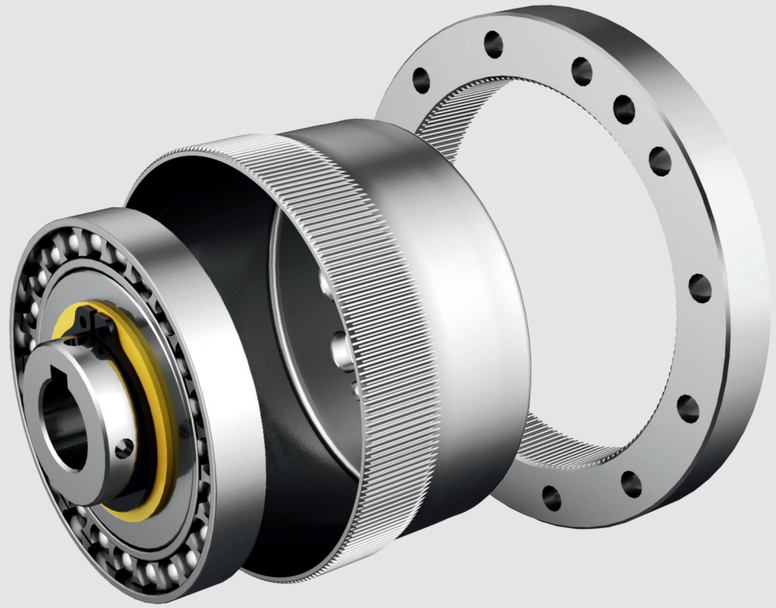
PICEA MOTION

PICEA MOTION

Harmonic Drive

PRODUCT SELECTION MANUAL

PICEA MOTION



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The company is committed to continuously improving its products. If there are any discrepancies between the contents, specifications, or images in this catalog and the actual product, the actual product will take precedence. Product details are subject to change without prior notice. The company reserves the right to make the final interpretation of the information in this catalog.

SHENZHEN PICEA MOTION TECHNOLOGY CO., LTD.

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Making precision transmission technology accessible to every industry

Empowering intelligent manufacturing to grow without limits

CONTENTS

ABOUT PICEA MOTION

SHENZHEN PICEA MOTION TECHNOLOGY CO., LTD (PICEA MOTION, formerly known as Shenzhen Han's Motion Technology Co., Ltd.) was founded in 2015. As a national high-tech enterprise focused on core components for robots, we specialize in the R&D, design, manufacturing and sales of precision harmonic drives.

Since 2010, our core R&D team has been dedicated to fundamental research and technological development in high-precision harmonic drive. The team has successfully overcome the challenge related to non-standard double-arc tooth profiles, significantly improving key performance indicators such as load torque, transmission smoothness and repeat positioning accuracy. These breakthroughs have enabled technological upgrades and widespread adoption of domestically produced harmonic drive. Our products are widely used across various industries, including robotics, aerospace, medical devices, semiconductor equipment and CNC machine tools, providing precise and stable power transmission solutions for high-end equipment manufacturing and cutting-edge technology sectors in the world.

> National High-Tech Enterprise
> Municipal Specialized and Sophisticated SME

60+ items
Independent intellectual property rights

60 %
Proportion of technical staff

30,000 m²
Production area

CNY 182 million
Registered capital

TECHNICAL ADVANTAGES

Exploring scenario requirements and uncover underlying technical principles
Refining core technologies to enhance product performance

Industry Applications


Industrial robots


Cobot


Humanoid robots


Medical devices


Semiconductor equipment


CNC machine tools

...

Performance Requirements

High load capacity and rigidity ↓

Smooth operation with low noise ↓

Fast response ↓

High precision ↓

High efficiency ↓

Long service life ↓

...

Technical Breakthroughs

Spatial conjugate meshing theory for double-arc harmonic drives

Rigid-flexible coupled dynamic meshing mechanism

Mechanisms and testing principles for how design and manufacturing affect the performance of double-arc harmonic drive

Technical Solutions

Multi-objective design methods for macro/micro geometric parameters of new arc tooth profiles

Rigid-flexible coupled meshing simulation technology for double-arc harmonic drive

Harmonic drive dynamics modeling and vibration/noise suppression technology

Fatigue failure mechanism and life extension technology for double-arc harmonic drive

High-efficiency high-precision machining processes for small-module, thin-walled circular spline/flexspline

Material modification methods and heat treatment processes for flexible flexspline

Assembly technology for flexible thin-walled harmonic drive based on real-time inspection

Reliability evaluation and rapid life test of double-arc harmonic drive

Performance Highlights

- Up to 30% more meshing teeth for **smoother operation**
- Load torque is 2× that of involute profiles, providing **higher load capacity**
- Flexspline length-to-diameter ratio reaches 1:2, **resulting in lighter weight**
- Transmission error ≤1 arcmin and backlash ≤10 arcsec for **higher precision**
- Flexspline fatigue life increased by 66%, ensuring **longer service life**
- ...

TECHNICAL ADVANTAGES

2025 | Standardized Product Development

Commitment to exceptional performance and continuous structural cost reduction with shared value|
Ultra-fast delivery and highly efficient response

2020 | PMCG and PMHG Series

Hollow long-shaft design, with internal cable routing that improves space utilization
Simplifies the transmission chain and enable efficient integration and easy installation

2019 | PMHS-V Series

Hollow long-shaft design, with internal cable routing that improves space utilization
Simplifies the transmission chain and enable efficient integration and easy installation

2018 | PMCD and PMHD Series

Lightweight, compact design, saving 32–53% installation space compared to the PMCS and PMHS series and providing greater flexibility for overall machine layout

2017 | PMCS and PMHS Series

Successfully overcame challenges in non-standard double-arc tooth profile design
Achieved up to 30% more simultaneously meshing teeth for smoother operation
Torque doubled compared to traditional involute tooth profiles

Note: Starting July 2025, series names have been changed from HMXX to PMXX (e.g., HMCG → PMCG). Product specifications remain unchanged.

PICEA MOTION

PRODUCT SYSTEM

PICEA MOTION Core Product Series

Core Product Series			Structural Features	Model	Reduction ratio	Torque	Weight (kg)	Page No.
Cup-shaped	Component Type · Three-Component	PMCG-I-E	Lightweight, compact design is ideal for applications with space or weight constraints where hollow-shaft wiring is not required.	14-40	50-160	23-841	0.1-1.8	019-029
	Unit Type · Integral Cam	PMCG-II-E *	Features an integral cam structure with zero backlash and high rigidity, making it suitable for dynamic shaft ends that require frequent high-speed starts and stops as well as high positioning accuracy.	14-40	50-160	23-841	0.52-5.02	030-042
	Unit Type · Super-flat	PMCD-II *	Super-flat profile maximizes available space for overall machine design, while the high static torque is ideal for joint end-effectors or ultra-thin interlayer installations.	14-32	50-100	11.4-221	0.5-3.3	043-052
Hat-shaped	Unit Type · Hollow Shaft	PMHG-I *	Large-bore, fully sealed hollow design is perfect for high-protection-grade enclosures where cables or air tubes need to pass through the center.	14-40	50-160	23-841	0.71-7.7	053-069
	Simple Unit Type · Integral Cam	PMHG-II-E *	Integral cam with bidirectional output is designed for applications with limited space that require high-torque power transmission and adjustable output ends.	14-40	50-160	23-841	0.41-5.12	070-086
	Simple Unit Type · Hollow Shaft	PMHG-III	Hollow structure with built-in crossed roller bearing is suitable for lightweight platforms that must withstand both radial and axial loads while maintaining compact wiring.	14-40	50-160	23-841	0.45-5.4	087-097
	Unit Type · Input Shaft	PMHG-IV *	Fully sealed construction with built-in input shaft and support bearings is ideal for applications where a bevel gear or synchronous belt is installed at the input end.	14-40	50-160	23-841	0.66-7.3	098-107
	Simple Unit Type · Super-flat Hollow Shaft	PMHD-III *	Super-flat hollow shaft design meets the needs of high-precision end-effectors or stacked structures with tight space constraints.	14-32	50-100	11.4-221	0.33-1.87	108-118


PMCG-I-E


PMCG-II-E *


PMCD-II *


PMHG-I *


PMHG-II-E *


PMHG-III


PMHG-IV *


PMHD-III *

Note*: Some models in this series have completed standardized development. For details, see page 11.

STANDARDIZED PRODUCTS

Breaking through cost barriers with structural cost reduction and efficiency gains
Making advanced precision transmission technology accessible to all

Comprehensive axis coverage · Precise configuration on demand

Drawing on years of experience and data from a full range of industrial robot joint transmissions, we have developed a standardized harmonic drive lineup that covers axes J1 through J6. This range meets the transmission needs of every axis in mainstream robots, including multi-joint and SCARA models.

Ultra-fast delivery · Highly efficient response

We have established a dedicated inventory management system, securing core raw materials in advance for high-demand models and prioritizing their production schedules. By optimizing our supply chain and production processes, we significantly reduce lead times and can quickly fulfill customer orders.

Cost reduction and value sharing · Passing on the benefits of technology

Through structural cost reductions and improved efficiency, we achieve significant cost advantages. These savings are reflected in our product pricing, allowing us to share the benefits with our customers and make advanced precision harmonic drive technology accessible to a wide range of intelligent manufacturing enterprises.

Performance commitment · Lower costs and higher efficiency without compromising quality

We always put product performance first, maintaining strict quality standards throughout every stage—from materials and machining to manufacturing, assembly, and inspection—to ensure our products are consistently stable and reliable.

Series		Model	Reduction ratio					Page No.
PMCG-II-E-BZ		PMCG-14-XX-II-E8-BZ	50	80	-	-	-	031
		PMCG-17-XX-II-E8-BZ	50	80	100	-	-	032
		PMCG-20-XX-II-E11-BZ	50	80	100	-	-	033
		PMCG-20-XX-II-E14-BZ	50	-	100	-	-	033
		PMCG-25-XX-II-E14-BZ	50	80	-	-	-	034
		PMCG-32-XX-II-E19-BZ	-	80	-	-	-	035
PMCD-II-BZ		PMCD-14-XX-II-BZ	50	-	-	-	-	044
		PMCD-17-XX-II-BZ	50	-	-	-	-	045
PMHG-I	PMHG-I-BZ	PMHG-20-XX-I-BZ	50	80	100	-	-	056
		PMHG-25-XX-I-BZ	50	80	100	120	-	057
		PMHG-32-XX-I-BZ	50	80	100	120	-	058
		PMHG-40-XX-I-BZ	-	-	100	-	-	059
	PMHG-I-B-BZ	PMHG-25-XX-I-B-BZ	50	80	-	-	-	060
		PMHG-32-XX-I-B-BZ	50	80	100	-	-	061
	PMHG-I-LW-BZ	PMHG-17-XX-I-LW-BZ	50	-	100	-	-	062
		PMHG-20-XX-I-LW-BZ	50	80	-	-	-	063
	PMHG-I-DZK-BZ	PMHG-20-XX-I-DZK-BZ	50	-		-	-	064
		PMHG-25-XX-I-DZK-BZ	50	80	-	-	-	065
		PMHG-32-XX-I-DZK-BZ	50	-	-	-	-	066
PMHG-II	PMHG-II-E-BZ	PMHG-17-XX-II-E8-BZ	50	80	-	-	-	072
		PMHG-20-XX-II-E11-BZ	50	80	100	-	-	073
		PMHG-20-XX-II-E14-BZ	50	80	100	-	-	073
		PMHG-25-XX-II-E14-BZ	50	80	100	120	-	074
		PMHG-25-XX-II-E19-BZ	-	80	100	120	-	074
		PMHG-32-XX-II-E19-BZ	50	80	100	120	-	075
PMHG-IV	PMHG-IV-BZ	PMHG-17-XX-IV-BZ	-	-	100	-	-	100
		PMHG-20-XX-IV-BZ	50	80	-	-	-	101
PMHD-III-BZ		PMHD-14-XX-III-BZ	50	80	-	-	-	109
		PMHD-17-XX-III-BZ	50	80	100	-	-	110
		PMHD-20-XX-III-BZ	50	80	-	-	-	111
		PMHD-25-XX-III-BZ	-	80	-	-	-	112
		PMHD-32-XX-III-BZ	-	80	-	-	-	113

PICEA MOTION Harmonic Drive

TECHNICAL INFORMATION

PRODUCT CODING RULES

PMCG - 25 - 100 - Type - Special Specifications

Model Name	Specification Code	Reduction ratio					Type (Standard)	Special Specifications
PMCG	14	50	80	100	120	-	I-E: Component Type II-E: Unit Type	Standard product: conforms to standard shape and performance specifications. Special specifications: not applicable / none. SP: Special
	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		
PMCD	14	50	80	100	-	-	II: Unit Type (Super-flat)	
	17	50	80	100	-	-		
	20	50	80	100	-	160		
	25	50	80	100	-	160		
	32	50	80	100	-	-		
PMHG	14	50	80	100	120	-	I: Unit Type (Hollow Shaft) I-DZK: Unit Type (Large Hollow Shaft) II-E: Simple Unit Type (Integral Cam) II-D: Simple Unit Type (Large-Bore Cam) III: Simple Unit Type (Hollow Shaft) IV: Unit Type (Input Shaft)	
	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		
PMHD	14	50	80	100	-	-	I: Unit Type (Hollow Shaft) III: Simple Unit Type (Super-flat Hollow Shaft)	
	17	50	80	100	-	-		
	20	50	80	100	-	-		
	25	50	80	100	-	-		
	32	50	80	100	-	-		

Note 1: Model Name
- PM is the abbreviation of our English name, PICEA MOTION.
- The flexspline shape comes in two types: Cup and Hat. A Cup-shaped flexspline is indicated by the uppercase letter “C,” while a Hat-type flexspline is indicated by the uppercase letter “H.”
- The flexspline length is divided into two types: Standard and Dwarf. A Standard flexspline is denoted by the uppercase letter “S,” and a Dwarf flexspline by the uppercase letter “D.”
- The uppercase letter “G” indicates a high-torque version.

Note 2: Specification Code

Specification Code	14	17	20	25	32	40
Pitch Diameter of Flexspline	35.6	43.2	50.8	63.5	81.3	101.6

TERMS AND DEFINITIONS

I. Rated Torque

This refers to the permissible continuous load torque that can be applied when the input speed is 2000 r/min.

II. Permissible Peak Torque at Start/Stop

When starting or stopping, the rotational inertia of the load can generate a torque greater than the normal operating torque, which acts on the harmonic drive. The permissible peak torque at start/stop is the maximum torque the harmonic drive can safely handle in these conditions.

III. Instantaneous Permissible Max. Torque

In cases of emergency stops or unexpected external impacts, the harmonic drive may be subjected to a significantly higher load torque. If the torque applied to the harmonic drive reaches the maximum allowable instantaneous torque, it can cause irreversible damage.

IV. Ratcheting Torque

If an excessive impact torque is applied during operation, the engagement between the circular spline and the flexspline may momentarily shift, even if components like the flexspline itself are not damaged. This phenomenon is known as ratcheting, and the torque at which it occurs is called the ratcheting torque (refer to the ratcheting torque table of each series for specific values). If operation continues after ratcheting has occurred, the wear debris generated can lead to premature gear wear and reduce the service life of the wave generator bearing.

Please note the following points:
① When ratcheting occurs, abnormal gear meshing may result (such as meshing in an offset position). Continued operation under these conditions can cause vibration and may damage the flexspline.
② After ratcheting occurs once, wear will appear on the tooth tips; if it happens two or more times, the torque value at which ratcheting occurs will decrease.

V. Buckling Torque

If excessive torque is applied to the output end while the wave generator is fixed, the flexspline may undergo plastic deformation, causing it to buckle in the middle and become damaged. The torque at which this occurs is called the buckling torque.

SERVICE LIFE

The service life of PICEA Motion harmonic drive is determined by the lifespan of the wave generator bearing.

Wave Generator Service Life		
Series	PMCD,PMHD	PMCG,PMHG
L10 (Service life at a 10% failure rate)	7000 hours	10000 hours
L50 (Average service life)	35000 hours	50000 hours

*Service life is specified at the rated speed and rated torque as listed in the performance parameter table.

Calculation Formula For Wave Generator Service Life

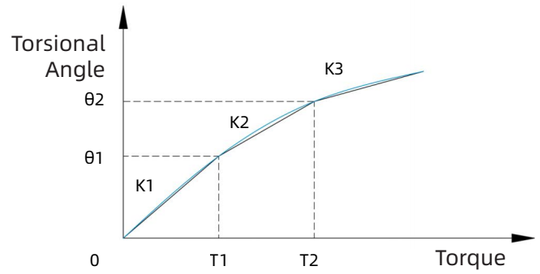
$$Lh = Ln \cdot \left(\frac{Tr}{Tav}\right)^3 \cdot \left(\frac{Nr}{Nav}\right)$$

Ln	Service life at L10 or L50
Tr	Rated torque
Nr	Rated speed (2000 r/min)
Tav	Average load torque on the output side
Nav	Average input speed

RIGIDITY

With the input shaft (wave generator) fixed, torsional rigidity and angle are measured when torque is applied to the output side (flexspline).

Torsional Rigidity = Torque (T) / Torsional angle (θ)
K1… Torsional rigidity for torque range 0 to T1
K2… Torsional rigidity for torque range T1 to T2
K3… Torsional rigidity for torque range above T2



HYSTERESIS LOSS

With the input side (wave generator) fixed, when torque is applied to the output side up to the rated torque and then reduced back to zero, the torsional angle does not fully return to zero, leaving a small amount of backlash. This residual clearance is known as hysteresis loss.

TERMS AND DEFINITIONS

Please follow the flowchart below to select the appropriate model. If any value exceeds the limits listed in the rating table, please reconsider your selection–either choose a larger model or adjust conditions such as reducing the load torque.

Calculate the average load torque applied to the output side of the harmonic drive based on the load-torque profile:

Tav（Nm）

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

Temporarily select a model based on the following conditions:
Tav ≤ permissible max. value of ave. load torque (see the rating table for each series)

- Calculate the average output speed: $no\ av = \frac{n_1 \cdot t_1 + n_2 \cdot t_2 + \ldots n_n \cdot t_n}{t_1 + t_2 + \ldots t_n}$
- Determine the reduction ratio (R)
  The ni max will be limited by the motor or other factors. $\frac{ni\ max}{no\ max} \geq R$
- Calculate the average input speed based on the average output speed (no av) and the reduction ratio (R):
  ni av (r/min) $ni\ av = no\ av \cdot R$
- Calculate the maximum input speed based on the maximum output speed (no max) and the reduction ratio (R):
  ni max (r/min) $ni\ max = no\ max \cdot R$

Review the operating conditions or model

NO — Check that the temporarily selected model is within the values in the rating table:
ni av ≤ Permissible ave. input rotational speed (r/min)
ni max ≤ Permissible max. input rotational speed (r/min)

NO — Check that T1, T3 are within the allowable peak torque during start/stop (Nm) values in the rating table

NO — Check that Ts is within the maximum allowable instantaneous torque values in the rating table

NO — Based on the output speed (ns) and time (ts) when impact torque is applied, calculate the allowable number of occurrences and check that the operating conditions are met

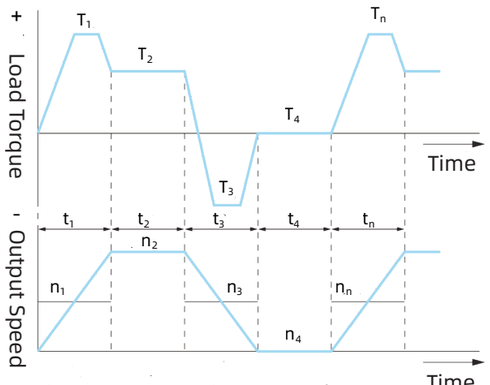
$N_s = \frac{10^4}{2 \cdot \frac{n_s \cdot R}{60} \cdot t}$ speed…$N_s \leq 1.0 \times 10^4$ speed

Model selected

In general, servo systems rarely operate continuously under constant load.Operating conditions such as input speed and load torque will fluctuate.During start-up and stopping, higher torques are often present. In addition,unexpected impact torques may occur.

· Confirm the load-torque profile

First, understand the load-torque profile. Please refer to the specifications shown in the diagram below.



※ n1, n2, nn represent average values

Calculate the following values for each load-torque mode

Load Torque	Tn （Nm）
Time	t_n （sec）
Output Speed	n_n （r/min）

Operating modes

At start-up	T_1、t_1、n_1
During normal operation	T_2、t_2、n_2
At stop (deceleration)	T_3、t_3、n_3
At standstill	T_4、t_4、n_4

Maximum speed

Maximum output speed	no max
Maximum input speed	ni max

(limited by the motor or other factors)

Impact torque

When impact torque is applied	T_s、t_s、n_s

MAIN BEARING SPECIFICATIONS

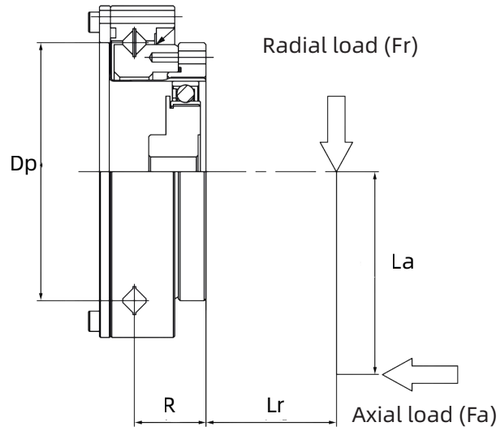
Confirm that the maximum load static moment (Mmax) ≤ the allowable static moment (MC)
M max = Fr max （Lr + R） + Fa max · La

Calculate the average radial load (Fra), average axial load (Faa), and average output speed (Noav)

$$Fra = \sqrt[10/3]{\frac{n_1 t_1 (|Fr_1|)^{10/3} + n_2 t_2 (|Fr_2|)^{10/3} \ldots + n_n t_n (|Fr_n|)^{10/3}}{n_1 t_1 + n_2 t_2 \ldots + n_n t_n}}$$

$$Faa = \sqrt[10/3]{\frac{n_1 t_1 (|Fa_1|)^{10/3} + n_2 t_2 (|Fa_2|)^{10/3} \ldots + n_n t_n (|Fa_n|)^{10/3}}{n_1 t_1 + n_2 t_2 \ldots + n_n t_n}}$$

$$Noav = \frac{n_1 t_1 + n_2 t_2 \ldots + n_n t_n}{t_1 + t_2 \ldots + t_n}$$



Determine the load factor

Determine the load factor	Radial factor (X)	Axial factor (Y)
$\frac{Faa}{Fra + 2(Fra(Lr + R) + Faa \cdot La)/DP} \leq 1.5$	1	0.45
$\frac{Faa}{Fra + 2(Fra(Lr + R) + Faa \cdot La)/DP} > 1.5$	0.67	0.67

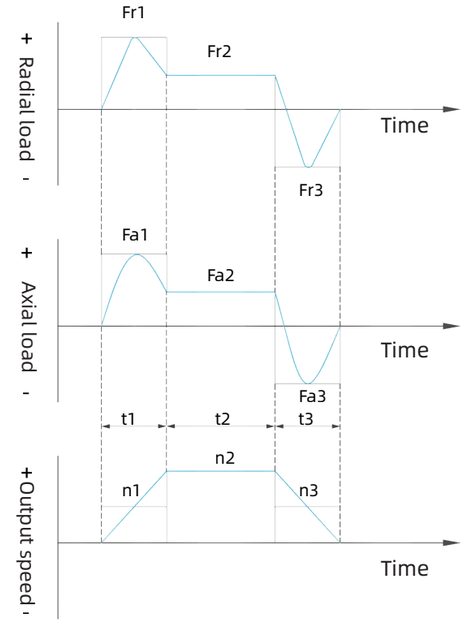
Calculate the dynamic equivalent load (Pc)

$$Pc = X \cdot (Fra + \frac{2(Fra(Lr + R) + Faa \cdot La)}{Dp}) + Y \cdot Faa$$

Calculate the bearing service life

$$L_{10} = \frac{10^6}{60 \times Noav} \times (\frac{C}{fw \cdot Pc})^{10/3}$$

Load condition	fw
No shock or vibration; smooth operation	1~1.2
Normal operating conditions	1.2~1.5
Operation with shock and vibration	1.5~3



PICEA MOTION Harmonic Drive

PRODUCT INFORMATION

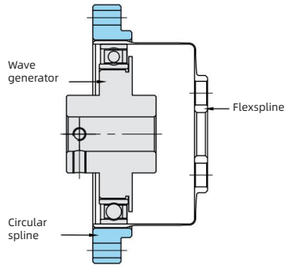
PMCG-I-E Series (Component Type)

The product consists of three main components: flexspline, circular spline, and wave generator. The input shaft connects directly to the inner bore of the wave generator, secured with a flat key or set screw.

The three-piece, cup-shaped design is compact and lightweight, saving space and making it easy to maintain.

Connected by a flat key or set screw
Flexible connection with strong adaptability

Torque capacity increased by 30% compared with the PMCS series
Service life increased by 43% compared with the PMCS series

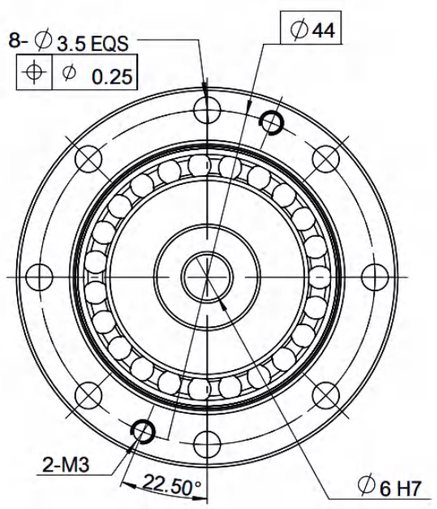


PMCG-I-E Series Performance Parameters

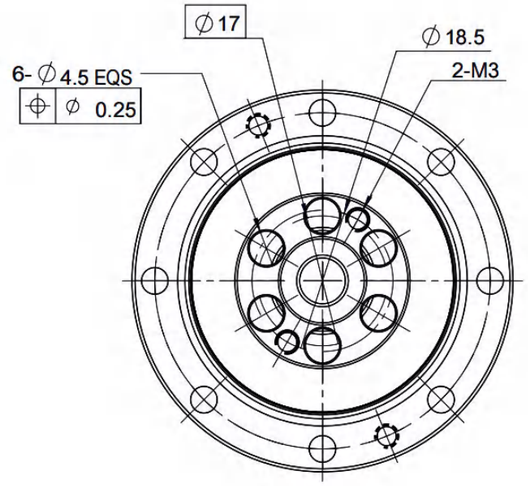
Model	Reduction ratio	Rated torque at 2000 r/min input	Permissible peak torque at start/stop	Permissible max .value of ave. load torque	Instantaneous permissible max. torque	Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash (arcsec)	Transmission error (arcsec)	Weight
		Nm	Nm	Nm	Nm	r/min	r/min	≤	≤	kg
14	50	7	23	9	46	8500	3500	20	90	0.1
	80	10	30	14	51	8500	3500	20	90	
	100	10	36	14	70	8500	3500	10	90	
	120	10	36	14	70	8500	3500	10	90	
17	50	21	44	34	91	7300	3500	20	90	0.17
	80	29	56	35	113	7300	3500	20	90	
	100	31	70	51	143	7300	3500	10	90	
	120	31	70	51	112	7300	3500	10	90	
20	50	33	73	44	127	6500	3500	20	60	0.26
	80	44	96	61	165	6500	3500	20	60	
	100	52	107	64	191	6500	3500	10	60	
	120	52	113	64	191	6500	3500	10	60	
	160	52	120	64	191	6500	3500	10	60	
25	50	51	127	72	242	5600	3500	20	60	0.43
	80	82	178	113	332	5600	3500	20	60	
	100	87	204	140	369	5600	3500	10	60	
	120	87	217	140	395	5600	3500	10	60	
	160	87	229	140	408	5600	3500	10	60	
32	50	99	281	140	497	4800	3500	20	60	0.91
	80	153	395	217	738	4800	3500	10	60	
	100	178	433	281	841	4800	3500	10	60	
	120	178	459	281	892	4800	3500	10	60	
	160	178	484	281	892	4800	3500	10	60	
40	50	178	523	255	892	4000	3000	10	60	1.8
	80	268	675	369	1270	4000	3000	10	60	
	100	345	738	484	1400	4000	3000	10	60	
	120	382	802	586	1530	4000	3000	10	60	
	160	382	841	586	1530	4000	3000	10	60	

PMCG-I-E Series Structural Diagram — PMCG-14-XX-I-E Model

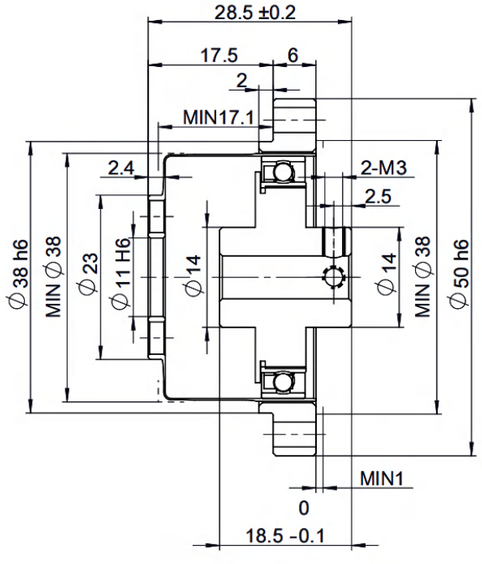
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

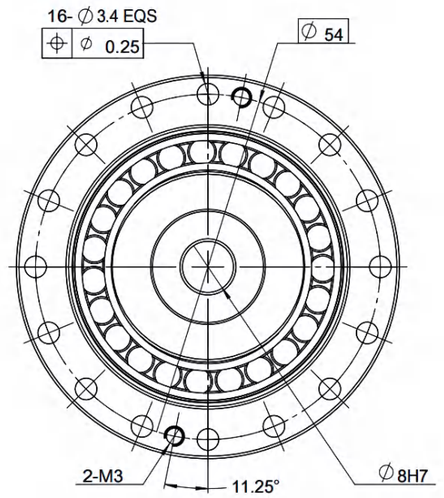


Technical Parameters

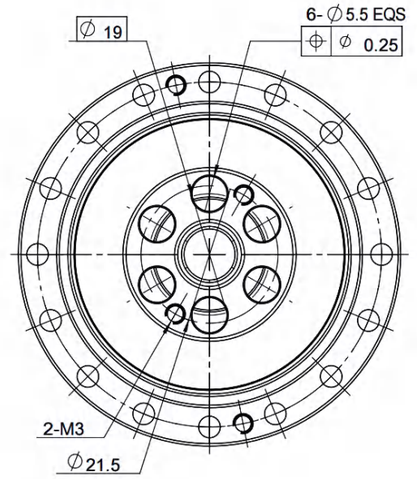
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	7	23	9	46	8500	3500	20	90	0.1
80	10	30	14	51	8500	3500	20	90	
100	10	36	14	70	8500	3500	10	90	
120	10	36	14	70	8500	3500	10	90	

PMCG-I-E Series Structural Diagram — PMCG-17-XX-I-E Model

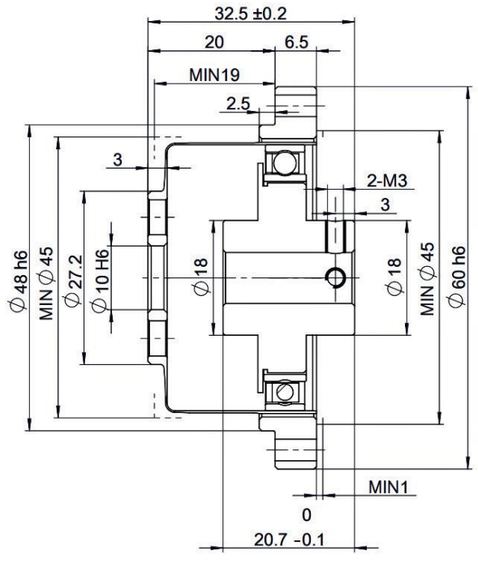
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

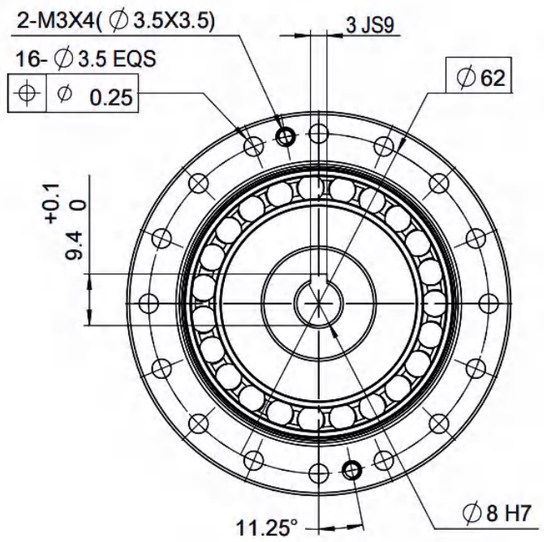


Technical Parameters

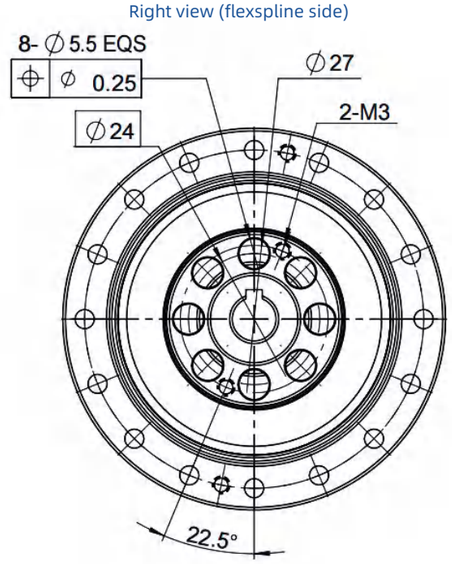
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	21	44	34	91	7300	3500	20	90	0.17
80	29	56	35	113	7300	3500	20	90	
100	31	70	51	143	7300	3500	10	90	
120	31	70	51	112	7300	3500	10	90	

PMCG-I-E Series Structural Diagram — PMCG-20-XX-I-E Model

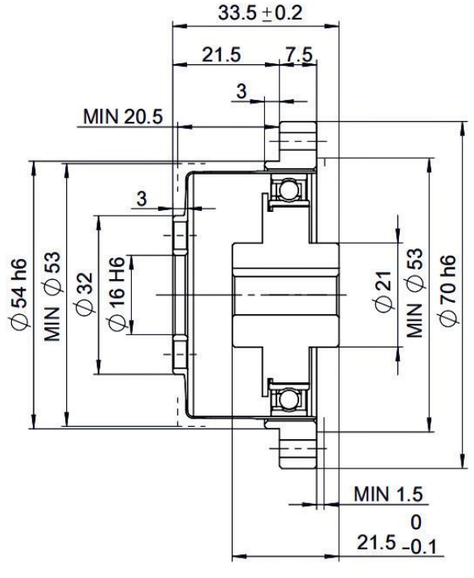
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

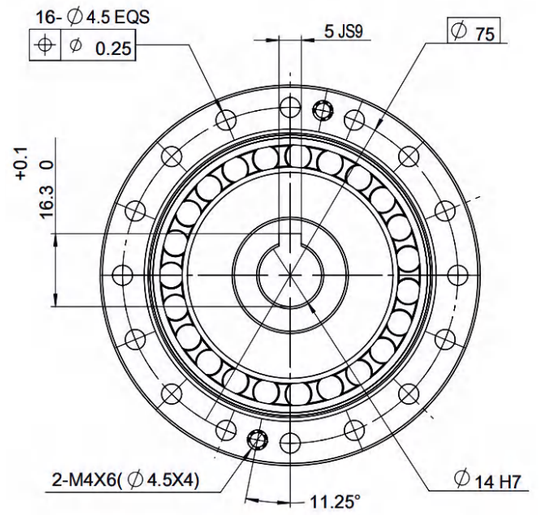


Technical Parameters

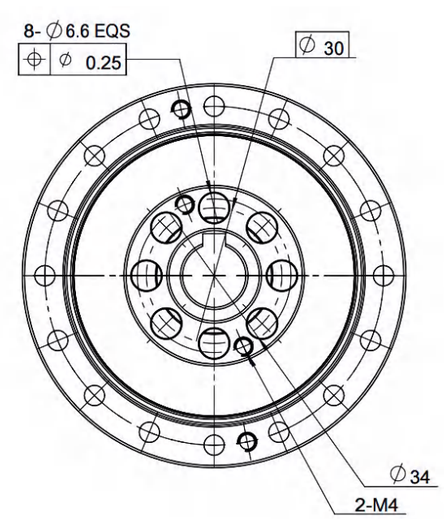
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	33	73	44	127	6500	3500	20	60	0.26
80	44	96	61	165	6500	3500	20	60	
100	52	107	64	191	6500	3500	10	60	
120	52	113	64	191	6500	3500	10	60	
160	52	120	64	191	6500	3500	10	60	

PMCG-I-E Series Structural Diagram — PMCG-25-XX-I-E Model

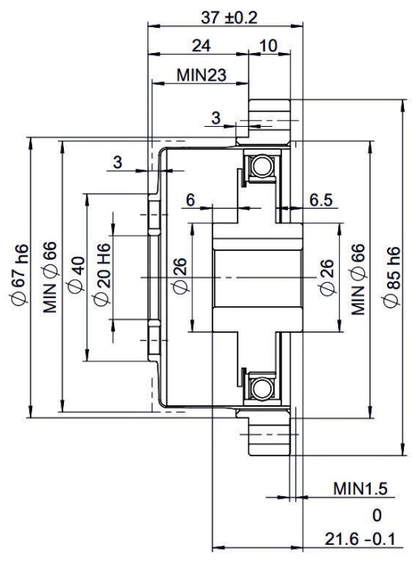
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

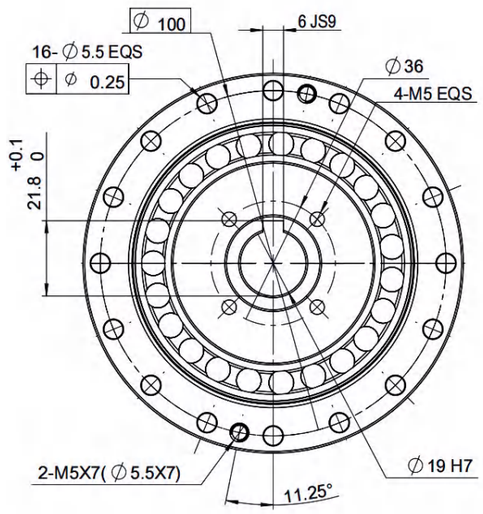


Technical Parameters

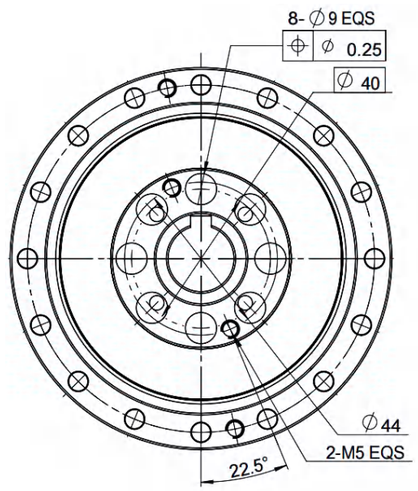
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	51	127	72	242	5600	3500	20	60	0.43
80	82	178	113	332	5600	3500	20	60	
100	87	204	140	369	5600	3500	10	60	
120	87	217	140	395	5600	3500	10	60	
160	87	229	140	408	5600	3500	10	60	

PMCG-I-E Series Structural Diagram — PMCG-32-XX-I-E Model

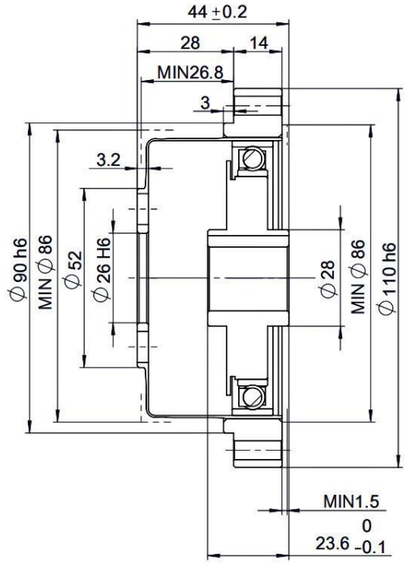
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

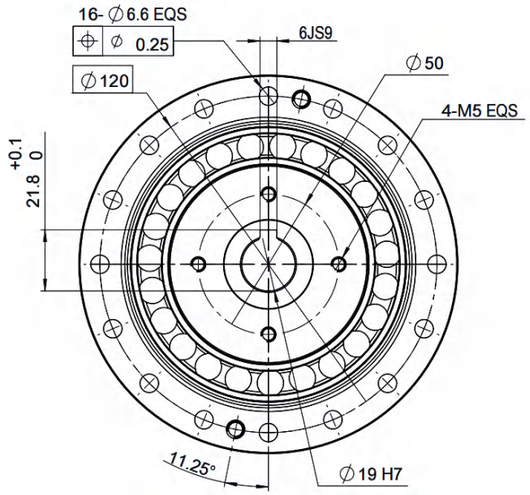


Technical Parameters

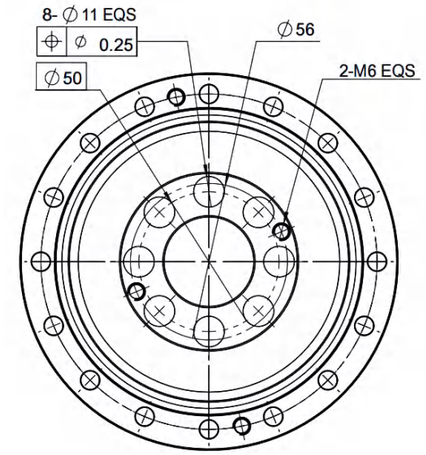
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	99	281	140	497	4800	3500	20	60	0.91
80	153	395	217	738	4800	3500	10	60	
100	178	433	281	841	4800	3500	10	60	
120	178	459	281	892	4800	3500	10	60	
160	178	484	281	892	4800	3500	10	60	

PMCG-I-E Series Structural Diagram — PMCG-40-XX-I-E Model

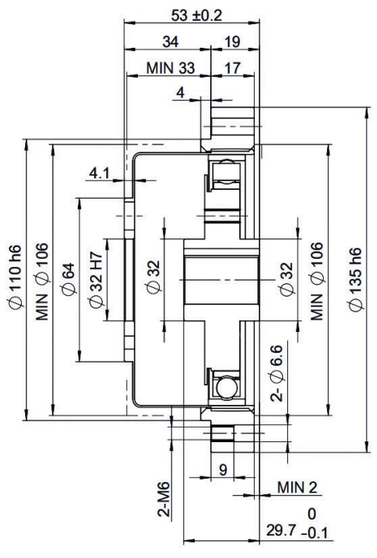
Left view (circular spline side)



Right view (flexspline side)



Full-section front view



Technical Parameters

Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	178	523	255	892	4000	3000	10	60	1.8
80	268	675	369	1270	4000	3000	10	60	
100	345	738	484	1400	4000	3000	10	60	
120	382	802	586	1530	4000	3000	10	60	
160	382	841	586	1530	4000	3000	10	60	

PMCG-I-E Series Starting Torque (N·cm)

Model	14				17				20					25					32					40				
Reduction ratio	50	80	100	120	50	80	100	120	50	80	100	120	160	50	80	100	120	160	50	80	100	120	160	50	80	100	120	160
Starting Torque	3.6	2.6	2.3	2.2	5.6	3.6	3.2	3	7.3	4.5	4.1	3.6	3.2	13	8.5	7.6	6.9	6.1	29	18	17	14	13	51	32	29	26	23

PMCG-I-E Series Pawl Torque (Nm)

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

PMCG-I-E Series Buckling Torque (Nm)

Model	14	17	20	25	32	40
Full Reduction Ratio	260	500	800	1700	3500	6700

PMCG-I-E Series Hysteresis Loss and Rigidity

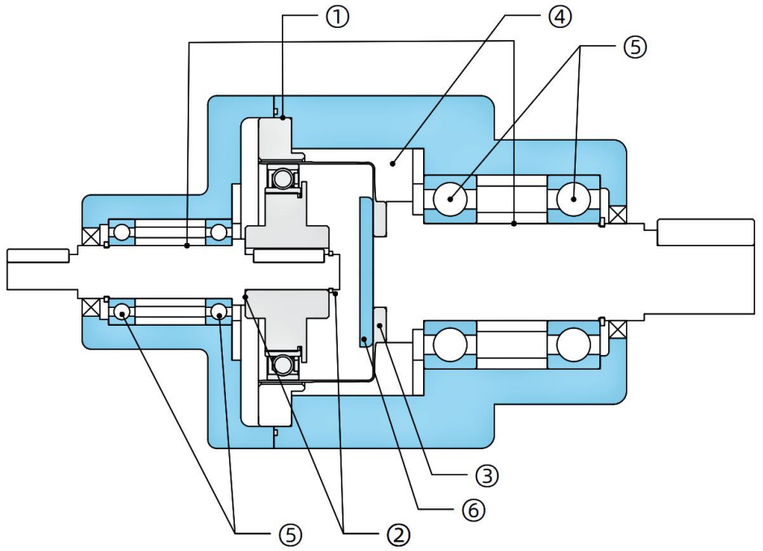
Model	Reduction ratio	T1	T2	HYSTERESIS LOSS	Torsional Rigidity (10000 Nm/rad)			Torsional Deflection (arcmin)	
		Nm	Nm	arcmin	K1	K2	K3	θ1	θ2
14	50	2	6.9	2	0.34	0.47	0.57	2.0	5.6
	≥80			1	0.47	0.61	0.71	1.4	4.2
17	50	3.9	12	2	0.81	1.10	1.30	1.7	4.2
	≥80			1	1.00	1.40	1.60	1.3	3.3
20	50	7	25	2	1.30	1.80	2.30	1.8	5.3
	≥80			1	1.60	2.50	2.90	1.5	3.9
25	50	14	48	2	2.50	3.40	4.40	1.9	5.4
	≥80			1	3.10	5.00	5.70	1.5	3.8
32	50	29	108	2	5.40	7.80	9.80	1.9	5.4
	≥80			1	6.70	11.00	12.00	1.5	4.0
40	50	54	198	2	10.00	14.00	18.00	1.8	5.3
	≥80			1	13.00	20.00	23.00	1.4	3.8

* Torque rigidity values are for reference only; the lower limit is approximately 80% of the stated value.

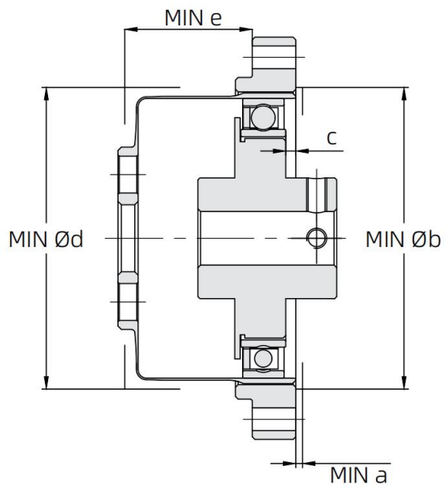
PMCG-I-E Series Design Guidelines

To maximize the performance of the harmonic drive, please observe the following:

① Ensure the input shaft, circular spline, output shaft, and housing are concentric.
② The wave generator produces axial force; design the input shaft to support this force.
③ Due to the harmonic drive's compact size and high torque capacity, use the specified tightening torque for bolts connecting the flexspline and output shaft.
④ The flexspline deforms elastically; design the housing's inner-wall dimensions according to the recommended specifications.
⑤ Use matched bearings (spaced for two-point support) for the input and output shafts to withstand both radial and axial loads. Avoid applying excessive force to the wave generator and flexspline.
⑥ The flange diameter for mounting the flexspline must not exceed the diameter of the flexspline hub bore. Machine a fillet on the flange area connected to the diaphragm. Design all dimensions according to the recommended specifications.



PMCG-I-E Series Clearance Dimensions and Wave Generator Mounting Depth



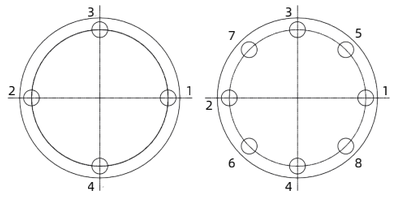
Unit: mm

Model	a	b	C	d	e
14	1	38	1.4±0.2	38	17.1
17	1	45	1.6±0.2	45	19
20	1.5	53	1.5±0.2	53	20.5
25	1.5	66	3.5±0.2	66	23
32	1.5	86	4.2±0.2	86	26.8
40	2	106	5.6±0.2	106	33

Note:
① C refers to the distance between the end face of the flex bearing's inner ring and the end face of the circular spline.
② Strictly adhere to the specified clearance dimensions for the flange and wave generator. Exceeding these may cause interference between the flexspline and the flange or wave generator, reducing service life.
③ Install the harmonic drive according to the required wave generator mounting depth. Installation depth affects starting torque and accuracy.

PMCG-I-E Series Screw Locking Method

(1) Set the motor speed to 100 rpm and start the motor. Tighten the screws in a crisscross pattern, gradually increasing torque in 4–5 steps until reaching the specified value (see the diagram below for tightening force).
(2) The mounting surface connecting to the harmonic drive must have a flatness of 0.01 mm and be perpendicular to the axis within 0.01 mm.



Screw Tightening Force

Screw property class	12.9							
Nominal diameter	mm	3	4	5	6	8	10	12
Tightening torque	N·m	2	4	9	15	35	70	125

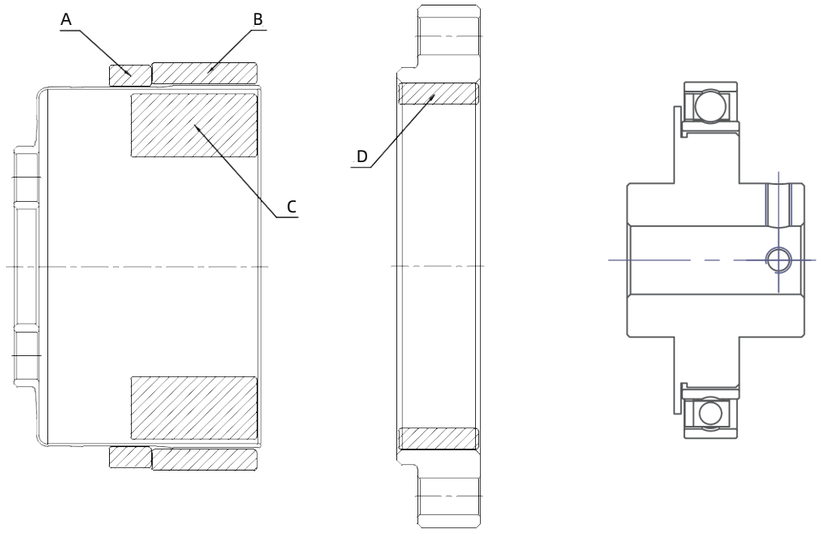
PMCG-I-E Series Grease Application Requirements

(1) Grease application amount

Unit: gram (g)

Size	Application Locations					
	A	B	C			D
			For Horizontal Use	For Vertical Use		
				Upward	Downward	
14	0.3	0.3	6	8	9	0.3
17	0.5	0.5	10	12	14	0.5
20	0.8	0.8	16	18	21	0.8
25	1.5	1.5	30	35	40	1.5
32	3	3	60	70	80	3
40	6	6	120	130	150	6

(2) Grease application locations



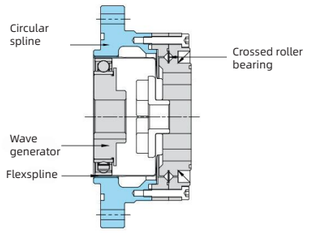
PMCG-II-E Series Unit Type (Integral Cam)

The cup-shaped unit features an integral cam design. The input shaft fits directly into the inner bore of the wave generator and is connected using a flat key. In this configuration, the circular spline end is fixed, while the flexspline end serves as the output.

Integral cam design ensures zero-backlash transmission for improved accuracy and fast response.

Cup-shaped unit allows for easy installation, reduced axial length, and higher load capacity.

Circular spline is fixed, flexspline serves as the output
Higher torque, greater rigidity, and reduced error

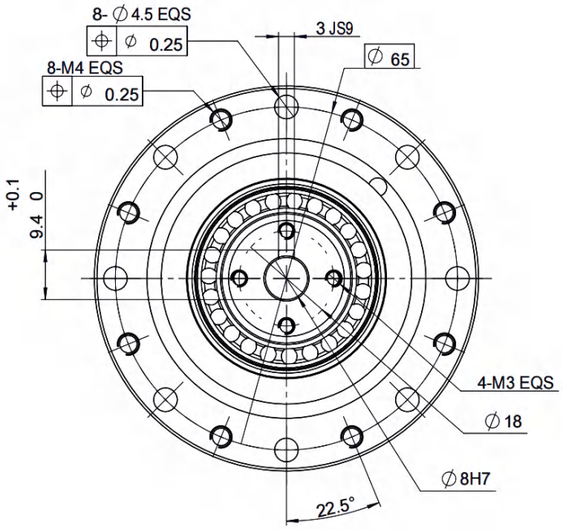


PMCG-II-E Series Performance Parameters

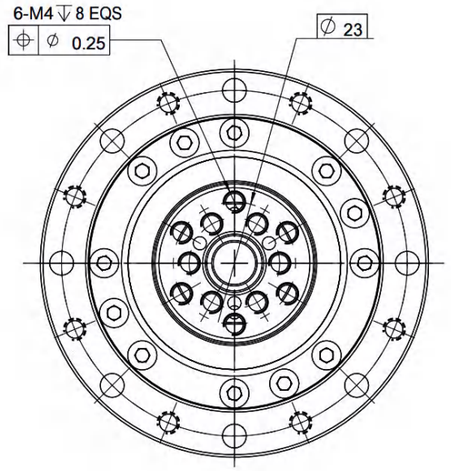
Model	Reduction ratio	Rated torque at 2000 r/min input	Permissible peak torque at start/stop	Permissible max .value of ave. load torque	Instantaneous permissible max. torque	Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash (arcsec)	Transmission error (arcsec)	Weight
		Nm	Nm	Nm	Nm	r/min	r/min	≤	≤	kg
14	50	7	23	9	46	8500	3500	20	90	0.52
	80	10	30	14	51	8500	3500	20	90	
	100	10	36	14	70	8500	3500	10	90	
	120	10	36	14	70	8500	3500	10	90	
17	50	21	44	34	91	7300	3500	20	90	0.68
	80	29	56	35	113	7300	3500	20	90	
	100	31	70	51	143	7300	3500	10	90	
	120	31	70	51	112	7300	3500	10	90	
20	50	33	73	44	127	6500	3500	20	60	0.98
	80	44	96	61	165	6500	3500	20	60	
	100	52	107	64	191	6500	3500	10	60	
	120	52	113	64	191	6500	3500	10	60	
	160	52	120	64	191	6500	3500	10	60	
25	50	51	127	72	242	5600	3500	20	60	1.5
	80	82	178	113	332	5600	3500	20	60	
	100	87	204	140	369	5600	3500	10	60	
	120	87	217	140	395	5600	3500	10	60	
	160	87	229	140	408	5600	3500	10	60	
32	50	99	281	140	497	4800	3500	20	60	3.22
	80	153	395	217	738	4800	3500	10	60	
	100	178	433	281	841	4800	3500	10	60	
	120	178	459	281	892	4800	3500	10	60	
	160	178	484	281	892	4800	3500	10	60	
40	50	178	523	255	892	4000	3000	10	60	5.02
	80	268	675	369	1270	4000	3000	10	60	
	100	345	738	484	1400	4000	3000	10	60	
	120	382	802	586	1530	4000	3000	10	60	
	160	382	841	586	1530	4000	3000	10	60	

PMCG-II-E Series Structural Diagram — PMCG-14-XX-II-E8 Model

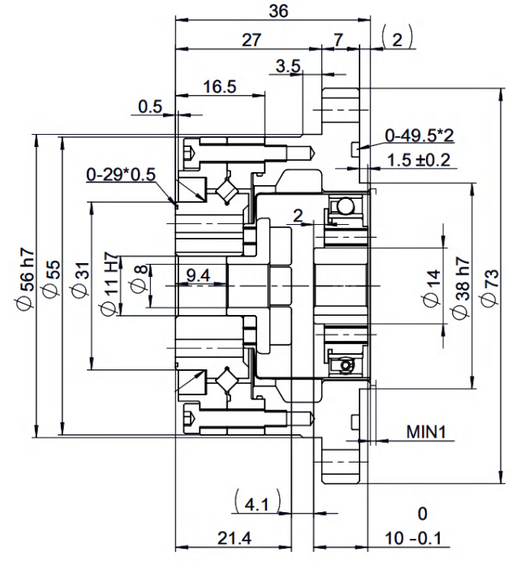
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

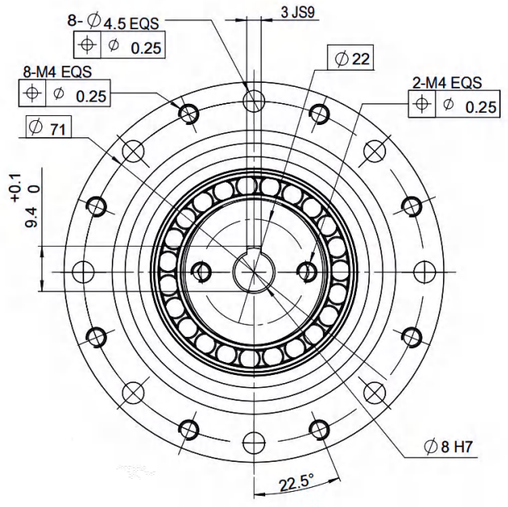


Technical Parameters

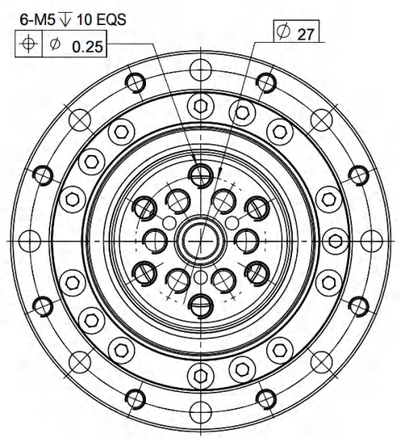
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmission error (arcsec)	Weight (kg)
							≤	≤	
50	7	23	9	46	8500	3500	20	90	0.52
80	10	30	14	51	8500	3500	20	90	
100	10	36	14	70	8500	3500	10	90	
120	10	36	14	70	8500	3500	10	90	

PMCG-II-E Series Structural Diagram — PMCG-17-XX-II-E8 Model

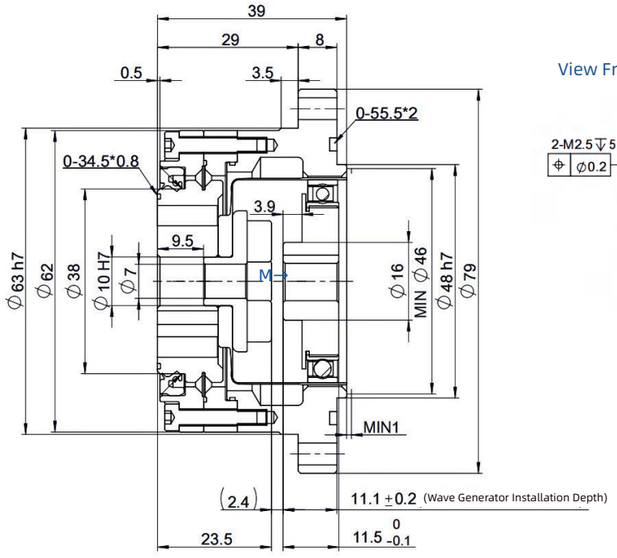
Left view (circular spline side)



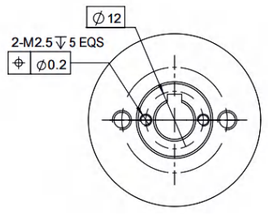
Right view (flexspline side)



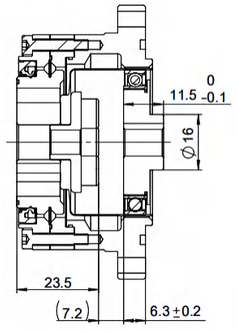
Full-section front view



View From Direction M (Cam)



Wave Generator Reverse Installation Dimensions

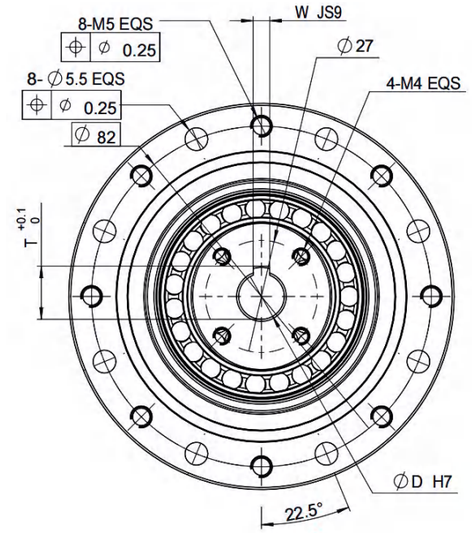


Technical Parameters

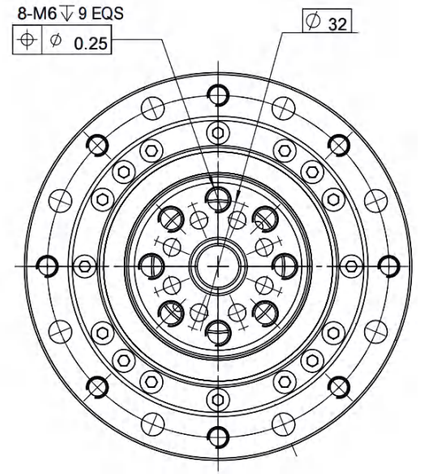
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	21	44	34	91	7300	3500	20	90	0.68
80	29	56	35	113	7300	3500	20	90	
100	31	70	51	143	7300	3500	10	90	
120	31	70	51	112	7300	3500	10	90	

PMCG-II-E Series Structural Diagram — PMCG-20-XX-II-E8/11/14 Model

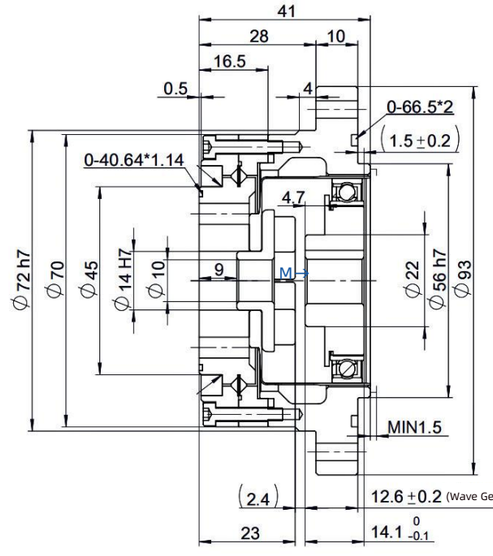
Left view (circular spline side)



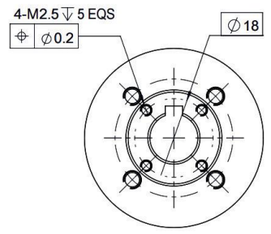
Right view (flexspline side)



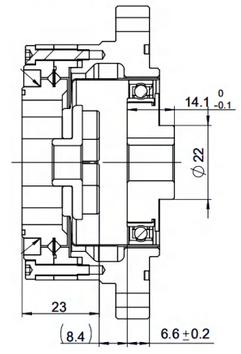
Full-section front view



View From Direction M (Cam)



Wave Generator Reverse Installation Dimensions



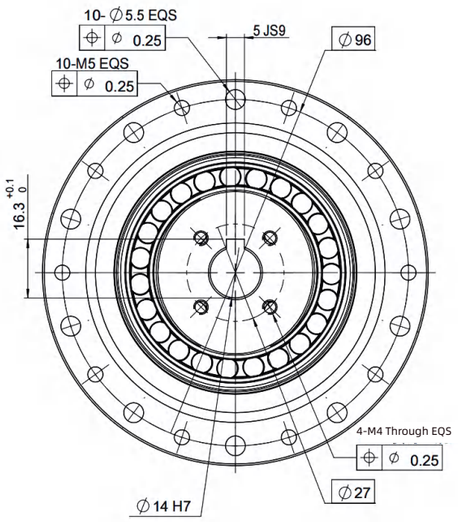
Model	D	T	W
PMCG-20-XX-II-E8	8	3	9.4
PMCG-20-XX-II-E11	11	4	12.8
PMCG-20-XX-II-E14	14	5	16.3

Technical Parameters

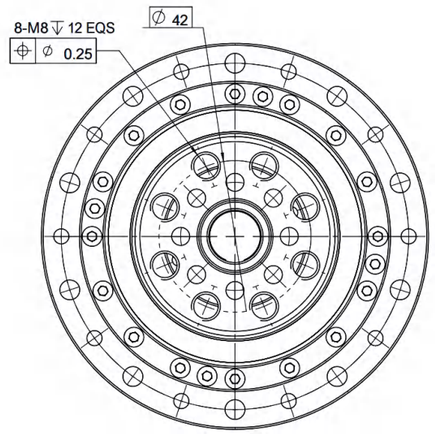
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	33	73	44	127	6500	3500	20	60	0.98
80	44	96	61	165	6500	3500	20	60	
100	52	107	64	191	6500	3500	10	60	
120	52	113	64	191	6500	3500	10	60	
160	52	120	64	191	6500	3500	10	60	

PMCG-II-E Series Structural Diagram — PMCG-25-XX-II-E14 Model

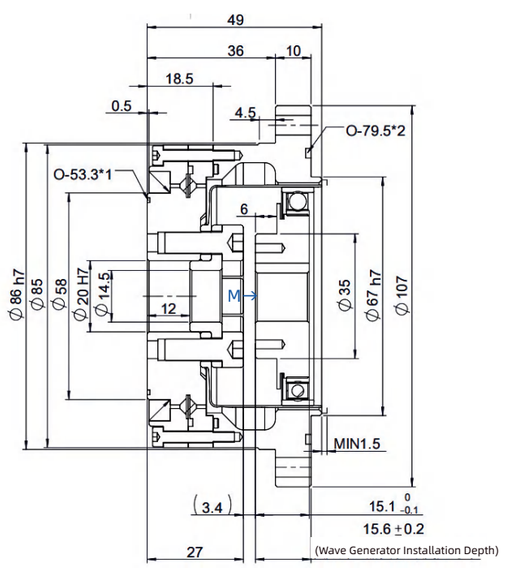
Left view (circular spline side)



Right view (flexspline side)

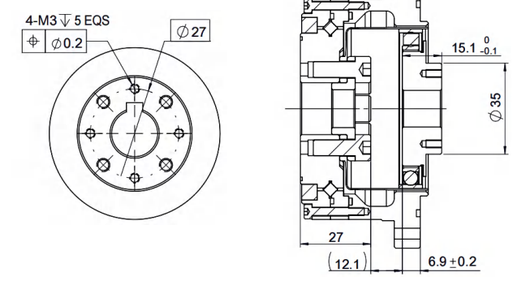


Full-section front view



Wave Generator Reverse Installation Dimensions

View From Direction M (Cam)

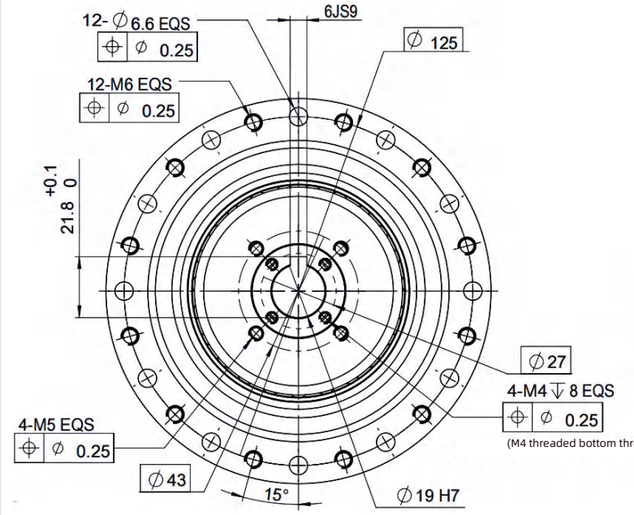


Technical Parameters

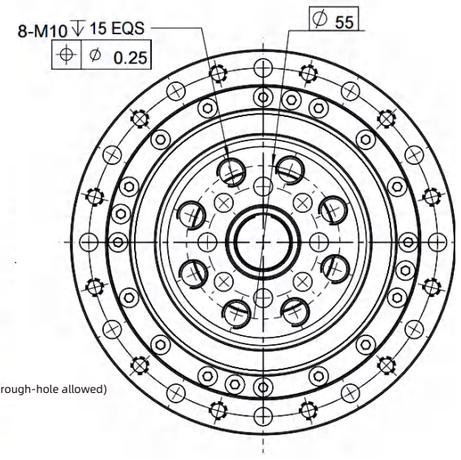
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	51	127	72	242	5600	3500	20	60	1.5
80	82	178	113	332	5600	3500	20	60	
100	87	204	140	369	5600	3500	10	60	
120	87	217	140	395	5600	3500	10	60	
160	87	229	140	408	5600	3500	10	60	

PMCG-II-E Series Structural Diagram — PMCG-32-XX-II-E19 Model

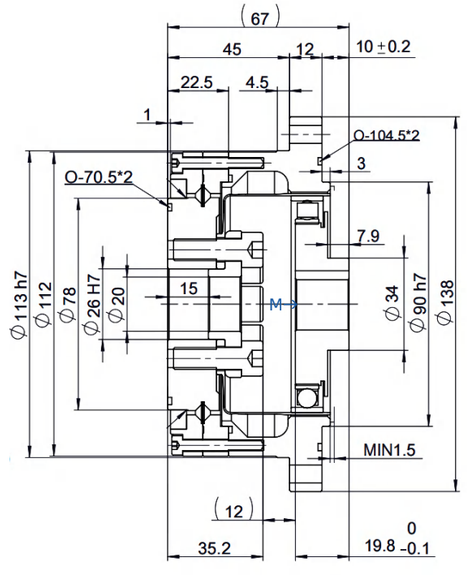
Left view (circular spline side)



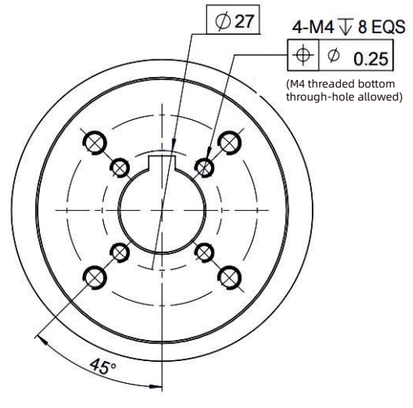
Right view (flexspline side)



Full-section front view



View From Direction M (Cam)

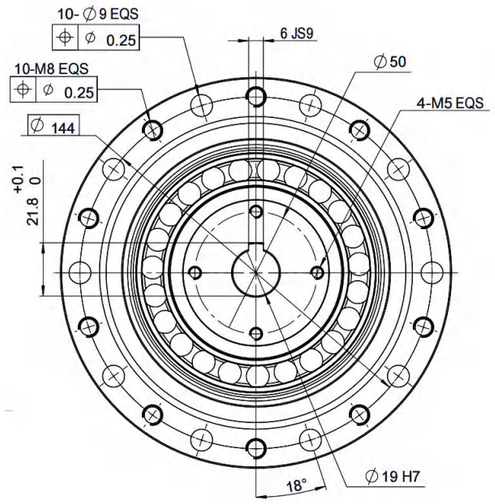


Technical Parameters

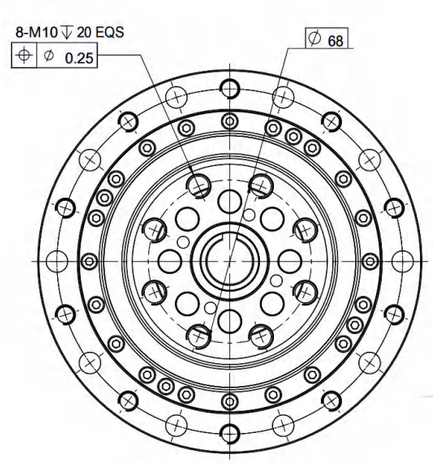
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	99	281	140	497	4800	3500	20	60	3.22
80	153	395	217	738	4800	3500	10	60	
100	178	433	281	841	4800	3500	10	60	
120	178	459	281	892	4800	3500	10	60	
160	178	484	281	892	4800	3500	10	60	

PMCG-II-E Series Structural Diagram — PMCG-40-XX-II-E19 Model

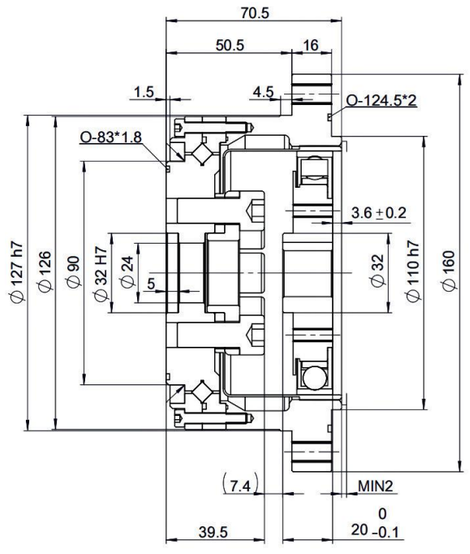
Left view (circular spline side)



Right view (flexspline side)



Full-section front view



Technical Parameters

Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	178	523	255	892	4000	3000	10	60	5.02
80	268	675	369	1270	4000	3000	10	60	
100	345	738	484	1400	4000	3000	10	60	
120	382	802	586	1530	4000	3000	10	60	
160	382	841	586	1530	4000	3000	10	60	

PMCG-II-E Series Starting Torque (N·cm)

Model	14				17				20					25					32					40				
Reduc-tion ratio	50	80	100	120	50	80	100	120	50	80	100	120	160	50	80	100	120	160	50	80	100	120	160	50	80	100	120	160
Starting Torque	4.5	3.1	2.8	2.6	6.7	4.4	3.7	3.4	8.6	5.4	4.7	4.2	3.6	17	10	8.8	8	6.9	34	21	20	17	15	61	39	34	31	26

PMCG-II-E Series Pawl Torque (Nm)

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

PMCG-II-E Series Buckling Torque (Nm)

Model	14	17	20	25	32	40
Full Reduction Ratio	260	500	800	1700	3500	6700

PMCG-II-E Series Hysteresis Loss and Rigidity

Model	Reduction ratio	T1	T2	HYSTERE-SIS LOSS	Torsional Rigidity (10000 Nm/rad)			Torsional Deflection (arcmin)	
		Nm	Nm	arcmin	K1	K2	K3	θ1	θ2
14	50	2	6.9	2	0.34	0.47	0.57	2.0	5.6
	≥80			1	0.47	0.61	0.71	1.4	4.2
17	50	3.9	12	2	0.81	1.10	1.30	1.7	4.2
	≥80			1	1.00	1.40	1.60	1.3	3.3
20	50	7	25	2	1.30	1.80	2.30	1.8	5.3
	≥80			1	1.60	2.50	2.90	1.5	3.9
25	50	14	48	2	2.50	3.40	4.40	1.9	5.4
	≥80			1	3.10	5.00	5.70	1.5	3.8
32	50	29	108	2	5.40	7.80	9.80	1.9	5.4
	≥80			1	6.70	11.00	12.00	1.5	4.0
40	50	54	198	2	10.00	14.00	18.00	1.8	5.3
	≥80			1	13.00	20.00	23.00	1.4	3.8

* Torque rigidity values are for reference only; the lower limit is approximately 80% of the stated value.

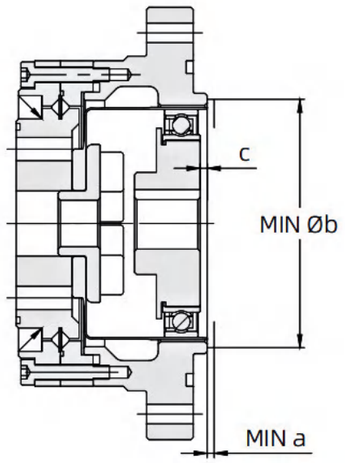
PMCG-II-E Series Main Bearing Specifications

The unit-type product uses precision crossed roller bearings to support external loads.

Crossed Roller Bearing Specifications				
Model	Moment Rigidity	Allowable Static Moment (Mc)	Rated Dynamic Load (C)	Rated Static Load (Co)
	10^4Nm/rad	Nm	$\times10^2$N	$\times10^2$N
14	4.38	41	47	60.7
17	7.75	64	52.9	75.5
20	12.8	91	57.8	90
25	24.2	156	96	151
32	53.9	313	150	250
40	91	450	213	365

* Torque rigidity values are for reference only; the lower limit is approximately 80% of the stated value.

PMCG-II-E Series Clearance Dimensions and Wave Generator Mounting Depth



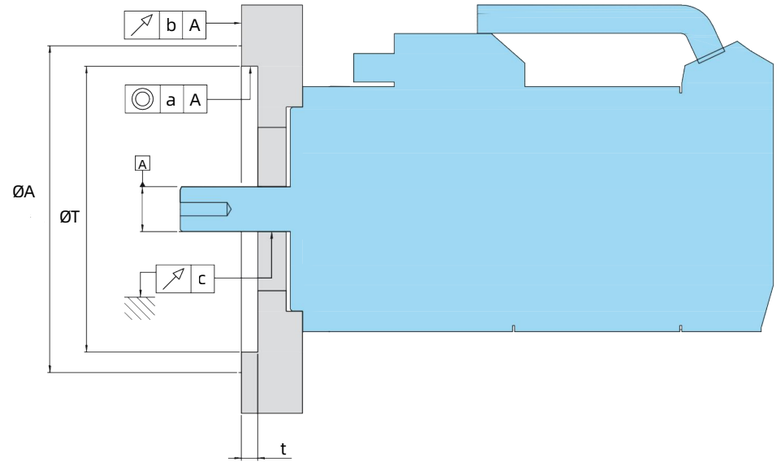
Unit: mm

Model	a	b	C
14	1	38	1.4±0.2
17	1	45	1.6±0.2
20	1.5	53	1.5±0.2
25	1.5	66	3.5±0.2
32	1.5	86	4.2±0.2
40	2	106	5.6±0.2

Note:
① C refers to the distance between the end face of the flex bearing's inner ring and the end face of the circular spline.
② Strictly adhere to the specified clearance dimensions for the flange and wave generator. Exceeding these may cause interference between the flexspline and the flange or wave generator, reducing service life.
③ Install the harmonic drive according to the required wave generator mounting depth. Installation depth affects starting torque and accuracy.

PMCG-II-E Series Motor Installation

Flange for motor installation: When mounting the motor onto the unit-type product, a flange designed for motor installation must be used. Please refer to the figure and table below for the dimensions and tolerances of the flange's key components.

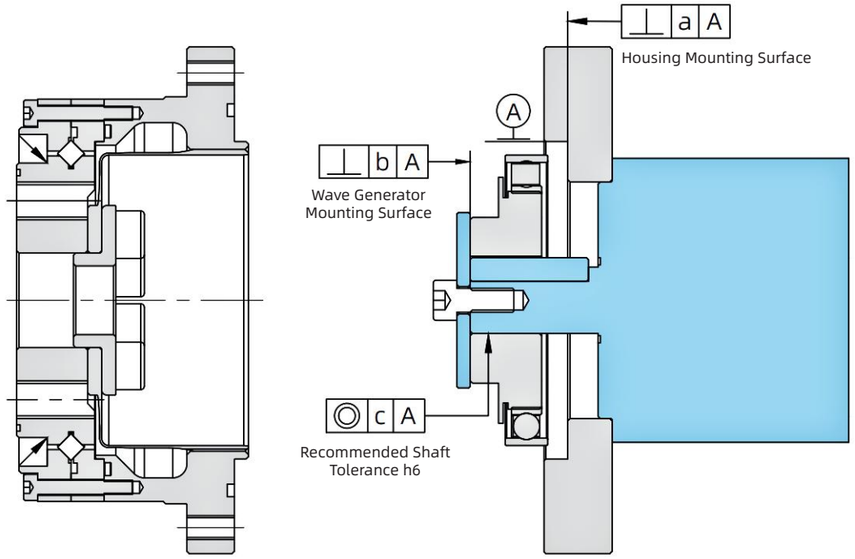


Unit: mm

Symbol \ Model	14	17	20	25	32	40
a	0.03	0.04	0.04	0.04	0.04	0.05
b	0.03	0.04	0.04	0.04	0.04	0.05
C	0.015	0.015	0.018	0.018	0.018	0.018
ØA	73	79	93	107	138	160
t	3	3	4.5	4.5	4.5	6
ØT	38H7	48H7	56H7	67H7	90H7	110H7

PMCG-II-E Series Assembly Precision

To fully leverage the superior performance of the unit type, ensure that the housing assembly precision meets the recommended parameters shown in the figure and table below.

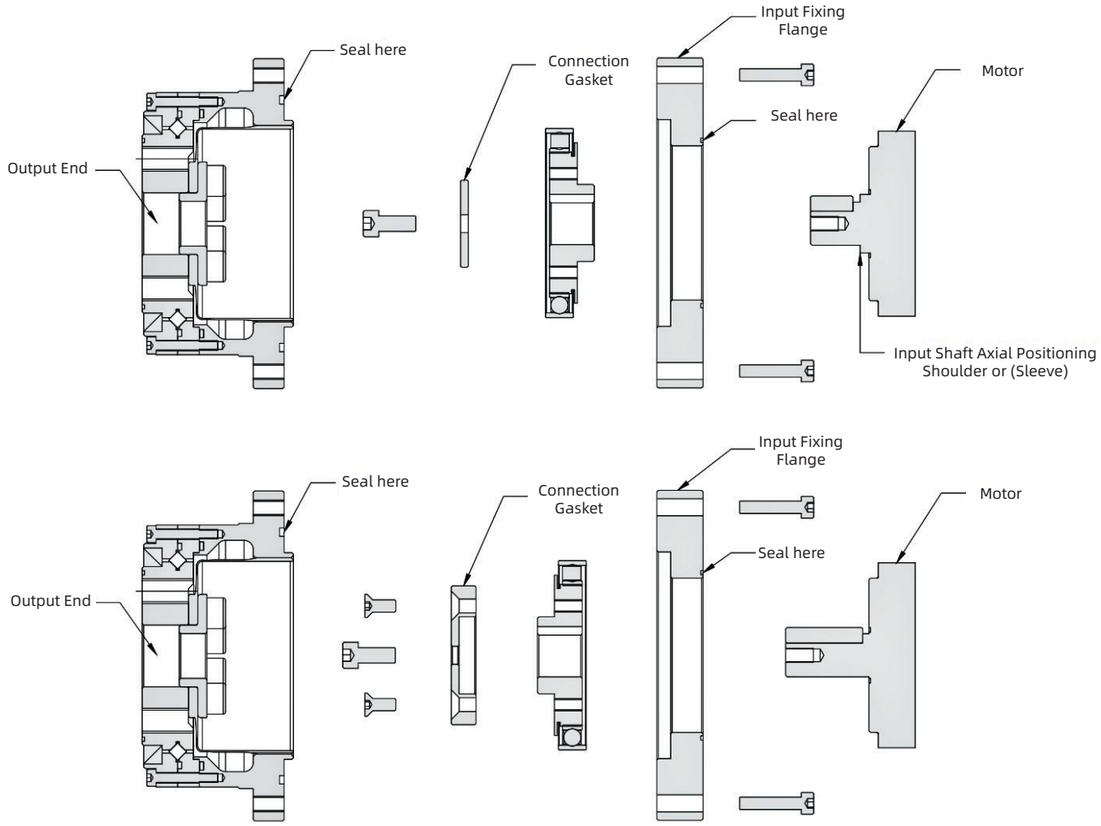


Unit: mm

Symbol \ Model	14	17	20	25	32	40
a	0.011	0.015	0.017	0.024	0.026	0.0026
b	(0.008)	(0.010)	(0.010)	(0.012)	(0.012)	(0.012)
C	(0.016)	(0.018)	(0.019)	(0.022)	(0.022)	(0.024)

※ Values in parentheses apply when the input section (wave generator) is integrated (i.e., when the Oldham coupling is not used).

PMCG-II-E Series Connection Method (circular spline is fixed, and flexspline serves as the output)

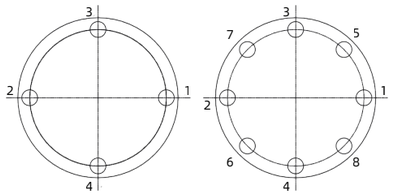


① Evenly apply grease to the flex bearing and inject an appropriate amount into the cavity where the input fixing flange connects to the motor. Use only the specified lubricant; do not substitute other greases, as this may damage the harmonic drive. Install the wave generator onto the motor shaft or input connecting shaft, securing it with screws and flat gaskets or with a connection end cover.
② Apply a uniform layer of grease to the inner wall of the flexspline, then inject the recommended amount into the flexspline cavity. Use only the specified lubricant; do not substitute other greases, as this may damage the harmonic drive. Install the harmonic drive as shown in the figure, aligning the long axis of the wave generator with the long axis of the flexspline. Once in position, secure it with the appropriate screw, tightened to a preload torque of 0.5 Nm.
③ Set the motor speed to approximately 100 rpm and start the motor. Tighten the screws in a crisscross pattern, gradually increasing torque in 4–5 steps until reaching the specified tightening force. All connecting and fastening screws must be grade 12.9 and coated with Loctite 243 threadlocker to prevent loosening or failure during operation.
④ The mounting surface connecting to the harmonic drive must have a flatness of 0.01 mm and be perpendicular to the axis within 0.01 mm.

Note: If the harmonic drive is installed with the output end facing downward horizontally (not recommended), ensure that the grease inside the flexspline covers the meshing tooth surfaces. If unsure, please contact us for guidance. Always use the specified lubricant. Do not substitute other greases, as this may cause damage to the harmonic drive. A static seal must be applied between the circular spline and the input mounting surface to prevent grease leakage during operation, which could lead to potential damage due to insufficient or no lubrication.

PMCG-II-E Series Screw Locking Method

(1) Set the motor speed to 100 rpm and start the motor. Tighten the screws in a crisscross pattern, gradually increasing torque in 4–5 steps until reaching the specified value (see the diagram below for tightening force).
(2) The mounting surface connecting to the harmonic drive must have a flatness of 0.01 mm and be perpendicular to the axis within 0.01 mm.

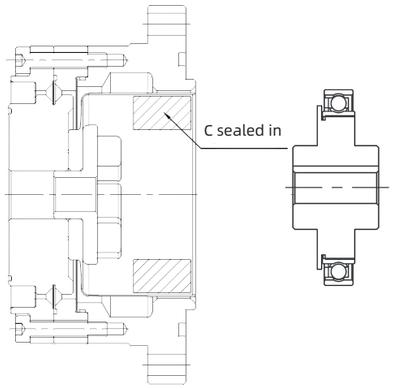


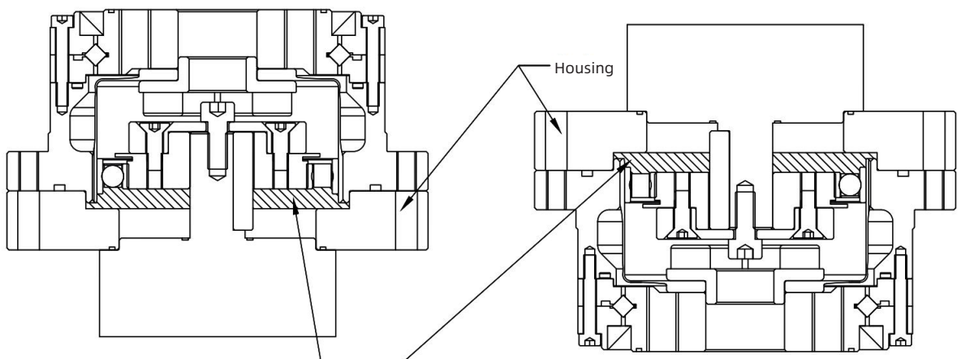
Screw Tightening Force

Screw property class		12.9						
Nominal diameter	mm	3	4	5	6	8	10	12
Tightening torque	N·m	2	4	9	15	35	70	125

PMCG-II-E Series Grease Application Requirements

(1) Grease application locations



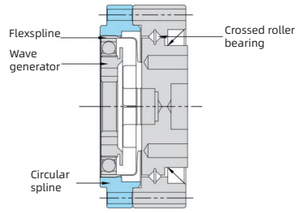


When the wave generator is oriented vertically (up or down), fill the cavity between the wave generator and the flange to 100%.
When the wave generator is horizontal, fill the cavity to 50%.

PMCD-II Series Unit Type (Super-flat)

Pushing the limits of super-flat design, this series achieves a structural breakthrough while maintaining the outstanding performance of conventional products. It is especially well-suited for robotic end joints and customer-side harmonic drives.

- Super-flat structural design provides a compact and efficient transmission solution
- High static torque capacity ensures stable operation under extreme loads
- Excellent positioning and rotational accuracy

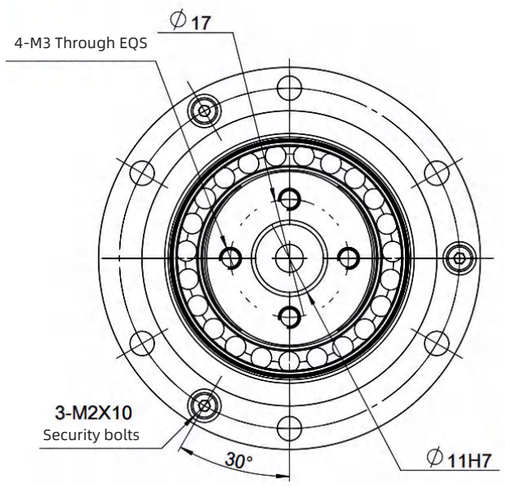


PMCD-II Series Performance Parameters

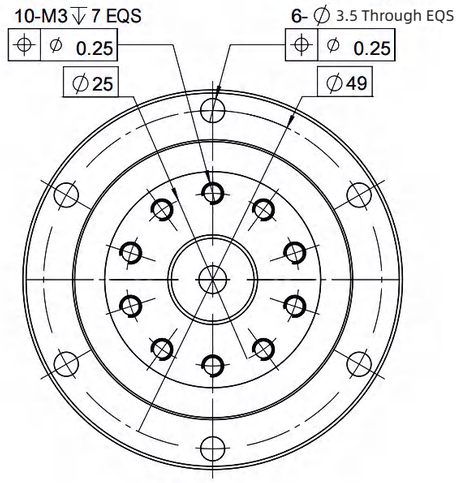
Model	Reduction ratio	Rated torque at 2000 r/min input	Permissible peak torque at start/stop	Permissible max .value of ave. load torque	Instantaneous permissible max. torque	Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash (arcsec)	Transmission error (arcsec)	Weight
		Nm	Nm	Nm	Nm	r/min	r/min	≤	≤	kg
14	50	3.5	11.4	4.6	23	8500	3500	20	90	0.5
	80	5.1	15	6.2	29	8500	3500	20	90	
	100	5.1	18	7	33	8500	3500	20	90	
17	50	10.5	22	17	46	7300	3500	20	90	0.66
	80	14	29	21	54	7300	3500	20	90	
	100	15	35	26	67	7300	3500	20	90	
20	50	16	37	23	66	6500	3500	20	90	0.94
	80	23	49	28	78	6500	3500	10	90	
	100	27	54	32	90	6500	3500	10	90	
25	50	26	66	36	121	5600	3500	20	60	1.7
	80	42	91	62	157	5600	3500	10	60	
	100	45	105	71	175	5600	3500	10	60	
32	50	50	143	71	255	4800	3500	20	60	3.3
	80	79	202	126	350	4800	3500	10	60	
	100	91	221	143	399	4800	3500	10	60	

PMCD-II Series Structural Diagram — PMCD-14-XX-II Model

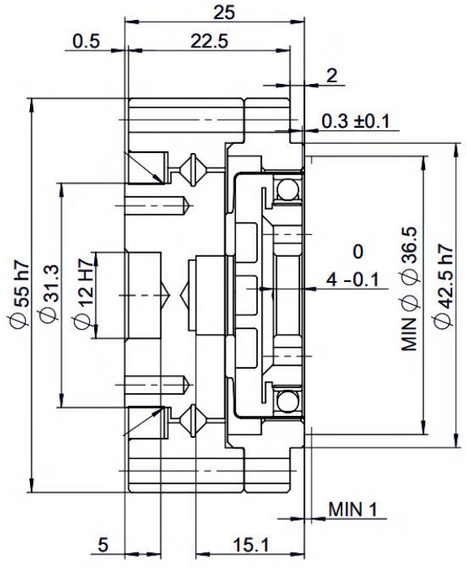
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

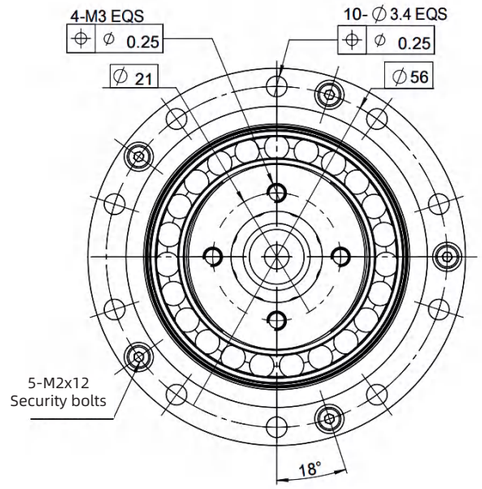


Technical Parameters

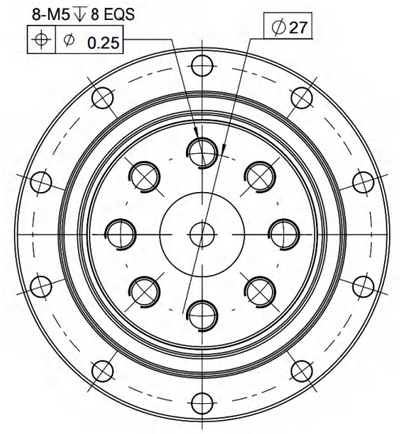
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	3.5	11.4	4.6	23	8500	3500	20	90	0.5
80	5.1	15	6.2	29	8500	3500	20	90	
100	5.1	18	7	33	8500	3500	20	90	

PMCD-II Series Structural Diagram — PMCD-17-XX-II Model

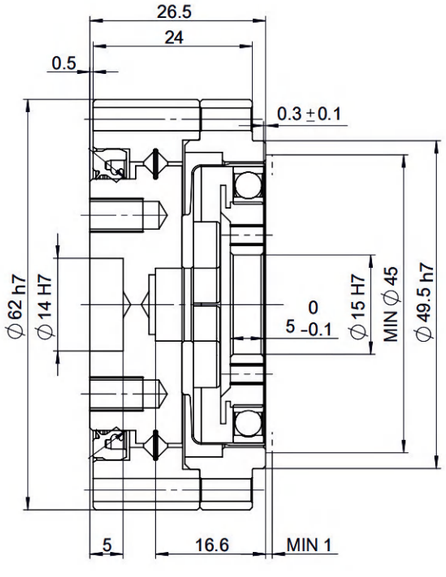
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

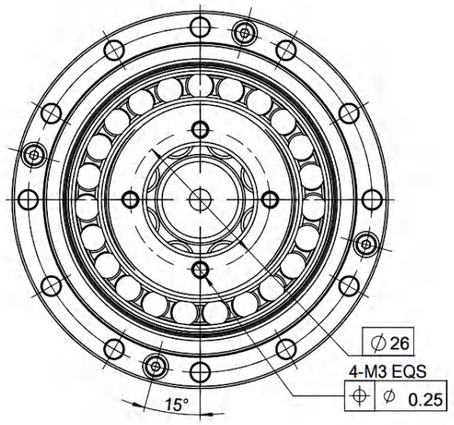


Technical Parameters

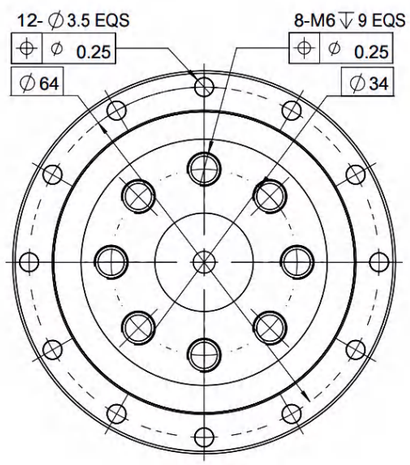
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	10.5	22	17	46	7300	3500	20	90	0.66
80	14	29	21	54	7300	3500	20	90	
100	15	35	26	67	7300	3500	20	90	

PMCD-II Series Structural Diagram — PMCD-20-XX-II Model

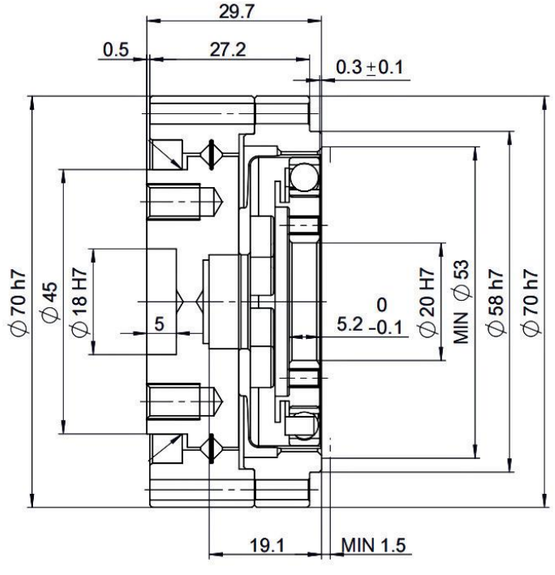
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

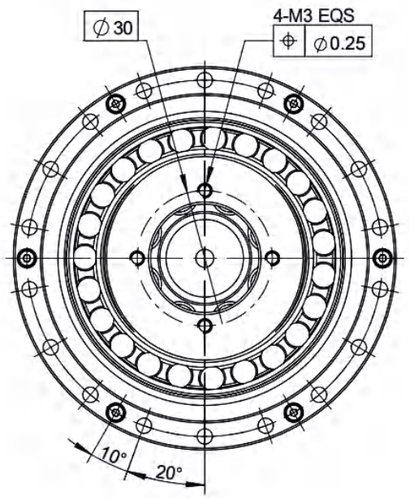


Technical Parameters

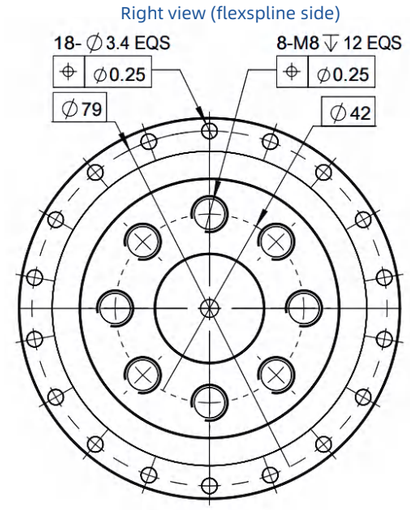
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	16	37	23	66	6500	3500	20	90	0.94
80	23	49	28	78	6500	3500	10	90	
100	27	54	32	90	6500	3500	10	90	

PMCD-II Series Structural Diagram — PMCD-25-XX-II Model

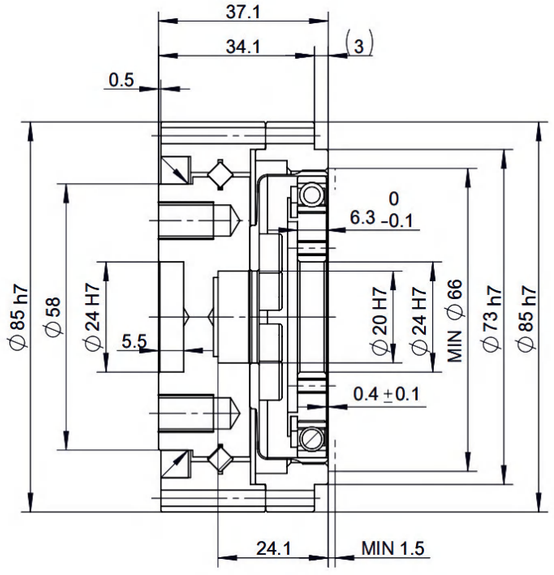
Left view (circular spline side)



Right view (flexspline side)



Full-section front view



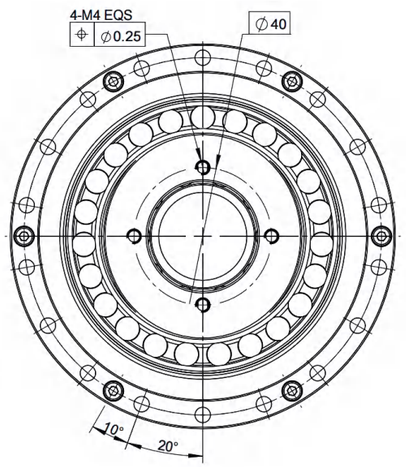
Technical Parameters

Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	26	66	36	121	5600	3500	20	60	1.7
80	42	91	62	157	5600	3500	10	60	
100	45	105	71	175	5600	3500	10	60	

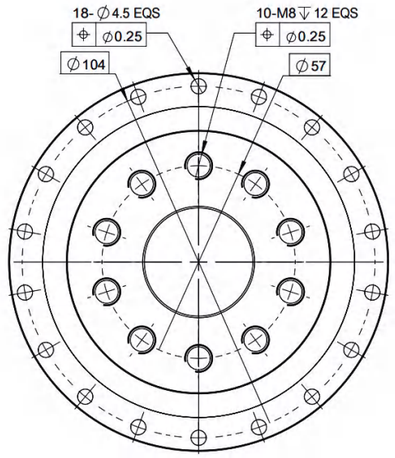
PMCD-II Series Structural Diagram

PMCD-32-XX-II Model

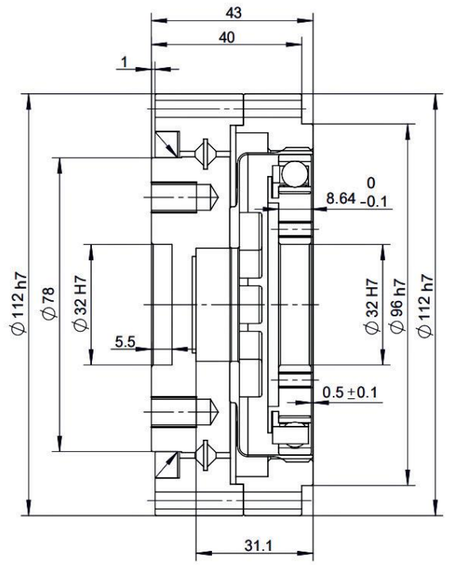
Left view (circular spline side)



Right view (flexspline side)



Full-section front view



Technical Parameters

Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmission error (arcsec)	Weight (kg)
							≤	≤	
50	50	143	71	255	4800	3500	20	60	3.3
80	79	202	126	350	4800	3500	10	60	
100	91	221	143	399	4800	3500	10	60	

PMCD-II Series Starting Torque (N·cm)

Model	14			17			20				25				32			
Reduction ratio	50	80	100	50	80	100	50	80	100	120	50	80	100	120	50	80	100	120
Starting Torque	4.4	3.5	2.8	6.7	4.5	3.8	8.9	5.5	5.1	–	16	10	9.1	–	32	20	20	–

PMCD-II Series Pawl Torque (Nm)

Reduction ratio \ Model	14	17	20	25	32
50	88	150	220	450	980
80	90	170	280	550	1050
100	84	160	260	500	1000

PMCD-II Series Buckling Torque (Nm)

Model	14	17	20	25	32
Full Reduction Ratio	190	330	560	1000	2200

PMCD-II Series Hysteresis Loss and Rigidity

Model	Reduction ratio	T1	T2	HYSTERESIS LOSS	Torsional Rigidity (10000 Nm/rad)			Torsional Deflection (arcmin)	
		Nm	Nm	arcmin	K1	K2	K3	θ1	θ2
14	50	2	6.9	2.5	0.29	0.37	0.47	2.4	6.4
	≥80			2	0.4	0.44	0.61	1.7	5.4
17	50	3.9	12	2	0.67	0.88	1.20	2.0	4.6
	≥80			1	0.84	0.94	1.30	1.6	4.3
20	50	7	25	2	1.1	1.3	2	2.2	6.6
	≥80			1	1.3	1.7	2.5	1.8	5.0
25	50	14	48	2	2	2.7	3.7	2.4	6.1
	≥80			1	2.7	3.7	4.7	1.8	4.5
32	50	29	108	2	4.7	6.1	8.4	2.1	6.1
	≥80			1	6.1	7.8	11	1.7	4.8

* Torque rigidity values are for reference only; the lower limit is approximately 80% of the stated value.

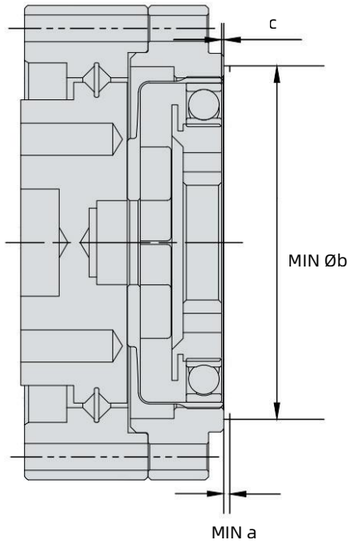
PMCD-II Series Main Bearing Specifications

The unit-type product uses precision crossed roller bearings to support external loads.

Crossed Roller Bearing Specifications				
Model	Moment Rigidity	Allowable Static Moment (Mc)	Rated Dynamic Load (C)	Rated Static Load (Co)
	10^4Nm/rad	Nm	$\times10^2$N	$\times10^2$N
14	4.38	41	47	60.7
17	7.75	64	52.9	75.5
20	12.8	91	57.8	90
25	24.2	156	96	151
32	53.9	313	150	250

* Torque rigidity values are for reference only; the lower limit is approximately 80% of the stated value.

PMCD-II Series Clearance Dimensions and Wave Generator Mounting Depth



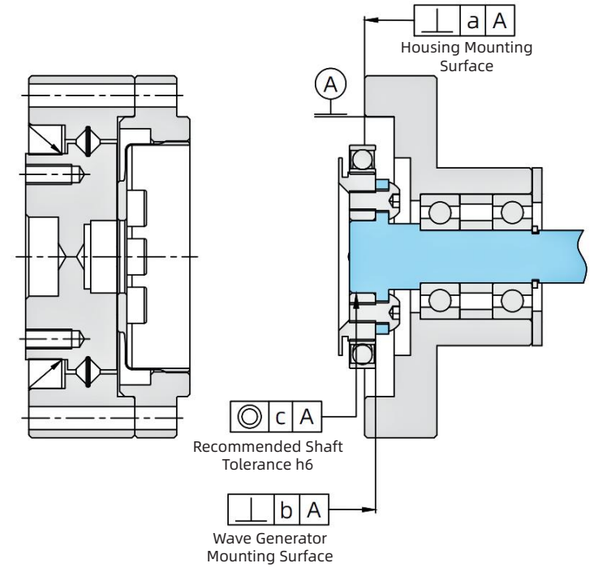
Unit: mm

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

Note:
① C refers to the distance between the end face of the flex bearing's inner ring and the end face of the circular spline.
② Strictly adhere to the specified clearance dimensions for the flange and wave generator. Exceeding these may cause interference between the flexspline and the flange or wave generator, reducing service life.
③ Install the harmonic drive according to the required wave generator mounting depth. Installation depth affects starting torque and accuracy.

PMCD-II Series Motor Installation

During assembly design, if there are abnormalities such as deformation of the mounting surface or forced assembly, product performance will be reduced.
To fully leverage the superior performance of the harmonic drive, please pay close attention to the following key points and ensure that the housing assembly precision meets the recommended parameters shown in the figure and table below.
① Tilt or deformation of the mounting surface
② Foreign material caught in the mesh
③ Burrs, bulging, or abnormal positioning around the threaded hole area of the mounting holes
④ Insufficient chamfer on the recessed circular mounting section
⑤ Abnormal roundness of the recessed circular mounting section

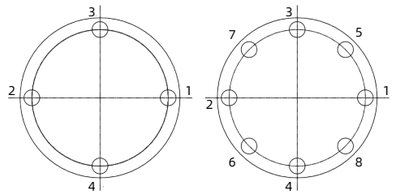


Unit: mm

Symbol \ Model	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
ØC	0.016	0.018	0.019	0.022	0.022

PMCD-II Series Screw Locking Method

(1) Set the motor speed to 100 rpm and start the motor. Tighten the screws in a crisscross pattern, gradually increasing torque in 4–5 steps until reaching the specified tightening force. (see the diagram below for tightening force).
(2) The mounting surface connecting to the harmonic drive must have a flatness of 0.01 mm and be perpendicular to the axis within 0.01 mm.



Screw Tightening Force

Screw property class	12.9							
Nominal diameter	mm	3	4	5	6	8	10	12
Tightening torque	N·m	2	4	9	15	35	70	125

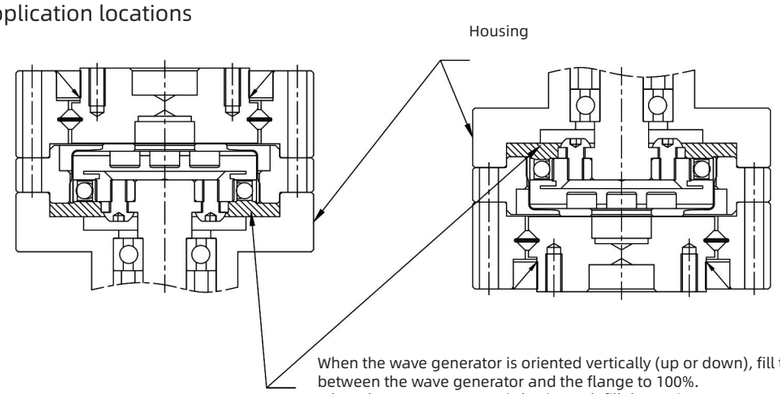
PMCD-II Series Grease Application Requirements

(1) Grease application locations

Unit: gram (g)

Size	Application Locations		
	C		
	For Horizontal Use	For Vertical Use	
		Upward	Downward
14	3	4	5
17	5	6	7
20	8	9	11
25	16	19	21
32	36	42	48

(2) Grease application locations



When the wave generator is oriented vertically (up or down), fill the cavity between the wave generator and the flange to 100%.
When the wave generator is horizontal, fill the cavity to 50%.

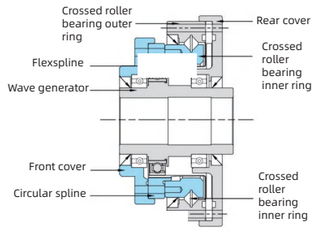
PMHG-I Series Unit Type (Hollow Shaft)

The flexspline features a hollow flanged design, with the wave generator cam incorporating a large-diameter hollow shaft bore at its center. Support bearings are integrated within the harmonic drive, and the fully sealed construction ensures easy installation. This makes it ideal for applications where wiring or piping needs to pass through the center of the harmonic drive.

Large-diameter hollow-bore design facilitates integrated routing of wiring or pneumatic lines, optimizing space utilization

Built-in support bearings improves rigidity and stability at the input end

Fully sealed unit-type structure simplifies installation and meets high ingress protection requirements

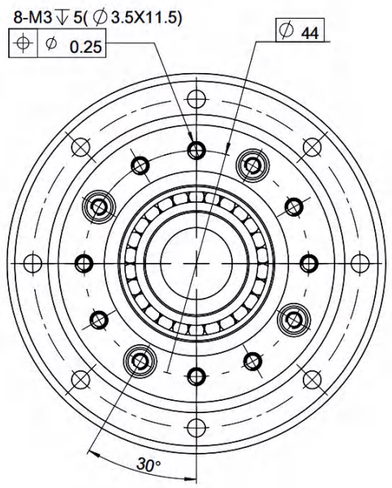


PMHG-I Series Performance Parameters

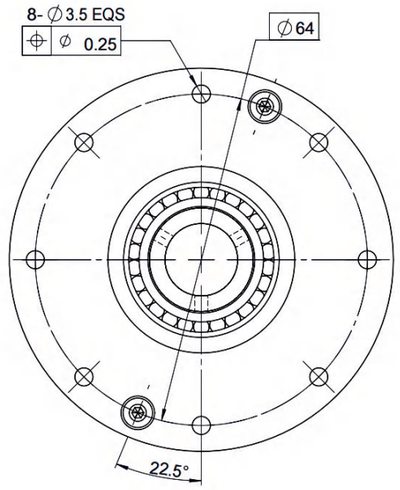
Model	Reduction ratio	Rated torque at 2000 r/min input	Permissible peak torque at start/stop	Permissible max .value of ave. load torque	Instantaneous permissible max. torque	Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash (arcsec)	Transmission error (arcsec)	Weight
		Nm	Nm	Nm	Nm	r/min	r/min	≤	≤	kg
14	50	7	23	9	46	8500	3500	20	90	0.71
	80	10	30	14	51	8500	3500	20	90	
	100	10	36	14	70	8500	3500	10	90	
	120	10	36	14	70	8500	3500	10	90	
17	50	21	44	34	91	7300	3500	20	90	1
	80	29	56	35	113	7300	3500	20	90	
	100	31	70	51	143	7300	3500	10	90	
	120	31	70	51	112	7300	3500	10	90	
20	50	33	73	44	127	6500	3500	20	60	1.38
	80	44	96	61	165	6500	3500	20	60	
	100	52	107	64	191	6500	3500	10	60	
	120	52	113	64	191	6500	3500	10	60	
	160	52	120	64	191	6500	3500	10	60	
25	50	51	127	72	242	5600	3500	20	60	2.1
	80	82	178	113	332	5600	3500	20	60	
	100	87	204	140	369	5600	3500	10	60	
	120	87	217	140	395	5600	3500	10	60	
	160	87	229	140	408	5600	3500	10	60	
32	50	99	281	140	497	4800	3500	20	60	4.5
	80	153	395	217	738	4800	3500	10	60	
	100	178	433	281	841	4800	3500	10	60	
	120	178	459	281	892	4800	3500	10	60	
	160	178	484	281	892	4800	3500	10	60	
40	50	178	523	255	892	4000	3000	10	60	7.7
	80	268	675	369	1270	4000	3000	10	60	
	100	345	738	484	1400	4000	3000	10	60	
	120	382	802	586	1530	4000	3000	10	60	
	160	382	841	586	1530	4000	3000	10	60	

PMHG-I Series Structural Diagram — PMHG-14-XX-I Model

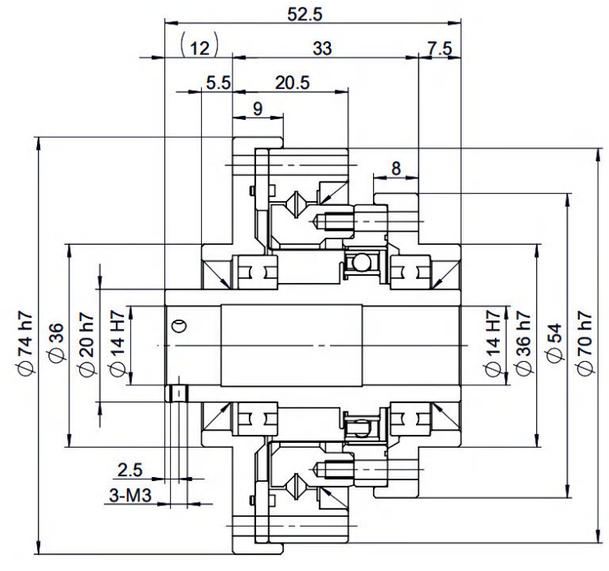
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

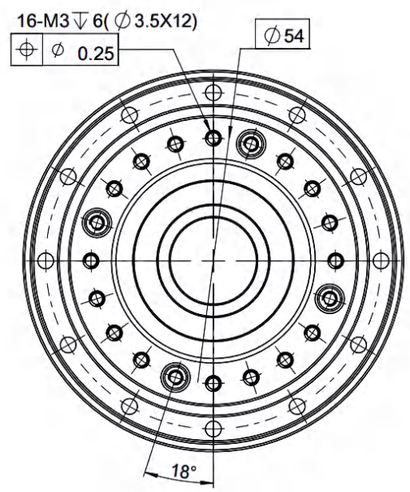


Technical Parameters

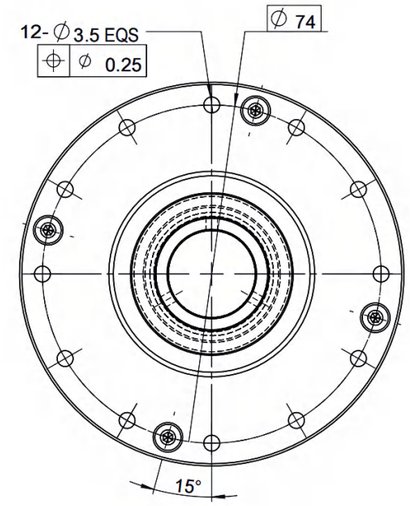
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	7	23	9	46	8500	3500	20	90	0.71
80	10	30	14	51	8500	3500	20	90	
100	10	36	14	70	8500	3500	10	90	
120	10	36	14	70	8500	3500	10	90	

PMHG-I Series Structural Diagram — PMHG-17-XX-I Model

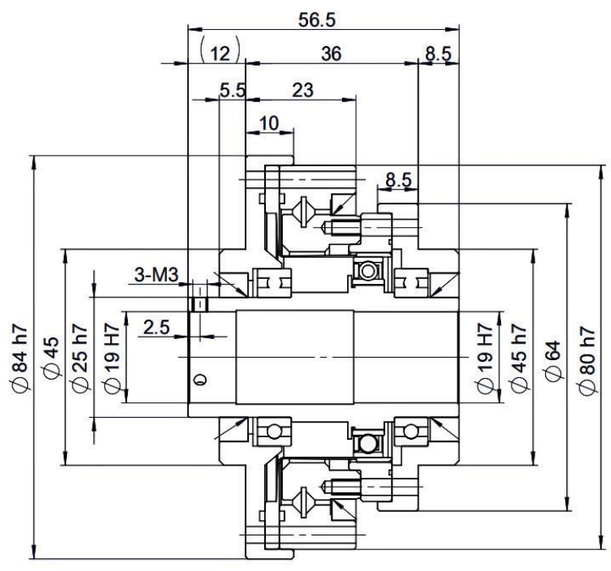
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

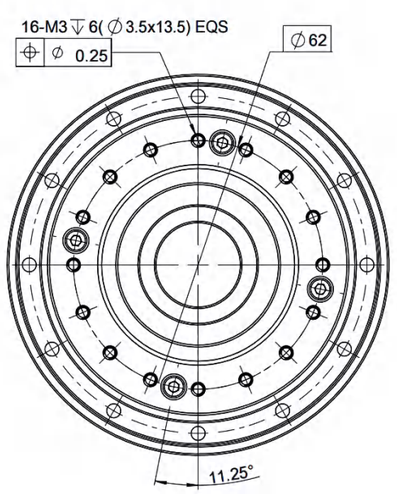


Technical Parameters

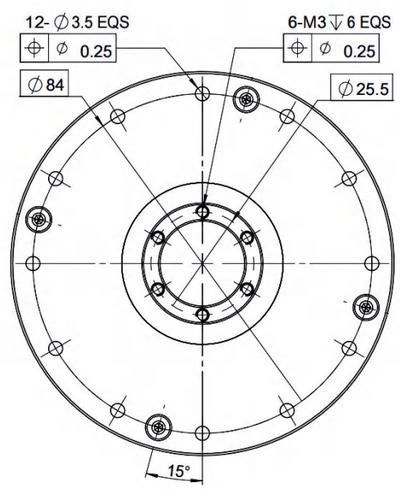
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	21	44	34	91	7300	3500	20	90	1
80	29	56	35	113	7300	3500	20	90	
100	31	70	51	143	7300	3500	10	90	
120	31	70	51	112	7300	3500	10	90	

PMHG-I Series Structural Diagram — PMHG-20-XX-I Model

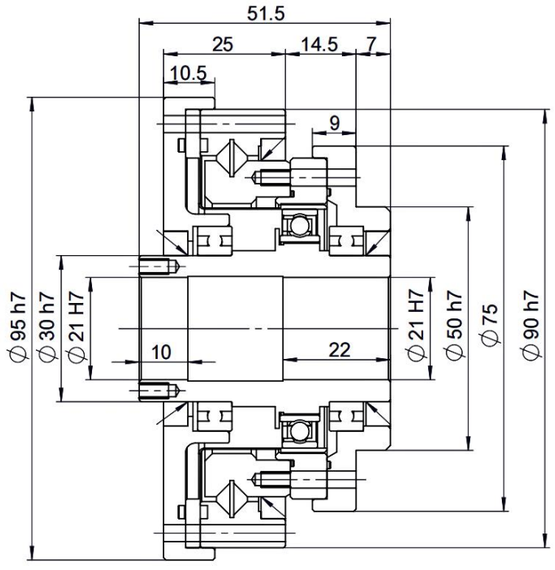
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

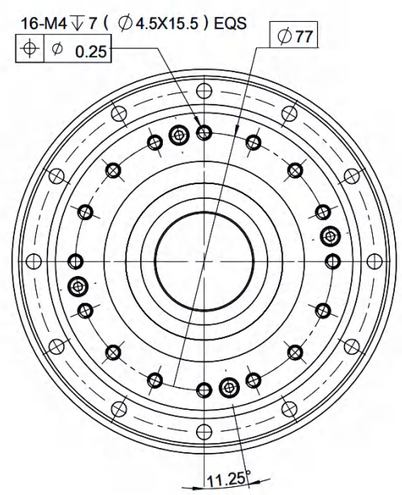


Technical Parameters

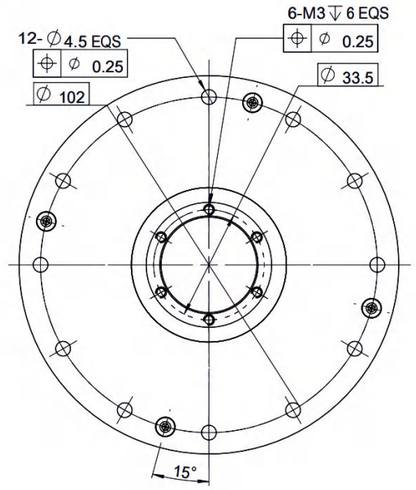
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	33	73	44	127	6500	3500	20	60	1.38
80	44	96	61	165	6500	3500	20	60	
100	52	107	64	191	6500	3500	10	60	
120	52	113	64	191	6500	3500	10	60	
160	52	120	64	191	6500	3500	10	60	

PMHG-I Series Structural Diagram — PMHG-25-XX-I Model

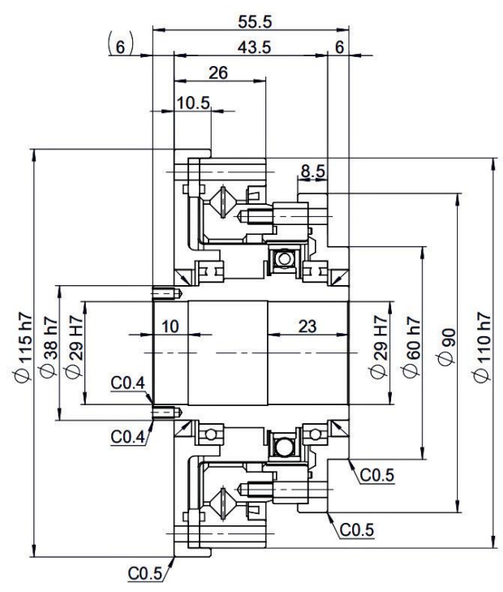
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

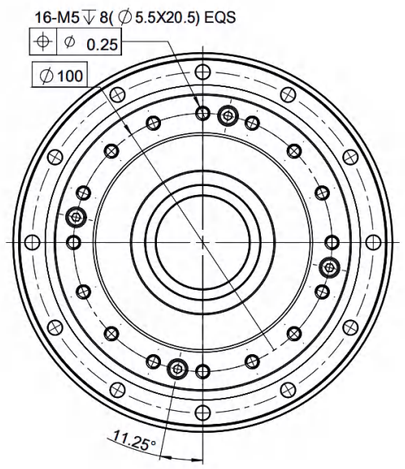


Technical Parameters

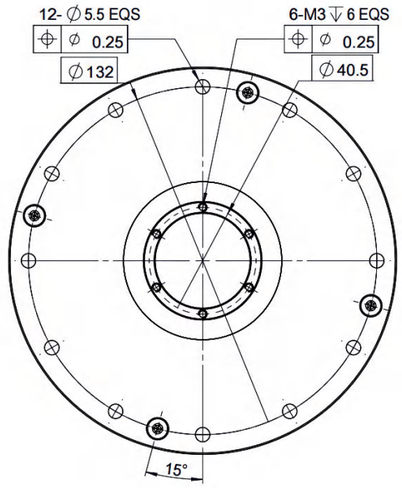
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	51	127	72	242	5600	3500	20	60	2.1
80	82	178	113	332	5600	3500	20	60	
100	87	204	140	369	5600	3500	10	60	
120	87	217	140	395	5600	3500	10	60	
160	87	229	140	408	5600	3500	10	60	

PMHG-I Series Structural Diagram — PMHG-32-XX-I Model

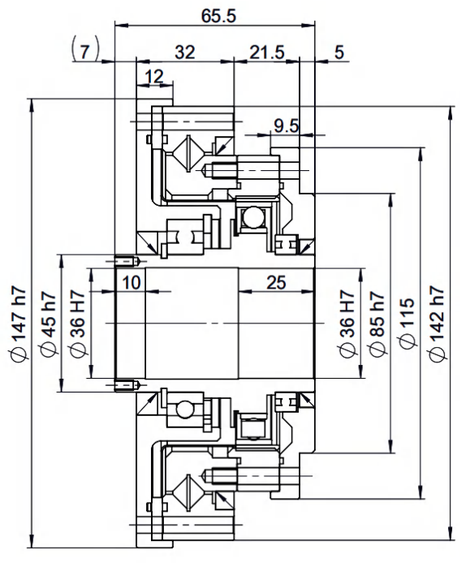
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

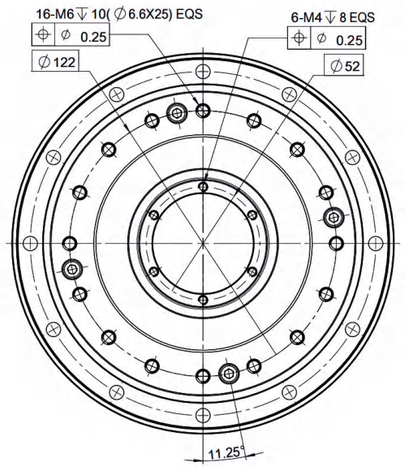


Technical Parameters

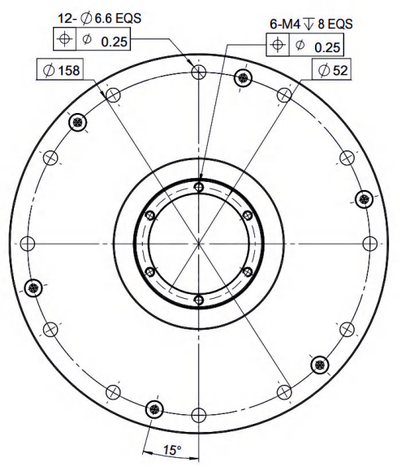
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec) ≤	Transmis-sion error (arcsec) ≤	Weight (kg)
50	99	281	140	497	4800	3500	20	60	4.5
80	153	395	217	738	4800	3500	10	60	
100	178	433	281	841	4800	3500	10	60	
120	178	459	281	892	4800	3500	10	60	
160	178	484	281	892	4800	3500	10	60	

PMHG-I Series Structural Diagram — PMHG-40-XX-I Model

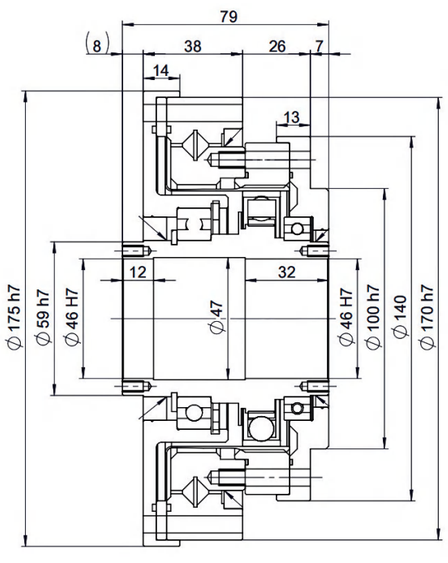
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

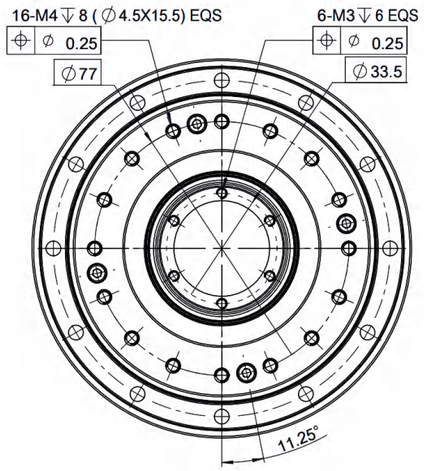


Technical Parameters

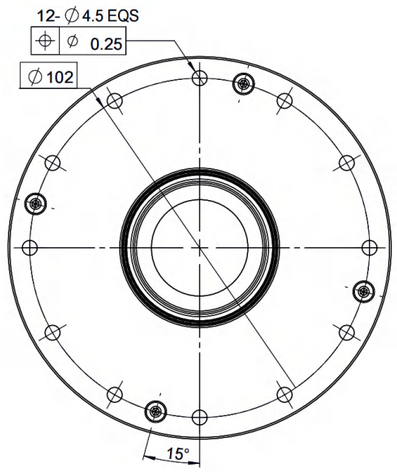
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec) ≤	Transmis-sion error (arcsec) ≤	Weight (kg)
50	178	523	255	892	4000	3000	10	60	7.7
80	268	675	369	1270	4000	3000	10	60	
100	345	738	484	1400	4000	3000	10	60	
120	382	802	586	1530	4000	3000	10	60	
160	382	841	586	1530	4000	3000	10	60	

PMHG-I Series Structural Diagram — PMHG-25-XX-I-B Model

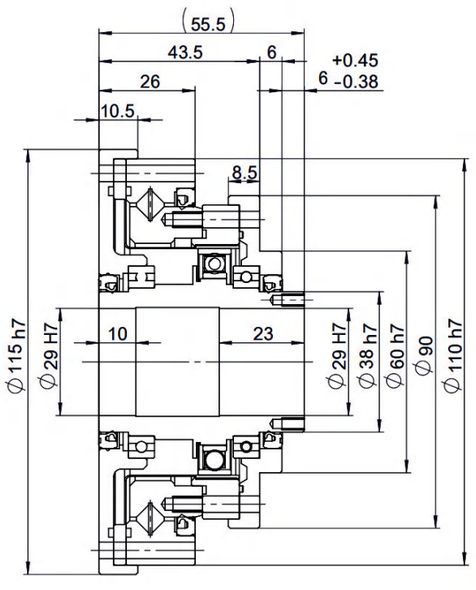
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

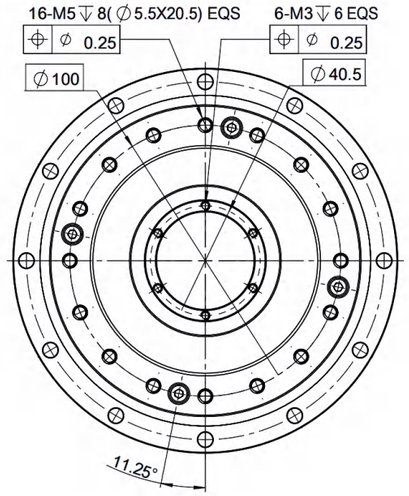


Technical Parameters

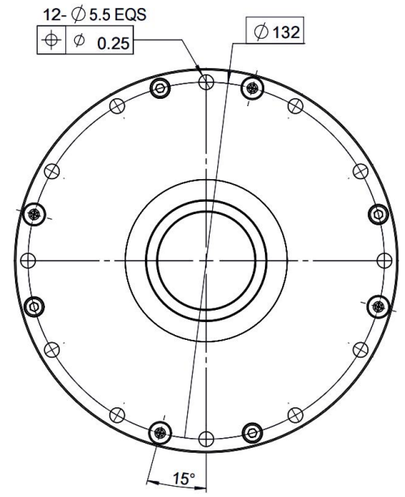
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	51	127	72	242	5600	3500	20	60	2.1
80	82	178	113	332	5600	3500	20	60	
100	87	204	140	369	5600	3500	10	60	
120	87	217	140	395	5600	3500	10	60	
160	87	229	140	408	5600	3500	10	60	

PMHG-I Series Structural Diagram — PMHG-32-XX-I-B Model

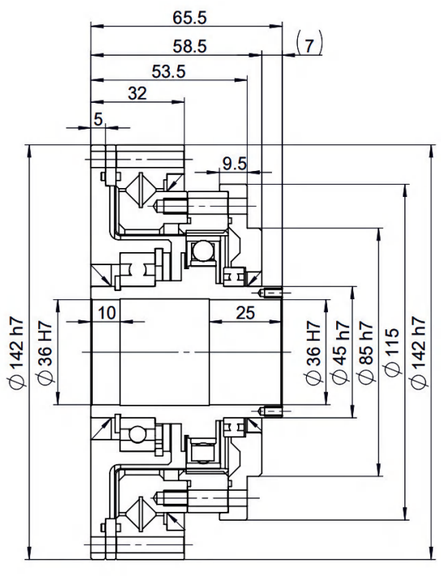
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

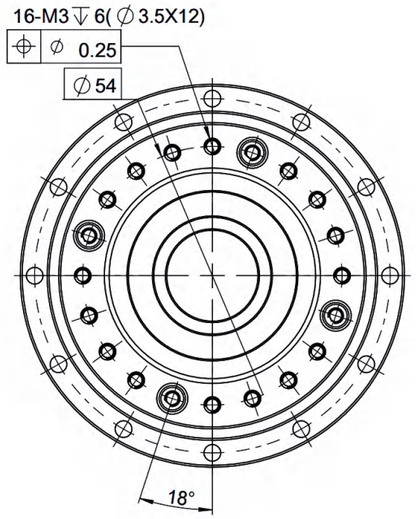


Technical Parameters

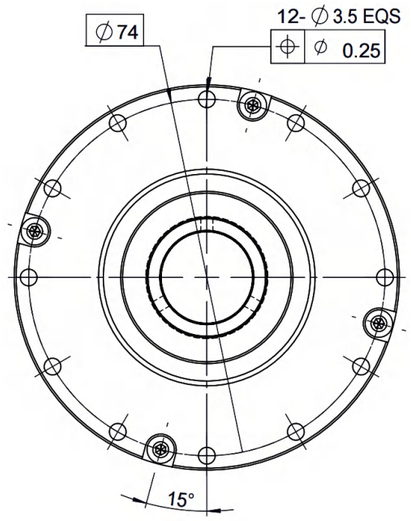
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	99	281	140	497	4800	3500	20	60	4.5
80	153	395	217	738	4800	3500	10	60	
100	178	433	281	841	4800	3500	10	60	
120	178	459	281	892	4800	3500	10	60	
160	178	484	281	892	4800	3500	10	60	

PMHG-I Series Structural Diagram — PMHG-17-XX-I-LW Model

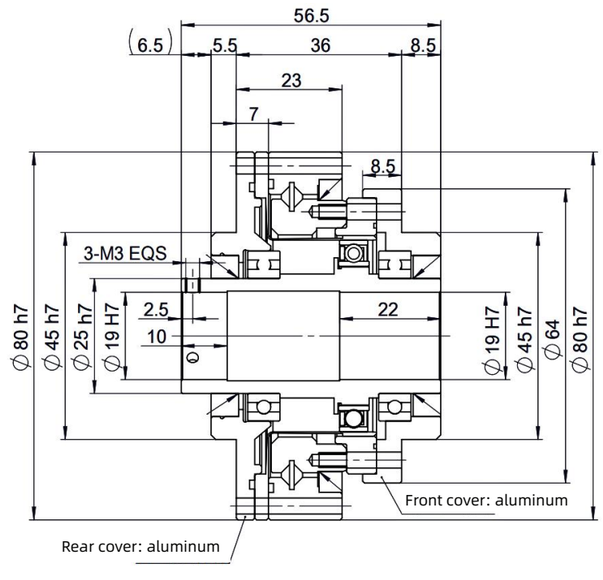
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

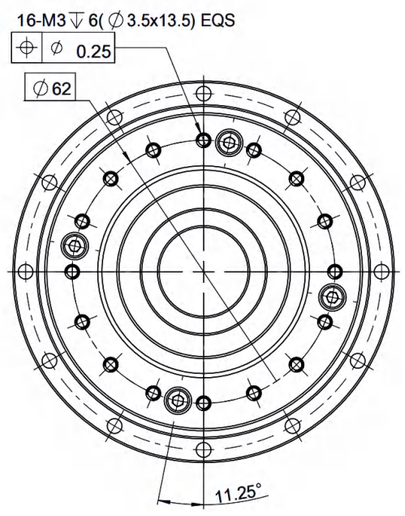


Technical Parameters

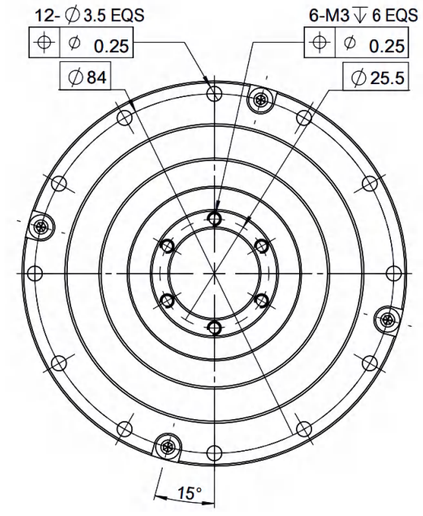
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	21	44	34	91	7300	3500	20	90	0.8
80	29	56	35	113	7300	3500	20	90	
100	31	70	51	143	7300	3500	10	90	
120	31	70	51	112	7300	3500	10	90	

PMHG-I Series Structural Diagram — PMHG-20-XX-I-LW Model

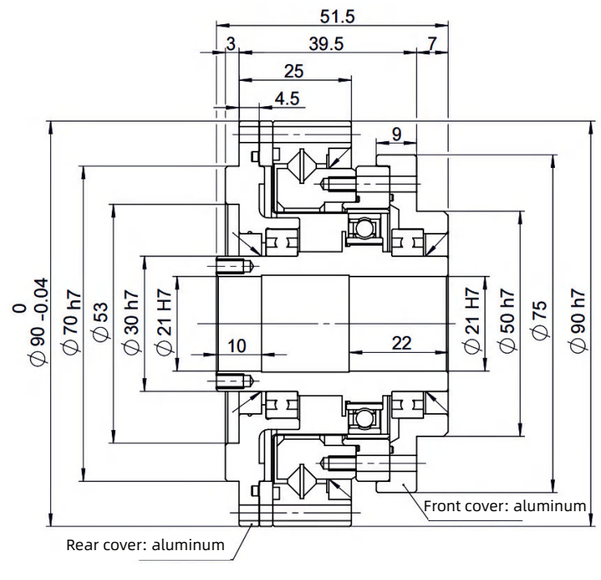
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

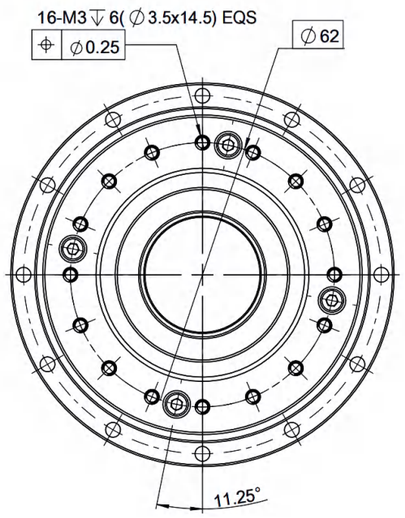


Technical Parameters

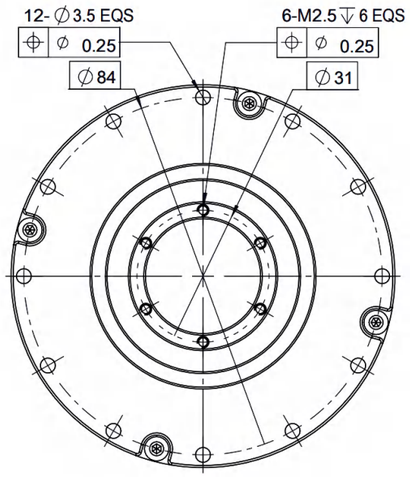
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	33	73	44	127	6500	3500	20	60	1.1
80	44	96	61	165	6500	3500	20	60	
100	52	107	64	191	6500	3500	10	60	
120	52	113	64	191	6500	3500	10	60	
160	52	120	64	191	6500	3500	10	60	

PMHG-I Series Structural Diagram　　PMHG-20-XX-I-DZK Model

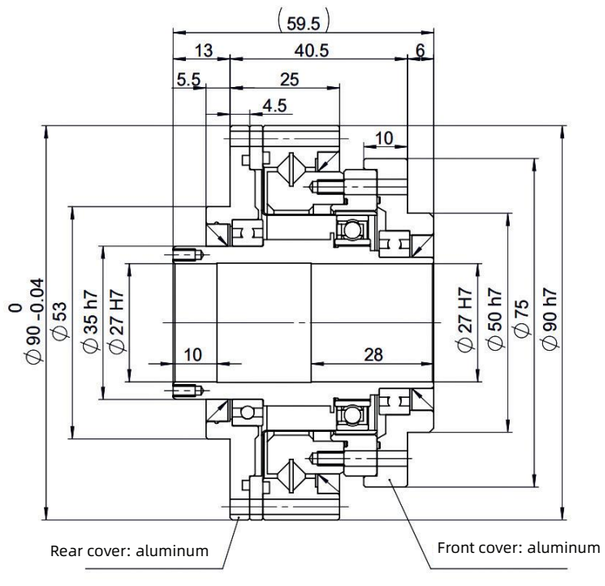
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

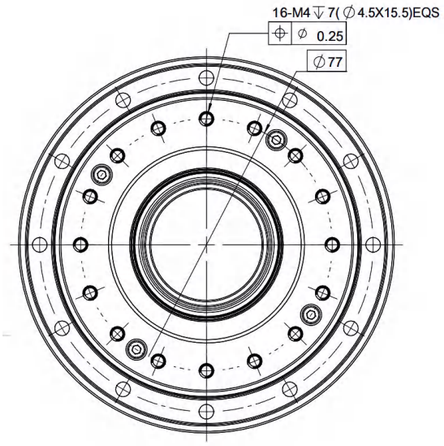


Technical Parameters

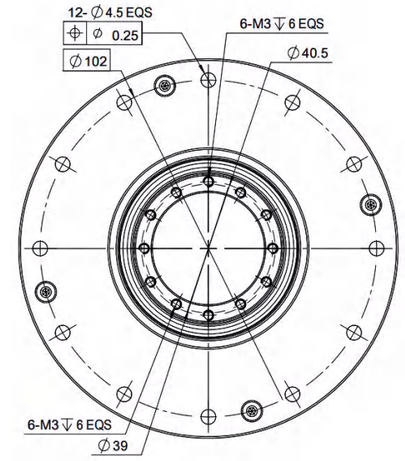
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec) ≤	Transmis-sion error (arcsec) ≤	Weight (kg)
50	33	73	44	127	6500	3500	20	60	1.1
80	44	96	61	165	6500	3500	20	60	
100	52	107	64	191	6500	3500	10	60	
120	52	113	64	191	6500	3500	10	60	
160	52	120	64	191	6500	3500	10	60	

PMHG-I Series Structural Diagram　　PMHG-25-XX-I-DZK Model

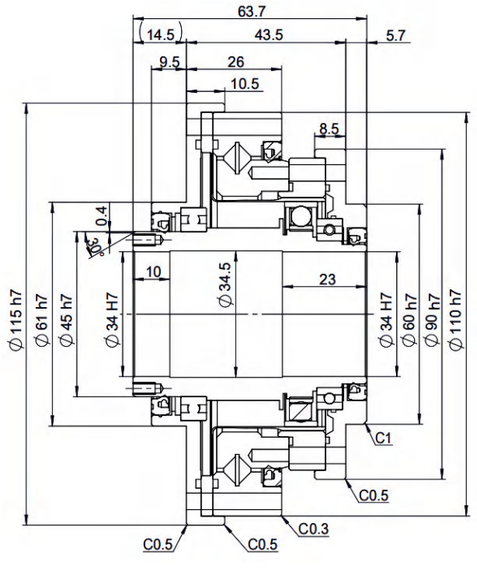
Left view (circular spline side)



Right view (flexspline side)



Full-section front view



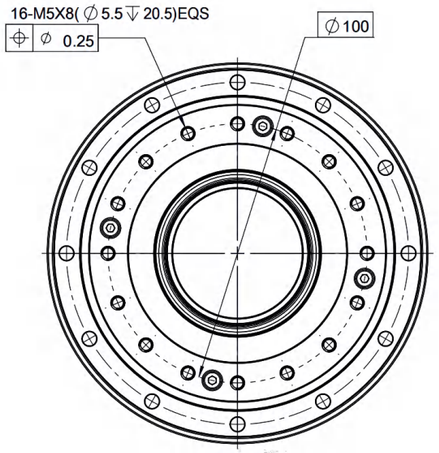
Technical Parameters

Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec) ≤	Transmis-sion error (arcsec) ≤	Weight (kg)
50	51	127	72	242	5600	3500	20	60	2.1
80	82	178	113	332	5600	3500	20	60	
100	87	204	140	369	5600	3500	10	60	
120	87	217	140	395	5600	3500	10	60	
160	87	229	140	408	5600	3500	10	60	

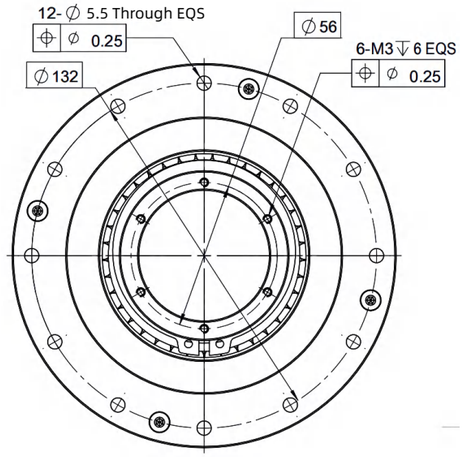
PMHG-I Series Structural Diagram

PMHG-32-XX-I-DZK Model

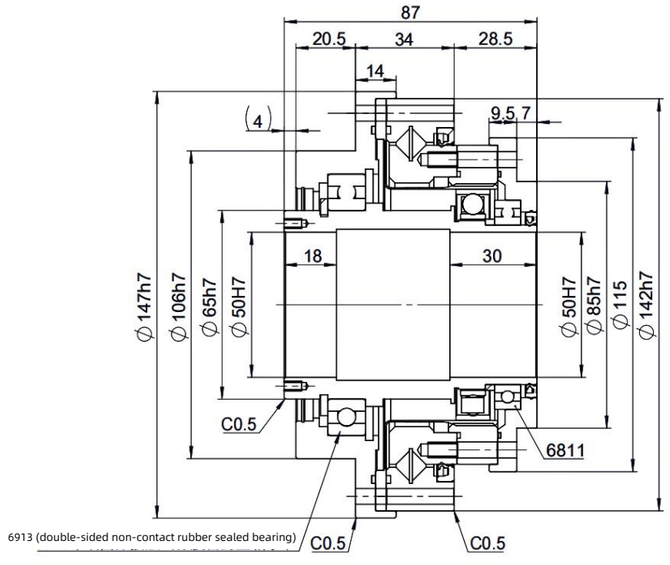
Left view (circular spline side)



Right view (flexspline side)



Full-section front view



Technical Parameters

Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmission error (arcsec)	Weight (kg)
							≤	≤	
50	99	281	140	497	4800	3500	20	60	5.1
80	153	395	217	738	4800	3500	10	60	
100	178	433	281	841	4800	3500	10	60	
120	178	459	281	892	4800	3500	10	60	
160	178	484	281	892	4800	3500	10	60	

PMHG-I Series Starting Torque (N·cm)

Model	14				17				20					25					32					40				
Reduction ratio	50	80	100	120	50	80	100	120	50	80	100	120	160	50	80	100	120	160	50	80	100	120	160	50	80	100	120	160
Starting Torque	8.8	7.5	6.9	6.7	27	25	24	24	36	33	32	31	31	56	50	49	48	47	85	74	72	68	67	136	117	112	110	105

PMHG-I Series Pawl Torque (Nm)

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

PMHG-I Series Buckling Torque (Nm)

Model	14	17	20	25	32	40
Full Reduction Ratio	180	350	590	1100	2400	4400

PMHG-I Series Hysteresis Loss and Rigidity

Model	Reduction ratio	T1	T2	HYSTERESIS LOSS	Torsional Rigidity (10000 Nm/rad)			Torsional Deflection (arcmin)	
		Nm	Nm	arcmin	K1	K2	K3	θ1	θ2
14	50	2	6.9	2	0.34	0.47	0.57	2.0	5.6
	≥80			1	0.47	0.61	0.71	1.4	4.2
17	50	3.9	12	2	0.81	1.10	1.30	1.7	4.2
	≥80			1	1.00	1.40	1.60	1.3	3.3
20	50	7	25	2	1.30	1.80	2.30	1.8	5.3
	≥80			1	1.60	2.50	2.90	1.5	3.9
25	50	14	48	2	2.50	3.40	4.40	1.9	5.4
	≥80			1	3.10	5.00	5.70	1.5	3.8
32	50	29	108	2	5.40	7.80	9.80	1.9	5.4
	≥80			1	6.70	11.00	12.00	1.5	4.0
40	50	54	198	2	10.00	14.00	18.00	1.8	5.3
	≥80			1	13.00	20.00	23.00	1.4	3.8

* Torque rigidity values are for reference only; the lower limit is approximately 80% of the stated value.

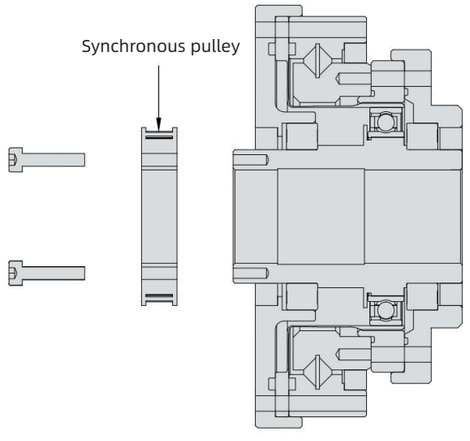
PMHG-I Series Main Bearing Specifications

The unit-type product uses precision crossed roller bearings to support external loads.

Crossed Roller Bearing Specifications				
Model	Moment Rigidity	Allowable Static Moment (Mc)	Rated Dynamic Load (C)	Rated Static Load (Co)
	10^4Nm/rad	Nm	$\times10^2$N	$\times10^2$N
14	8.5	74	58	86
17	15.4	124	104	163
20	25.2	187	146	220
25	39.2	258	218	358
32	100	580	382	654
40	179	849	433	816

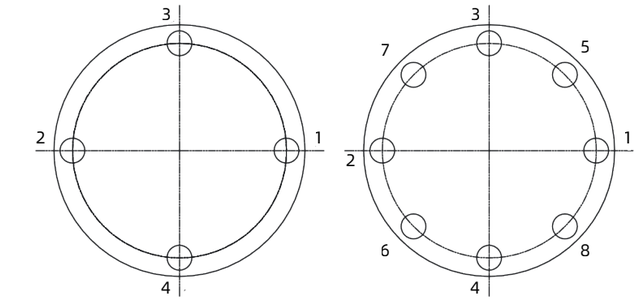
* Torque rigidity values are for reference only; the lower limit is approximately 80% of the stated value.

PMHG-I Series Connection Method



PMHG-I Series Screw Locking Method

(1) Set the motor speed to 100 rpm and start the motor. Tighten the screws in a crisscross pattern, gradually increasing torque in 4-5 steps until reaching the specified tightening force.
(see the diagram below for tightening force).
(2) The mounting surface connecting to the harmonic drive must have a flatness of 0.01 mm and be perpendicular to the axis within 0.01 mm.



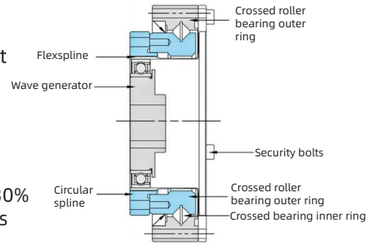
Screw Tightening Force

Screw property class	12.9						
Nominal diameter mm	3	4	5	6	8	10	12
Tightening torque N·m	2	4	9	15	35	70	125

PMHG-II-E Series Simple Unit Type (Integral Cam)

Hollow flanged standard design with a compact overall structure. The input shaft connects to the inner bore of the wave generator through an integral cam. Supports two configurations: fixed circular spline with flexspline as the output, or fixed flexspline with circular spline as the output.

- Integral cam design ensures zero-backlash transmission for improved accuracy and fast response.
- Bidirectional output design provides flexible installation options.
- Torque capacity increased by 30% compared with the PMHS series
  Service life increased by 43% compared with the PMHS series

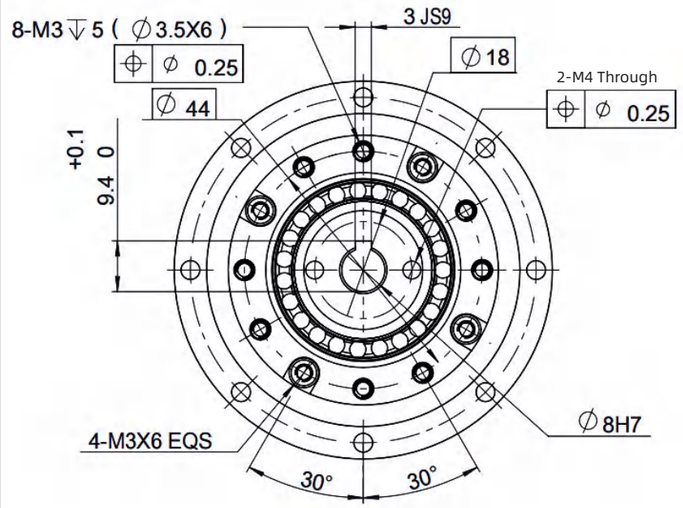


PMHG-II-E Series Performance Parameters

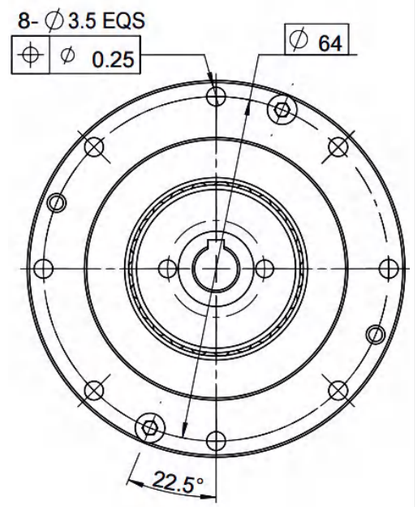
Model	Reduction ratio	Rated torque at 2000 r/min input	Permissible peak torque at start/stop	Permissible max .value of ave. load torque	Instantaneous permissible max. torque	Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash (arcsec)	Transmission error (arcsec)	Weight
		Nm	Nm	Nm	Nm	r/min	r/min	≤	≤	kg
14	50	7	23	9	46	8500	3500	20	90	0.41
	80	10	30	14	51	8500	3500	20	90	
	100	10	36	14	70	8500	3500	10	90	
	120	10	36	14	70	8500	3500	10	90	
17	50	21	44	34	91	7300	3500	20	90	0.57
	80	29	56	35	113	7300	3500	20	90	
	100	31	70	51	143	7300	3500	10	90	
	120	31	70	51	112	7300	3500	10	90	
20	50	33	73	44	127	6500	3500	20	60	0.79
	80	44	96	61	165	6500	3500	20	60	
	100	52	107	64	191	6500	3500	10	60	
	120	52	113	64	191	6500	3500	10	60	
	160	52	120	64	191	6500	3500	10	60	
25	50	51	127	72	242	5600	3500	20	60	1.3
	80	82	178	113	332	5600	3500	20	60	
	100	87	204	140	369	5600	3500	10	60	
	120	87	217	140	395	5600	3500	10	60	
	160	87	229	140	408	5600	3500	10	60	
32	50	99	281	140	497	4800	3500	20	60	2.97
	80	153	395	217	738	4800	3500	10	60	
	100	178	433	281	841	4800	3500	10	60	
	120	178	459	281	892	4800	3500	10	60	
	160	178	484	281	892	4800	3500	10	60	
40	50	178	523	255	892	4000	3000	10	60	5.12
	80	268	675	369	1270	4000	3000	10	60	
	100	345	738	484	1400	4000	3000	10	60	
	120	382	802	586	1530	4000	3000	10	60	
	160	382	841	586	1530	4000	3000	10	60	

PMHG-II-E Series Structural Diagram — PMHG-14-XX-II-E8 Model

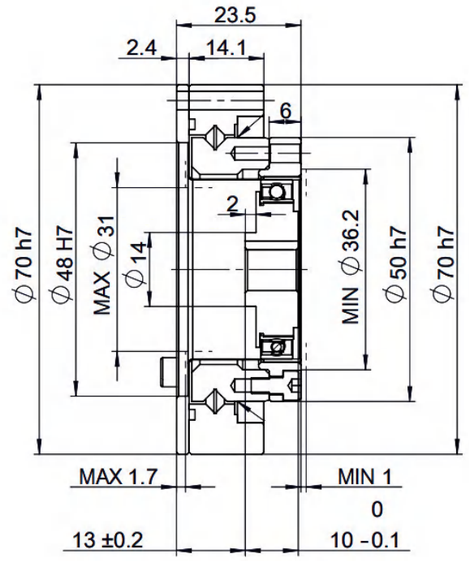
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

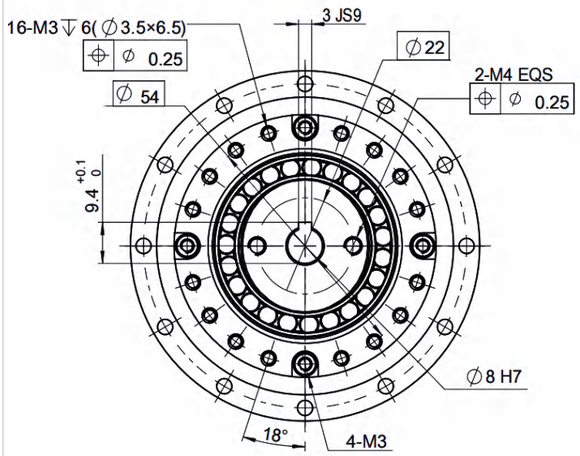


Technical Parameters

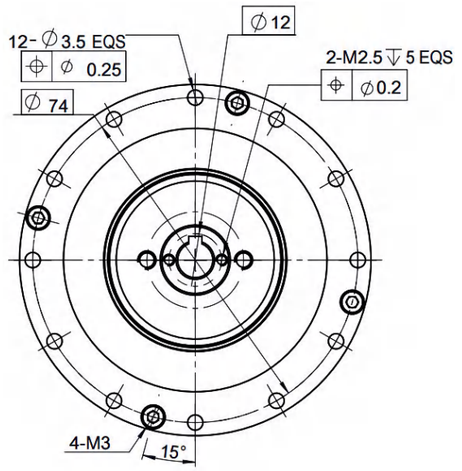
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	7	23	9	46	8500	3500	20	90	0.41
80	10	30	14	51	8500	3500	20	90	
100	10	36	14	70	8500	3500	10	90	
120	10	36	14	70	8500	3500	10	90	

PMHG-II-E Series Structural Diagram — PMHG-17-XX-II-E8 Model

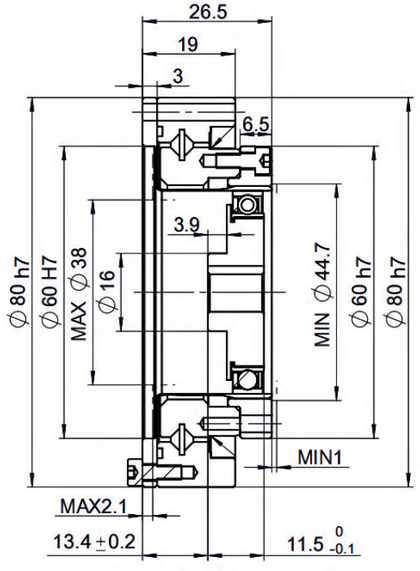
Left view (circular spline side)



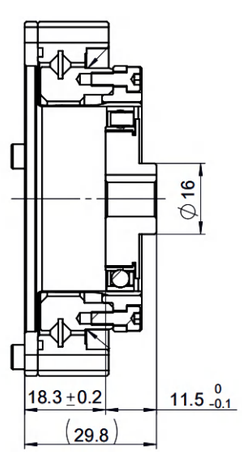
Right view (flexspline side)



Full-section front view



Wave Generator Reverse Installation Dimensions

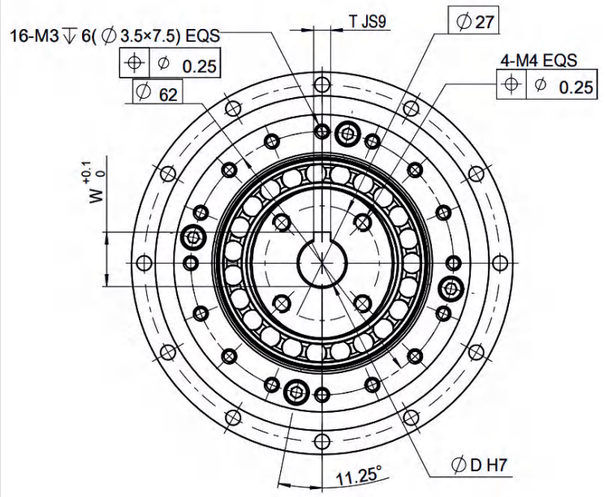


Full-section front view

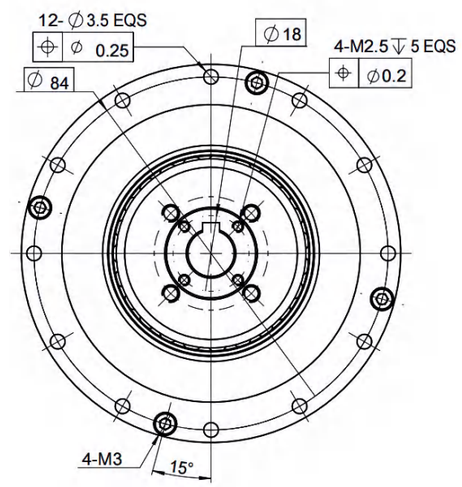
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	21	44	34	91	7300	3500	20	90	0.57
80	29	56	35	113	7300	3500	20	90	
100	31	70	51	143	7300	3500	10	90	
120	31	70	51	112	7300	3500	10	90	

PMHG-II-E Series Structural Diagram — PMHG-20-XX-II-EXX Model

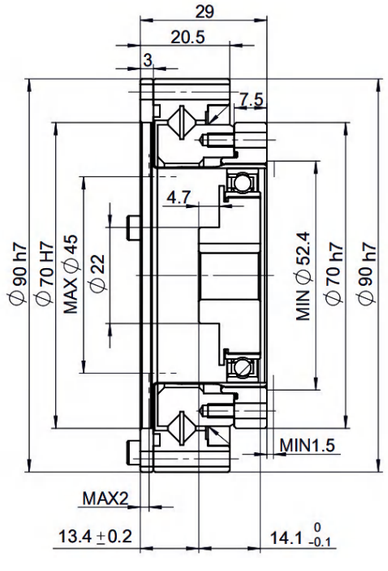
Left view (circular spline side)



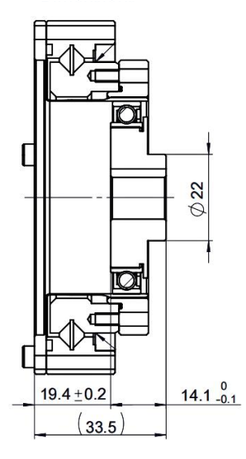
Right view (flexspline side)



Full-section front view



Wave Generator Reverse Installation Dimensions



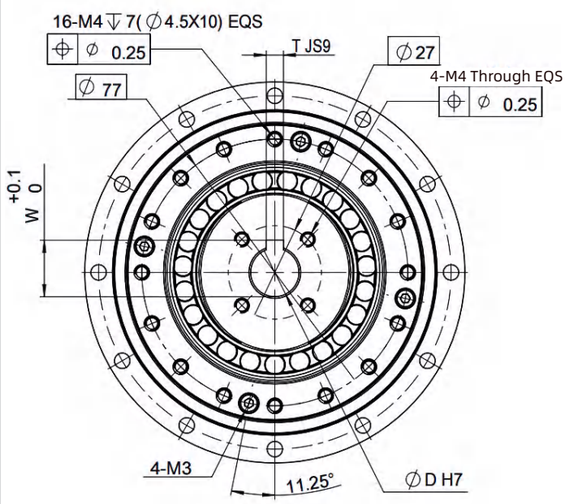
Model	D	T	W
PMHG-20-XX-II-E8	8	3	9.4
PMHG-20-XX-II-E11	11	4	12.8
PMHG-20-XX-II-E14	14	5	16.3

Full-section front view

Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	33	73	44	127	6500	3500	20	60	0.79
80	44	96	61	165	6500	3500	20	60	
100	52	107	64	191	6500	3500	10	60	
120	52	113	64	191	6500	3500	10	60	
160	52	120	64	191	6500	3500	10	60	

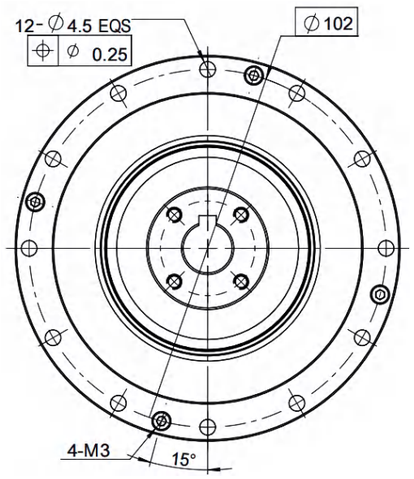
PMHG-II-E Series Structural Diagram — PMHG-25-XX-II-EXX Model

Left view (circular spline side)

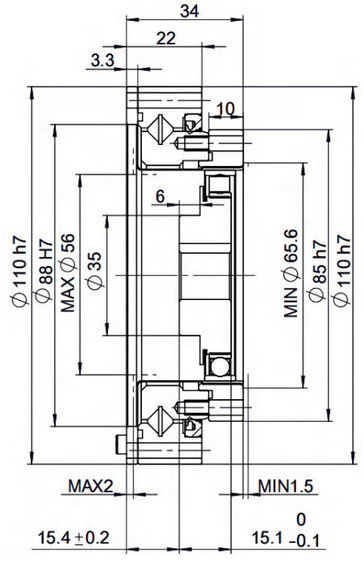


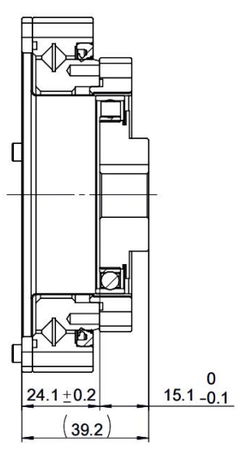
Full-section front view

Right view (flexspline side)



Wave Generator Reverse Installation Dimensions





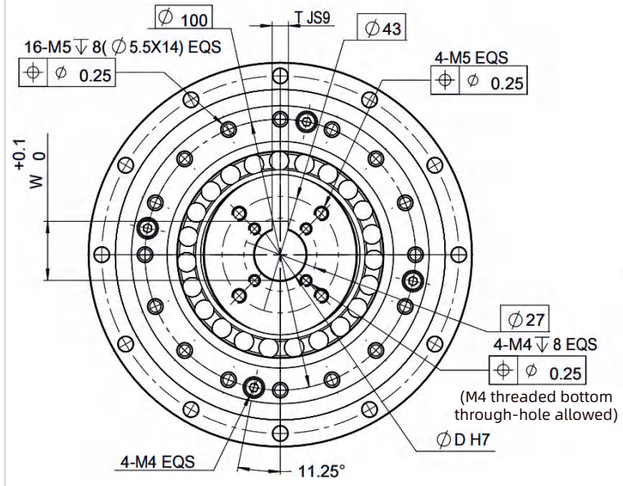
Model	D	T	W
PMHG-25-XX-II-E14	14	5	16.3
PMHG-25-XX-II-E19	19	6	21.8

Technical Parameters

Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	51	127	72	242	5600	3500	20	60	1.3
80	82	178	113	332	5600	3500	20	60	
100	87	204	140	369	5600	3500	10	60	
120	87	217	140	395	5600	3500	10	60	
160	87	229	140	408	5600	3500	10	60	

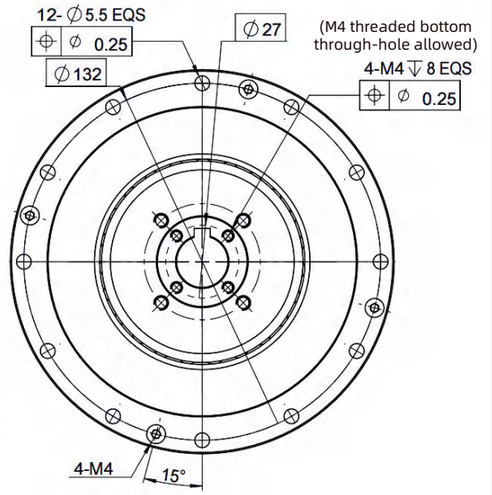
PMHG-II-E Series Structural Diagram — PMHG-32-XX-II-EXX Model

Left view (circular spline side)

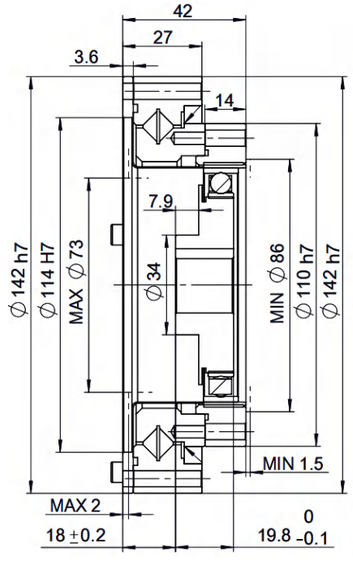


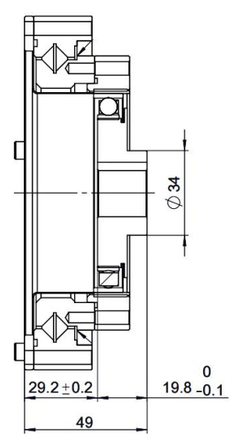
Full-section front view

Right view (flexspline side)



Wave Generator Reverse Installation Dimensions





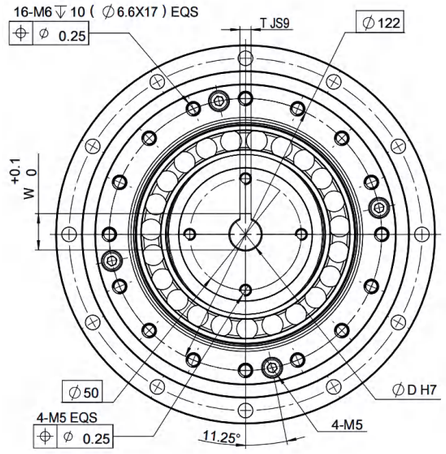
Model	D	T	W
PMHG-32-XX-II-E14	14	5	16.3
PMHG-32-XX-II-E19	19	6	21.8

Technical Parameters

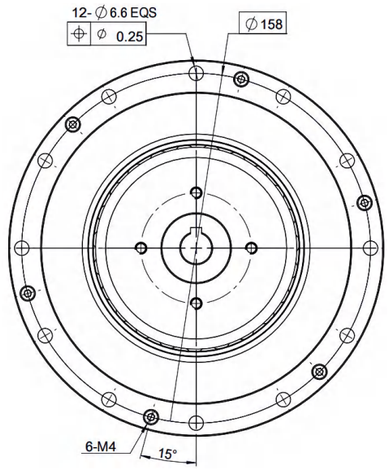
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	99	281	140	497	4800	3500	20	60	2.97
80	153	395	217	738	4800	3500	10	60	
100	178	433	281	841	4800	3500	10	60	
120	178	459	281	892	4800	3500	10	60	
160	178	484	281	892	4800	3500	10	60	

PMHG-II-E Series Structural Diagram — PMHG-40-XX-II-EXX Model

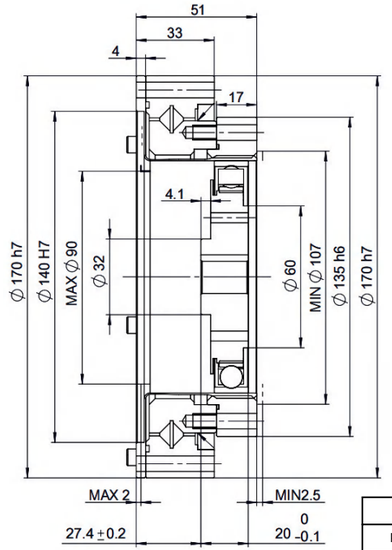
Left view (circular spline side)



Right view (flexspline side)



Full-section front view



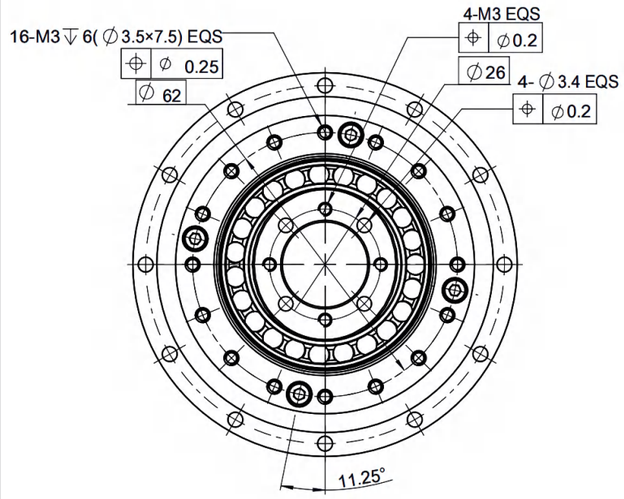
Model	D	T	W
PMHG-40-XX-II-E14	14	5	16.3
PMHG-40-XX-II-E19	19	6	21.8
PMHG-40-XX-II-E22	22	8	25.3

Technical Parameters

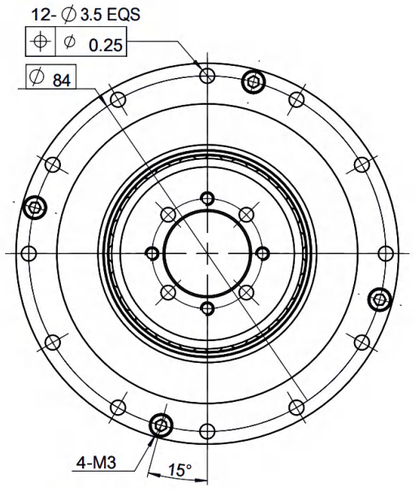
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	178	523	255	892	4000	3000	10	60	5.12
80	268	675	369	1270	4000	3000	10	60	
100	345	738	484	1400	4000	3000	10	60	
120	382	802	586	1530	4000	3000	10	60	
160	382	841	586	1530	4000	3000	10	60	

PMHG-II-E Series Structural Diagram — PMHG-20-XX-II-D20 Model

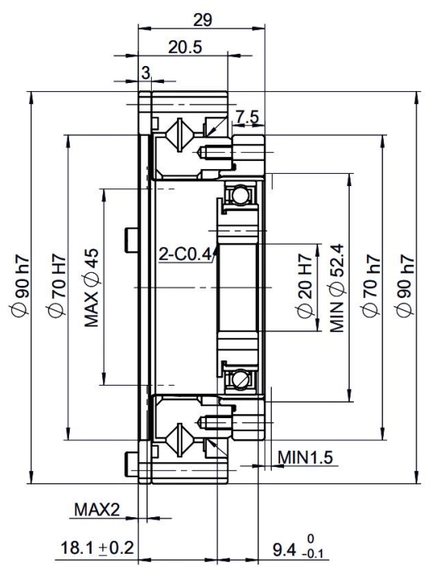
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

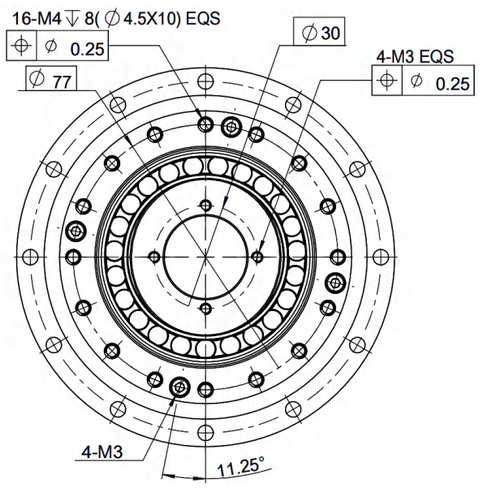


Technical Parameters

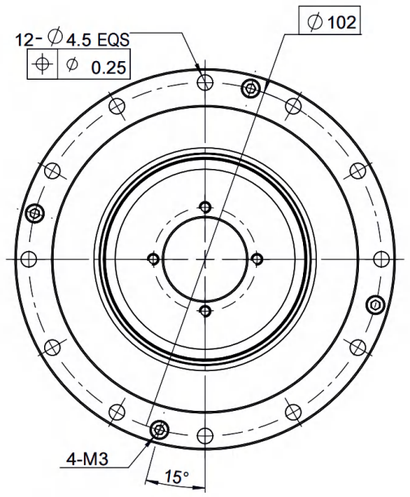
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	33	73	44	127	6500	3500	20	60	0.76
80	44	96	61	165	6500	3500	20	60	
100	52	107	64	191	6500	3500	10	60	
120	52	113	64	191	6500	3500	10	60	
160	52	120	64	191	6500	3500	10	60	

PMHG-II-E Series Structural Diagram — PMHG-25-XX-II-D24 Model

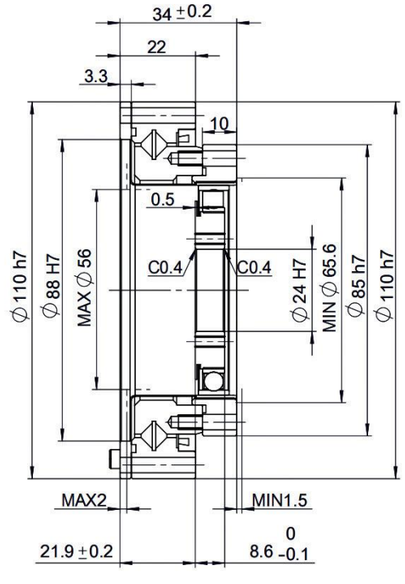
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

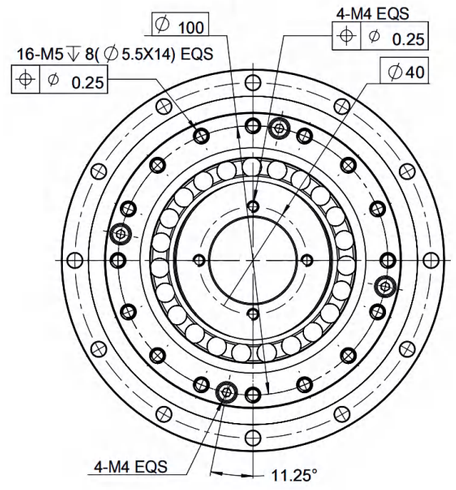


Technical Parameters

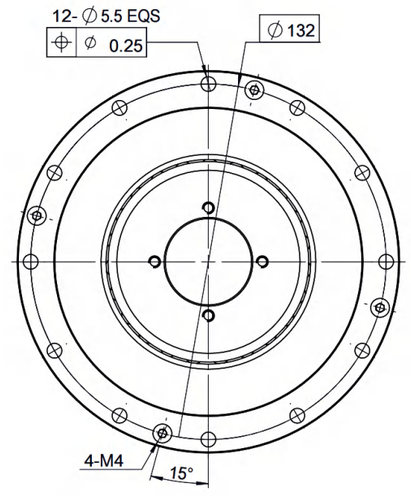
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	51	127	72	242	5600	3500	20	60	1.24
80	82	178	113	332	5600	3500	20	60	
100	87	204	140	369	5600	3500	10	60	
120	87	217	140	395	5600	3500	10	60	
160	87	229	140	408	5600	3500	10	60	

PMHG-II-E Series Structural Diagram — PMHG-32-XX-II-D32 Model

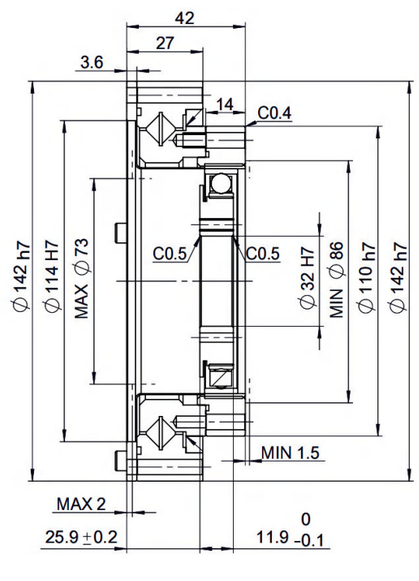
Left view (circular spline side)



Right view (flexspline side)



Full-section front view



Technical Parameters

Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	99	281	140	497	4800	3500	20	60	2.8
80	153	395	217	738	4800	3500	10	60	
100	178	433	281	841	4800	3500	10	60	
120	178	459	281	892	4800	3500	10	60	
160	178	484	281	892	4800	3500	10	60	

PMHG-II-E Series Starting Torque (N·cm)

Model	14				17				20					25					32					40				
Reduction ratio	50	80	100	120	50	80	100	120	50	80	100	120	160	50	80	100	120	160	50	80	100	120	160	50	80	100	120	160
Starting Torque	4.5	3.1	2.8	2.6	6.7	4.4	3.7	3.4	8.6	5.4	4.7	4.2	3.6	17	10	8.8	8	6.9	34	21	20	17	15	61	39	34	31	26

PMHG-II-E Series Pawl Torque (Nm)

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

PMHG-II-E Series Buckling Torque (Nm)

Model	14	17	20	25	32	40
Full Reduction Ratio	180	350	590	1100	2400	4400

PMHG-II-E Series Hysteresis Loss and Rigidity

Model	Reduction ratio	T1	T2	HYSTERESIS LOSS	Torsional Rigidity (10000 Nm/rad)			Torsional Deflection (arcmin)	
		Nm	Nm	arcmin	K1	K2	K3	θ1	θ2
14	50	2	6.9	2	0.34	0.47	0.57	2.0	5.6
	≥80			1	0.47	0.61	0.71	1.4	4.2
17	50	3.9	12	2	0.81	1.10	1.30	1.7	4.2
	≥80			1	1.00	1.40	1.60	1.3	3.3
20	50	7	25	2	1.30	1.80	2.30	1.8	5.3
	≥80			1	1.60	2.50	2.90	1.5	3.9
25	50	14	48	2	2.50	3.40	4.40	1.9	5.4
	≥80			1	3.10	5.00	5.70	1.5	3.8
32	50	29	108	2	5.40	7.80	9.80	1.9	5.4
	≥80			1	6.70	11.00	12.00	1.5	4.0
40	50	54	198	2	10.00	14.00	18.00	1.8	5.3
	≥80			1	13.00	20.00	23.00	1.4	3.8

* Torque rigidity values are for reference only; the lower limit is approximately 80% of the stated value.

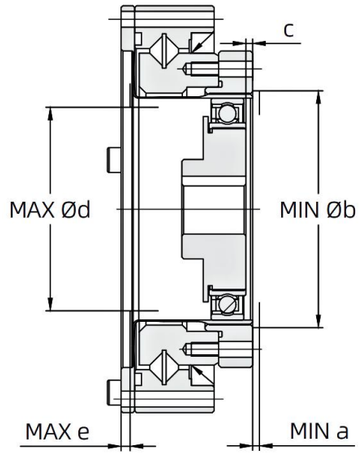
PMHG-II-E Series Main Bearing Specifications

The unit-type product uses precision crossed roller bearings to support external loads.

Crossed Roller Bearing Specifications				
Model	Moment Rigidity	Allowable Static Moment (Mc)	Rated Dynamic Load (C)	Rated Static Load (Co)
	10^4Nm/rad	Nm	×10^2N	×10^2N
14	8.5	74	58	86
17	15.4	124	104	163
20	25.2	187	146	220
25	39.2	258	218	358
32	100	580	382	654
40	179	849	433	816

* Torque rigidity values are for reference only; the lower limit is approximately 80% of the stated value.

PMHG-II-E Series Clearance Dimensions and Wave Generator Mounting Depth



Unit: mm

Model	a	b	C	d	e
14	1	36.2	1.4±0.2	31	1.7
17	1	44.7	1.6±0.2	38	2.1
20	1.5	52.4	1.5±0.2	45	2
25	1.5	65.6	3.5±0.2	56	2
32	1.5	85.5	4.2±0.2	73	2
40	2	106	5.6±0.2	90	2

Note:
① C refers to the distance between the end face of the flex bearing's inner ring and the end face of the circular spline.
② Strictly adhere to the specified clearance dimensions for the flange and wave generator. Exceeding these may cause interference between the flexspline and the flange or wave generator, reducing service life.
③ Install the harmonic drive according to the required wave generator mounting depth. Installation depth affects starting torque and accuracy.

PMHG-II-E Series Sealing Mechanism

To prevent grease leakage and ensure the high durability of the harmonic drive, please use the following sealing mechanisms:

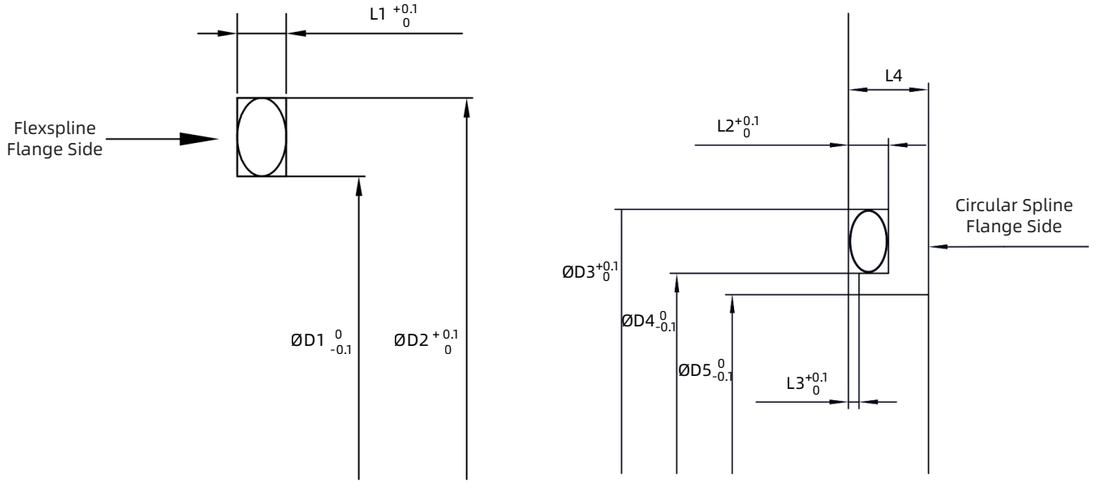
1. Rotating parts: Use an oil seal (spring-embedded type). Please check the shaft for any scratches or damage before installation.
2. Flange mounting surface and fit: Use an O-ring and sealant. Ensure the surface is level and check the proper engagement of the O-ring. (For the dimensions of the O-ring and O-ring groove, please refer to the table and figure below.)
3. Threaded holes: Apply a screw locking agent with sealing properties (recommended: Loctite 243) or use sealing tape.

Required Sealing Locations		Recommended Sealing Methods
Output Side	Through hole in the center of the output flange and the output flange mounting surface	Use the O-ring supplied with the product.
	Mounting screw locations	Apply a screw locking agent with sealing properties (recommended: Loctite 243).
Input Side	Flange mounting surface	Use the O-ring supplied with the product.
	Motor output shaft	Please use an oil seal. If no oil seal is present, install one on the motor mounting flange.

PMHG-II-E Series Sealing O-ring and O-ring Groove Dimensions

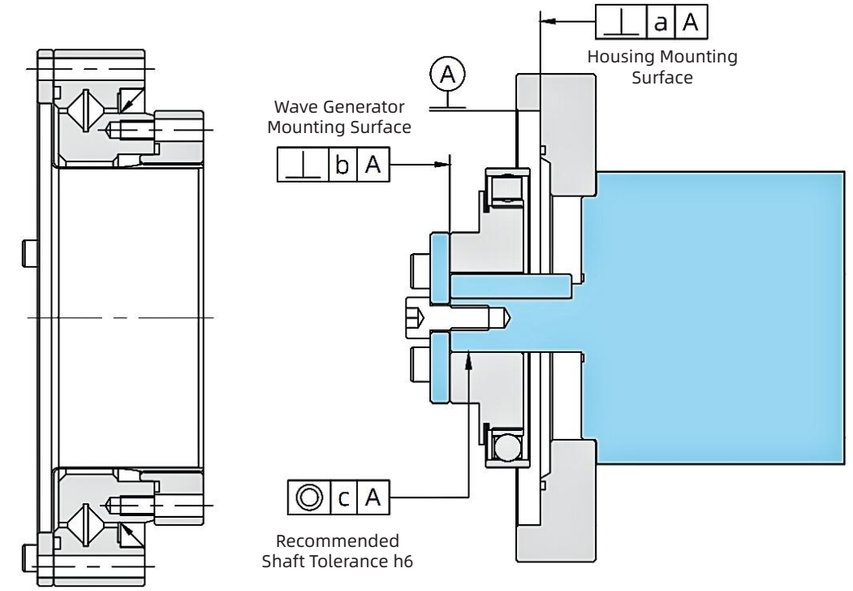
Mode	Flexspline Side				Circular Spline Side						
	O-ring	O-ring Groove			O-ring	O-ring Groove					
		ØD1	ØD2	L1		ØD3	ØD4	ØD5	L2	L3	L4 MIN
PMHG-14-XX-II-E	55*1.5 (OD * CS)	51.1	55.5	1.2	37.8*0.6 (OD * CS)	38	36.5	36.2	0.45	0.15	1
PMHG-17-XX-II-E	64*1.5 (OD * CS)	60.5	64.5	1.2	47*1 (OD * CS)	48	45.5	44.7	0.75	0.2	1
PMHG-20-XX-II-E	72*1.5 (OD * CS)	70	74	1.2	56*1 (OD * CS)	56.2	53.8	52.4	0.75	0.2	1.5
PMHG-25-XX-II-E	93.6*1.8 (OD * CS)	89.8	94.6	1.4	70*1.5 (OD * CS)	70.5	66.8	65.6	1.2	0.3	1.5
PMHG-32-XX-II-E	120*1.9 (OD * CS)	115.5	120.5	1.5	90*1.5 (OD * CS)	91	87	85.5	1.2	0.3	2
PMHG-40-XX-II-E	144.5*2 (OD * CS)	148	142.6	1.5	109.5*1.5 (OD * CS)	112.4	108	106	1.2	0.4	2

Dimensions of the O-ring and O-ring Groove



PMHG-II-E Series Assembly Precision

To fully leverage the superior performance of the unit type, ensure that the housing assembly precision meets the recommended parameters shown in the figure and table below.



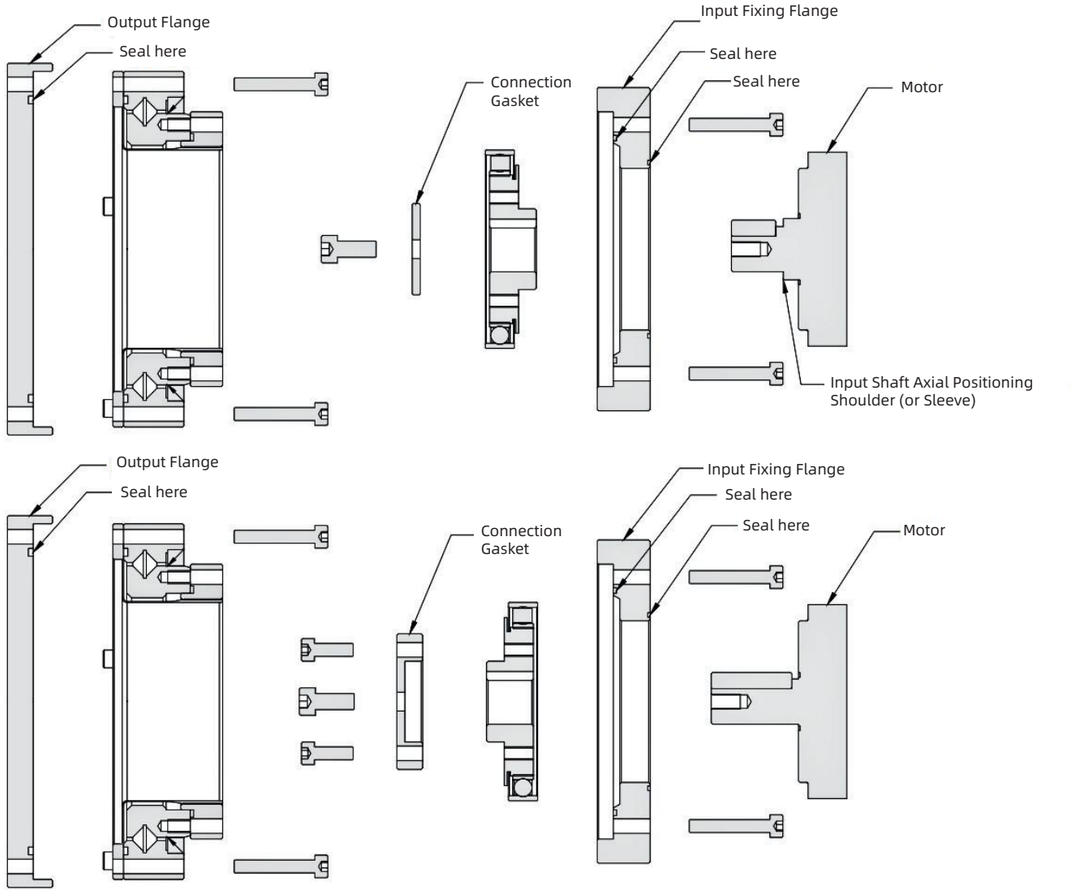
Unit: mm

Symbol \ Model	14	17	20	25	32	40
a	0.011	0.015	0.017	0.024	0.026	0.026
b	(0.008)	(0.010)	(0.010)	(0.012)	(0.012)	(0.012)
C	(0.016)	(0.018)	(0.019)	(0.022)	(0.022)	(0.024)

※ Values in parentheses apply when the input section (wave generator) is integrated (i.e., when the Oldham coupling is not used).

PMHG-II-E Series Connection Method

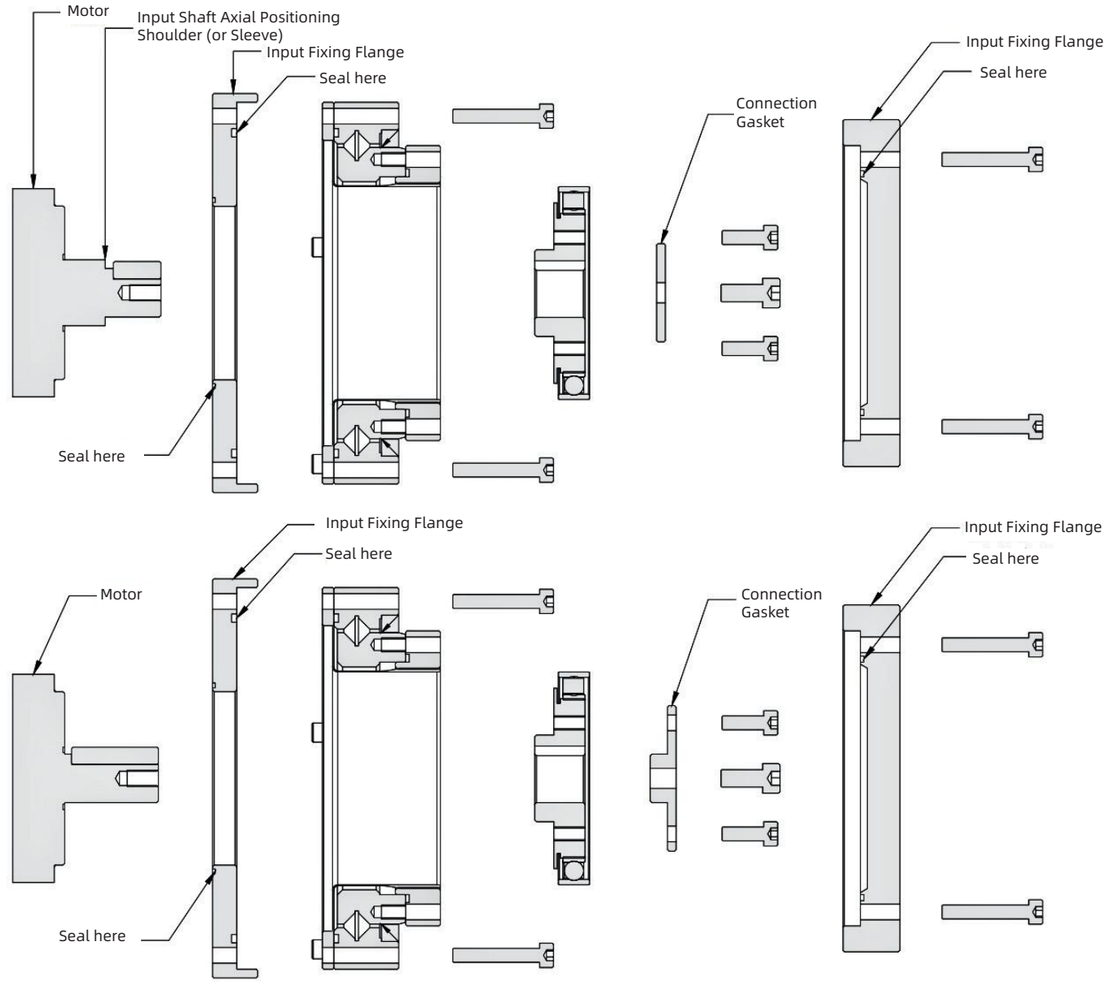
Connection method 1 (circular spline is fixed, flexspline serves as the output)



① Evenly apply grease to the flex bearing and inject an appropriate amount into the cavity where the input fixing flange connects to the motor. Use only the specified lubricant; do not substitute other greases, as this may damage the harmonic drive. Install the wave generator onto the motor shaft or input connecting shaft, securing it with screws and flat gaskets or with a connection end cover.
② Install the harmonic drive as shown in the figure, aligning the long axis of the wave generator with the long axis of the flexspline. Once in position, secure it with the appropriate screw, tightened to a preload torque of 0.5 Nm.
③ Set the motor speed to approximately 100 rpm and start the motor. Tighten the screws in a crisscross pattern, gradually increasing torque in 4–5 steps until reaching the specified tightening force. All connecting and fastening screws must be grade 12.9 and coated with Loctite 243 threadlocker to prevent loosening or failure during operation.
④ Apply a uniform layer of grease to the inner wall of the flexspline, then inject the recommended amount into the flexspline cavity. Use only the specified lubricant; do not substitute other greases, as this may damage the harmonic drive.
⑤ Fasten the output end in the same manner as described in Step 3. All connecting and fastening screws must be grade 12.9 and coated with Loctite 243 threadlocker to prevent loosening or failure during operation.
⑥ The mounting surface connecting to the harmonic drive must have a flatness of 0.01 mm and be perpendicular to the axis within 0.01 mm.

Note: If the harmonic drive is installed with the output end facing downward horizontally (not recommended), ensure that the grease inside the flexspline covers the meshing tooth surfaces. If unsure, please contact us for guidance. Always use the specified lubricant. Do not substitute other greases, as this may cause damage to the harmonic drive. A static seal must be used between the mounting plane of the reducer circular spline and the input end to ensure that grease will not leak during use, preventing damage to the reducer when operating with insufficient or no grease.

Connection method 2 (flexspline fixed, circular spline serves as the output)

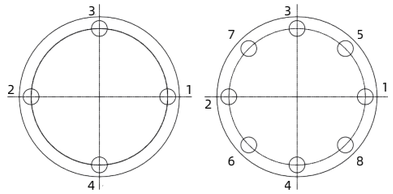


① Mount the harmonic drive onto the input end and fasten it securely using the appropriate screws; tighten them to a preload torque of 0.5 Nm.
② Apply a uniform layer of grease to the inner wall of the flexspline, then inject the recommended amount into the flexspline cavity. Use only the specified lubricant; do not substitute other greases, as this may damage the harmonic drive.
③ Install the harmonic drive as shown in the figure, aligning the long axis of the wave generator with the long axis of the flexspline. Once in position, rotate the wave generator to align the keyway on the cam with the keyway on the input shaft. Apply Loctite 638 adhesive to the key, insert it into the aligned keyways, and then secure the wave generator to the shaft using screws and a large washer.
④ Inject an appropriate amount of grease into the cavity between the flexible bearing of the wave generator and the housing (flange). Use only the specified lubricant; do not substitute other greases, as this may damage the harmonic drive.
⑤ Set the motor speed to approximately 100 rpm and start the motor. Tighten the screws in a crisscross pattern, gradually increasing torque in 4–5 steps until reaching the specified tightening force. All connecting and fastening screws must be grade 12.9 and coated with Loctite 243 threadlocker to prevent loosening or failure during operation.
⑥ Fasten the output end in the same manner as described in Step 5. All connecting and fastening screws must be grade 12.9 and coated with Loctite 243 threadlocker to prevent loosening or failure during operation.
⑦ The mounting surface connecting to the harmonic drive must have a flatness of 0.01 mm and be perpendicular to the axis within 0.01 mm.

Note: If the harmonic drive is installed with the output end (as shown in the diagram above) facing downward horizontally (not recommended), ensure that the grease inside the flexspline covers the meshing tooth surfaces. If unsure, please contact us for guidance. Always use the specified lubricant. Do not substitute other greases, as this may cause damage to the harmonic drive. A static seal must be applied between the circular spline and the input mounting surface to prevent grease leakage during operation, which could lead to potential damage due to insufficient or no lubrication.

PMHG-II-E Series Screw Locking Method

(1) Set the motor speed to 100 rpm and start the motor. Tighten the screws in a crisscross pattern, gradually increasing torque in 4–5 steps until reaching the specified tightening force. (see the diagram below for tightening force)
(2) The mounting surface connecting to the harmonic drive must have a flatness of 0.01 mm and be perpendicular to the axis within 0.01 mm.

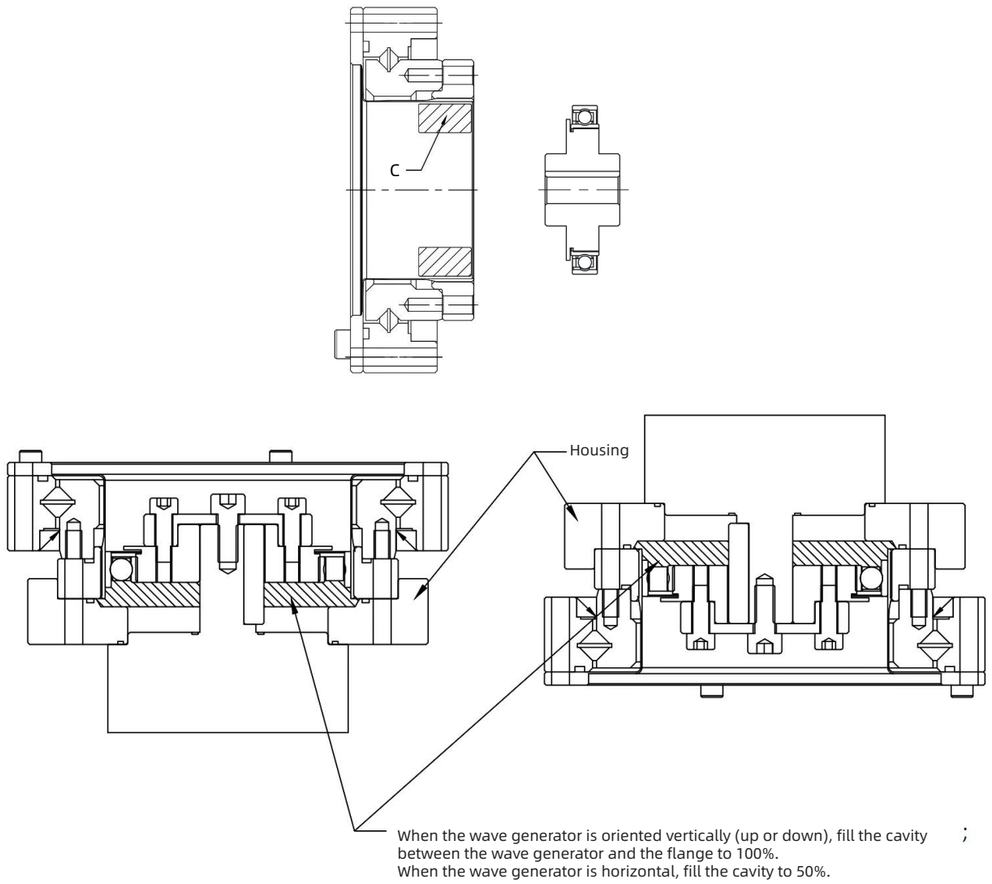


Screw Tightening Force

Screw property class	12.9							
Nominal diameter	mm	3	4	5	6	8	10	12
Tightening torque	N·m	2	4	9	15	35	70	125

PMHG-II-E Series Grease Application Requirements

(1) Grease application locations



When the wave generator is oriented vertically (up or down), fill the cavity between the wave generator and the flange to 100%.
When the wave generator is horizontal, fill the cavity to 50%.

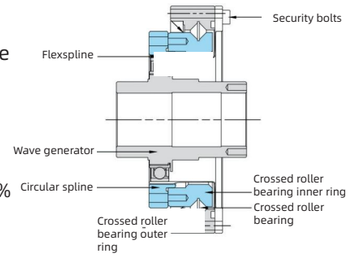
PMHG-III Series Simple Unit Type (Hollow Shaft)

The flexspline features a hollow flanged design, with a large-diameter hollow shaft wave generator that incorporates a crossed roller bearing, allowing it to withstand both radial and axial loads. The overall structure is compact and simple, making it easy to customize and install.

Hollow design facilitates integrated routing of wiring or pneumatic lines, optimizing space utilization

Built-in crossed roller bearing features high impact resistance and long service life.

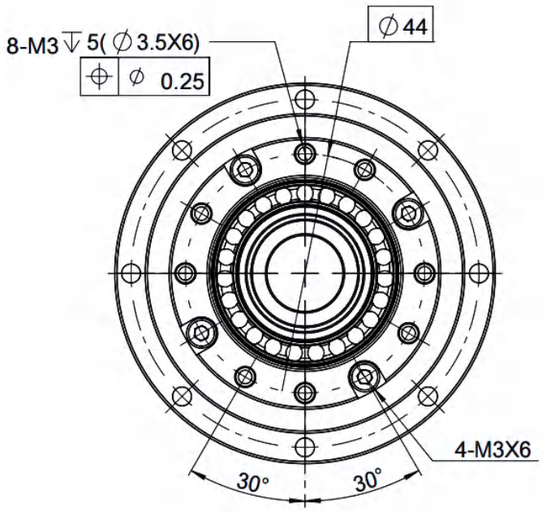
Torque capacity increased by 30% compared with the PMHS series
Service life increased by 43% compared with the PMHS series



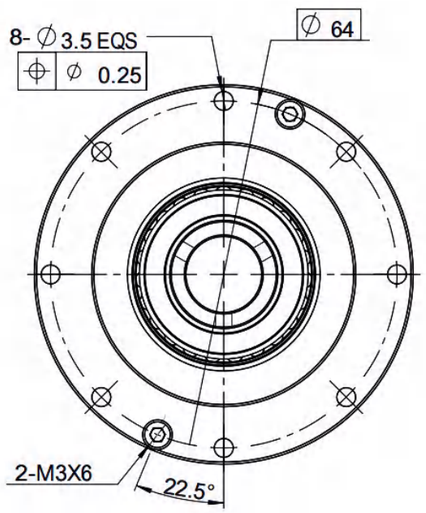
PMHG-III Series Performance Parameters										
Model	Reduction ratio	Rated torque at 2000 r/min input	Permissible peak torque at start/stop	Permissible max .value of ave. load torque	Instantaneous permissible max. torque	Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash (arcsec)	Transmission error (arcsec)	Weight
		Nm	Nm	Nm	Nm	r/min	r/min	≤	≤	kg
14	50	7	23	9	46	8500	3500	20	90	0.45
	80	10	30	14	51	8500	3500	20	90	
	100	10	36	14	70	8500	3500	10	90	
	120	10	36	14	70	8500	3500	10	90	
17	50	21	44	34	91	7300	3500	20	90	0.63
	80	29	56	35	113	7300	3500	20	90	
	100	31	70	51	143	7300	3500	10	90	
	120	31	70	51	112	7300	3500	10	90	
20	50	33	73	44	127	6500	3500	20	60	0.89
	80	44	96	61	165	6500	3500	20	60	
	100	52	107	64	191	6500	3500	10	60	
	120	52	113	64	191	6500	3500	10	60	
	160	52	120	64	191	6500	3500	10	60	
25	50	51	127	72	242	5600	3500	20	60	1.44
	80	82	178	113	332	5600	3500	20	60	
	100	87	204	140	369	5600	3500	10	60	
	120	87	217	140	395	5600	3500	10	60	
	160	87	229	140	408	5600	3500	10	60	
32	50	99	281	140	497	4800	3500	20	60	3.1
	80	153	395	217	738	4800	3500	10	60	
	100	178	433	281	841	4800	3500	10	60	
	120	178	459	281	892	4800	3500	10	60	
	160	178	484	281	892	4800	3500	10	60	
40	50	178	523	255	892	4000	3000	10	60	5.4
	80	268	675	369	1270	4000	3000	10	60	
	100	345	738	484	1400	4000	3000	10	60	
	120	382	802	586	1530	4000	3000	10	60	
	160	382	841	586	1530	4000	3000	10	60	

PMHG-III Series Structural Diagram — PMHG-14-XX-III Model

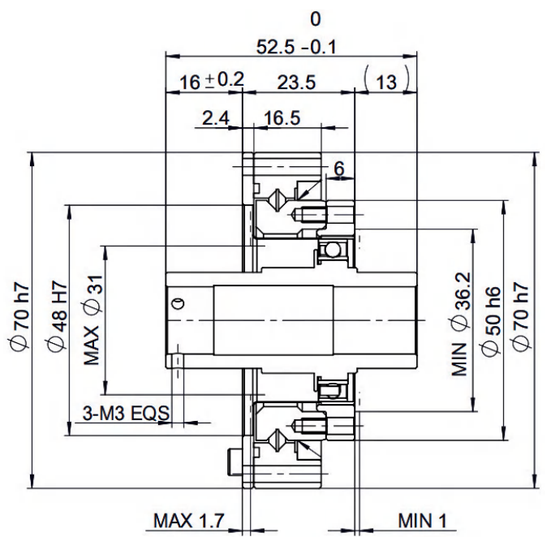
Left view (circular spline side)



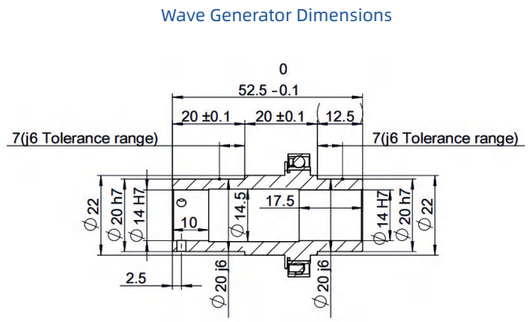
Right view (flexspline side)



Full-section front view



Wave Generator Dimensions

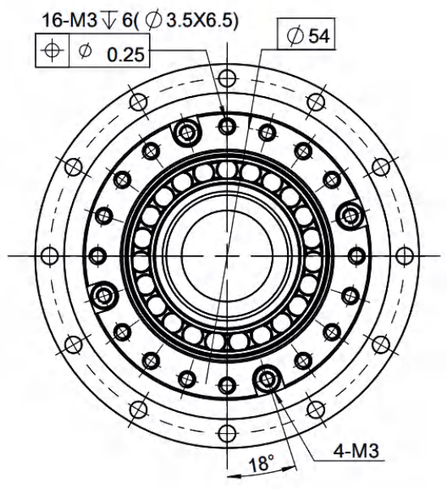


Technical Parameters

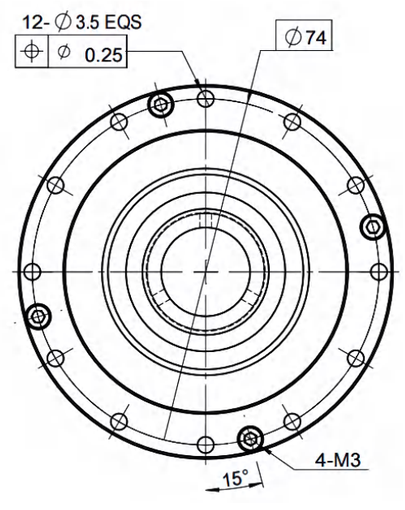
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	7	23	9	46	8500	3500	20	90	0.45
80	10	30	14	51	8500	3500	20	90	
100	10	36	14	70	8500	3500	10	90	
120	10	36	14	70	8500	3500	10	90	

PMHG-III Series Structural Diagram — PMHG-17-XX-III Model

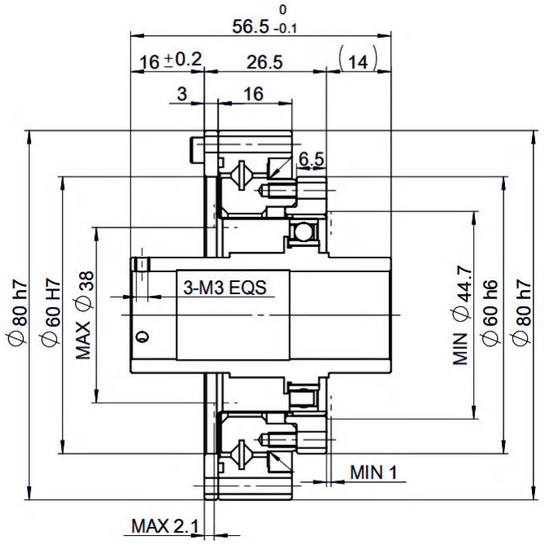
Left view (circular spline side)



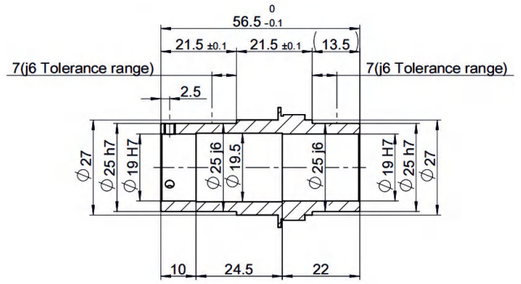
Right view (flexspline side)



Full-section front view



Wave Generator Dimensions

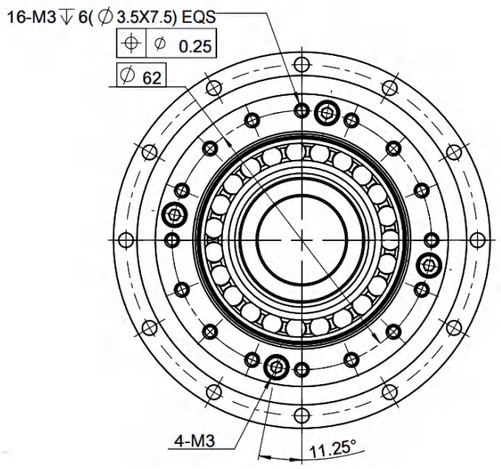


Technical Parameters

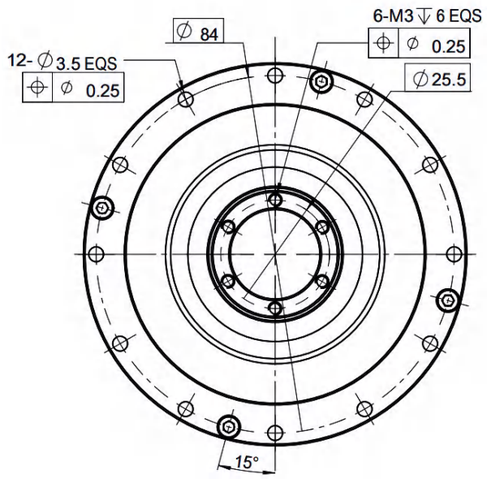
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	21	44	34	91	7300	3500	20	90	0.63
80	29	56	35	113	7300	3500	20	90	
100	31	70	51	143	7300	3500	10	90	
120	31	70	51	112	7300	3500	10	90	

PMHG-III Series Structural Diagram — PMHG-20-XX-III Model

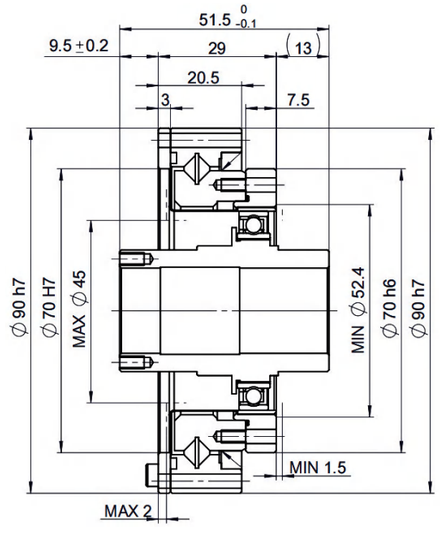
Left view (circular spline side)



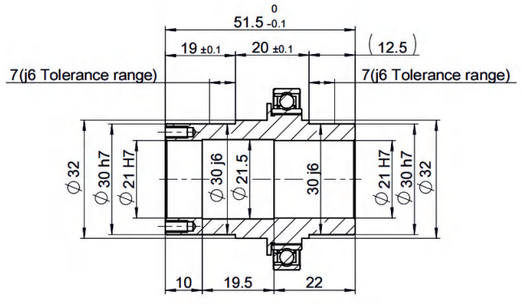
Right view (flexspline side)



Full-section front view



Wave Generator Dimensions

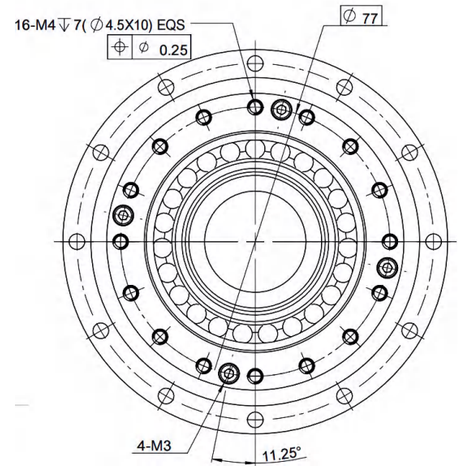


Technical Parameters

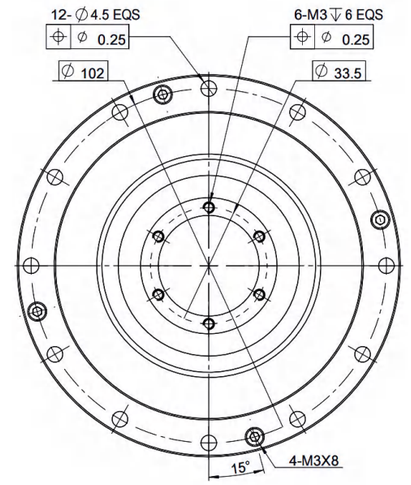
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	33	73	44	127	6500	3500	20	60	0.89
80	44	96	61	165	6500	3500	20	60	
100	52	107	64	191	6500	3500	10	60	
120	52	113	64	191	6500	3500	10	60	
160	52	120	64	191	6500	3500	10	60	

PMHG-III Series Structural Diagram — PMHG-25-XX-III Model

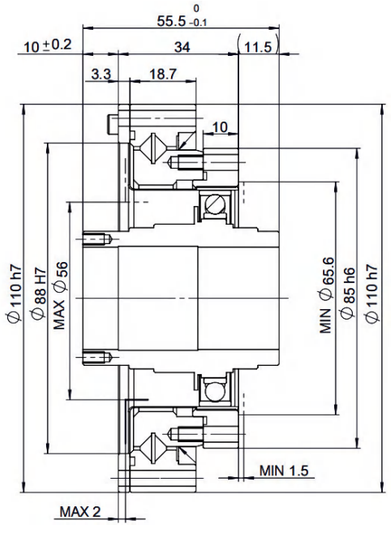
Left view (circular spline side)



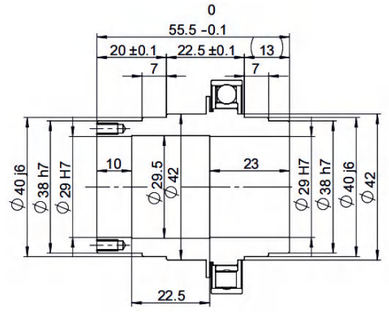
Right view (flexspline side)



Full-section front view



Wave Generator Dimensions

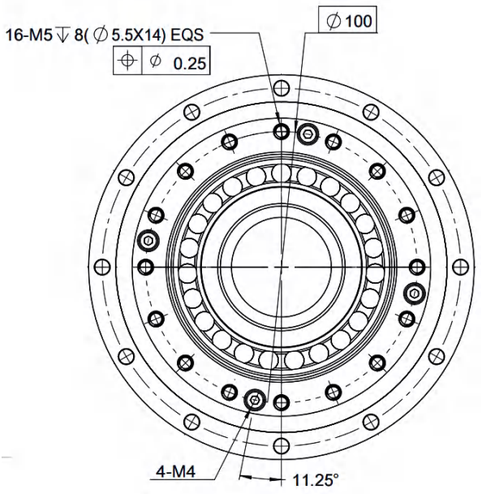


Technical Parameters

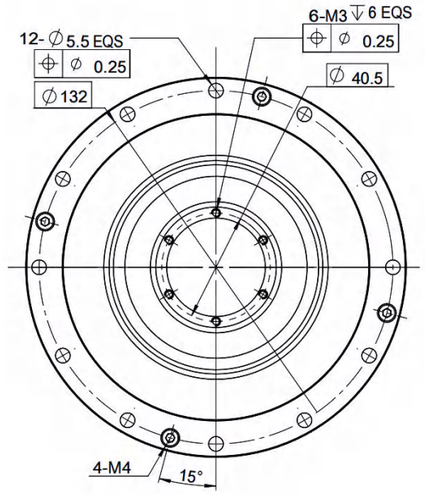
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	51	127	72	242	5600	3500	20	60	1.44
80	82	178	113	332	5600	3500	20	60	
100	87	204	140	369	5600	3500	10	60	
120	87	217	140	395	5600	3500	10	60	
160	87	229	140	408	5600	3500	10	60	

PMHG-III Series Structural Diagram — PMHG-32-XX-III Model

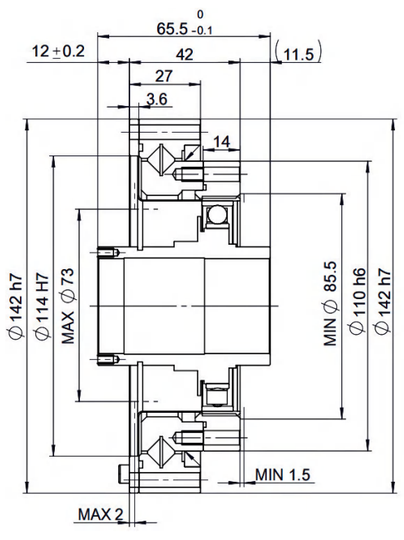
Left view (circular spline side)



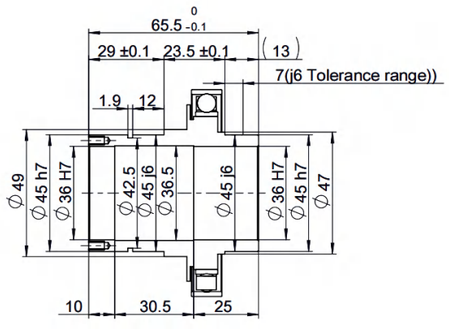
Right view (flexspline side)



Full-section front view



Wave Generator Dimensions

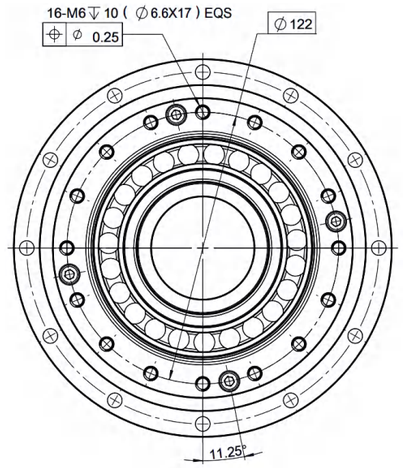


Technical Parameters

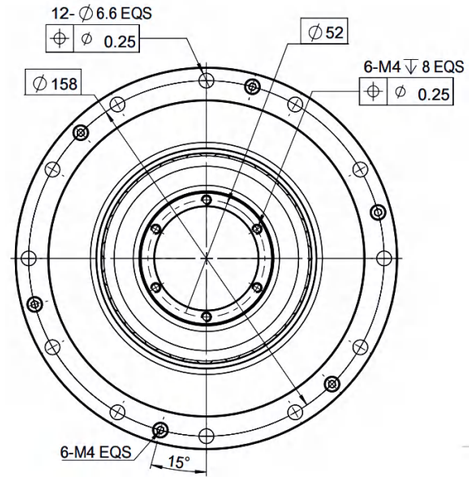
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	99	281	140	497	4800	3500	20	60	3.1
80	153	395	217	738	4800	3500	10	60	
100	178	433	281	841	4800	3500	10	60	
120	178	459	281	892	4800	3500	10	60	
160	178	484	281	892	4800	3500	10	60	

PMHG-III Series Structural Diagram — PMHG-40-XX-III Model

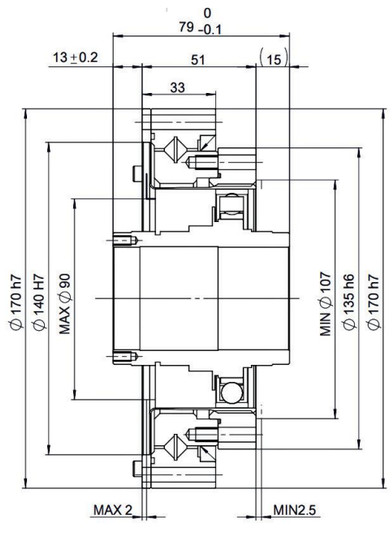
Left view (circular spline side)



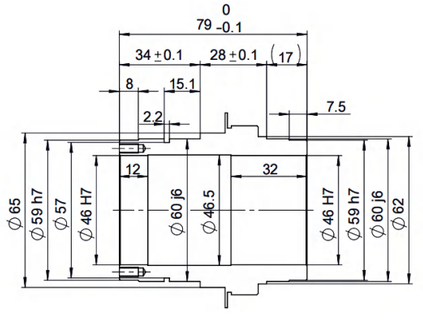
Right view (flexspline side)



Full-section front view



Wave Generator Dimensions



Technical Parameters

Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	178	523	255	892	4000	3000	10	60	5.4
80	268	675	369	1270	4000	3000	10	60	
100	345	738	484	1400	4000	3000	10	60	
120	382	802	586	1530	4000	3000	10	60	
160	382	841	586	1530	4000	3000	10	60	

PMHG-III Series Starting Torque (N·cm)

Model	14				17				20					25					32					40				
Reduction ratio	50	80	100	120	50	80	100	120	50	80	100	120	160	50	80	100	120	160	50	80	100	120	160	50	80	100	120	160
Starting Torque	4.5	3.1	2.8	2.6	6.7	4.4	3.7	3.4	8.6	5.4	4.7	4.2	3.6	17	10	8.8	8	6.9	34	21	20	17	15	61	39	34	31	26

PMHG-III Series Pawl Torque (Nm)

Model / Reduction ratio	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

PMHG-III Series Buckling Torque (Nm)

Model	14	17	20	25	32	40
Full Reduction Ratio	180	350	590	1100	2400	4400

PMHG-III Series Hysteresis Loss and Rigidity

Model	Reduction ratio	T1	T2	HYSTERESIS LOSS	Torsional Rigidity (10000 Nm/rad)			Torsional Deflection (arcmin)	
		Nm	Nm	arcmin	K1	K2	K3	θ1	θ2
14	50	2	6.9	2	0.34	0.47	0.57	2.0	5.6
	≥80			1	0.47	0.61	0.71	1.4	4.2
17	50	3.9	12	2	0.81	1.10	1.30	1.7	4.2
	≥80			1	1.00	1.40	1.60	1.3	3.3
20	50	7	25	2	1.30	1.80	2.30	1.8	5.3
	≥80			1	1.60	2.50	2.90	1.5	3.9
25	50	14	48	2	2.50	3.40	4.40	1.9	5.4
	≥80			1	3.10	5.00	5.70	1.5	3.8
32	50	29	108	2	5.40	7.80	9.80	1.9	5.4
	≥80			1	6.70	11.00	12.00	1.5	4.0
40	50	54	198	2	10.00	14.00	18.00	1.8	5.3
	≥80			1	13.00	20.00	23.00	1.4	3.8

* Torque rigidity values are for reference only; the lower limit is approximately 80% of the stated value.

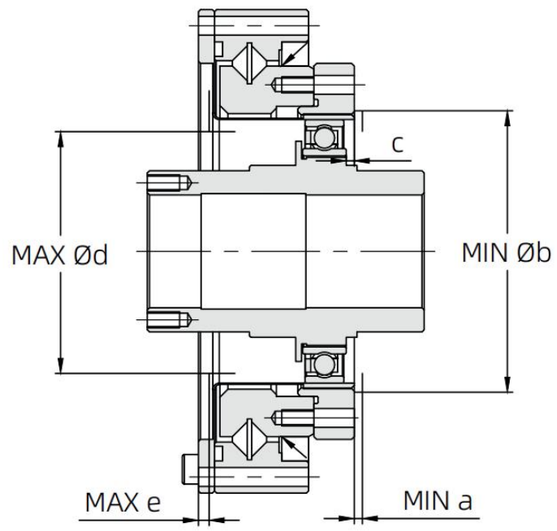
PMHG-III Series Main Bearing Specifications

The unit-type product uses precision crossed roller bearings to support external loads.

Crossed Roller Bearing Specifications				
Model	Moment Rigidity	Allowable Static Moment (Mc)	Rated Dynamic Load (C)	Rated Static Load (Co)
	10^4Nm/rad	Nm	$\times10^2$N	$\times10^2$N
14	8.5	74	58	86
17	15.4	124	104	163
20	25.2	187	146	220
25	39.2	258	218	358
32	100	580	382	654
40	179	849	433	816

* Torque rigidity values are for reference only; the lower limit is approximately 80% of the stated value.

PMHG-III Series Clearance Dimensions and Wave Generator Mounting Depth



Unit: mm

Model	a	b	C	d	e
14	1	36.2	1.4±0.2	31	1.7
17	1	44.7	1.6±0.2	38	2.1
20	1.5	52.4	1.5±0.2	45	2
25	1.5	65.6	3.5±0.2	56	2
32	1.5	85.5	4.2±0.2	73	2
40	2	106	5.6±0.2	90	2

Note:
① C refers to the distance between the end face of the flex bearing's inner ring and the end face of the circular spline.
② Strictly adhere to the specified clearance dimensions for the flange and wave generator. Exceeding these may cause interference between the flexspline and the flange or wave generator, reducing service life.
③ Install the harmonic drive according to the required wave generator mounting depth. Installation depth affects starting torque and accuracy.

PMHG-III Series Sealing Mechanism

To prevent grease leakage and ensure the high durability of the harmonic drive, please use the following sealing mechanisms:

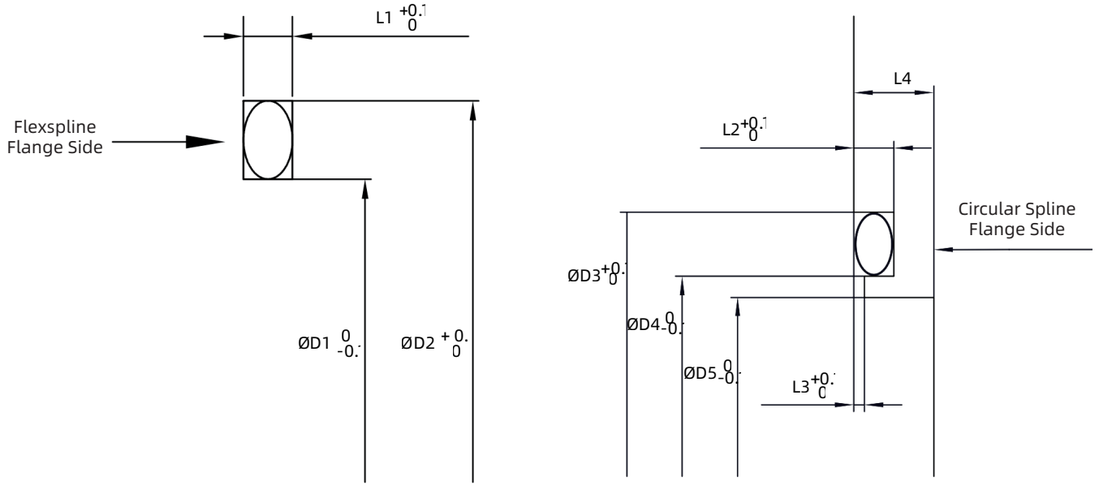
1. Rotating parts: Use an oil seal (spring-embedded type). Please check the shaft for any scratches or damage before installation.
2. Flange mounting surface and fit: Use an O-ring and sealant. Ensure the surface is level and check the proper engagement of the O-ring. (For the dimensions of the O-ring and O-ring groove, please refer to the table and figure below.)
3. Threaded holes: Apply a screw locking agent with sealing properties (recommended: Loctite 243) or use sealing tape.

Required Sealing Locations		Recommended Sealing Methods
Output Side	Through hole in the center of the output flange and the output flange mounting surface	Use the O-ring supplied with the product.
	Mounting screw locations	Apply a screw locking agent with sealing properties (recommended: Loctite 243).
Input Side	Flange mounting surface	Use the O-ring supplied with the product.
	Motor output shaft	Please use an oil seal. If no oil seal is present, install one on the motor mounting flange.

PMHG-III Series Sealing O-ring and O-ring Groove Dimensions

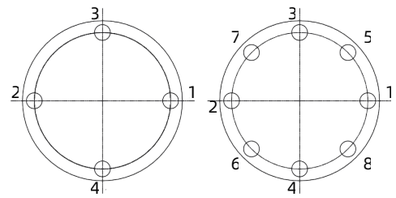
Mode	Flexspline Side				Circular Spline Side						
	O-ring	O-ring Groove			O-ring	O-ring Groove					
		ØD1	ØD2	L1		ØD3	ØD4	ØD5	L2	L3	L4 MIN
PMHG-14-XX-III	55*1.5 (OD * CS)	51.1	55.5	1.2	37.8*0.6 (OD * CS)	38	36.5	36.2	0.45	0.15	1
PMHG-17-XX-III	64*1.5 (OD * CS)	60.5	64.5	1.2	47*1 (OD * CS)	48	45.5	44.7	0.75	0.2	1
PMHG-20-XX-III	72*1.5 (OD * CS)	70	74	1.2	56*1 (OD * CS)	56.2	53.8	52.4	0.75	0.2	1.5
PMHG-25-XX-III	93.6*1.8 (OD * CS)	89.8	94.6	1.4	70*1.5 (OD * CS)	70.5	66.8	65.6	1.2	0.3	1.5
PMHG-32-XX-II-E	120*1.9 (OD * CS)	115.5	120.5	1.5	90*1.5 (OD * CS)	91	87	85.5	1.2	0.3	2
PMHG-40-XX-III	144.5*2 (OD * CS)	148	142.6	1.5	109.5*1.5 (OD * CS)	112.4	108	106	1.2	0.4	2

Dimensions of the O-ring and O-ring Groove



PMHG-III Series Screw Locking Method

(1) Set the motor speed to 100 rpm and start the motor. Tighten the screws in a crisscross pattern, gradually increasing torque in 4–5 steps until reaching the specified tightening force. (see the diagram below for tightening force).
(2) The mounting surface connecting to the harmonic drive must have a flatness of 0.01 mm and be perpendicular to the axis within 0.01 mm.



Screw Tightening Force

Screw property class	12.9							
Nominal diameter	mm	3	4	5	6	8	10	12
Tightening torque	N·m	2	4	9	15	35	70	125

PMHG-III Series Grease Application Requirements

(1) Grease application locations

Unit: gram (g)

Size	Application Locations
	C1
14	5.5
17	9.6
20	10.3
25	16
32	26
40	60

(2) Grease application locations

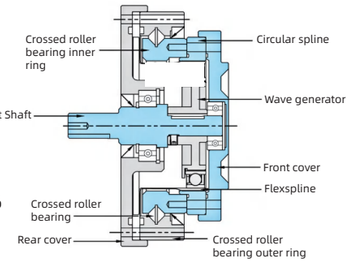
PMHG-IV Series Unit Type (Input Shaft)

The flexspline features a hollow flanged design, with the wave generator integrating the input shaft and support bearings. Fully sealed construction is ideal for applications where a bevel gear or synchronous belt is installed at the input end.

Integrated input shaft enables easy connection to external drive mechanisms.

Built-in support bearings improves rigidity and stability at the input end

Torque capacity increased by 30% compared with the PMHS series
Service life increased by 43% compared with the PMHS series

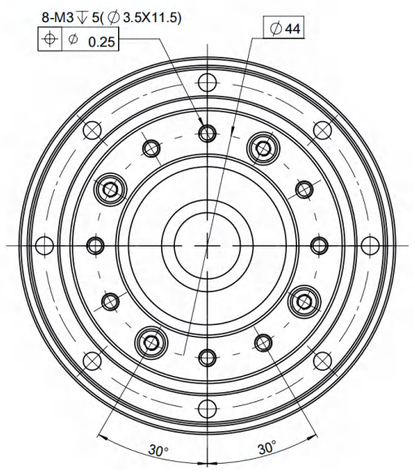


PMHG-IV Series Performance Parameters

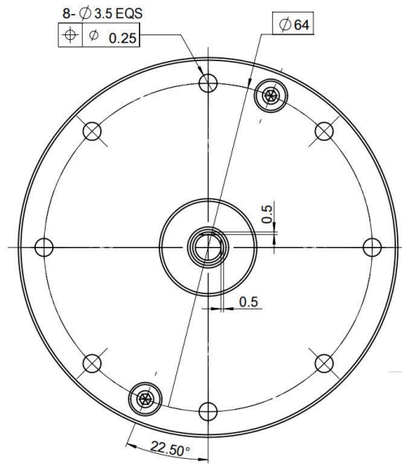
Model	Reduction ratio	Rated torque at 2000 r/min input	Permissible peak torque at start/stop	Permissible max .value of ave. load torque	Instantaneous permissible max. torque	Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash (arcsec)	Transmission error (arcsec)	Weight
		Nm	Nm	Nm	Nm	r/min	r/min	≤	≤	kg
14	50	7	23	9	46	8500	3500	20	90	0.66
	80	10	30	14	51	8500	3500	20	90	
	100	10	36	14	70	8500	3500	10	90	
	120	10	36	14	70	8500	3500	10	90	
17	50	21	44	34	91	7300	3500	20	90	0.94
	80	29	56	35	113	7300	3500	20	90	
	100	31	70	51	143	7300	3500	10	90	
	120	31	70	51	112	7300	3500	10	90	
20	50	33	73	44	127	6500	3500	20	60	1.38
	80	44	96	61	165	6500	3500	20	60	
	100	52	107	64	191	6500	3500	10	60	
	120	52	113	64	191	6500	3500	10	60	
	160	52	120	64	191	6500	3500	10	60	
25	50	51	127	72	242	5600	3500	20	60	2.1
	80	82	178	113	332	5600	3500	20	60	
	100	87	204	140	369	5600	3500	10	60	
	120	87	217	140	395	5600	3500	10	60	
	160	87	229	140	408	5600	3500	10	60	
32	50	99	281	140	497	4800	3500	20	60	4.4
	80	153	395	217	738	4800	3500	10	60	
	100	178	433	281	841	4800	3500	10	60	
	120	178	459	281	892	4800	3500	10	60	
	160	178	484	281	892	4800	3500	10	60	
40	50	178	523	255	892	4000	3000	10	60	7.3
	80	268	675	369	1270	4000	3000	10	60	
	100	345	738	484	1400	4000	3000	10	60	
	120	382	802	586	1530	4000	3000	10	60	
	160	382	841	586	1530	4000	3000	10	60	

PMHG-IV Series Structural Diagram — PMHG-14-XX-IV Model

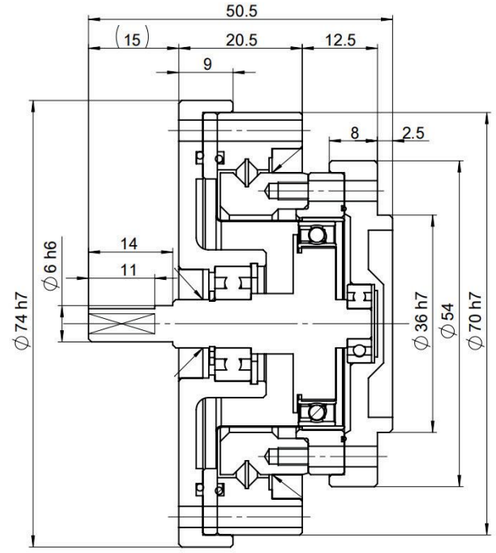
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

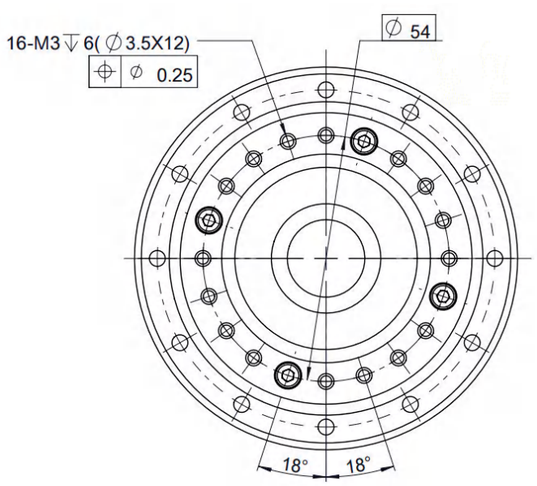


Technical Parameters

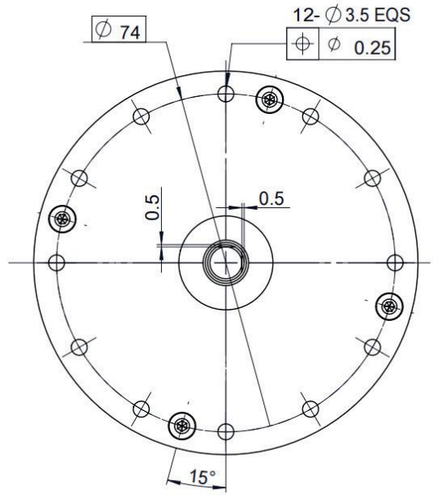
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	7	23	9	46	8500	3500	20	90	0.66
80	10	30	14	51	8500	3500	20	90	
100	10	36	14	70	8500	3500	10	90	
120	10	36	14	70	8500	3500	10	90	

PMHG-IV Series Structural Diagram — PMHG-17-XX-IV Model

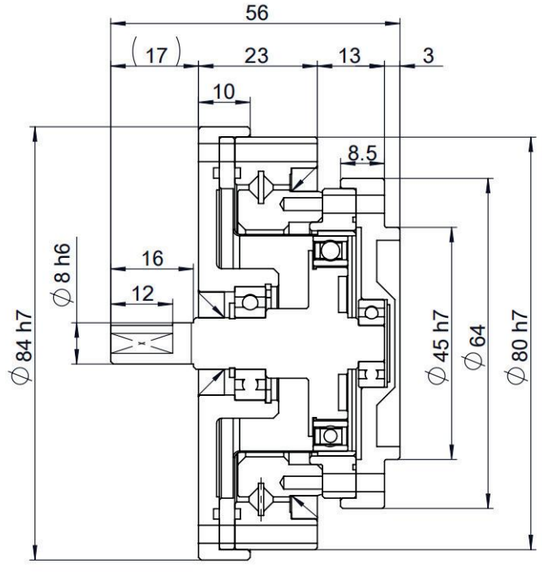
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

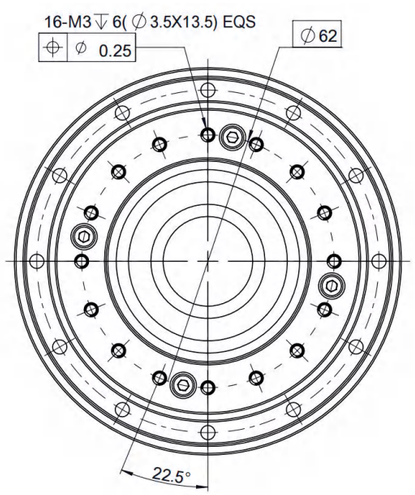


Technical Parameters

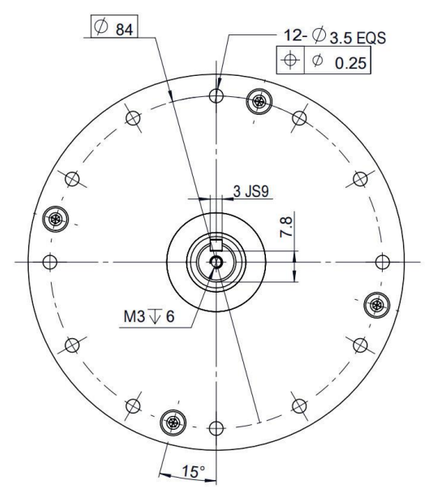
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	21	44	34	91	7300	3500	20	90	0.94
80	29	56	35	113	7300	3500	20	90	
100	31	70	51	143	7300	3500	10	90	
120	31	70	51	112	7300	3500	10	90	

PMHG-IV Series Structural Diagram — PMHG-20-XX-IV Model

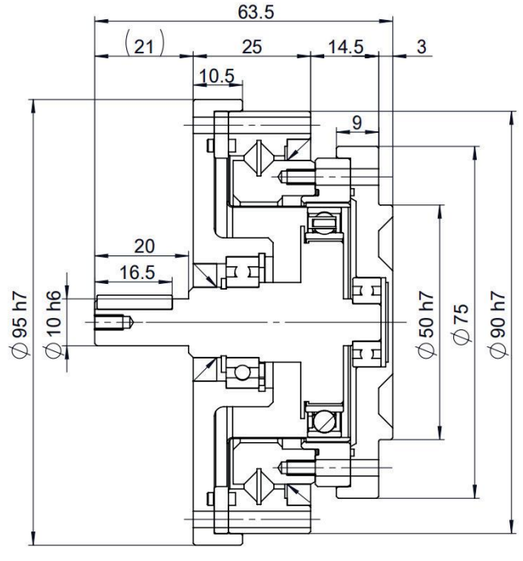
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

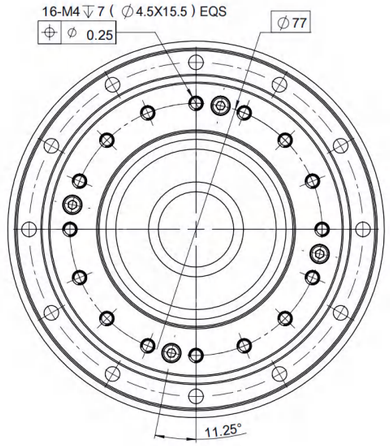


Technical Parameters

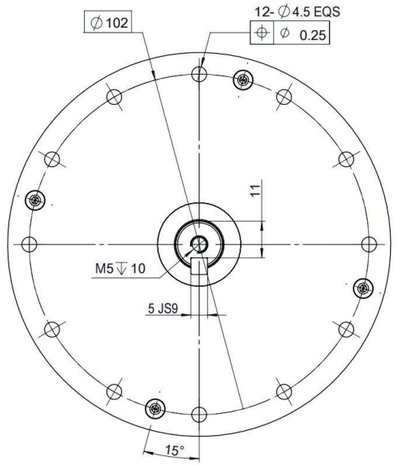
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	33	73	44	127	6500	3500	20	60	1.38
80	44	96	61	165	6500	3500	20	60	
100	52	107	64	191	6500	3500	10	60	
120	52	113	64	191	6500	3500	10	60	
160	52	120	64	191	6500	3500	10	60	

PMHG-IV Series Structural Diagram — PMHG-25-XX-IV Model

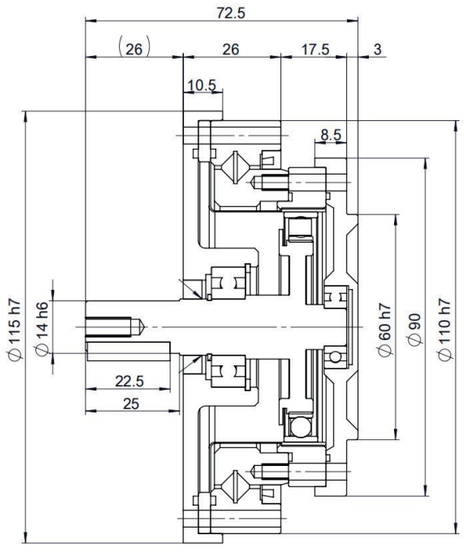
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

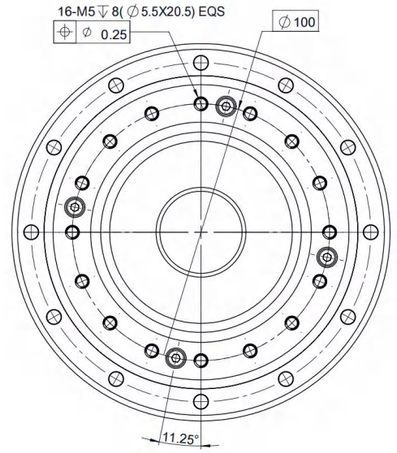


Technical Parameters

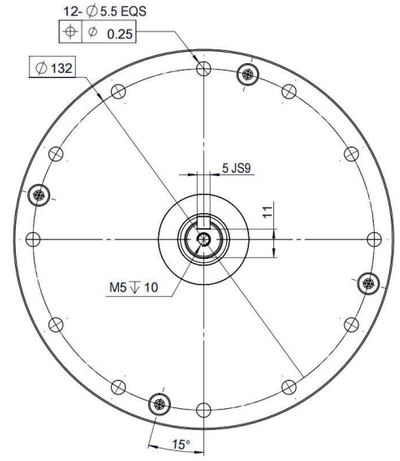
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	51	127	72	242	5600	3500	20	60	2.1
80	82	178	113	332	5600	3500	20	60	
100	87	204	140	369	5600	3500	10	60	
120	87	217	140	395	5600	3500	10	60	
160	87	229	140	408	5600	3500	10	60	

PMHG-IV Series Structural Diagram — PMHG-32-XX-IV Model

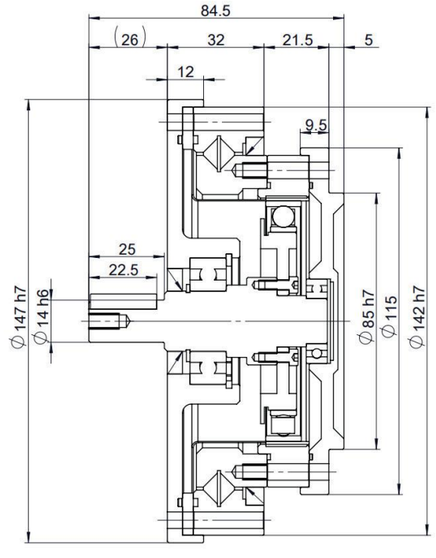
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

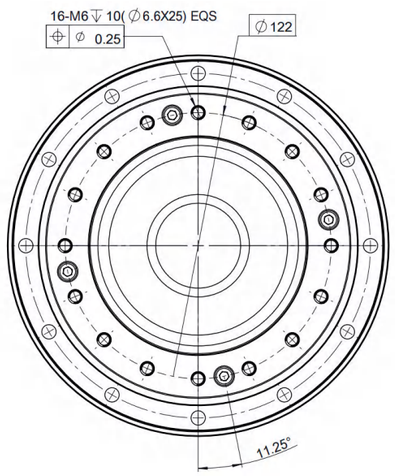


Technical Parameters

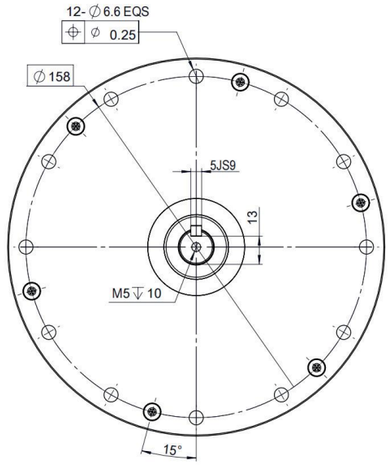
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	99	281	140	497	4800	3500	20	60	4.4
80	153	395	217	738	4800	3500	10	60	
100	178	433	281	841	4800	3500	10	60	
120	178	459	281	892	4800	3500	10	60	
160	178	484	281	892	4800	3500	10	60	

PMHG-IV Series Structural Diagram — PMHG-40-XX-IV Model

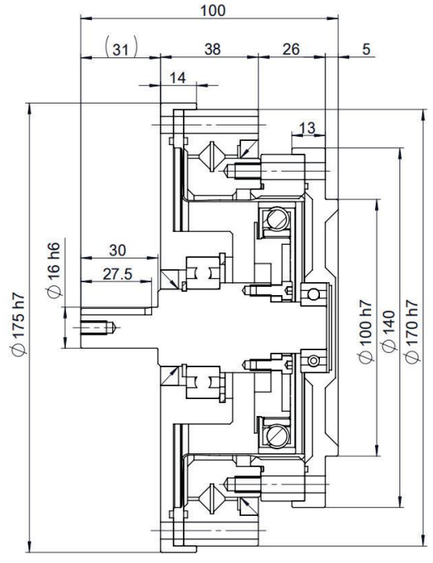
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

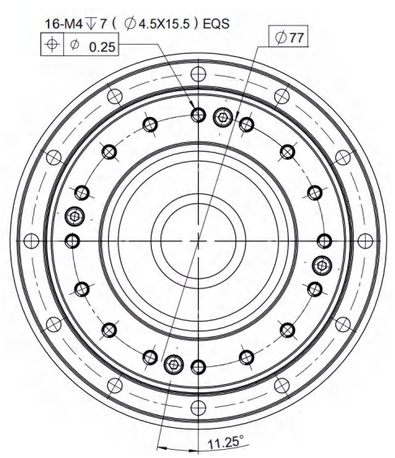


Technical Parameters

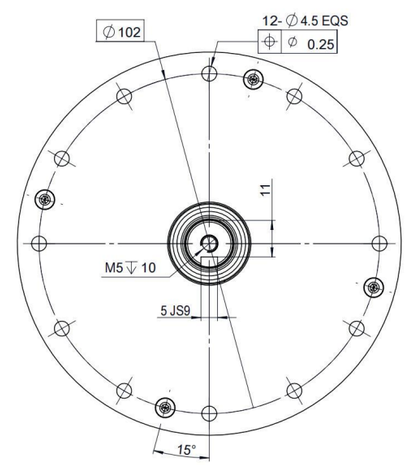
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	178	523	255	892	4000	3000	10	60	7.3
80	268	675	369	1270	4000	3000	10	60	
100	345	738	484	1400	4000	3000	10	60	
120	382	802	586	1530	4000	3000	10	60	
160	382	841	586	1530	4000	3000	10	60	

PMHG-IV Series Structural Diagram — PMHG-25-XX-IV-B Model

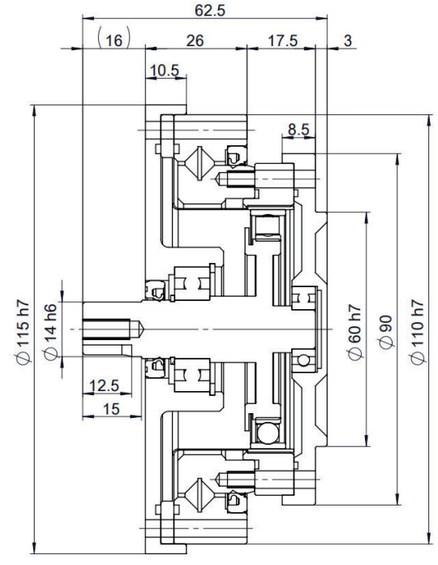
Left view (circular spline side)



Right view (flexspline side)



Full-section front view



Technical Parameters

Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	51	127	72	242	5600	3500	20	60	2.05
80	82	178	113	332	5600	3500	20	60	
100	87	204	140	369	5600	3500	10	60	
120	87	217	140	395	5600	3500	10	60	
160	87	229	140	408	5600	3500	10	60	

PMHG-IV Series Starting Torque (N·cm)

Model	14				17				20					25					32					40				
Reduction ratio	50	80	100	120	50	80	100	120	50	80	100	120	160	50	80	100	120	160	50	80	100	120	160	50	80	100	120	160
Starting Torque	5.7	4.4	3.7	3.5	9.7	7.2	6.5	6.2	14	11	9.9	9.3	8.6	22	15	14	13	12	41	29	27	24	23	72	52	47	47	39

PMHG-IV Series Pawl Torque (Nm)

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

PMHG-IV Series Buckling Torque (Nm)

Model	14	17	20	25	32	40
Full Reduction Ratio	180	350	590	1100	2400	4400

PMHG-IV Series Hysteresis Loss and Rigidity

Model	Reduction ratio	T1	T2	HYSTERESIS LOSS	Torsional Rigidity (10000 Nm/rad)			Torsional Deflection (arcmin)	
		Nm	Nm	arcmin	K1	K2	K3	θ1	θ2
14	50	2	6.9	2	0.34	0.47	0.57	2.0	5.6
	≥80			1	0.47	0.61	0.71	1.4	4.2
17	50	3.9	12	2	0.81	1.10	1.30	1.7	4.2
	≥80			1	1.00	1.40	1.60	1.3	3.3
20	50	7	25	2	1.30	1.80	2.30	1.8	5.3
	≥80			1	1.60	2.50	2.90	1.5	3.9
25	50	14	48	2	2.50	3.40	4.40	1.9	5.4
	≥80			1	3.10	5.00	5.70	1.5	3.8
32	50	29	108	2	5.40	7.80	9.80	1.9	5.4
	≥80			1	6.70	11.00	12.00	1.5	4.0
40	50	54	198	2	10.00	14.00	18.00	1.8	5.3
	≥80			1	13.00	20.00	23.00	1.4	3.8

* Torque rigidity values are for reference only; the lower limit is approximately 80% of the stated value.

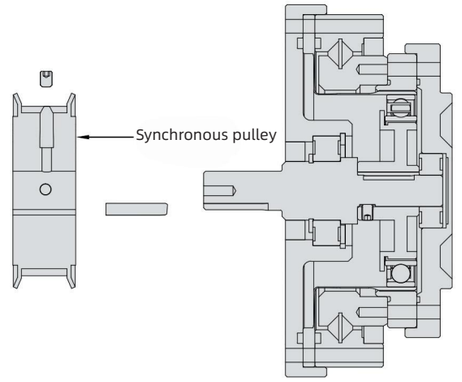
PMHG-IV Series Main Bearing Specifications

The unit-type product uses precision crossed roller bearings to support external loads.

Crossed Roller Bearing Specifications				
Model	Moment Rigidity	Allowable Static Moment (Mc)	Rated Dynamic Load (C)	Rated Static Load (Co)
	10^4Nm/rad	Nm	$\times10^2$N	$\times10^2$N
14	8.5	74	58	86
17	15.4	124	104	163
20	25.2	187	146	220
25	39.2	258	218	358
32	100	580	382	654
40	179	849	433	816

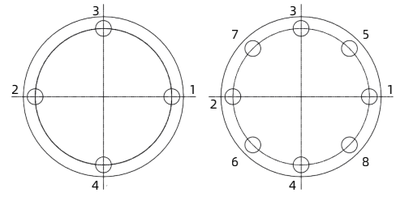
* Torque rigidity values are for reference only; the lower limit is approximately 80% of the stated value.

PMHG-IV Series Connection Method



PMHG-IV Series Screw Locking Method

(1) Set the motor speed to 100 rpm and start the motor. Tighten the screws in a crisscross pattern, gradually increasing torque in 4–5 steps until reaching the specified tightening force. (see the diagram below for tightening force).
(2) The mounting surface connecting to the harmonic drive must have a flatness of 0.01 mm and be perpendicular to the axis within 0.01 mm.



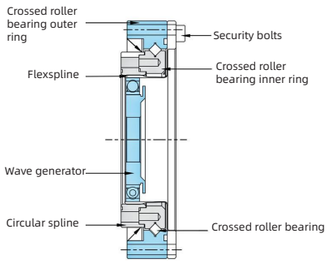
Screw Tightening Force

Screw property class	12.9							
Nominal diameter	mm	3	4	5	6	8	10	12
Tightening torque	N·m	2	4	9	15	35	70	125

PMHD-III Series Simple Unit Type (Super-flat Hollow Shaft)

Pushing the limits of super-flat design, this series features a flexspline with a super-flat, hollow-flanged construction. The output end is equipped with a built-in, high-rigidity crossed roller bearing, making it ideal for applications where space is limited and a compact design is essential.

- Super-flat structural design is perfect for high-precision applications with space constraints.
- Hollow design facilitates integrated routing of wiring or pneumatic lines, optimizing space utilization
- Built-in high-rigidity crossed roller bearing features high impact resistance and long service life.

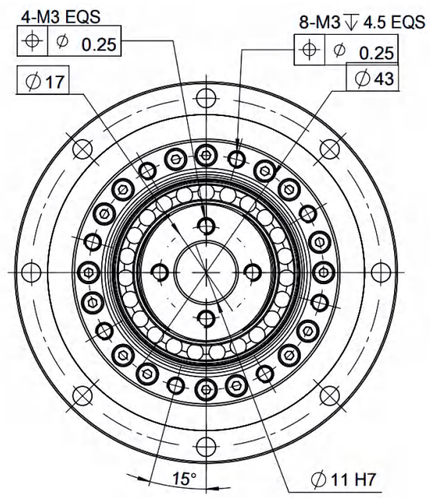


PMHD-III Series Performance Parameters

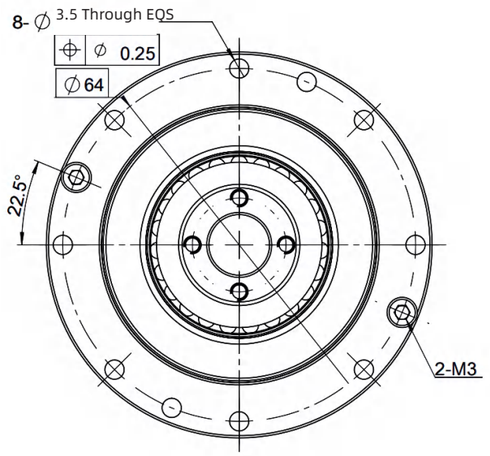
Model	Reduc-tion ratio	Rated torque at 2000 r/min input	Permissible peak torque at start/stop	Permissible max .value of ave. load torque	Instantaneous permissible max. torque	Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash (arcsec)	Transmission error (arcsec)	Weight
		Nm	Nm	Nm	Nm	r/min	r/min	≤	≤	kg
14	50	3.5	11.4	4.6	23	8500	3500	20	90	0.33
	80	5.1	15	6.2	29	8500	3500	20	90	
	100	5.1	18	7	33	8500	3500	20	90	
17	50	10.5	22	17	46	7300	3500	20	90	0.42
	80	14	29	21	54	7300	3500	20	90	
	100	15	35	26	67	7300	3500	20	90	
20	50	16	37	23	66	6500	3500	20	90	0.52
	80	23	49	28	78	6500	3500	10	90	
	100	27	54	32	90	6500	3500	10	90	
25	50	26	66	36	121	5600	3500	20	60	0.91
	80	42	91	62	157	5600	3500	10	60	
	100	45	105	71	175	5600	3500	10	60	
32	50	50	143	71	255	4800	3500	20	60	1.87
	80	79	202	126	350	4800	3500	10	60	
	100	91	221	143	399	4800	3500	10	60	

PMHD-III Series Structural Diagram — PMHD-14-XX-III Model

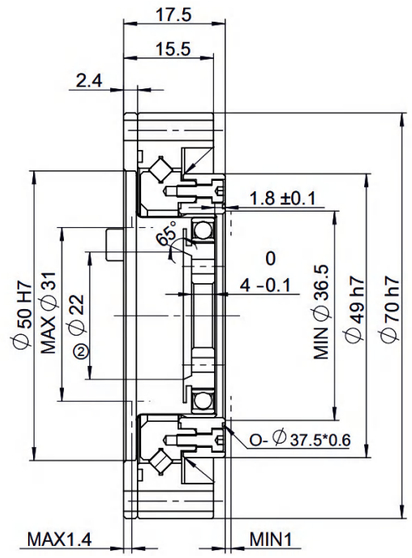
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

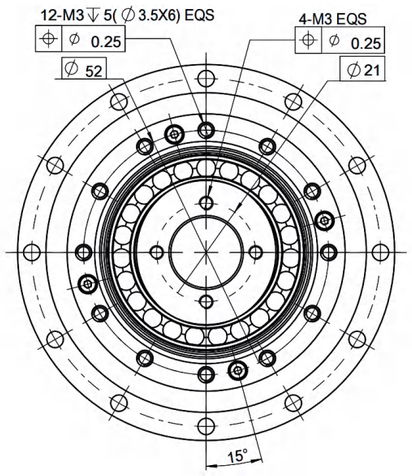


Technical Parameters

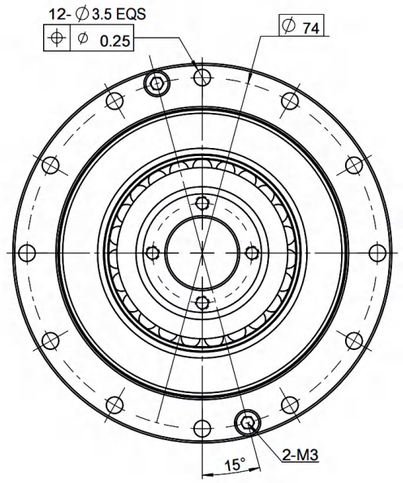
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	3.5	11.4	4.6	23	8500	3500	20	90	0.33
80	5.1	15	6.2	29	8500	3500	20	90	
100	5.1	18	7	33	8500	3500	20	90	

PMHD-III Series Structural Diagram — PMHD-17-XX-III Model

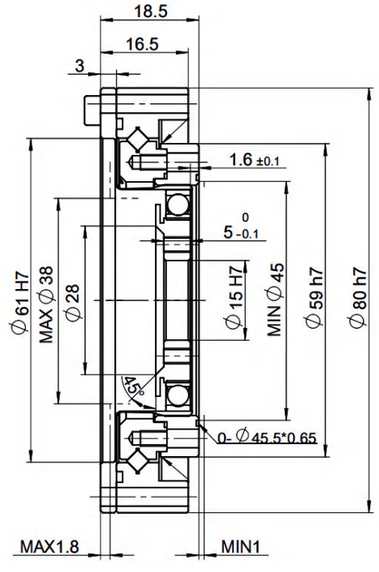
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

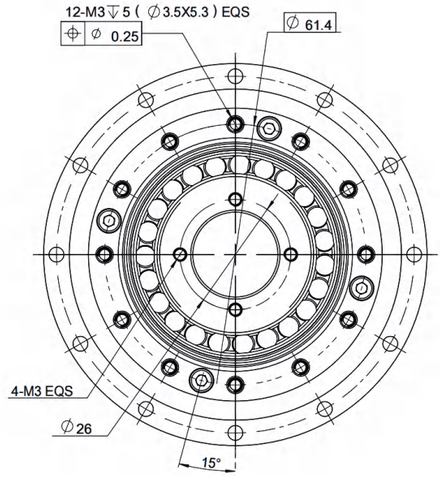


Technical Parameters

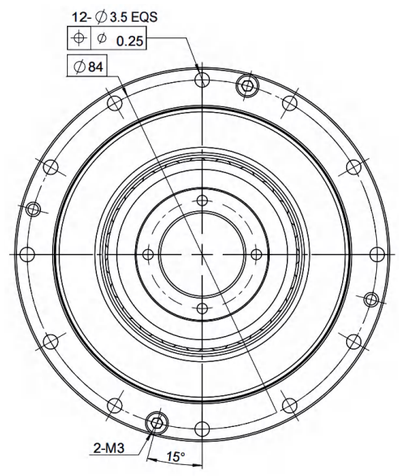
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	10.5	22	17	46	7300	3500	20	90	0.42
80	14	29	21	54	7300	3500	20	90	
100	15	35	26	67	7300	3500	20	90	

PMHD-III Series Structural Diagram — PMHD-20-XX-III Model

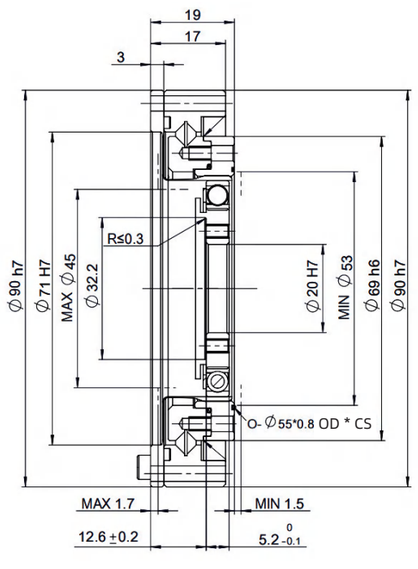
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

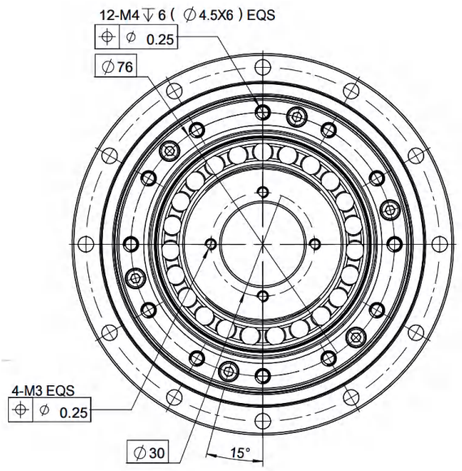


Technical Parameters

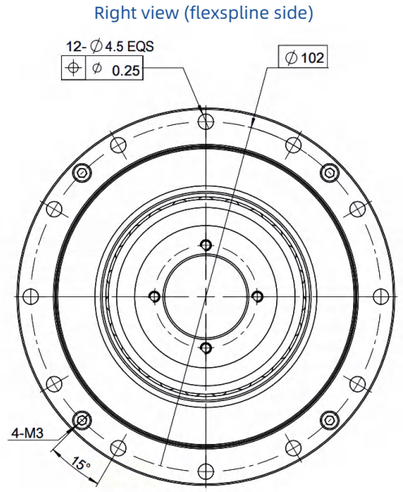
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec)	Transmis-sion error (arcsec)	Weight (kg)
							≤	≤	
50	16	37	23	66	6500	3500	20	90	0.52
80	23	49	28	78	6500	3500	10	90	
100	27	54	32	90	6500	3500	10	90	

PMHD-III Series Structural Diagram — PMHD-25-XX-III Model

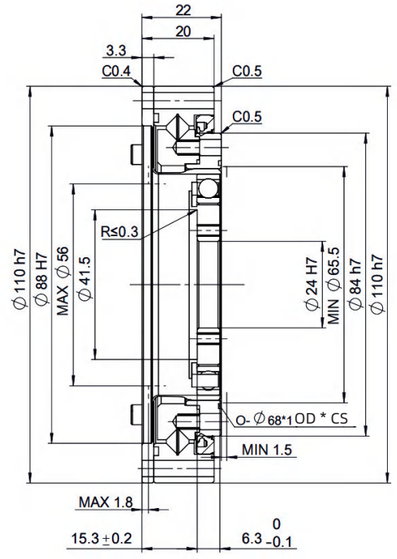
Left view (circular spline side)



Right view (flexspline side)



Full-section front view

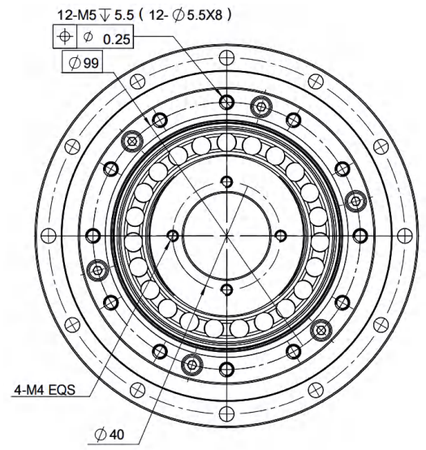


Technical Parameters

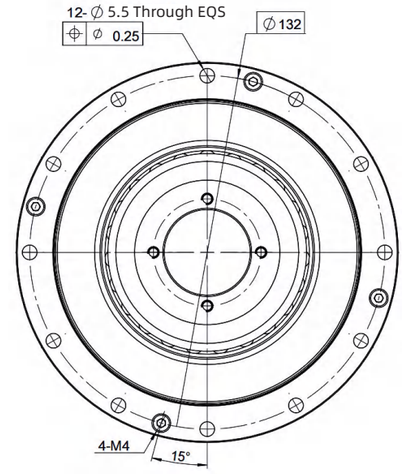
Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec) ≤	Transmis-sion error (arcsec) ≤	Weight (kg)
50	26	66	36	121	5600	3500	20	60	0.91
80	42	91	62	157	5600	3500	10	60	
100	45	105	71	175	5600	3500	10	60	

PMHD-III Series Structural Diagram — PMHD-32-XX-III Model

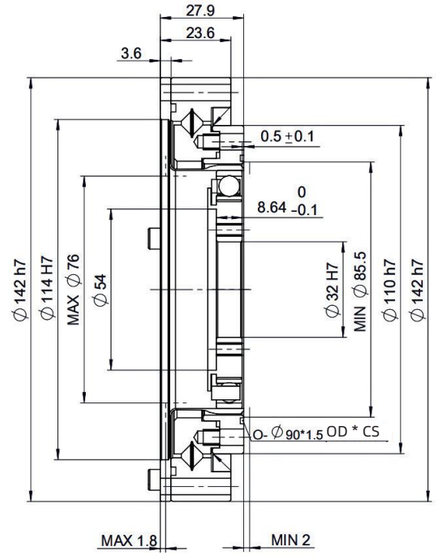
Left view (circular spline side)



Right view (flexspline side)



Full-section front view



Technical Parameters

Reduction ratio	Rated torque at 2000 r/min input (Nm)	Permissible peak torque at start/stop (Nm)	Permissible max. value of ave. load torque (Nm)	Instantaneous permissible max. torque (Nm)	Permissible max. input rotational speed (r/min)	Permissible ave. input rotational speed (r/min)	Backlash (arcsec) ≤	Transmis-sion error (arcsec) ≤	Weight (kg)
50	50	143	71	255	4800	3500	20	60	1.87
80	79	202	126	350	4800	3500	10	60	
100	91	221	143	399	4800	3500	10	60	

PMHD-III Series Starting Torque (N·cm)

Model	14			17			20				25				32			
Reduction ratio	50	80	100	50	80	100	50	80	100	120	50	80	100	120	50	80	100	120
Starting Torque	6.2	5.2	4.8	10	9	9	13	12	11	–	20	18	17	–	30	28	25	–

PMHD-III Series Pawl Torque (Nm)

Reduction ratio \ Model	14	17	20	25	32
50	88	150	220	450	980
80	90	170	280	550	1050
100	84	160	260	500	1000

PMHD-III Series Buckling Torque (Nm)

Model	14	17	20	25	32
Full Reduction Ratio	130	260	470	850	1800

PMHD-III Series Hysteresis Loss and Rigidity

Model	Reduction ratio	T1	T2	HYSTERESIS LOSS	Torsional Rigidity (10000 Nm/rad)			Torsional Deflection (arcmin)	
		Nm	Nm	arcmin	K1	K2	K3	θ1	θ2
14	50	2	6.9	2.5	0.29	0.37	0.47	2.4	6.4
	≥80			2	0.4	0.44	0.61	1.7	5.4
17	50	3.9	12	2	0.67	0.88	1.20	2.0	4.6
	≥80			1	0.84	0.94	1.30	1.6	4.3
20	50	7	25	2	1.1	1.3	2	2.2	6.6
	≥80			1	1.3	1.7	2.5	1.8	5.0
25	50	14	48	2	2	2.7	3.7	2.4	6.1
	≥80			1	2.7	3.7	4.7	1.8	4.5
32	50	29	108	2	4.7	6.1	8.4	2.1	6.1
	≥80			1	6.1	7.8	11	1.7	4.8

* Torque rigidity values are for reference only; the lower limit is approximately 80% of the stated value.

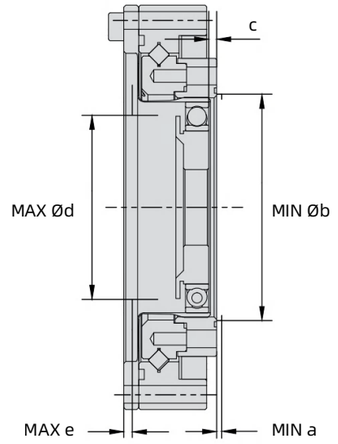
PMHD-III Series Main Bearing Specifications

The unit-type product uses precision crossed roller bearings to support external loads.

Crossed Roller Bearing Specifications				
Model	Moment Rigidity	Allowable Static Moment (Mc)	Rated Dynamic Load (C)	Rated Static Load (Co)
	10^4Nm/rad	Nm	$\times10^2$N	$\times10^2$N
14	7.08	37	29	43
17	12.7	62	52	81
20	21	93	73	110
25	31	129	109	179
32	82.1	290	191	327

* Torque rigidity values are for reference only; the lower limit is approximately 80% of the stated value.

PMHD-III Series Clearance Dimensions and Wave Generator Mounting Depth



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

Note:
① C refers to the distance between the end face of the flex bearing's inner ring and the end face of the circular spline.
② Strictly adhere to the specified clearance dimensions for the flange and wave generator. Exceeding these may cause interference between the flexspline and the flange or wave generator, reducing service life.
③ Install the harmonic drive according to the required wave generator mounting depth. Installation depth affects starting torque and accuracy.

PMHD-III Series Sealing Mechanism

To prevent grease leakage and ensure the high durability of the harmonic drive, please use the following sealing mechanisms:

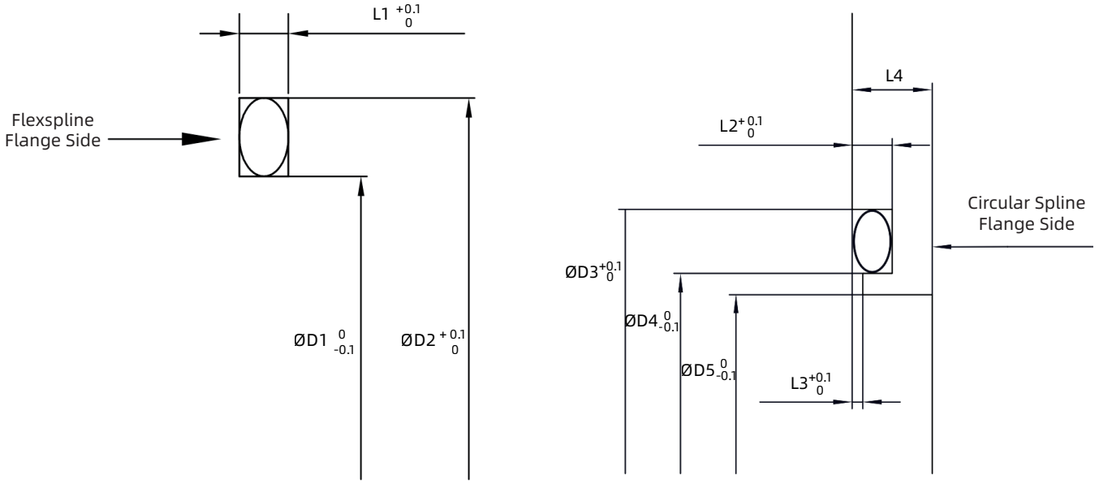
1. Rotating parts: Use an oil seal (spring-embedded type). Please check the shaft for any scratches or damage before installation.
2. Flange mounting surface and fit: Use an O-ring and sealant. Ensure the surface is level and check the proper engagement of the O-ring. (For the dimensions of the O-ring and O-ring groove, please refer to the table and figure below.)
3. Threaded holes: Apply a screw locking agent with sealing properties (recommended: Loctite 243) or use sealing tape.

Required Sealing Locations		Recommended Sealing Methods
Output Side	Through hole in the center of the output flange and the output flange mounting surface	Use the O-ring supplied with the product.
	Mounting screw locations	Apply a screw locking agent with sealing properties (recommended: Loctite 243).
Input Side	Flange mounting surface	Use the O-ring supplied with the product.
	Motor output shaft	Please use an oil seal. If no oil seal is present, install one on the motor mounting flange.

PMHD-III Series Sealing O-ring and O-ring Groove Dimensions

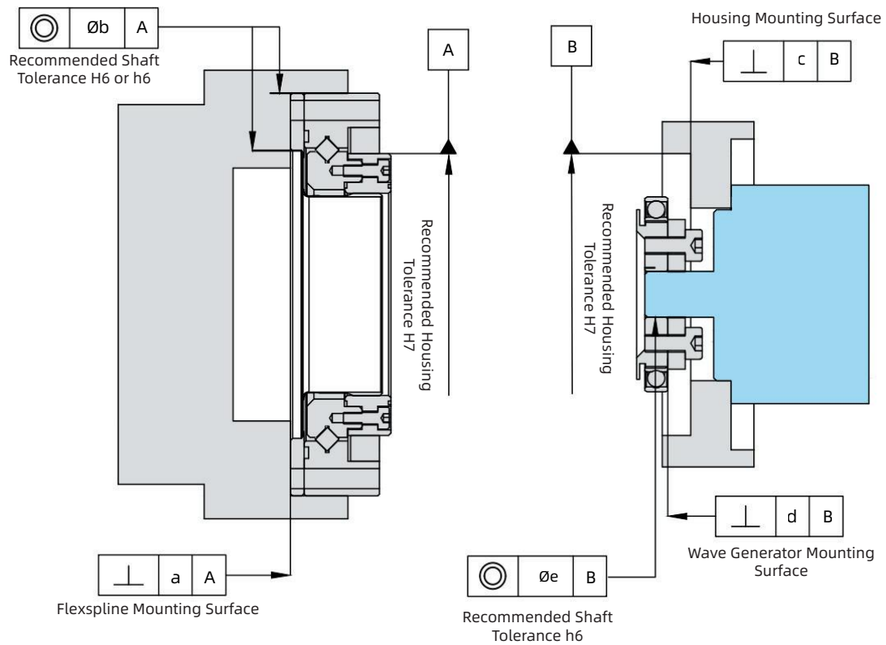
	Flexspline Side				Circular Spline Side						
	O-ring	O-ring Groove			O-ring	O-ring Groove					
		ØD1	ØD2	L1		ØD3	ØD4	ØD5	L2	L3	L4 MIN
PMHD-14-XX-III	55*1.5 (OD * CS)	51.5	55.5	1.2	37.5*0.6 (OD * CS)	The O-ring groove of the PMHD series is machined into the circular spline.					
PMHD-17-XX-III	64*1.5 (OD * CS)	60.5	64.5	1.2	45.5*0.65 (OD * CS)						
PMHD-20-XX-III	72*1.5 (OD * CS)	70	74.5	1.2	55*0.8 (OD * CS)						
PMHD-25-XX-III	93.6*1.8 (OD * CS)	89.8	94.6	1.4	68*1 (OD * CS)						
PMHD-32-XX-III	120*1.9 (OD * CS)	115.5	120.5	1.5	90*1.5 (OD * CS)						

Dimensions of the O-ring and O-ring Groove



PMHD-III Series Assembly Precision

During assembly design, if there are abnormalities such as deformation of the mounting surface or forced assembly, product performance will be reduced.
To fully leverage the superior performance of the harmonic drive, please pay close attention to the following key points and ensure that the housing assembly precision meets the recommended parameters shown in the figure and table below.
① Tilt or deformation of the mounting surface
② Foreign material caught in the mesh
③ Burrs, bulging, or abnormal positioning around the threaded hole area of the mounting holes
④ Insufficient chamfer on the recessed circular mounting section
⑤ Abnormal roundness of the recessed circular mounting section

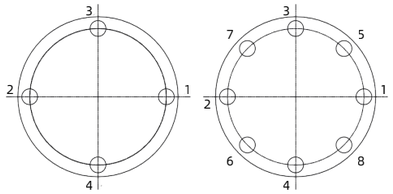


Unit: mm

Symbol \ Model	14	17	20	25	32
a	0.016	0.021	0.027	0.035	0.042
Øb	0.015	0.018	0.019	0.022	0.022
C	0.011	0.012	0.013	0.014	0.016
d	0.008	0.010	0.012	0.012	0.012
Øe	0.016	0.018	0.019	0.022	0.022

PMHD-III Series Screw Locking Method

(1) Set the motor speed to 100 rpm and start the motor. Tighten the screws in a crisscross pattern, gradually increasing torque in 4-5 steps until reaching the specified tightening force. (see the diagram below for tightening force).
(2) The mounting surface connecting to the harmonic drive must have a flatness of 0.01 mm and be perpendicular to the axis within 0.01 mm.



Screw Tightening Force

Screw property class		12.9						
Nominal diameter	mm	3	4	5	6	8	10	12
Tightening torque	N·m	2	4	9	15	35	70	125

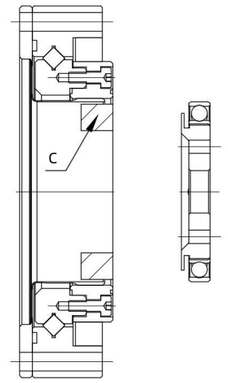
PMHD-III Series Grease Application Requirements

(1) Grease application locations

Unit: gram (g)

Size	Application Locations		
	C		
	For Horizontal Use	For Vertical Use	
		Upward	Downward
14	3	4	5
17	5	6	7
20	8	9	11
25	16	19	21
32	36	42	48

(2) Grease application locations



PICEA MOTION Harmonic Drive

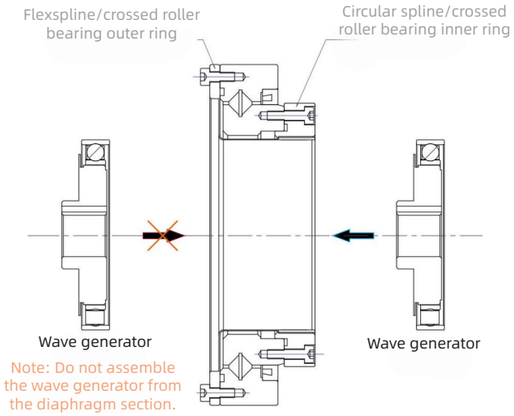
PRECAUTIONS

PRECAUTIONS FOR ASSEMBLY

Improper assembly can cause the harmonic drive to vibrate or produce abnormal noise during operation. Please follow these assembly precautions.

1. Wave Generator Precautions

(1) Avoid applying excessive force to the wave generator bearing area during assembly. Allow the wave generator to rotate smoothly as you insert it.
(2) If using an integrated wave generator, ensure that any center offset or tilt stays within the recommended limits.
(3) Mount the circular spline and flexspline onto the equipment as a unit before assembling the wave generator. Note: Do not assemble the wave generator from the flexspline diaphragm section.



2. Circular Spline Precautions

(1) Ensure the mounting surface is flat and properly aligned.
(2) Check that the screw hole area is not raised, free of burrs, and clear of any foreign objects.
(3) Make sure chamfering and relief machining have been performed on the housing mounting section to prevent interference with the circular spline.
(4) After installing the circular spline into the housing, verify that it can rotate freely and that there is no interference or binding at any point.
(5) When inserting bolts into the mounting holes, confirm that the holes are correctly positioned and that the bolts do not touch the circular spline. Issues such as angled drilling or machining can cause the bolts to bind.
(6) Do not tighten the bolts to full torque all at once. First, tighten them to about half the specified torque, then fully tighten to the specified value. In addition, always tighten bolts in a diagonal sequence.
(7) Avoid using dowel pins in the circular spline, as this can reduce rotational accuracy.

3. Flexspline Precautions

(1) Ensure the mounting surface is flat and properly aligned.
(2) Check that the screw hole area is not raised, free of burrs, and clear of any foreign objects.
(3) Make sure chamfering and relief machining have been performed on the housing mounting section to prevent interference with the flexspline.
(4) After installing the flexspline into the housing, verify that it can rotate freely and that there is no interference or binding at any point.
(5) When inserting bolts into the mounting holes, confirm that the holes are correctly positioned and that the bolts do not touch the flexspline. Issues such as angled drilling or machining can cause the bolts to bind.
(6) Do not tighten the bolts to full torque all at once. First, tighten them to about half the specified torque, then fully tighten to the specified value. In addition, always tighten bolts in a diagonal sequence.
(7) When assembling the flexspline, do not strike the open end of the gear or use excessive force to press it in.

4. Other Precautions

(1) Assemble the harmonic drive in a clean environment. Prevent any foreign matter from entering the harmonic drive during installation to avoid damage.
(2) Always keep the gear tooth surfaces and the flexspline bearing section properly lubricated. Avoid installing the harmonic drive with the gear teeth facing upward, as this can impair lubrication.

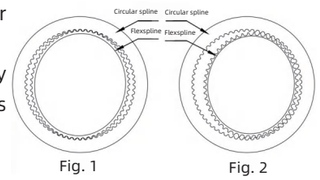


Fig. 1 Fig. 2

PRECAUTIONS FOR THE USE OF GREASE

I. Precautions for Using Grease

(1) Grease is pre-applied to the internal hidden components of both cup-shaped unit type and hat-shaped hollow unit type harmonic drive at the factory. However, grease must also be applied or injected when assembling the wave generator.
(2) The input and output ends of the harmonic drive must be designed with a reliable sealing structure. For dynamic sealing areas, a skeleton oil seal is recommended. For static sealing areas, use an O-ring or sealant, and ensure that the sealing surfaces are flat and undamaged.
(3) Only use the recommended semi-fluid grease specifically designed for harmonic drive. Do not mix it with other types of grease.
(4) Always follow the instructions in the manual when applying grease. Please note that the injection and required amount of grease may vary depending on the model.
(5) If the wave generator is positioned facing upwards during operation, lubrication may be insufficient. In such cases, increase the amount of grease applied or contact our company for guidance.
(6) Grease performance is affected by temperature; higher temperatures cause grease to deteriorate more quickly. To maintain optimal grease condition, ensure that the thermal equilibrium temperature at the high-temperature end of the harmonic drive does not exceed 70°C and the temperature rise stays less than 40°C.
(7) The wear of moving parts in the harmonic drive is mainly influenced by the condition of the grease. If possible, replace the grease every 3,000 operating hours.

II. Grease Replacement Interval

The wear of moving parts in the harmonic drive is largely determined by the condition of the grease.
Grease performance is affected by temperature; higher temperatures cause grease to deteriorate more quickly. Therefore, it is important to replace it as soon as possible. As shown in the figure below, when the average load torque is less than the rated torque, you can determine the recommended grease replacement interval based on the relationship between grease temperature and the total number of wave generator revolutions. If the average load torque exceeds the rated torque, calculate the grease replacement interval using the following formula.

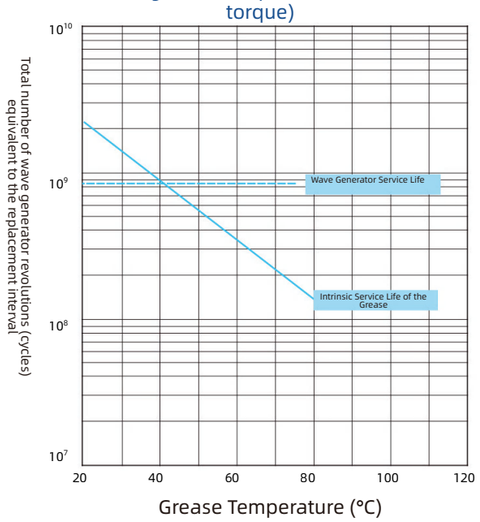
Formula for calculating replacement interval when average load torque exceeds rated torque:

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

Symbols in the Formula

L_{GT}	Replacement interval when exceeding the rated torque	Rotational speed	—
L_{GTn}	Replacement interval when below the rated torque	Rotational speed	Refer to the figure below
Tr	Rated torque	Nm,kgfm	Refer to the "Parameters" for each series
Tav	Average load torque on the output side	—	Determine based on operating conditions

Grease replacement interval: L_{GTn} (when the average load torque is below the rated torque)



※ The service life of the wave generator is based on a 10% failure rate.

Other Precautions:
① Do not mix with other greases. When assembling the device, ensure that the harmonic drive is installed in a separate housing.
② If you use the harmonic drive with the wave generator facing upward and operating at low speed in a single direction under a constant load (input speed below 1,000r/min), inadequate lubrication may occur. In such cases, please consult us before use.
③ Grease leakage in unit-type products: Although unit-type products are designed with leakage preventive measures, please reinforce the sealing structure as needed for your operating environment.

SAFETY PRECAUTIONS

WARNING	Indicates that incorrect operation may result in death or serious injury.
CAUTION	Indicates that incorrect operation may result in injury or property damage.

Disposal

CAUTION

Dispose of the product in accordance with industrial waste regulations.

- When disposing of the product, treat it as industrial waste.

Design Precautions (Please read the manual thoroughly before designing.)

CAUTION

Use the product only within the specified environment. When using the harmonic drive, please adhere to the following requirements.

- Ambient temperature: 0–40°C
- No exposure to water, oil, etc.
- No corrosive or explosive gases
- No dust, such as metal powder

Install using the specified method.

- Follow the correct assembly procedures and sequence as described in the product catalog.
- Use the recommended tightening methods (e.g., bolts) as specified by our company.
- Incorrect assembly may result in vibration, reduced service life, decreased accuracy, damage, or any other failures.

Install to the specified accuracy.

- Design and assemble each component to achieve the recommended installation accuracy listed in the product catalog.
- Failure to meet the specified accuracy may lead to vibration, reduced service life, decreased accuracy, damage, or any other failures.

Use only the specified grease.

- Using grease not recommended by our company may shorten the product's service life. In addition, replace the grease according to the specified conditions.
- Unit type products are pre-filled with grease. Do not mix with other greases.

Precautions for Use (Please read the manual thoroughly before operation.)

CAUTION

Handle the product and its components with care.

- Do not strike any components or units with a hammer or similar tools. In addition, avoid causing cracks, dents, or other damage from dropping or impacts. Otherwise, the product may be damaged.
- Do not use the product if it is damaged, as this may lead to malfunction or breakage.

Do not exceed the allowable torque during use.

- Never apply torque beyond the Instantaneous permissible max. torque. Exceeding torque limits may cause bolts to loosen, wobbling, breakage, or other failures.
- If the output shaft is directly connected to a joint arm, collisions may cause damage or loss of control.

Do not interchange parts between sets.

- Each part is manufactured as a matched set. Mixing with other sets will compromise performance.

Do not disassemble the unit-type products.

- Disassembly and reassembly are strictly prohibited, as original performance cannot be restored.

Handling Grease

WARNING

Installation Precautions

- If grease gets into the eyes, it may cause inflammation. Wear safety glasses to prevent splashing.
- Contact with skin may cause irritation. Wear protective gloves to avoid direct contact.
- Do not swallow grease (may cause diarrhea, vomiting, etc.).
- Be careful not to cut your fingers when opening the container. Wear protective gloves.
- Keep out of reach of children.

First Aid

- If grease gets into eyes, rinse immediately with clean water for 15 minutes and seek medical attention.
- If it contacts skin, wash thoroughly with soap and water.
- If swallowed, do not induce vomiting; seek medical attention immediately.

CAUTION

Storage

- After use, seal the container to prevent contamination by dust or moisture. Store in a cool, shaded place away from direct sunlight.
- For long-term storage, check product performance and rust prevention as needed.
- For details on surface treatment, refer to the delivery drawings.

Disposal of Waste Oil and Containers

- Users are responsible for complying with all applicable laws and regulations regarding proper disposal methods. Dispose of them properly in accordance with applicable laws and regulations. If unsure, consult us before disposal.
- Do not apply pressure to empty containers, as they may rupture.
- Do not weld, heat, drill, or cut containers, as this may cause explosions or fires due to residual contents

WARRANTY

The warranty period and coverage for our harmonic drive are as follows:

Warranty Period

If the product is used under normal assembly and lubrication conditions as described in the instruction manual,
the warranty period is one year from delivery or 8,000 operating hours, whichever comes first.

Warranty Coverage

If a failure occurs due to a manufacturing defect within the warranty period, we will repair or replace the product.
However, the warranty does not cover:
(1) Failures caused by improper operation or non-compliant use.
(2) Failures resulting from modifications or repairs not performed by us.
(3) Failures not attributable to this product.
(4) Failures caused by natural disasters or other causes beyond our control.

This warranty covers only the product itself.
Any additional losses, including labor or costs related to installation or removal, are not covered.