80	1					

Rated Output Torque

The maximum allowable torque that can be operated for a long time at the rated wheel input speed (2000 rpm).

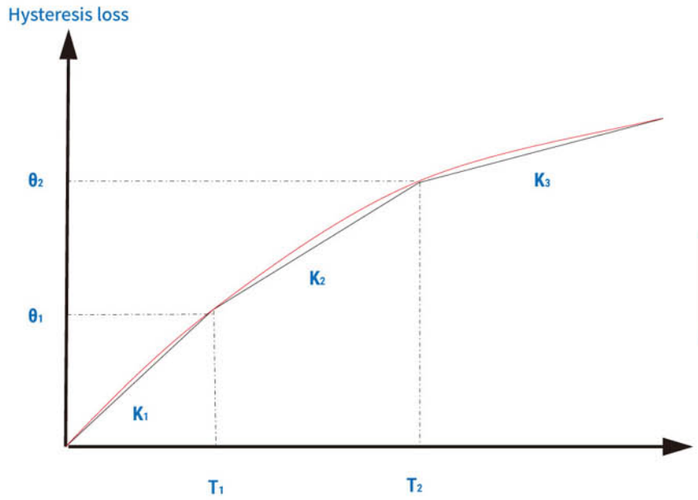
Starting Torque

Under no load, rotate the input end and measure the torque value when it starts to rotate (ambient temperature: 25°C).

Characteristic Data

Rigidity

The rigidity and torsion angle calculated by fixing the input and applying torque at the output end.



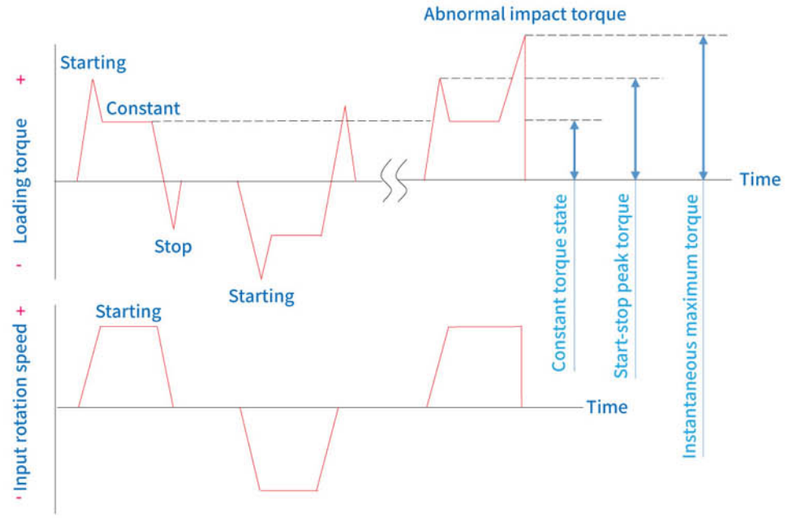
K_1 : rigidity value from torque 0 to T1
K_2 : rigidity value from torque T1 to T2
K_3 : rigidity value above T2

Speed reduction ratio	Symbol	Unit	Specification					
			14	17	20	25	32	40
	T_1	Nm	2.0	3.9	7.0	14	29	54
	T_2	Nm	6.9	12	25	48	108	196
50	K_1	$\times10^4$ Nm/rad	0.34	0.81	1.3	2.5	5.4	10
	K_2	$\times10^4$ Nm/rad	0.47	1.1	1.8	3.4	7.8	14
	K_3	$\times10^4$ Nm/rad	0.57	1.3	2.3	4.4	9.8	18
	θ_1	$\times10^{-4}$ rad	5.8	4.9	5.2	5.5	5.5	5.2
	θ_2	$\times10^{-4}$ rad	16	12	15.4	15.7	15.7	15.4
≥80	K_1	$\times10^4$ Nm/rad	0.47	1	1.6	3.1	6.7	13
	K_2	$\times10^4$ Nm/rad	0.61	1.4	2.5	5.0	11	20
	K_3	$\times10^4$ Nm/rad	0.71	1.6	2.9	5.7	12	23
	θ_1	$\times10^{-4}$ rad	4.1	3.9	4.4	4.4	4.4	4.1
	θ_2	$\times10^{-4}$ rad	12	9.7	11.3	11.1	11.6	11.1

Characteristic Data

Allowable Peak Torque For Start And Stop

When starting and stopping, the torque borne by inertia is larger than the constant torque.



Rated Output Torque

The maximum allowable torque that can be operated for a long time at the rated wheel input speed (2000 rpm).

Starting Torque

Under no load, rotate the input end and measure the torque value when it starts to rotate (ambient temperature: 25°C).

No-load Operating Torque

Input torque required to rotate the harmonic reducer under no load and at rated rotation speed (ambient temperature: 25°C).

Output Starting Torque

Under no load, rotate the output end and measure the torque value when it starts to rotate (ambient temperature: 25°C).

Rated Input Rotation Speed

Allowable input rotation speed.

Noise Value

Measure 1m away from the harmonic reducer under no load and rated rotation speed.

Efficiency

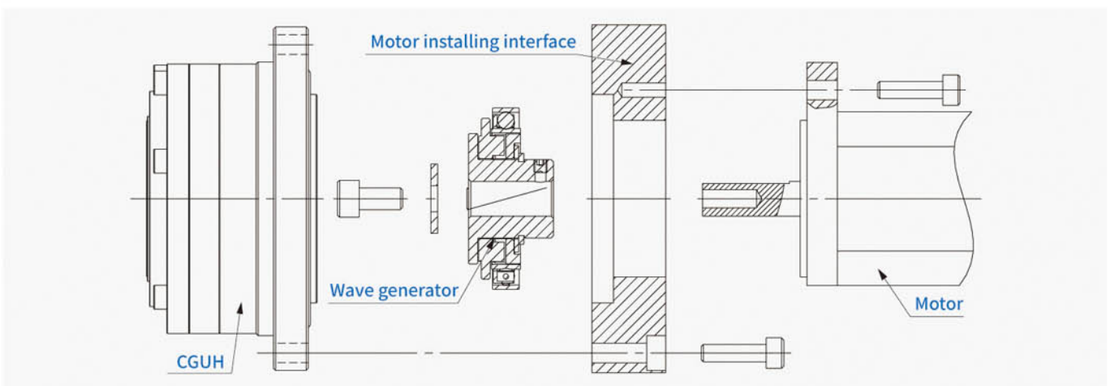
Efficiency value measured under rated load and rated rotation speed.

Installation

Motor Installation Method

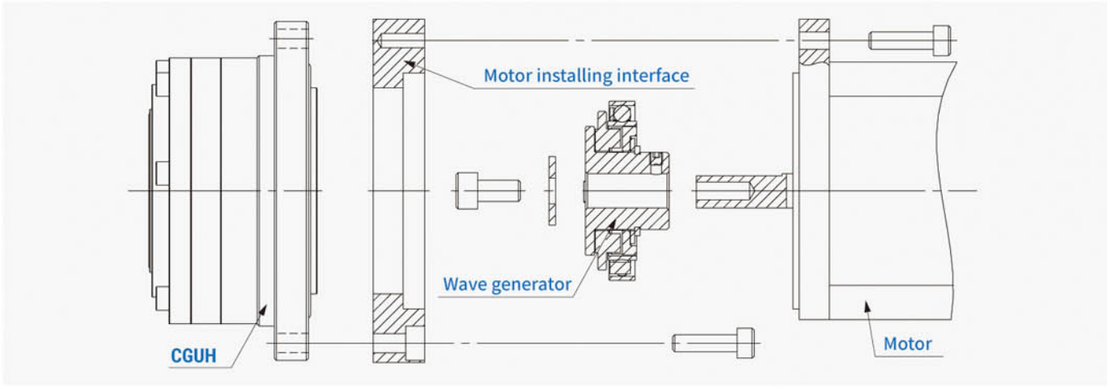
Installation Method 1

1. Motor installing interface combined with motor.
2. Wave generator combined with motor output shaft.
3. Reducer combined with motor installing interface.



Installation Method 2

1. Motor installing interface combined with motor
2. Wave generator combined with motor output shaft.
3. Reducer combined with motor installing interface.



Installation precautions

1. It is necessary to confirm whether the flatness of the installation surface is good. If there is any skew, it is easy to cause vibration, abnormal sound and other phenomena.
2. Avoid applying excessive force on the wave generator during assembling. It can be installed slowly by applying pressure while rotating.

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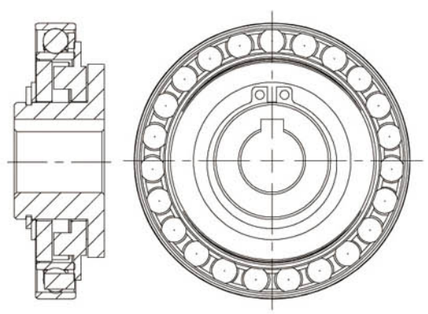
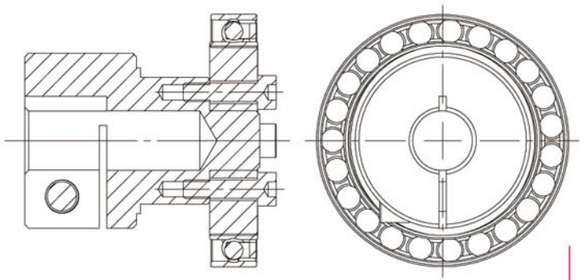
Installation

Motor Installation Method

The structure of the input part is divided into two types: Oldham type and pressing type



Oldham Type

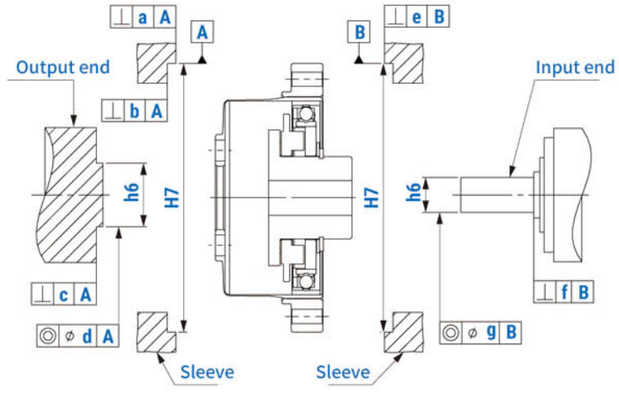


Pressing Type

Installation Accuracy

When the customer installs the input and output interface by himself, attention shall be paid to the installation accuracy requirements of the following models.

Cup Type with Component Type - CGAA

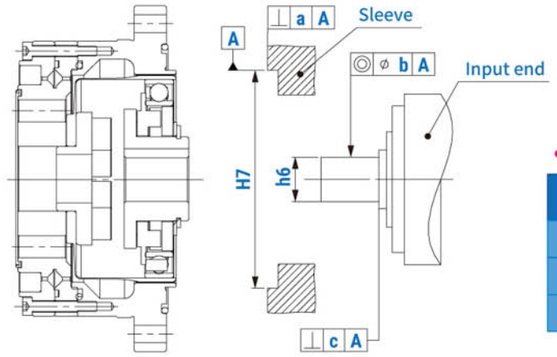


• Installation Accuracy (mm)

Size		14	17	20	25	32
a		0.011	0.015	0.017	0.024	0.026
b		0.011	0.012	0.013	0.014	0.016
c		0.008	0.011	0.014	0.018	0.022
d		0.015	0.018	0.019	0.022	0.022
e		0.011	0.015	0.017	0.024	0.026
f	Oldham type	0.017	0.020	0.020	0.024	0.024
g	Oldham type	0.030	0.034	0.044	0.047	0.050

Installation

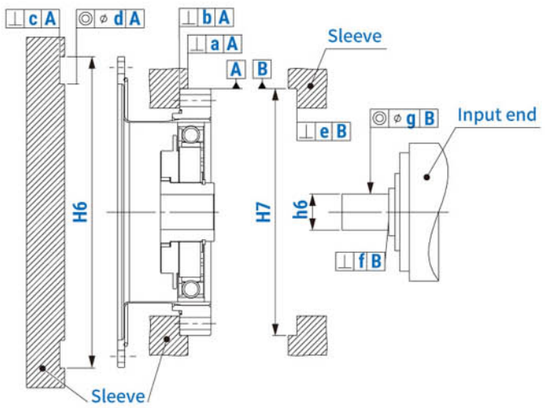
Cup Type with Unit Type - CGUH



• Installation Accuracy (mm)

Size		14	17	20	25	32
a		0.011	0.015	0.017	0.024	0.026
b	Oldham type	0.017	0.020	0.020	0.024	0.024
c	Oldham type	0.030	0.034	0.044	0.047	0.050

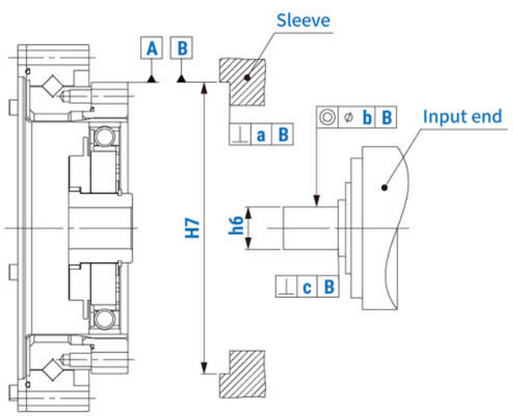
Hollow Type with Component Type - HGAA



• Installation Accuracy (mm)

Size		14	17	20	25	32	40
a		0.011	0.015	0.017	0.024	0.026	0.026
b		0.011	0.012	0.013	0.014	0.016	0.016
c		0.016	0.021	0.027	0.035	0.042	0.048
d		0.015	0.018	0.019	0.022	0.022	0.024
e		0.011	0.015	0.017	0.024	0.026	0.026
f	Oldham type	0.017	0.020	0.020	0.024	0.024	0.032
g	Oldham type	0.030	0.034	0.044	0.047	0.050	0.063

Hollow Type with Unit Type - HGUH/Input Shaft Type - HGUJ/Simple Type - HGSO/Simple Type - HGSH



• Installation Accuracy (mm)

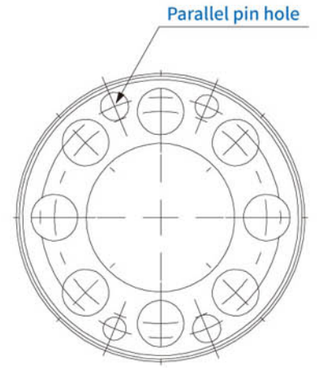
Size		14	17	20	25	32	40
a		0.011	0.015	0.017	0.024	0.026	0.026
b	Oldham type	0.030	0.034	0.044	0.047	0.047	0.050
c	Oldham type	0.017	0.020	0.020	0.024	0.024	0.024

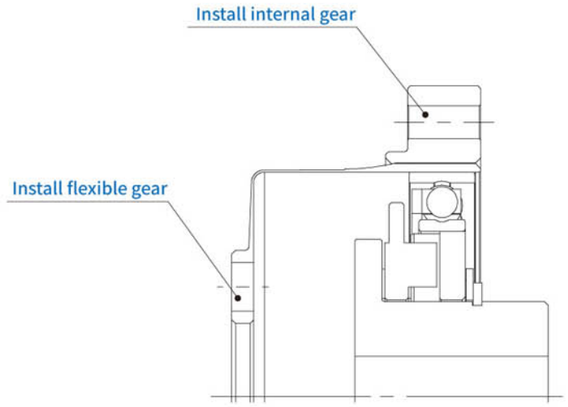
Installation

Bolt Locking

When installing the output and fixed interface, pay attention to the requirements of the following models to ensure proper torque transmission

Cup Type with Component type - CGAA





When the transmission torque of the flexible gear does not meet the requirements, please add parallel pins. CGAA uses 4 parallel pins.

• Install Flexible Gear

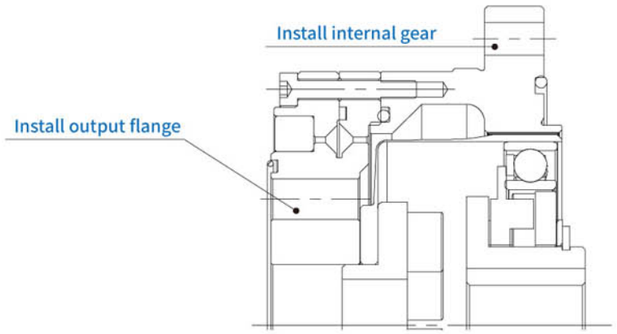
Size	14	17	20	25	32
Bolt size	M4	M5	M5	M6	M8
Quantity of bolts	6	6	8	8	8
Bolt PCD (mm)	17	19	24	30	40
Locking torque (Nm)	5.4	10.8	10.8	18.4	44.4
Transmission torque (Nm)	43	77	130	230	555

• Install Internal Gear

Size	14	17	20	25	32
Bolt size	M3	M3	M3	M4	M5
Quantity of bolts	8	16	16	16	16
Bolt PCD (mm)	44	54	62	75	100
Locking torque (Nm)	2	2	2	4.5	9
Transmission torque (Nm)	72	175	196	419	901

Installation

Cup Type with Unit Type - CGUH



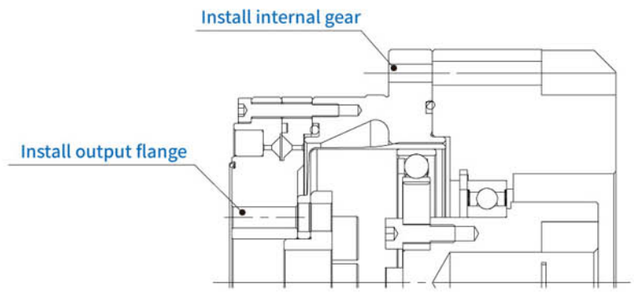
• Install Output Flange

Size	14	17	20	25	32
Bolt size	M4	M5	M6	M8	M10
Quantity of bolts	6	6	8	8	8
Bolt PCD (mm)	23	27	32	42	55
Locking torque (Nm)	5.4	10.8	18.4	45	89
Transmission torque (Nm)	58	109	245	580	1220

• Install Internal Gear

Size	14	17	20	25	32
Bolt size	M4	45	56	M5	M6
Quantity of bolts	8	8	8	10	12
Bolt PCD (mm)	65	71	82	96	125
Locking torque (Nm)	4.5	4.5	9	9	15.3
Transmission torque (Nm)	182	196	365	538	1220

Cup Type with Flange Type - CGGH



• Install Output Flange

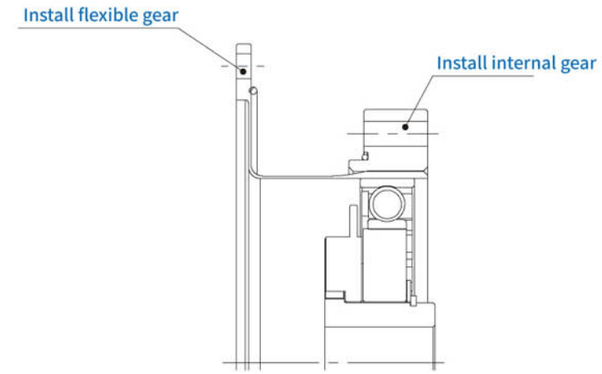
Size	14	17	20	25	32
Bolt size	M4	M5	M6	M8	M10
Quantity of bolts	6	6	8	8	8
Bolt PCD (mm)	23	27	32	42	55
Locking torque (Nm)	5.4	10.8	18.4	45	89
Transmission torque (Nm)	58	109	245	580	1220

• Install Internal Gear

Size	14	17	20	25	32
Bolt size	M4	45	56	M5	M6
Quantity of bolts	8	8	8	10	12
Bolt PCD (mm)	65	71	82	96	125
Locking torque (Nm)	4.5	4.5	9	9	15.3
Transmission torque (Nm)	182	196	365	538	1220

Installation

Hollow Type with Component Type - HGAA



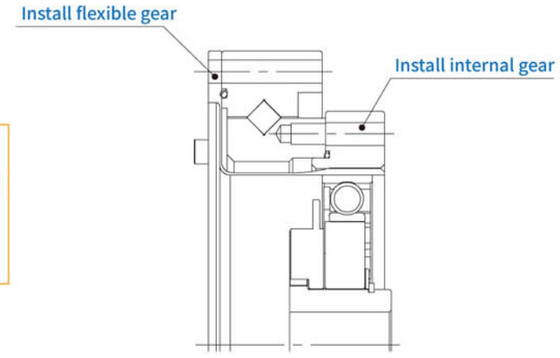
• Install Flexible Gear

Size	14	17	20	25	32	40
Bolt size	M3	M3	M3	M4	M5	M6
Quantity of bolts	8	12	12	12	12	12
Bolt PCD (mm)	54	66	76	96	124	152
Locking torque (Nm)	2.4	2.4	2.4	5.4	10.4	18.4
Transmission torque (Nm)	108	198	228	486	1000	1740

• Install Internal Gear

Size	14	17	20	25	32	40
Bolt size	M3	M3	M3	M4	M5	M6
Quantity of bolts	8	16	16	16	16	16
Bolt PCD (mm)	44	54	62	75	100	120
Locking torque (Nm)	2	2	2	4.5	9	15.3
Transmission torque (Nm)	72	175	196	419	901	1530

Hollow Type Unit Type - HGUH
Hollow Type with Simple Type – Oldham Coupling - HGSO
Hollow Type with Input Shaft Type - HGUJ
Hollow Type with Simple Type - Hollow Saft - HGSH



• Install Flexible Gear

Size	14	17	20	25	32	40
Bolt size	M3	M3	M3	M4	M5	M6
Quantity of bolts	8	12	12	12	12	12
Bolt PCD (mm)	64	74	84	102	132	158
Locking torque (Nm)	2.4	2.4	2.4	5.4	10.8	18.4
Transmission torque (Nm)	128	222	252	516	1069	1813

• Install Internal Gear

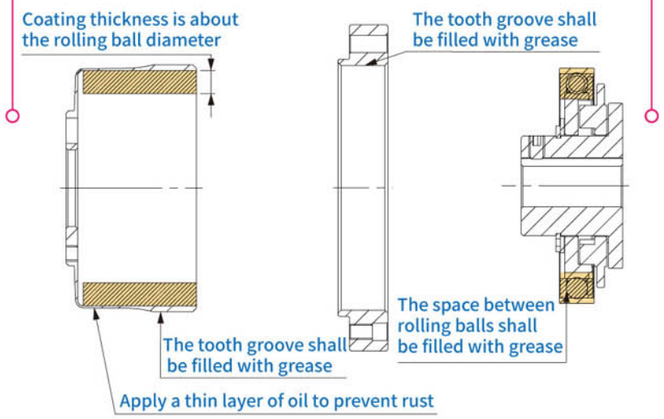
Size	14	17	20	25	32	40
Bolt size	M3	M3	M3	M4	M5	M6
Quantity of bolts	8	16	16	16	16	16
Bolt PCD (mm)	44	54	62	77	100	122
Locking torque (Nm)	2.4	2.4	2.4	5.4	10.8	18.36
Transmission torque (Nm)	88	216	248	520	1080	1867

Lubrication

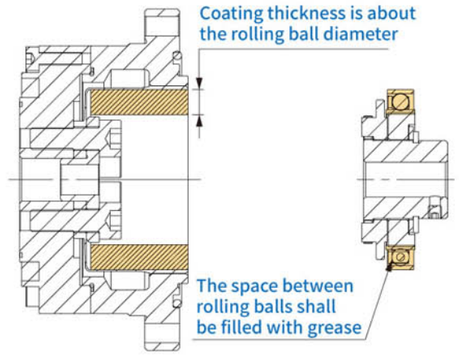
Application Range Of Lubricating Grease

The following models are the application range of lubricating grease that customers should pay attention to when assembling wave generators by themselves

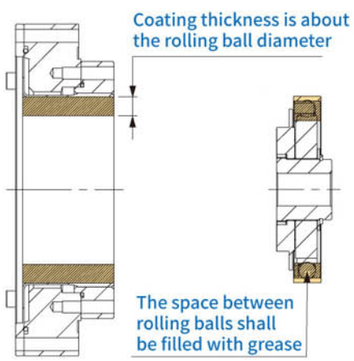
Cup Type with Component Type - CGAA



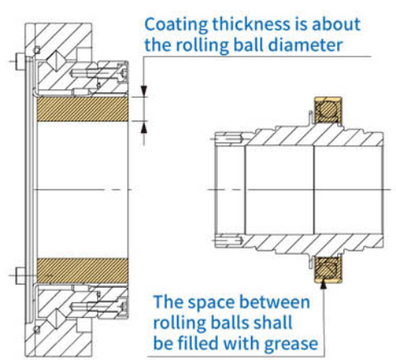
Cup Type with Unit Type - CGUH



Hollow Type with Simple Type - HGSO



Hollow Type with Simple Type - HGSH



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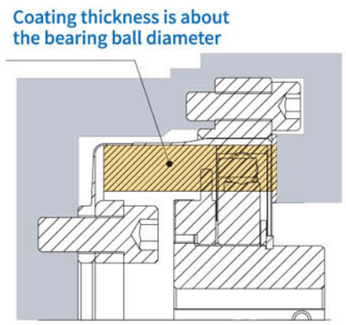
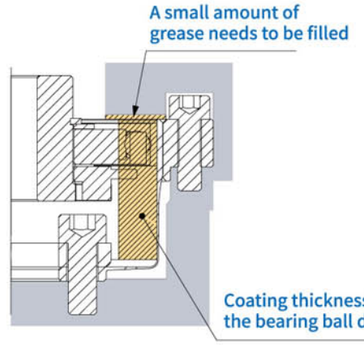
Lubrication

Coating with Different Assembly Methods

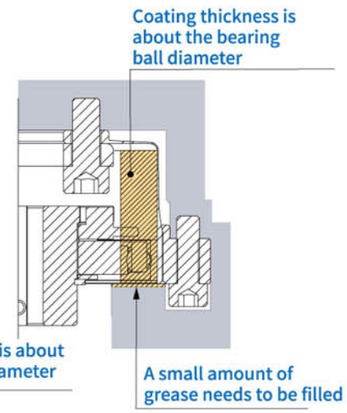
Horizontal installation of wave generator



Facing up installation of wave generator



Facing down installation of wave generator



Recommended Amount Of Grease For Each Model

• Applicable Model: HGAA/CGUH

Unit: g

Method \ Model	14	17	20	25	32
Horizontal installation of wave generator	5.5	10	16	30	60
Facing up installation of wave generator	7	12	18	35	70
Facing down installation of wave generator	8.5	14	21	40	80

• Applicable Model: HGSO/HGSH

Unit: g

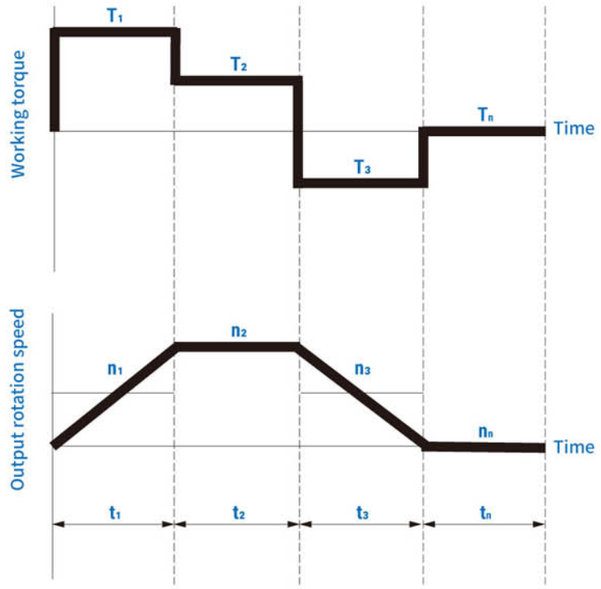
Method \ Model	14	17	20	25	32	40
Horizontal installation of wave generator	5.8	11	18	32	64	120
Facing up installation of wave generator	7.5	13	19	37	74	130
Facing down installation of wave generator	8.9	15	22	42	84	150

※If you have special grease requirements, please contact our website for inquiries

Service Life

Service Life Of Flexible Bearing

The operating life of the harmonic reducer is equal to the operating life of the flexible bearing of the wave generator.
The following is the relevant calculation:



(*n1, n2, n3 and nn are average value)

• Calculation Of Output Torque

Average output torque (Nm)	$T_{av} = \sqrt[3]{\frac{n_1 \times t_1 \times \lvert T_1 \rvert^3 + n_2 \times t_2 \times \lvert T_2 \rvert^3 + \ldots + n_n \times t_n \times \lvert T_n \rvert^3}{n_1 \times t_1 + n_2 \times t_2 + \ldots + n_n \times t_n}}$
Rated output torque (Nm)	T_r Nominal output torque (defined in the specification sheet)

• Calculation Of Input Rotation Speed

Average input rotation speed (rpm)	$n_{av} = \frac{n_1 \times t_1 + n_2 \times t_2 + \ldots + n_n \times t_n}{t_1 \times t_2 + \ldots + t_n} \times R$
Rated input rotation speed (rpm)	n_r 2000 rpm

※R is speed reduction ratio

Service Life

• Service Life Under Rated Torque And Rated Rotation Speed (Selection Of Ln)

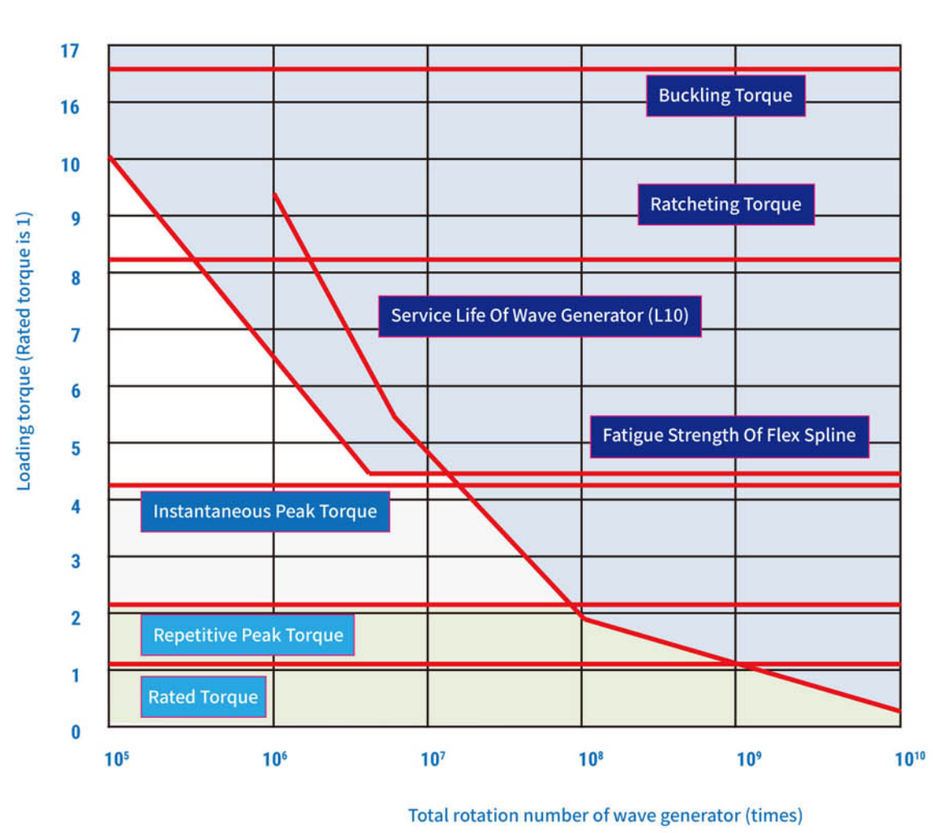
	Service Life
Model	CG, HG
L10 (10% failure)	10,000 hours
L50 (50% failure)	50,000 hours

Calculation method for service life of flexible bearing:

$$L_n = L_n \left(\frac{T_r}{T_{av}}\right)^3 \left(\frac{n_r}{n_{av}}\right)$$

※Tooth surface wear is not considered in this formula
※The calculated value of this formula is only for reference

• Please use the harmonic reducer in the green area. Running in the gray area will cause early damage, while running in the blue area will cause direct damage.



Service Life

Strength

Strength Of Flexible Gear

During operation, the repeated elastic deformation of the flexible gear makes its tooth root prone to fatigue damage. Therefore, the applied torque (rated torque and allowable peak torque for startup and shutdown) is determined based on the fatigue limit of the tooth root of the flexible gear. However, after the impact torque is applied to a certain number of times, the tooth root of the flexible gear will fatigue.

Upper limit of elastic deformation times of flexible gear under impact torque: 104 (times)
Allowable times of impact torque application:

$$N = \frac{10^4}{2 \times \frac{n}{60} \times t}$$

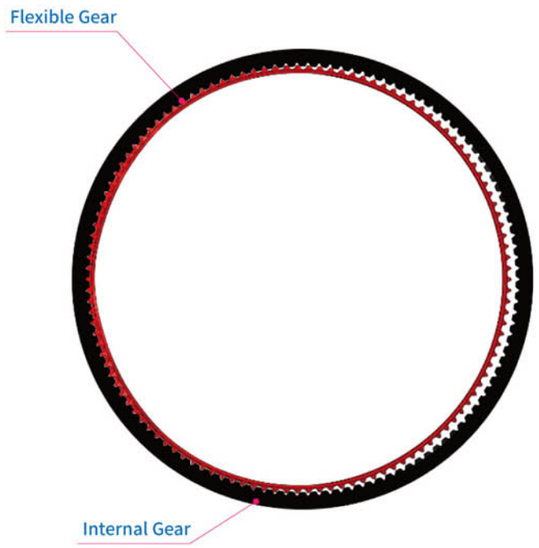
N : Allowable times (times)
T : Impact torque application time (sec)
N : Rotation speed of wave generator (rpm)

Buckling Torque

Fix the input end and apply buckling torque to the output end, resulting in plastic deformation of the flexible gear.

Ratcheting Torque

Fix the input end and apply the ratchet torque to the output end, resulting in the meshing deviation of the flexible gear and the internal gear to one side, which makes the reducer unable to mesh normally.



Service Life

Cross Roller Bearing

Specification Reference Of Each Series Of Main Bearings

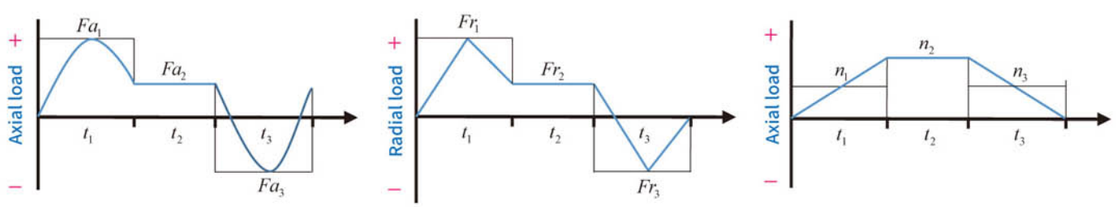
• CG Series

Model	Roller pitch diameter dp	Offset R	Basic rated loading		Allowable bending moment	Moment rigidity
			Basic dynamic rated load	Basic static rated load		
	m	m	×10²N	×10²N	Nm	×10⁴Nm/rad
14	0.035	0.0095	47	60.7	41	4.38
17	0.0425	0.0095	52.9	75.5	64	7.75
20	0.050	0.0095	57.8	90.0	91	12.8
25	0.062	0.0115	96.0	151	156	24.2
32	0.080	0.0130	150	250	313	53.9

• HG Series

Model	Roller pitch diameter dp	Offset R	Basic rated loading		Allowable bending moment	Moment rigidity
			Basic dynamic rated load	Basic static rated load		
	m	m	×10²N	×10²N	Nm	×10⁴Nm/rad
14	0.050	0.0217	58	86	74	8.5
17	0.060	0.0239	104	163	124	15.4
20	0.070	0.0255	146	220	187	25.2
25	0.085	0.0296	218	358	258	39.2
32	0.111	0.0364	382	654	580	100
40	0.133	0.044	433	816	849	179

• Main Bearing Running Type



Service Life

Calculation Formula Of Cross Roller Bearing

Calculate the mechanical engineering load according to the formula in this chapter, and select the reducer of appropriate model according to the maximum load inertia, bearing life and safety factor.

Calculation Formula Of Average Loading

Average Radial Load

$$Fr_{av} = \sqrt[10/3]{\frac{n_1t_1(|Fr_1|)^{10/3} + n_2t_2(|Fr_2|)^{10/3} + \dots + n_nt_n(|Fr_n|)^{10/3}}{n_1t_1 + n_2t_2 \dots + n_nt_n}}$$

Average Axial Load

$$Fa_{av} = \sqrt[10/3]{\frac{n_1t_1(|Fa_1|)^{10/3} + n_2t_2(|Fa_2|)^{10/3} + \dots + n_nt_n(|Fa_n|)^{10/3}}{n_1t_1 + n_2t_2 \dots + n_nt_n}}$$

Average Output Rotation Speed

$$N_{av} = \frac{n_1t_1 + n_2t_2 \dots + n_nt_n}{t_1 + t_2 \dots + t_n}$$

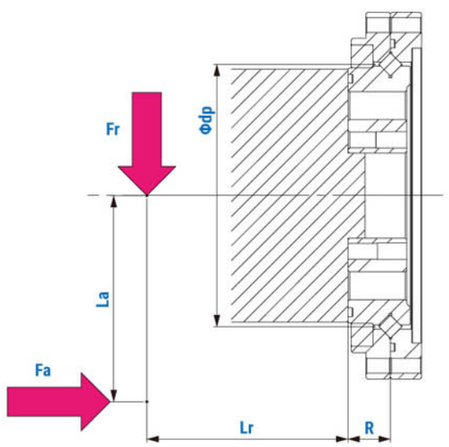
Maximum Load Inertia

$$M_{max} = Fr_{max}(Lr + R) + Fa_{max} \cdot La$$

Average Load Inertia

$$M_{av} = Fr_{av}(Lr + R) + Fa_{av} \cdot La$$

Symbolic interpretation		
Fr_{max}	Maximum radial load	N(kgf)
Fa_{max}	Maximum axial load	N(kgf)
Lr,La	-	m
R	Offset from roller center to end face	m
dp	Roller installation pitch circle diameter	-



Service Life

Calculation Formula Of Bearing Service Life

Load Factor

$$\begin{cases} \dfrac{Fa_{av}}{Fr_{av} + 2(Fr_{av}(Lr + R)\,Fa_{av} \cdot La)/dp} \le 1.5 \Rightarrow X = 1, Y = 0.45 \\ \dfrac{Fa_{av}}{Fr_{av} + 2(Fr_{av}(Lr + R)\,Fa_{av} \cdot La)/dp} > 1.5 \Rightarrow X = 0.67, Y = 0.67 \end{cases}$$

Dynamic Equivalence Radial Load

$$Pc = X \cdot \left(Fr_{av} + \frac{2(Fr_{av}(Lr + R) + Fa_{av} \cdot La)}{dp}\right) + Y \cdot Fa_{av}$$

Service Life (Hours)

$$L_n = \frac{10^6}{60 \times N_{av}} \times \left(\frac{C}{fw \times Pc}\right)^{10/3}$$

Symbolic interpretation		
N_{av}	Average output rotation speed	rpm
C	Rated dynamic load	N(kgf)
fw	Load factor	-

Load factor fw	
The load is no impact, when the vibration	1~1.2
Normal operation use	1.2~1.5
When the load bears impact and vibration	1.5~3

Calculation Formula Of Static Safety Factor

Static Equivalence Radial Load

$$P_0 = Fr_{max} + \frac{2M_{max}}{dp} + 0.44\,Fa_{max}$$

Static Safe Factor

$$f_s = \frac{C_0}{P_0}$$

Symbolic interpretation		
C_0	Rated static load	N(kgf)

※Rated static load, please check relevant table for rated dynamic load.

Service Life

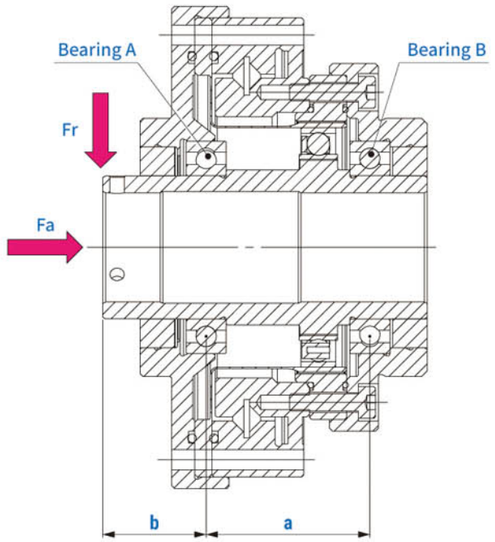
Allowable Load Of Input Shaft

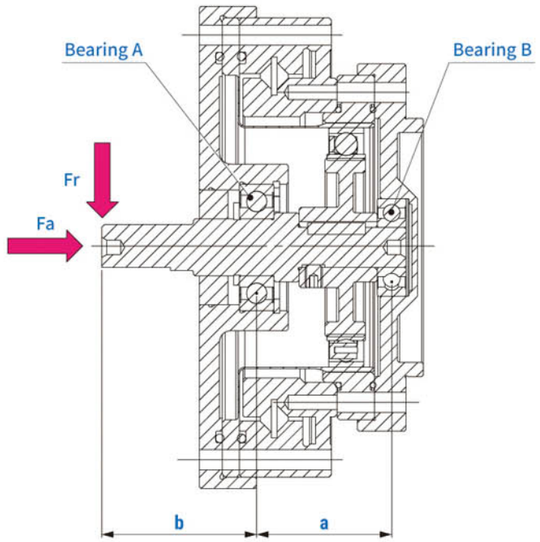
Model Selection

Both unit type (Uh) and input shaft type (UJ) use deep groove ball bearings for support on the input shaft. Please confirm whether the load applied by the selected model to the input shaft is appropriate.

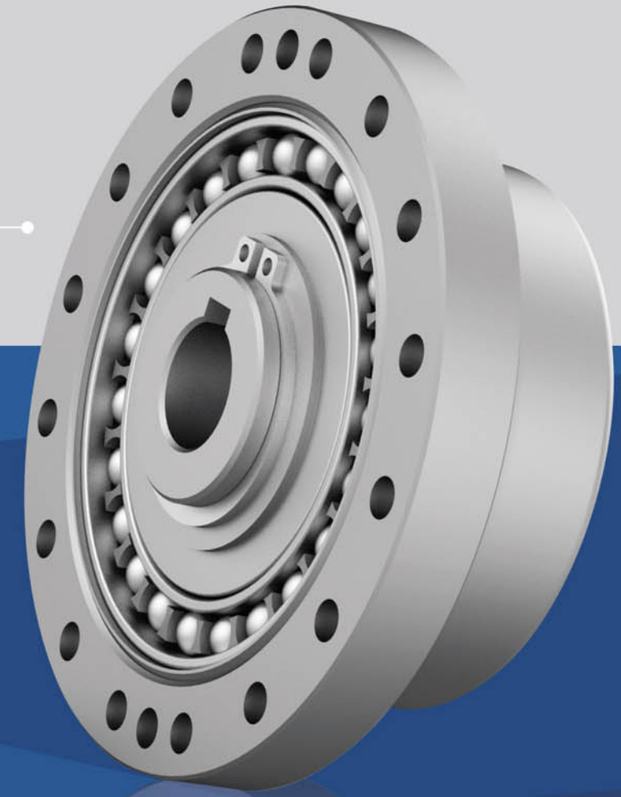
• Bearing Specification

Series	Model	Bearing A		Bearing B		a	b	Maximum radial load
		Basic dynamic rated load	Basic static rated load	Basic dynamic rated load	Basic static rated load			
		Cr(N)	Cor(N)	Cr(N)	Cor(N)	mm	mm	Fr(N)
HGUH	14	4000	2470	4000	2470	27	16.5	230
	17	4300	2950	4300	2950	29	17.5	250
	20	4500	3450	4500	3450	27	15.5	275
	25	4900	4350	4900	4350	29.5	16.5	250
	32	14100	10900	5350	5250	33	23	770
	40	19400	16300	11500	10900	39.5	27.5	1060
HGUJ	14	2240	910	1080	430	20	14	110
	17	2700	1270	1610	710	23.5	21	135
	20	4350	2260	2240	910	26.5	23.3	210
	25	5600	2830	2700	1270	28	28	270
	32	9400	5000	4350	2260	36	27	490
	40	13200	8300	6000	3250	43	32.5	660





Cup Type
with Component Type

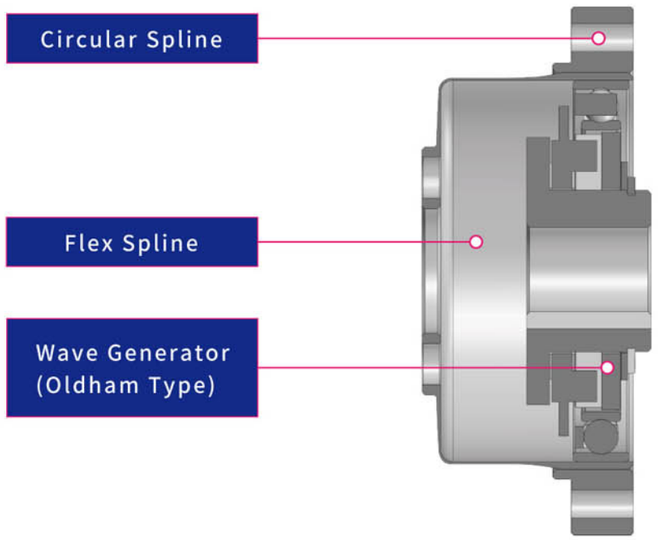


CGAA component type is composed of only three basic parts.
It can be directly assembled to machinery and devices to improve the freedom of design.

CGAA

Features

Structure Of CGAA Series



Product Coding

CGAA 25 100 Specification 1&2

Model	Type	Model	Speed reduction ratio					Special Specification
CG	AA= Component type	14	50	80	100	-	-	Specification: no mark = standard product
		17	50	80	100	120	-	
		20	50	80	100	120	160	
		25	50	80	100	120	160	
		32	50	80	100	120	160	

Technical Data

• Rating Table

Model	Speed reduction ratio	Rated torque when inputting 2000r/min	Allowable peak torque at start and stop	Allowable maximum value of average loading torque	Instantaneous allowable maximum torque	Allowable maximum input rotation speed	Allowable maximum input rotation speed	Moment of inertia	
		N·m	N·m	N·m	N·m	r/min	r/min	$I\times10^{-4}kg\cdot m^2$	$J\times10^{-5}kgf\cdot ms^2$
14	50	7.0	23	9.0	46	8500	3500	0.033	0.034
	80	10	30	14	61				
	100	10	36	14	70				
17	50	21	44	34	91	7300	3500	0.079	0.081
	80	29	56	35	113				
	100	31	70	51	143				
	120	31	70	51	112				
20	50	33	73	44	127	6500	3500	0.193	0.197
	80	44	96	61	165				
	100	52	107	64	191				
	120	52	113	64	191				
	160	52	120	64	191				
25	50	51	127	72	242	5600	3500	0.413	0.421
	80	82	178	113	332				
	100	87	204	140	369				
	120	87	217	140	395				
	160	87	229	140	408				
32	50	99	281	140	497	4800	3000	1.69	1.72
	80	153	395	217	738				
	100	178	433	281	841				
	120	178	459	281	892				
	160	178	484	281	892				

Technical Data

• Inspection Specifications

— Angular Transmission Accuracy

Speed reduction ratio	Model	14	17	20	25	32
Overall speed reduction ratio	arc-min	1.5	1.5	1	1	1

— Hysteresis Loss

Speed reduction ratio	Unit \ Model	14	17	20	25	32
50	arc-min	2.0	2.0	2.0	2.0	2.0
80 or more	arc-min	1.0	1.0	1.0	1.0	1.0

— Maximum Amount Of Backlash

Speed reduction ratio \ Model	14	17	20	25	32
50	arc-sec	36	20	17	17	14
80	arc-sec	23	13	11	11	9
100	arc-sec	18	10	9	9	7
120	arc-sec	-	8	8	8	6
160	arc-sec	-	-	6	6	5

— Rigidity (Spring Constant)

Speed reduction ratio \ Model		14	17	20	25	32
T_1	N·m	2.0	3.9	7.0	14	29
T_2	N·m	6.9	12	25	48	108
Speed reduction ratio 50	K_1	×10⁴N·m/rad	0.34	0.81	1.3	2.5	5.4
	K_2	×10⁴N·m/rad	0.47	1.1	1.8	3.4	7.8
	K_3	×10⁴N·m/rad	0.57	1.3	2.3	4.4	9.8
	θ_1	arc-min	2.0	1.7	1.8	1.9	1.9
	θ_2	arc-min	5.6	4.2	5.3	5.4	5.4
Speed reduction ratio more than 80	K_1	×10⁴N·m/rad	0.47	1	1.6	3.1	6.7
	K_2	×10⁴N·m/rad	0.61	1.4	2.5	5.0	11
	K_3	×10⁴N·m/rad	0.71	1.6	2.9	5.7	12
	θ_1	arc-min	1.4	1.3	1.5	1.5	1.5
	θ_2	arc-min	4.2	3.3	3.9	3.8	4.0

Technical Data

• Inspection Specifications

— Starting Torque

Unit:cNm

Speed reduction ratio \ Model	14	17	20	25	32
50	3.6	5.6	7.3	13	29
80	2.6	3.6	4.5	8.5	18
100	2.3	3.2	4.1	7.6	17
120	-	3.0	3.6	6.9	14
160	-	-	3.2	6.1	13

— Acceleration Starting Torque

Unit:Nm

Speed reduction ratio \ Model	14	17	20	25	32
50	1.5	2.8	4.4	8.3	18
80	1.5	2.8	4.6	8.5	18
100	1.9	3.1	5.0	9.2	20
120	-	3.4	5.4	10	21
160	-	-	6.4	12	25

— Release Torque

Unit:Nm

Speed reduction ratio \ Model	14	17	20	25	32
50	110	190	280	580	1200
80	140	260	450	880	1800
100	100	200	330	650	1300
120	-	150	310	610	1200
160	-	-	280	580	1200

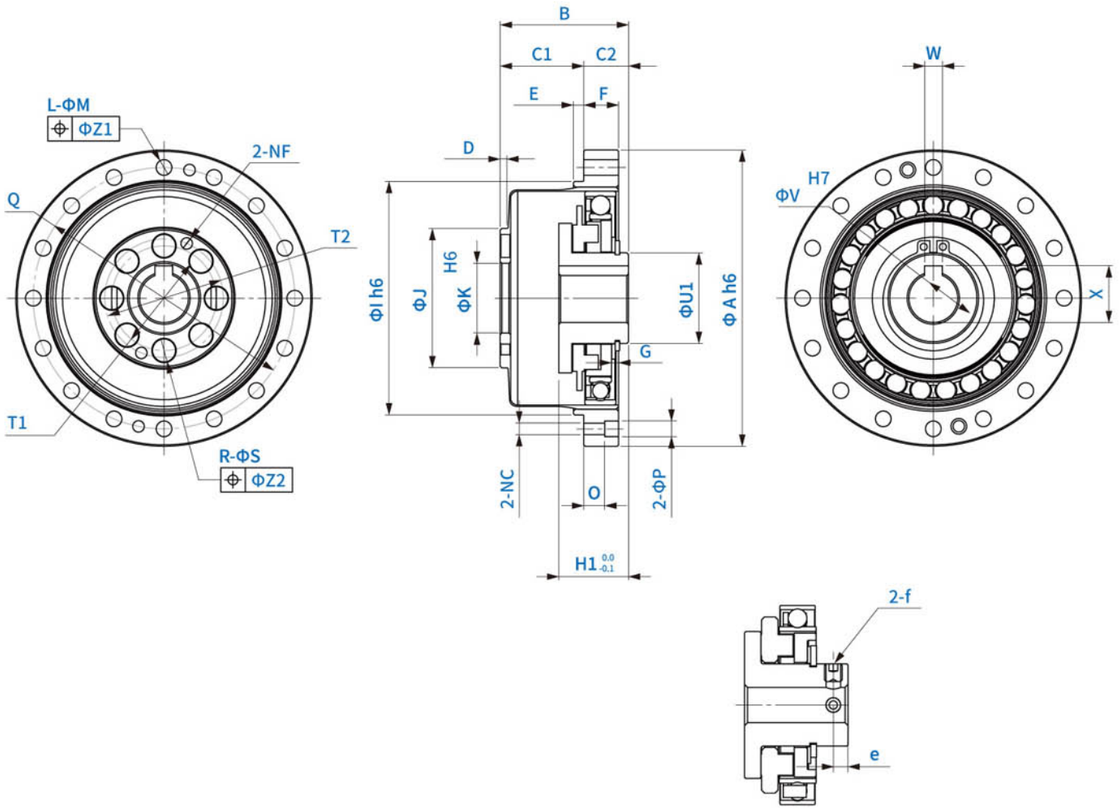
— Buckling Torque

Unit:Nm

Model	14	17	20	25	32
Overall speed reduction ratio	260	500	800	1700	3500

Specification Dimension

• Appearance Drawing



Specification Dimension

• Dimension Table

Unit:mm

Mark \ Model	14	17	20	25	32
ΦA h6	50	60	70	85	110
B	28.5 $^{0}_{-0.4}$	32.5 $^{0}_{-0.4}$	33.5 $^{0}_{-0.4}$	37 $^{0}_{-0.5}$	44 $^{0}_{-0.6}$
C1	17.5 $^{+0.4}_{0}$	20 $^{+0.5}_{0}$	21.5 $^{+0.6}_{0}$	24 $^{+0.6}_{0}$	28 $^{+0.6}_{0}$
C2	11	12.5	12	13	16
D	2.4	3	3	3	3.2
E	2	2.5	3	3	3
F	6	6.5	7.5	10	14
G	1.4	1.6	1.5	3.5	4.2
H $^{0}_{1-0.1}$	18.5	20.7	21.5	21.6	23.6
ΦI h6	38	48	54	67	90
ΦJ	23	27.2	32	40	52
ΦK H6	11	10	16	20	26
L	8	16	16	16	16
ΦM	3.5	3.4	3.5	4.5	5.5
NC	M3	M3	M3	M4	M5
NF	M3	M3	M3	M4	M5
O	6	6.5	4	6	7
ΦP	-	-	3.5	4.5	5.5
Q(PCD)	44	54	62	75	100
R	6	6	8	8	8
ΦS	4.5	5.5	5.5	6.6	9
T1(PCD)	17	19	24	30	40
T2(PCD)	18.5	21.5	27	34	45
ΦU1	14	18	21	26	26
ΦV	6	-	10	14	-
	-	10	10	14	15
WJs9	-	3	3	5	5
X	-	11.4 $^{+0.1}_{0}$	11.4 $^{+0.1}_{0}$	16.3 $^{+0.1}_{0}$	17.3 $^{+0.1}_{0}$
ΦZ1	0.25	0.20	0.25	0.25	0.25
ΦZ2	0.25	0.25	0.25	0.3	0.5
e	2.5	3	-	-	-
f	M3x4	M3x6	-	-	-
Mass (kg)	0.09	0.15	0.28	0.42	0.89

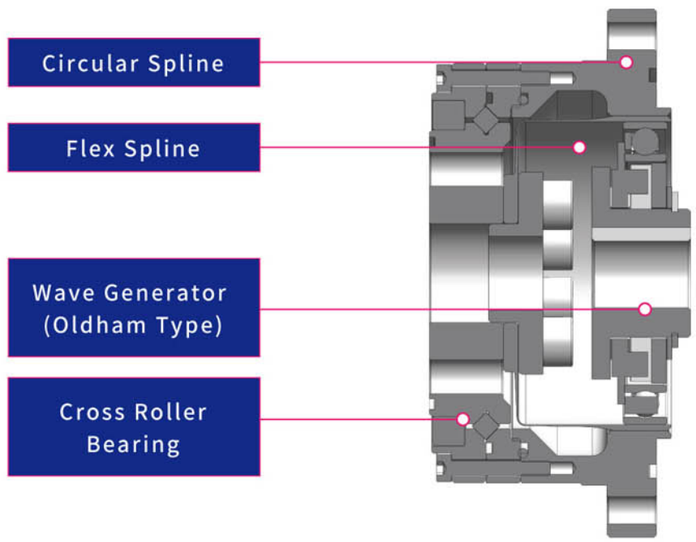
Cup Type
with Unit Type

Integrated cross roller bearing, the output end can bear torque and bending torque.CGUH series wave generators are Oldham couplings. Oldham couplings can provide large concentricity offset, and machinery and reducers can withstand low assembly accuracy.

CGUH

Features

Structure Of CGUH Series



Product Coding

CGUH 25 100 Specification 1&2

Model	Type	Model	Speed reduction ratio					Special Specification
CG	UH= Unit type	14	50	80	100	-	-	Specification: no mark = standard product
		17	50	80	100	120	-	
		20	50	80	100	120	160	
		25	50	80	100	120	160	
		32	50	80	100	120	160	

Technical Data

Rating Table

Model	Speed reduction ratio	Rated torque when inputting 2000r/min	Allowable peak torque at start and stop	Allowable maximum value of average loading torque	Instantaneous allowable maximum torque	Allowable maximum input rotation speed	Allowable maximum input rotation speed	Moment of inertia	
		N·m	N·m	N·m	N·m	r/min	r/min	I×10⁻⁴kg·m²	J×10⁻⁵kgf·ms²
14	50	7.0	23	9.0	46	8500	3500	0.033	0.034
	80	10	30	14	58				
	100	10	36	14	58				
17	50	21	44	34	91	7300	3500	0.079	0.081
	80	29	56	35	109				
	100	31	70	51	109				
	120	31	70	51	109				
20	50	33	73	44	127	6500	3500	0.193	0.197
	80	44	96	61	165				
	100	52	107	64	191				
	120	52	113	64	191				
	160	52	120	64	191				
25	50	51	127	72	242	5600	3500	0.413	0.421
	80	82	178	113	332				
	100	87	204	140	369				
	120	87	217	140	395				
	160	87	229	140	408				
32	50	99	281	140	497	4800	3000	1.69	1.72
	80	153	395	217	738				
	100	178	433	281	841				
	120	178	459	281	892				
	160	178	484	281	892				

Technical Data

• Inspection Specifications

— Angular Transmission Accuracy

Speed reduction ratio	Model	14	17	20	25	32
Overall speed reduction ratio	arc-min	1.5	1.5	1	1	1

— Hysteresis Loss

Speed reduction ratio	Unit \ Model	14	17	20	25	32
50	arc-min	2.0	2.0	2.0	2.0	2.0
80 or more	arc-min	1.0	1.0	1.0	1.0	1.0

— Maximum Amount Of Backlash

Speed reduction ratio \ Model	14	17	20	25	32
50	arc-sec	36	20	17	17	14
80	arc-sec	23	13	11	11	9
100	arc-sec	18	10	9	9	7
120	arc-sec	-	8	8	8	6
160	arc-sec	-	-	6	6	5

— Rigidity (Spring Constant)

Speed reduction ratio \ Model		14	17	20	25	32
T_1	N·m	2.0	3.9	7.0	14	29
T_2	N·m	6.9	12	25	48	108
Speed reduction ratio 50	K_1	×10⁴N·m/rad	0.34	0.81	1.3	2.5	5.4
	K_2	×10⁴N·m/rad	0.47	1.1	1.8	3.4	7.8
	K_3	×10⁴N·m/rad	0.57	1.3	2.3	4.4	9.8
	θ_1	arc-min	2.0	1.7	1.8	1.9	1.9
	θ_2	arc-min	5.6	4.2	5.3	5.4	5.4
Speed reduction ratio more than 80	K_1	×10⁴N·m/rad	0.47	1	1.6	3.1	6.7
	K_2	×10⁴N·m/rad	0.61	1.4	2.5	5.0	11
	K_3	×10⁴N·m/rad	0.71	1.6	2.9	5.7	12
	θ_1	arc-min	1.4	1.3	1.5	1.5	1.5
	θ_2	arc-min	4.2	3.3	3.9	3.8	4.0

Technical Data

• Inspection Specifications

— Starting Torque

Unit:cNm

Speed reduction ratio \ Model	14	17	20	25	32
50	4.5	6.7	8.6	17	34
80	3.1	4.4	5.4	10	21
100	2.8	3.7	4.7	8.8	20
120	-	3.4	4.2	8.0	17
160	-	-	3.6	6.9	15

— Acceleration Starting Torque

Unit:Nm

Speed reduction ratio \ Model	14	17	20	25	32
50	1.8	3.3	5.2	9.9	20
80	1.8	3.3	5.3	10	21
100	2	3.6	5.6	11	22
120	-	3.9	6.1	12	24
160	-	-	7	14	29

— Release Torque

Unit:Nm

Speed reduction ratio \ Model	14	17	20	25	32
50	110	190	280	580	1200
80	140	260	450	880	1800
100	100	200	330	650	1300
120	-	150	310	610	1200
160	-	-	280	580	1200

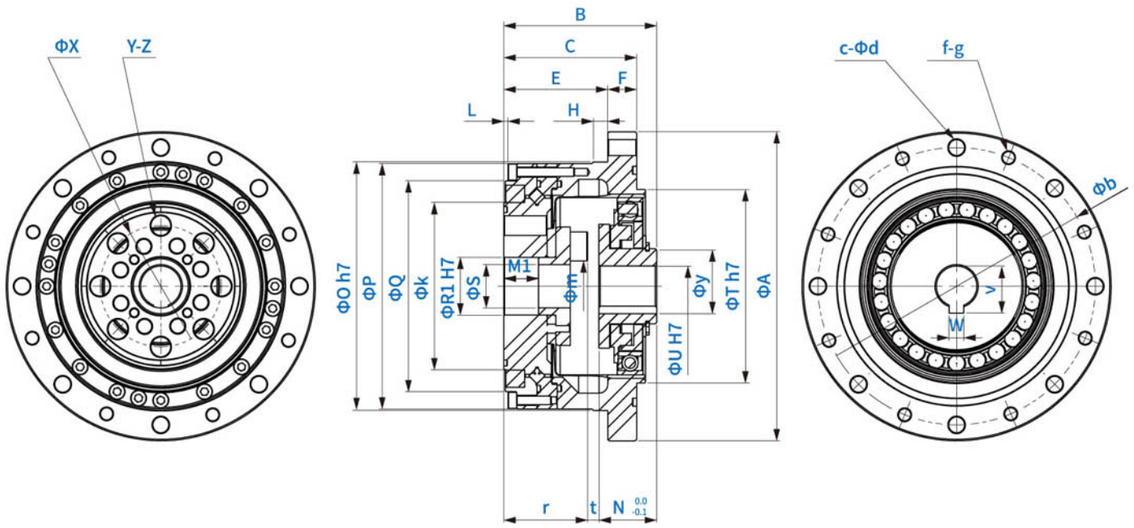
— Buckling Torque

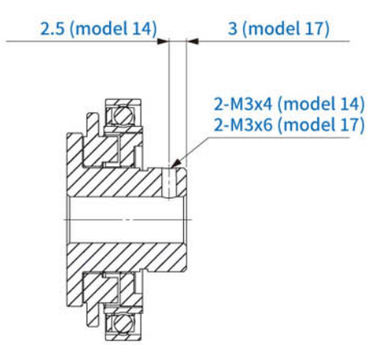
Unit:Nm

Model	14	17	20	25	32
Overall speed reduction ratio	260	500	800	1700	3500

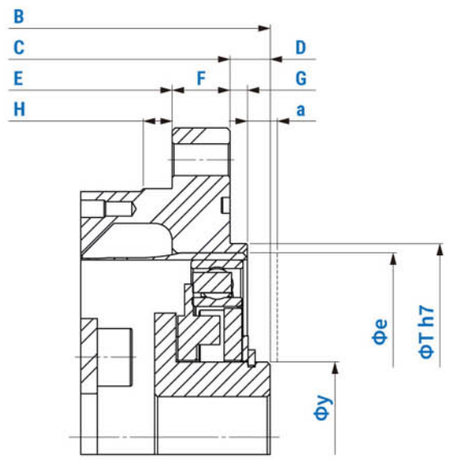
Specification Dimension

• Appearance Drawing





Wave generator hub shape for models 14 and 17 (no keyway)



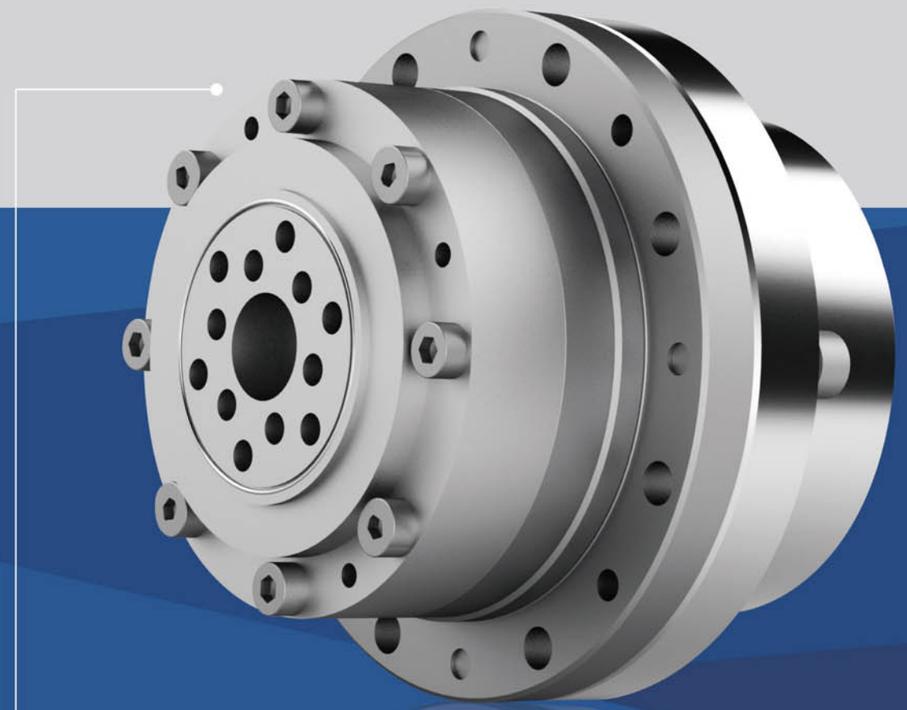
Specification Dimension

• Dimension Table

Unit:mm

Mark \ Model	14	17	20	25	32
ΦA	73	79	93	107	138
B	41 $^{0}_{-0.9}$	45 $^{0}_{-0.9}$	45.5 $^{0}_{-1.0}$	53 $^{0}_{-1.0}$	62 $^{0}_{-1.1}$
C	34	37	38	46	57
D	7 $^{0}_{-0.4}$	8 $^{0}_{-0.4}$	7.5 $^{0}_{-0.4}$	6 $^{0}_{-0.5}$	5 $^{0}_{-0.6}$
E	27	29	28	36	45
F	7	8	10	10	12
G	2	2	3	3	3
H	3.5	4	5	5	5
L	0.5	0.5	0.5	0.5	1
M1	9.4	9.5	9	2	15
N $^{0}_{-0.1}$	18.5	20.7	21.5	21.6	23.6
ΦO h7	56	63	72	86	113
ΦP	56	62	70	85	112
ΦQ	42.5	49.5	58	73	96
ΦR1 H7	11	10	14	20	26
ΦS	8	7	10	15	20
ΦT h7	38	48	56	67(68)	90
ΦU	6	-	10	14	-
	-	10	10	-	15
V	-	11.4 $^{+0.1}_{0}$	11.4 $^{+0.1}_{0}$	16.3 $^{+0.1}_{0}$	17.3 $^{+0.1}_{0}$
W Js9	-	3	3	5	5
ΦX	23	27	32	42	55
Y	6	6	8	8	8
Z	M4x8	M5x10	M6x9	M8x12	M10x15
a	1	1	1.5	1.5	1.5
Φb	65	71	82	96	125
c	8	8	8	10	12
Φd	4.5	4.5	5.5	5.5	6.6
Φe	38	45	53	66	86
f	8	8	8	10	12
g	M4	M4	M5	M5	M6
Φk	31	38	45	58	78
Φm	10	10.5	15.5	20	27
r	21.4	23.5	23	29	37
t	1.1	0.8	1	1.4	1.4
Φy	14	18	21	26	26
Mass (kg)	0.52	0.68	0.98	1.5	3.2

Cup Type
with Flange Type



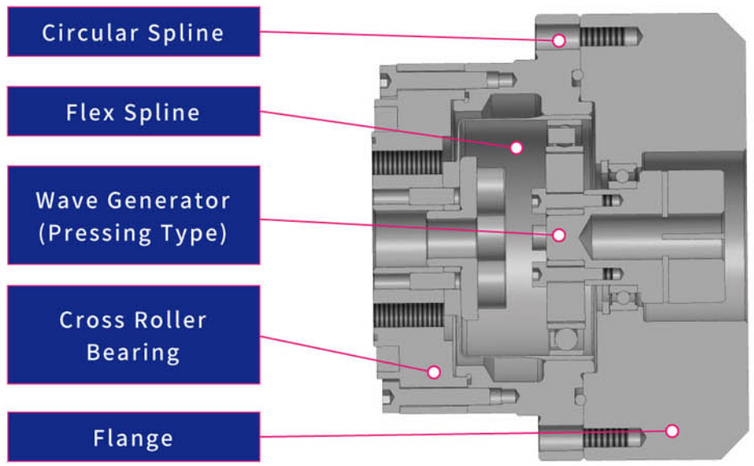
The reducer includes a motor quick coupling interface (the pressing coupling,corresponding to the motor frame number), and the output end can be equipped with flange face or output shaft type products, which can be easily integrated and applied in the field of automation and tools.

Features	Product Coding	Technical data	Specification Dimension
		Rated Table	Appearance drawing
		Inspection Specification	Dimension Table

CGGH

Features

Structure Of CGGH Series



Product Coding

CGGH 25 100 Motor Model & Shaft Diameter

Model	Type	Model	Speed reduction ratio					Motor model	Motor shaft diameter
CG	GH= Flange	14	50	80	100	-	-	#40 Frame	Ø8
		17	50	80	100	120	-	#40 Frame	Ø8
		20	50	80	100	120	160	#40 Frame #60 Frame	Ø8、Ø11、Ø14
		25	50	80	100	120	160	#60 Frame	Ø14
		32	50	80	100	120	160	#60 Frame #80 Frame	Ø14、Ø19

Technical Data

Rating Table

Model	Speed reduction ratio	Rated torque when inputting 2000r/min	Allowable peak torque at start and stop	Allowable maximum value of average loading torque	Instantaneous allowable maximum torque	Allowable maximum input rotation speed	Allowable maximum input rotation speed	Moment of inertia	
		N·m	N·m	N·m	N·m	r/min	r/min	$I\times10^{-4}kg\cdot m^2$	$J\times10^{-5}kgf\cdot ms^2$
14	50	7.0	23	9.0	46	8500	3500	0.033	0.034
	80	10	30	14	61				
	100	10	36	14	70				
17	50	21	44	34	91	7300	3500	0.079	0.081
	80	29	56	35	113				
	100	31	70	51	143				
	120	31	70	51	112				
20	50	33	73	44	127	6500	3500	0.193	0.197
	80	44	96	61	165				
	100	52	107	64	191				
	120	52	113	64	191				
	160	52	120	64	191				
25	50	51	127	72	242	5600	3500	0.413	0.421
	80	82	178	113	332				
	100	87	204	140	369				
	120	87	217	140	395				
	160	87	229	140	408				
32	50	99	281	140	497	4800	3000	1.69	1.72
	80	153	395	217	738				
	100	178	433	281	841				
	120	178	459	281	892				
	160	178	484	281	892				

Technical Data

• Inspection Specifications

— Angular Transmission Accuracy

Speed reduction ratio	Model	14	17	20	25	32
Overall speed reduction ratio	arc-min	1.5	1.5	1	1	1

— Hysteresis Loss

Speed reduction ratio	Model / Unit	14	17	20	25	32
50	arc-min	2.0	2.0	2.0	2.0	2.0
80 or more	arc-min	1.0	1.0	1.0	1.0	1.0

— Maximum Amount Of Backlash

Speed reduction ratio	Model	14	17	20	25	32
50	arc-sec	36	20	17	17	14
80	arc-sec	23	13	11	11	9
100	arc-sec	18	10	9	9	7
120	arc-sec	-	8	8	8	6
160	arc-sec	-	-	6	6	5

— Rigidity (Spring Constant)

Speed reduction ratio		Model	14	17	20	25	32
T_1		N·m	2.0	3.9	7.0	14	29
T_2		N·m	6.9	12	25	48	108
Speed reduction ratio 50	K_1	×10⁴N·m/rad	0.34	0.81	1.3	2.5	5.4
	K_2	×10⁴N·m/rad	0.47	1.1	1.8	3.4	7.8
	K_3	×10⁴N·m/rad	0.57	1.3	2.3	4.4	9.8
	θ_1	arc-min	2.0	1.7	1.8	1.9	1.9
	θ_2	arc-min	5.6	4.2	5.3	5.4	5.4
Speed reduction ratio more than 80	K_1	×10⁴N·m/rad	0.47	1	1.6	3.1	6.7
	K_2	×10⁴N·m/rad	0.61	1.4	2.5	5.0	11
	K_3	×10⁴N·m/rad	0.71	1.6	2.9	5.7	12
	θ_1	arc-min	1.4	1.3	1.5	1.5	1.5
	θ_2	arc-min	4.2	3.3	3.9	3.8	4.0

Technical Data

• Inspection Specifications

— Starting Torque

Unit:cNm

Speed reduction ratio	Model	14	17	20	25	32
50		4.5	6.7	8.6	17	34
80		3.1	4.4	5.4	10	21
100		2.8	3.7	4.7	8.8	20
120		-	3.4	4.2	8.0	17
160		-	-	3.6	6.9	15

— Acceleration Starting Torque

Unit:Nm

Speed reduction ratio	Model	14	17	20	25	32
50		1.8	3.3	5.2	9.9	20
80		1.8	3.3	5.3	10	21
100		2	3.6	5.6	11	22
120		-	3.9	6.1	12	24
160		-	-	7	14	29

— Release Torque

Unit:Nm

Speed reduction ratio	Model	14	17	20	25	32
50		110	190	280	580	1200
80		140	260	450	880	1800
100		100	200	330	650	1300
120		-	150	310	610	1200
160		-	-	280	580	1200

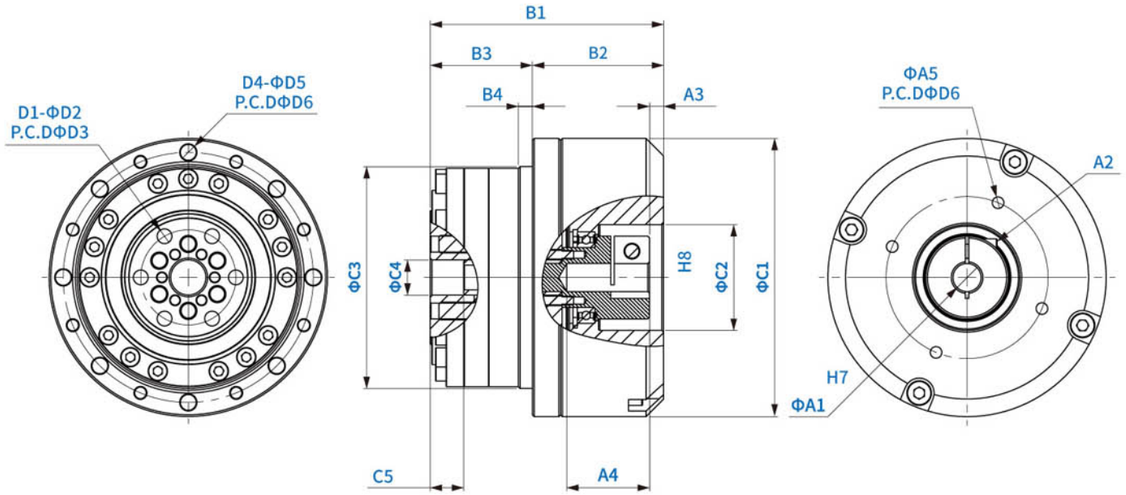
— Buckling Torque

Unit:Nm

Model	14	17	20	25	32
Overall speed reduction ratio	260	500	800	1700	3500

Specification Dimension

• Appearance Drawing



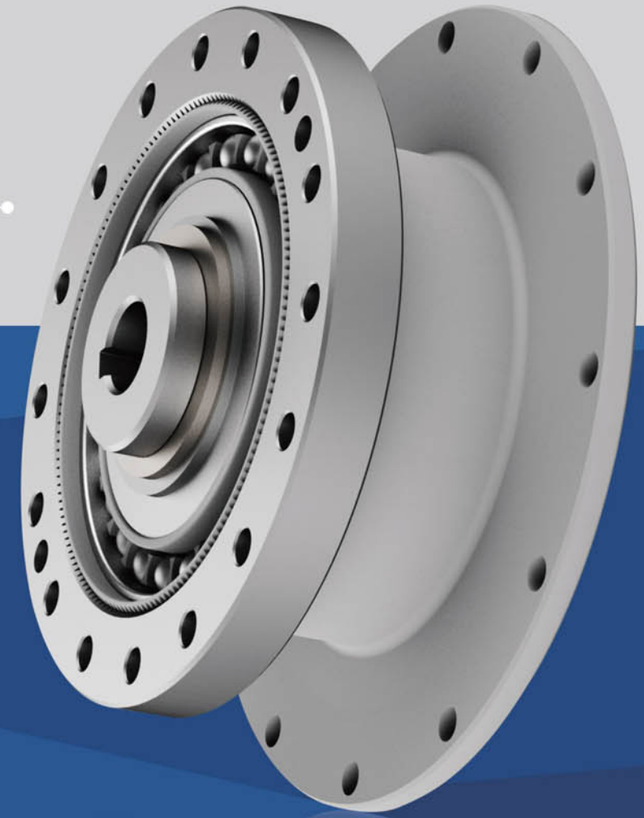
Specification Dimension

• Dimension Table

Unit:mm

	14	17	20	25	32
A1	8	8	8、11、14	14	14、19
A2	M4x0.7P	M4x0.7P	M4x0.7P	M4x0.7P	M4x0.7P
A3	4	4	4、5	5	5
A4	-	27.5	36	38	43.5
A5	45、56	45、46	46、63、70	70	70、90、100
A6	M3、M4	M3、M4	M4、M5	M5	M4、M5、M6
B1	63.55	66.25	76.5	88	111.5
B2	36.55	37.25	48.5	52	66.5
B3	27	29	28	36	45
B4	3.5	4	5	5	5
C1	73	79	93	107	138
C2	30	30	30、40、50	50	50、70、80
C3	56	63	72	86	113
C4	11	10	14	20	26
C5	9.4	9.5	9	12	15
D1	6	6	8	8	8
D2	M4	M5	M6	M8	M10
D3	23	27	32	42	55
D4	8	8	8	10	12
D5	M4	M4	M5	M5	M6
D6	65	71	82	96	125

Hollow Type
with Component Type

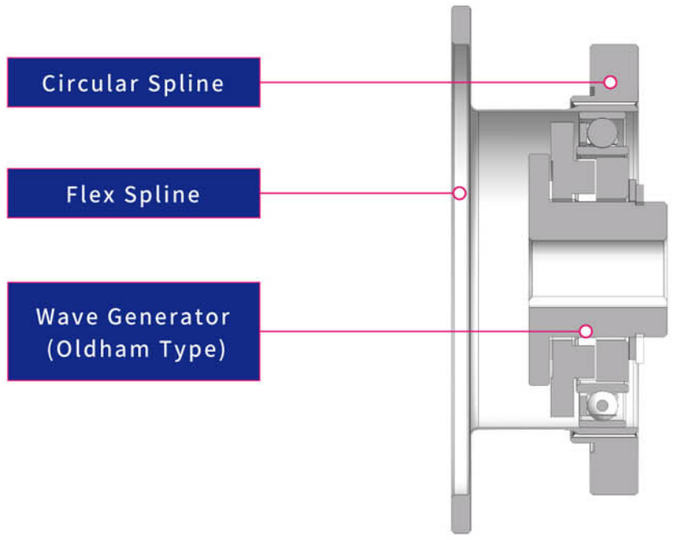


HGAA series component type is composed of only three basic parts.
It can be directly assembled to machinery and devices to improve the freedom of design.

HGAA

Features

Structure Of HGAA Series



Product Coding

HGAA 25 100 Specification 1&2

Model	Type	Model	Speed reduction ratio					Speed reduction ratio
HG	AA= Component type	14	50	80	100	-	-	Specification: no mark = standard product
		17	50	80	100	120	-	
		20	50	80	100	120	160	
		25	50	80	100	120	160	
		32	50	80	100	120	160	
		40	50	80	100	120	160	

Technical Data

Rating Table

Model	Speed reduction ratio	Rated torque when inputting 2000r/min	Allowable peak torque at start and stop	Allowable maximum value of average loading torque	Instantaneous allowable maximum torque	Allowable maximum input rotation speed	Allowable maximum input rotation speed	Moment of inertia	
		N·m	N·m	N·m	N·m	r/min	r/min	I×10⁻⁴kg·m²	J×10⁻⁵kgf·ms²
14	50	7.0	23	9.0	46	8500	3500	0.033	0.034
	80	10	30	14	61				
	100	10	36	14	70				
17	50	21	44	34	91	7300	3500	0.079	0.081
	80	29	56	35	113				
	100	31	70	51	143				
	120	31	70	51	112				
20	50	33	73	44	127	6500	3500	0.193	0.197
	80	44	96	61	165				
	100	52	107	64	191				
	120	52	113	64	191				
	160	52	120	64	191				
25	50	51	127	72	242	5600	3500	0.413	0.421
	80	82	178	113	332				
	100	87	204	140	369				
	120	87	217	140	395				
	160	87	229	140	408				
32	50	99	281	140	497	4800	3000	1.69	1.72
	80	153	395	217	738				
	100	178	433	281	841				
	120	178	459	281	892				
	160	178	484	281	892				
40	50	178	523	255	892	4000	3000	4.50	4.59
	80	268	675	369	1270				
	100	345	738	484	1400				
	120	382	802	586	1530				
	160	382	841	586	1530				

Technical Data

• Inspection Specifications

— Angular Transmission accuracy

Speed reduction ratio	Model	14	17	20	25	32	40
Overall speed reduction ratio	arc-min	1.5	1.5	1	1	1	1

— Hysteresis Loss

Speed reduction ratio	Model / Unit	14	17	20	25	32	40
50	arc-min	2.0	2.0	2.0	2.0	2.0	2.0
80 or more	arc-min	1.0	1.0	1.0	1.0	1.0	1.0

— Maximum Amount Of Backlash

Speed reduction ratio / Model		14	17	20	25	32	40
50	arc-sec	36	20	17	17	14	14
80	arc-sec	23	13	11	11	9	9
100	arc-sec	18	10	9	9	7	7
120	arc-sec	-	8	8	8	6	6
160	arc-sec	-	-	6	6	5	5

— Rigidity (Spring Constant)

Speed reduction ratio / Model			14	17	20	25	32	40
T_1		N·m	2.0	3.9	7.0	14	29	54
T_2		N·m	6.9	12	25	48	108	196
Speed reduction ratio 50	K_1	×10⁴N·m/rad	0.34	0.81	1.3	2.5	5.4	10
	K_2	×10⁴N·m/rad	0.47	1.1	1.8	3.4	7.8	14
	K_3	×10⁴N·m/rad	0.57	1.3	2.3	4.4	9.8	18
	θ_1	arc-min	2.0	1.7	1.8	1.9	1.9	1.8
	θ_2	arc-min	5.6	4.2	5.3	5.4	5.4	5.3
Speed reduction ratio more than 80	K_1	×10⁴N·m/rad	0.47	1	1.6	3.1	6.7	13
	K_2	×10⁴N·m/rad	0.61	1.4	2.5	5.0	11	20
	K_3	×10⁴N·m/rad	0.71	1.6	2.9	5.7	12	23
	θ_1	arc-min	1.4	1.3	1.5	1.5	1.5	1.4
	θ_2	arc-min	4.2	3.3	3.9	3.8	4.0	3.8

Technical Data

• Inspection Specifications

— Starting Torque

Unit:cNm

Speed reduction ratio / Model	14	17	20	25	32	40
50	3.7	5.7	7.3	14	28	50
80	2.8	3.8	4.8	8.9	19	33
100	2.4	3.3	4.3	7.9	18	29
120	-	3.1	3.9	7.3	15	27
160	-	-	3.4	6.4	14	24

— Acceleration Starting Torque

Unit:Nm

Speed reduction ratio / Model	14	17	20	25	32	40
50	2.2	3.4	4.4	8.2	17	30
80	2.7	3.7	4.6	8.6	18	32
100	2.8	4	5.2	9.5	21	35
120	-	4.5	5.6	10	21	40
160	-	-	6.6	12	26	45

— Release Torque

Unit:Nm

Speed reduction ratio / Model	14	17	20	25	32	40
50	110	190	280	580	1200	2300
80	140	260	450	880	1800	3600
100	100	200	330	650	1300	2700
120	-	150	310	610	1200	2400
160	-	-	280	580	1200	2300

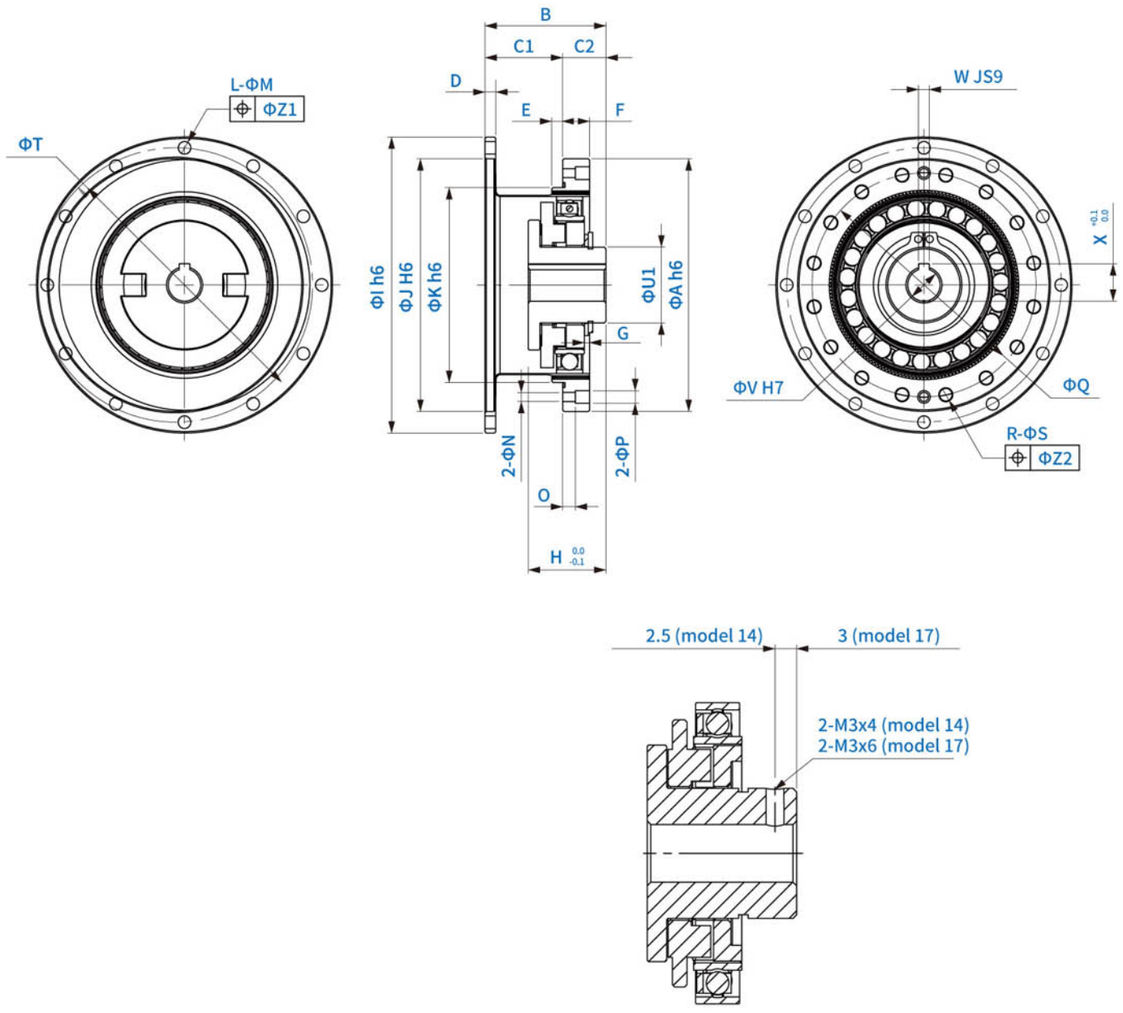
— Buckling Torque

Unit:Nm

Model	14	17	20	25	32	40
Overall speed reduction ratio	210	420	700	1300	2800	5200

Specification Dimension

• Appearance Drawing



Specification Dimension

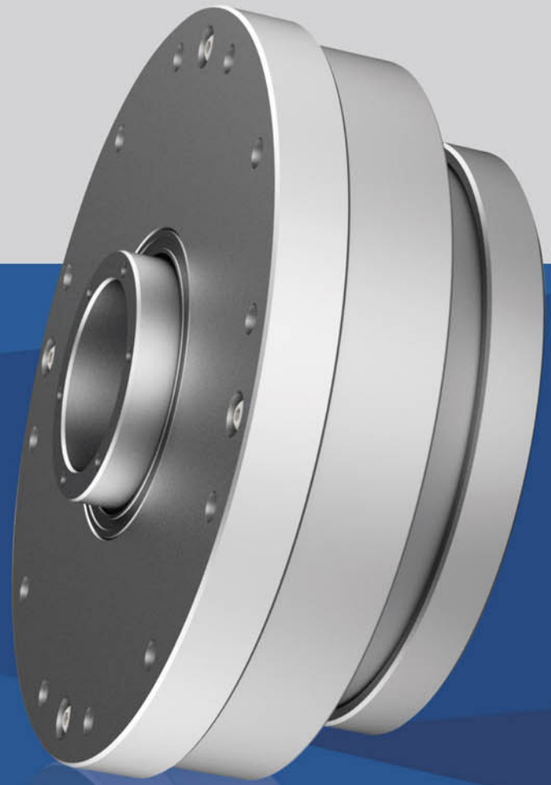
• Dimension Table

Unit:mm

Mark \ Model	14	17	20	25	32	40
ΦA h6	50	60	70	85	110	135
B	28.5 $^{0}_{-0.4}$	32.5 $^{0}_{-0.4}$	33.5 $^{0}_{-0.4}$	37 $^{0}_{-0.5}$	44 $^{0}_{-0.6}$	53 $^{0}_{-0.6}$
C1	17.5 $^{+0.4}_{0}$	20 $^{+0.5}_{0}$	21.5 $^{+0.8}_{0}$	24 $^{+0.8}_{0}$	28 $^{+0.8}_{0}$	34 $^{+0.6}_{0}$
C2	11	12.5	12	13	16	19
D	2.4	3	3	3.3	3.6	4
E	2	2.5	3	3	3	4
F	6	6.5	7.5	10	14	17
G	1.4	1.6	1.5	3.5	4.2	5.6
H	18.5 $^{0}_{-0.1}$	20.7 $^{0}_{-0.1}$	21.5 $^{0}_{-0.1}$	21.6 $^{0}_{-0.1}$	23.6 $^{0}_{-0.1}$	29.7 $^{0}_{-0.1}$
ΦI h6	60	72	82	104	134	164
ΦJ H6	48	60	70	88	114	140
ΦK h6	38	48	54	67	90	110
L	8	12	12	12	12	12
ΦM	3.5	3.4	3.5	4.5	5.5	6.6
N	M3	M3	M3	M4	M5	M6
O	6	6.5	4	6	7	9
ΦP	-	-	3.5	4.5	5.5	6.6
ΦQ	44	54	62	75	100	120
R	8	16	16	16	16	16
ΦS	3.5	3.5	3.5	4.5	5.5	6.6
ΦT	54	66	76	96	124	152
ΦU1	14	18	21	26	26	32
ΦV	6	-	10	14	15	14
	-	10	10	14	15	-
WJs9	-	3	3	5	5	5
X	-	11.4 $^{+0.1}_{0}$	11.4 $^{+0.1}_{0}$	16.3 $^{+0.1}_{0}$	17.3 $^{+0.1}_{0}$	16.3 $^{+0.1}_{0}$
ΦZ_1	0.25	0.20	0.25	0.25	0.25	0.3
ΦZ_2	0.25	0.25	0.25	0.25	0.25	0.3
Mass (kg)	0.11	0.18	0.31	0.48	0.97	1.87

Hollow Type with Unit Type

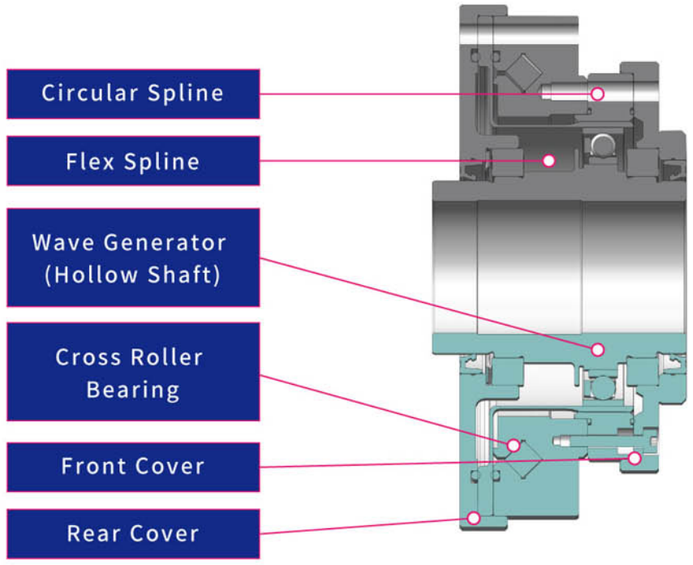
HGUH adopts a hollow hole structure, which can arrange pipes and wiring in the hollow structure of the rotation center without biasing the motor, which contributes to the miniaturization of the device layout.
The configuration has a front and rear cover design. Both front and rear covers are sealed with shaft seals and O-rings. This reducer has a good leak proof effect.



HGUH

Features

Structure Of HGUH Series



Product Coding

HGUH 25 100 Specification 1&2

Model	Type	Model	Speed reduction ratio					Special Specification
HG	UH= Unit type	14	50	80	100	-	-	Specification: no mark = standard product
		17	50	80	100	120	-	
		20	50	80	100	120	160	
		25	50	80	100	120	160	
		32	50	80	100	120	160	
		40	50	80	100	120	160	

Technical Data

Rating Table

Model	Speed reduction ratio	Rated torque when inputting 2000r/min	Allowable peak torque at start and stop	Allowable maximum value of average loading torque	Instantaneous allowable maximum torque	Allowable maximum input rotation speed	Allowable average input rotation speed
		N·m	N·m	N·m	N·m	r/min	r/min
14	50	7.0	23	9	46	8500	3500
	80	10	30	14	61		
	100	10	36	14	70		
17	50	21	44	34	91	7300	3500
	80	29	56	35	113		
	100	31	70	51	143		
	120	31	70	51	112		
20	50	33	73	44	127	6500	3500
	80	44	96	61	165		
	100	52	107	64	191		
	120	52	113	64	191		
	160	52	120	64	191		
25	50	51	127	72	242	5600	3500
	80	82	178	113	332		
	100	87	204	140	369		
	120	87	217	140	395		
	160	87	229	140	408		
32	50	99	281	140	497	4800	3500
	80	153	395	217	738		
	100	178	433	281	841		
	120	178	459	281	892		
	160	178	484	281	892		
40	50	178	523	255	892	4000	3000
	80	268	675	369	1270		
	100	345	738	484	1400		
	120	382	802	586	1530		
	160	382	841	586	1530		

Technical Data

• Inspection Specifications

— Angular Transmission Accuracy

Speed reduction ratio	Model	14	17	20	25	32	40
Overall speed reduction ratio	arc-min	1.5	1.5	1	1	1	1

— Hysteresis Loss

Speed reduction ratio	Model / Unit	14	17	20	25	32	40
50	arc-min	2.0	2.0	2.0	2.0	2.0	2.0
80 or more	arc-min	1.0	1.0	1.0	1.0	1.0	1.0

— Maximum Amount Of Backlash

Speed reduction ratio / Model		14	17	20	25	32	40
50	arc-sec	36	20	17	17	14	14
80	arc-sec	23	13	11	11	9	9
100	arc-sec	18	10	9	9	7	7
120	arc-sec	-	8	8	8	6	6
160	arc-sec	-	-	6	6	5	5

— Rigidity (Spring Constant)

Speed reduction ratio / Model			14	17	20	25	32	40
T_1		N·m	2.0	3.9	7.0	14	29	54
T_2		N·m	6.9	12	25	48	108	196
Speed reduction ratio 50	K_1	×10⁴N·m/rad	0.34	0.81	1.3	2.5	5.4	10
	K_2	×10⁴N·m/rad	0.47	1.1	1.8	3.4	7.8	14
	K_3	×10⁴N·m/rad	0.57	1.3	2.3	4.4	9.8	18
	θ_1	arc-min	2.0	1.7	1.8	1.9	1.9	1.8
	θ_2	arc-min	5.6	4.2	5.3	5.4	5.4	5.3
Speed reduction ratio more than 80	K_1	×10⁴N·m/rad	0.47	1	1.6	3.1	6.7	13
	K_2	×10⁴N·m/rad	0.61	1.4	2.5	5.0	11	20
	K_3	×10⁴N·m/rad	0.71	1.6	2.9	5.7	12	23
	θ_1	arc-min	1.4	1.3	1.5	1.5	1.5	1.4
	θ_2	arc-min	4.2	3.3	3.9	3.8	4.0	3.8

Technical Data

• Inspection Specifications

— Starting Torque

Unit:cNm

Speed reduction ratio / Model	14	17	20	25	32	40
50	8.8	27	36	56	85	136
80	7.5	25	33	50	74	117
100	6.9	24	32	49	72	112
120	-	24	31	48	68	110
160	-	-	31	47	67	105

— Acceleration Starting Torque

Unit:Nm

Speed reduction ratio / Model	14	17	20	25	32	40
50	5.3	16	22	34	51	82
80	7.2	24	31	48	70	112
100	8.2	29	38	59	86	134
120	-	34	45	69	97	158
160	-	-	59	90	128	201

— Release Torque

Unit:Nm

Speed reduction ratio / Model	14	17	20	25	32	40
50	110	190	280	580	1200	2300
80	140	260	450	880	1800	3600
100	100	200	330	650	1300	2700
120	-	150	310	610	1200	2400
160	-	-	280	580	1200	2300

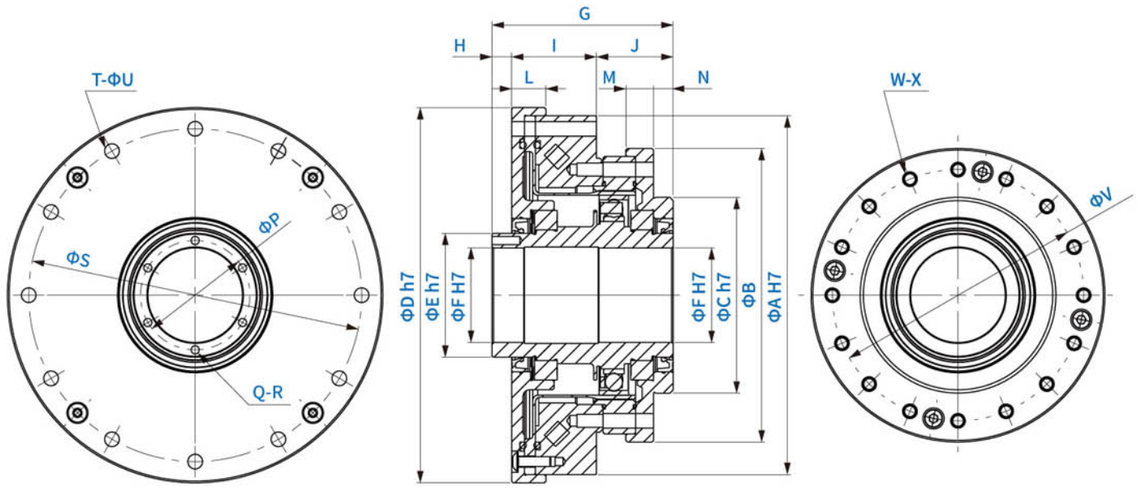
— Buckling Torque

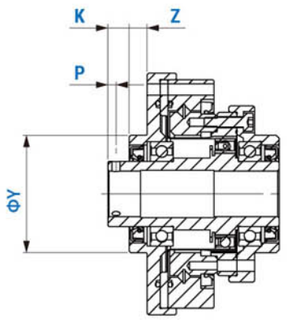
Unit:Nm

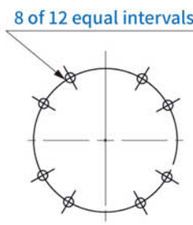
Model	14	17	20	25	32	40
Overall speed reduction ratio	210	420	700	1300	2800	5200

Specification Dimension

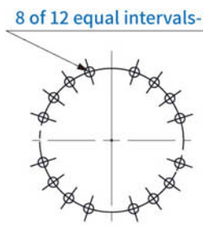
• Appearance Drawing







Model 14



Model 17

Specification Dimension

• Dimension Table

Mark \ Model	14	17	20	25	32	40
ΦA h7	70	80	90	110	142	170
ΦB	54	64	75	90	115	140
ΦC h7	36	45	50	60	85	100
ΦD h7	74	84	95	115	147	175
ΦE h7	20	25	30	38	45	59
ΦF h7	14	19	21	29	36	46
G	52.5	56.5	51.5	55.5	65.5	79
H	12	12	5	6	7	8
I	20.5	23	25	26	32	38
J	20	21.5	21.5	23.5	26.5	33
K	6.5	6.5	-	-	-	-
L	9	10	10.5	10.5	12	14
M	8	8.5	9	8.5	9.5	13
N	7.5	8.5	7	6	5	7
O	21.7	23.9	25.5	29.6	36.4	44
ΦP (P)	(2.5)	(2.5)	25.5	33.5	40.5	52
Q	3	3	6	6	6	6
R	M3	M3	M3x6	M3x6	M3x6	M4x8
ΦS	64	74	84	102	132	158
T	8	12	12	12	12	12
ΦU	3.5	3.5	3.5	4.5	5.5	6.6
ΦV	44	54	62	77	100	122
W	8 of 12 equal intervals	16 of 20 equal intervals	16	16	16	16
X	M3x5	M3x6	M3x6	M4x7	M5x8	M6x10
	Φ3.5x11.5	Φ3.5x12	Φ3.5x13.5	Φ4.5x15.5	Φ5.5x20.5	Φ6.6x25
ΦY	36	45	-	-	-	-
Z	5.5	5.5	-	-	-	-

Hollow Type with Simple Type

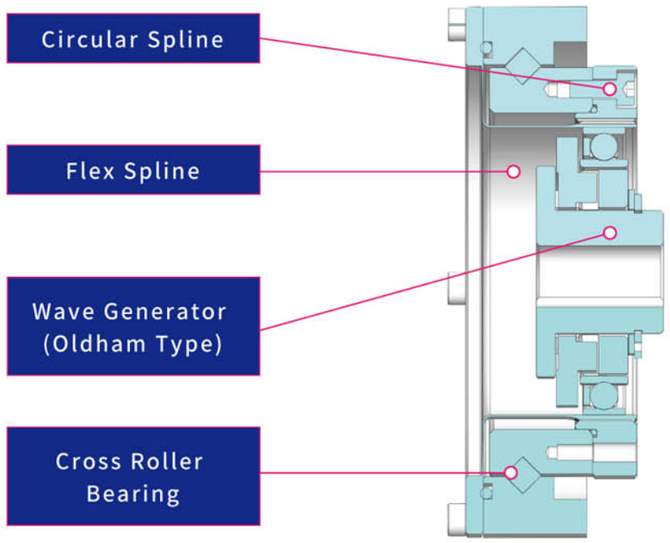
– Combined with Oldham Coupling

HGSO series wave generators are Oldham couplings. Oldham couplings can provide large concentricity offset, and machinery and reducers can withstand low assembly accuracy. This design facilitates customers to assemble directly to machinery and devices, and improves the freedom of design.

HGSO

Features

Structure Of HGSO Series



Product Coding

HGSO 25 100 Specification 1&2

Model	Type	Model	Speed reduction ratio					Special Specification
HG	SO= Simple type (Oldham coupling)	14	50	80	100	-	-	Specification: no mark = standard product
		17	50	80	100	120	-	
		20	50	80	100	120	160	
		25	50	80	100	120	160	
		32	50	80	100	120	160	
		40	50	80	100	120	160	

Technical Data

Rating Table

Model	Speed reduction ratio	Rated torque when inputting 2000r/min	Allowable peak torque at start and stop	Allowable maximum value of average loading torque	Instantaneous allowable maximum torque	Allowable maximum input rotation speed	Allowable average input rotation speed
		N·m	N·m	N·m	N·m	r/min	r/min
14	50	7.0	23	9	46	8500	3500
	80	10	30	14	61		
	100	10	36	14	70		
17	50	21	44	34	91	7300	3500
	80	29	56	35	113		
	100	31	70	51	143		
	120	31	70	51	112		
20	50	33	73	44	127	6500	3500
	80	44	96	61	165		
	100	52	107	64	191		
	120	52	113	64	191		
	160	52	120	64	191		
25	50	51	127	72	242	5600	3500
	80	82	178	113	332		
	100	87	204	140	369		
	120	87	217	140	395		
	160	87	229	140	408		
32	50	99	281	140	497	4800	3500
	80	153	395	217	738		
	100	178	433	281	841		
	120	178	459	281	892		
	160	178	484	281	892		
40	50	178	523	255	892	4000	3000
	80	268	675	369	1270		
	100	345	738	484	1400		
	120	382	802	586	1530		
	160	382	841	586	1530		

Technical Data

• Inspection Specifications

— Angular Transmission Accuracy

Speed reduction ratio	Model	14	17	20	25	32	40
Overall speed reduction ratio	arc-min	1.5	1.5	1	1	1	1

— Hysteresis Loss

Speed reduction ratio	Model / Unit	14	17	20	25	32	40
50	arc-min	2.0	2.0	2.0	2.0	2.0	2.0
80 or more	arc-min	1.0	1.0	1.0	1.0	1.0	1.0

— Maximum Amount Of Backlash

Speed reduction ratio / Model		14	17	20	25	32	40
50	arc-sec	36	20	17	17	14	14
80	arc-sec	23	13	11	11	9	9
100	arc-sec	18	10	9	9	7	7
120	arc-sec	-	8	8	8	6	6
160	arc-sec	-	-	6	6	5	5

— Rigidity (Spring Constant)

Speed reduction ratio / Model			14	17	20	25	32	40
T_1		N·m	2.0	3.9	7.0	14	29	54
T_2		N·m	6.9	12	25	48	108	196
Speed reduction ratio 50	K_1	×10⁴N·m/rad	0.34	0.81	1.3	2.5	5.4	10
	K_2	×10⁴N·m/rad	0.47	1.1	1.8	3.4	7.8	14
	K_3	×10⁴N·m/rad	0.57	1.3	2.3	4.4	9.8	18
	θ_1	arc-min	2.0	1.7	1.8	1.9	1.9	1.8
	θ_2	arc-min	5.6	4.2	5.3	5.4	5.4	5.3
Speed reduction ratio more than 80	K_1	×10⁴N·m/rad	0.47	1	1.6	3.1	6.7	13
	K_2	×10⁴N·m/rad	0.61	1.4	2.5	5.0	11	20
	K_3	×10⁴N·m/rad	0.71	1.6	2.9	5.7	12	23
	θ_1	arc-min	1.4	1.3	1.5	1.5	1.5	1.4
	θ_2	arc-min	4.2	3.3	3.9	3.8	4.0	3.8

Technical Data

• Inspection Specifications

— Release Torque

Unit:cNm

Speed reduction ratio / Model	14	17	20	25	32	40
50	110	190	280	580	1200	2300
80	140	260	450	880	1800	3600
100	100	200	330	650	1300	2700
120	-	150	310	610	1200	2400
160	-	-	280	580	1200	2300

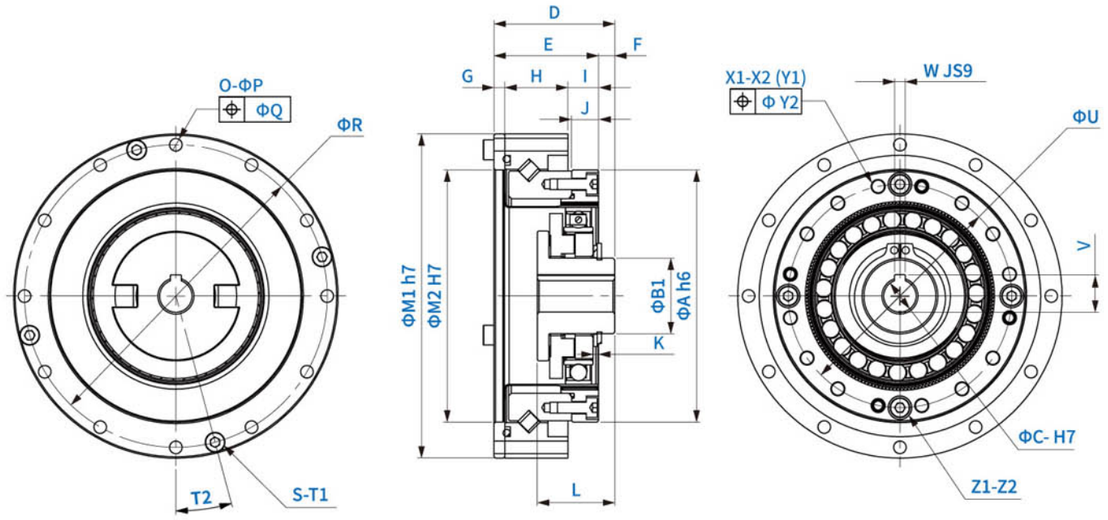
— Buckling Torque

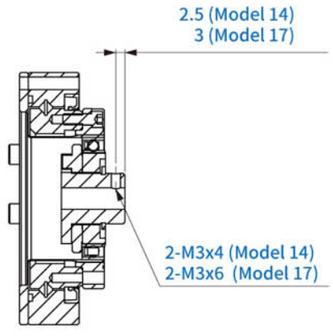
Unit:Nm

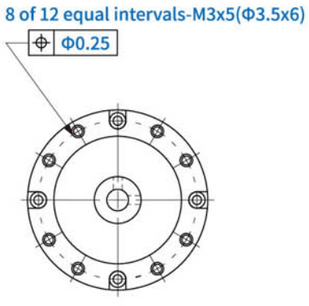
Model	14	17	20	25	32	40
Overall speed reduction ratio	210	420	700	1300	2800	5200

Specification Dimension

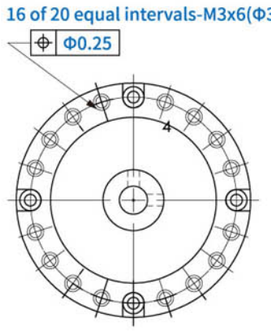
• Appearance Drawing







Model 14



Model 17

Specification Dimension

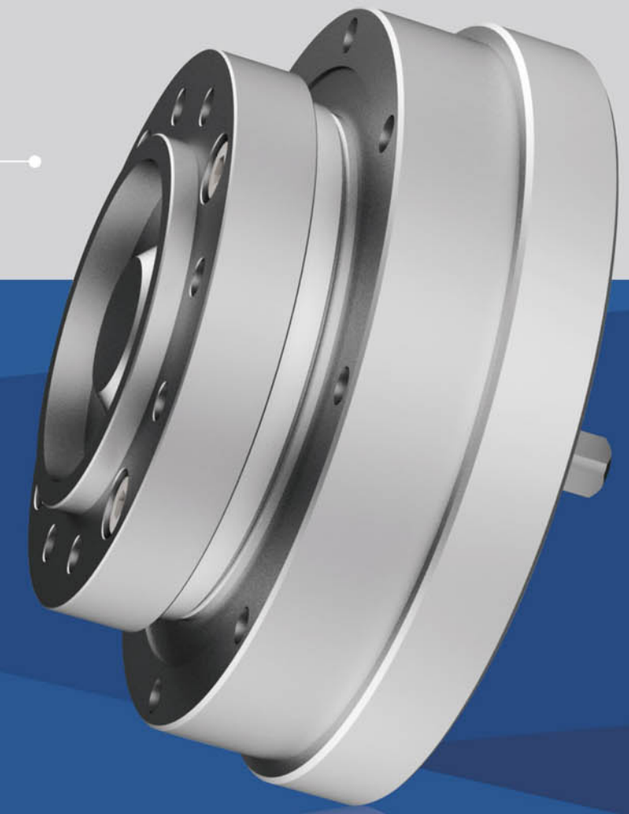
• Dimension Table

Unit:Nm

Mark \ Model	14	17	20	25	32	40
ΦA h6	50	60	70	85	110	135
ΦB1	14	18	21	26	26	32
ΦB2	-	-	-	-	-	-
ΦB3	-	-	-	-	-	-
ΦC	6	-	10	14	15	14
	-	10	10	14	15	-
D *	28.5 $^{0}_{-0.4}$	32.5 $^{0}_{-0.4}$	33.5 $^{0}_{-0.4}$	37 $^{0}_{-0.5}$	44 $^{0}_{-0.6}$	53 $^{0}_{-0.6}$
E	23.5	26.5	29	34	42	51
F *	5	6	4.5	3	2	2
G	2.4	3	3	3.3	3.6	4
H	14.1	16	17.5	18.7	23.4	29
I	7	7.5	8.5	12	15	18
J	6	6.5	7.5	10	14	17
K *	1.4	1.6	1.5	3.5	4.2	5.6
L	18.5 $^{0}_{-0.1}$	20.7 $^{0}_{-0.1}$	21.5 $^{0}_{-0.1}$	21.6 $^{0}_{-0.1}$	23.6 $^{0}_{-0.1}$	29.7 $^{0}_{-0.1}$
ΦM1 h7	70	80	90	110	142	170
ΦM2 H7	48	60	70	88	114	140
ΦN2	-	-	-	-	-	32
O	8	12	12	12	12	12
ΦP	3.5	3.5	3.5	4.5	5.5	6.6
ΦQ	0.25	0.25	0.25	0.25	0.25	0.3
ΦR	64	74	84	102	132	158
S	2	4	4	4	4	6
T_1	M3x6	M3x6	M3x8	M3x8	M4x8	M4x10
T_2(Angle)	22.5°	15°	15°	15°	15°	15°
ΦU	44	54	62	77	100	122
V	-	11.4 $^{+0.1}_{0}$	11.4 $^{+0.1}_{0}$	16.3 $^{+0.1}_{0}$	17.3 $^{+0.1}_{0}$	16.3 $^{+0.1}_{0}$
W Js9	-	3	3	5	5	5
X1	8 of 12 equal intervals	16 of 20 equal intervals	16	16	16	16
X2	M3x5	M3x6	M3x6	M4x7	M5x8	M6x10
Y1	Φ3.5x6	Φ3.5x6.5	Φ3.5x7.5	Φ4.5x10	Φ5.5x14	Φ6.6x17
Y2	0.25	0.25	0.25	0.25	0.25	0.3
Z1	4	4	4	4	4	4
Z2	M3x6	M3x6	M3x8	M3x10	M4x16	M5x20

Hollow Type
with Input Shaft Type

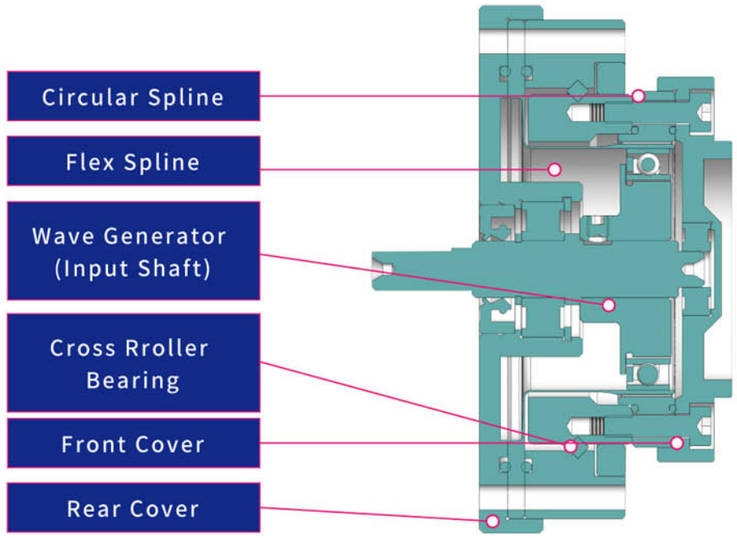
HGUJ series adopts the input shaft structure and uses a coupling to connect with the motor , which can correspond to a variety of input types, such as pulley, gear, coupling input, etc. The configuration is designed with front and rear covers, and shaft seals and O-rings are used as seals. This reducer configuration has good leak proof effect.



HGUJ

Features

Structure Of HGUJ Series



Product Coding

HGUJ 25 100 Specification 1&2

Model	Type	Model	Speed reduction ratio					Special Specification
HG	UJ= input shaft type	14	50	80	100	-	-	Specification: no mark = standard product
		17	50	80	100	120	-	
		20	50	80	100	120	160	
		25	50	80	100	120	160	
		32	50	80	100	120	160	
		40	50	80	100	120	160	

Technical Data

Rating Table

Model	Speed reduction ratio	Rated torque when inputting 2000r/min	Allowable peak torque at start and stop	Allowable maximum value of average loading torque	Instantaneous allowable maximum torque	Allowable maximum input rotation speed	Allowable average input rotation speed
		N·m	N·m	N·m	N·m	r/min	r/min
14	50	7.0	23	9	46	8500	3500
	80	10	30	14	61		
	100	10	36	14	70		
17	50	21	44	34	91	7300	3500
	80	29	56	35	113		
	100	31	70	51	143		
	120	31	70	51	112		
20	50	33	73	44	127	6500	3500
	80	44	96	61	165		
	100	52	107	64	191		
	120	52	113	64	191		
	160	52	120	64	191		
25	50	51	127	72	242	5600	3500
	80	82	178	113	332		
	100	87	204	140	369		
	120	87	217	140	395		
	160	87	229	140	408		
32	50	99	281	140	497	4800	3500
	80	153	395	217	738		
	100	178	433	281	841		
	120	178	459	281	892		
	160	178	484	281	892		
40	50	178	523	255	892	4000	3000
	80	268	675	369	1270		
	100	345	738	484	1400		
	120	382	802	586	1530		
	160	382	841	586	1530		

Technical Data

• Inspection Specifications

— Angular Transmission Accuracy

Speed reduction ratio	Model	14	17	20	25	32	40
Overall speed reduction ratio	arc-min	1.5	1.5	1	1	1	1

— Hysteresis Loss

Speed reduction ratio	Unit \ Model	14	17	20	25	32	40
50	arc-min	2.0	2.0	2.0	2.0	2.0	2.0
80 or more	arc-min	1.0	1.0	1.0	1.0	1.0	1.0

— Maximum Amount Of Backlash

Speed reduction ratio \ Model		14	17	20	25	32	40
50	arc-sec	36	20	17	17	14	14
80	arc-sec	23	13	11	11	9	9
100	arc-sec	18	10	9	9	7	7
120	arc-sec	-	8	8	8	6	6
160	arc-sec	-	-	6	6	5	5

— Rigidity (Spring Constant)

Speed reduction ratio \ Model			14	17	20	25	32	40
T_1		N·m	2.0	3.9	7.0	14	29	54
T_2		N·m	6.9	12	25	48	108	196
Speed reduction ratio 50	K_1	×10⁴N·m/rad	0.34	0.81	1.3	2.5	5.4	10
	K_2	×10⁴N·m/rad	0.47	1.1	1.8	3.4	7.8	14
	K_3	×10⁴N·m/rad	0.57	1.3	2.3	4.4	9.8	18
	θ_1	arc-min	2.0	1.7	1.8	1.9	1.9	1.8
	θ_2	arc-min	5.6	4.2	5.3	5.4	5.4	5.3
Speed reduction ratio more than 80	K_1	×10⁴N·m/rad	0.47	1	1.6	3.1	6.7	13
	K_2	×10⁴N·m/rad	0.61	1.4	2.5	5.0	11	20
	K_3	×10⁴N·m/rad	0.71	1.6	2.9	5.7	12	23
	θ_1	arc-min	1.4	1.3	1.5	1.5	1.5	1.4
	θ_2	arc-min	4.2	3.3	3.9	3.8	4.0	3.8

Technical Data

• Inspection Specifications

— Starting Torque

Unit:cNm

Speed reduction ratio \ Model	14	17	20	25	32	40
50	5.7	9.7	14	22	41	72
80	4.4	7.2	11	15	29	52
100	3.7	6.5	9.9	14	27	47
120	-	6.2	9.3	13	24	44
160	-	-	8.6	12	23	39

— Acceleration Starting Torque

Unit:Nm

Speed reduction ratio \ Model	14	17	20	25	32	40
50	3.4	5.8	8.4	13	25	43
80	4.2	6.9	10	15	28	50
100	4.5	7.8	12	17	33	56
120	-	8.9	13	19	34	63
160	-	-	17	23	43	75

— Release Torque

Unit:Nm

Speed reduction ratio \ Model	14	17	20	25	32	40
50	110	190	280	580	1200	2300
80	140	260	450	880	1800	3600
100	100	200	330	650	1300	2700
120	-	150	310	610	1200	2400
160	-	-	280	580	1200	2300

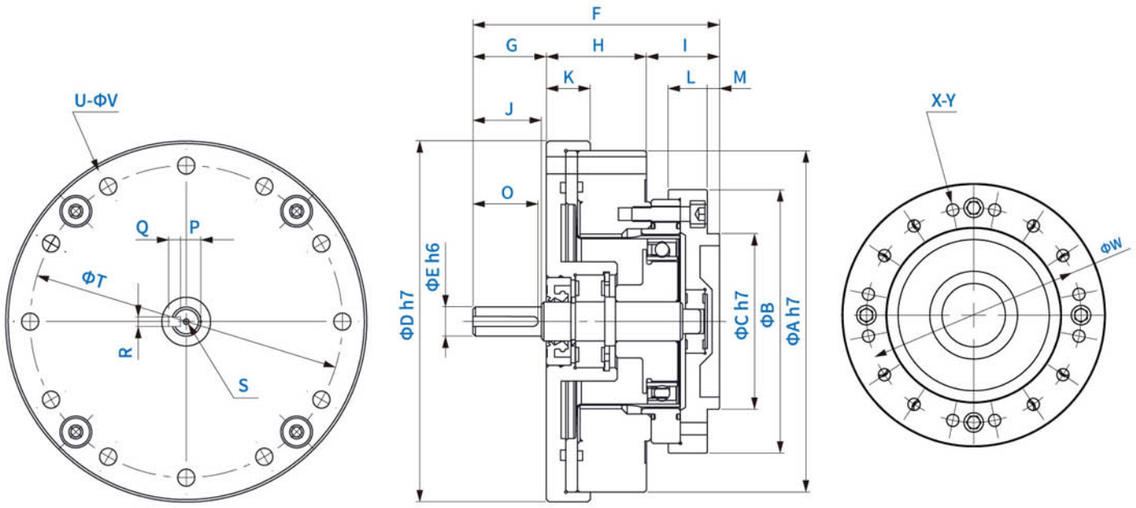
— Buckling Torque

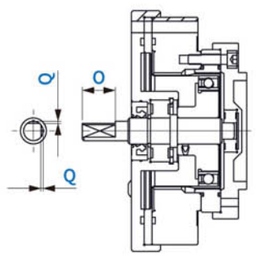
Unit:Nm

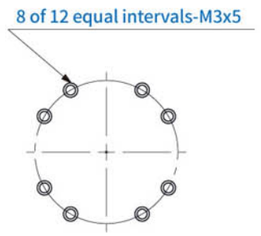
Model	14	17	20	25	32	40
Overall speed reduction ratio	210	420	700	1300	2800	5200

Specification Dimension

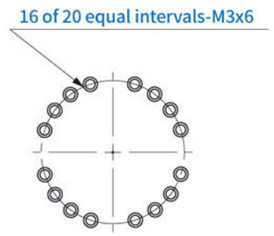
• Appearance Drawing







Model 14



Model 17

Specification Dimension

• Dimension Table

Unit:mm

Mark \ Model	40	17	20	25	32	40
ΦA h7	70	80	90	110	142	170
ΦB	54	64	75	90	115	140
ΦC h7	36	45	50	60	85	100
ΦD h7	74	84	95	115	147	175
ΦE h7	6	8	10	14	14	16
F	50.5	56	63.5	72.5	84.5	100
G	15	17	21	26	26	31
H	20.5	23	25	26	32	38
I	15	16	17.5	20.5	26.5	31
J	14	16	20	25	25	30
K	9	10	10.5	10.5	12	14
L	8	8.5	9	8.5	9.5	13
M	2.5	3	3	3	5	5
N	21.7	23.9	25.5	29.6	36.4	44
O	11	12	16.5	22.5	22.5	27.5
P	-	-	8.2 $^{0}_{-0.1}$	11 $^{0}_{-0.1}$	11 $^{0}_{-0.1}$	13 $^{0}_{-0.1}$
Q	0.5	0.5	3 $^{0}_{-0.025}$	5 $^{0}_{-0.030}$	5 $^{0}_{-0.030}$	5 $^{0}_{-0.030}$
R	-	-	3 $^{0}_{-0.025}$	5 $^{0}_{-0.030}$	5 $^{0}_{-0.030}$	5 $^{0}_{-0.030}$
S	-	-	M3x6	M5x10	M5x10	M5x10
ΦT	64	74	84	102	132	158
U	8	12	12	12	12	12
ΦV	3.5	3.5	3.5	4.5	5.5	6.6
ΦW	44	54	62	77	100	122
X	8 of 12 equal intervals	16 of 20 equal intervals	16	16	16	16
Y	M3x5	M3x6	M3x6	M4x7	M5x8	M6x10
	Φ3.5x11.5	Φ3.5x12	Φ3.5x13.5	Φ4.5x15.5	Φ5.5x20.5	Φ6.6x25

Hollow Type with Simple Type

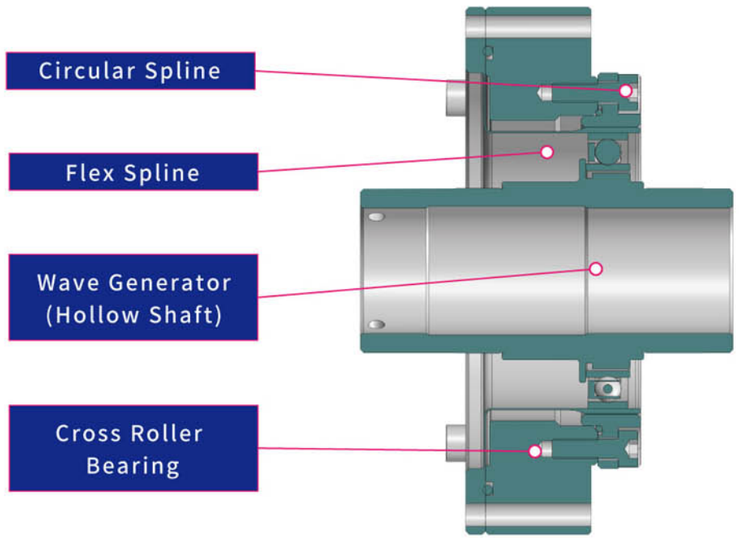
– Combined with Hollow Shaft

HGSH series adopts hollow shaft structure. The piping and wiring can be arranged in the hollow structure of the rotation center without biasing the motor, which contributes to the miniaturization of the device layout.
The design without front and back cover is convenient for customers to directly assemble to machinery and devices, improving the freedom of design.

HGSH

Features

Structure Of HGSH Series



Product Coding

HGSH 25 100 Specification 1&2

Model	Type	Model	Speed reduction ratio					Special Specification
HG	SH=simple type (hollow shaft)	14	50	80	100	-	-	Specification : no mark = standard product
		17	50	80	100	120	-	
		20	50	80	100	120	160	
		25	50	80	100	120	160	
		32	50	80	100	120	160	
		40	50	80	100	120	160	

Technical Data

Rating Table

Model	Speed reduction ratio	Rated torque when inputting 2000r/min	Allowable peak torque at start and stop	Allowable maximum value of average loading torque	Instantaneous allowable maximum torque	Allowable maximum input rotation speed	Allowable average input rotation speed
		N·m	N·m	N·m	N·m	r/min	r/min
14	50	7.0	23	9	46	8500	3500
	80	10	30	14	61		
	100	10	36	14	70		
17	50	21	44	34	91	7300	3500
	80	29	56	35	113		
	100	31	70	51	143		
	120	31	70	51	112		
20	50	33	73	44	127	6500	3500
	80	44	96	61	165		
	100	52	107	64	191		
	120	52	113	64	191		
	160	52	120	64	191		
25	50	51	127	72	242	5600	3500
	80	82	178	113	332		
	100	87	204	140	369		
	120	87	217	140	395		
	160	87	229	140	408		
32	50	99	281	140	497	4800	3500
	80	153	395	217	738		
	100	178	433	281	841		
	120	178	459	281	892		
	160	178	484	281	892		
40	50	178	523	255	892	4000	3000
	80	268	675	369	1270		
	100	345	738	484	1400		
	120	382	802	586	1530		
	160	382	841	586	1530		

Technical Data

• Inspection Specifications

— Angular Transmission Accuracy

Speed reduction ratio	Model	14	17	20	25	32	40
Overall speed reduction ratio	arc-min	1.5	1.5	1	1	1	1

— Hysteresis Loss

Speed reduction ratio	Model	14	17	20	25	32	40
50	arc-min	2.0	2.0	2.0	2.0	2.0	2.0
80 or more	arc-min	1.0	1.0	1.0	1.0	1.0	1.0

— Maximum Amount Of Backlash

Speed reduction ratio \ Model		14	17	20	25	32	40
50	arc-sec	36	20	17	17	14	14
80	arc-sec	23	13	11	11	9	9
100	arc-sec	18	10	9	9	7	7
120	arc-sec	-	8	8	8	6	6
160	arc-sec	-	-	6	6	5	5

— Rigidity (Spring Constant)

Speed reduction ratio \ Model			14	17	20	25	32	40
T_1		N·m	2.0	3.9	7.0	14	29	54
T_2		N·m	6.9	12	25	48	108	196
Speed reduction ratio 50	K_1	×10⁴N·m/rad	0.34	0.81	1.3	2.5	5.4	10
	K_2	×10⁴N·m/rad	0.47	1.1	1.8	3.4	7.8	14
	K_3	×10⁴N·m/rad	0.57	1.3	2.3	4.4	9.8	18
	θ_1	arc-min	2.0	1.7	1.8	1.9	1.9	1.8
	θ_2	arc-min	5.6	4.2	5.3	5.4	5.4	5.3
Speed reduction ratio more than 80	K_1	×10⁴N·m/rad	0.47	1	1.6	3.1	6.7	13
	K_2	×10⁴N·m/rad	0.61	1.4	2.5	5.0	11	20
	K_3	×10⁴N·m/rad	0.71	1.6	2.9	5.7	12	23
	θ_1	arc-min	1.4	1.3	1.5	1.5	1.5	1.4
	θ_2	arc-min	4.2	3.3	3.9	3.8	4.0	3.8

— Release Torque

Unit:Nm

Speed reduction ratio \ Model	14	17	20	25	32	40
50	110	190	280	580	1200	2300
80	140	260	450	880	1800	3600
100	100	200	330	650	1300	2700
120	-	150	310	610	1200	2400
160	-	-	280	580	1200	2300

Technical Data

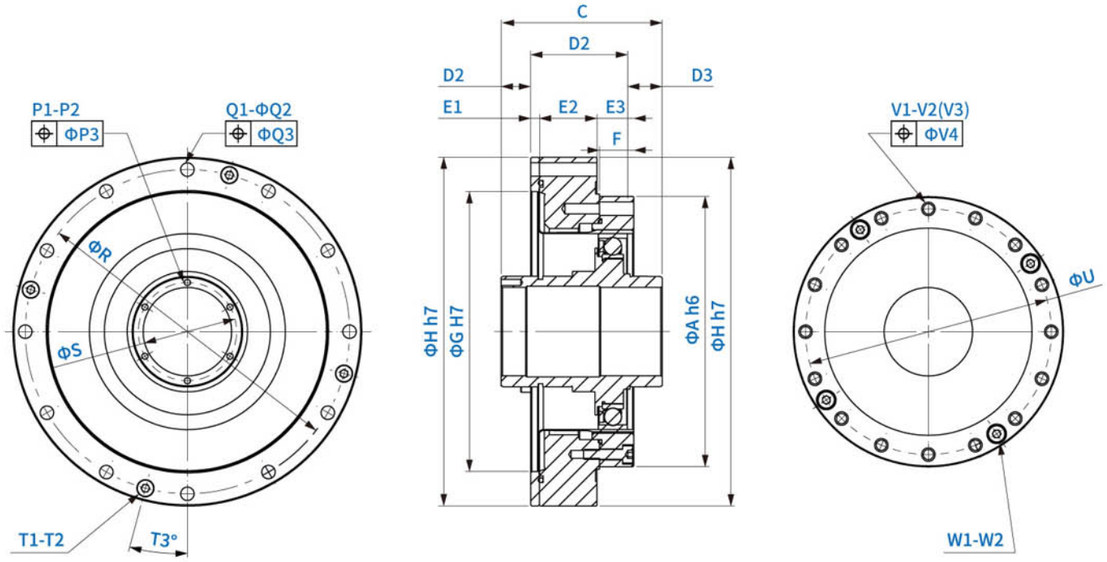
• Inspection Specifications

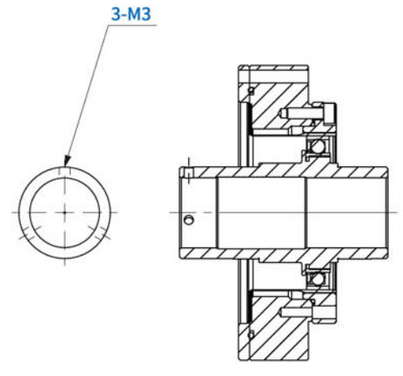
— Buckling Torque

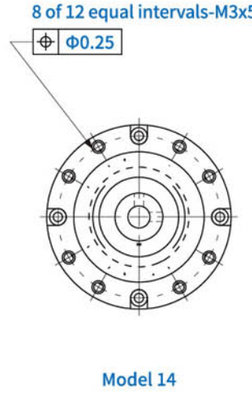
Unit:Nm

Model	14	17	20	25	32	40
Overall speed reduction ratio	210	420	700	1300	2800	5200

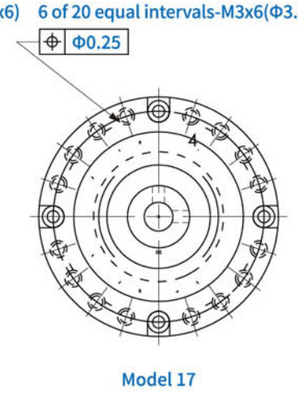
• Appearance Drawing







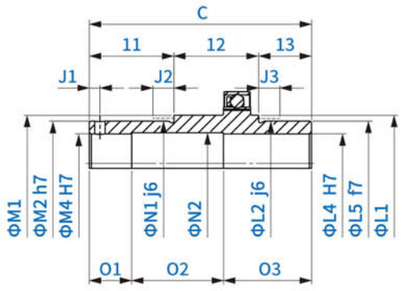
Model 14



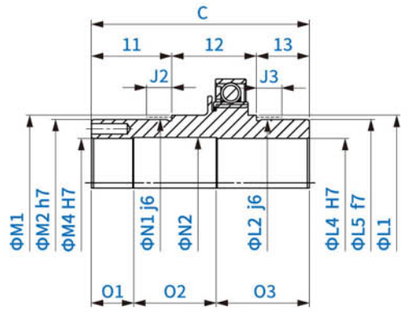
Model 17

Specification Dimension

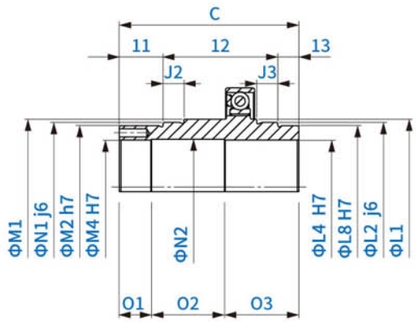
• Appearance Drawing



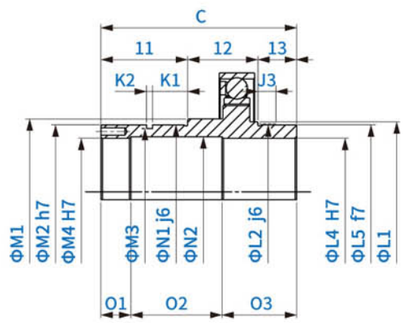
Model 14, 17



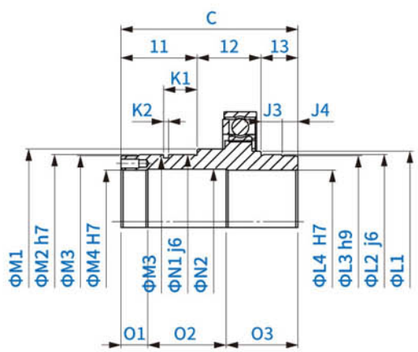
Model 20



Model 25



Model 32



Model 40

Specification Dimension

• Dimension Table

Unit:mm

Mark \ Model		14	17	20	25	32	40
ΦA h6		50	60	70	85	110	135
$ΦB_1$		-	-	-	-	-	-
B_2		-	-	-	-	-	-
C		$52.5^{\ 0}_{-0.1}$	$56.5^{\ 0}_{-0.1}$	$51.5^{\ 0}_{-0.1}$	$55.5^{\ 0}_{-0.1}$	$65.5^{\ 0}_{-0.1}$	$79^{\ 0}_{-0.1}$
D_1*		$16^{\ +0.4}_{\ 0}$	$16^{\ +0.4}_{\ 0}$	$9.5^{\ +0.4}_{\ 0}$	$10^{\ +0.5}_{\ 0}$	$12^{\ +0.6}_{\ 0}$	$13^{\ +0.6}_{\ 0}$
D_2		23.5	26.5	29	34	42	51
D_3*		13	14	13	11.5	11.5	15
E_1		2.4	3	3	3.3	3.6	4
E_2		14.1	16	17.5	18.7	23.4	29
E_3		7	7.5	8.5	12	15	18
F		6	6.5	7.5	10	14	17
ΦG H6		48	60	70	88	114	140
ΦH h6		70	80	90	110	142	170
Size of wave generator	I_1	$20_{\pm0.1}$	$21.5_{\pm0.1}$	$19_{\pm0.1}$	$20_{\pm0.1}$	$29_{\pm0.1}$	$34_{\pm0.1}$
	I_2	$20_{\pm0.1}$	$21.5_{\pm0.1}$	$20_{\pm0.1}$	$22.5_{\pm0.1}$	$23.5_{\pm0.1}$	$28_{\pm0.1}$
	I_3	(12.5)	(13.5)	(12.5)	(13)	(13)	(17)
	J_1	2.5	2.5	-	-	-	-
	J_2	7	7	7	6.5	-	-
	J_3	7	7	7	6.5	-	9.5
	J_4	-	-	-	-	-	(7.5)
	K_1	-	-	-	-	13.9	15.1
	K_2	-	-	-	-	1.9	2.2
	$ΦL_1$	22	27	32	42	47	62
	ΦL2 j6	20	25	30	40	45	60
	ΦL3 h9	-	-	-	38	-	59
	ΦL4 H7	14	19	21	29	36	46
	ΦL5 f7	20	25	30	-	45	-
	$ΦM_1$	22	27	32	42	49	65
	ΦM2 h7	20	25	30	38	45	59
	$ΦM_3$	-	-	-	-	42.5	57
	ΦM4 H7	14	19	21	29	36	46
	$ΦN_1$ j6	20	25	30	40	45	60
	$ΦN_2$	14.5	19.5	21.5	29.5	36.5	46.5
	O_1	10	10	10	10	10	12
	O_2	22.5	24.5	(19.5)	22.5	(30.5)	(35)
	O_3	20	22	22	23	25	32
P_1		3	3	6	6	6	6
P_2		M3	M3	M3x6	M3x6	M3x6	M4x8
$ΦP_3$		-	-	0.25	0.25	0.25	0.25
Q_1		8	12	12	12	12	12
$ΦQ_2$		3.5	3.5	3.5	4.5	5.5	6.6
$ΦQ_3$		0.25	0.25	0.25	0.25	0.25	0.3
ΦR		64	74	84	102	132	158
ΦS		-	-	25.5	33.5	40.5	52
T_1		2	4	4	4	4	6
T_2		M3x6	M3x6	M3x8	M3x8	M4x8	M4x10
T3(Angle)		22.5°	15°	15°	15°	15°	15°
ΦU		44	54	62	77	100	122
V_1		8 of 12 equal intervals	16 of 20 equal intervals	16	16	16	16
V_2		M3x5	M3x6	M3x6	M4x7	M5x8	M6x10
V_3		Φ3.5x6	Φ3.5x6.5	Φ3.5x7.5	Φ4.5x10	Φ5.5x14	Φ6.6x17
V_4		0.25	0.25	0.25	0.25	0.25	0.3
W_1		4	4	4	4	4	4
W_2		M3x6	M3x6	M3x8	M3x10	M4x16	M5x20

Application

Characteristic Application Of Harmonic Reducer

- Robot / robot arm
- Metal processing machinery
- Semiconductor equipment
- Flat panel display production equipment
- Optical equipment
- Printing machinery
- Woodworking machinery
- PCB machinery
- Medical machinery

Articulated Robot

Collaborative Robot

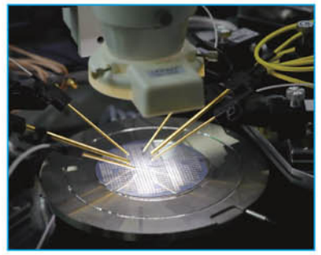
Selective Compliance Assembly Robot Arm

Main Drive
MAIN DRIVE CORPORATION

Application

Application Scope

Medical Equipment



Semiconductor Equipment

Metal Processing Machinery

Printing Machinery

PCB Machinery

Flat Panel Display Production Equipment

Robot / Robot Arm

Optical Equipment

Optical Equipment