Laifual Drive®
Stock Code: 03952.HK



STRAIN WAVE GEAR

Reducer for precision control

General Catalog

Laifual Drive Co., Ltd.

Laifual Drive®



About Laifual Drive

Laifual Drive Co., Ltd. (stock code:03952.HK) is a global provider of precision transmission solutions, with fully integrated R&D and manufacturing capabilities. We focus on three core business segments: strain wave gears, joint modules, precision components, and planetary gearboxes.

Laifual offers a complete range of strain wave gears (sizes 3–58) and rotary actuators (sizes 40–190), backed by a fully integrated supply chain that spans raw materials to finished products. Our 52,000 m² state-ofthe-art facility is equipped with imported production and testing equipment, and we enforce rigorous quality control at every stage.

Supported by multiple R&D centers and joint university laboratories, we continuously enhance technological independence and production efficiency, driving down costs and shortening lead times. Today, our products are widely applied in high-precision sectors, including humanoid and industrial robotics, aerospace, CNC machine tools, semiconductor equipment, and precision automation systems.

For more information, please visit our website: *www.laifualdrive.com*

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Product Lineup

Product Lineup

● Available — This is currently available.
○ Not Available — This is temporarily not available.


FSS/FSG-C-I


FSS/FSN/FSG-I


FSS/FSG-II


LFS-I


FSD


FHT/FHG-I


FHT/FHG-II


FHT/FHN/FHG-III


FHT/FHN/FHG-IV


FHT/FHG-V


FHD-I


FHD-III

			Model	Size	30 Ratio	50 Ratio	80 Ratio	100 Ratio	120 Ratio	160 Ratio
Component Type	Cup Type	Standard Type	FSS-XX-C-I	5	○	●	○	●	○	○
				8	●	●	○	●	○	○
				11	●	●	●	●	○	○
				14	●	●	●	●	●	○
				17	●	●	●	●	●	○
				20	●	●	●	●	●	●
				25	●	●	●	●	●	●
				32	●	●	●	●	●	●
				40	○	●	●	●	●	●
		High Torque Type	FSG-XX-C-I	14	●	●	●	●	●	○
				17	●	●	●	●	●	○
				20	●	●	●	●	●	●
				25	●	●	●	●	●	●
				32	●	●	●	●	●	●
				40	○	●	●	●	●	●
				45	○	●	●	●	●	●
				50	○	○	●	●	●	○
	Hat Type	Standard Type	FHT-XX-C-I	11	●	●	●	●	○	○
				14	●	●	●	●	●	○
				17	●	●	●	●	●	○
				20	●	●	●	●	●	●
				25	●	●	●	●	●	●
				32	●	●	●	●	●	●
				40	○	●	●	●	●	●
		High Torque Type	FHG-XX-C-I	14	●	●	●	●	●	○
				17	●	●	●	●	●	○
				20	●	●	●	●	●	●
				25	●	●	●	●	●	●
				32	●	●	●	●	●	●
				40	○	●	●	●	●	●
				45	○	○	●	●	●	○
				50	○	○	●	●	●	○
	Double Circular Spline Type	Flat and Thin Type	FBS-XX-C-I	11	○	○	○	●	○	○
				14	○	●	●	●	○	○
				17	○	●	●	●	○	○
				20	○	●	●	●	○	○
				25	○	●	●	●	○	○
				32	○	●	●	●	○	○
				40	○	○	○	○	○	○
				50	○	○	○	○	○	○
Units	Cup Type	Standard Type	FSS-XX-U-I	14	●	●	●	●	●	○
				17	●	●	●	●	●	○
				20	●	●	●	●	●	●
				25	●	●	●	●	●	●
				32	●	●	●	●	●	●
				40	○	●	●	●	●	●
			FSS-XX-U-II	14	○	●	●	●	●	○
				17	○	●	●	●	●	○
				20	○	●	●	●	●	●
				25	○	●	●	●	●	●
				32	○	●	●	●	●	●
			FSF-XX-U-I	14	●	●	●	●	●	○
				17	●	●	●	●	●	○
				20	●	●	●	●	●	●
				25	●	●	●	●	●	●
				40	○	●	●	●	●	●
			LFS-XX-U-I	11	○	●	●	●	○	○
				14	○	●	●	●	○	○
		Lightweight Standard Type	FSN-XX-U-I	3	○	○	○	○	○	○
				5	○	●	○	●	○	○
				8	●	●	○	●	○	○
				11	●	●	●	●	○	○
				14	●	●	●	●	●	○
				17	●	●	●	●	●	○
				20	●	●	●	●	●	●
				25	●	●	●	●	●	●
				32	●	●	●	●	●	●
				40	○	●	●	●	●	●
			FSN-XX-U-II	14	●	●	●	●	●	○
				17	●	●	●	●	●	○
				20	●	●	●	●	●	●
				25	●	●	●	●	●	●
				32	●	●	●	●	●	●
		High Torque Type	FSG-XX-U-I	14	○	●	●	●	●	○
				17	○	●	●	●	●	○
				20	○	●	●	●	●	●
				25	○	●	●	●	●	●
				32	○	●	●	●	●	●
				40	○	●	●	●	●	●
				45	○	●	●	●	●	●
				50	○	○	○	○	○	○
			FSG-XX-U-II	14	○	●	●	●	●	○
				17	○	●	●	●	●	○
				20	○	●	●	●	●	●
				25	○	●	●	●	●	●
				32	○	●	●	●	●	●
		Ultra Flat Type	FSD-XX-U-I	14	○	●	●	●	○	○
				17	○	●	●	●	●	○
				20	○	●	●	●	○	○
				25	○	●	●	●	○	○
				32	○	●	●	●	○	○

			Model	Size	30 Ratio	50 Ratio	80 Ratio	100 Ratio	120 Ratio	160 Ratio
Units	Hat Type	Standard Type	FHT-XX-U-I	11	●	●	●	●	○	○
				14	●	●	●	●	●	○
				17	●	●	●	●	●	○
				20	●	●	●	●	●	●
				25	●	●	●	●	●	●
				32	●	●	●	●	●	●
				40	○	●	●	●	●	●
			FHT-XX-U-II	14	●	●	●	●	●	○
				17	●	●	●	●	●	○
				20	●	●	●	●	●	●
				25	●	●	●	●	●	●
				32	●	●	●	●	●	●
		Hollow Shaft Type	FHT-XX-U-III	11	●	●	●	●		○
				14	●	●	●	●	●	○
				17	●	●	●	●	●	○
				20	●	●	●	●	●	●
				25	●	●	●	●	●	●
				32	●	●	●	●	●	●
				40	○	●	●	●	●	●
		Shaft Input Type	FHT-XX-U-IV	14	●	●	●	●	●	○
				17	●	●	●	●	●	○
				20	●	●	●	●	●	●
				25	●	●	●	●	●	●
				32	●	●	●	●	●	●
				40	○	●	●	●	●	●
		Simple Hollow Shaft Type	FHT-XX-U-V	14	●	●	●	●	●	○
				17	●	●	●	●	●	○
				20	●	●	●	●	●	●
				25	●	●	●	●	●	●
				32	●	●	●	●	●	●
				40	○	●	●	●	●	●
		Lightweight Hollow Shaft Type	FHN-XX-U-III	14	●	●	●	●	●	○
				17	●	●	●	●	●	○
				20	●	●	●	●	●	●
				25	●	●	●	●	●	●
				32	●	●	●	●	●	●
				40	○	●	●	●	●	●
		Shaft Input Type	FHN-XX-U-IV	14	●	●	●	●	●	○
				17	●	●	●	●	●	○
				20	●	●	●	●	●	●
				25	●	●	●	●	●	●
				32	●	●	●	●	●	●
				40	○	●	●	●	●	●
		High Torque Standard Type	FHG-XX-U-I	14	○	●	●	●	●	○
				17	○	●	●	●	●	○
				20	○	●	●	●	●	●
				25	○	●	●	●	●	●
				32	○	●	●	●	●	●
				40	○	●	●	●	●	●
				45	○	○	●	●	●	●
				50	○	○	●	●	●	●
				58	○	○	●	●	●	●
			FHG-XX-U-II	14	○	●	●	●	●	○
				17	○	●	●	●	●	○
				20	○	●	●	●	●	●
				25	○	●	●	●	●	●
				32	○	●	●	●	●	●
		High Torque Hollow Shaft Type	FHG-XX-U-III	14	○	●	●	●	●	○
				17	○	●	●	●	●	○
				20	○	●	●	●	●	●
				25	○	●	●	●	●	●
				32	○	●	●	●	●	●
				40	○	●	●	●	●	●
				45	○	○	●	●	●	●
				50	○	○	●	●	●	○
				58	○	○	○	○	○	○
		High Torque Shaft Input Type	FHG-XX-U-IV	14	○	●	●	●	●	○
				17	○	●	●	●	●	○
				20	○	●	●	●	●	●
				25	○	●	●	●	●	●
				32	○	●	●	●	●	●
				40	○	●	●	●	●	●
		High Torque Simple Hollow Shaft Type	FHG-XX-U-V	14	○	●	●	●	●	○
				17	○	●	●	●	●	○
				20	○	●	●	●	●	●
				25	○	●	●	●	●	●
				32	○	●	●	●	●	●
				40	○	●	●	●	●	●
				45	○	○	●	●	●	●
				50	○	○	●	●	●	●
				58	○	○	●	●	●	●
		High Torque Lightweight Hollow Shaft Type	FHNG-XX-U-III	14	○	●	●	●	●	○
				17	○	●	●	●	●	○
				20	○	●	●	●	●	●
				25	○	●	●	●	●	●
				32	○	●	●	●	●	●
				40	○	●	●	●	●	●
		High Torque Lightweight Shaft Input Type	FHNG-XX-U-IV	14	○	●	●	●	●	○
				17	○	●	●	●	●	○
				20	○	●	●	●	●	●
				25	○	●	●	●	●	●
				32	○	●	●	●	●	●
				40	○	●	●	●	●	●
		Ultra Flat Simple Unit Type	FHD-XX-U-I	8	○	●	○	●	○	○
				11	○	●	●	●	○	○
				14	○	●	●	●	○	○
				17	○	●	●	●	●	○
				20	○	●	●	●	○	○
				25	○	●	●	●	○	○
				32	○	●	●	●	○	○
		Super Flat Hollow Shaft Type	FHD-XX-U-III	14	○	●	●	●	○	○
				17	○	●	●	●	○	○
				20	○	●	●	●	○	○
				25	○	●	●	●	○	○
				32	○	●	●	●	○	○
Miniature	Cup Type	Lightweight Unit Type	FSN-XX-U-I	3	●	●	○	○	○	○
				5	○	●	○	●	○	○
				8	○	●	○	●	○	○
				11	○	●	●	●	○	○
	Hat Type	Standard Unit Type	FHT-XX-U-I	11	●	●	●	●	○	○

Principle of Strain Wave Gear

Composition of Strain Wave Gear

Strain Wave Gear consist of three basic components: Wave generator, flexspline and circular spline.

Wave generator: it is made up of a wave bearing and an elliptical cam. The Wave generator is usually attached to the input end. The inner ring of the bearing is fixed around the cam, causing the outer ring of the bearing deform into an elliptical shape.

Flexspline: it is an elastic thin-walled component with teeth on outer surface. It is usually mounted to output end.

Circular Spline: it is a rigid ring with internal teeth. It usually has two more teeth than the flexspline, and generally mounted to the housing.

Working Principle

As a reducer, the strain wave gear typically operates with the Wave generator as the driving element, the circular spline is fixed, the flexspline serving as the output.

When the Wave generator is placed inside the flexspline, the flexspline is deformed into an elliptical shape, causing its teeth to engage with those of the circular spline along the major axis of the ellipse. Along the minor axis, the teeth are completely disengaged.

As the Wave generator rotates, it continuously deforms the flexspline. The gear teeth go through cycles of engagement and disengagement, thus transmitting motion from the Wave generator to the flexspline.

Characteristics of Strain Wave Gear

High Accuracy: A significant portion of the teeth are always engaged in two zones 180 degrees apart. This neutralizes the effects of tooth pitch errors and accumulated pitch errors, ensuring high positional and rotational accuracy.

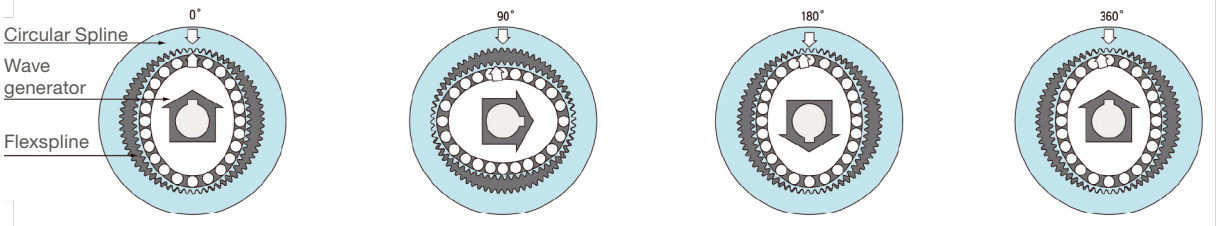
High Reduction Ratio: Strain Wave Gear offer high single-stage reduction ratios ranging from 1/30 to 1/500. The three core components are aligned along a common axis, enabling high ratios without complex structures.

High Torque Capacity: Each tooth experiences minimal load, yet the gear provides high torque capacity due to the large number of teeth engaged simultaneously.

Small Size and Lightweight: While being smaller and lighter than conventional gearing mechanisms, the strain wave gear provides the same levels of torque and speed reduction ratios as its conventional counterparts, enabling machinery and equipment to be more compact and lightweight.

It also offers superior efficiency, a long service life, and quiet operation with minimal vibration.





The flexspline is deformed into an elliptical shape by the Wave generator, causing its teeth to engage with those of the circular spline along the major axis of the ellipse, while completely disengaging along the minor axis.

With the circular spline fixed, as the Wave generator rotates clockwise, the flexspline undergoes continuous elastic deformation, causing the tooth engagement region to shift gradually along the circular spline.

When the Wave generator rotates 180 degrees clockwise, the flexspline moves one tooth counterclockwise relative to the circular spline.

For every full 360-degree clockwise rotation of the Wave generator, the flexspline moves two teeth counterclockwise relative to the circular spline, due to having two fewer teeth. This relative motion is typically used as the output of the system.

Technical Information

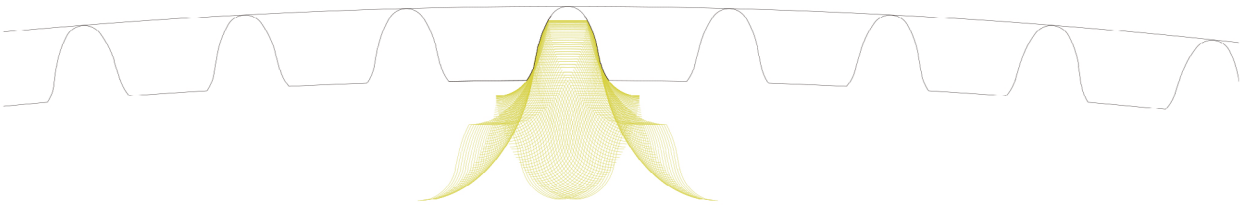
ON THE TOOTH PROFILE

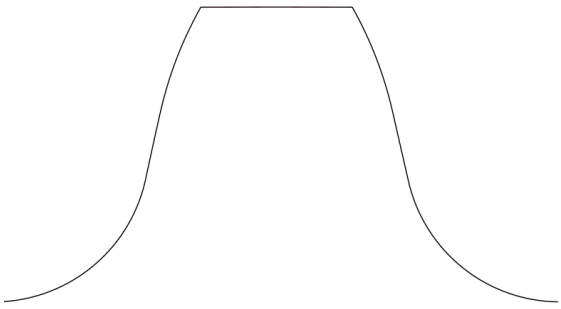
Laifual Tooth Engagement - Step-by-Step Improvement

- Torque capacity increase 15%-30%
- Temperature rise decreased by 8-10℃
- Minimize the tooth surface contact area prone to fatigue pitting
- Service life exceeds 15,000 hours

About FS tooth profile

We have made several upgrades to the traditional theoretical double-arc profile. The original two-curve continuous arc profile has been optimized into a multi-segment continuous arc with varying curvatures. This ensures proper gear meshing in the reducer while reducing relative sliding friction, thereby mitigating the risk of grease failure caused by grease displacement. Based on the 5-tooth design, the load capacity is increased by 15%, the temperature rise is reduced by 8–10°C, and the gear contact area affected by fatigue pitting is reduced by more than 30%. The continuous operating life now exceeds 15,000 hours, significantly improving the overall performance of the strain wave gearbox.





During development, the formation of the flex-spline tooth profile can be defined by the radial displacement of the Wave generator. Different reduction ratios can be achieved by matching various tooth profiles, and the meshing backlash can be conveniently adjusted according to actual conditions, ensuring that the reducer operates in an optimal working state.

TERMS AND DEFINITIONS

Starting Torque

It is the minimum torque value applied to the input end at which the strain wave gear first starts to rotate with no load.

Permissible Peak Torque for Start and Stop

It is the maximum torque as a result of the moment of inertia of the output load during acceleration and deceleration.

Permissible Maximum Momentary Torque

It is the momentary peak torque the strain wave gear may be subjected to the event of a collision or emergency stop.

Maximum Average Input Speed

It is the average value of input speed.

Rated Torque

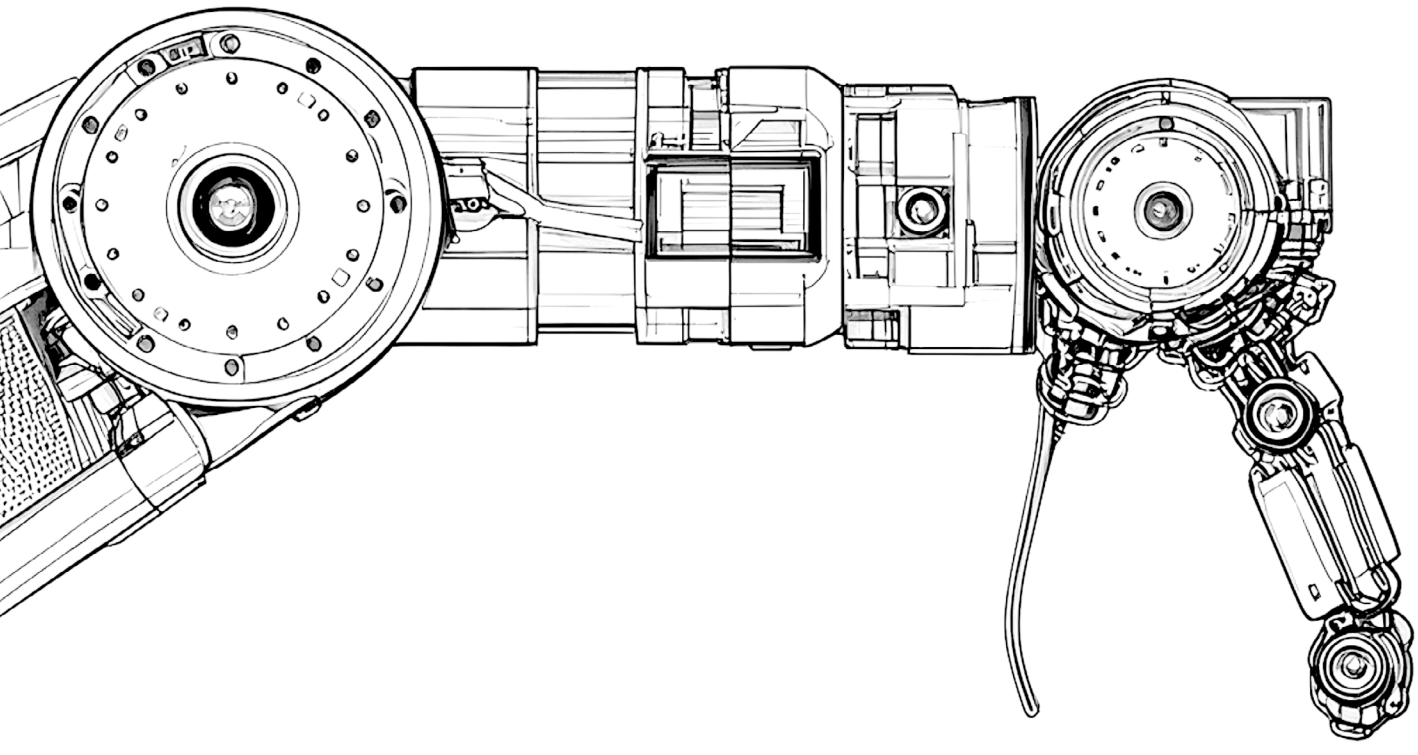
It indicates allowable continuous load torque when the rated input speed is 2000r/min.

Permissible Maximum Value for Average Load Torque

It is the maximum torque when the strain wave gear keeps continuous operation.

Maximum Input Speed

It is the maximum allowable input rotational speed.



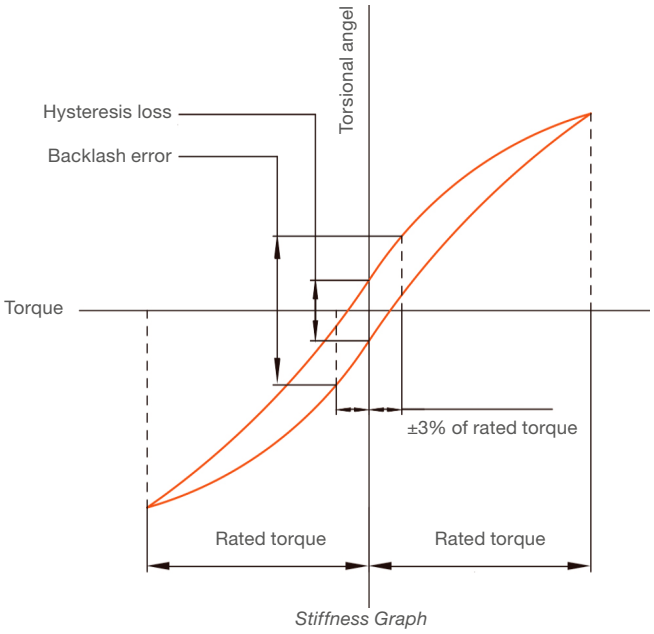
TERMS AND DEFINITIONS

Angle Transmission Accuracy

Angle transmission accuracy indicates the difference between the logical rotating angle and the actual rotating angle as the angle transmission error when any rotating angle is given as an input.

Stiffness Diagraph

From the stiffness graph, parameters such as backlash, stiffness, hysteresis loss, and lost motion can be obtained. →



Backlash

Fix the circular spline and input end (Wave generator) of the strain wave gear, and when ±2% rated torque is applied to the output end (flexspline), a small amount of angular displacement at the output end is observed, which is expressed as backlash.

Torsional Stiffness (Spring Constant)

Fix the circular spline and input end (Wave generator) of the strain wave gear, and apply torque to the output end (flexspline). The applied torque starts from 0 and increases or decreases to the rated torque on the positive and negative sides respectively. The change of the torsion angle at the output side can be slotted as 'stiffness curve', and the inclination of the stiffness curve can be expressed as the spring constant (unit: Nm/rad)

KI... the spring constant for the torque from '0' to 'T1'

K2... the spring constant for the torque from 'T1' to 'T2'

K3... the spring constant for the torque from 'T2' to rated torque

Hysteresis loss

Fix the circular spline and input end (Wave generator) of the strain wave reducer,and apply torque to the output end (flexspline) until the rated torque, when the torque returns to “0”, the torsion angle does not become '0' completely, there will be a slight amount of clearance is left. This amount of clearance is called hysteresis loss.

Backlash Error

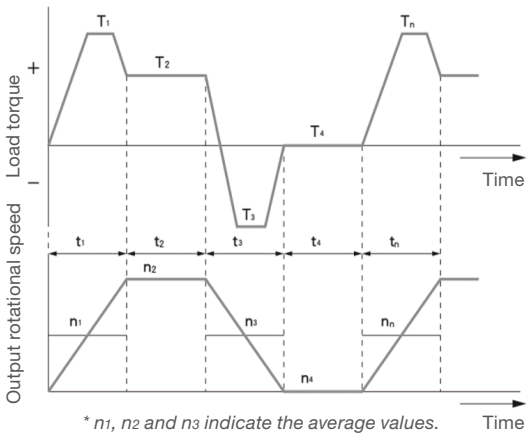
In the hysteresis curve, when the horizontal coordinate is +3% of the rated torque, the average of the two corresponding rotation-angle values on the forward curve is defined as θ_1. When the horizontal coordinate is –3% of the rated torque, the average of the two corresponding angle values on the reverse curve is defined as θ_2. The difference between θ_1 and θ_2 is defined as the lost motion of the test specimen.

SELECTION PROCESS

In general, the servo system is rarely in a continuous constant loadstate. The input rotational speed, load torque change and comparatively large torque are applied at start and stop.Unexpected impact torque may be applied.

These fluctuating load torques should be converted to the average load torque in selecting a Model number.

As an accurate cross roller bearing is built in the direct external load support (output flange) of the unit type, the maximum moment load, life of the cross roller bearing and the static safety coefficient should also be checked (see 'Checking the main roller bearing' on Page 23)



* n1, n2 and n3 indicate the average values.

Obtain the value of each load torque pattern.

Load torque	Tn(Nm)
Time	tn(sec)
Output rotational speed	Nn(r/min)
<Normal operation pattern>	
Starting time	T1, T1, n1
Steady operation time	T2, T2, n2
Stopping (slowing) time	T3, T3, n3
Break time	T4, T4, n4
<Maximum rotational speed>	
Max. output rotational speed	no max
Max. input rotational speed (Restricted by motors)	ni max
<Impact torque>	
When impact torque is applied	Ts, Ts, n4
< Required life >	
	Lio= L(hours)

Flowchart of Model number selection

Select a Model number according to the following flowchart. If you find a value exceeding that from the ratings, you should review it with the upper-level Model number or consider reduction of conditions including the load torque.

Calculate the average load torque applied on the output side of strain wave gear from the load torque pattern: Tav(N.m).

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

Select a Model number temporarily with the following conditions.
Tav≤ Permissible maximum value of the average load torque

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

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

Obtain the reduction ratio (R).A limit is placed on 'ni max' by motors.

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

Calculate the average input rotational speed from the average output rotational speed (no av and the reduction ratio (R): ni av (r/min)

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

Calculate the maximum input rotational speed from the max. output rotational speed (no max) and the reduction ratio (R): ni max(r/min)

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

NG: Check whether the temporarily Ni av≤Permissible average input rotational selected Model number speed (r/min)
Satisfies the following condition Ni max≤Permissible max. input rotational from the ratings speed (r/min)

OK

NG: Check whether T1 and T3 are equal to or less than the permissible peak torque (Nm) value at start and stop from the ratings.

OK

NG: Check whether Ts is equal to or less than the permissible maximum momentary torque (Nm) value from the ratings.

OK

NG: Calculate (Ns) the permissible number of times from output rotational speed ns and time ts when the impact torque is applied, and check whether it satisfies the usage conditions.

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

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

OK

Calculate the lifetime.

$$L_{10} = 7000 \cdot \left(\frac{Tr}{Tav}\right)^3 \cdot \left(\frac{nr}{ni\ av}\right)\ (hours)$$

NG: Check whether the calculated lifetime is equal to or more than the life of the Wave generator.

OK

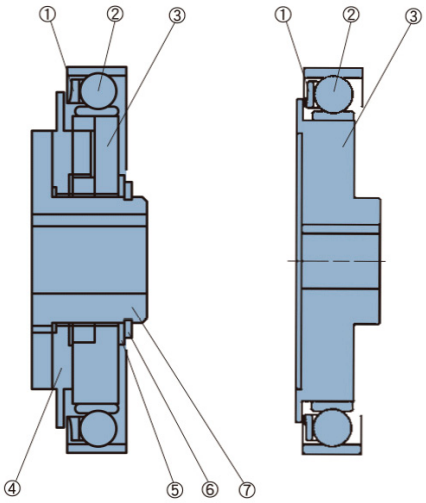
The Model number is determined.

Review of the operation conditions and Model number

ON THE Wave generator

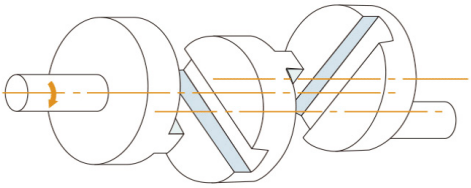
The Wave generator includes a structure of a European-style coupling with a self-aligning structure and an rigid type without an automatic self-aligning structure and varies depending on the series. For details, please refer to the outline drawing of each series.

Basic structure and shape of Wave generator shown as below.



Oldham coupling　　Rigid type

Oldham coupling Structure - Utiling a European Style Coupling



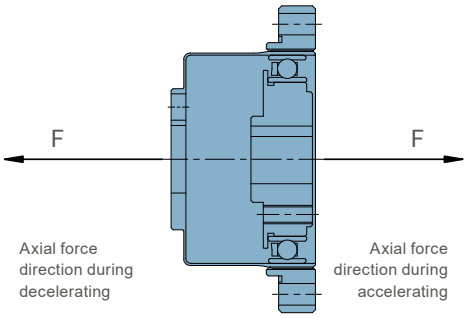
① Retainer
② Wave bearing
③ Wave generator Plug
④ Insert hole
⑤ Rubwasher
⑥ C type retaining ring
⑦ Wave generator hub

Axial force and axial fixation of Wave generator

The axial force on Wave generator begins to work due to the elastic deformation of the flexspline. When used as a reducer,the axial force moves towards the inside of the flexspline. When used as a speed increaser, the axial forces movement is opposite to the direction of the deceleration. The design to prevent axial force of the Wave generator shall be adopted under any conditions of usage.

** Please make sure to consult with the authorized distributor when setting the stop screw and fixing it to the input axial on the Wave generator.*

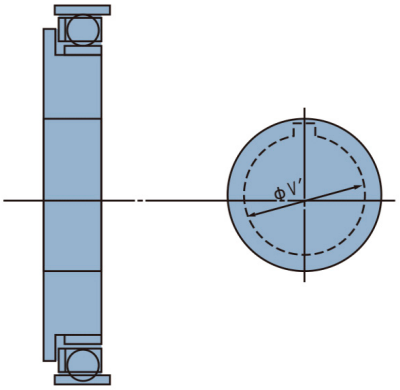
Axial force direction of the Wave generator



Maximum hole diameter of Wave generator of Unit Type

The standard hole diameter of the Wave generator is shown in the outline drawing and maybe changed in the range up to the maximum size range shown in the table.

We recommend the dimension of keyway based on (GB) standard. It is necessary that the dimension of keyways should be fully durable the transmission torque.



Hole diameter of Wave generator

unit: mm

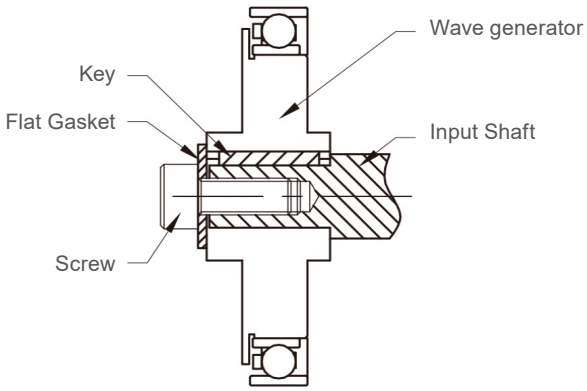
Model	5	8	11	14	17	20	25	32	40	45	50	58
Standards size(H7)	3	5	5、6、8	6、8	8、11、14	8、11、14	11、14	14、19、22	14、19、22	19、22	19、22	\
Minimum size	\	\	5	6	8	8	11	14	14	19	19	
Maximum size	\	\	8	8	14	14	14	22	22	22	22	

** The hole diameter of the Wave generator can be customized according to customer requirements. Please contact the authorized distributor in case of any changes in the table.*

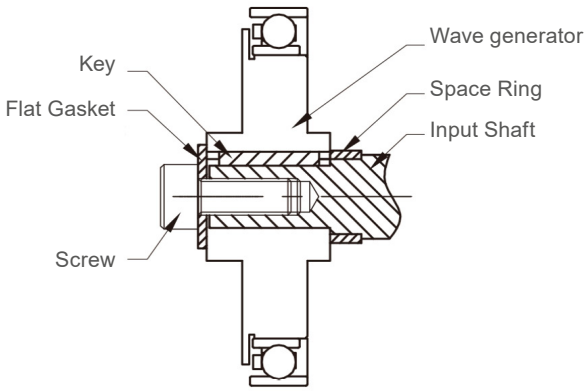
PRECAUTIONS ON ASSEMBLY

The connecting and fixing method of Wave generator

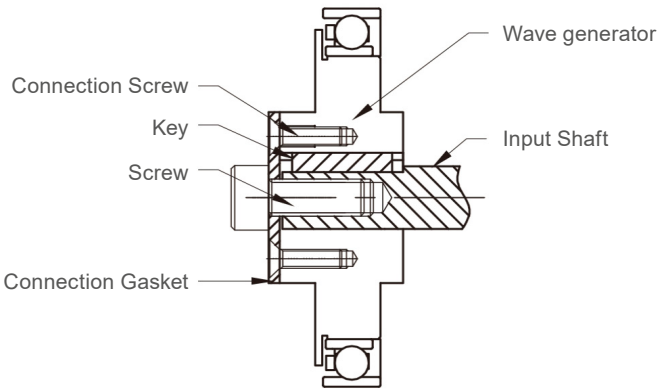
1. Input shaft has a shaft shoulder, it can be connected with Wave generator directly. As shown in the figure.



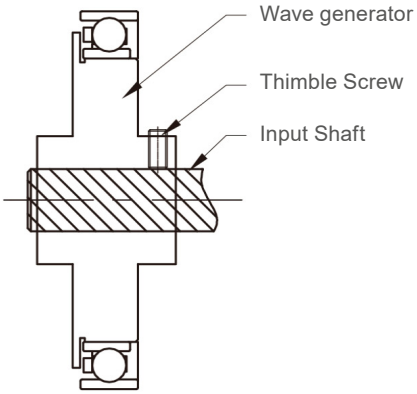
2. Input shaft has a shaft shoulder, but it's too long. You can add a space ring on the shaft(the parallelism of the spacer ring should be within 0.01mm), then connect and fix it through the thimble screw on the Wave generator. As shown in the figure.



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

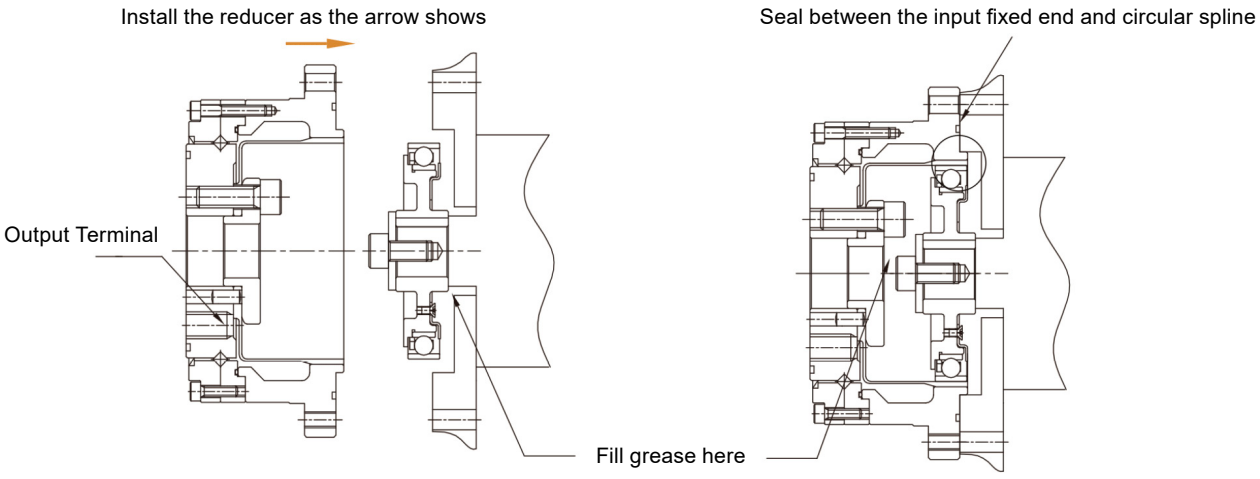


4. This fixing method is suitable for small Models, optical axis input. Input shaft inserted into the Wave generator, then connect and fix it through the thimble screw on Wave generator. As shown in the figure.

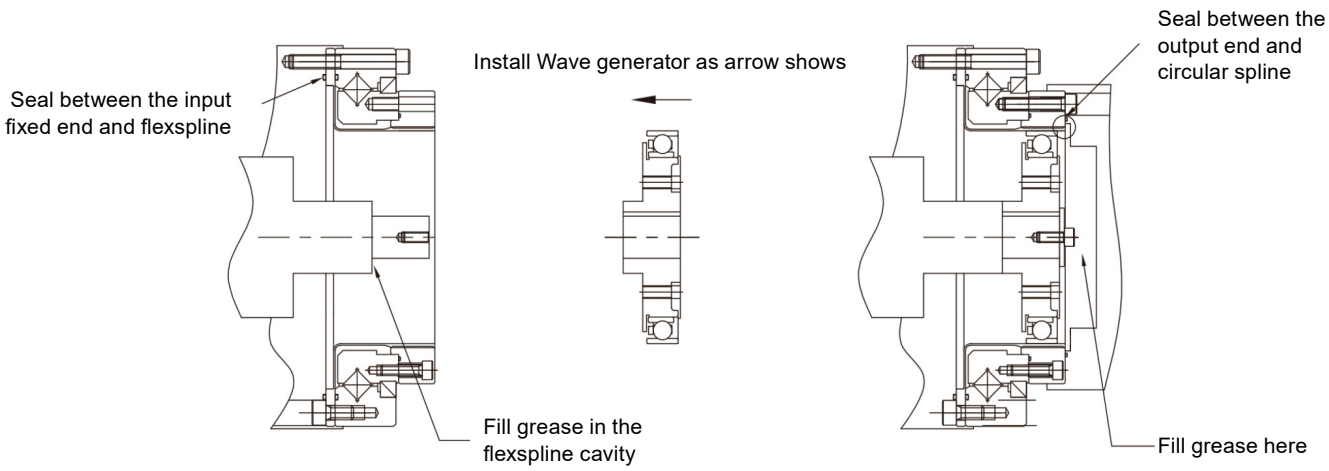


PRECAUTIONS ON ASSEMBLY

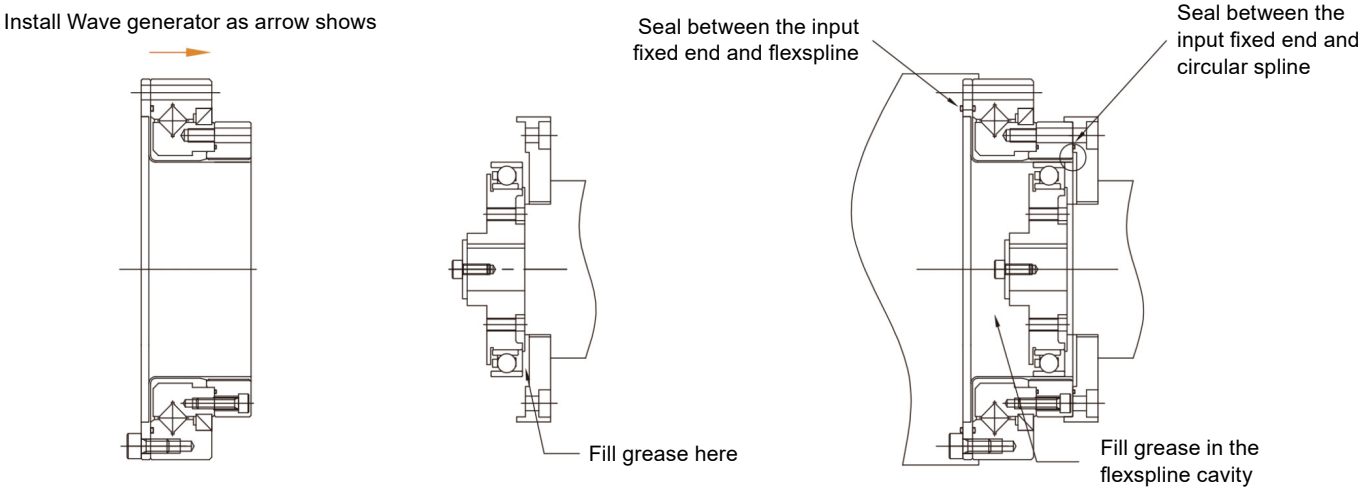
Installation of FSS/FSG/FSN series



The First Method of Installation for FHT/FHG-I/II Series



The Second Method of Installation for FHT/FHG-I/II Series

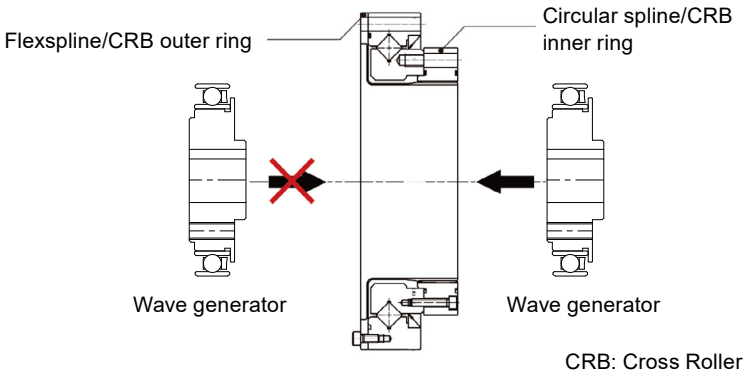


PRECAUTIONS ON ASSEMBLY

Assembly procedure

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

Correct assembly steps



CRB: Cross Roller Bearing

Precautions on installation:

The improper assembly may cause vibration and noise during operation.Please follow the precautions below for assembly

Precautions on Wave generator:

1.Please avoid applying undue force to the bearing on the Wave generator during assembly. We suggest rotating the Wave generator while inserting, this will ease the process.

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

Precautions on circular spline:

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

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

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

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

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

6.Don't tighten the bolts to the specified torque all at once. Tighten the bolts temporarily with about half the specified torque, then tighten them to the specified torque. Tighten them in an even, crisscross pattern.

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

Precautions on flexspline:

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

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

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

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

5.Don't tighten the bolts to the specified torque all at once. Tighten the bolts temporarily with about half the specified torque, then tighten them to the specified torque. Tighten them in an even, crisscross pattern.

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

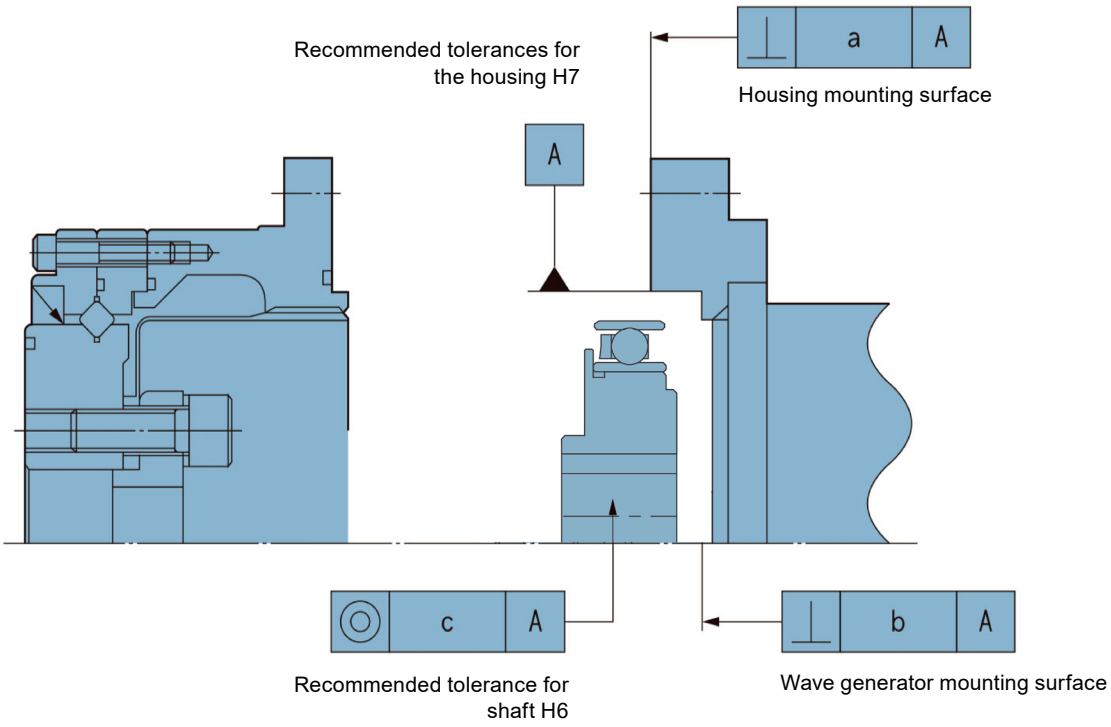
Rust prevention:

The complete assembly unit has no rust prevention treatment on the surface. If rust prevention is needed, please apply an anti-rust agent to the surface. Besides, if a specific anti-rust product is needed, please contact the authorized distributor.

PRECAUTIONS ON ASSEMBLY

Assembly accuracy of FS series

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



Recommended accuracy of the assembled housing

unit: mm

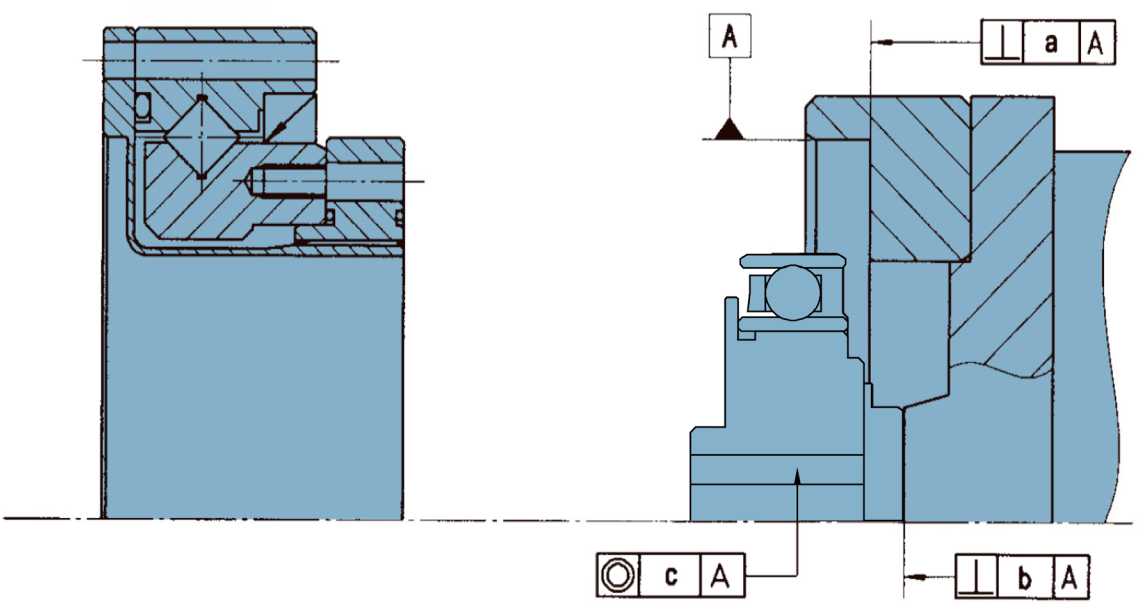
Symbol \ Model	5	8	11	14	17	20	25	32	40
a	0.008	0.01	0.011	0.011	0.015	0.017	0.024	0.026	0.026
b	—	—	—	0.017	0.02	0.02	0.024	0.024	0.032
	(0.005)	(0.006)	(0.007)	0.008	0.01	0.01	0.012	0.012	0.012
c	—	—	—	0.03	0.034	0.044	0.047	0.05	0.063
	(0.005)	(0.006)	(0.007)	0.016	0.018	0.019	0.022	0.022	0.024

** b.c is the value of the rigid type generator(I series)and the Oldham coupling generator(II series). The value in() is the value of the rigid type generator(I series).*

PRECAUTIONS ON ASSEMBLY

Assembly accuracy of FH series

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



Recommended accuracy of the assembled housing

unit: mm

Symbol \ Model	8	11	14	17	20	25	32	40	45	50
a	0.01	0.011	0.011	0.015	0.017	0.024	0.026	0.026	0.027	0.028
b	—	—	0.017	0.02	0.02	0.024	0.024	0.032	0.032	0.032
	(0.006)	(0.007)	0.008	0.01	0.01	0.012	0.012	0.012	(0.012)	(0.015)
c	—	—	0.03	0.034	0.044	0.047	0.05	0.063	0.063	0.066
	(0.006)	(0.007)	0.016	0.018	0.019	0.022	0.022	0.024	(0.024)	(0.03)

** b.c is the value of the rigid type generator(I series)and the Oldham coupling generator(II series). The value in() is the value of the rigid type generator(I series).*

PRECAUTIONS ON GREASE LUBRICANT

For Strain Wave Gear, the correct use of grease is essential to ensure normal operation and extend the service life of the gearbox. The following are the requirements for the use of grease in our company's Strain Wave Gear. Please follow these requirements when installing the gearbox.

Precautions for Using Grease

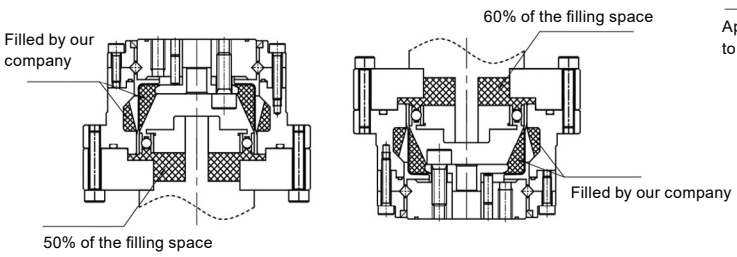
1. For type III and type IV gearboxes, the internal grease is already sealed before leaving the factory and can be installed and used directly without adding additional grease. For all Others Models, grease must be applied according to the corresponding requirements during installation.
2. Please use the special grease recommended by our company for Strain Wave Gear. Avoid mixing with Others greases, as different brands of grease may contain different additives and chemical components, which can cause chemical reactions, affecting the lubrication performance and service life of the gearbox.
3. Grease must be stored in a cool place, avoiding direct sunlight.
4. If grease has been stored for a long time, it needs to be stirred before use to avoid the separation of additives and base oil.
5. To prevent grease leakage, the input and output ends of the strain wave gearbox must be designed with strict sealing structures. For static sealing areas, it is recommended to use O-rings or sealant, and ensure that the sealing surface is not tilted or damaged. For dynamic sealing areas, it is recommended to use skeleton oil seals.
6. During the use of strain wave gearboxes, if the Wave generator is facing upwards and rotates in a fixed direction with a fixed load at low speed (input speed: less than 1000 r/min), poor lubrication may occur. In this case, increase the amount of grease injected or consult our company.
7. The performance of grease varies with temperature. To ensure the grease remains in good condition, maintain the grease temperature between -20℃ and 130℃ during use.If the grease temperature is found to be too high or too low, timely measures should be taken.
8. The wear of the moving parts in strain wave gearboxes is mainly affected by the performance of the grease. If conditions permit, the grease should be replaced after a cumulative working time of 3000 hours.

Grease Filling Quantity

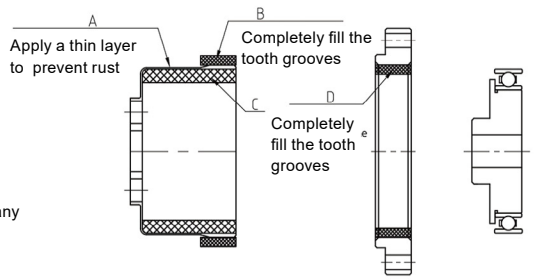
When adding grease, ensure the appropriate amount is added, neither too much nor too little. Overfilling can cause leakage, while underfilling can reduce the service life of the Strain Wave Gear. Apply grease according to the following requirements for each Model.

1.FS Series U (Complete Unit) Type

Wave generator facing down **Wave generator facing up**



2. FS Series C (Component) Type



Regular FSS-U/C Grease Filling Amount (g)

Specification	A	B	C			D
			Horizontal Use	Wave generator facing down	Wave generator facing up	
11	0.2	0.2	2.9	3.5	4.4	0.2
14	0.3	0.3	5.5	7	8.5	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	5	5	110	125	145	5

** Note: The cavity between the gearbox and the mounting flange should refer to the FS Series U (Complete Unit) Type.*

PRECAUTIONS ON GREASE LUBRICANT

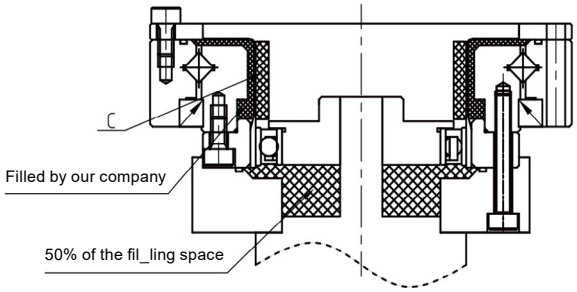
Ultra flat FSD Grease Filling Amount (g)

Specification	A	B	C			D
			Horizontal Use	Wave generator facing down	Wave generator facing up	
14	0.2	0.2	3.5	3.9	4.6	0.2
17	0.3	0.3	5.2	6	7.1	0.3
20	0.5	0.5	9	10	12	0.5
25	1	1	17	19	22	1
32	2	2	37	42	48	2

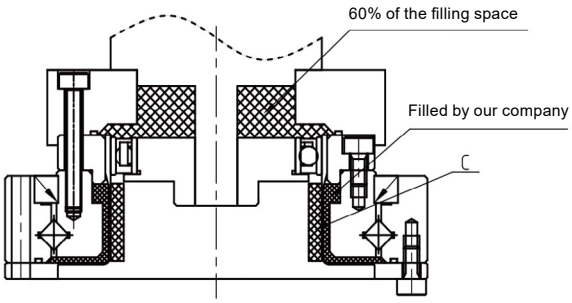
** Note: The cavity between the gearbox and the mounting flange should refer to the FS Series U (Complete Unit) Type.*

3. FH Series U (Complete Unit) Type

Wave generator facing down



Wave generator facing up



Regular Grease Filling Amount (g)

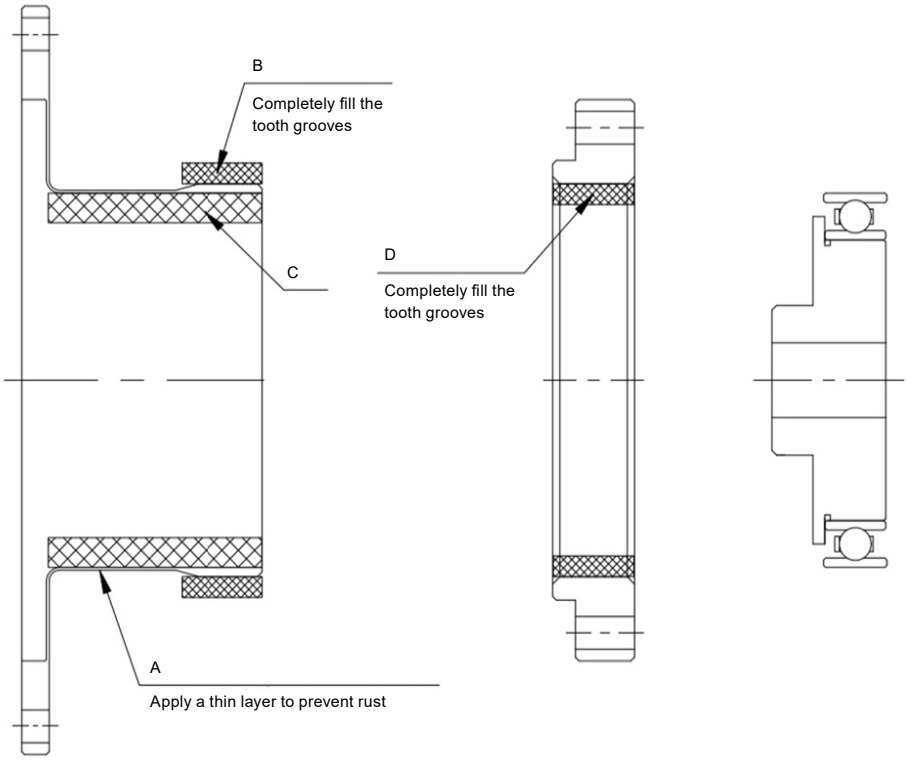
Specification	Horizontal Use	Wave generator facing down	Wave generator facing up
11	3.2	4	4.8
14	5.8	7.5	8.9
17	11	13	15
20	18	19	22
25	32	37	42
32	64	74	84
40	120	130	150

Ultra-Short Cylinder Grease Filling Amount (g)

Specification	C
14	5
17	9
20	13
25	24
32	51

PRECAUTIONS ON GREASE LUBRICANT

FH Series C (Component) Type



Regular Grease Filling Amount (g)

Specification	A	B	C			D
			Horizontal Use	Wave generator facing down	Wave generator facing up	
11	0.2	0.2	3.2	4	4.8	0.2
14	0.3	0.3	5.8	7.5	8.9	0.3
17	0.5	0.5	11	13	15	0.5
20	0.8	0.8	18	19	22	0.8
25	1.5	1.5	32	37	42	1.5
32	3	3	64	74	84	3
40	5	5	120	130	150	5

** Note: The cavity between the gearbox and the mounting flange should refer to the FH Series U (Complete Unit) Type.*

Ultra flat FHD Grease Filling Amount (g)

Specification	A	B	C	D
14	0.2	0.2	5	0.2
17	0.3	0.3	9	0.3
20	0.5	0.5	13	0.5
25	1	1	24	1
32	2	2	51	2

** Note: The cavity between the gearbox and the mounting flange should refer to the FH Series U (Complete Unit) Type.*

SEALING MECHANISM

Model	Specification	Circular spline		Flexspline	
		Seal Dimensions	Groove Dimensions	Seal Dimensions	Groove Dimensions
FHT-I	11	30*0.5	The seal groove on the Circular Spline is already machined. NO further machining is required by the client.	46*1	$Ø46_{-0.1}^{0} * Ø48.6_{0}^{+0.1} * 0.75_{0}^{+0.1}$
	14	36.5*0.6	$Ø36.5_{-0.1}^{0} * Ø38_{0}^{+0.1} * 0.45_{0}^{+0.1}$	53*1.5	$Ø53_{-0.1}^{0} * Ø56.8_{0}^{+0.1} * 1.15_{0}^{+0.1}$
	17	45*1	$Ø45.5_{-0.1}^{0} * Ø48_{0}^{+0.1} * 0.75_{0}^{+0.1}$	64*1	$Ø64_{-0.1}^{0} * Ø66.6_{0}^{+0.1} * 0.75_{0}^{+0.1}$
FHT-II	20	54*1	$Ø53.8_{-0.1}^{0} * Ø56.2_{0}^{+0.1} * 0.75_{0}^{+0.1}$	73*1.5	$Ø73_{-0.1}^{0} * Ø76.8_{0}^{+0.1} * 1.15_{0}^{+0.1}$
	25	68*1	$Ø68_{-0.1}^{0} * Ø70.6_{0}^{+0.1} * 0.75_{0}^{+0.1}$	90*1.5	$Ø90_{-0.1}^{0} * Ø94.2_{0}^{+0.1} * 1.15_{0}^{+0.1}$
	32	88*1.5	$Ø88_{-0.1}^{0} * Ø92_{0}^{+0.1} * 1.15_{0}^{+0.1}$	119*1.5	$Ø119_{-0.1}^{0} * Ø123.1_{0}^{+0.1} * 1.15_{0}^{+0.1}$
FHT-V	40	108*1.75	$Ø108_{-0.1}^{0} * Ø113_{0}^{+0.1} * 1.5_{0}^{+0.1}$	143*2	$Ø142.6_{-0.1}^{0} * Ø148_{0}^{+0.1} * 1.5_{0}^{+0.1}$
	45	123*2	The seal groove on the Circular Spline is already machined. NO further machining is required by the client.	164*2	$Ø163.8_{-0.1}^{0} * Ø169_{0}^{+0.1} * 1.5_{0}^{+0.1}$
	50	136*2		183*2	$Ø182.8_{-0.1}^{0} * Ø188_{0}^{+0.1} * 1.5_{0}^{+0.1}$
FHD-I	8	21*0.5	The seal groove on the Circular Spline is already machined. NO further machining is required by the client.	—	The groove space on this side is insufficient. Please use sealant during assembly.
	11	—	The groove space on this side is insufficient. Please use sealant during assembly.	—	
	14	36.5*0.6	The seal groove on the Circular Spline is already machined. NO further machining is required by the client.	53*1.5	$Ø53_{-0.1}^{0} * Ø56.8_{0}^{+0.1} * 1.15_{0}^{+0.1}$
	17	45*1		64*1	$Ø64_{-0.1}^{0} * Ø66.6_{0}^{+0.1} * 0.75_{0}^{+0.1}$
	20	54*0.8		73*1.5	$Ø73_{-0.1}^{0} * Ø76.8_{0}^{+0.1} * 1.15_{0}^{+0.1}$
	25	67*1		90*1.5	$Ø90_{-0.1}^{0} * Ø94.2_{0}^{+0.1} * 1.15_{0}^{+0.1}$
	32	87*1		119*1.5	$Ø119_{-0.1}^{0} * Ø123.1_{0}^{+0.1} * 1.15_{0}^{+0.1}$
In order to give full play to the excellent performance of FHT-I/II, please ensure the recommended accuracy as shown in the figure.					

ON THE SCREW

All connecting and fixing screws shall be of grade 12.9 and coated with thread locker to prevent screw failure or looseness during operation. Refer to the table below for the screw locking force.

Specification	M3	M4	M5	M6	M8	M10	M12
Locking torque value(Nm)	2.4	5.4	10.8	18.5	45	89	154

CHECKING MAIN ROLLER BEARING

A precision cross roller bearing is built in the unit type and the gear head type to directly support the external load (output flange) (precision 4-point contact ball bearing for the FSN- mini series).Check the maximum load moment load, lifespan of the bearing and static safety coefficient to fully bring out the performance of the unit type.

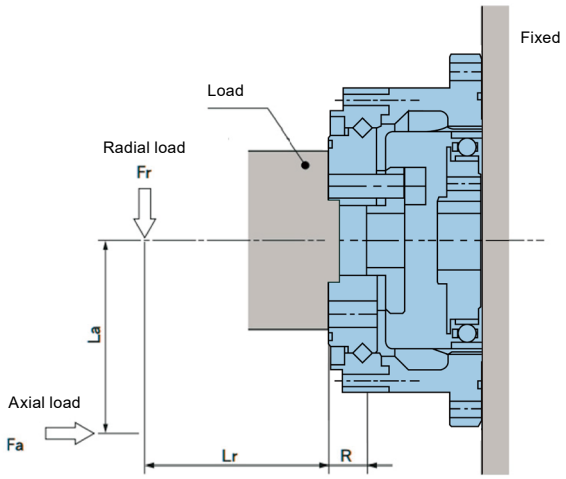
See the corresponding pages on each series for main shaft bearing.

How to obtain the maximum load moment load

Maximum load moment load (Mmax) is obtained as follows. Make sure that Mma Mc(Allowable static torque Me refer to the main bearing specification table of each series).

$$Mmax = Frmax(Lr+R) + Famax \cdot La$$

External Load influence diagram



Fr*max*	Max. radial load	N(kgf)	Refer to above figure
Fa*max*	Max.axial load	N(kgf)	Refer to above figure
Lr, La	—	m	Refer to above figure
R	OFSFet amount	m	See above figure and 'Specification of the main roller bearing' of each series.

MAIN ROLLER BEARING SPECIFICATIONS

Specification of FS series

Type	Pitch circle diameter of a roller	The bias amount R	Basic rated load				Allowable static moment Mc	
			Basic rated dynamic load Cr		Basic rated static load Co			
	m	m	KN	Kgf	KN	Kgf	Nm	Kgfm
5	0.0135	0.00485	0.914	93	0.763	78	0.89	0.09
8	0.0205	0.0073	2.16	220	1.9	194	3.46	0.35
11	0.02715	0.009	3.89	397	3.54	361	6.6	0.67
14	0.035	0.0095	4.7	480	6.07	620	41	4.2
17	0.0425	0.0095	5.3	540	7.55	770	64	6.5
20	0.05	0.0095	5.8	590	9.0	920	91	9.3
25	0.062	0.0115	9.6	980	15.1	1540	156	16
32	0.08	0.013	15	1530	25.0	2550	313	32
40	0.096	0.0145	21	2170	36.5	3720	450	46

Specification of FSD series

Type	Pitch circle diameter of a roller	The bias amount R	Basic rated load				Allowable static moment Mc	
			Basic rated dynamic load Cr		Basic rated static load Co			
	m	m	KN	Kgf	KN	Kgf	Nm	Kgfm
14	0.035	0.0095	4.7	480	6.07	620	41	4.2
17	0.0425	0.0099	5.3	540	7.55	770	64	6.5
20	0.05	0.0102	5.8	590	9.0	920	91	9.3
25	0.062	0.013	9.6	980	15.1	1540	156	16
32	0.08	0.0144	15	1530	25	2550	313	32

Specification of LFS series

Type	Pitch circle diameter of a roller	The bias amount R	Basic rated load				Allowable static moment Mc	
			Basic rated dynamic load Cr		Basic rated static load Co			
	m	m	KN	Kgf	KN	Kgf	Nm	Kgfm
11	0.0425	0.014	6.5	663	9.9	1010	40	4.1
14	0.0541	0.014	7.4	755	12.8	1306	75	7.7

- *The basic rated dynamic load refers to the constant radial load under which the bearing is expected to achieve a basic rating life of 1 million revolutions.*
- *The basic rated static load refers to the static load that produces a specified level of contact stress (4 kN/mm²) at the central contact point between the location of maximum bearing load and the raceway surface.*
- *The allowable static moment refers to the maximum permissible torque applied to the output bearing, within which the bearing can operate properly and maintain its basic performance.*

MAIN ROLLER BEARING SPECIFICATIONS

Specification of FH series

Each product is assembled with precise cross roller bearing for supporting external loading(Output flange).

Type	Pitch circle diameter of a roller	The bias amount R	Basic rated load				Allowable static moment Mc	
			Basic rated dynamic load Cr		Basic rated static load Co			
	m	m	KN	Kgf	KN	Kgf	Nm	Kgfm
11	0.043	0.018	5.29	540	7.55	770	74	7.6
14	0.05	0.0217	5.8	590	8.6	880	74	7.6
17	0.06	0.0239	10.4	1060	16.3	1670	124	12.6
20	0.07	0.0255	14.6	1490	22	2250	187	19.1
25	0.085	0.0296	21.8	2230	35.8	3660	258	26.3
32	0.111	0.0364	38.2	3900	65.4	6680	580	59.1
40	0.133	0.044	43.3	4410	81.6	8330	849	86.6
45	0.154	0.0475	77.6	7920	135	13800	1127	115
50	0.170	0.0525	81.6	8330	149	15300	1487	152

Specification of FHD series

Type	Pitch circle diameter of a roller	The bias amount R	Basic rated load				Allowable static moment Mc	
			Basic rated dynamic load Cr		Basic rated static load Co			
	m	m	KN	Kgf	KN	Kgf	Nm	Kgfm
8	0.0309	0.0069	1.4	143	1.8	183	10	1
11	0.0401	0.009	2.3	234	3.2	326	30	3.1
14	0.0503	0.0111	2.9	296	4.3	438	37	3.8
17	0.061	0.0115	5.2	530	8.1	826	62	6.3
20	0.07	0.011	7.3	744	11	1122	93	9.5
25	0.086	0.0121	10.9	1111	17.9	1825	129	13.2
32	0.112	0.0173	19.1	1948	32.7	3334	290	29.6

- *The basic rated dynamic load refers to the constant radial load under which the bearing is expected to achieve a basic rating life of 1 million revolutions.*
- *The basic rated static load refers to the static load that produces a specified level of contact stress (4 kN/mm²) at the central contact point between the location of maximum bearing load and the raceway surface.*
- *The allowable static moment refers to the maximum permissible torque applied to the output bearing, within which the bearing can operate properly and maintain its basic performance.*

ON STARTING TORQUE

Recommended accuracy of the assembled housing

unit: cNm

Type / Reduction ratio	5	8	11	14	17	20	25	32	40
50	0.4	0.8	2	4.1	6.1	7.8	15	31	55
80	—	—	—	2.8	4	4.9	9.2	19	35
100	0.3	0.59	1.5	2.5	3.4	4.3	8	18	31
120	—	—	—	2.3	3.1	3.8	7.3	15	28
160	—	—	—	—	—	3.3	7.3	14	24

Starting torque of FSG series

unit: cNm

Type / Reduction ratio	11	14	17	20	25	32	40
50	—	4.5	6.7	8.6	17	34	61
80	—	3.1	4.4	5.4	10	21	39
100	—	2.8	3.7	4.7	8.8	20	34
120	—	—	3.4	4.2	8	17	31
160	—	—	—	3.6	6.9	15	26

Starting torque of FSD series

unit: cNm

Type / Reduction ratio	11	14	17	20	25
50	4.4	6.7	8.9	16	32
80	3.2	4.4	5.7	10	22
100	2.8	3.8	5.1	9.1	20

Starting torque of FHT series (FHT/FHN-I/II/V)

unit: cNm

Type / Reduction ratio	11	14	17	20	25	32	40
50	2.0	4.1	6.1	7.8	15	31	55
80	1.8	2.8	4.0	4.9	9.2	19	35
100	1.5	2.5	3.4	4.3	8.0	18	31
120	—	—	3.1	3.8	7.3	15	28
160	—	—	—	3.3	7.3	14	24

Starting torque of FHT series (FHT/FHG-III)

unit: cNm

Type / Reduction ratio	11	14	17	20	25	32	40	45	50
50	7.1	8.8	27	36	56	85	136	—	—
80	—	7.5	25	33	50	74	117	138	179
100	5.9	6.9	24	32	49	72	112	131	171
120	—	—	24	31	48	68	110	126	165
160	—	—	—	31	47	67	105	—	—

ON STARTING TORQUE

Starting torque of FHT series (FHT/FHG-IV)

unit: cNm

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

Starting torque of FHG series (FHG-I/II/V)

unit: cNm

Type / Reduction ratio	11	14	17	20	25	32	40	45	50
50	—	4.5	6.7	8.6	17	34	61	—	—
80	—	3.1	4.4	5.4	10	21	39	54	73
100	—	2.8	3.7	4.7	8.8	20	34	47	64
120	—	—	3.4	4.2	8	17	31	43	57
160	—	—	—	3.6	6.9	15	26	—	—

Starting torque of FHD-I series

unit: cNm

Type / Reduction ratio	14	17	20	25	32
50	6.2	10	13	20	30
80	5.2	9	12	18	28
100	4.8	9	11	17	25

Starting torque of FHD-III series

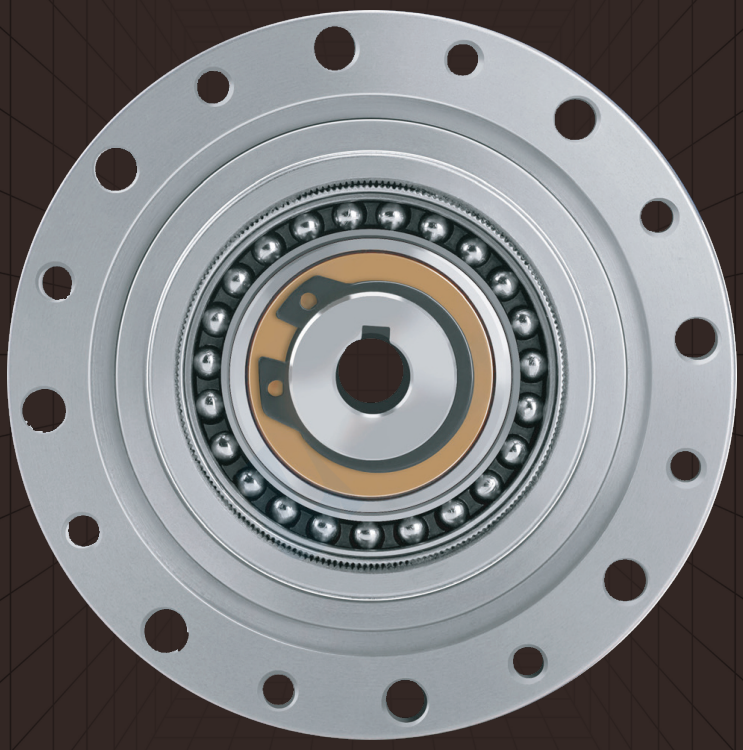
unit: cNm

Type / Reduction ratio	14	17	20	25	32
50	11	39	53	79	114
80	9	34	44	66	108
100	8.7	37	49	73	101

Starting torque of FSF series

unit: cNm

Type / Reduction ratio	11	14
50	2	4.1
80	2	2.8
100	1.5	2.5



FS SERIES

INTRODUCTION OF FSS/FSN/FSG



FSS/FSG-C-I



FSS/FSN/FSG-I



FSS/FSG-II

FSS/FSN/FSG

FSS-C series

Component cup type, comprising flexspline, circular spline and a Wave generator, are ideal for applications where specific space and mass constraints exist. it demands high installation precision.

FSS series

FSS Unit type are easy to insall, each Model featuring high rigidity crossed rllr bearings.

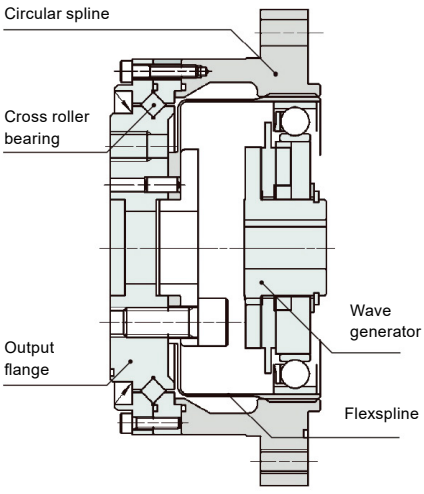
FSN series

A light weight product. Compare with standard product that with the same performance, FSN series is 30% lighter.

FSG series

High torque. Compare with standard products, FSG series' torque capacity is 30%higher.And the service life is increased by 43%, with high load capacity and high rlibility.

Unit type structure of FS series



Standard Type(FSS-I/II)

Application

- Industrial Robot
- Service Robots
- Meal Machine Tools
- Medical Devices
- Analysis,Test Equipment
- Energy Related Equipment
- Papermaking Equipment

TECHNICAL DATA OF FSS/FSF/FSN

Rating table of FSS/FSF/FSN

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissi-ble max. input rotational speed Grease lubricant	Permis-sible ave. input rotational speed Grease lubricant	Back-lash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
5	50	0.4	0.04	0.9	0.09	0.53	0.05	1.8	0.18	10000	6500	⩽60	0.025	10000
	100	0.6	0.06	1.4	0.14	0.94	0.1	2.7	0.28					10000
8	50	1.8	0.18	3.3	0.34	2.3	0.23	6.6	0.67	8500	3500	⩽30	FSN-I: 0.08 FSS-C: 0.026	10000
	100	2.4	0.24	4.8	0.49	3.3	0.34	9	0.92					10000
11	50	3.5	0.36	8.3	0.85	5.5	0.56	17	1.73	8500	3500	⩽30	FSS-I: 0.25 FSN-I: 0.17 FSS-C: 0.05	10000
	100	5	0.51	11	1.12	8.9	0.91	25	2.55					10000
14	50	5.4	0.55	18	1.8	6.9	0.7	35	3.6	8500	3500	⩽20	FSS-I/II: 0.51 FSS-C: 0.09 FSN-I/II: 0.39 FSF: 0.25	10000
	80	7.8	0.8	23	2.4	11	1.1	47	4.8					15000
	100	7.8	0.8	28	2.9	11	1.1	54	5.5					15000
17	50	16	1.6	34	3.5	26	2.6	70	7.1	7300	3500	⩽20	FSS-I/II: 0.67 FSS-C: 0.15 FSN-I/II: 0.52 FSF: 0.67	10000
	80	22	2.2	43	4.4	27	2.7	87	8.9					15000
	100	24	2.4	54	5.5	39	4	108	11					15000
	120	24	2.4	54	5.5	39	4	86	8.8					15000
20	50	25	2.5	56	5.7	34	3.5	98	10	6500	3500	⩽20	FSS-I/II: 0.96 FSS-C: 0.28 FSN-I/II: 0.73 FSF: 0.96	10000
	80	34	3.5	74	7.5	47	4.8	127	13					15000
	100	40	4.1	82	8.4	49	5	147	15					15000
	120	40	4.1	87	8.9	49	5	147	15					15000
	160	40	4.1	92	9.4	49	5	147	15					15000
25	50	39	4	98	10	55	5.6	186	19	5600	3500	⩽20	FSS-I/II: 1.46 FSS-C: 0.42 FSN-I/II: 1.14 FSF: 1.46	10000
	80	63	6.4	137	14	87	8.9	255	26					15000
	100	67	6.8	157	16	108	11	284	29					15000
	120	67	6.8	167	17	108	11	304	31					15000
	160	67	6.8	176	18	108	11	314	32					15000
32	50	76	7.8	216	22	108	11	382	39	4800	3500	⩽20	FSS-I/II: 3.11 FSS-C: 0.89 FSN-I/II: 2.47	10000
	80	118	12	304	31	167	17	568	58					15000
	100	137	14	333	34	216	22	647	66					15000
	120	137	14	353	36	216	22	686	70					15000
	160	137	14	372	38	216	22	686	70					15000
40	50	137	14	402	41	196	20	686	70	4000	3000	⩽20	FSS-I/II: 4.6 FSS-C: 1.7 FSN-I/II: 3.64 FSF: 4.6	10000
	80	206	21	519	53	284	29	980	100					15000
	100	265	27	568	58	372	38	1080	110					15000
	120	294	30	617	63	451	46	1180	120					15000
	160	294	30	647	66	451	46	1180	120					15000

TECHNICAL DATA OF FSG

Rating table of FSG

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed (Grease lubricant)	Permissible ave. input rotational speed (Grease lubricant)	Back-lash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
14	50	7	0.7	23	2.3	9	0.9	46	4.7	8500	3500	⩽20	FSG-U-I/II: 0.51 FSG-C: 0.09	10000
	80	10	1	30	3.1	14	1.4	58[1]	5.9[1]					15000
	100	10	1	36	3.7	14	1.4	58[1]	5.9[1]					15000
17	50	21	2.1	44	4.5	34	3.4	91	9	7300	3500	⩽20	FSG-U-I/II: 0.67 FSG-C: 0.15	10000
	80	29	2.9	56	5.7	35	3.6	109[1]	11[1]					15000
	100	31	3.2	70	7.2	51	5.2	109[1]	11[1]					15000
	120	31	3.2	70	7.2	51	5.2	109[1]	11[1]					15000
20	50	33	3.3	73	7.4	44	4.5	127	13	6500	3500	⩽20	FSG-U-I/II: 0.96 FSG-C: 0.28	10000
	80	44	4.5	96	9.8	61	6.2	165	17					15000
	100	52	5.3	107	10.9	64	6.5	191	20					15000
	120	52	5.3	113	11.5	64	6.5	191	20					15000
	160	52	5.3	120	12.2	64	6.5	191	20					15000
25	50	51	5.2	127	13	72	7.3	242	25	5600	3500	⩽20	FSG-U-I/II: 1.46 FSG-C: 0.42	10000
	80	82	8.4	178	18	113	12	332	34					15000
	100	87	8.9	204	21	140	14	369	38					15000
	120	87	8.9	217	22	140	14	395	40					15000
	160	87	8.9	229	23	140	14	408	42					15000
32	50	99	10	281	29	140	14	497	51	4800	3500	⩽20	FSG-U-I/II: 3.11 FSG-C: 0.89	10000
	80	153	16	395	40	217	22	738	75					15000
	100	178	18	433	44	281	29	841	86					15000
	120	178	18	459	47	281	29	842[1]	86[1]					15000
	160	178	18	484	49	281	29	842[1]	86[1]					15000
40	50	178	18	523	53	255	26	892	91	4000	3000	⩽20	FSG-U-I/II: 4.60 FSG-C: 1.7	10000
	80	268	27	675	69	369	38	1270	130					15000
	100	345	35	738	75	484	49	1400	143					15000
	120	382	39	802	82	586	60	1510[1]	154[1]					15000
	160	382	39	841	86	586	60	1510[1]	154[1]					15000
45	50	229	23	650	66	345	35	1235	126	3800	3000	⩽20	FSG-U-I: 6.3 FSG-C: 4	10000
	80	407	41	918	94	507	52	1651	168					15000
	100	459	47	928	100	650	66	2041	208					15000
	120	523	53	1070	109	806	82	2288	233					15000
	160	523	53	1147	117	819	84	2483	253					15000
50	50	245	25	715	73	350	36	1430	146	3500	2500	⩽20	FSG-U-I: 7 FSG-C: 4.8	10000
	80	372	38	941	96	519	53	1860	190					15000
	100	470	48	980	100	666	68	2060	210					15000
	120	529	54	1080	110	813	83	2060	210					15000
	160	529	54	1180	120	843	86	2450	250					15000

✸ *The permissible maximum torque is limited by the driving torque of the coupling screw at the output end.*

TECHNICAL DATA OF FSS/FSF/FSN/FSG

Angle transmission accuracy

unit: arc min

Type / Reduction ratio	5	8	11	14	17	20	25	32	40	45-50
above 50	3	2	2	1.5	1.5	1	1	1	1	1

Hysteresis loss

unit: arc min

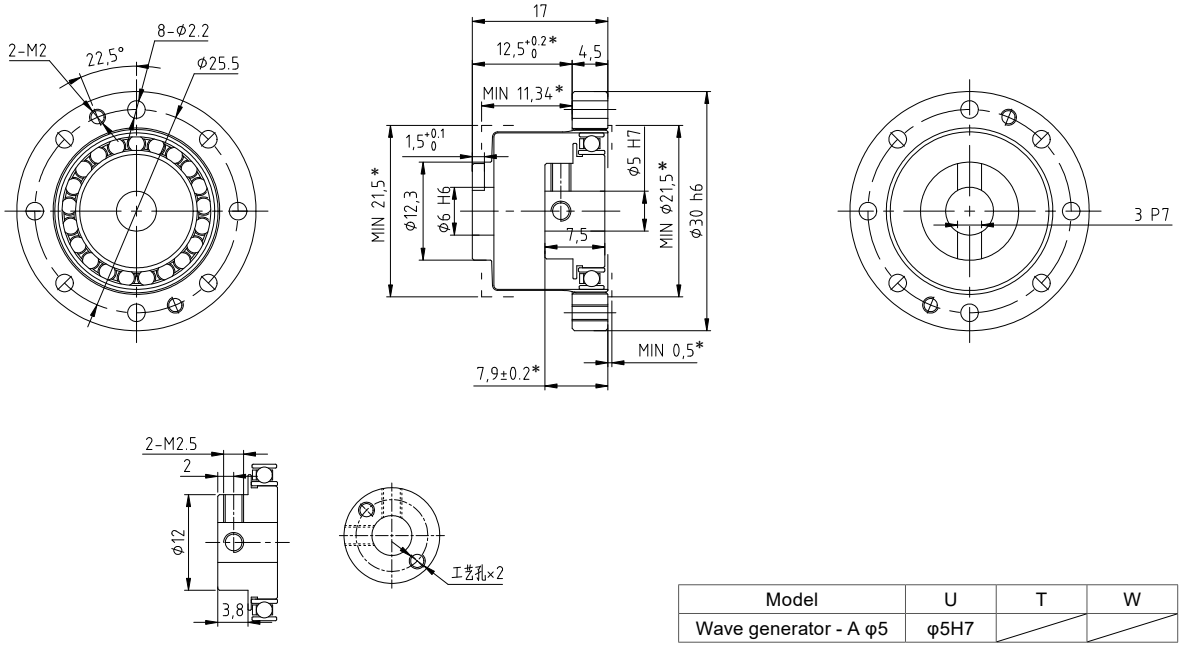
Type / Reduction ratio	5	8	11	14	17	20	25	32	40	45-50
50	3	3	2	2	2	2	2	2	2	2
above 50	3	2	2	1	1	1	1	1	1	1

Torsional stiffness

Project		Type / Unit	5	8	11	14	17	20	25	32	40	45	50
T1		N·m	0.075	0.29	0.8	2	3.9	7	14	29	54	76	108
T2		N·m	0.22	0.75	2	6.9	12	25	48	108	196	275	382
Reduction ratio 30	K1	× 10^4 N·m/rad	—	—	—	0.19	0.34	0.57	1.0	2.4	—	—	—
	K2	× 10^4 N·m/rad	—	—	—	0.24	0.44	0.71	1.3	3.0	—	—	—
	K3	× 10^4 N·m/rad	—	—	—	0.34	0.67	1.1	2.1	4.9	—	—	—
Reduction ratio 50	K1	× 10^4 N·m/rad	0.011	0.039	0.177	0.34	0.81	1.3	2.5	5.4	10	15	20
	K2	× 10^4 N·m/rad	0.014	0.056	0.225	0.47	1.1	1.8	3.4	7.8	14	20	28
	K3	× 10^4 N·m/rad	0.017	0.067	0.236	0.57	1.3	2.3	4.4	9.8	18	26	34

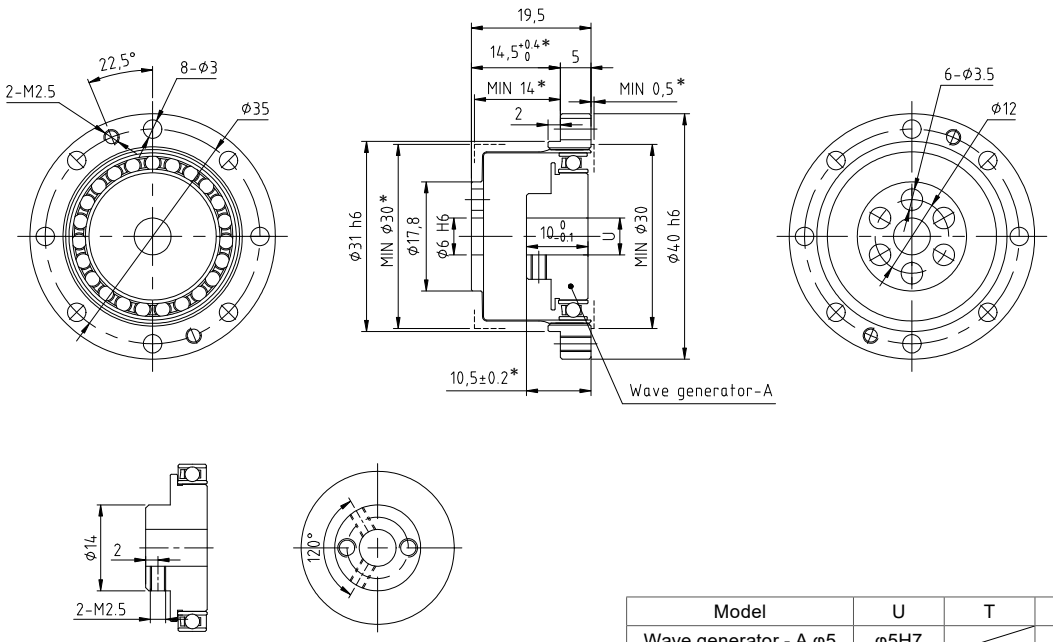
OUTLINE DRAWING

FSS-8-XX-C-I



Model	U	T	W
Wave generator - A φ5	φ5H7		

FSS-11-XX-C-I

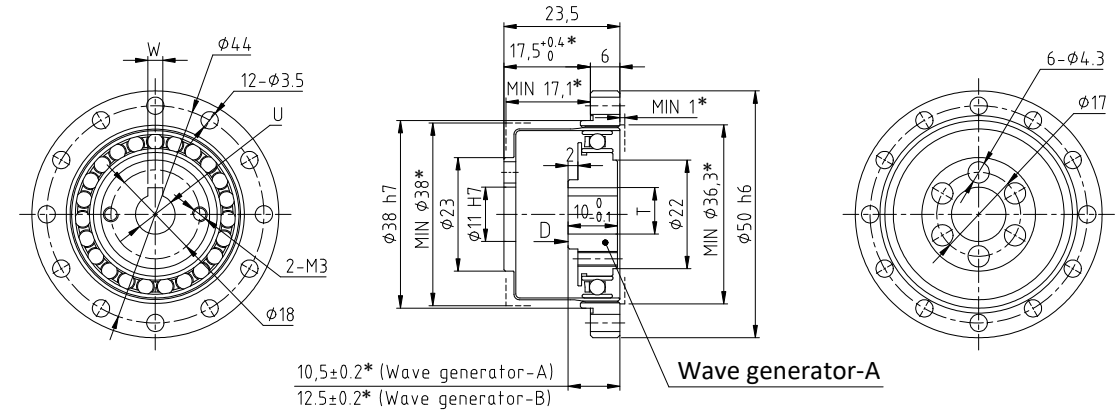


Model	U	T	W
Wave generator - A φ5	φ5H7		
Wave generator - A φ6	φ6H7		

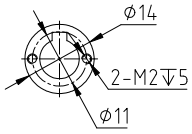
Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
8	50	1.8	0.18	3.3	0.34	2.3	0.23	6.6	0.67	8500	3500	≤30	0.026	10000
	100	2.4	0.24	4.8	0.49	3.3	0.34	9	0.92					10000
11	50	3.5	0.36	8.3	0.85	5.5	0.56	17	1.73	8500	3500	≤30	0.05	10000
	100	5	0.51	11	1.12	8.9	0.91	25	2.55					10000

OUTLINE DRAWING

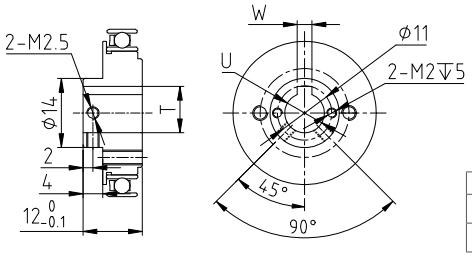
FSS-14-XX-C-I



D Direction

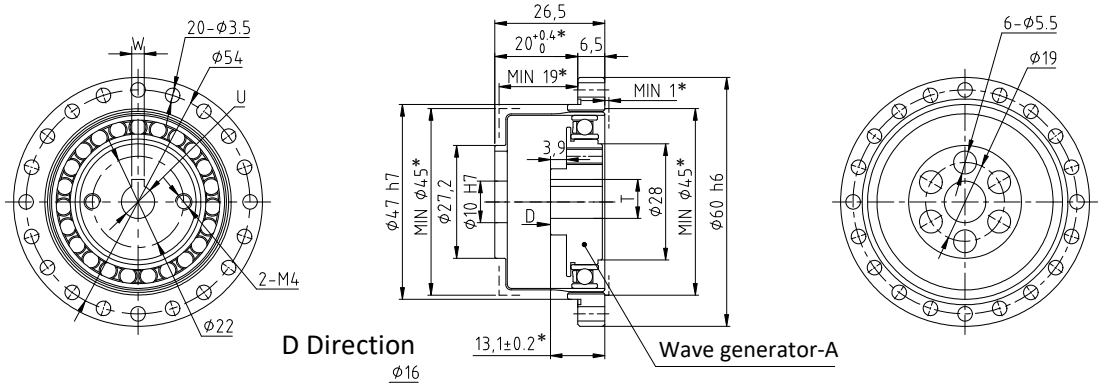


Wave generator-B

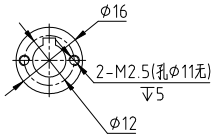


Model	U	T	W
Wave generator - A/B φ6	φ6H7	$7^{+0.1}_{0}$	2JS9/P9
Wave generator - A/B φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9

FSS-17-XX-C-I



D Direction

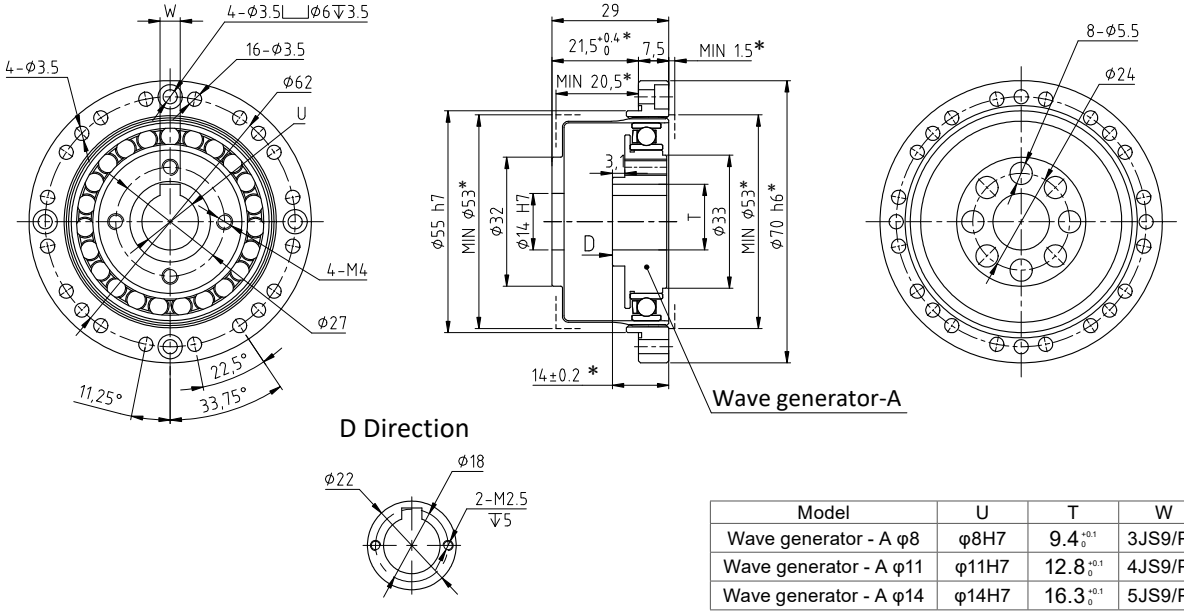


Model	U	T	W
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9
Wave generator - A φ11	φ11H7	$12.8^{+0.1}_{0}$	4JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
14	50	5.4	0.55	18	18	6.9	0.7	35	3.6	8500	3500	≤20	0.09	10000
	80	7.8	0.8	23	2.4	11	1.1	47	4.8					15000
	100	7.8	0.8	28	2.9	11	1.1	54	5.5					15000
17	50	16	1.6	34	3.5	26	2.6	70	7.1	7300	3500	≤20	0.15	10000
	80	22	2.2	43	4.4	27	2.7	87	8.9					15000
	100	24	2.4	54	5.5	39	4	108	11					15000
	120	24	2.4	54	5.5	39	4	86	8.8					15000

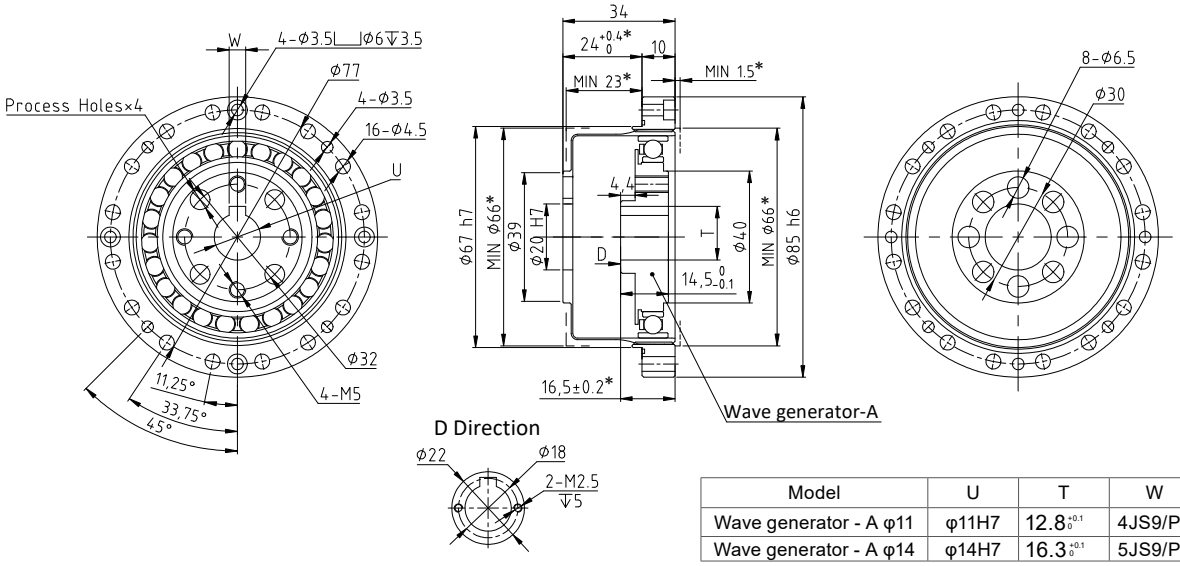
OUTLINE DRAWING

FSS-20-XX-C-I



Model	U	T	W
Wave generator - A φ8	φ8H7	9.4 +0.1 0	3JS9/P9
Wave generator - A φ11	φ11H7	12.8 +0.1 0	4JS9/P9
Wave generator - A φ14	φ14H7	16.3 +0.1 0	5JS9/P9

FSS-25-XX-C-I

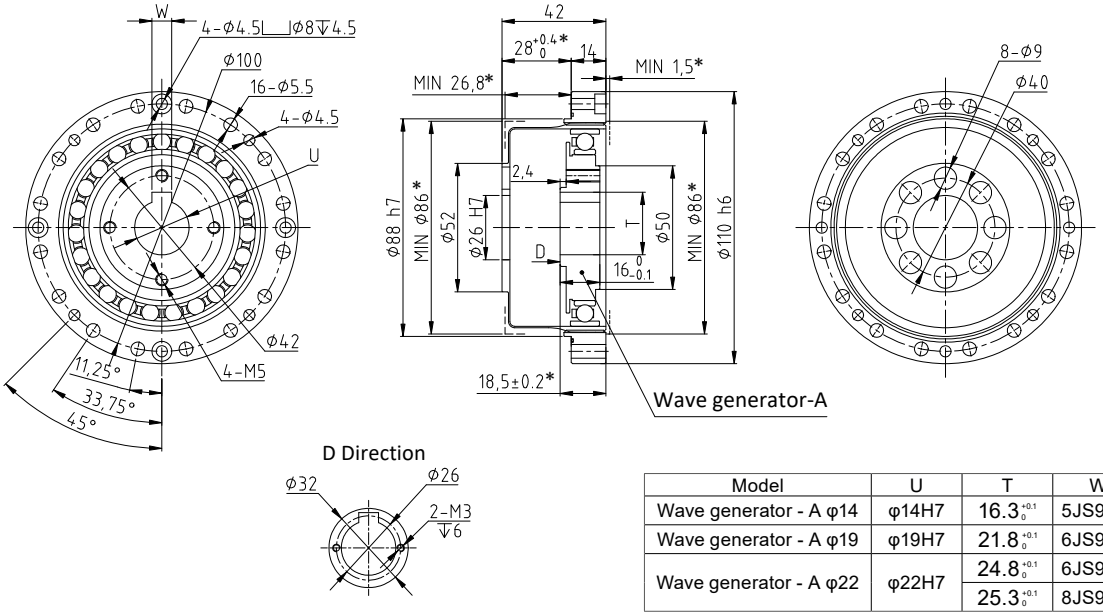


Model	U	T	W
Wave generator - A φ11	φ11H7	12.8 +0.1 0	4JS9/P9
Wave generator - A φ14	φ14H7	16.3 +0.1 0	5JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
20	50	25	2.5	56	5.7	34	3.5	98	10	6500	3500	≤20	0.28	10000
	80	34	3.5	74	7.5	47	4.8	127	13					15000
	100	40	4.1	82	8.4	49	5	147	15					15000
	120	40	4.1	87	8.9	49	5	147	15					15000
	160	40	4.1	92	9.4	49	5	147	15					15000
25	50	39	4	98	10	55	5.6	186	19	5600	3500	≤20	0.42	10000
	80	63	6.4	137	14	87	8.9	255	26					15000
	100	67	6.8	157	16	108	11	284	29					15000
	120	67	6.8	167	17	108	11	304	31					15000
	160	67	6.8	176	18	108	11	314	32					15000

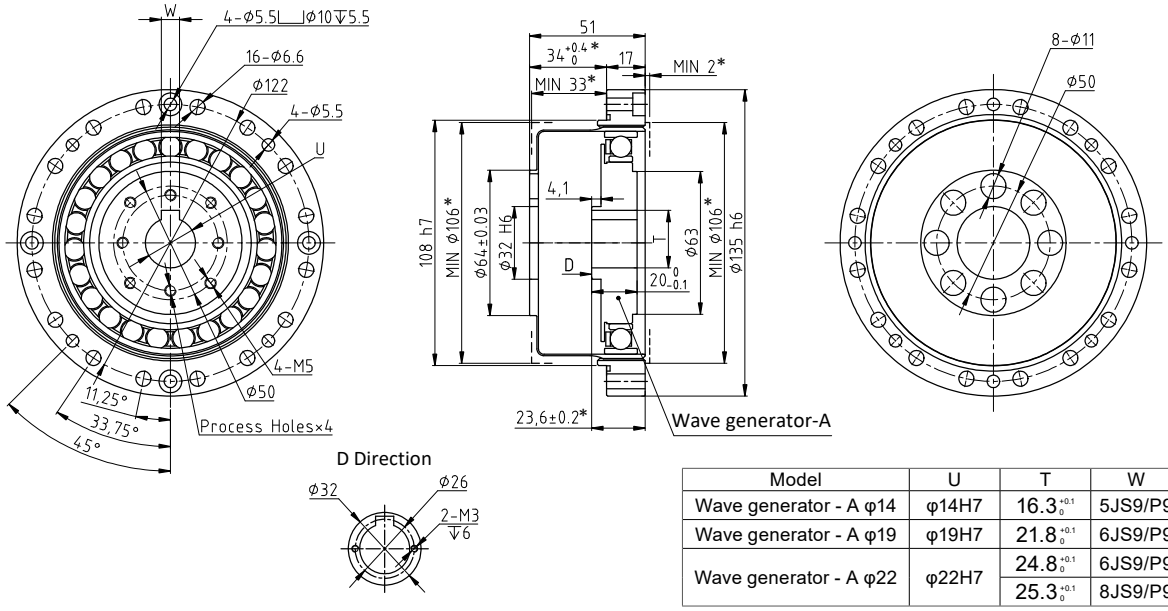
OUTLINE DRAWING

FSS-32-XX-C-I



Model	U	T	W
Wave generator - A φ14	φ14H7	16.3 +0.1 0	5JS9/P9
Wave generator - A φ19	φ19H7	21.8 +0.1 0	6JS9/P9
Wave generator - A φ22	φ22H7	24.8 +0.1 0	6JS9/P9
		25.3 +0.1 0	8JS9/P9

FSS-40-XX-C-I

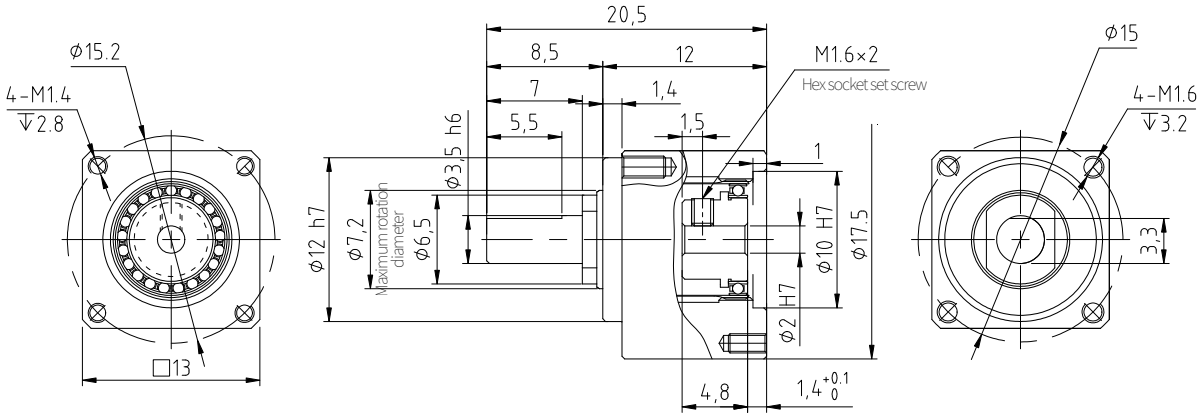


Model	U	T	W
Wave generator - A φ14	φ14H7	16.3 +0.1 0	5JS9/P9
Wave generator - A φ19	φ19H7	21.8 +0.1 0	6JS9/P9
Wave generator - A φ22	φ22H7	24.8 +0.1 0	6JS9/P9
		25.3 +0.1 0	8JS9/P9

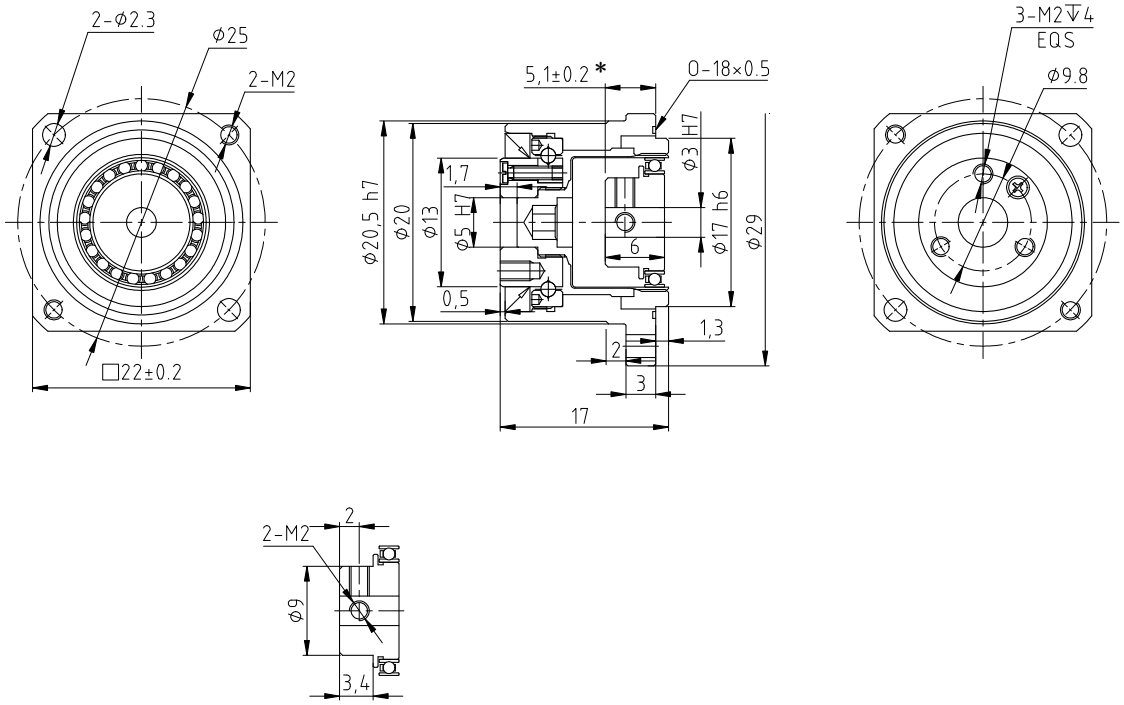
Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
32	50	76	7.8	216	22	108	11	382	39	4800	3500	≤20	0.89	10000
	80	118	12	304	31	167	17	568	58					15000
	100	137	14	333	34	216	22	647	66					15000
	120	137	14	353	36	216	22	686	70					15000
	160	137	14	372	38	216	22	686	70					15000
40	50	137	14	402	41	196	20	686	70	4000	3000	≤20	1.7	10000
	80	206	21	519	53	284	29	980	100					15000
	100	265	27	568	58	372	38	1080	110					15000
	120	294	30	617	63	451	46	1180	120					15000
	160	294	30	647	66	451	46	1180	120					15000

OUTLINE DRAWING

FSN-3-XX-U-I



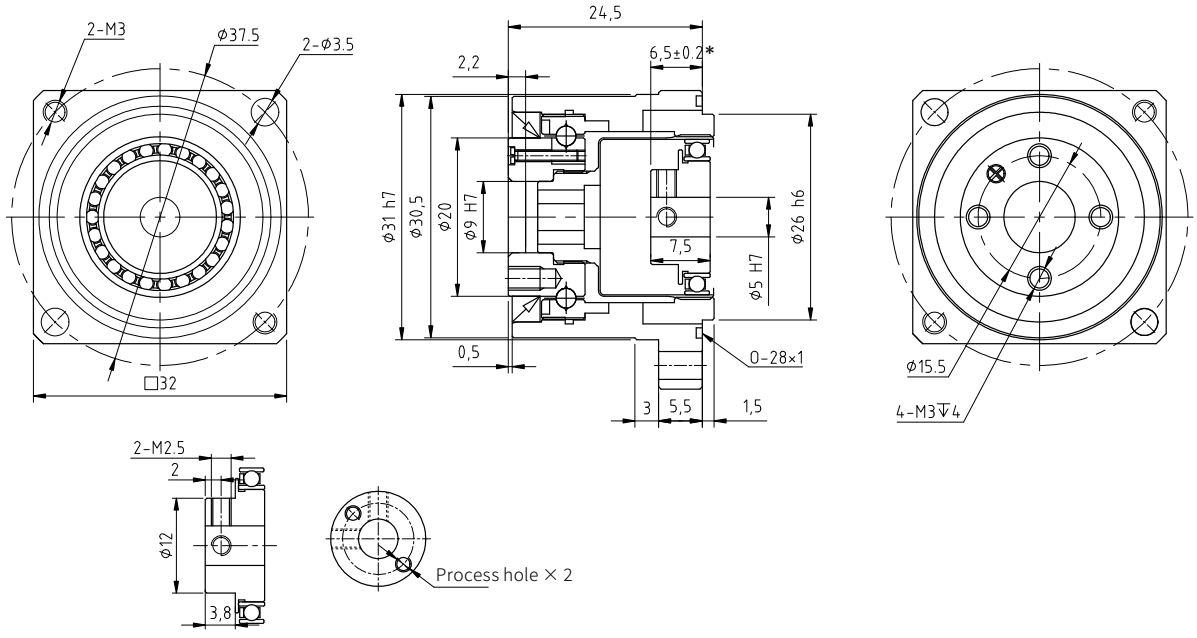
FSN-5-XX-U-I



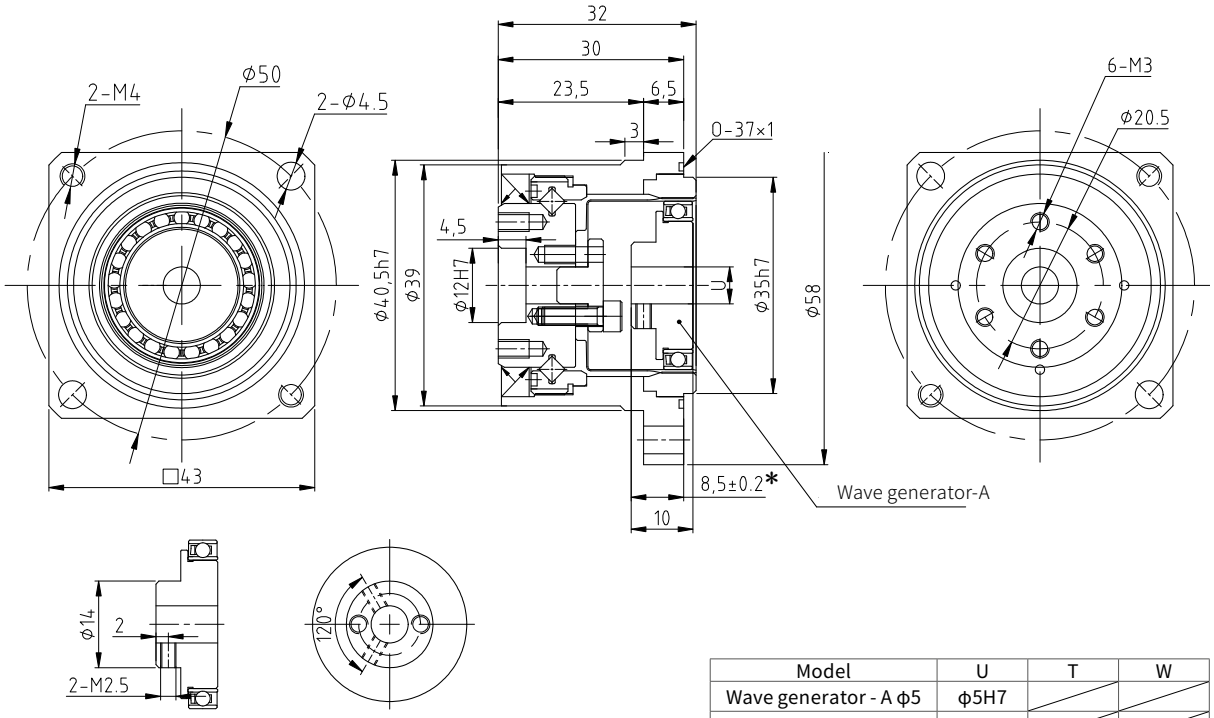
Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
3	30	0.06	0.006	0.13	0.013	0.1	0.01	0.22	0.022	10000	6500	⩽60	/	10000
5	50	0.4	0.04	0.9	0.09	0.53	0.05	1.8	0.18	10000	6500	⩽60	0.025	10000
	100	0.6	0.06	1.4	0.14	0.94	0.1	2.7	0.28					10000

OUTLINE DRAWING

FSN-8-XX-U-I



FSN-11-XX-U-I

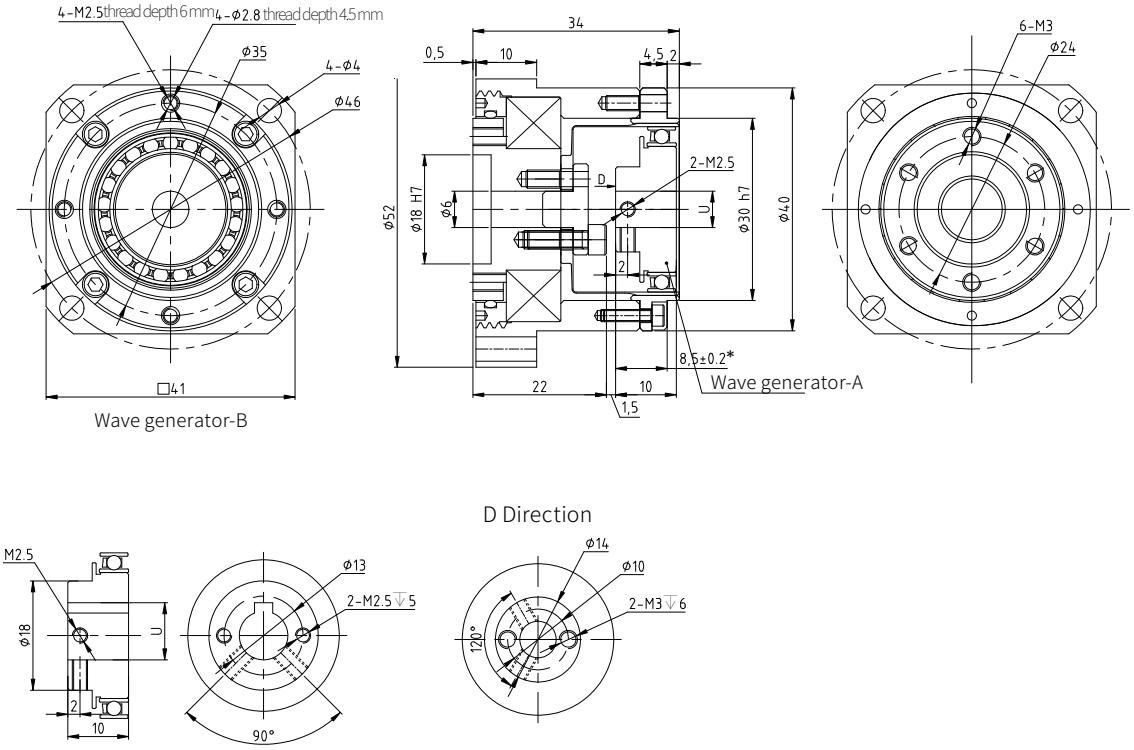


Model	U	T	W
Wave generator - A φ5	φ5H7		
Wave generator - A φ6	φ6H7		

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
8	50	1.8	0.18	3.3	0.34	2.3	0.23	6.6	0.67	8500	3500	⩽30	0.08	10000
	100	2.4	0.24	4.8	0.49	3.3	0.34	9	0.92					10000
11	50	3.5	0.36	8.3	0.85	5.5	0.56	17	1.73	8500	3500	⩽30	0.17	10000
	100	5	0.51	11	1.12	8.9	0.91	25	2.55					10000

OUTLINE DRAWING

FSS-11-XX-U-I

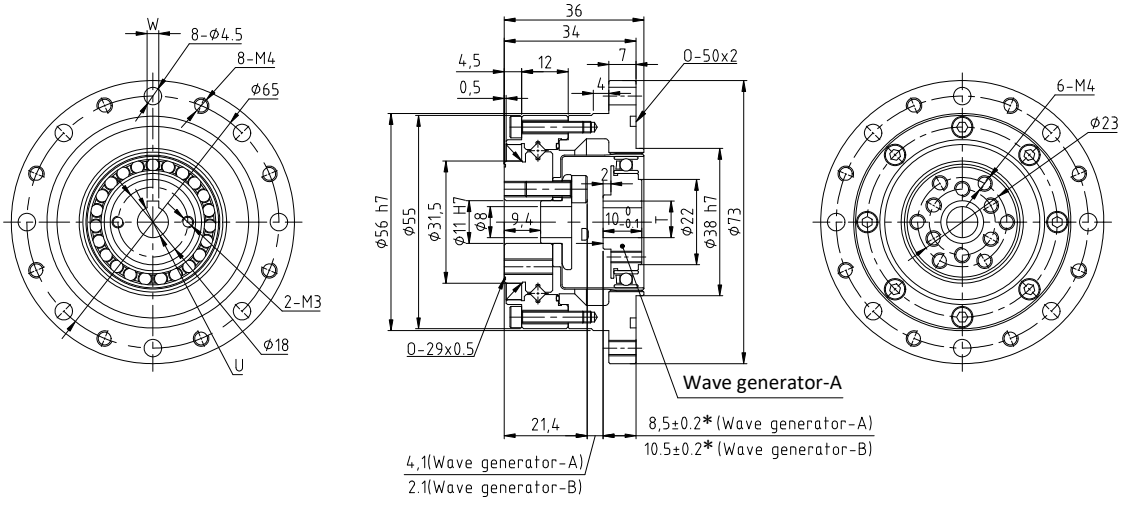


Model	U	T	W
Wave generator - A ϕ5	ϕ5H7		
Wave generator - A ϕ6	ϕ6H7		
Wave generator - A ϕ8	ϕ8H7	$9.4^{+0.1}_{0}$	3JS9/P9

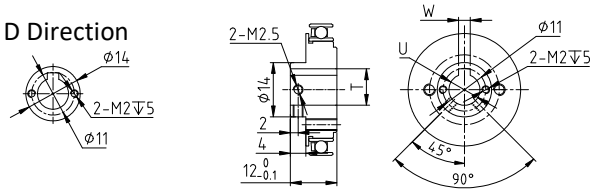
Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
11	50	3.5	0.36	8.3	0.85	5.5	0.56	17	1.73	8500	3500	⩽30	0.25	10000
	100	5	0.51	11	1.12	8.9	0.91	25	2.55					10000

OUTLINE DRAWING

FSS-14-XX-U-I

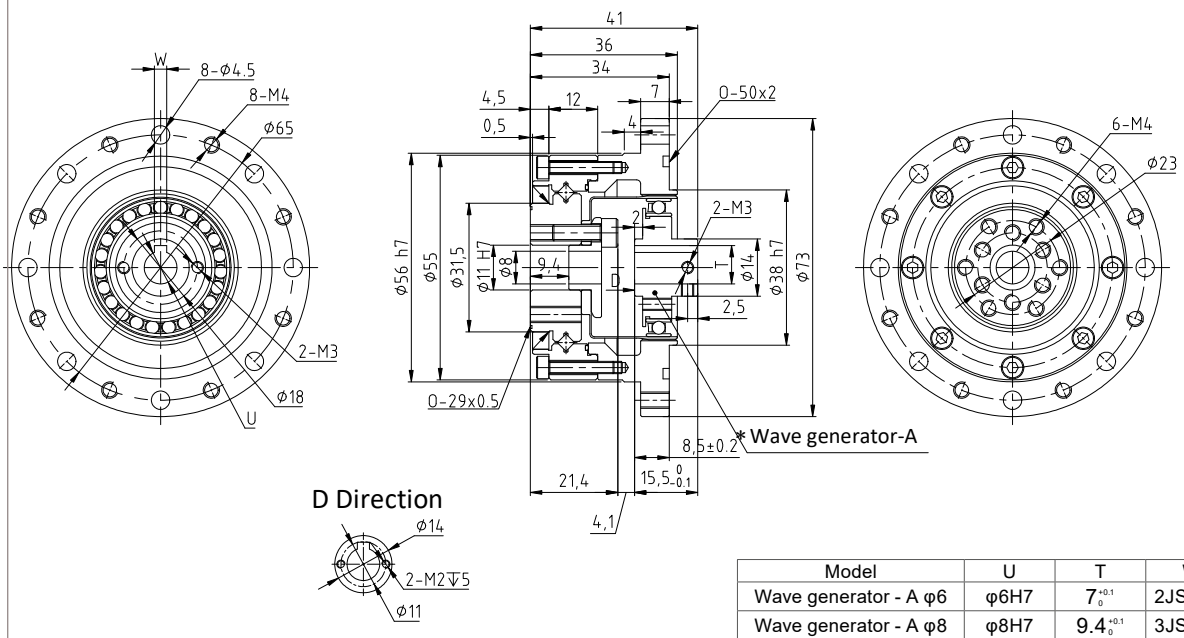


Wave generator-B



Model	U	T	W
Wave generator - A φ6	φ6H7	$7^{+0.1}_{0}$	2JS9/P9
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9

FSS-14-XX-U-I-LF



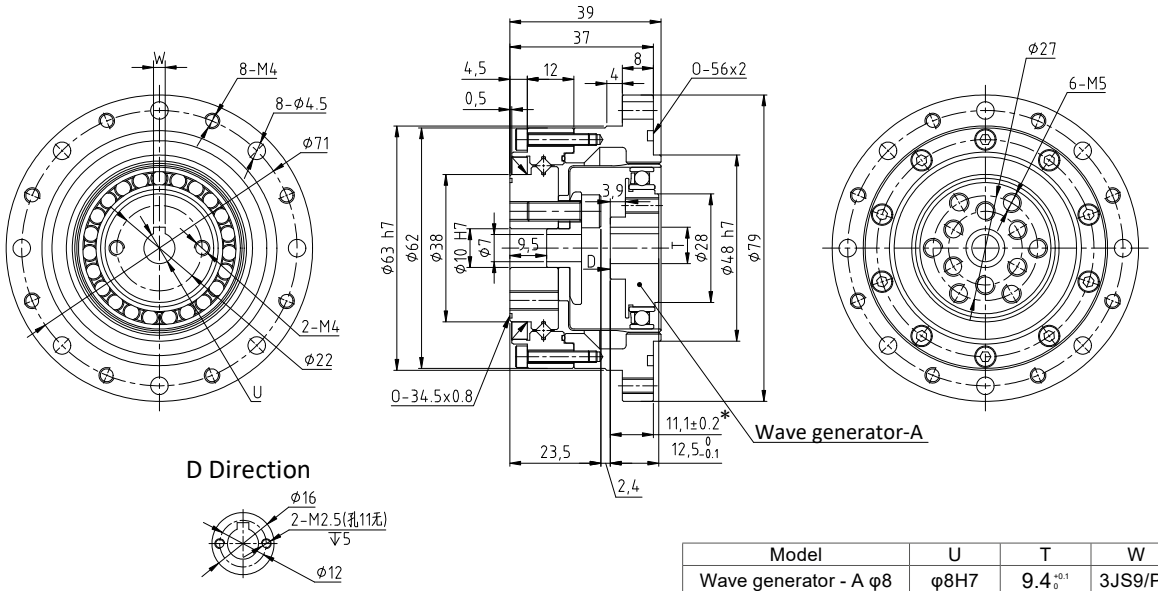
D Direction

Model	U	T	W
Wave generator - A φ6	φ6H7	$7^{+0.1}_{0}$	2JS9/P9
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
14	50	5.4	0.55	18	18	6.9	0.7	35	3.6	8500	3500	≤20	0.51	10000
	80	7.8	0.8	23	2.4	11	1.1	47	4.8					15000
	100	7.8	0.8	28	2.9	11	1.1	54	5.5					15000

OUTLINE DRAWING

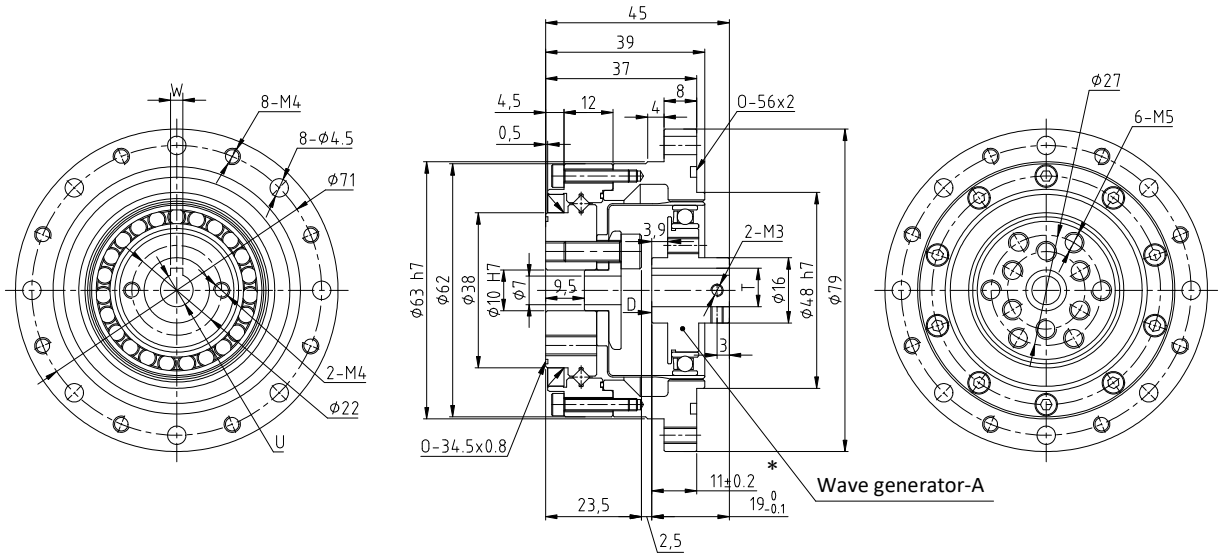
FSS-17-XX-U-I



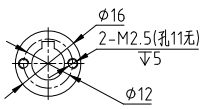
D Direction

Model	U	T	W
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9
Wave generator - A φ11	φ11H7	$12.8^{+0.1}_{0}$	4JS9/P9

FSS-17-XX-U-I-LF



D Direction

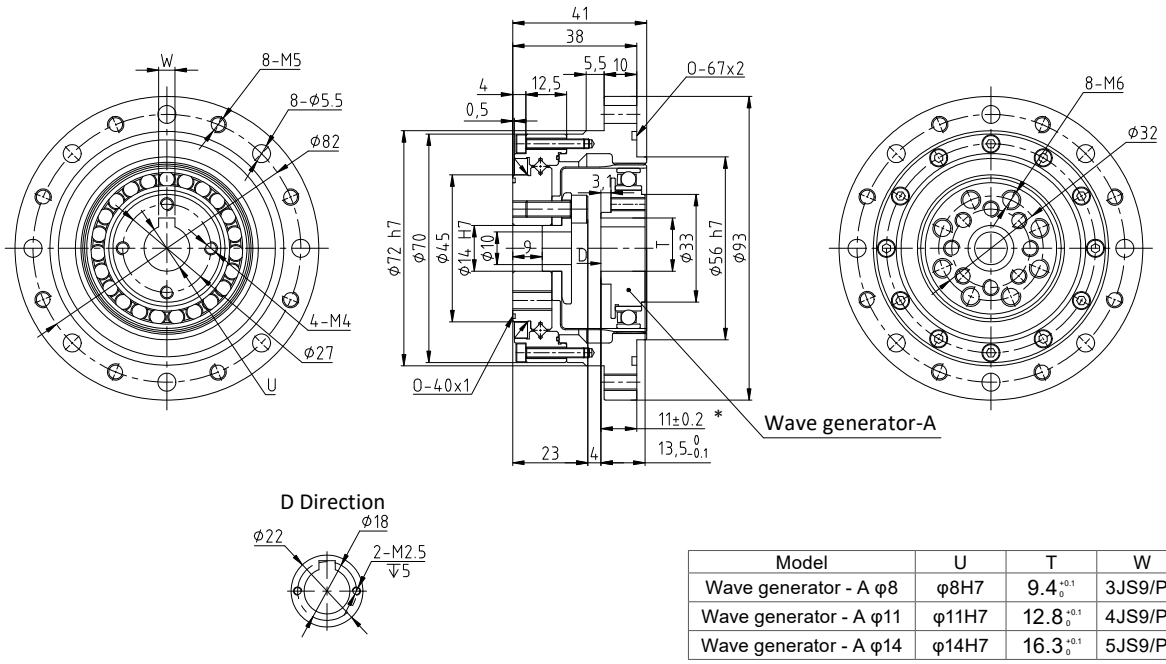


Model	U	T	W
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9
Wave generator - A φ11	φ11H7	$12.8^{+0.1}_{0}$	4JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
17	50	16	1.6	34	3.5	26	2.6	70	7.1	7300	3500	≤20	0.67	10000
	80	22	2.2	43	4.4	27	2.7	87	8.9					15000
	100	24	2.4	54	5.5	39	4	108	11					15000
	120	24	2.4	54	5.5	39	4	86	8.8					15000

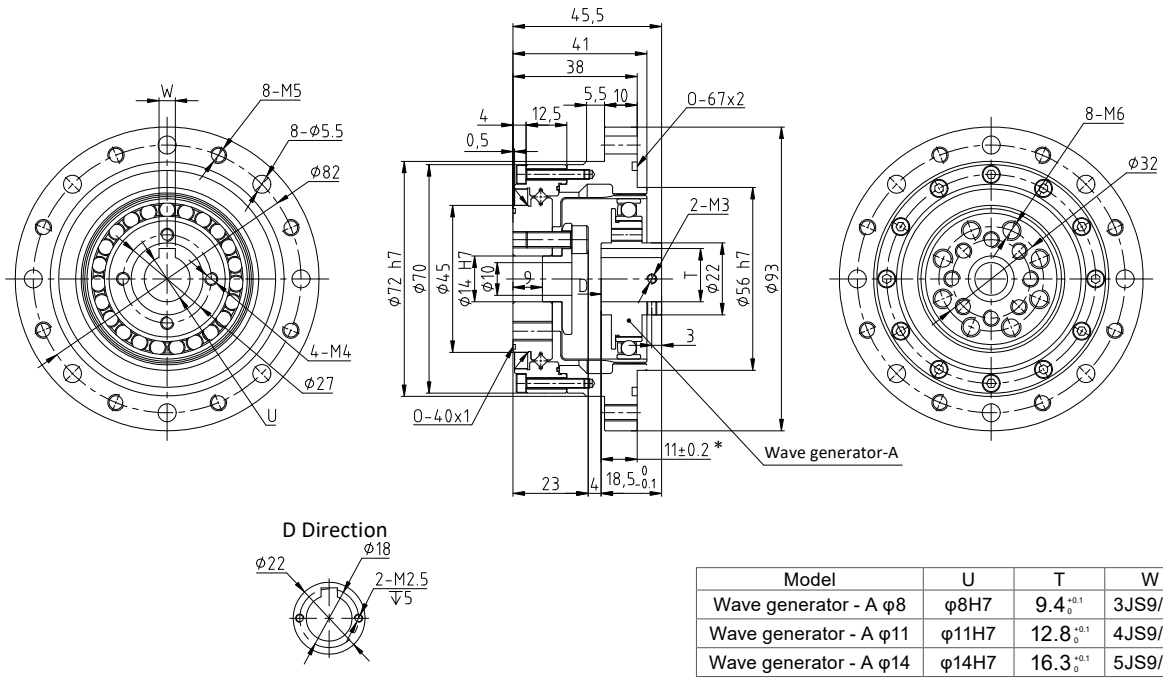
OUTLINE DRAWING

FSS-20-XX-U-I



Model	U	T	W
Wave generator - A φ8	φ8H7	9.4 +0.1 0	3JS9/P9
Wave generator - A φ11	φ11H7	12.8 +0.1 0	4JS9/P9
Wave generator - A φ14	φ14H7	16.3 +0.1 0	5JS9/P9

FSS-20-XX-U-I-LF

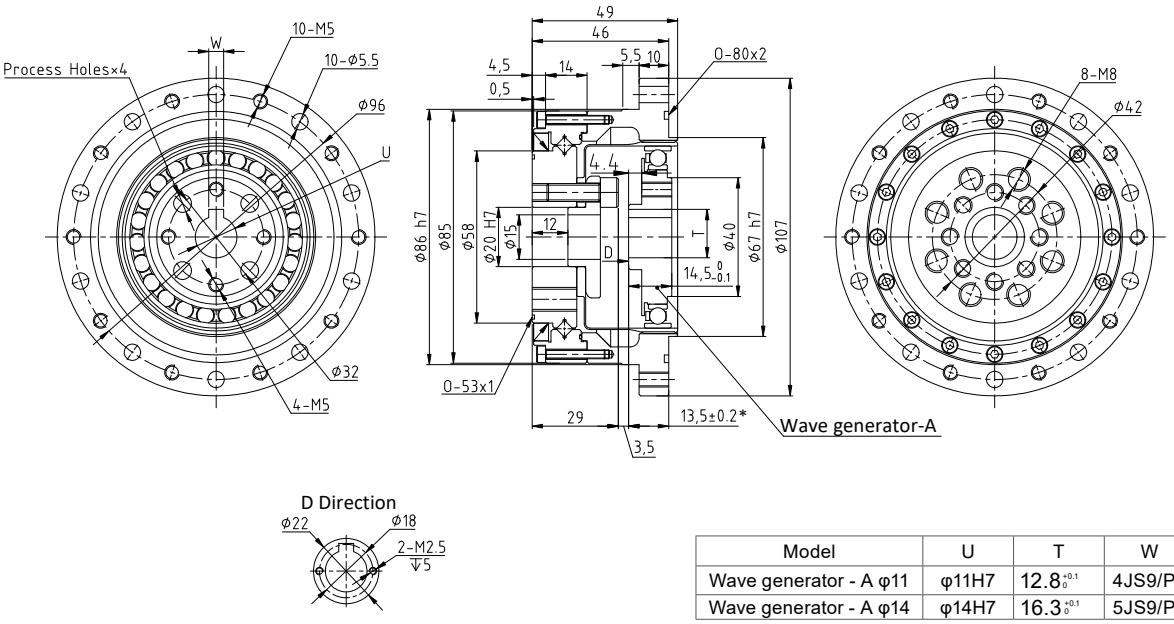


Model	U	T	W
Wave generator - A φ8	φ8H7	9.4 +0.1 0	3JS9/P9
Wave generator - A φ11	φ11H7	12.8 +0.1 0	4JS9/P9
Wave generator - A φ14	φ14H7	16.3 +0.1 0	5JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
20	50	25	2.5	56	5.7	34	3.5	98	10	6500	3500	≤20	0.96	10000
	80	34	3.5	74	7.5	47	4.8	127	13					15000
	100	40	4.1	82	8.4	49	5	147	15					15000
	120	40	4.1	87	8.9	49	5	147	15					15000
	160	40	4.1	92	9.4	49	5	147	15					15000

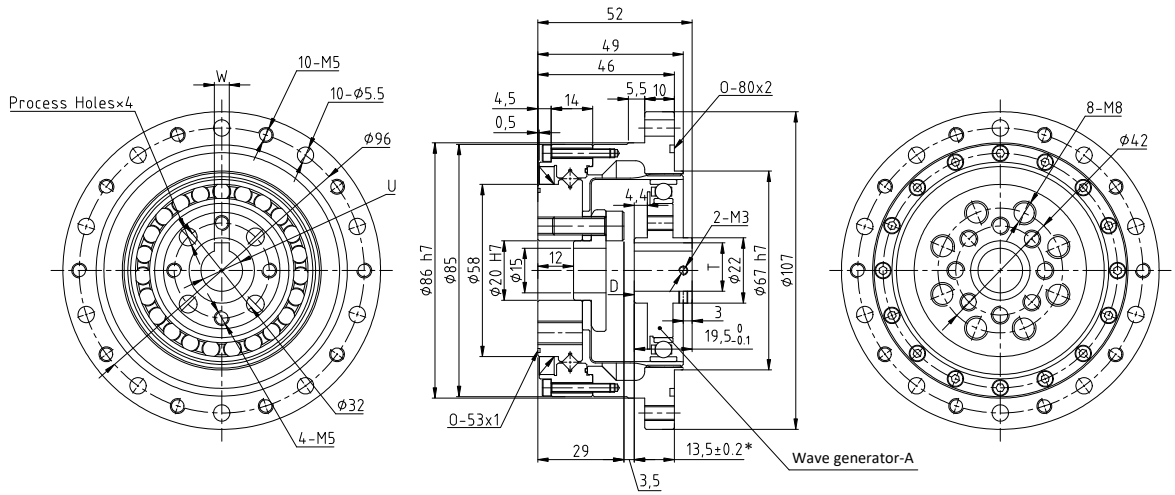
OUTLINE DRAWING

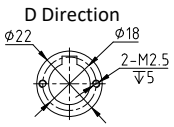
FSS-25-XX-U-I



Model	U	T	W
Wave generator - A φ11	φ11H7	$12.8^{+0.1}_{0}$	4JS9/P9
Wave generator - A φ14	φ14H7	$16.3^{+0.1}_{0}$	5JS9/P9

FSS-25-XX-U-I-LF



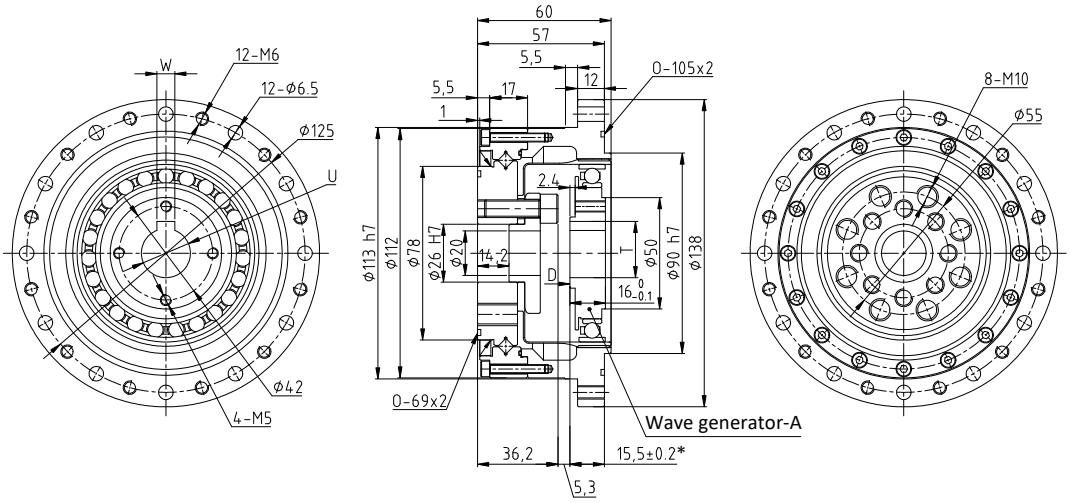


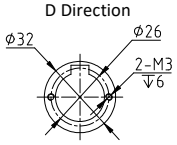
Model	U	T	W
Wave generator - A φ11	φ11H7	$12.8^{+0.1}_{0}$	4JS9/P9
Wave generator - A φ14	φ14H7	$16.3^{+0.1}_{0}$	5JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
25	50	39	4	98	10	55	5.6	186	19	5600	3500	≤20	1.46	10000
	80	63	6.4	137	14	87	8.9	255	26					15000
	100	67	6.8	157	16	108	11	284	29					15000
	120	67	6.8	167	17	108	11	304	31					15000
	160	67	6.8	176	18	108	11	314	32					15000

OUTLINE DRAWING

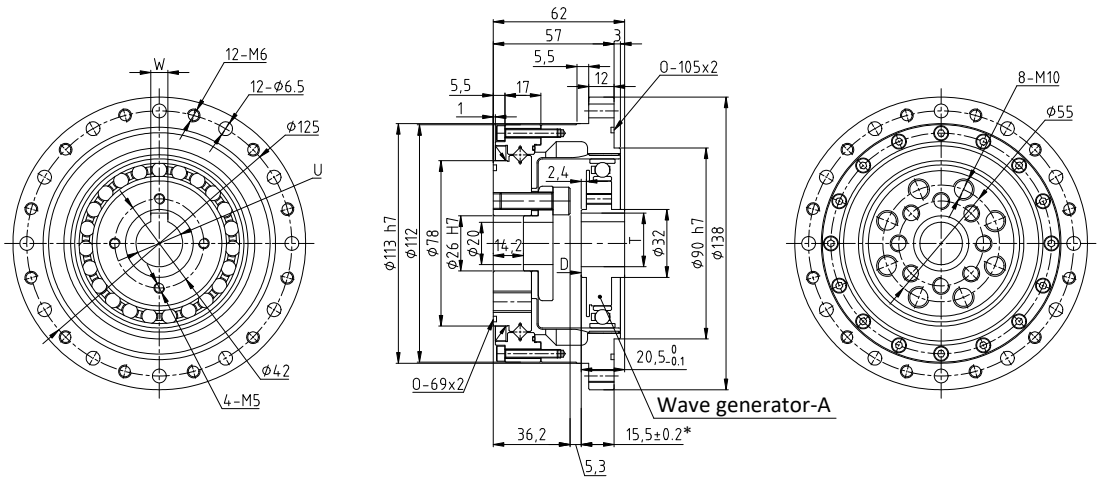
FSS-32-XX-U-I

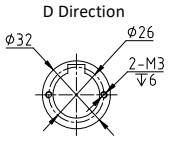




Model	U	T	W
Wave generator - A φ14	φ14H7	16.3 $^{+0.1}_{0}$	5JS9/P9
Wave generator - A φ19	φ19H7	21.8 $^{+0.1}_{0}$	6JS9/P9
Wave generator - A φ22	φ22H7	24.8 $^{+0.1}_{0}$	6JS9/P9
		25.3 $^{+0.1}_{0}$	8JS9/P9

FSS-32-XX-U-I-LF



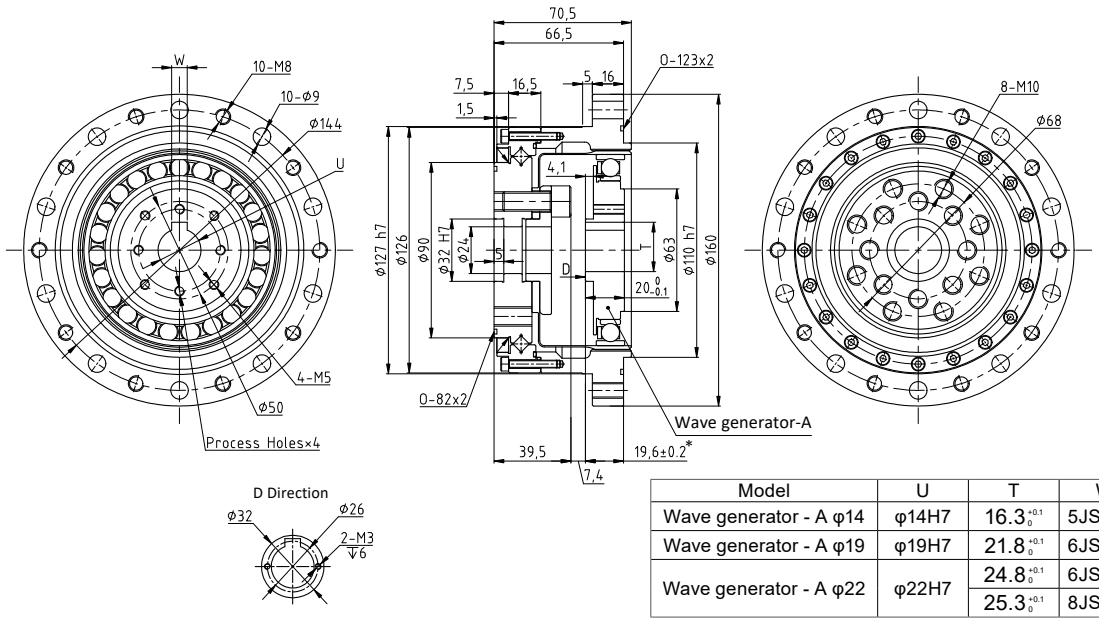


Model	U	T	W
Wave generator - A φ14	φ14H7	16.3 $^{+0.1}_{0}$	5JS9/P9
Wave generator - A φ19	φ19H7	21.8 $^{+0.1}_{0}$	6JS9/P9
Wave generator - A φ22	φ22H7	24.8 $^{+0.1}_{0}$	6JS9/P9
		25.3 $^{+0.1}_{0}$	8JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
32	50	76	7.8	216	22	108	11	382	39	4800	3500	≤20	3.11	10000
	80	118	12	304	31	167	17	568	58					15000
	100	137	14	333	34	216	22	647	66					15000
	120	137	14	353	36	216	22	686	70					15000
	160	137	14	372	38	216	22	686	70					15000

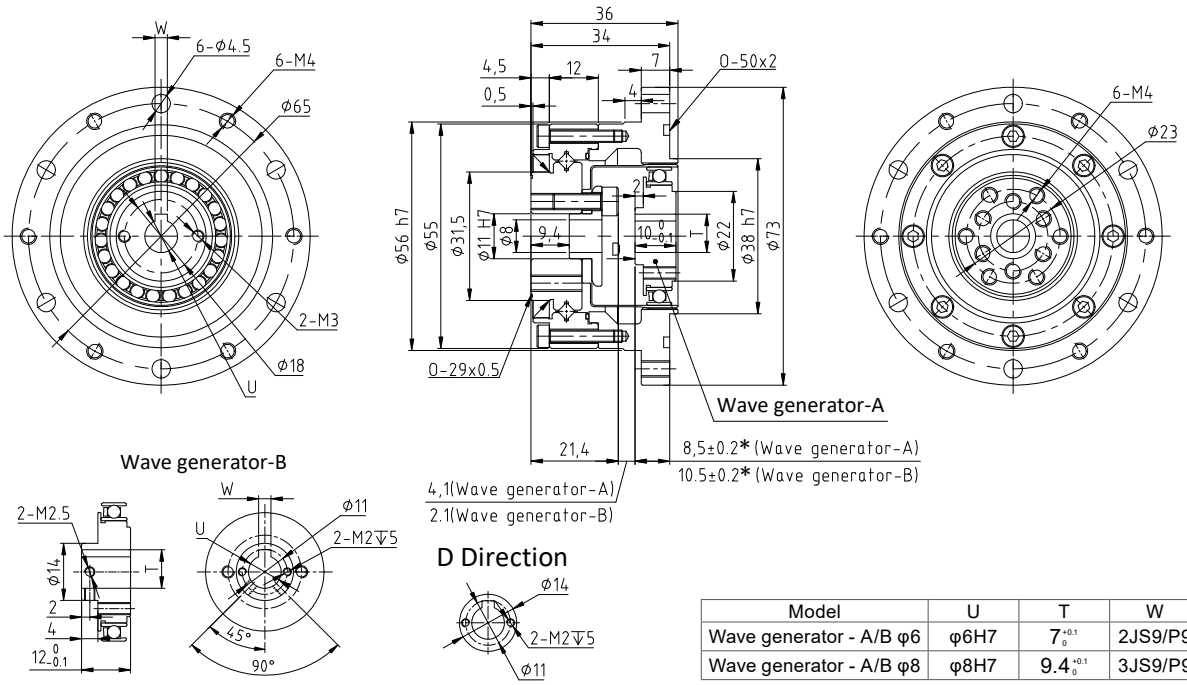
OUTLINE DRAWING

FSS-40-XX-U-I



Model	U	T	W
Wave generator - A φ14	φ14H7	$16.3^{+0.1}_{0}$	5JS9/P9
Wave generator - A φ19	φ19H7	$21.8^{+0.1}_{0}$	6JS9/P9
Wave generator - A φ22	φ22H7	$24.8^{+0.1}_{0}$	6JS9/P9
		$25.3^{+0.1}_{0}$	8JS9/P9

FSF-14-XX-U-I

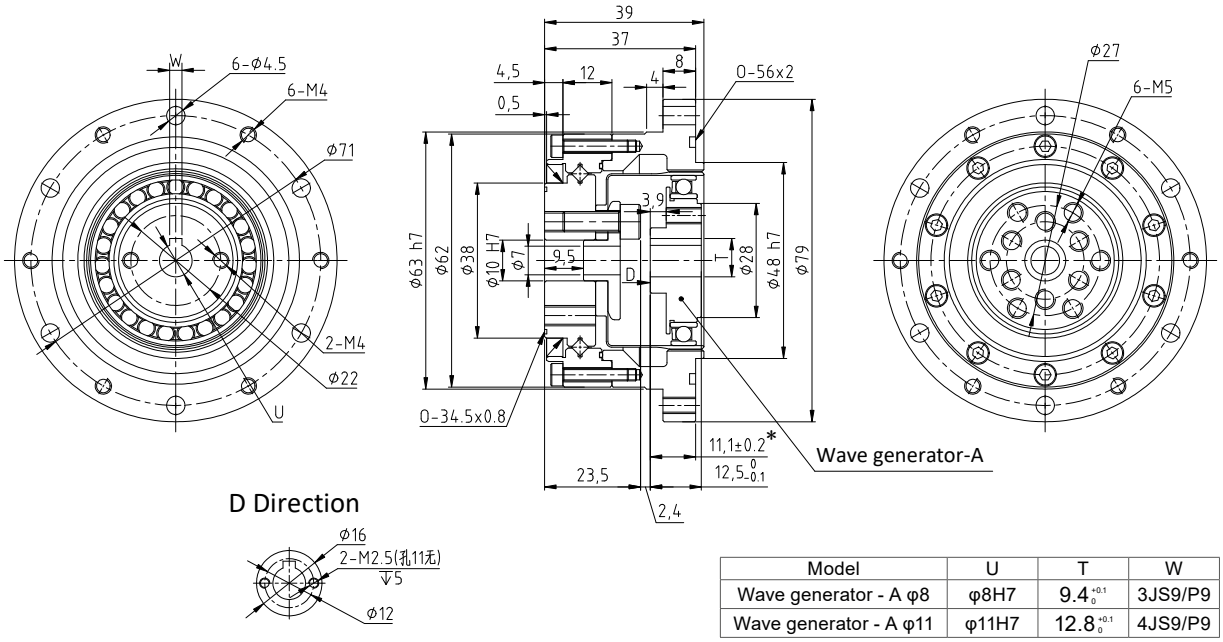


Model	U	T	W
Wave generator - A/B φ6	φ6H7	$7^{+0.1}_{0}$	2JS9/P9
Wave generator - A/B φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
40	50	137	14	402	41	196	20	686	70	4000	3000	≤20	4.6	10000
	80	206	21	519	53	284	29	980	100					15000
	100	265	27	568	58	372	38	1080	110					15000
	120	294	30	617	63	451	46	1180	120					15000
	160	294	30	647	66	451	46	1180	120					15000
14	50	5.4	0.55	18	18	6.9	0.7	35	3.6	8500	3500	≤20	0.25	10000
	80	7.8	0.8	23	2.4	11	1.1	47	4.8					15000
	100	7.8	0.8	28	2.9	11	1.1	54	5.5					15000

OUTLINE DRAWING

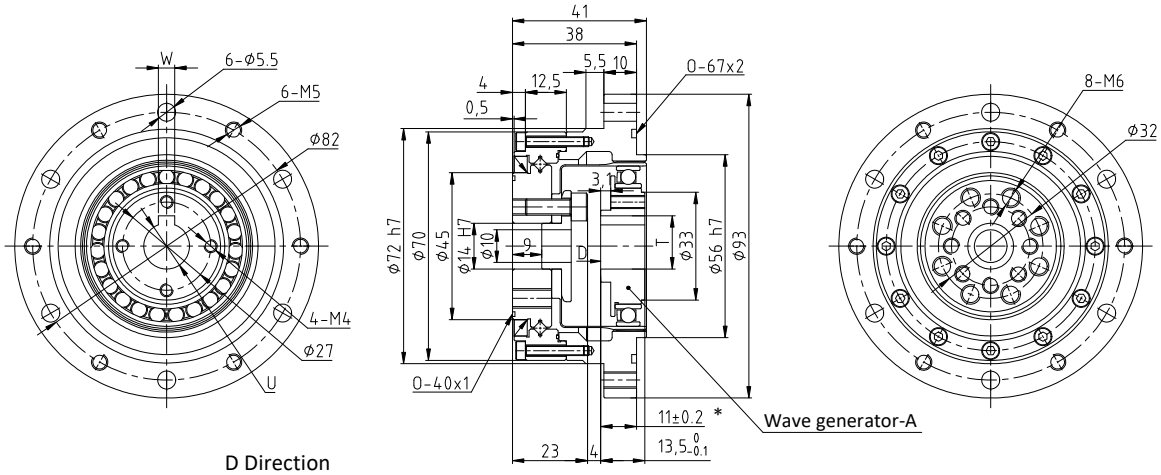
FSF-17-XX-U-I



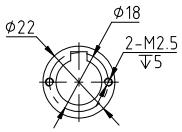
D Direction

Model	U	T	W
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9
Wave generator - A φ11	φ11H7	$12.8^{+0.1}_{0}$	4JS9/P9

FSF-20-XX-U-I



D Direction

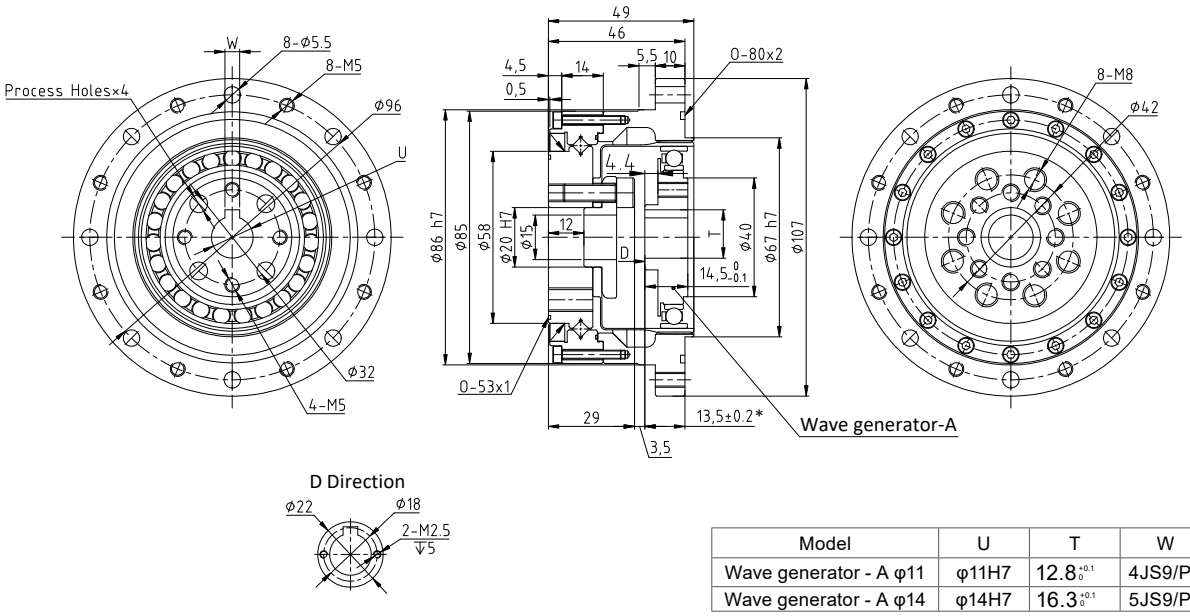


Model	U	T	W
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9
Wave generator - A φ11	φ11H7	$12.8^{+0.1}_{0}$	4JS9/P9
Wave generator - A φ14	φ14H7	$16.3^{+0.1}_{0}$	5JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
17	50	16	1.6	34	3.5	26	2.6	70	7.1	7300	3500	≤20	0.67	10000
	80	22	2.2	43	4.4	27	2.7	87	8.9					15000
	100	24	2.4	54	5.5	39	4	108	11					15000
	120	24	2.4	54	5.5	39	4	86	8.8					15000
20	50	25	2.5	56	5.7	34	3.5	98	10	6500	3500	≤20	0.96	10000
	80	34	3.5	74	7.5	47	4.8	127	13					15000
	100	40	4.1	82	8.4	49	5	147	15					15000
	120	40	4.1	87	8.9	49	5	147	15					15000
	160	40	4.1	92	9.4	49	5	147	15					15000

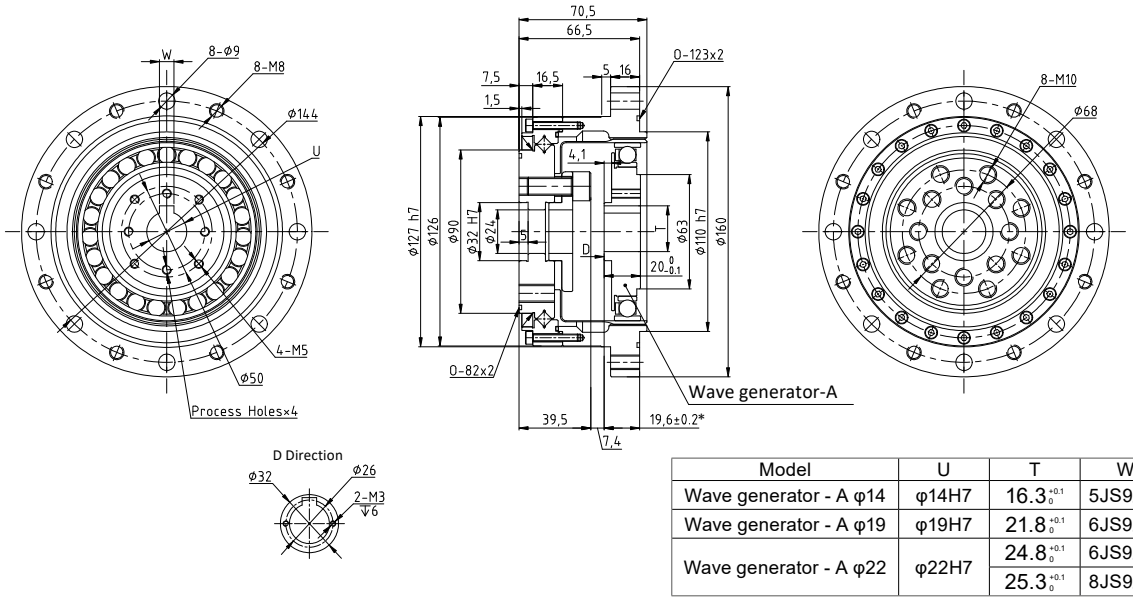
OUTLINE DRAWING

FSF-25-XX-U-I



Model	U	T	W
Wave generator - A φ11	φ11H7	12.8 +0.1 0	4JS9/P9
Wave generator - A φ14	φ14H7	16.3 +0.1 0	5JS9/P9

FSF-40-XX-U-I

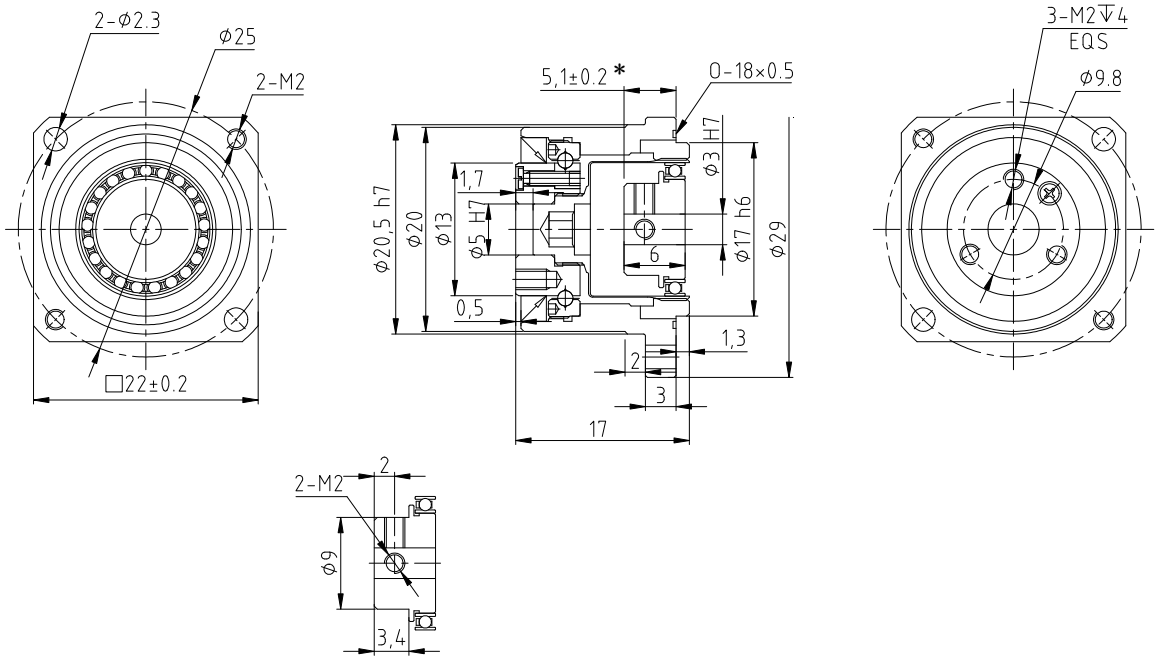


Model	U	T	W
Wave generator - A φ14	φ14H7	16.3 +0.1 0	5JS9/P9
Wave generator - A φ19	φ19H7	21.8 +0.1 0	6JS9/P9
Wave generator - A φ22	φ22H7	24.8 +0.1 0	6JS9/P9
		25.3 +0.1 0	8JS9/P9

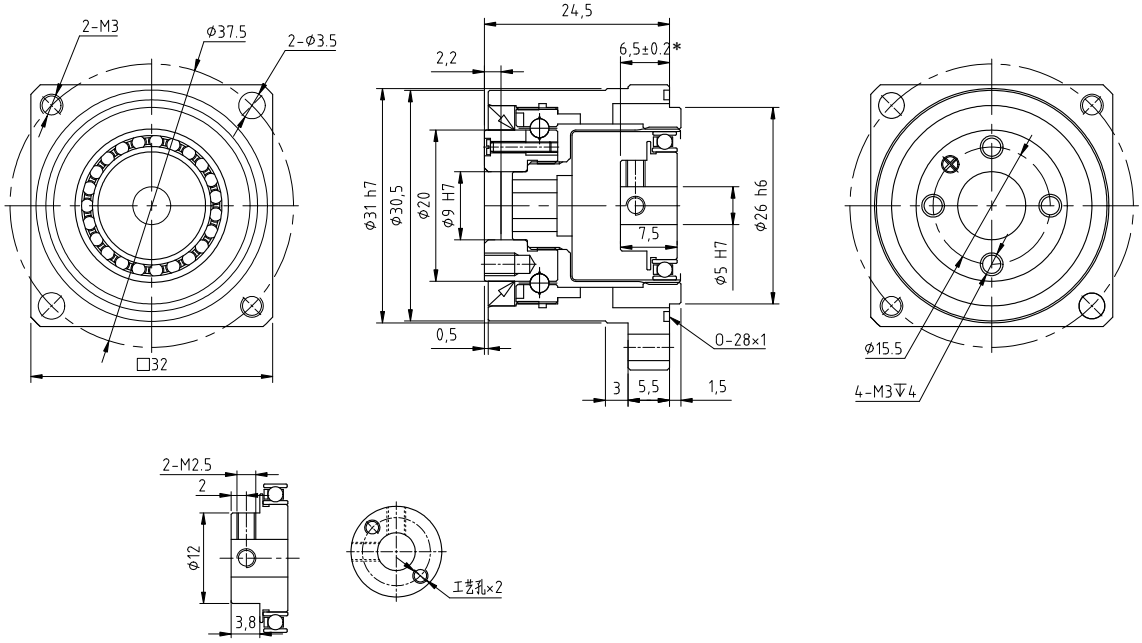
Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
25	50	39	4	98	10	55	5.6	186	19	5600	3500	≤20	1.46	10000
	80	63	6.4	137	14	87	8.9	255	26					15000
	100	67	6.8	157	16	108	11	284	29					15000
	120	67	6.8	167	17	108	11	304	31					15000
	160	67	6.8	176	18	108	11	314	32					15000
40	50	137	14	402	41	196	20	686	70	4000	3000	≤20	4.6	10000
	80	206	21	519	53	284	29	980	100					15000
	100	265	27	568	58	372	38	1080	110					15000
	120	294	30	617	63	451	46	1180	120					15000
	160	294	30	647	66	451	46	1180	120					15000

OUTLINE DRAWING

FSN-5-XX-U-I



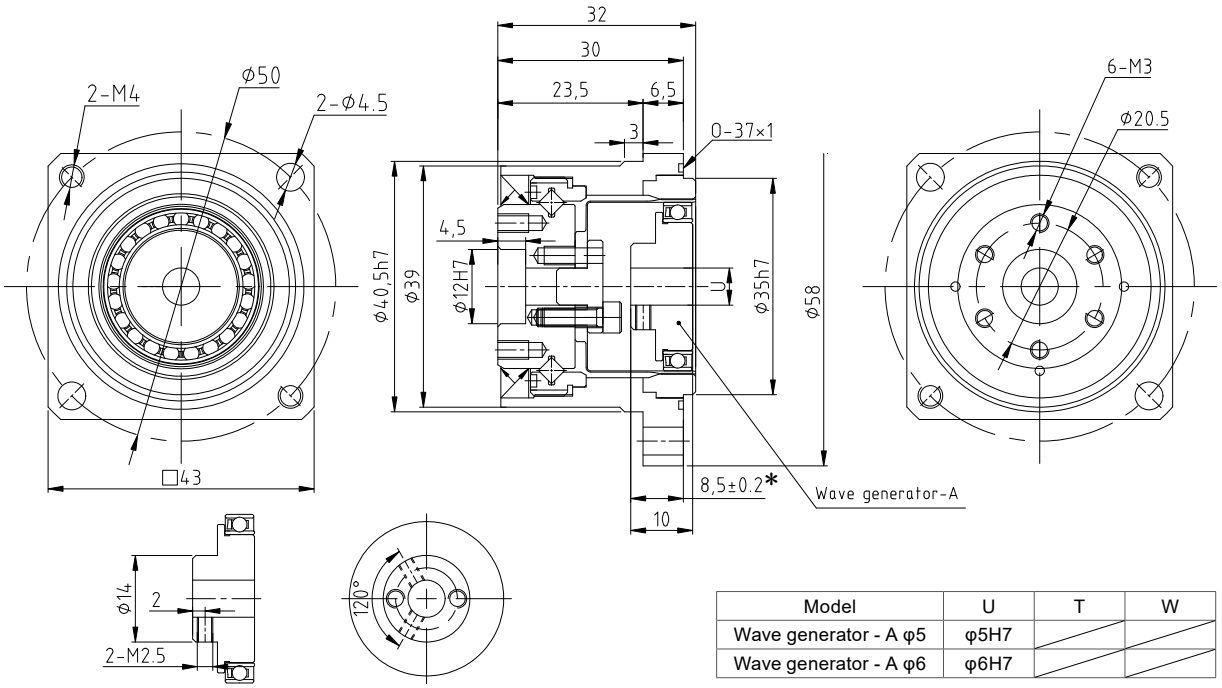
FSN-8-XX-U-I



Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
5	50	0.4	0.04	0.9	0.09	0.53	0.05	1.8	0.18	10000	6500	≤60	0.025	10000
	100	0.6	0.06	1.4	0.14	0.94	0.1	2.7	0.28					10000
8	50	1.8	0.18	3.3	0.34	2.3	0.23	6.6	0.67	8500	3500	≤30	0.08	10000
	100	2.4	0.24	4.8	0.49	3.3	0.34	9	0.92					10000

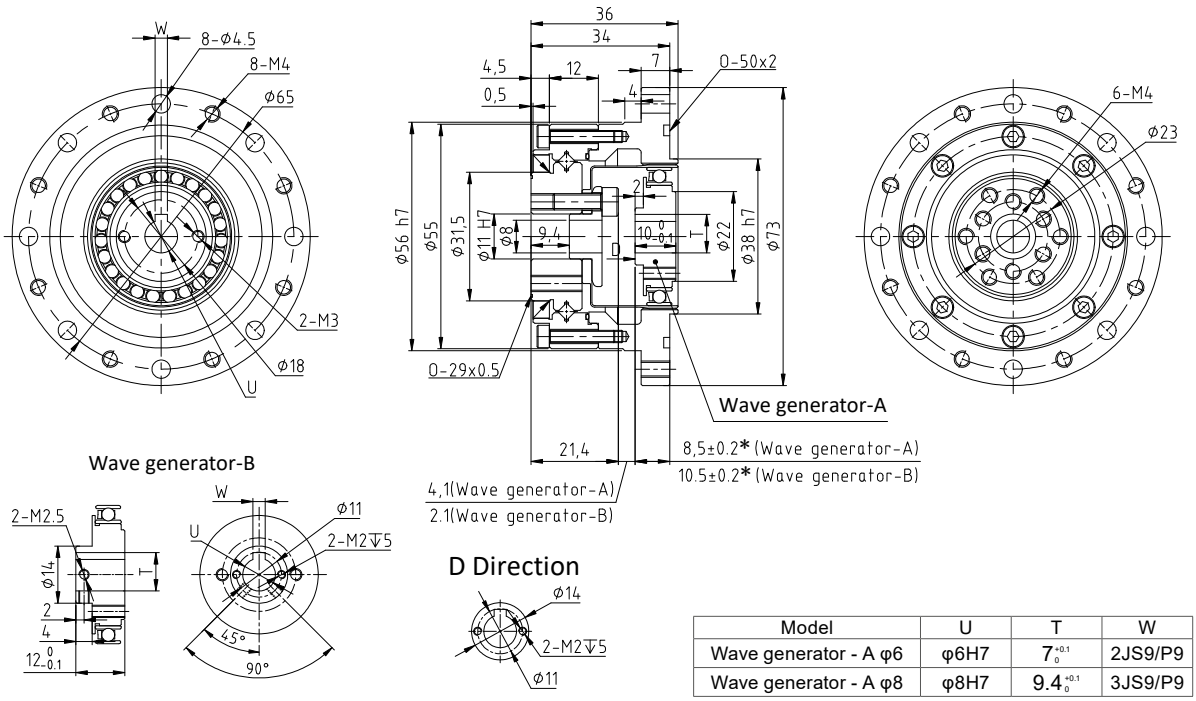
OUTLINE DRAWING

FSN-11-XX-U-I



Model	U	T	W
Wave generator - A φ5	φ5H7		
Wave generator - A φ6	φ6H7		

FSN-14-XX-U-I

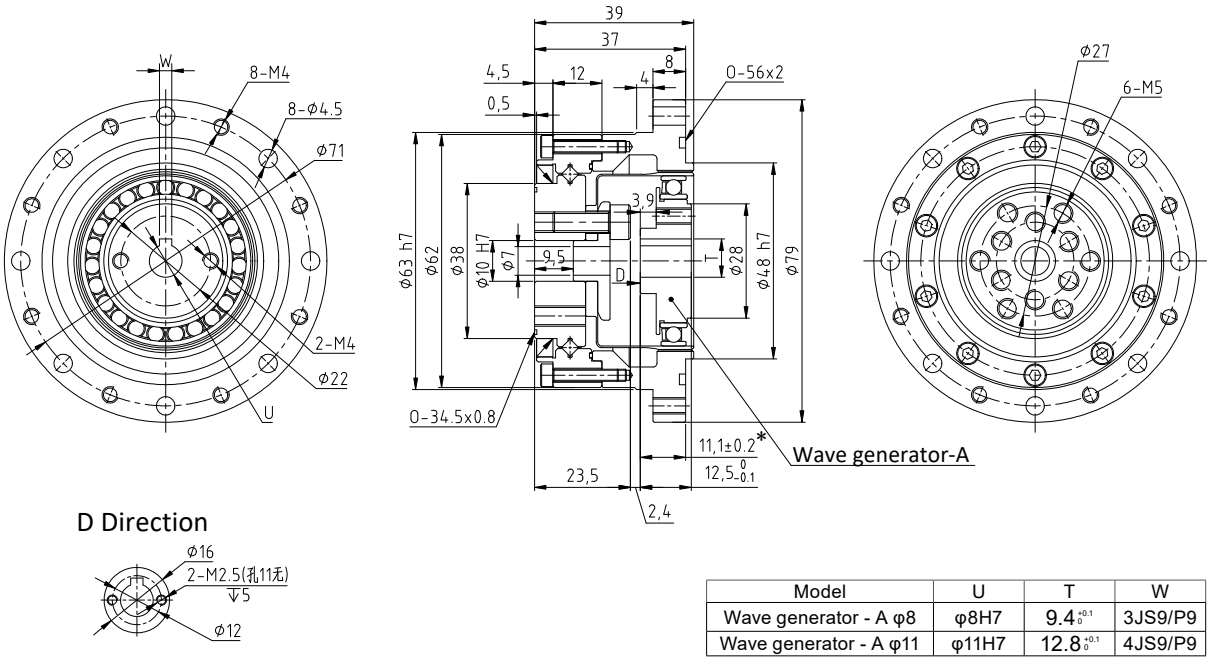


Model	U	T	W
Wave generator - A φ6	φ6H7	$7^{+0.1}_{0}$	2JS9/P9
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
11	50	3.5	0.36	8.3	0.85	5.5	0.56	17	1.73	8500	3500	≤30	0.17	10000
	100	5	0.51	11	1.12	8.9	0.91	25	2.55					10000
14	50	5.4	0.55	18	18	6.9	0.7	35	3.6	8500	3500	≤20	0.39	10000
	80	7.8	0.8	23	2.4	11	1.1	47	4.8					15000
	100	7.8	0.8	28	2.9	11	1.1	54	5.5					15000

OUTLINE DRAWING

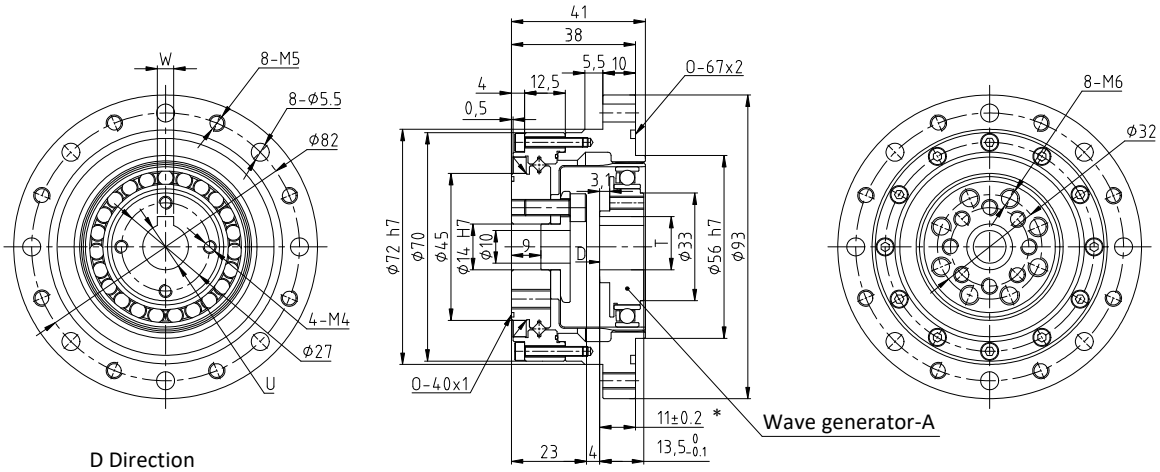
FSN-17-XX-U-I



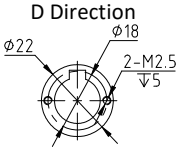
D Direction

Model	U	T	W
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9
Wave generator - A φ11	φ11H7	$12.8^{+0.1}_{0}$	4JS9/P9

FSN-20-XX-U-I



D Direction

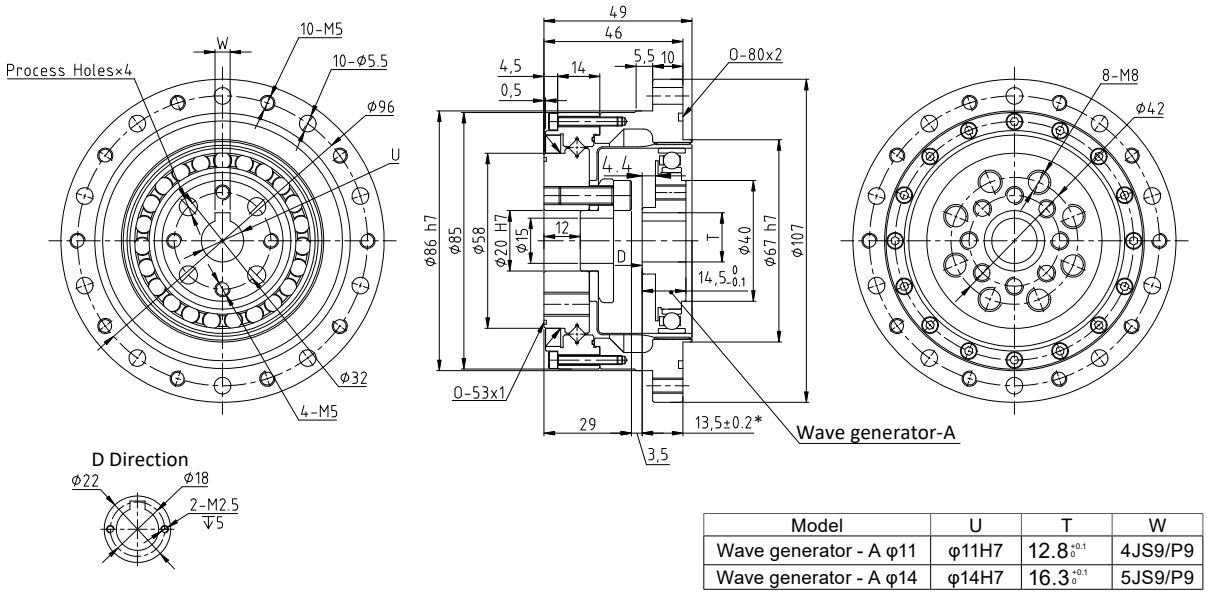


Model	U	T	W
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9
Wave generator - A φ11	φ11H7	$12.8^{+0.1}_{0}$	4JS9/P9
Wave generator - A φ14	φ14H7	$16.3^{+0.1}_{0}$	5JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
17	50	16	1.6	34	3.5	26	2.6	70	7.1	7300	3500	≤20	0.52	10000
	80	22	2.2	43	4.4	27	2.7	87	8.9					15000
	100	24	2.4	54	5.5	39	4	108	11					15000
	120	24	2.4	54	5.5	39	4	86	8.8					15000
20	50	25	2.5	56	5.7	34	3.5	98	10	6500	3500	≤20	0.73	10000
	80	34	3.5	74	7.5	47	4.8	127	13					15000
	100	40	4.1	82	8.4	49	5	147	15					15000
	120	40	4.1	87	8.9	49	5	147	15					15000
	160	40	4.1	92	9.4	49	5	147	15					15000

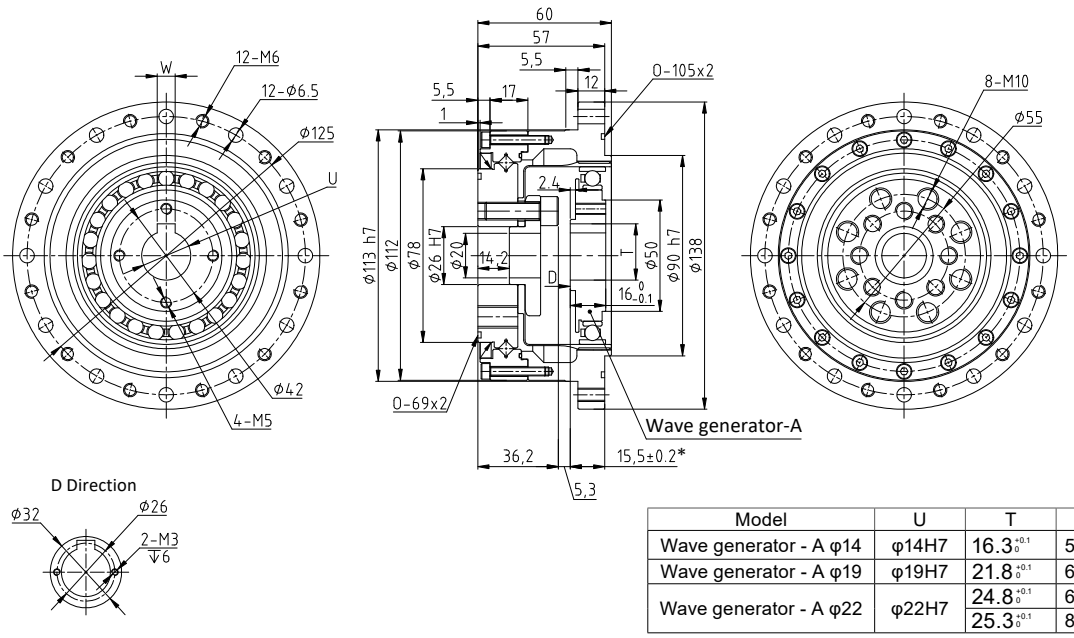
OUTLINE DRAWING

FSN-25-XX-U-I



Model	U	T	W
Wave generator - A φ11	φ11H7	12.8 $^{+0.1}_{0}$	4JS9/P9
Wave generator - A φ14	φ14H7	16.3 $^{+0.1}_{0}$	5JS9/P9

FSN-32-XX-U-I

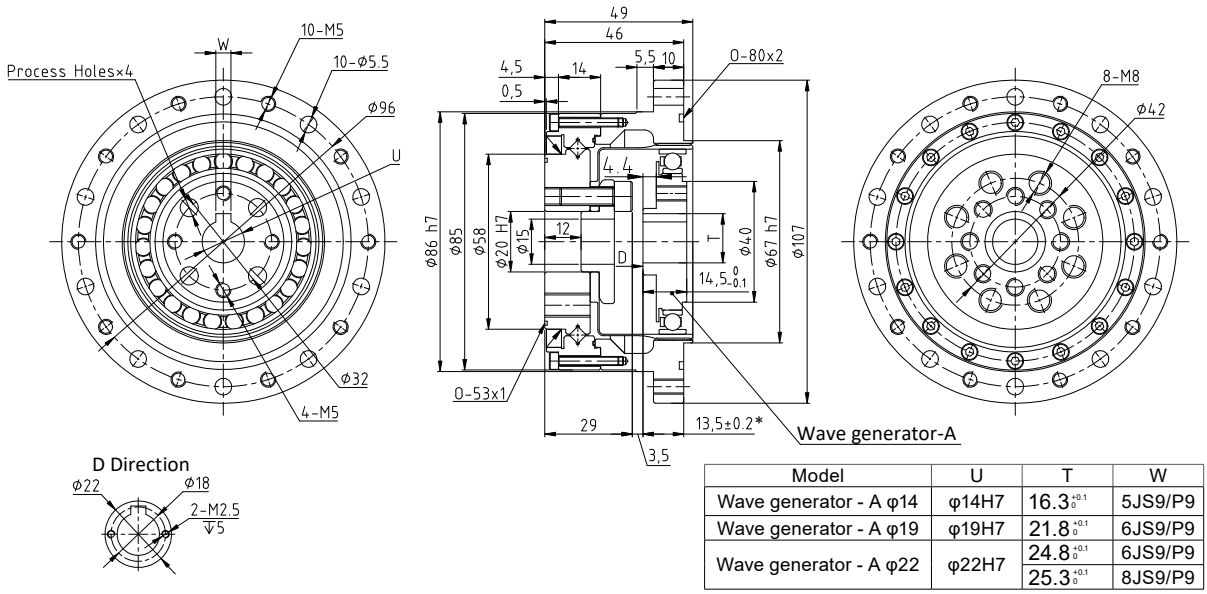


Model	U	T	W
Wave generator - A φ14	φ14H7	16.3 $^{+0.1}_{0}$	5JS9/P9
Wave generator - A φ19	φ19H7	21.8 $^{+0.1}_{0}$	6JS9/P9
Wave generator - A φ22	φ22H7	24.8 $^{+0.1}_{0}$	6JS9/P9
		25.3 $^{+0.1}_{0}$	8JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
25	50	39	4	98	10	55	5.6	186	19	5600	3500	≤20	1.14	10000
	80	63	6.4	137	14	87	8.9	255	26					15000
	100	67	6.8	157	16	108	11	284	29					15000
	120	67	6.8	167	17	108	11	304	31					15000
	160	67	6.8	176	18	108	11	314	32					15000
32	50	76	7.8	216	22	108	11	382	39	4800	3500	≤20	2.47	10000
	80	118	12	304	31	167	17	568	58					15000
	100	137	14	333	34	216	22	647	66					15000
	120	137	14	353	36	216	22	686	70					15000
	160	137	14	372	38	216	22	686	70					15000

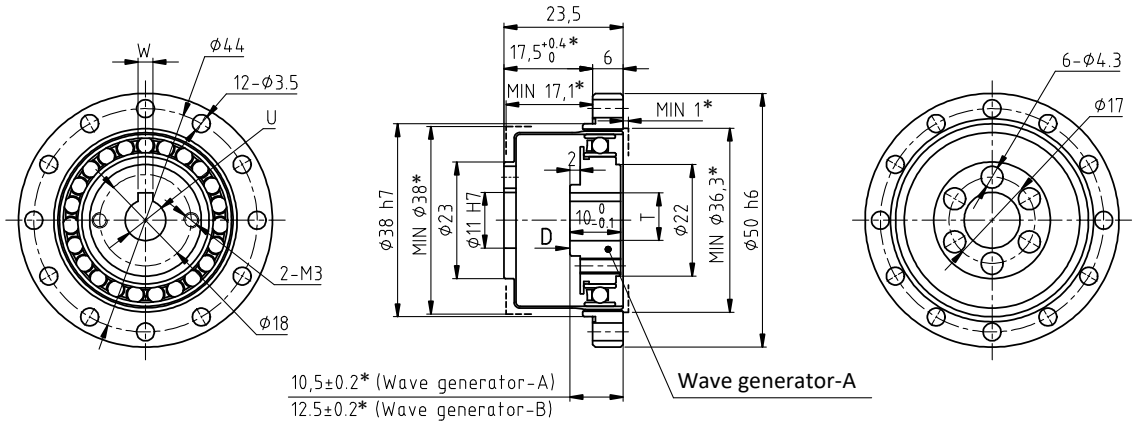
OUTLINE DRAWING

FSN-40-XX-U-I

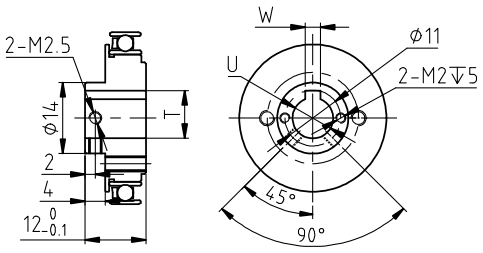


Model	U	T	W
Wave generator - A φ14	φ14H7	16.3 +0.1 0	5JS9/P9
Wave generator - A φ19	φ19H7	21.8 +0.1 0	6JS9/P9
Wave generator - A φ22	φ22H7	24.8 +0.1 0	6JS9/P9
		25.3 +0.1 0	8JS9/P9

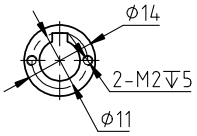
FSG-14-XX-C-I



Wave generator-B



D Direction

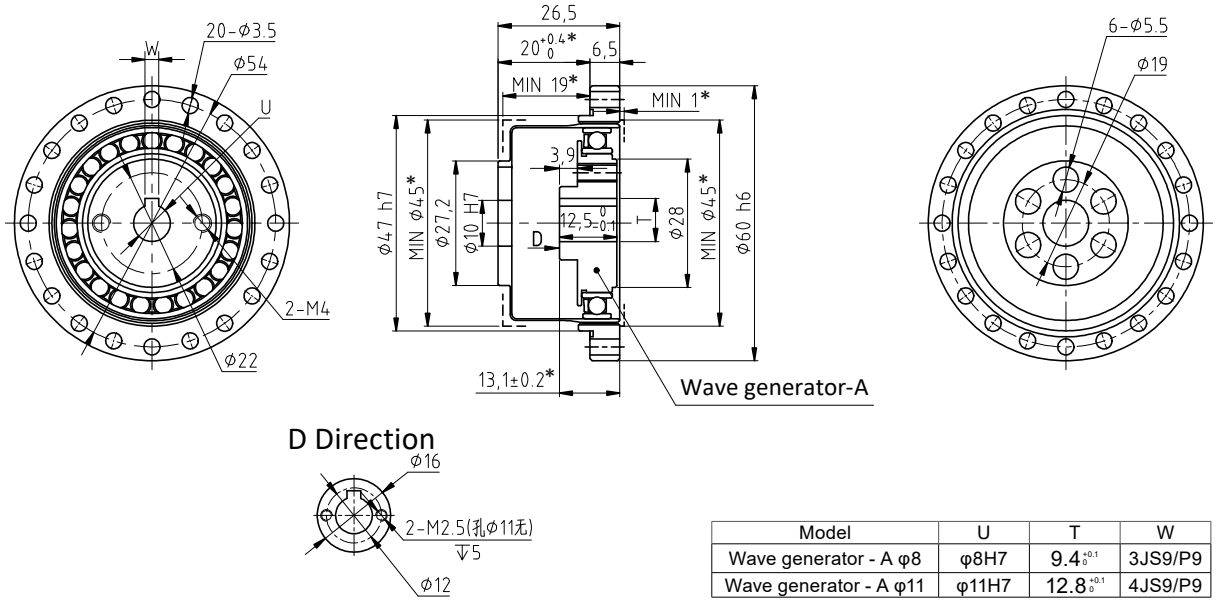


Model	U	T	W
Wave generator - A/B φ6	φ6H7	7 +0.1 0	2JS9/P9
Wave generator - A/B φ8	φ8H7	9.4 +0.1 0	3JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
40	50	137	14	402	41	196	20	686	70	4000	3000	≤20	3.64	10000
	80	206	21	519	53	284	29	980	100					15000
	100	265	27	568	58	372	38	1080	110					15000
	120	294	30	617	63	451	46	1180	120					15000
	160	294	30	647	66	451	46	1180	120					15000
14	50	7	0.7	23	2.3	9	0.9	46	4.7	8500	3500	≤20	0.09	10000
	80	10	1	30	3.1	14	1.4	61	6.2					15000
	100	10	1	36	3.7	14	1.4	70	7.2					15000

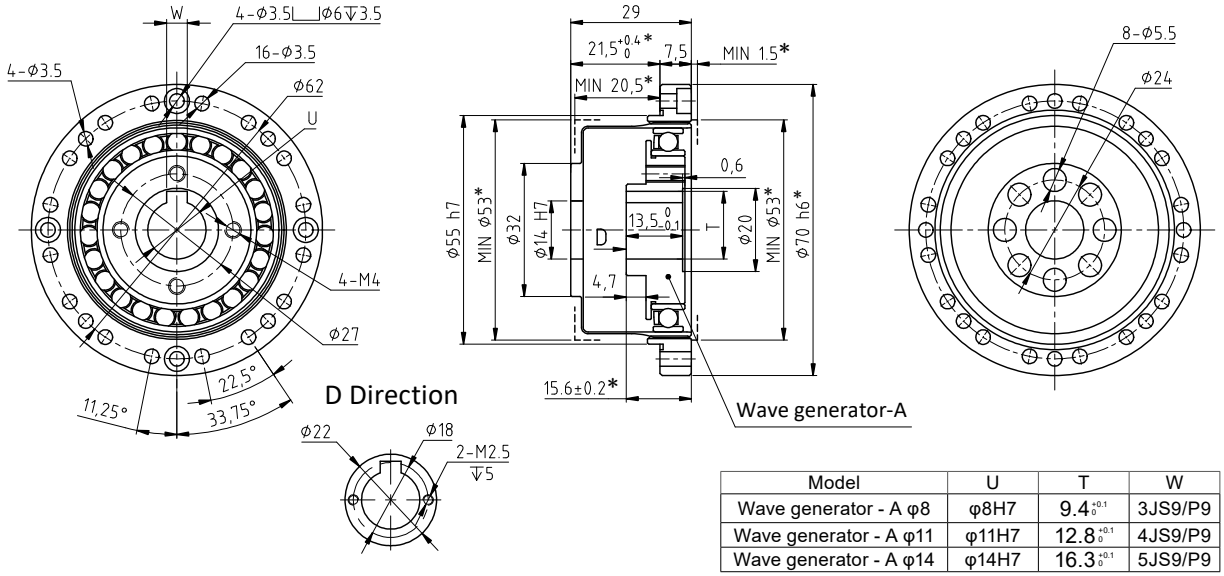
OUTLINE DRAWING

FSG-17-XX-C-I



Model	U	T	W
Wave generator - A φ8	φ8H7	9.4 +0.1 0	3JS9/P9
Wave generator - A φ11	φ11H7	12.8 +0.1 0	4JS9/P9

FSG-20-XX-C-I

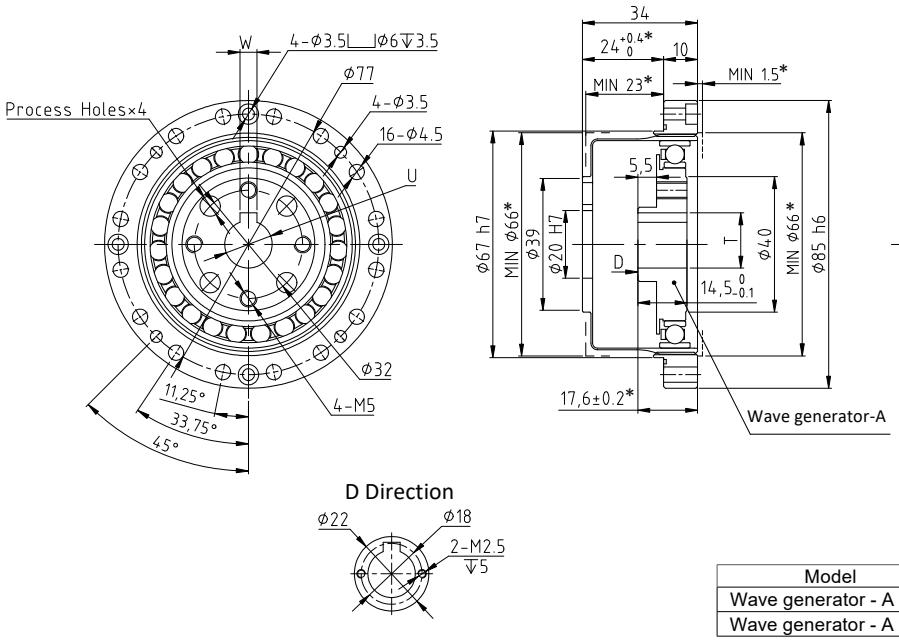


Model	U	T	W
Wave generator - A φ8	φ8H7	9.4 +0.1 0	3JS9/P9
Wave generator - A φ11	φ11H7	12.8 +0.1 0	4JS9/P9
Wave generator - A φ14	φ14H7	16.3 +0.1 0	5JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
17	50	21	2.1	44	4.5	34	3.4	91	9	7300	3500	≤20	0.15	10000
	80	29	2.9	56	5.7	35	3.6	113	12					15000
	100	31	3.2	70	7.2	51	5.2	143	15					15000
	120	31	3.2	70	7.2	51	5.2	112	11					15000
20	50	33	3.3	73	7.4	44	4.5	127	13	6500	3500	≤20	0.28	10000
	80	44	4.5	96	9.8	61	6.2	165	17					15000
	100	52	5.3	107	10.9	64	6.5	191	20					15000
	120	52	5.3	113	11.5	64	6.5	191	20					15000
	160	52	5.3	120	12.2	64	6.5	191	20					15000

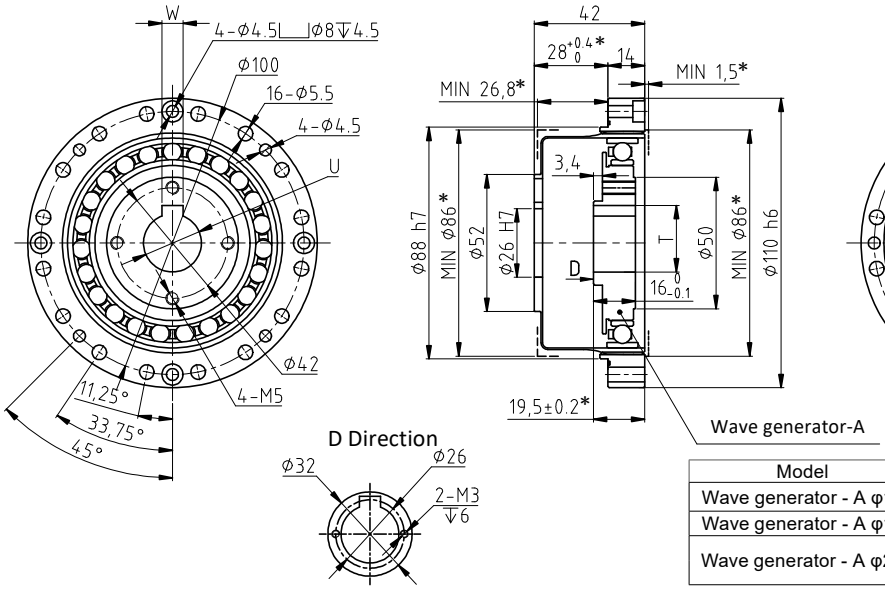
OUTLINE DRAWING

FSG-25-XX-C-I



Model	U	T	W
Wave generator - A φ11	φ11H7	12.8 +0.1 0	4JS9/P9
Wave generator - A φ14	φ14H7	16.3 +0.1 0	5JS9/P9

FSG-32-XX-C-I

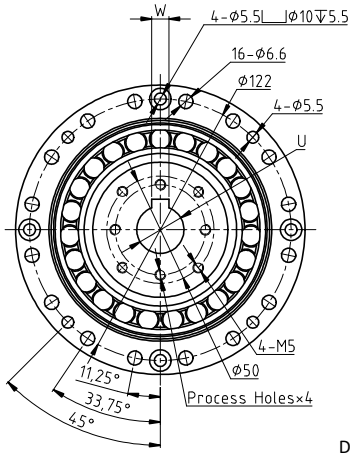


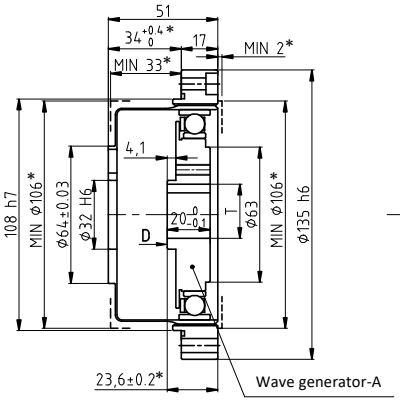
Model	U	T	W
Wave generator - A φ14	φ14H7	16.3 +0.1 0	5JS9/P9
Wave generator - A φ19	φ19H7	21.8 +0.1 0	6JS9/P9
Wave generator - A φ22	φ22H7	24.8 +0.1 0	6JS9/P9
		25.3 +0.1 0	8JS9/P9

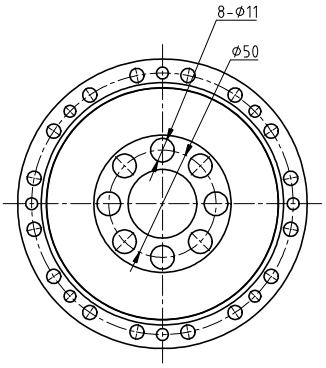
Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
25	50	51	5.2	127	13	72	7.3	242	25	5600	3500	≤20	0.42	10000
	80	82	8.4	178	18	113	12	332	34					15000
	100	87	8.9	204	21	140	14	369	38					15000
	120	87	8.9	217	22	140	14	395	40					15000
	160	87	8.9	229	23	140	14	408	42					15000
32	50	99	10	281	29	140	14	497	51	4800	3500	≤20	0.89	10000
	80	153	16	395	40	217	22	738	75					15000
	100	178	18	433	44	281	29	841	86					15000
	120	178	18	459	47	281	29	892	91					15000
	160	178	18	484	49	281	29	892	91					15000

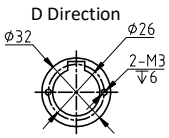
OUTLINE DRAWING

FSG-40-XX-C-I



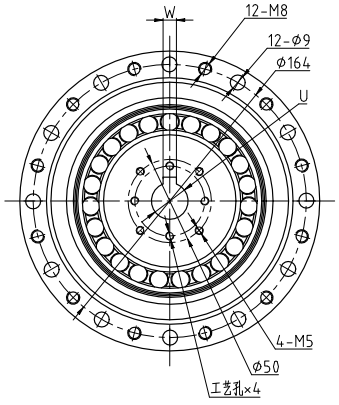


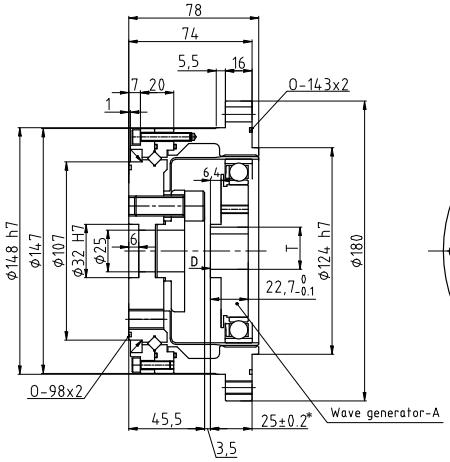


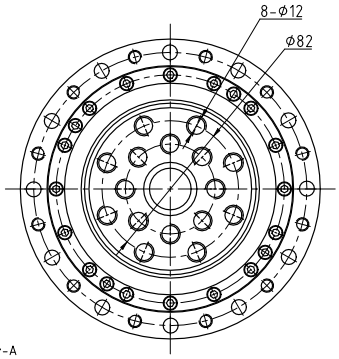


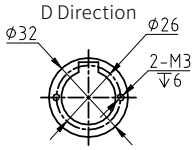
Model	U	T	W
Wave generator - A φ14	φ14H7	$16.3^{+0.1}_{0}$	5JS9/P9
Wave generator - A φ19	φ19H7	$21.8^{+0.1}_{0}$	6JS9/P9
Wave generator - A φ22	φ22H7	$24.8^{+0.1}_{0}$	6JS9/P9
		$25.3^{+0.1}_{0}$	8JS9/P9

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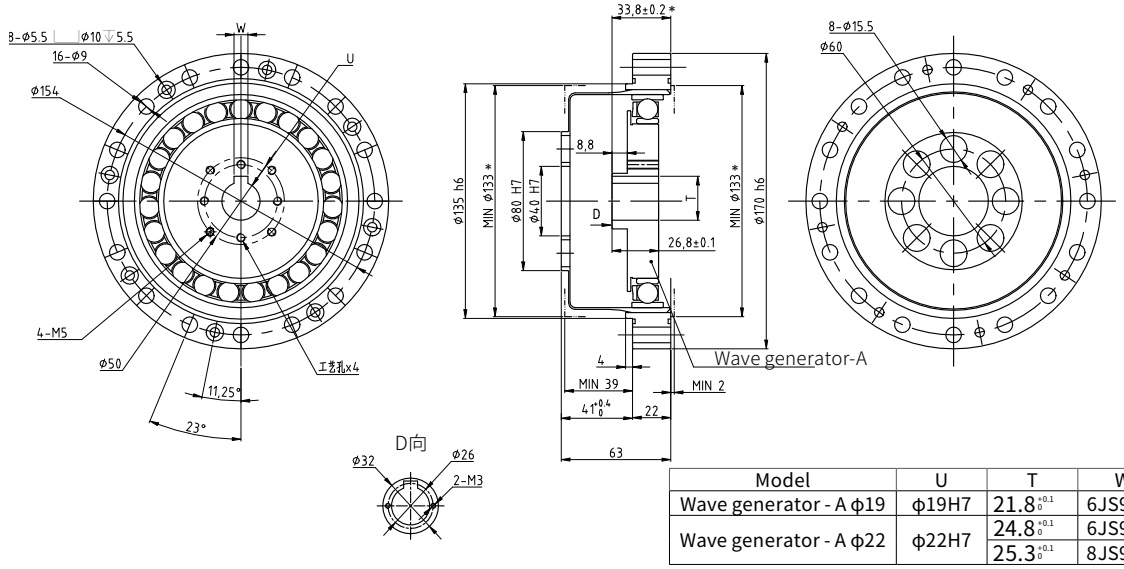




Model	U	T	W
Wave generator - A ϕ19	ϕ19H7	$21.8^{+0.1}_{0}$	6JS9/P9
Wave generator - A ϕ22	ϕ22H7	$24.8^{+0.1}_{0}$	6JS9/P9
		$25.3^{+0.1}_{0}$	8JS9/P9

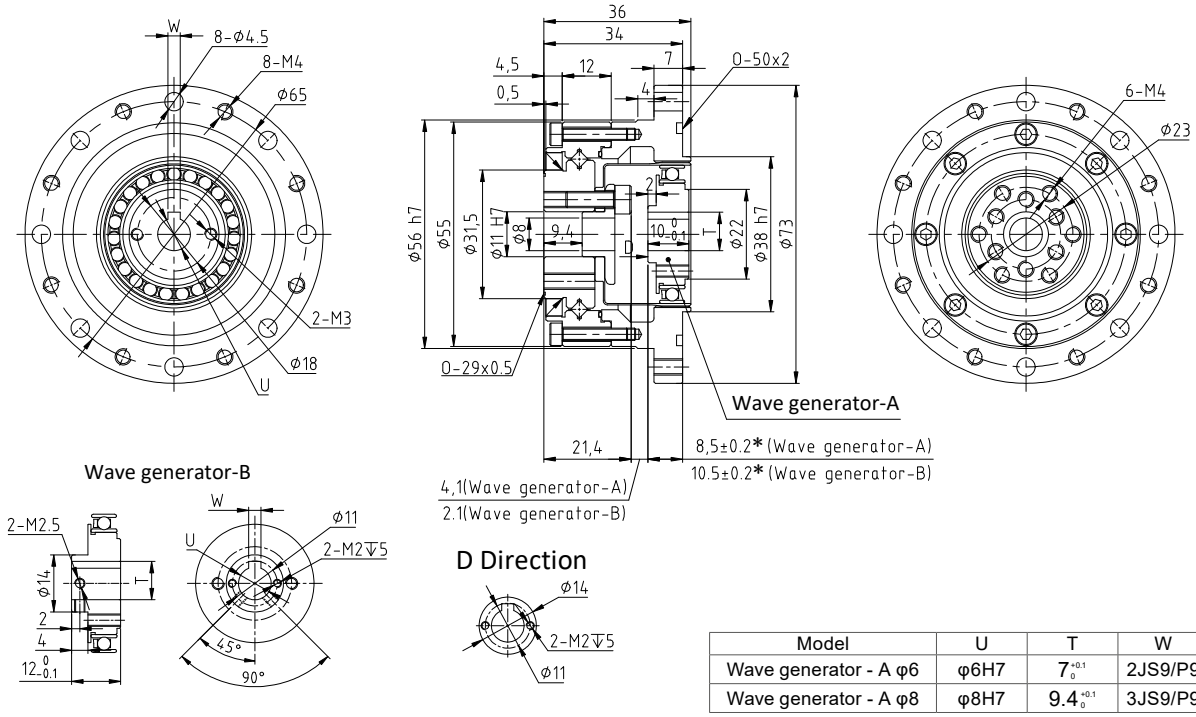
Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
40	50	178	18	523	53	255	26	892	91	4000	3000	⩽20	1.7	10000
	80	268	27	675	69	369	38	1270	130					15000
	100	345	35	738	75	484	49	1400	143					15000
	120	382	39	802	82	586	60	1530	156					15000
	160	382	39	841	86	586	60	1530	156					15000
45	50	229	23	650	66	345	35	1235	126	3800	3000	⩽20	4	10000
	80	407	41	918	94	507	52	1651	168					15000
	100	459	47	982	100	650	66	2041	208					15000
	120	523	53	1070	109	806	82	2288	233					15000
	160	523	53	1147	117	819	84	2483	253					15000

FSG-50-XX-C-I



Model	U	T	W
Wave generator - A φ19	φ19H7	21.8	6JS9/P9
Wave generator - A φ22	φ22H7	24.8	6JS9/P9
		25.3	8JS9/P9

FSG-14-XX-U-I

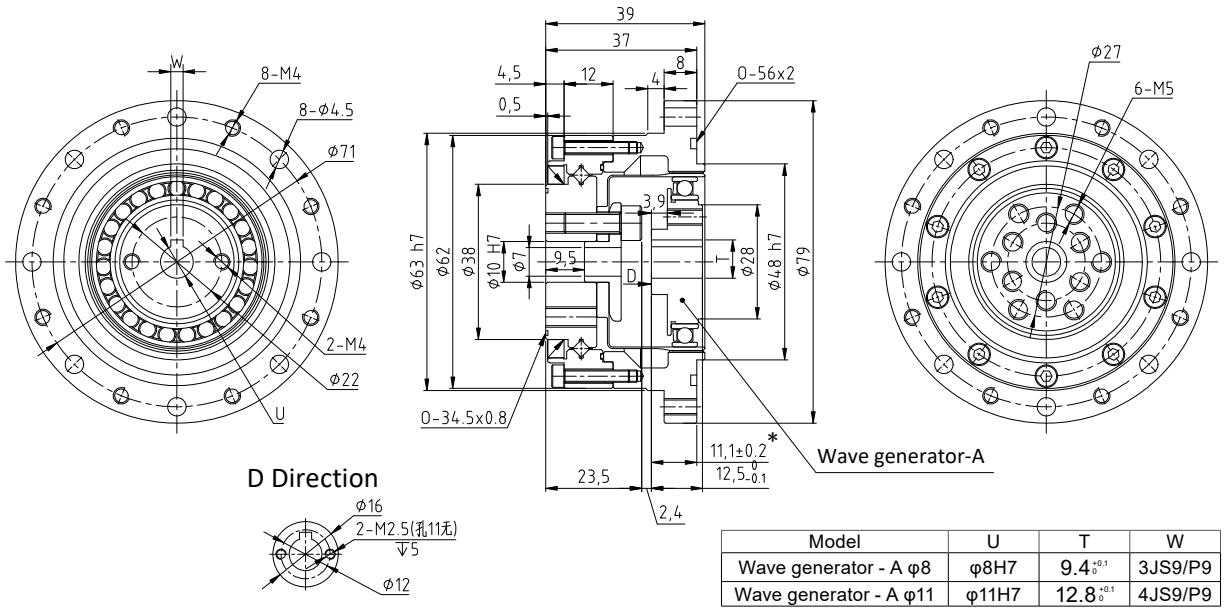


Model	U	T	W
Wave generator - A φ6	φ6H7	7	2JS9/P9
Wave generator - A φ8	φ8H7	9.4	3JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
50	50	245	25	715	73	350	36	1430	146	3500	2500	⩽20	4.8	10000
	80	372	38	941	96	519	53	1860	190					15000
	100	470	48	980	100	666	68	2060	210					15000
	120	529	54	1080	110	813	83	2060	210					15000
	160	529	54	1180	120	843	86	2450	250					15000
14	50	7	0.7	23	2.3	9	0.9	46	4.7	8500	3500	⩽20	0.51	10000
	80	10	1	30	3.1	14	1.4	58	5.9					15000
	100	10	1	36	3.7	14	1.4	58	5.9					15000

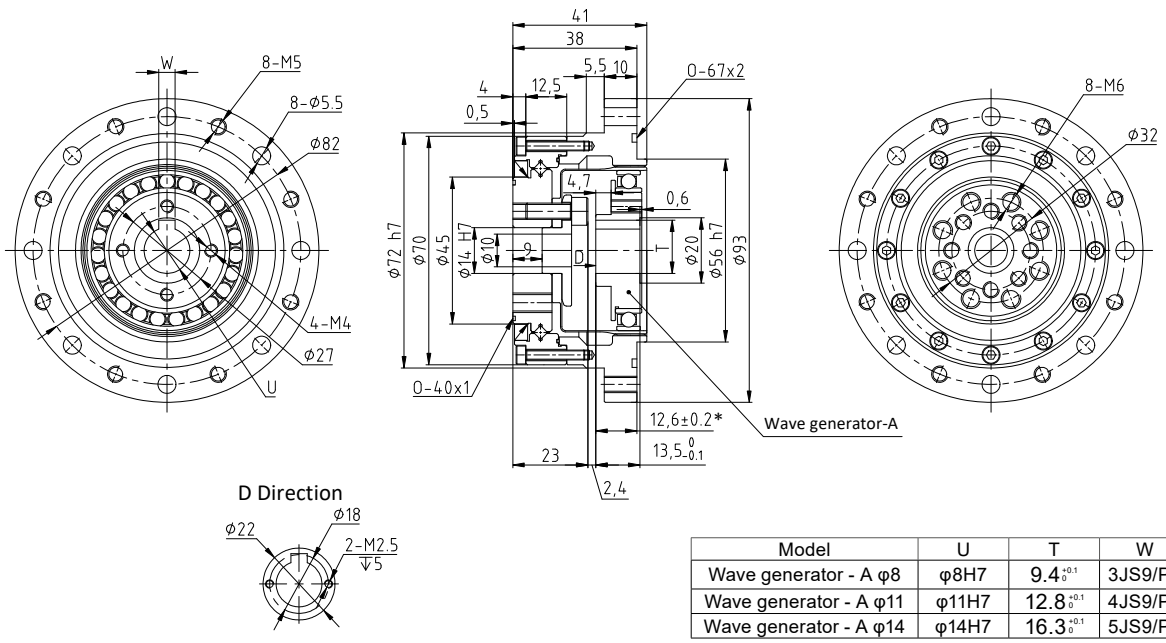
OUTLINE DRAWING

FSG-17-XX-U-I



Model	U	T	W
Wave generator - A φ8	φ8H7	9.4 +0.1 0	3JS9/P9
Wave generator - A φ11	φ11H7	12.8 +0.1 0	4JS9/P9

FSG-20-XX-U-I

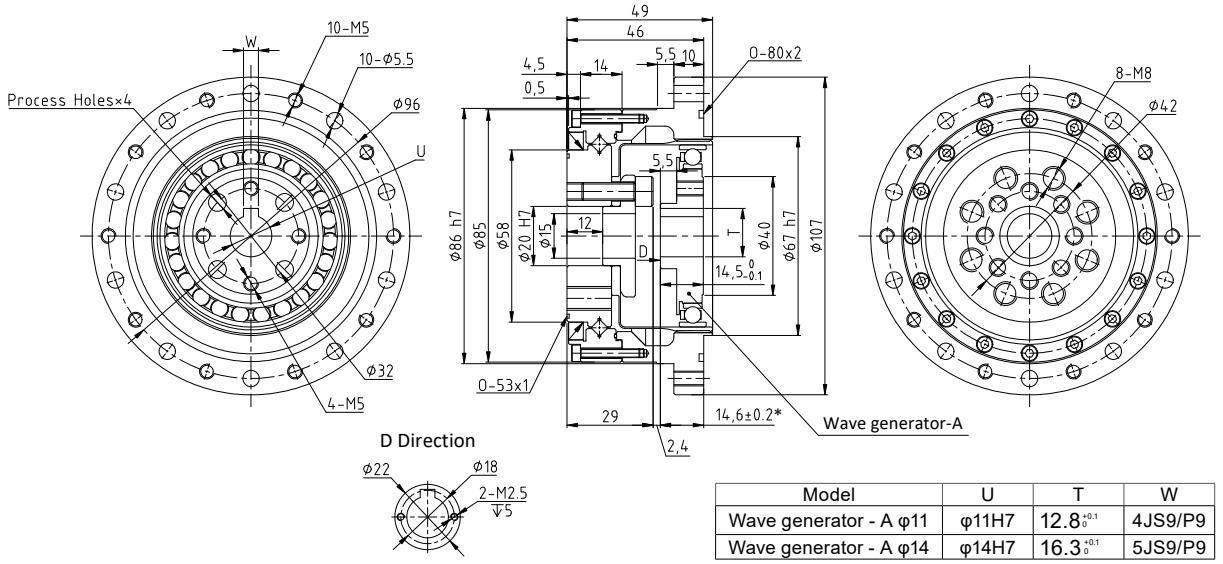


Model	U	T	W
Wave generator - A φ8	φ8H7	9.4 +0.1 0	3JS9/P9
Wave generator - A φ11	φ11H7	12.8 +0.1 0	4JS9/P9
Wave generator - A φ14	φ14H7	16.3 +0.1 0	5JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
17	50	21	2.1	44	4.5	34	3.4	91	9	7300	3500	≤20	0.67	10000
	80	29	2.9	56	5.7	35	3.6	109	11					15000
	100	31	3.2	70	7.2	51	5.2	109	11					15000
	120	31	3.2	70	7.2	51	5.2	109	11					15000
20	50	33	3.3	73	7.4	44	4.5	127	13	6500	3500	≤20	0.96	10000
	80	44	4.5	96	9.8	61	6.2	165	17					15000
	100	52	5.3	107	10.9	64	6.5	191	20					15000
	120	52	5.3	113	11.5	64	6.5	191	20					15000
	160	52	5.3	120	12.2	64	6.5	191	20					15000

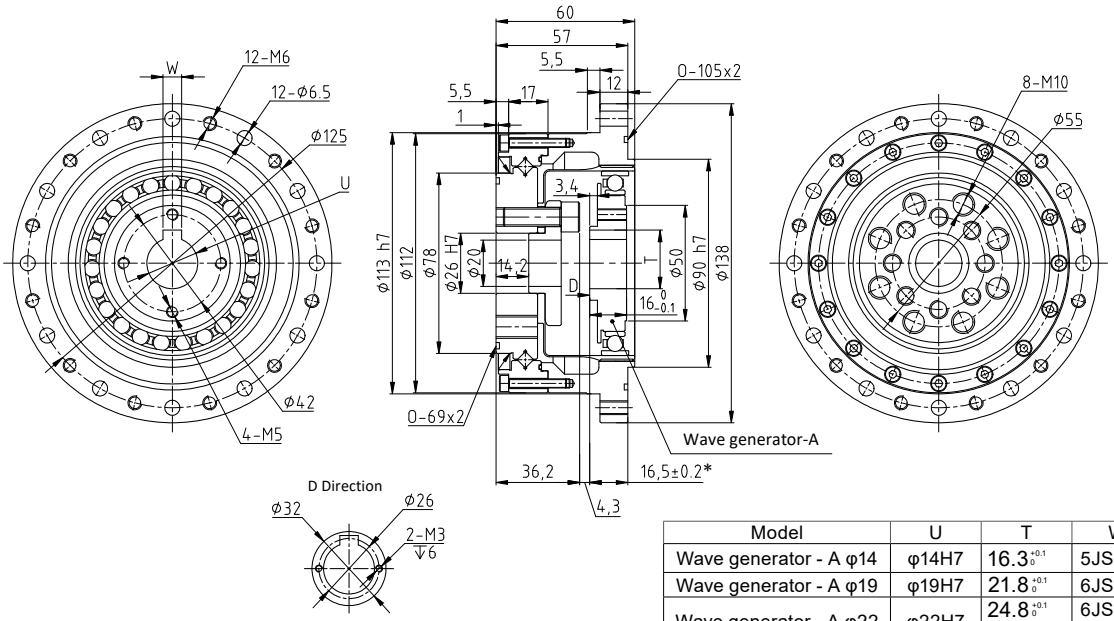
OUTLINE DRAWING

FSG-25-XX-U-I



Model	U	T	W
Wave generator - A φ11	φ11H7	12.8 $^{+0.1}_{0}$	4JS9/P9
Wave generator - A φ14	φ14H7	16.3 $^{+0.1}_{0}$	5JS9/P9

FSG-32-XX-U-I

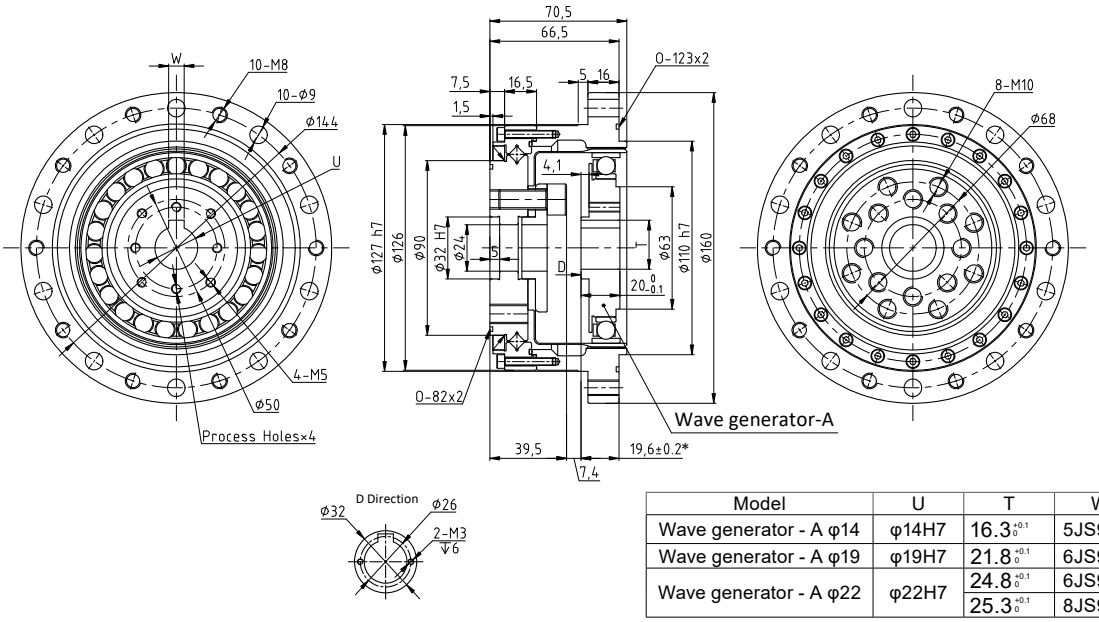


Model	U	T	W
Wave generator - A φ14	φ14H7	16.3 $^{+0.1}_{0}$	5JS9/P9
Wave generator - A φ19	φ19H7	21.8 $^{+0.1}_{0}$	6JS9/P9
Wave generator - A φ22	φ22H7	24.8 $^{+0.1}_{0}$	6JS9/P9
		25.3 $^{+0.1}_{0}$	8JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
25	50	51	5.2	127	13	72	7.3	242	25	5600	3500	≤20	1.46	10000
	80	82	8.4	178	18	113	12	332	34					15000
	100	87	8.9	204	21	140	14	369	38					15000
	120	87	8.9	217	22	140	14	395	40					15000
	160	87	8.9	229	23	140	14	408	42					15000
32	50	99	10	281	29	140	14	497	51	4800	3500	≤20	3.11	10000
	80	153	16	395	40	217	22	738	75					15000
	100	178	18	433	44	281	29	841	86					15000
	120	178	18	459	47	281	29	842	86					15000
	160	178	18	484	49	281	29	842	86					15000

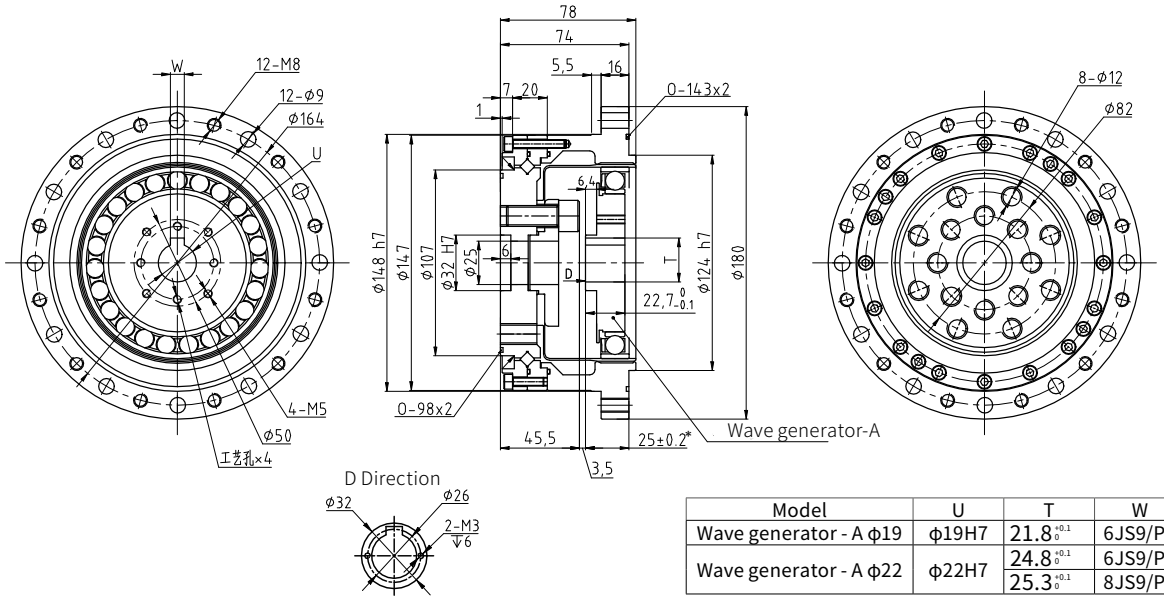
OUTLINE DRAWING

FSG-40-XX-U-I



Model	U	T	W
Wave generator - A φ14	φ14H7	16.3 $^{+0.1}_{0}$	5JS9/P9
Wave generator - A φ19	φ19H7	21.8 $^{+0.1}_{0}$	6JS9/P9
Wave generator - A φ22	φ22H7	24.8 $^{+0.1}_{0}$	6JS9/P9
		25.3 $^{+0.1}_{0}$	8JS9/P9

FSG-45-XX-U-I

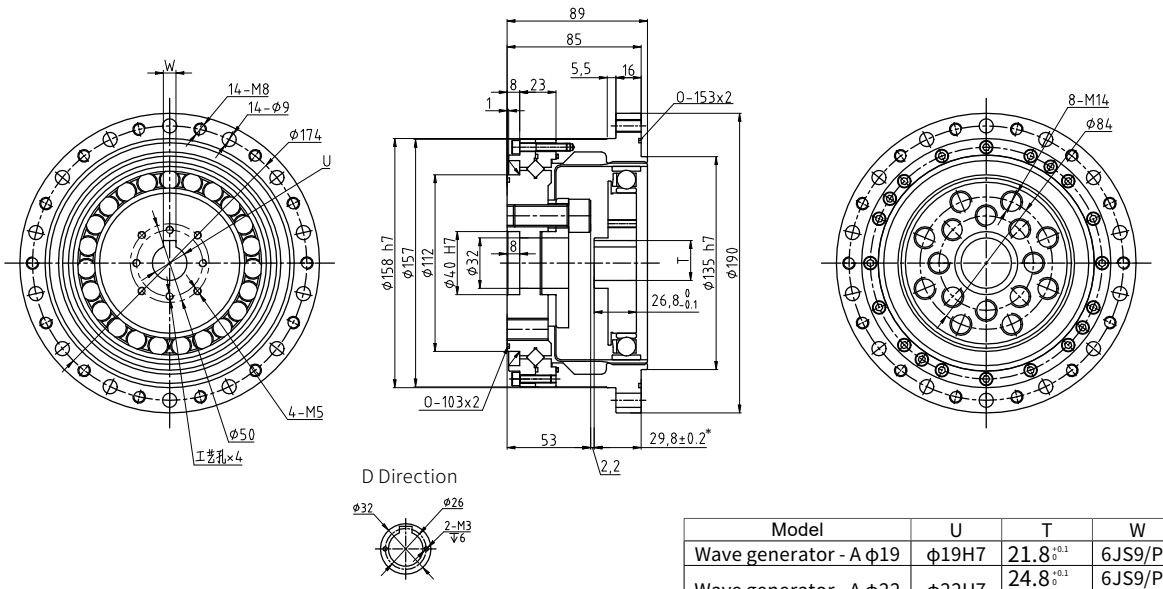


Model	U	T	W
Wave generator - A φ19	φ19H7	21.8 $^{+0.1}_{0}$	6JS9/P9
Wave generator - A φ22	φ22H7	24.8 $^{+0.1}_{0}$	6JS9/P9
		25.3 $^{+0.1}_{0}$	8JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
40	50	178	18	523	53	255	26	892	91	4000	3000	⩽20	4.60	10000
	80	268	27	675	69	369	38	1270	130					15000
	100	345	35	738	75	484	49	1400	143					15000
	120	382	39	802	82	586	60	1510	154					15000
	160	382	39	841	86	586	60	1510	154					15000
45	50	229	23	650	66	345	35	1235	126	3800	3000	⩽20	6.3	15000
	80	407	41	918	94	507	52	1651	168					15000
	100	459	47	982	100	650	66	2041	208					15000
	120	523	53	1070	109	806	82	2288	233					15000
	160	523	53	1147	117	819	84	2483	253					15000

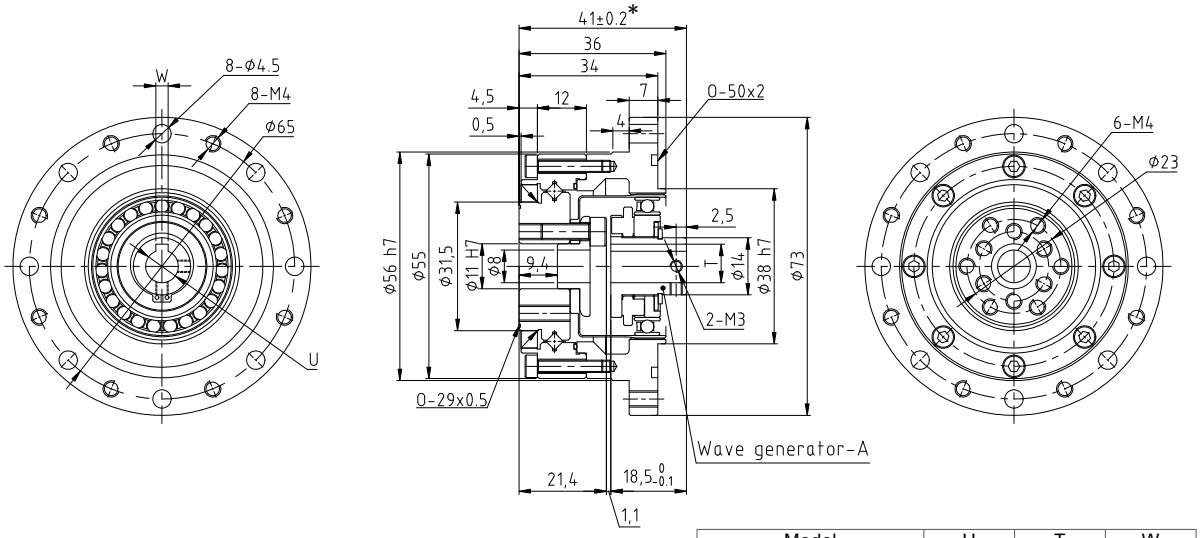
OUTLINE DRAWING

FSG-50-XX-U-I



Model	U	T	W
Wave generator - A φ19	φ19H7	21.8 +0.1 0	6JS9/P9
Wave generator - A φ22	φ22H7	24.8 +0.1 0	6JS9/P9
		25.3 +0.1 0	8JS9/P9

FSG-14-XX-U-II

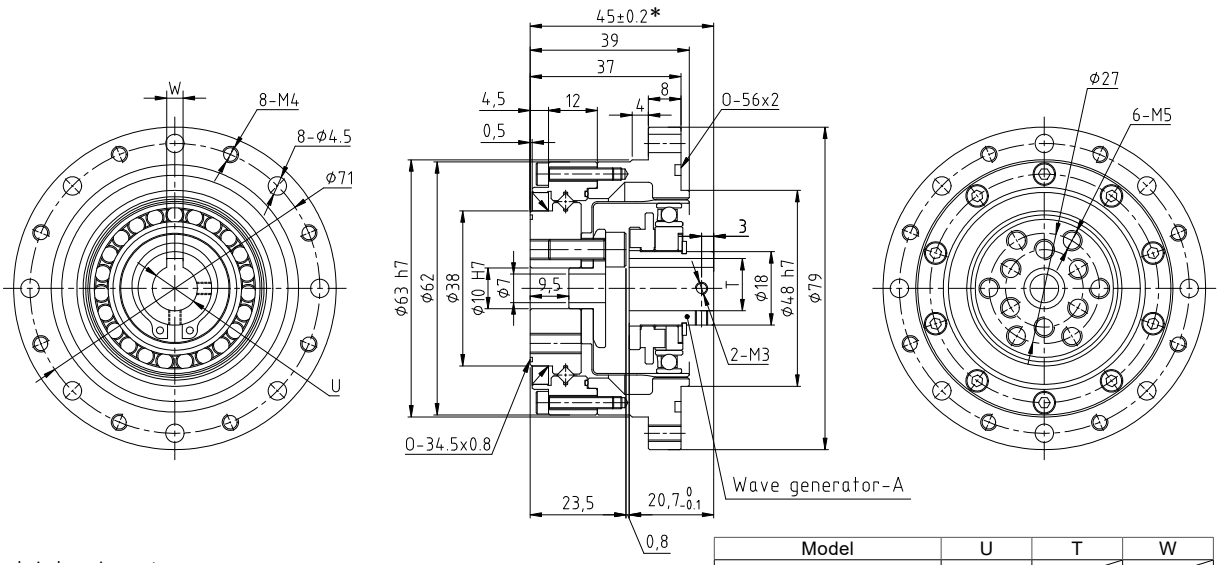


Model	U	T	W
Wave generator - A φ6	φ6H7		
Wave generator - A φ6	φ6H7	7 +0.1 0	2JS9/P9
Wave generator - A φ8	φ8H7	9.4 +0.1 0	3JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
50	50	245	25	715	73	350	36	1430	146	3500	2500	⩽20	7	10000
	80	372	38	941	96	519	53	1860	190					15000
	100	470	48	980	100	666	68	2060	210					15000
	120	529	54	1080	110	813	83	2060	210					15000
	160	529	54	1180	120	843	86	2450	250					15000
14	50	7	0.7	23	2.3	9	0.9	46	4.7	8500	3500	⩽20	0.51	10000
	80	10	1	30	3.1	14	1.4	58	5.9					15000
	100	10	1	36	3.7	14	1.4	58	5.9					15000

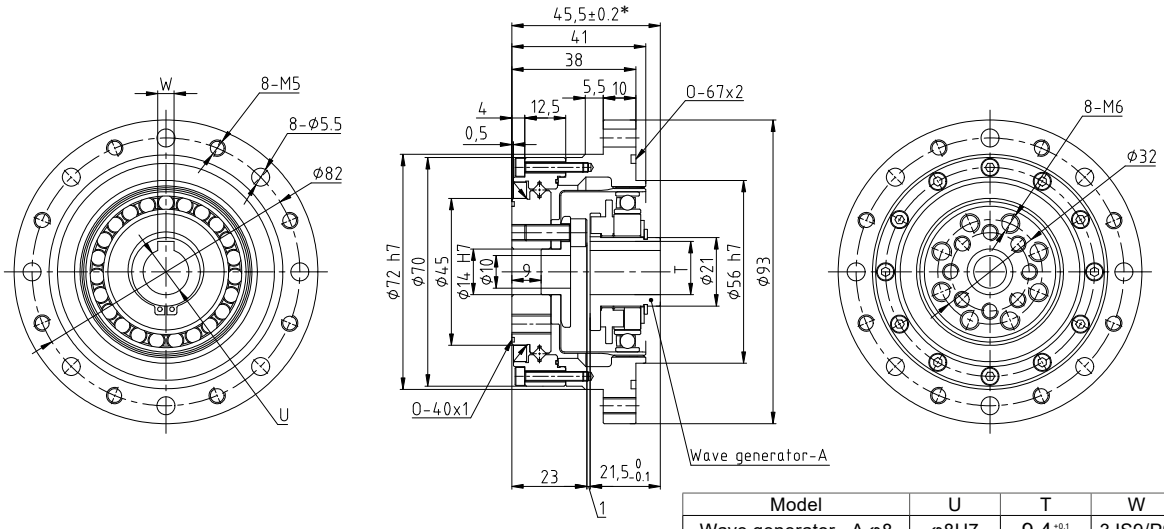
OUTLINE DRAWING

FSG-17-XX-U-II



Model	U	T	W
Wave generator - A φ8	φ8H7		
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9
Wave generator - A φ11	φ11H7	$12.8^{+0.1}_{0}$	4JS9/P9

FSG-20-XX-U-II

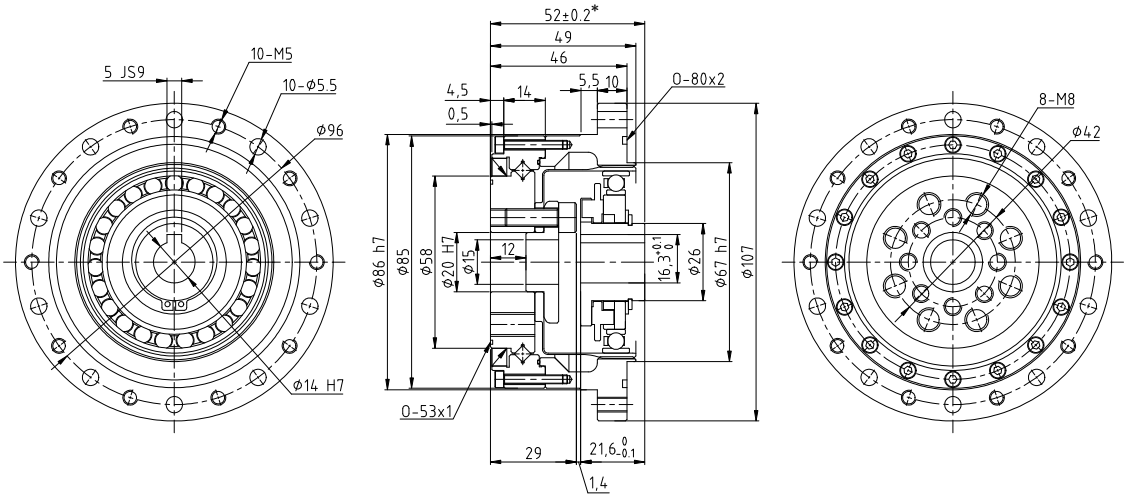


Model	U	T	W
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9
Wave generator - A φ11	φ11H7	$12.8^{+0.1}_{0}$	4JS9/P9
Wave generator - A φ14	φ14H7	$16.3^{+0.1}_{0}$	5JS9/P9

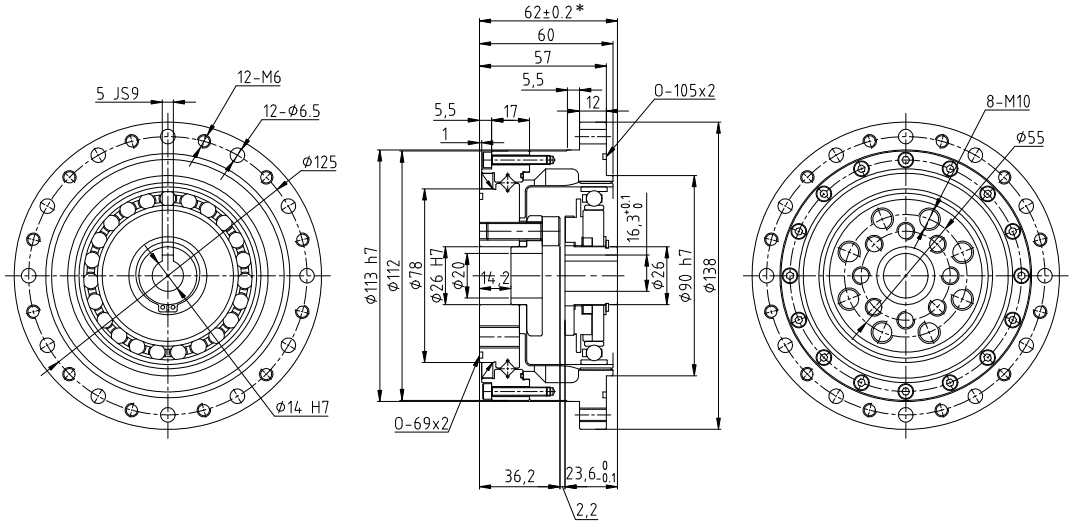
Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
17	50	21	2.1	44	4.5	34	3.4	91	9	7300	3500	≤20	0.67	10000
	80	29	2.9	56	5.7	35	3.6	109	11					15000
	100	31	3.2	70	7.2	51	5.2	109	11					15000
	120	31	3.2	70	7.2	51	5.2	109	11					15000
20	50	33	3.3	73	7.4	44	4.5	127	13	6500	3500	≤20	0.96	10000
	80	44	4.5	96	9.8	61	6.2	165	17					15000
	100	52	5.3	107	10.9	64	6.5	191	20					15000
	120	52	5.3	113	11.5	64	6.5	191	20					15000
	160	52	5.3	120	12.2	64	6.5	191	20					15000

OUTLINE DRAWING

FSG-25-XX-U-II



FSG-32-XX-U-II



Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
25	50	51	5.2	127	13	72	7.3	242	25	5600	3500	≤20	1.46	10000
	80	82	8.4	178	18	113	12	332	34					15000
	100	87	8.9	204	21	140	14	369	38					15000
	120	87	8.9	217	22	140	14	395	40					15000
	160	87	8.9	229	23	140	14	408	42					15000
32	50	99	10	281	29	140	14	497	51	4800	3500	≤20	3.11	10000
	80	153	16	395	40	217	22	738	75					15000
	100	178	18	433	44	281	29	841	86					15000
	120	178	18	459	47	281	29	842	86					15000
	160	178	18	484	49	281	29	842	86					15000

INTRODUCTION OF FSD



FSD-I

FSD

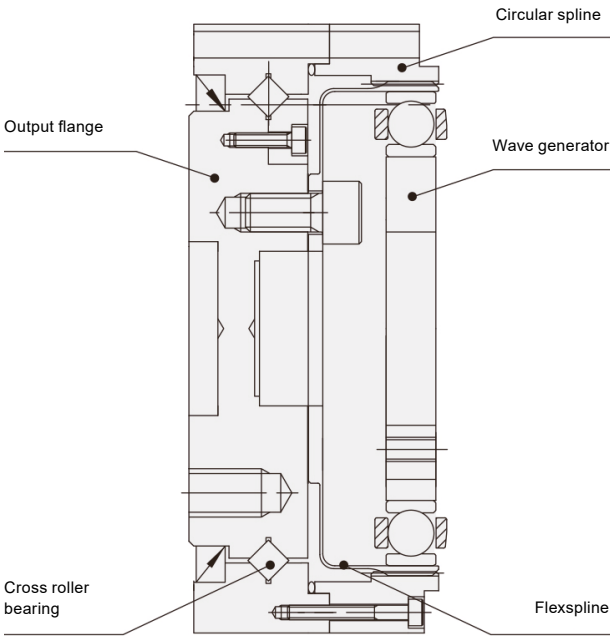
This miniaturized product was developed according to the marketing demand.

Compare with FSS series that with the same torque capacity, FSD series is more compact and thin-walled. smaller size.

Application

- **Industrial Robot**
- **Service Robots**
- **Printed Circuit Manufacturing**
- **Metal Machine Tools Equipment**
- **Wood Light Metal, Plastic Machine Tools**

Unit type structure of FSD



FSD-I

TECHNICAL DATA OF FSD

Rating table of FSD

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed (Grease lubricant)	Permissible ave. input rotational speed (Grease lubricant)	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
14	50	3.7	0.38	12	1.2	4.8	0.49	24	2.4	8500	3500	≤20	0.37	9000
	80	5.4	0.55	16	1.6	7.7	0.79	35	3.6					10000
	100	5.4	0.55	19	1.9	7.7	0.79	35	3.6					10000
17	50	11	1.1	23	2.3	18	1.8	48	4.9	7300	3500	≤20	0.49	9000
	80	15	1.5	29	3	19	1.9	61	6.2					10000
	100	16	1.6	37	3.8	27	2.8	71	7.2					10000
20	50	17	1.7	39	4	24	2.4	69	7	6500	3500	≤20	0.68	9000
	80	24	2.4	51	5.2	33	3.4	89	9.1					10000
	100	28	2.9	57	5.8	34	3.5	95	9.7					10000
25	50	27	2.8	69	7	38	3.9	127	13	5600	3500	≤20	1.25	9000
	80	44	4.5	96	9.8	60	6.1	179	18					10000
	100	47	4.8	110	11	75	7.6	184	19					10000
32	50	53	5.4	151	15	75	7.6	268	27	4800	3500	≤20	2.48	9000
	80	83	8.5	213	22	117	12	398	41					10000
	100	96	9.8	233	24	151	15	420	43					10000

Transmission accuracy

unit: arc min

Type / Reduction ratio	14	17	20	25	32
above 50	1.5	1.5	1.5	1	1

Hysteresis loss

unit: arc min

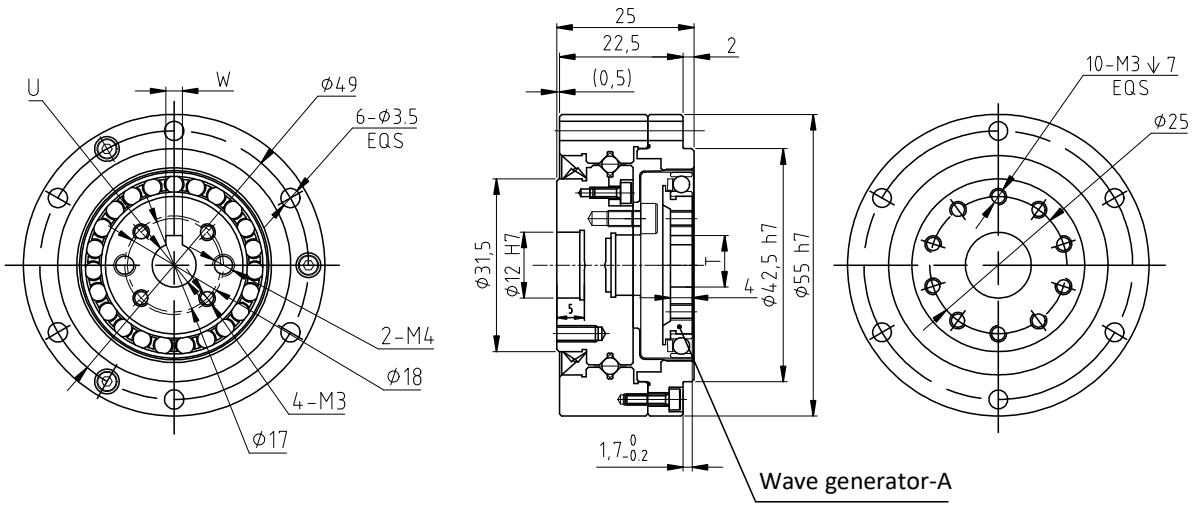
Type / Reduction ratio	14	17	20	25	32
50	2.5	2	2	2	2
above 80	1	1	1	1	1

Torsional stiffness

Project		Type / Unit	14	17	20	25	32
T1		N·m	2	3.9	7	14	29
T2		N·m	6.9	12	25	48	108
Reduction 50	K1	× 10^4 N·m/rad	0.29	0.67	1.1	2	4.7
	K2	× 10^4 N·m/rad	0.37	0.88	1.3	2.7	6.1
	K3	× 10^4 N·m/rad	0.47	1.2	2	3.7	8.4
Reduction ratio above 80	K1	× 10^4 N·m/rad	0.4	0.84	1.3	2.7	6.1
	K2	× 10^4 N·m/rad	0.44	0.94	1.7	3.7	7.8
	K3	× 10^4 N·m/rad	0.61	1.3	2.5	4.7	11

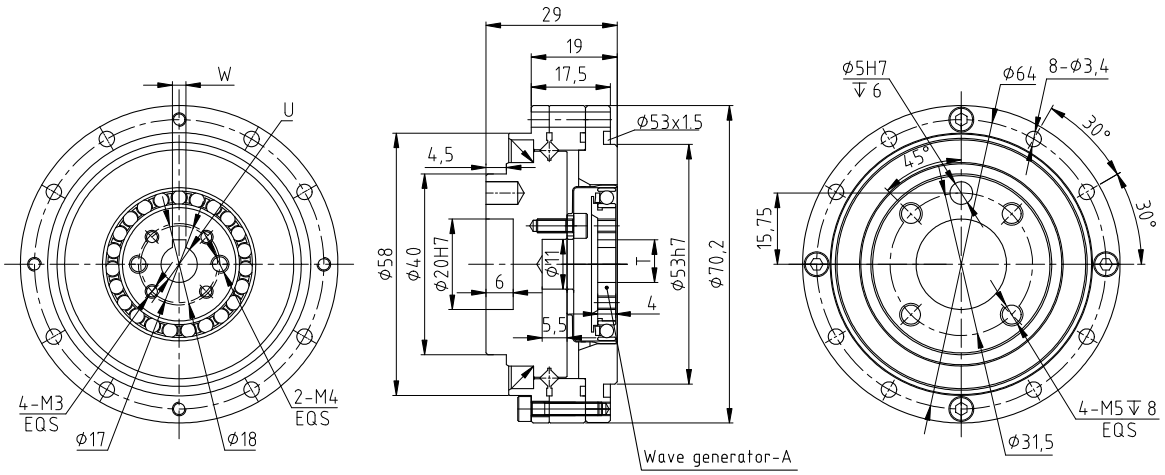
OUTLINE DRAWING

FSD-14-XX-U-I



Model	U	T	W
Wave generator - A φ6	φ6H7	$7^{+0.1}_{0}$	2P9/JS9
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3P9/JS9
Wave generator - A φ11	φ11H7		

FSD-14-P-XX-U-I

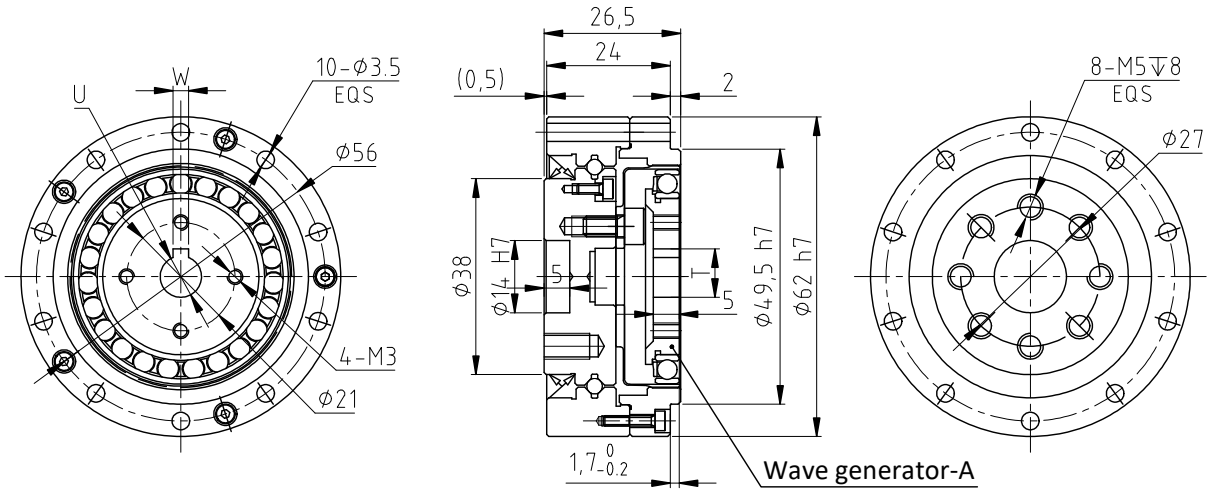


Model	U	T	W
Wave generator - A φ6	φ6H7	$7^{+0.1}_{0}$	2P9/JS9
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3P9/JS9
Wave generator - A φ11	φ11H7		

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
14	50	3.7	0.38	12	1.2	4.8	0.49	24	2.4	8500	3500	≤20	0.37	9000
	80	5.4	0.55	16	1.6	7.7	0.79	35	3.6					10000
	100	5.4	0.55	19	1.9	7.7	0.79	35	3.6					10000

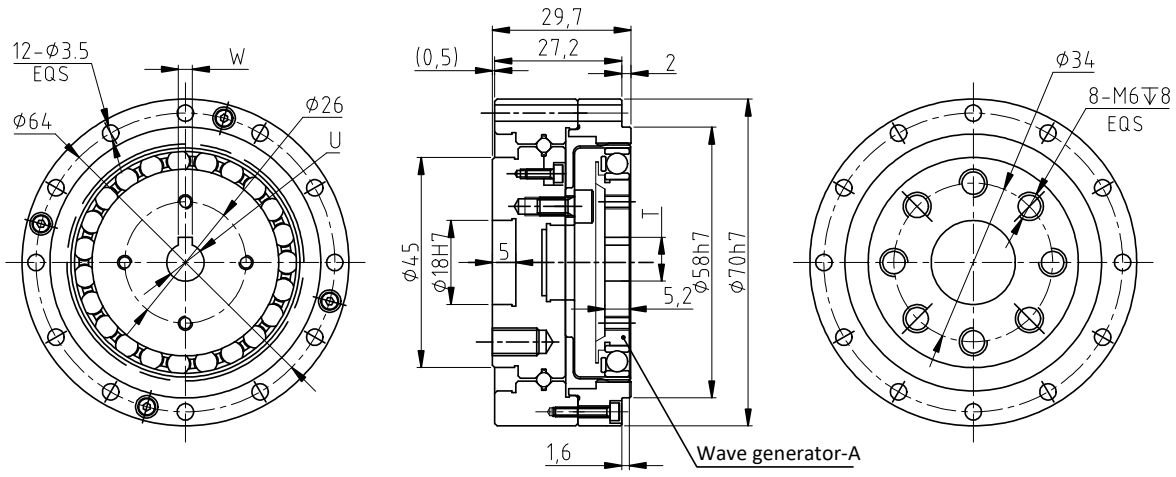
OUTLINE DRAWING

FSD-17-XX-U-I



Model	U	T	W
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3P9/JS9
Wave generator - A φ15	φ15H7		

FSD-20-XX-U-I

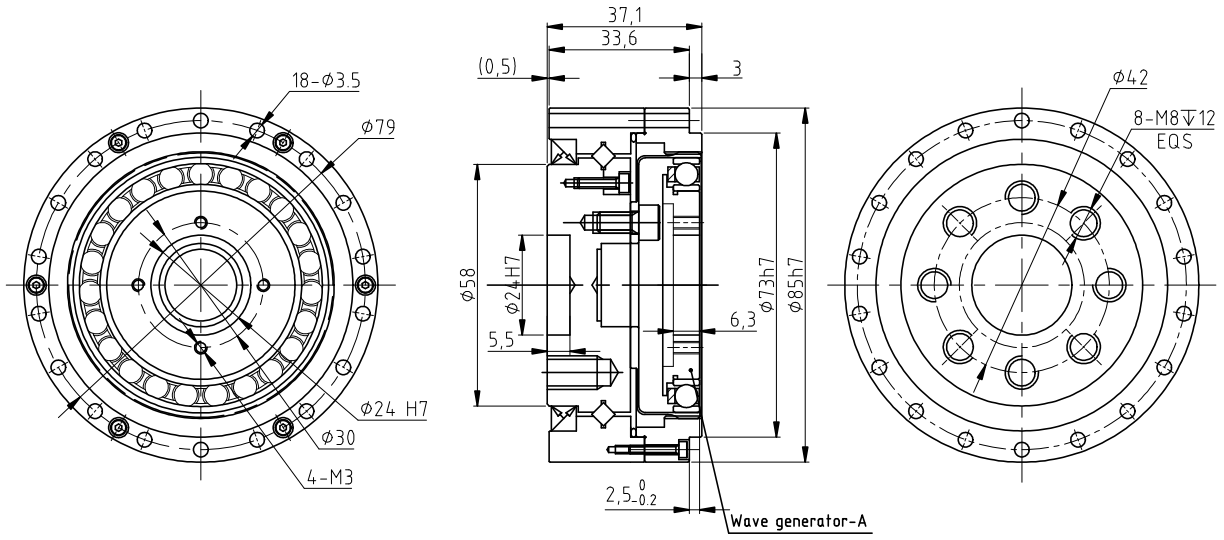


Model	U	T	W
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9
Wave generator - A φ20	φ20H7		

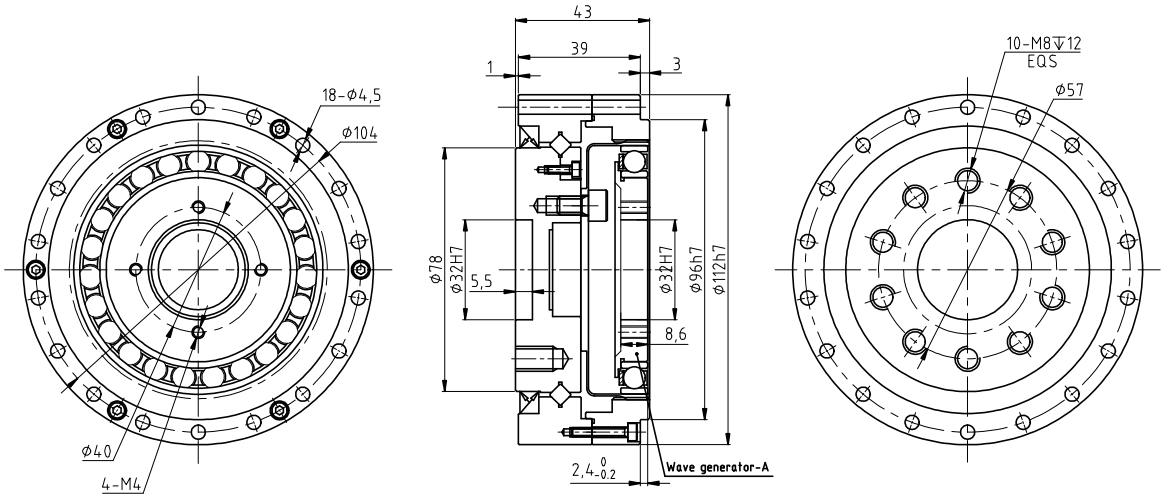
Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
17	50	11	1.1	23	2.3	18	1.8	48	4.9	7300	3500	≤20	0.46	9000
	80	15	1.5	29	3	19	1.9	61	6.2					10000
	100	16	1.6	37	3.8	27	2.8	71	7.2					10000
20	50	17	1.7	39	4	24	2.4	69	7	6500	3500	≤20	0.65	9000
	80	24	2.4	51	5.2	33	3.4	89	9.1					10000
	100	28	2.9	57	5.8	34	3.5	95	9.7					10000

OUTLINE DRAWING

FSD-25-XX-U-I



FSD-32-XX-U-I



Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
25	50	27	2.8	69	7	38	3.9	127	13	5600	3500	≤20	1.2	9000
	80	44	4.5	96	9.8	60	6.1	179	18					10000
	100	47	4.8	110	11	75	7.6	184	19					10000
32	50	53	5.4	151	15	75	7.6	268	27	4800	3500	≤20	2.4	9000
	80	83	8.5	213	22	117	12	398	41					10000
	100	96	9.8	233	24	151	15	420	43					10000

INTRODUCTION OF LFS



LFS-I



LFS Assembled Example

LFS

The LFS series is an ultra-flat compact product developed in response to market demand. The load-bearing structure adopts a crossed roller bearing, while the circular spline is manufactured using a steel–aluminum composite process. Compared with existing compact products, it features a smaller size, lighter weight, and higher rigidity, enabling a broader range of applications.

Application

- Industrial Robot
- Service Robots
- Medical Devices
- Automation and Special Equipment

TECHNICAL DATA OF LFS

Rating table of LFS

Model	Reduction ratio	Rated torque at input 2000r/min	Permissible peak torque at start/stop	Permissible max. value of ave.load torque	Instan-taneous permissible max. torque	Permissible max. input rota-tional speed (Grease lubricant)	Permissible ave. input rota-tional speed (Grease lubricant)	Backlash	Weight	Design life
		N·m	N·m	N·m	N·m	r/min	r/min	Arc Sec	kg	Hour
11	50	3.5	8.3	5.5	17	8500	3500	⩽20	0.35	7000
	80	4.5	9.9	8	22.5					7000
	100	5	11	8.9	25					7000
14	50	5.4	18	6.9	35	8500	3500	⩽20	0.63	10000
	80	7.8	23	11	47					10000
	100	7.8	28	11	54					10000

Transmission accuracy

Unit: arcmin

Type / Reduction ratio	11	14
50	2	1.5
Above 50	2	1.5

Hysteresis loss

Unit: arcmin

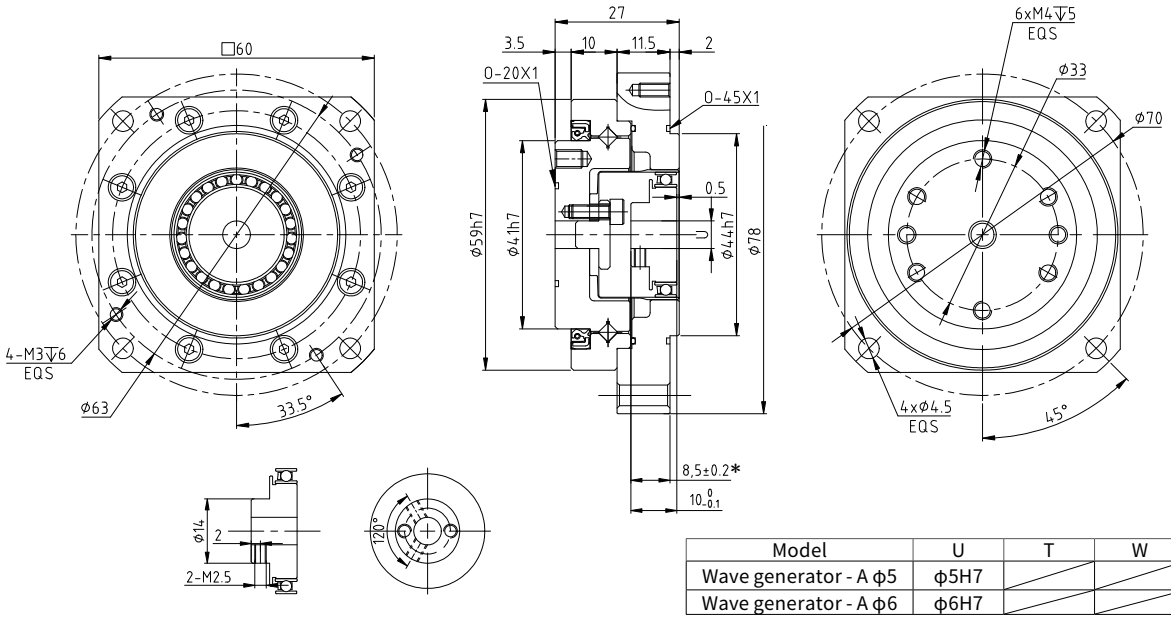
Type / Reduction ratio	11	14
50	2	2
Above 80	2	1

Torsional stiffness

Project		Type / Unit	11	14
T1		N·m	0.8	2
T2		N·m	2	6.9
Reduction ratio 50	K1	× 10^4N·m/rad	0.221	0.34
	K2	× 10^4N·m/rad	0.3	0.47
	K3	× 10^4N·m/rad	0.32	0.57
Reduction ratio above 80	K1	× 10^4N·m/rad	0.267	0.47
	K2	× 10^4N·m/rad	0.333	0.61
	K3	× 10^4N·m/rad	0.432	0.71

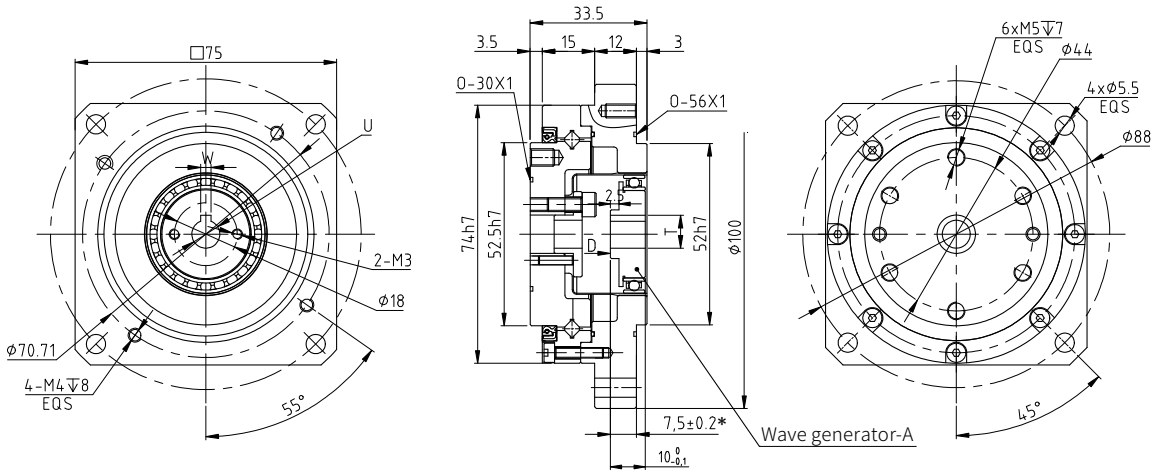
OUTLINE DRAWING

LFS-11-XX-U-I

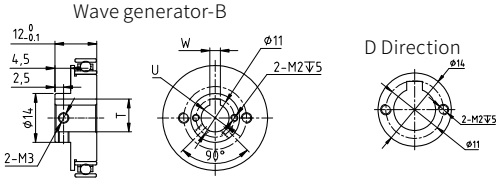


Model	U	T	W
Wave generator - A φ5	φ5H7		
Wave generator - A φ6	φ6H7		

LFS-14-XX-U-I



Wave generator-B



Model	U	T	W
Wave generator - A φ6	φ6H7	$7^{+0.1}_{0}$	2JS9/P9
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9
Wave generator - A φ8	φ8H7		

Model	Reduction ratio	Rated torque at input 2000r/min	Permissible peak torque at start/stop	Permissible max. value of ave.load torque	Instantaneous permissible max. torque	Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	N·m	N·m	N·m	r/min	r/min	Arc Sec	kg	Hour
11	50	3.5	8.3	5.5	17	8500	3500	⩽20	0.35	7000
	80	4.5	9.9	8	22.5					7000
	100	5	11	8.9	25					7000
14	50	5.4	18	6.9	35	8500	3500	⩽20	0.63	10000
	80	7.8	23	11	47					10000
	100	7.8	28	11	54					10000



FH SERIES

INTRODUCTION OF FHT/FHN/FHG



Hollow type FHG/FHT/FHN-III



Simple type FHG/FHT-I



Simple type FHG/FHT-II



Input shaft type FHG/FHT-IV



Simple unit type FHG/FHT-V

FHT/FHN/FHG

FHT series

The flexspline of the reducer adopts a flanged standard cylindrical structure. The flexspline and the circular spline are connected via a high-rigidity cross roller bearing. The product range includes multiple types such as compact models, hollow-shaft models, and input-shaft models. It is a modular product that is easy to assemble and operate.

FHN series

Light weight product, 20% lighter than standard products.

FHG series

High torque. Compare with standard products, FHG series torque capacity is 30% higher and the service life is increased by 43%, with high load capacity and high reliability.

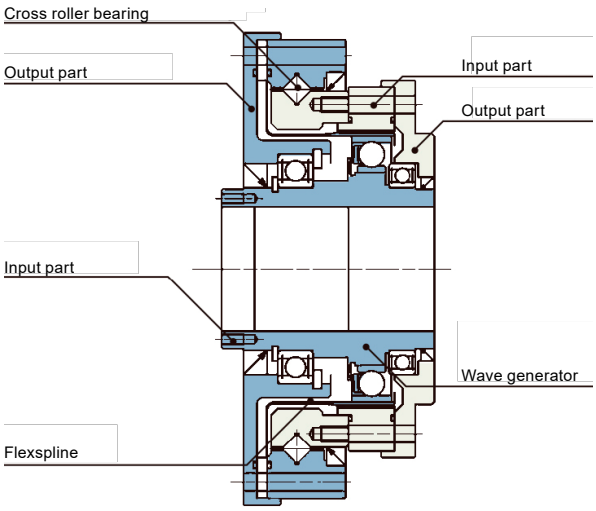
Application

- **Industrial Robot**
- **Service Robots**
- **Medical Devices**
- **Automation and Special Equipment**
- **Printed Circuit Manufacturing Equipment**

INTRODUCTION OF FHT/FHN/FHG

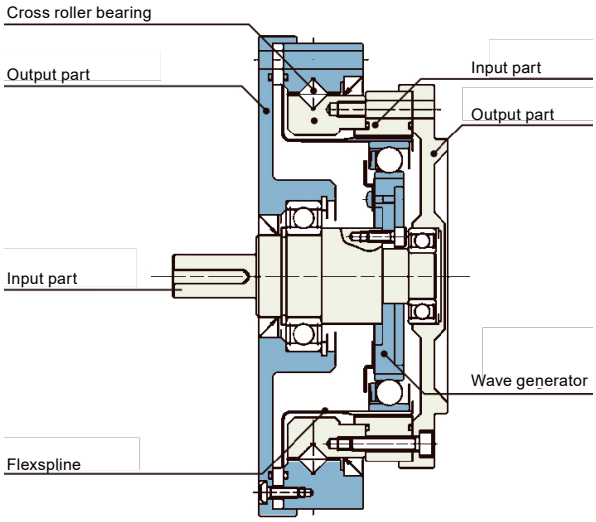
Unit type structure of FHT series

Hollow type



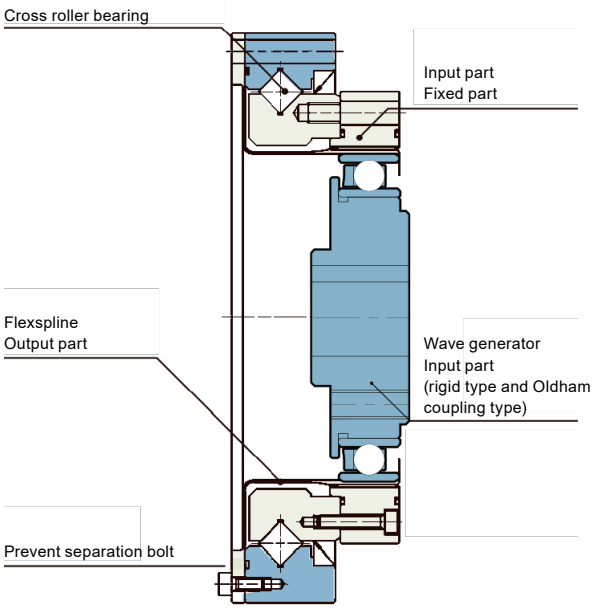
FHT/FHN/FHG-III

Input shaft type



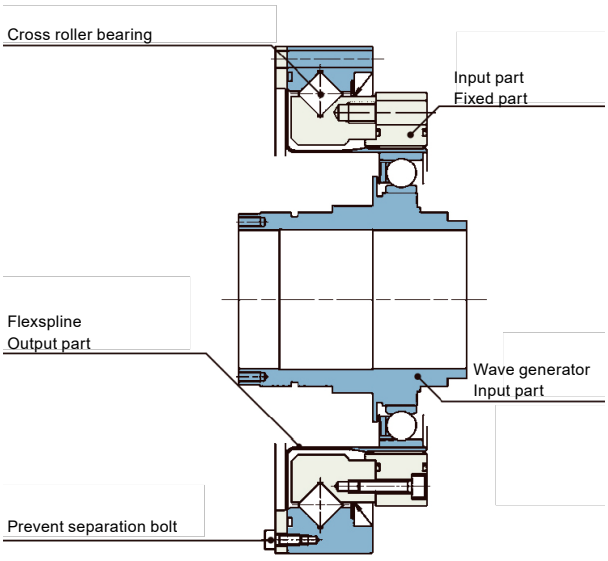
FHT/FHN/FHG-IV

Simple type



FHT/FHG-I/II

Simple Unit type



FHT/FHG-V

TECHNICAL DATA OF FHT/FHN/FHG

Rating table of FHT/FHN

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed (Grease lubricant)	Permissible ave. input rotational speed (Grease lubricant)	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
11	50	3.5	0.36	8.3	0.85	5.5	0.56	17	1.73	8500	3500	≤30	FHT-I: 0.27	10000
	100	5	0.51	11	1.12	8.9	0.91	25	2.55					10000
14	50	5.4	0.55	18	1.8	6.9	0.7	35	3.6	8500	3500	≤20	FHT-I/II: 0.4 FHT-III: 0.7 FHT-IV:0.66 FHT-V:0.4 FHT-C: 0.14 FHN-III: 0.56 FHN-IV: 0.5	10000
	80	7.8	0.8	23	2.4	11	1.1	47	4.8					15000
	100	7.8	0.8	28	2.9	11	1.1	54	5.5					15000
17	50	16	1.6	34	3.5	26	2.6	70	7.1	7300	3500	≤20	FHT-I/II: 0.54 FHT-III: 0.99 FHT-IV:0.9 FHT-V:0.62 FHT-C: 0.19 FHN-III: 0.79 FHN-IV: 0.69	10000
	80	22	2.2	43	4.4	27	2.7	87	8.9					15000
	100	24	2.4	54	5.5	39	4	108	11					15000
	120	24	2.4	54	5.5	39	4	86	8.8					15000
20	50	25	2.5	56	5.7	34	3.5	98	10	6500	3500	≤20	FHT-I/II: 0.72 FHT-III: 1.32 FHT-IV:1.29 FHT-V:0.82 FHT-C: 0.27 FHN-III: 1.04 FHN-IV: 0.98	10000
	80	34	3.5	74	7.5	47	4.8	127	13					15000
	100	40	4.1	82	8.4	49	5	147	15					15000
	120	40	4.1	87	8.9	49	5	147	15					15000
	160	40	4.1	92	9.4	49	5	147	15					15000
25	50	39	4	98	10	55	5.6	186	19	5600	3500	≤20	FHT-I/II: 1.22 FHT-III: 2.02 FHT-IV:1.99 FHT-V:1.4 FHT-C: 0.46 FHN-III: 1.65 FHN-IV: 1.43	10000
	80	63	6.4	137	14	87	8.9	255	26					15000
	100	67	6.8	157	16	108	11	284	29					15000
	120	67	6.8	167	17	108	11	304	31					15000
	160	67	6.8	176	18	108	11	314	32					15000
32	50	76	7.8	216	22	108	11	382	39	4800	3500	≤20	FHT-I/II: 2.54 FHT-III: 4.2 FHT-IV:4 FHT-V:2.7 FHT-C: 1 FHN-III: 3.19 FHN-IV: 3.17	10000
	80	118	12	304	31	167	17	568	58					15000
	100	137	14	333	34	216	22	647	66					15000
	120	137	14	353	36	216	22	686	70					15000
	160	137	14	372	38	216	22	686	70					15000
40	50	137	14	402	41	196	20	686	70	4000	3000	≤20	FHT-I/II: 4.4 FHT-III: 7.2 FHT-IV: 7 FHT-V: 4.06 FHT-C: 1.87 FHN-III: 5.95	10000
	80	206	21	519	53	284	29	980	100					15000
	100	265	27	568	58	372	38	1080	110					15000
	120	294	30	617	63	451	46	1180	120					15000
	160	294	30	647	66	451	46	1180	120					15000

TECHNICAL DATA OF FHT/FHN/FHG

Rating table of FHG

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed (Grease lubricant)	Permissible ave. input rotational speed (Grease lubricant)	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
14	50	7	0.7	23	2.3	9	0.9	46	4.7	8500	3500	≤20	FHG-I/II: 0.4 FHG-III: 0.7 FHG-IV: 0.66 FHG-V: 0.4	15000
	80	10	1	30	3.1	14	1.4	61	6.2					15000
	100	10	1	36	3.7	14	1.4	70	7.2					15000
17	50	21	2.1	44	4.5	34	3.4	91	9	7300	3500	≤20	FHG-I/II: 0.54 FHG-III: 0.99 FHG-IV: 0.9 FHG-V: 0.62	15000
	80	29	2.9	56	5.7	35	3.6	113	12					15000
	100	31	3.2	70	7.2	51	5.2	143	15					15000
	120	31	3.2	70	7.2	51	5.2	112	11					15000
20	50	33	3.3	73	7.4	44	4.5	127	13	6500	3500	≤20	FHG-I/II: 0.72 FHG-III: 1.32 FHG-IV: 1.29 FHG-V: 0.82	15000
	80	44	4.5	96	9.8	61	6.2	165	17					15000
	100	52	5.3	107	10.9	64	6.5	191	20					15000
	120	52	5.3	113	11.5	64	6.5	191	20					15000
	160	52	5.3	120	12.2	64	6.5	191	20					15000
25	50	51	5.2	127	13	72	7.3	242	25	5600	3500	≤20	FHG-I/II: 1.22 FHG-III: 2.02 FHG-IV: 1.99 FHG-V: 1.4	15000
	80	82	8.4	178	18	113	12	332	34					15000
	100	87	8.9	204	21	140	14	369	38					15000
	120	87	8.9	217	22	140	14	395	40					15000
	160	87	8.9	229	23	140	14	408	42					15000
32	50	99	10	281	29	140	14	497	51	4800	3500	≤20	FHG-I/II: 2.54 FHG-III: 4.2 FHG-IV: 4 FHG-V: 2.7	15000
	80	153	16	395	40	217	22	738	75					15000
	100	178	18	433	44	281	29	841	86					15000
	120	178	18	459	47	281	29	892	91					15000
	160	178	18	484	49	281	29	892	91					15000
40	50	178	18	523	53	255	26	892	91	4000	3000	≤20	FHG-I/II: 4.4 FHG-III: 7.2 FHG-IV: 7 FHG-V: 2.7	15000
	80	268	27	675	69	369	38	1270	130					15000
	100	345	35	738	75	484	49	1400	143					15000
	120	382	39	802	82	586	60	1530	156					15000
	160	382	39	841	86	586	60	1530	156					15000
45	80	407	41	918	94	507	52	1651	168	3800	3000	≤20	FHG-I: 6.5 FHG-III: 10	15000
	100	459	47	982	100	650	66	2041	208					15000
	120	523	53	1070	109	806	82	2288	233					15000
50	80	484	49	1223	125	675	69	2418	247	3500	2500	≤20	FHG-I: 9.6 FHG-III: 14.5	15000
	100	611	62	1247	130	866	88	2678	273					15000
	120	688	70	1404	143	1057	108	2678	273					15000

TECHNICAL DATA OF FHT/FHN/FHG

Transmission accuracy

unit: arc min

Type / Reduction ratio	11	14	17	20	25	32	above 40
30	/	2	1.5	1.5	1.5	1.5	/
above 50	2	1.5	1.5	1	1	1	1

Hysteresis loss

unit: arc min

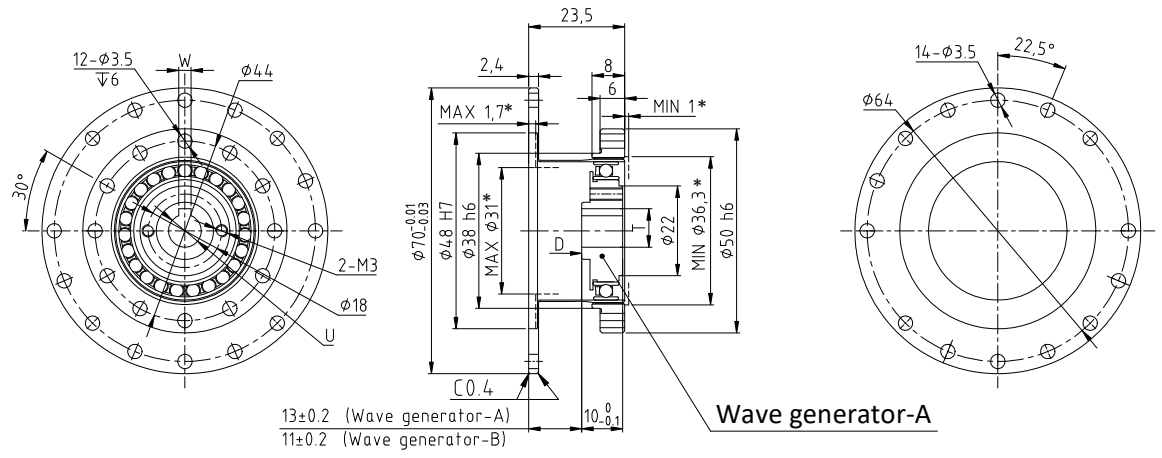
Type / Reduction ratio	11	14	17	20	25	32	above 40
30	/	3	3	3	3	3	/
50	2	2	2	2	2	2	2
above 80	2	1	1	1	1	1	1

Torsional stiffness

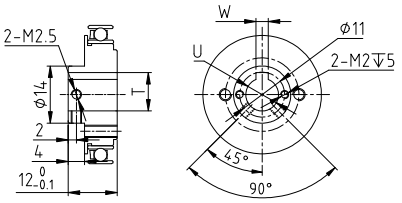
Project		Type / Unit	11	14	17	20	25	32	40	45	50
T1		Nm	0.8	2	3.9	7	14	29	54	76	108
T2		Nm	2	6.9	12	25	48	108	196	275	382
Reduction ratio 30	K1	× 10^4 N·m/rad	/	0.19	0.34	0.57	1	2.4	/	/	/
	K2	× 10^4 N·m/rad	/	0.24	0.44	0.71	1.3	3	/	/	/
	K3	× 10^4 N·m/rad	/	0.34	0.67	1.1	2.1	4.9	/	/	/
Reduction ratio 50	K1	× 10^4 N·m/rad	0.22	0.34	0.81	1.3	2.5	5.4	10	15	20
	K2	× 10^4 N·m/rad	0.3	0.47	1.1	1.8	3.4	7.8	14	20	44
	K3	× 10^4 N·m/rad	0.32	0.57	1.3	2.3	4.4	9.8	18	26	54
Reduction ratio above 80	K1	× 10^4 N·m/rad	0.27	0.47	1	1.6	3.1	6.7	13	18	25
	K2	× 10^4 N·m/rad	0.34	0.61	1.4	2.5	5	11	20	29	40
	K3	× 10^4 Nm/rad	0.44	0.71	1.6	2.9	5.7	12	23	33	44

OUTLINE DRAWING

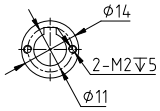
FHT-14-XX-C-I



Wave generator-B

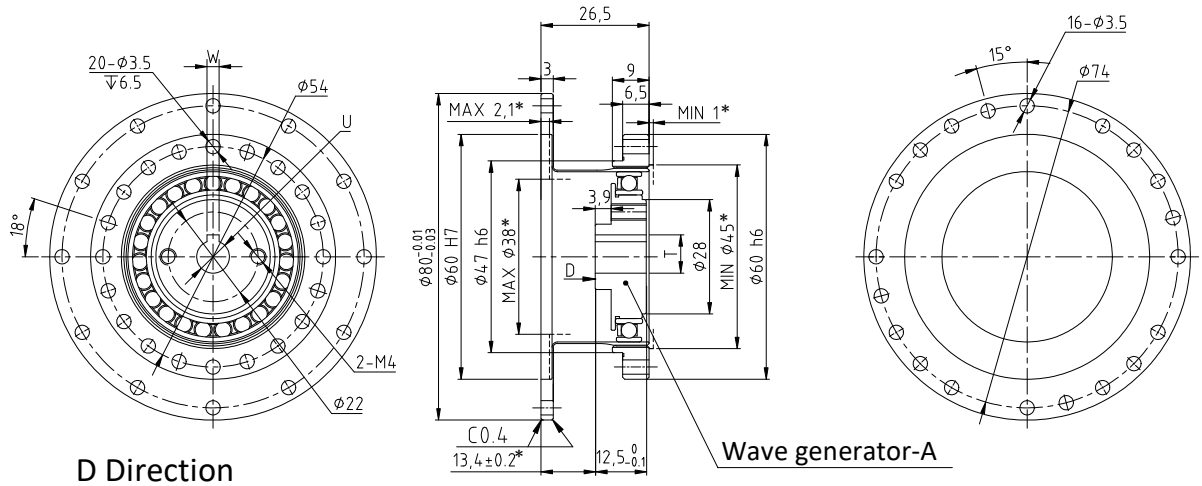


D Direction

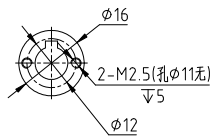


Model	U	T	W
Wave generator - A φ6	φ6H7	$7^{+0.1}_{0}$	2JS9/P9
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9

FHT-17-XX-C-I



D Direction

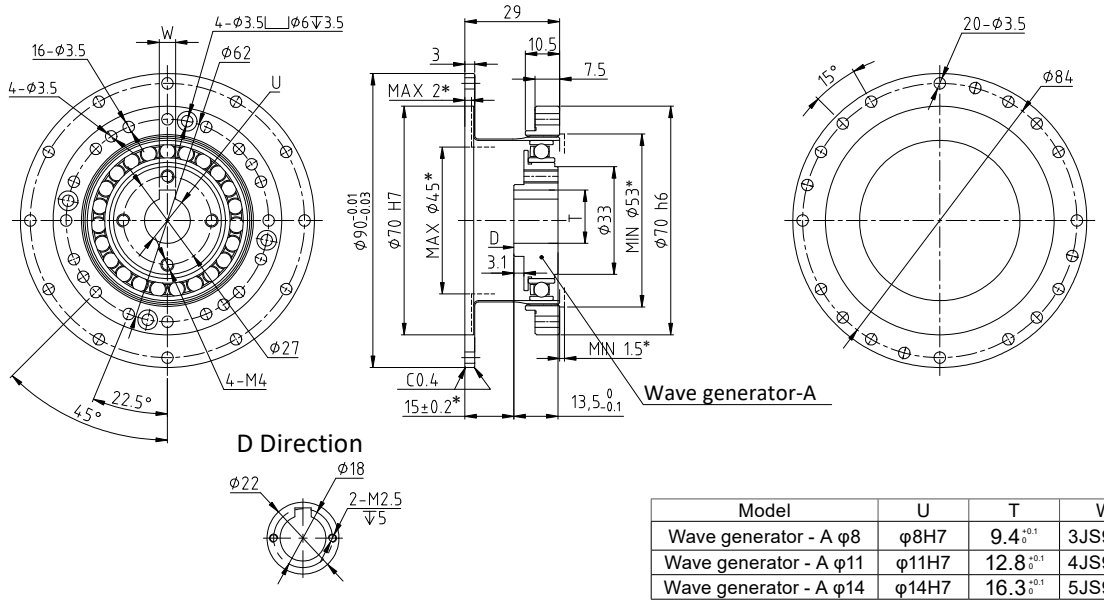


Model	U	T	W
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9
Wave generator - A φ11	φ11H7	$12.8^{+0.1}_{0}$	4JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
14	50	5.4	0.55	18	1.8	6.9	0.7	35	3.6	8500	3500	≤20	0.14	10000
	80	7.8	0.8	23	2.4	11	1.1	47	4.8					15000
	100	7.8	0.8	28	2.9	11	1.1	54	5.5					15000
17	50	16	1.6	34	3.5	26	2.6	70	7.1	7300	3500	≤20	0.19	10000
	80	22	2.2	43	4.4	27	2.7	87	8.9					15000
	100	24	2.4	54	5.5	39	4	108	11					15000
	120	24	2.4	54	5.5	39	4	86	8.8					15000

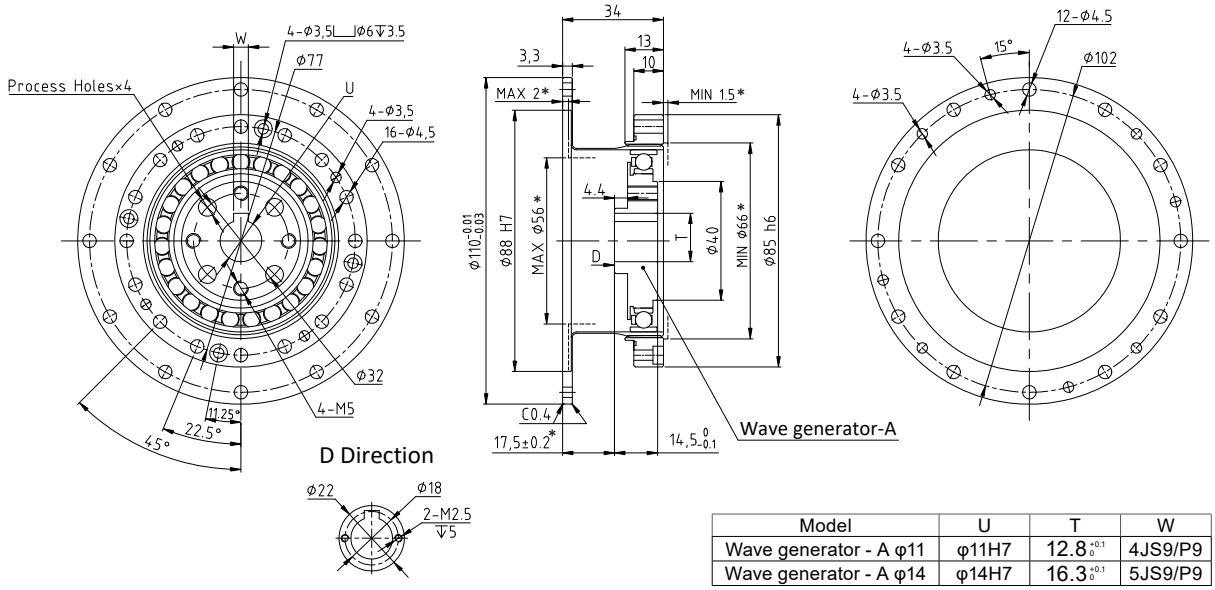
OUTLINE DRAWING

FHT-20-XX-C-I



Model	U	T	W
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9
Wave generator - A φ11	φ11H7	$12.8^{+0.1}_{0}$	4JS9/P9
Wave generator - A φ14	φ14H7	$16.3^{+0.1}_{0}$	5JS9/P9

FHT-25-XX-C-I

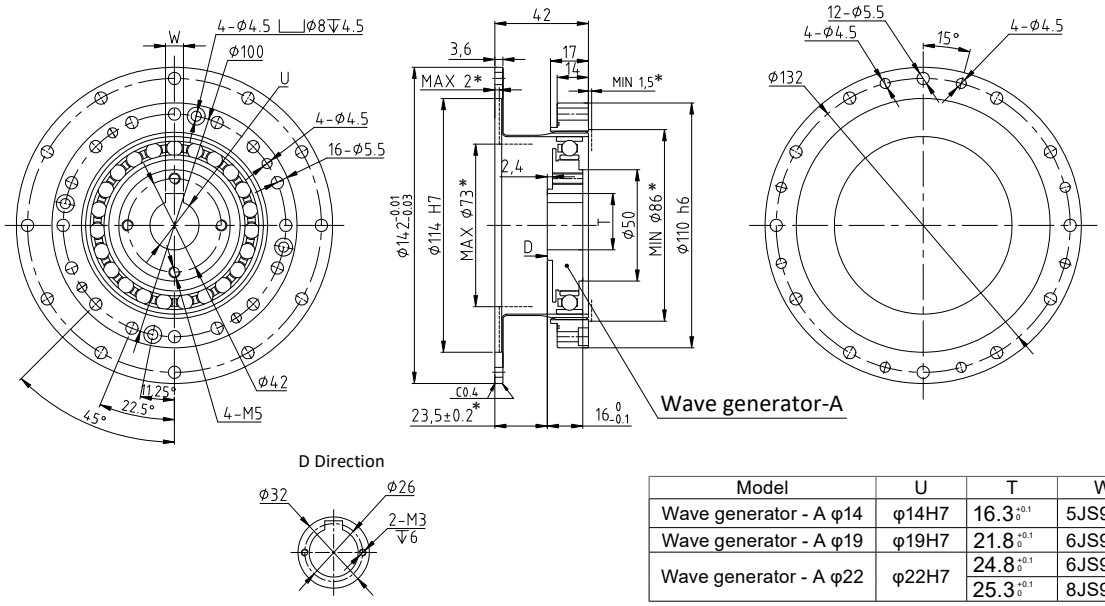


Model	U	T	W
Wave generator - A φ11	φ11H7	$12.8^{+0.1}_{0}$	4JS9/P9
Wave generator - A φ14	φ14H7	$16.3^{+0.1}_{0}$	5JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
20	50	25	2.5	56	5.7	34	3.5	98	10	6500	3500	≤20	0.27	10000
	80	34	3.5	74	7.5	47	4.8	127	13					15000
	100	40	4.1	82	8.4	49	5	147	15					15000
	120	40	4.1	87	8.9	49	5	147	15					15000
	160	40	4.1	92	9.4	49	5	147	15					15000
25	50	39	4	98	10	55	5.6	186	19	5600	3500	≤20	0.46	10000
	80	63	6.4	137	14	87	8.9	255	26					15000
	100	67	6.8	157	16	108	11	284	29					15000
	120	67	6.8	167	17	108	11	304	31					15000
	160	67	6.8	176	18	108	11	314	32					15000

OUTLINE DRAWING

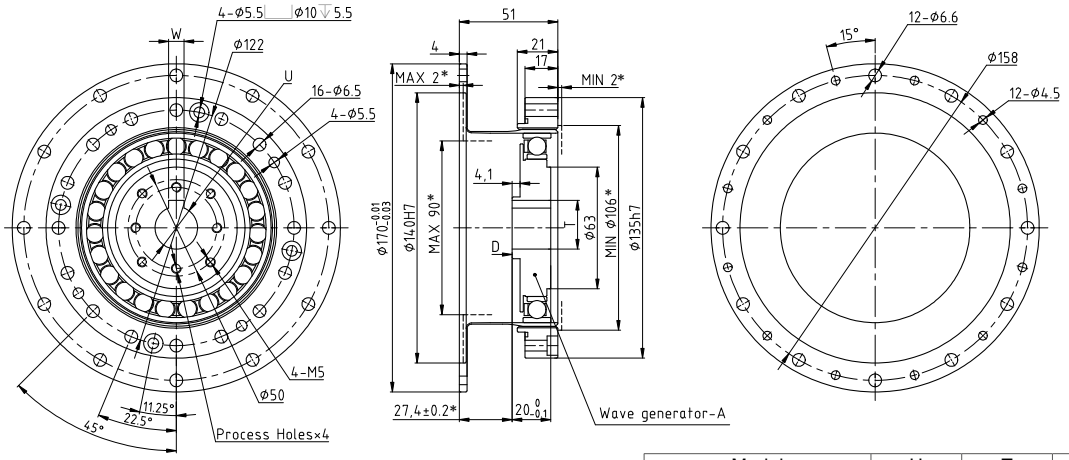
FHT-32-XX-C-I



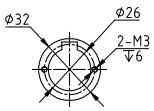
D Direction

Model	U	T	W
Wave generator - A φ14	φ14H7	16.3 +0.1 0	5JS9/P9
Wave generator - A φ19	φ19H7	21.8 +0.1 0	6JS9/P9
Wave generator - A φ22	φ22H7	24.8 +0.1 0	6JS9/P9
		25.3 +0.1 0	8JS9/P9

FHT-40-XX-C-I



D Direction

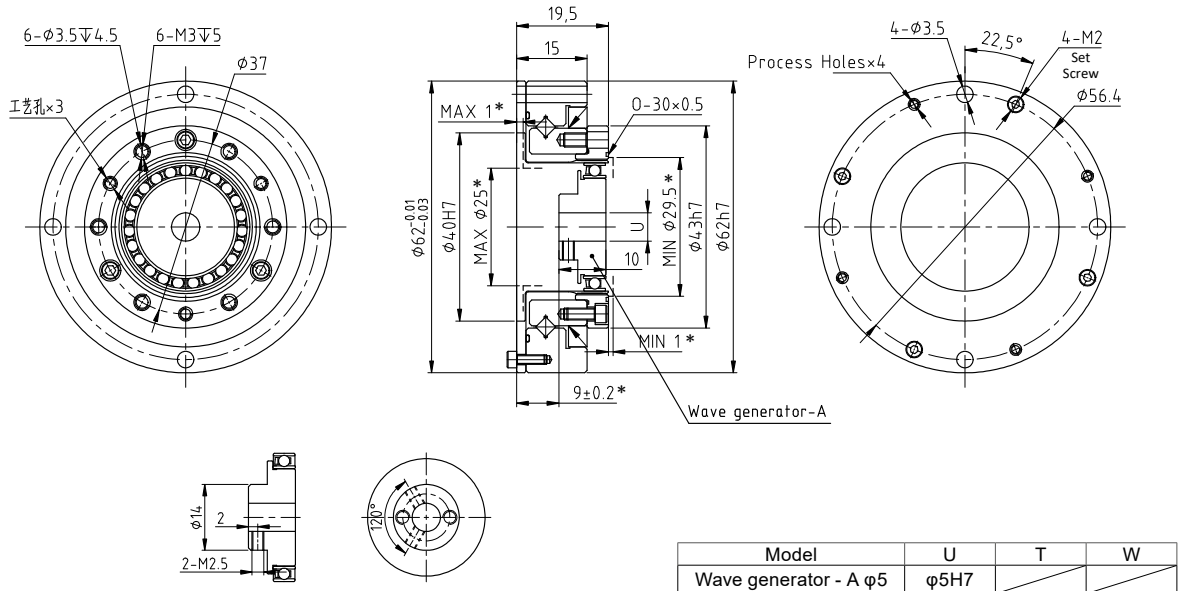


Model	U	T	W
Wave generator - A φ14	φ14H7	16.3 +0.1 0	5JS9/P9
Wave generator - A φ19	φ19H7	21.8 +0.1 0	6JS9/P9
Wave generator - A φ22	φ22H7	24.8 +0.1 0	6JS9/P9
		25.3 +0.1 0	8JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
32	50	76	7.8	216	22	108	11	382	39	4800	3500	≤20	1	10000
	80	118	12	304	31	167	17	568	58					15000
	100	137	14	333	34	216	22	647	66					15000
	120	137	14	353	36	216	22	686	70					15000
	160	137	14	372	38	216	22	686	70					15000
40	50	137	14	402	41	196	20	686	70	4000	3000	≤20	1.87	10000
	80	206	21	519	53	284	29	980	100					15000
	100	265	27	568	58	372	38	1080	110					15000
	120	294	30	617	63	451	46	1180	120					15000
	160	294	30	647	66	451	46	1180	120					15000

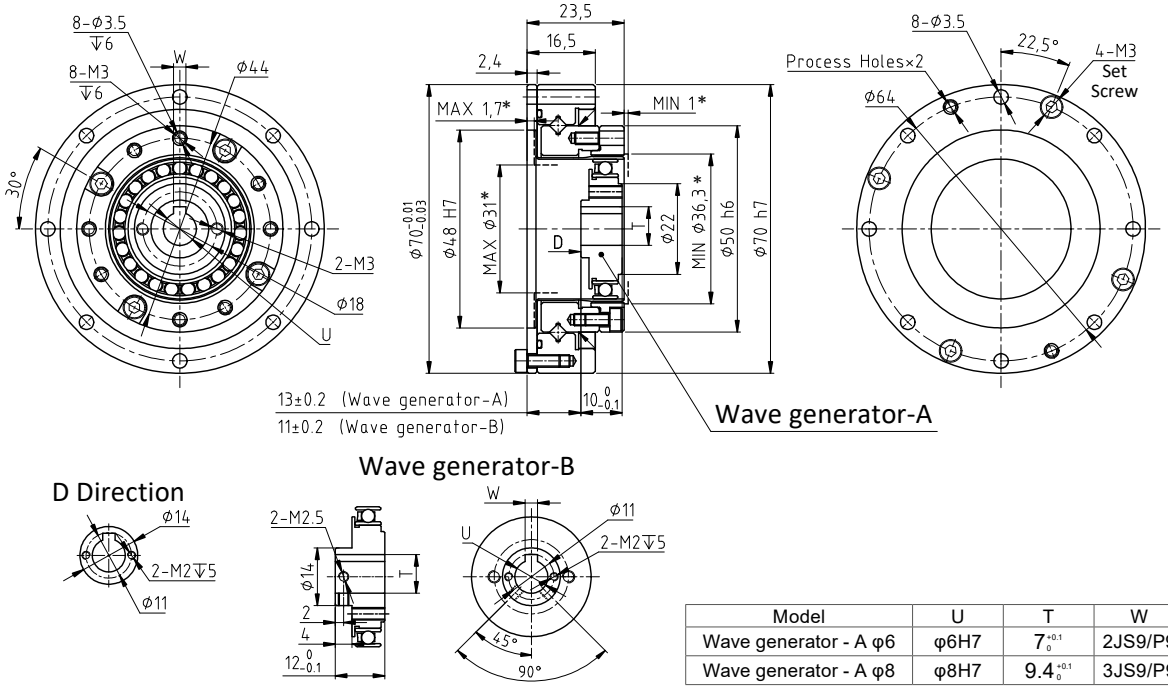
OUTLINE DRAWING

FHT-11-XX-U-I



Model	U	T	W
Wave generator - A φ5	φ5H7		
Wave generator - A φ6	φ6H7		

FHT-14-XX-U-I



Wave generator-B

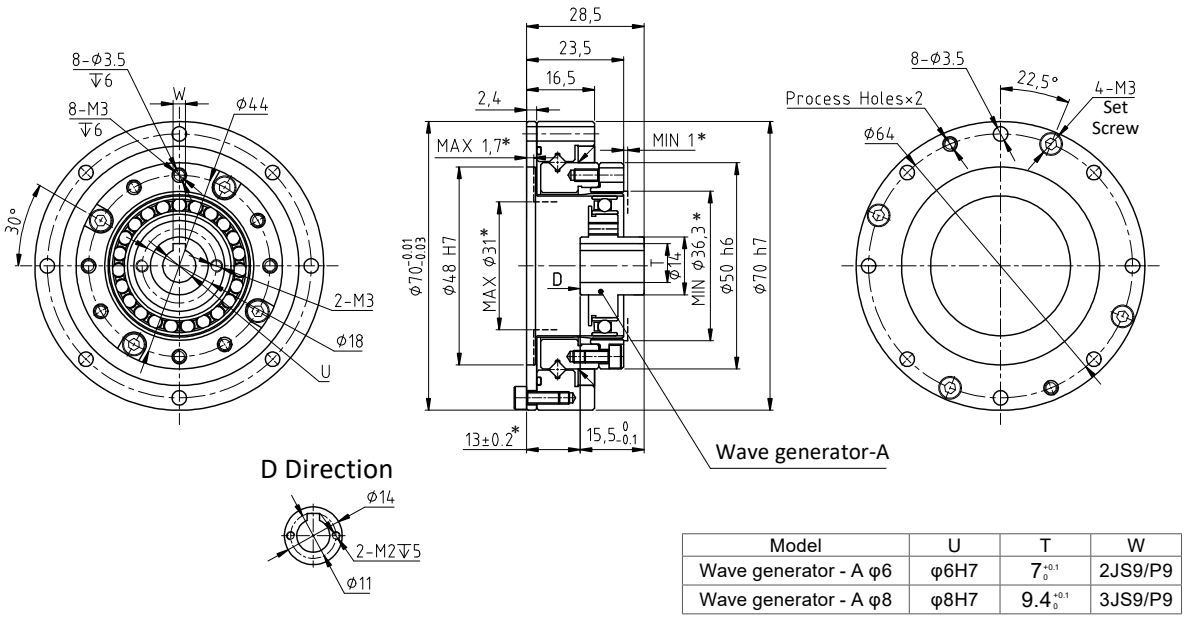
D Direction

Model	U	T	W
Wave generator - A φ6	φ6H7	$7^{+0.1}_{0}$	2JS9/P9
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
11	50	3.5	0.36	8.3	0.85	5.5	0.56	17	1.73	8500	3500	≤30	0.27	10000
	80	4.5	0.46	9.9	1.01	8	0.82	22.5	2.3					10000
	100	5	0.51	11	1.12	8.9	0.91	25	2.55					10000
14	50	5.4	0.55	18	1.8	6.9	0.7	35	3.6	8500	3500	≤20	0.4	10000
	80	7.8	0.8	23	2.4	11	1.1	47	4.8					15000
	100	7.8	0.8	28	2.9	11	1.1	54	5.5					15000

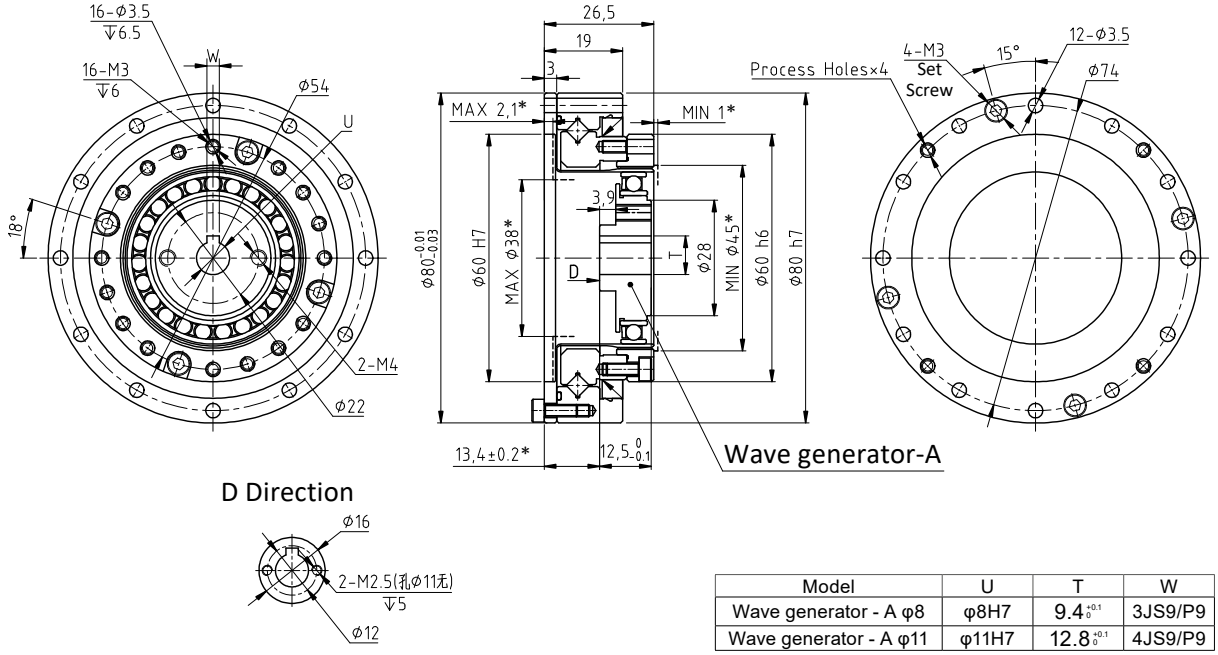
OUTLINE DRAWING

FHT-14-XX-U-I-LF



Model	U	T	W
Wave generator - A φ6	φ6H7	$7^{+0.1}_{0}$	2JS9/P9
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9

FHT-17-XX-U-I

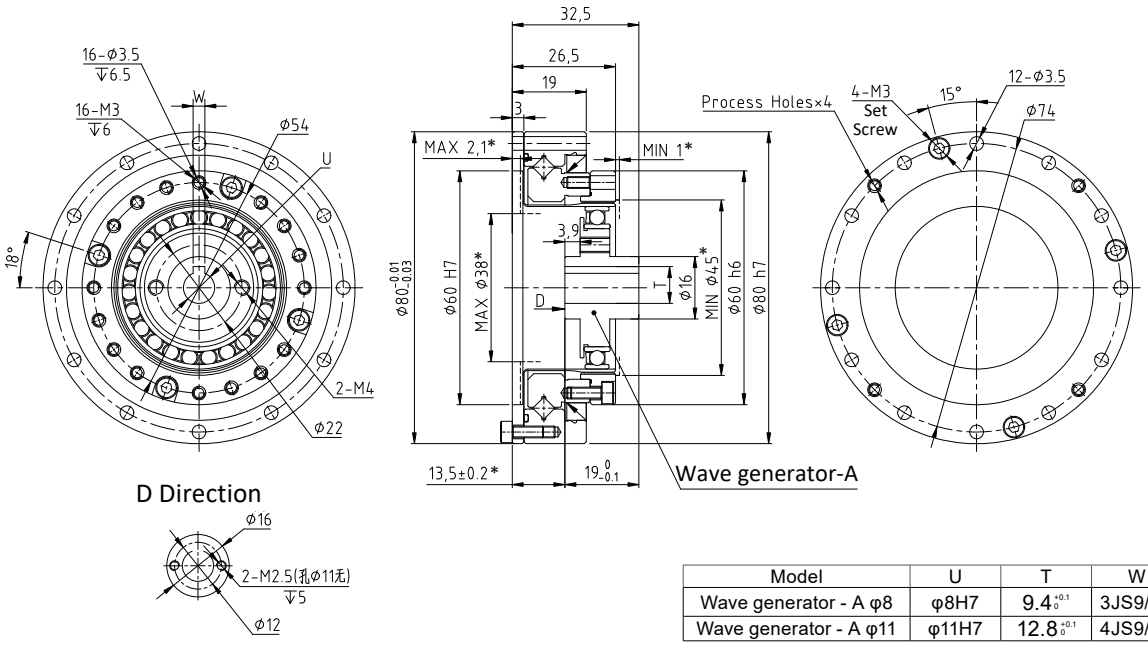


Model	U	T	W
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9
Wave generator - A φ11	φ11H7	$12.8^{+0.1}_{0}$	4JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
14	50	5.4	0.55	18	1.8	6.9	0.7	35	3.6	8500	3500	≤20	0.4	10000
	80	7.8	0.8	23	2.4	11	1.1	47	4.8					15000
	100	7.8	0.8	28	2.9	11	1.1	54	5.5					15000
17	50	16	1.6	34	3.5	26	2.6	70	7.1	7300	3500	≤20	0.54	10000
	80	22	2.2	43	4.4	27	2.7	87	8.9					15000
	100	24	2.4	54	5.5	39	4	108	11					15000
	120	24	2.4	54	5.5	39	4	86	8.8					15000

OUTLINE DRAWING

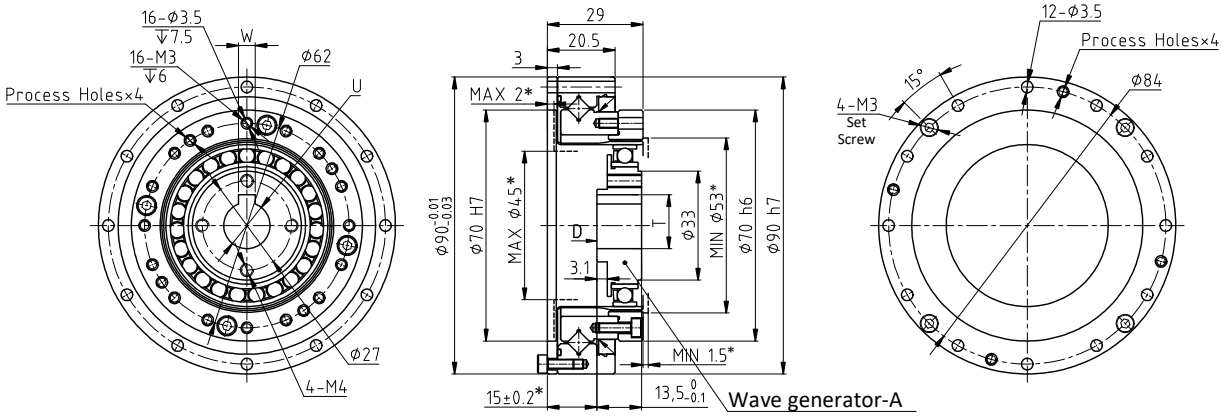
FHT-17-XX-U-I-LF



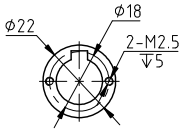
D Direction

Model	U	T	W
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9
Wave generator - A φ11	φ11H7	$12.8^{+0.1}_{0}$	4JS9/P9

FHT-20-XX-U-I



D Direction

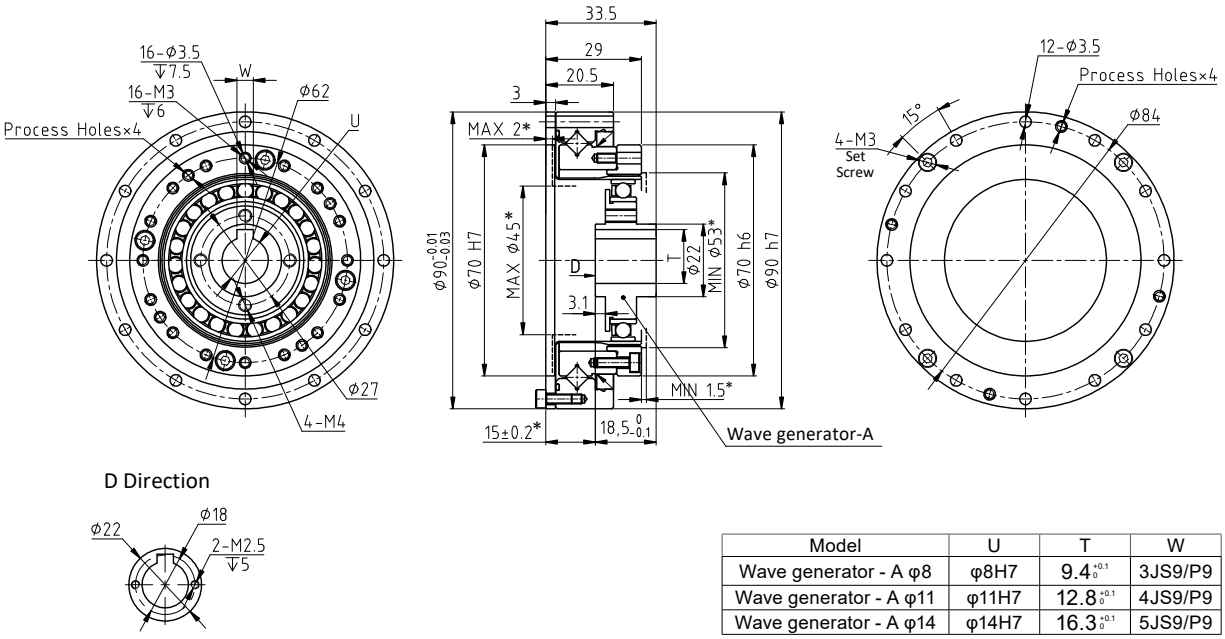


Model	U	T	W
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9
Wave generator - A φ11	φ11H7	$12.8^{+0.1}_{0}$	4JS9/P9
Wave generator - A φ14	φ14H7	$16.3^{+0.1}_{0}$	5JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
17	50	16	1.6	34	3.5	26	2.6	70	7.1	7300	3500	≤20	0.54	10000
	80	22	2.2	43	4.4	27	2.7	87	8.9					15000
	100	24	2.4	54	5.5	39	4	108	11					15000
	120	24	2.4	54	5.5	39	4	86	8.8					15000
20	50	25	2.5	56	5.7	34	3.5	98	10	6500	3500	≤20	0.72	10000
	80	34	3.5	74	7.5	47	4.8	127	13					15000
	100	40	4.1	82	8.4	49	5	147	15					15000
	120	40	4.1	87	8.9	49	5	147	15					15000
	160	40	4.1	92	9.4	49	5	147	15					15000

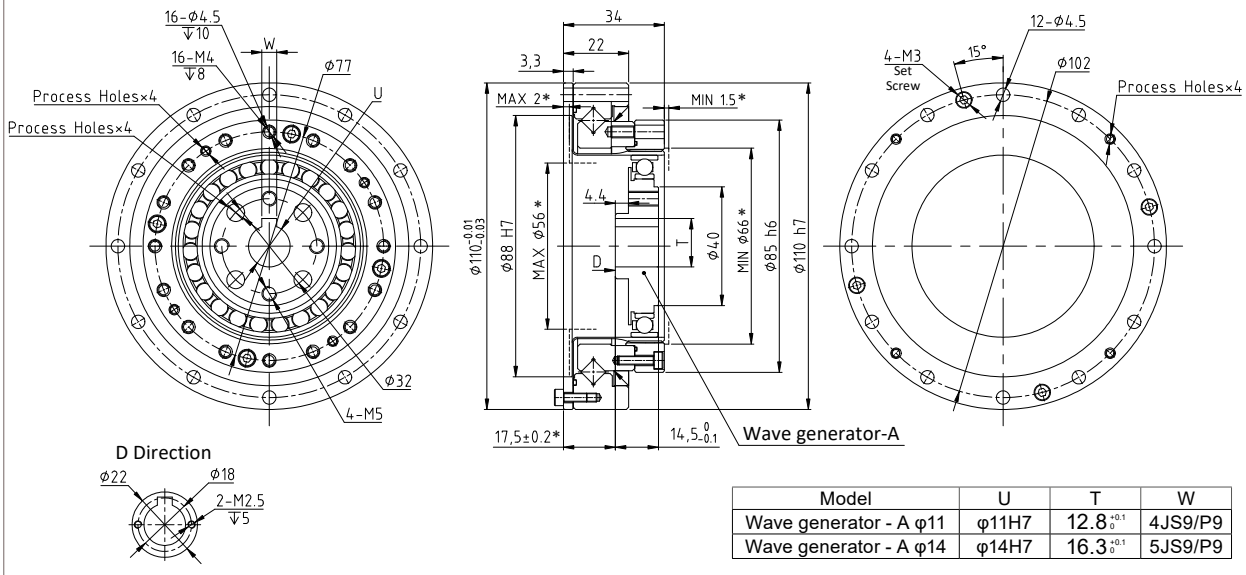
OUTLINE DRAWING

FHT-20-XX-U-I-LF



Model	U	T	W
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9
Wave generator - A φ11	φ11H7	$12.8^{+0.1}_{0}$	4JS9/P9
Wave generator - A φ14	φ14H7	$16.3^{+0.1}_{0}$	5JS9/P9

FHT-25-XX-U-I

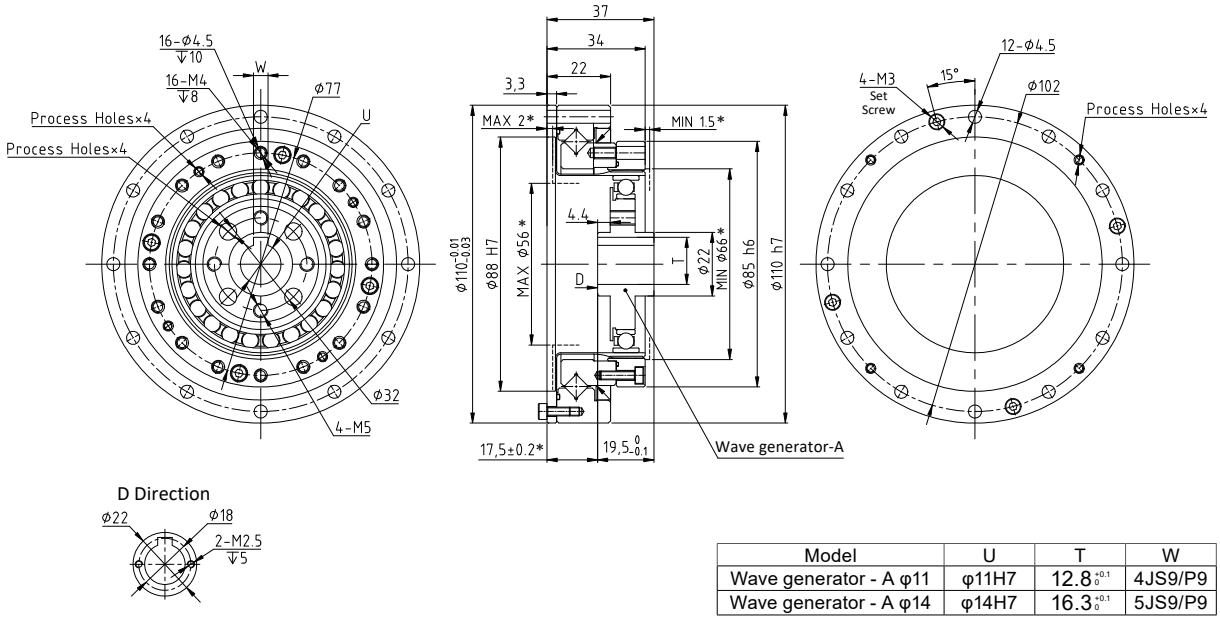


Model	U	T	W
Wave generator - A φ11	φ11H7	$12.8^{+0.1}_{0}$	4JS9/P9
Wave generator - A φ14	φ14H7	$16.3^{+0.1}_{0}$	5JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
20	50	25	2.5	56	5.7	34	3.5	98	10	6500	3500	≤20	0.72	10000
	80	34	3.5	74	7.5	47	4.8	127	13					15000
	100	40	4.1	82	8.4	49	5	147	15					15000
	120	40	4.1	87	8.9	49	5	147	15					15000
	160	40	4.1	92	9.4	49	5	147	15					15000
25	50	39	4	98	10	55	5.6	186	19	5600	3500	≤20	1.22	10000
	80	63	6.4	137	14	87	8.9	255	26					15000
	100	67	6.8	157	16	108	11	284	29					15000
	120	67	6.8	167	17	108	11	304	31					15000
	160	67	6.8	176	18	108	11	314	32					15000

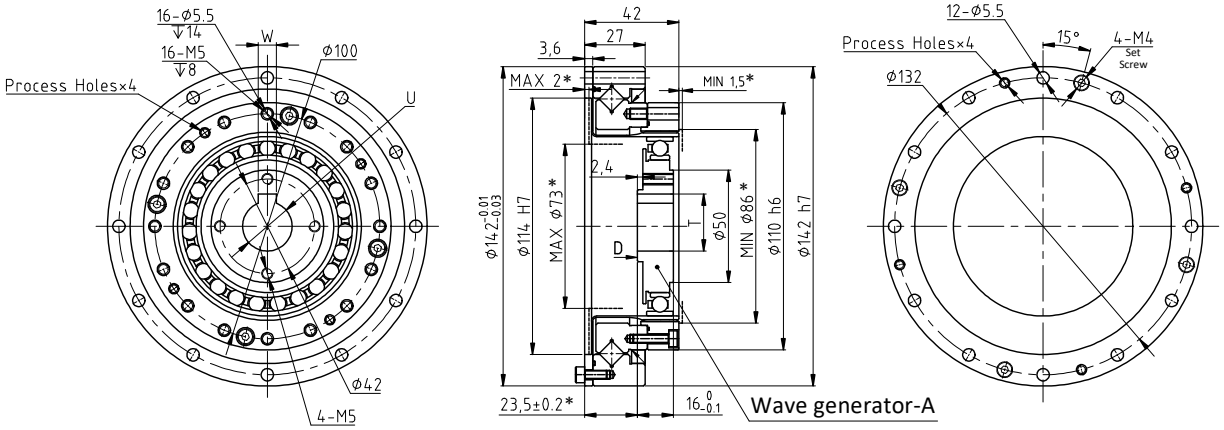
OUTLINE DRAWING

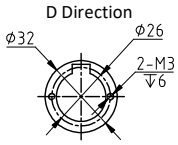
FHT-25-XX-U-I-LF



Model	U	T	W
Wave generator - A φ11	φ11H7	12.8 +0.1 0	4JS9/P9
Wave generator - A φ14	φ14H7	16.3 +0.1 0	5JS9/P9

FHT-32-XX-U-I



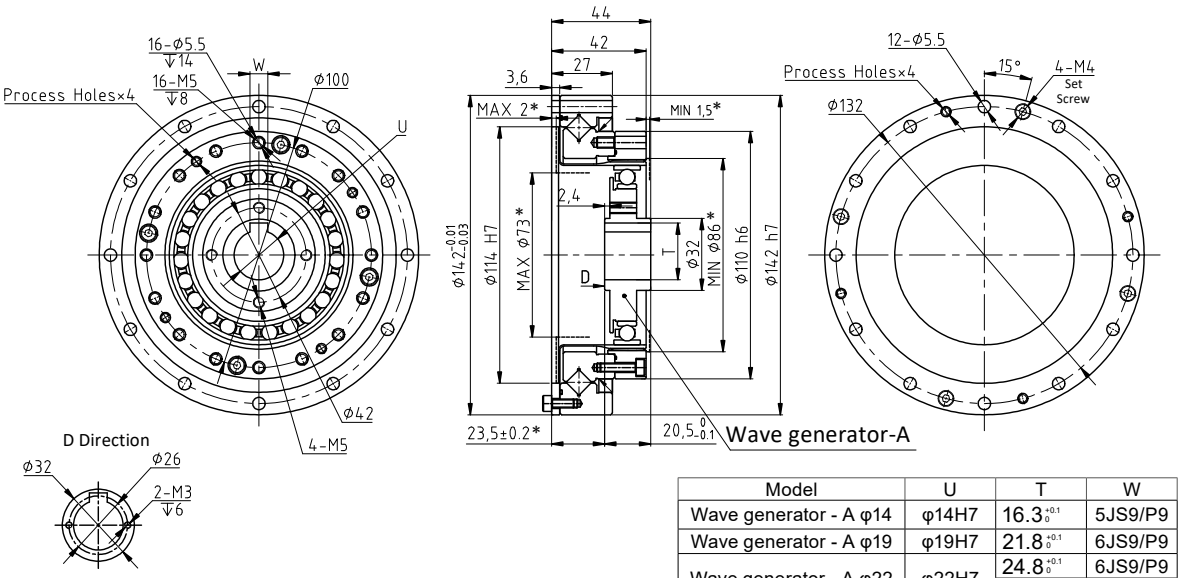


Model	U	T	W
Wave generator - A φ14	φ14H7	16.3 +0.1 0	5JS9/P9
Wave generator - A φ19	φ19H7	21.8 +0.1 0	6JS9/P9
Wave generator - A φ22	φ22H7	24.8 +0.1 0	6JS9/P9
		25.3 +0.1 0	8JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
25	50	39	4	98	10	55	5.6	186	19	5600	3500	≤20	1.22	10000
	80	63	6.4	137	14	87	8.9	255	26					15000
	100	67	6.8	157	16	108	11	284	29					15000
	120	67	6.8	167	17	108	11	304	31					15000
	160	67	6.8	176	18	108	11	314	32					15000
32	50	76	7.8	216	22	108	11	382	39	4800	3500	≤20	2.54	10000
	80	118	12	304	31	167	17	568	58					15000
	100	137	14	333	34	216	22	647	66					15000
	120	137	14	353	36	216	22	686	70					15000
	160	137	14	372	38	216	22	686	70					15000

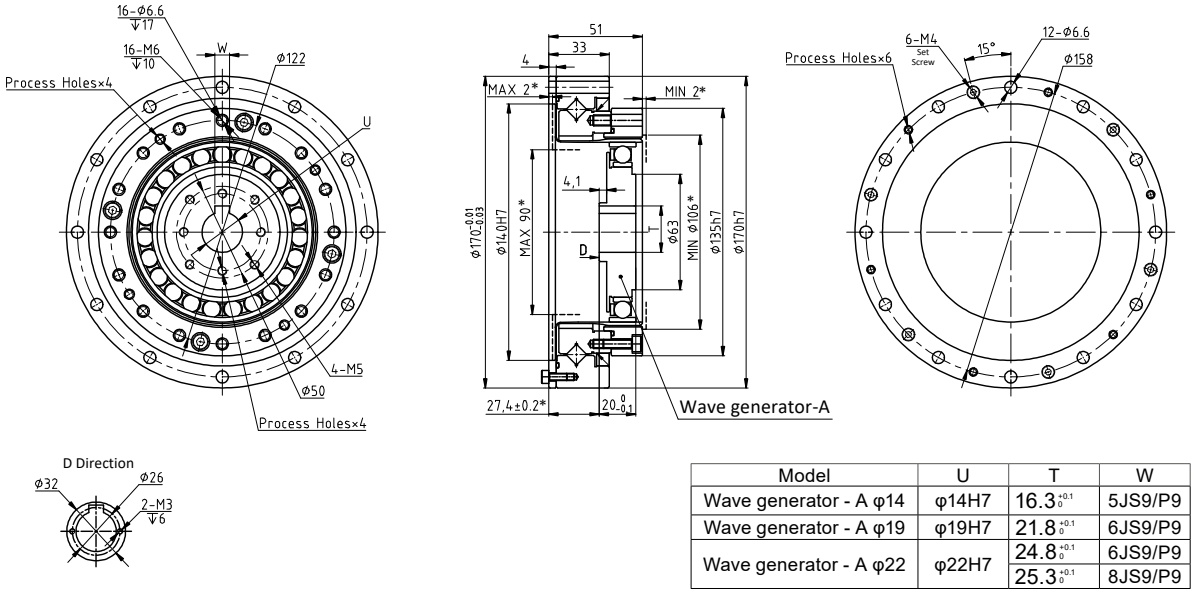
OUTLINE DRAWING

FHT-32-XX-U-I-LF



Model	U	T	W
Wave generator - A φ14	φ14H7	16.3 +0.1 0	5JS9/P9
Wave generator - A φ19	φ19H7	21.8 +0.1 0	6JS9/P9
Wave generator - A φ22	φ22H7	24.8 +0.1 0	6JS9/P9
		25.3 +0.1 0	8JS9/P9

FHT-40-XX-U-I

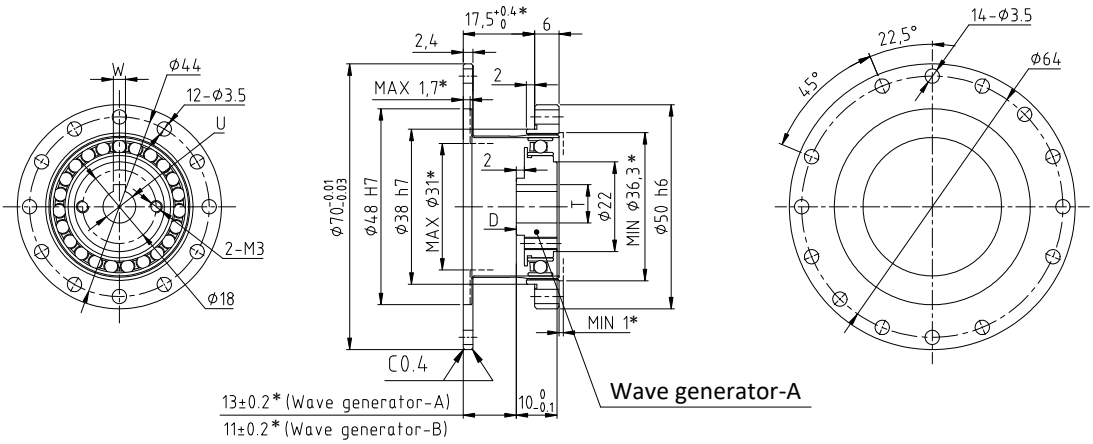


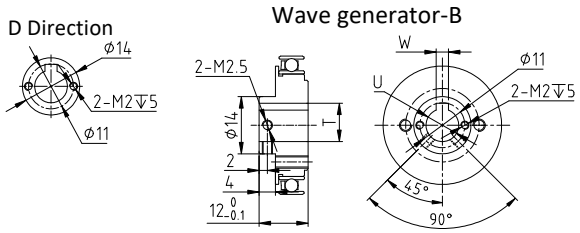
Model	U	T	W
Wave generator - A φ14	φ14H7	16.3 +0.1 0	5JS9/P9
Wave generator - A φ19	φ19H7	21.8 +0.1 0	6JS9/P9
Wave generator - A φ22	φ22H7	24.8 +0.1 0	6JS9/P9
		25.3 +0.1 0	8JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
32	50	76	7.8	216	22	108	11	382	39	4800	3500	≤20	2.54	10000
	80	118	12	304	31	167	17	568	58					15000
	100	137	14	333	34	216	22	647	66					15000
	120	137	14	353	36	216	22	686	70					15000
	160	137	14	372	38	216	22	686	70					15000
40	50	137	14	402	41	196	20	686	70	4000	3000	≤20	4.4	10000
	80	206	21	519	53	284	29	980	100					15000
	100	265	27	568	58	372	38	1080	110					15000
	120	294	30	617	63	451	46	1180	120					15000
	160	294	30	647	66	451	46	1180	120					15000

OUTLINE DRAWING

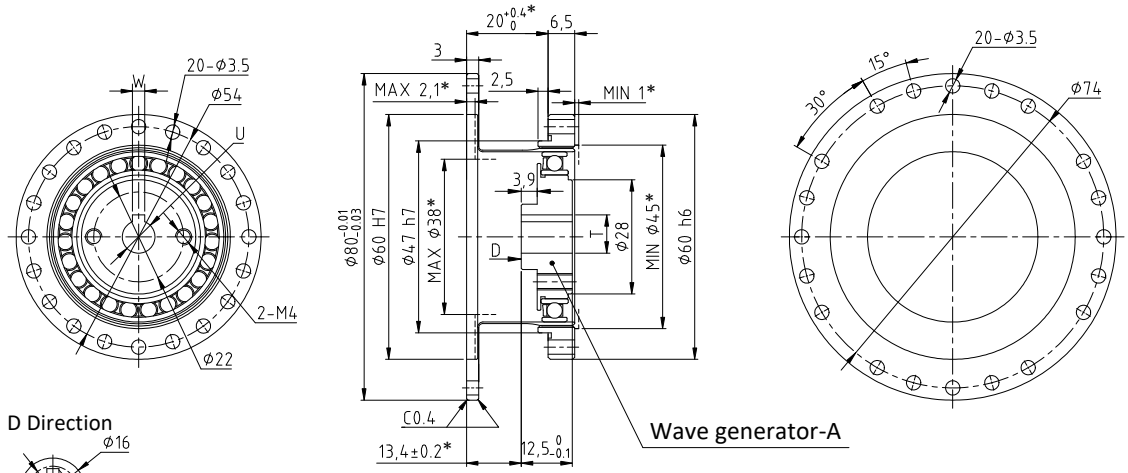
FHG-14-XX-C-I

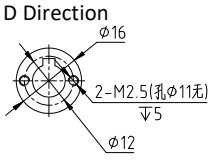




Model	U	T	W
Wave generator - A φ6	φ6H7	$7^{+0.1}_{0}$	2JS9/P9
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9

FHG-17-XX-C-I



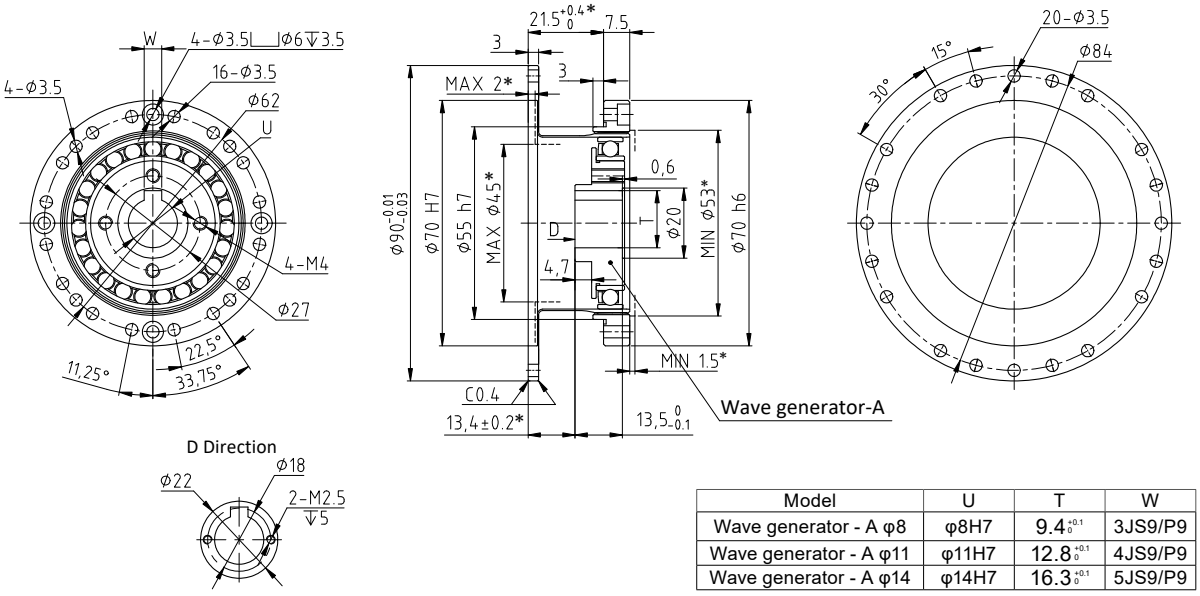


Model	U	T	W
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9
Wave generator - A φ11	φ11H7	$12.8^{+0.1}_{0}$	4JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
14	50	7	0.7	23	2.3	9	0.9	46	4.7	8500	3500	≤20	0.14	15000
	80	10	1	30	3.1	14	1.4	61	6.2					15000
	100	10	1	36	3.7	14	1.4	70	7.2					15000
17	50	21	2.1	44	4.5	34	3.4	91	9	7300	3500	≤20	0.19	15000
	80	29	2.9	56	5.7	35	3.6	113	12					15000
	100	31	3.2	70	7.2	51	5.2	143	15					15000
	120	31	3.2	70	7.2	51	5.2	112	11					15000

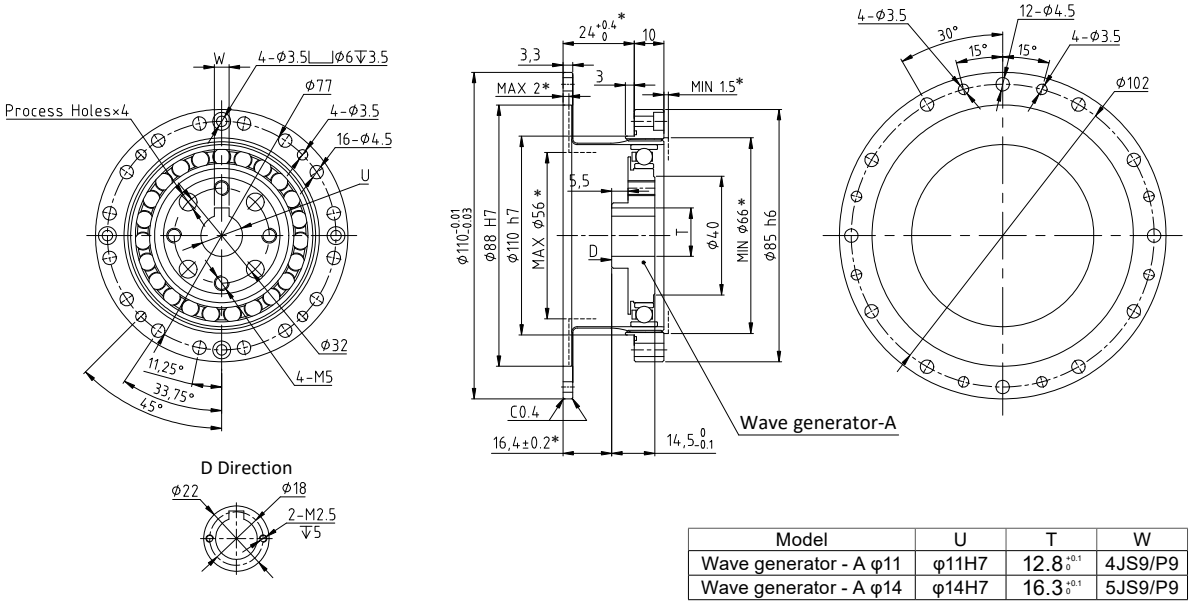
OUTLINE DRAWING

FHG-20-XX-C-I



Model	U	T	W
Wave generator - A φ8	φ8H7	9.4 +0.1 0	3JS9/P9
Wave generator - A φ11	φ11H7	12.8 +0.1 0	4JS9/P9
Wave generator - A φ14	φ14H7	16.3 +0.1 0	5JS9/P9

FHG-25-XX-C-I

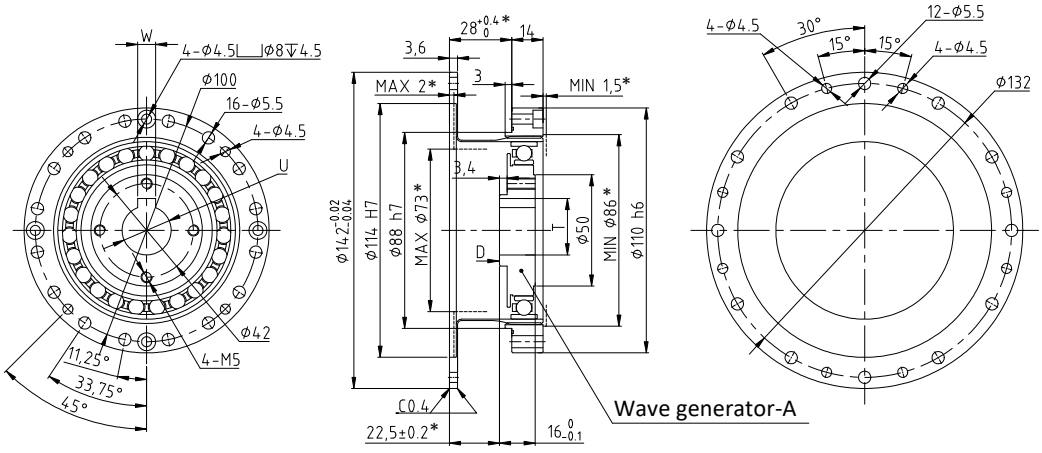


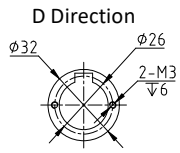
Model	U	T	W
Wave generator - A φ11	φ11H7	12.8 +0.1 0	4JS9/P9
Wave generator - A φ14	φ14H7	16.3 +0.1 0	5JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
20	50	33	3.3	73	7.4	44	4.5	127	13	6500	3500	≤20	0.27	15000
	80	44	4.5	96	9.8	61	6.2	165	17					15000
	100	52	5.3	107	10.9	64	6.5	191	20					15000
	120	52	5.3	113	11.5	64	6.5	191	20					15000
	160	52	5.3	120	12.2	64	6.5	191	20					15000
25	50	51	5.2	127	13	72	7.3	242	25	5600	3500	≤20	0.46	15000
	80	82	8.4	178	18	113	12	332	34					15000
	100	87	8.9	204	21	140	14	369	38					15000
	120	87	8.9	217	22	140	14	395	40					15000
	160	87	8.9	229	23	140	14	408	42					15000

OUTLINE DRAWING

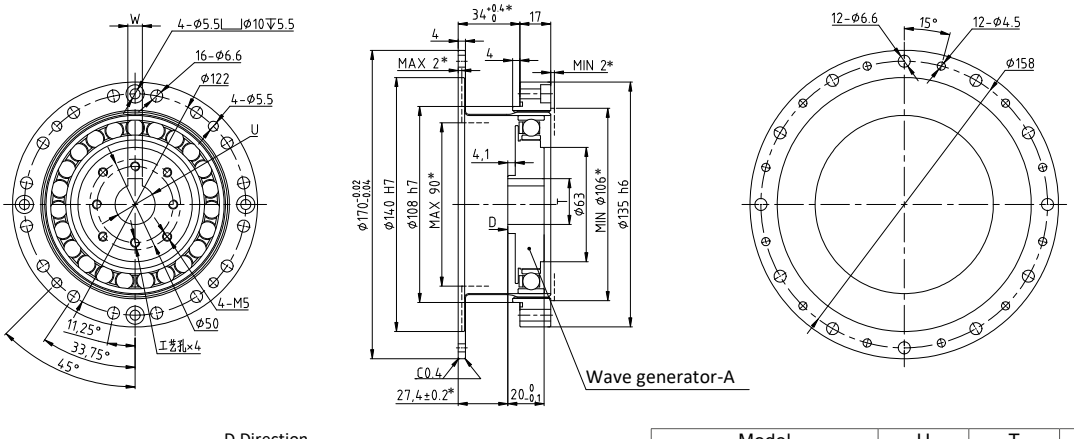
FHG-32-XX-C-I

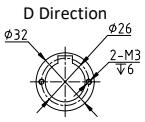




Model	U	T	W
Wave generator - A φ14	φ14H7	16.3 +0.1 0	5JS9/P9
Wave generator - A φ19	φ19H7	21.8 +0.1 0	6JS9/P9
Wave generator - A φ22	φ22H7	24.8 +0.1 0	6JS9/P9
		25.3 +0.1 0	8JS9/P9

FHG-40-XX-C-I



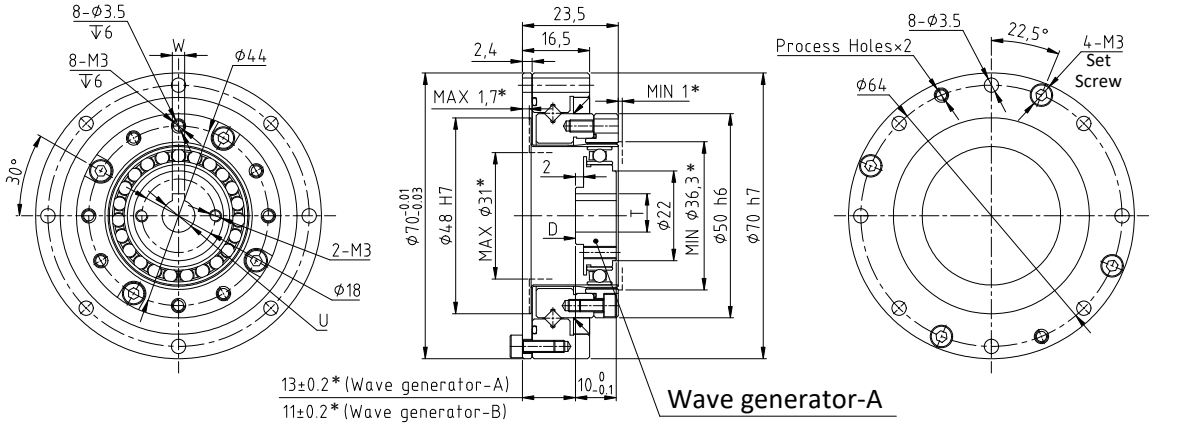


Model	U	T	W
Wave generator - A φ14	φ14H7	16.3 +0.1 0	5JS9/P9
Wave generator - A φ19	φ19H7	21.8 +0.1 0	6JS9/P9
Wave generator - A φ22	φ22H7	24.8 +0.1 0	6JS9/P9
		25.3 +0.1 0	8JS9/P9

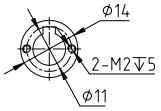
Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
32	50	99	10	281	29	140	14	497	51	4800	3500	≤20	1	15000
	80	153	16	395	40	217	22	738	75					15000
	100	178	18	433	44	281	29	841	86					15000
	120	178	18	459	47	281	29	892	91					15000
	160	178	18	484	49	281	29	892	91					15000
40	50	178	18	523	53	255	26	892	91	4000	3000	≤20	1.87	15000
	80	268	27	675	69	369	38	1270	130					15000
	100	345	35	738	75	484	49	1400	143					15000
	120	382	39	802	82	586	60	1530	156					15000
	160	382	39	841	86	586	60	1530	156					15000

OUTLINE DRAWING

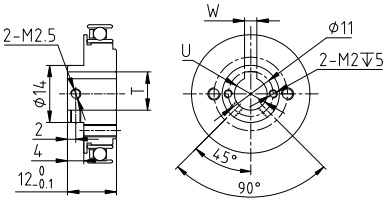
FHG-14-XX-U-I



D Direction

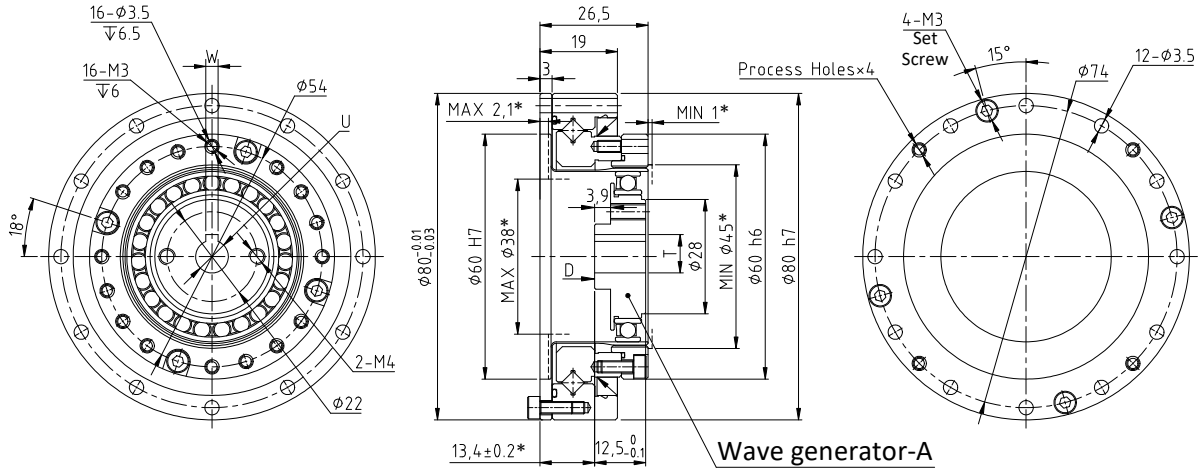


Wave generator-B

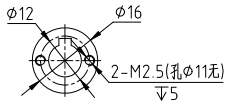


Model	U	T	W
Wave generator - A φ6	φ6H7	$7^{+0.1}_{0}$	2JS9/P9
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9

FHG-17-XX-U-I



D Direction

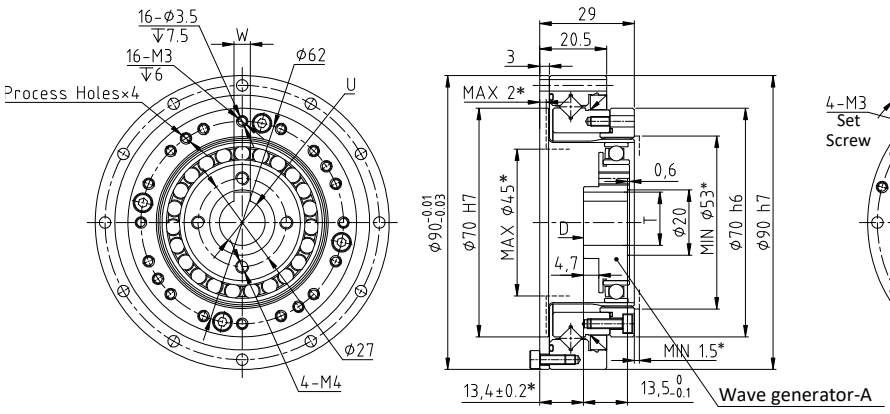


Model	U	T	W
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9
Wave generator - A φ11	φ11H7	$12.8^{+0.1}_{0}$	4JS9/P9

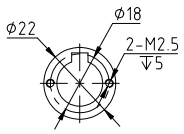
Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
14	50	7	0.7	23	2.3	9	0.9	46	4.7	8500	3500	≤20	0.4	15000
	80	10	1	30	3.1	14	1.4	61	6.2					15000
	100	10	1	36	3.7	14	1.4	70	7.2					15000
17	50	21	2.1	44	4.5	34	3.4	91	9	7300	3500	≤20	0.54	15000
	80	29	2.9	56	5.7	35	3.6	113	12					15000
	100	31	3.2	70	7.2	51	5.2	143	15					15000
	120	31	3.2	70	7.2	51	5.2	112	11					15000

OUTLINE DRAWING

FHG-20-XX-U-I

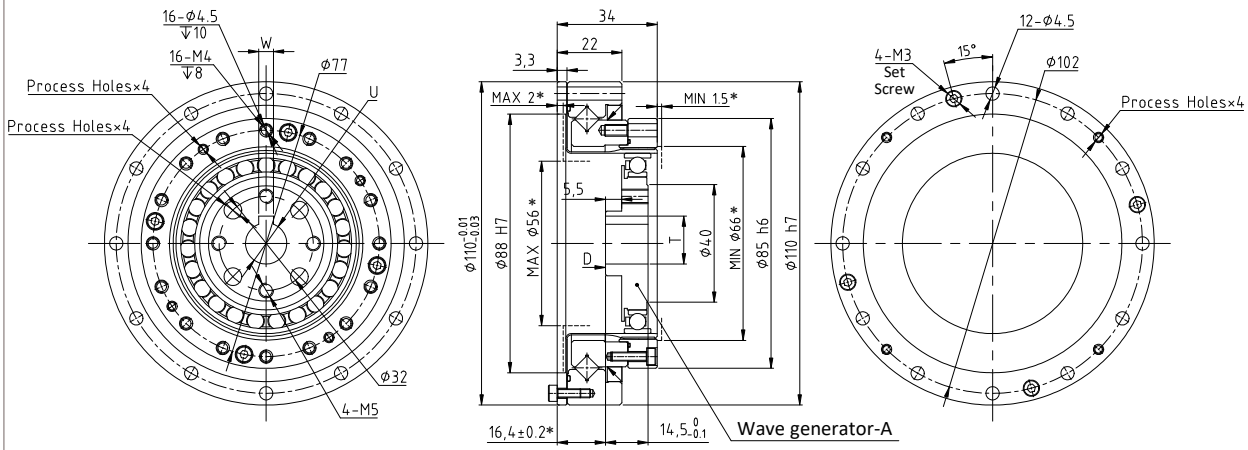


D Direction

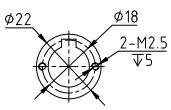


Model	U	T	W
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9
Wave generator - A φ11	φ11H7	$12.8^{+0.1}_{0}$	4JS9/P9
Wave generator - A φ14	φ14H7	$16.3^{+0.1}_{0}$	5JS9/P9

FHG-25-XX-U-I



D Direction

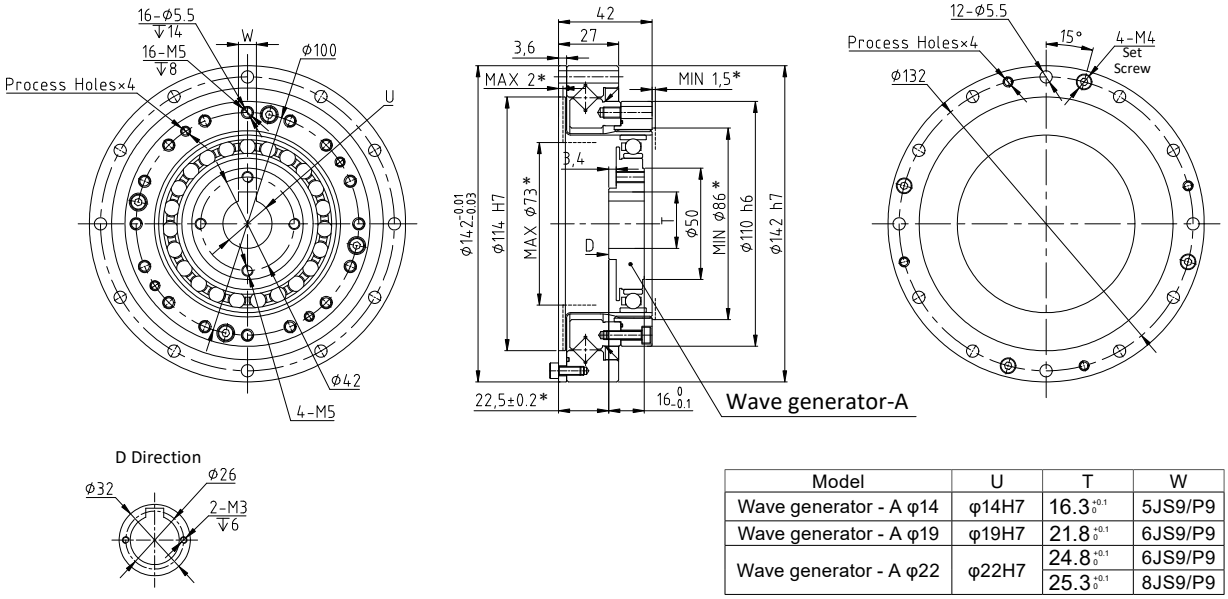


Model	U	T	W
Wave generator - A φ11	φ11H7	$12.8^{+0.1}_{0}$	4JS9/P9
Wave generator - A φ14	φ14H7	$16.3^{+0.1}_{0}$	5JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
20	50	33	3.3	73	7.4	44	4.5	127	13	6500	3500	≤20	0.72	15000
	80	44	4.5	96	9.8	61	6.2	165	17					15000
	100	52	5.3	107	10.9	64	6.5	191	20					15000
	120	52	5.3	113	11.5	64	6.5	191	20					15000
	160	52	5.3	120	12.2	64	6.5	191	20					15000
25	50	51	5.2	127	13	72	7.3	242	25	5600	3500	≤20	1.22	15000
	80	82	8.4	178	18	113	12	332	34					15000
	100	87	8.9	204	21	140	14	369	38					15000
	120	87	8.9	217	22	140	14	395	40					15000
	160	87	8.9	229	23	140	14	408	42					15000

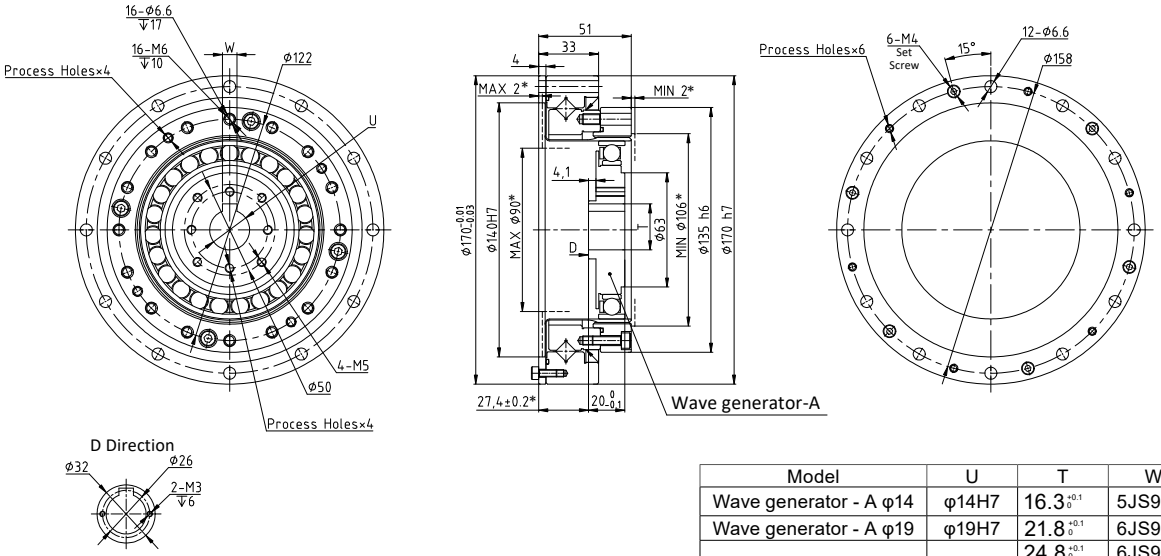
OUTLINE DRAWING

FHG-32-XX-U-I



Model	U	T	W
Wave generator - A φ14	φ14H7	16.3	5JS9/P9
Wave generator - A φ19	φ19H7	21.8	6JS9/P9
Wave generator - A φ22	φ22H7	24.8	6JS9/P9
		25.3	8JS9/P9

FHG-40-XX-U-I

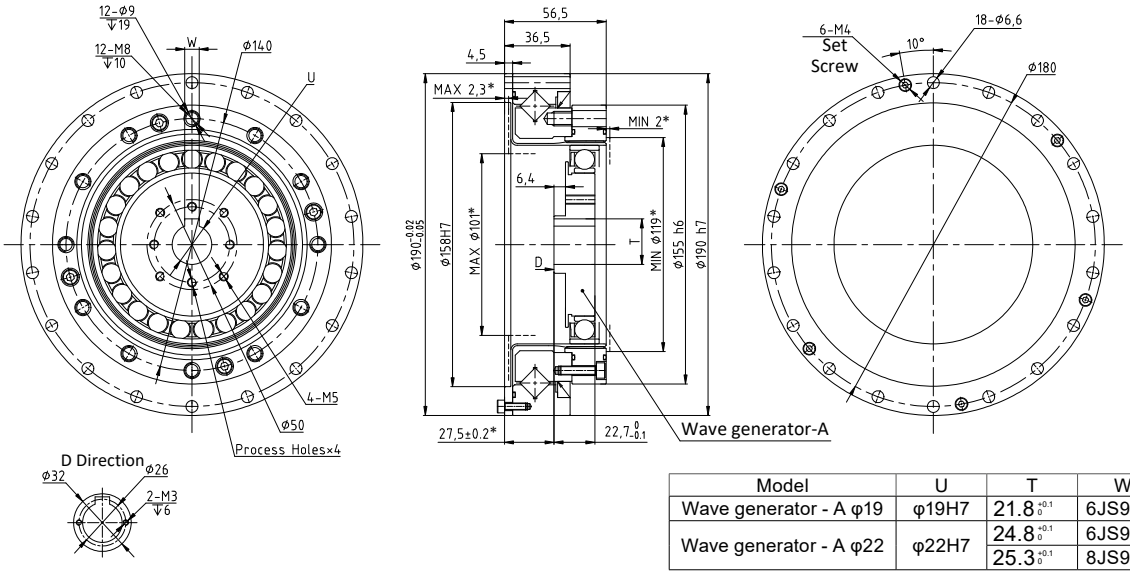


Model	U	T	W
Wave generator - A φ14	φ14H7	16.3	5JS9/P9
Wave generator - A φ19	φ19H7	21.8	6JS9/P9
Wave generator - A φ22	φ22H7	24.8	6JS9/P9
		25.3	8JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
32	50	99	10	281	29	140	14	497	51	4800	3500	≤20	2.54	15000
	80	153	16	395	40	217	22	738	75					15000
	100	178	18	433	44	281	29	841	86					15000
	120	178	18	459	47	281	29	892	91					15000
	160	178	18	484	49	281	29	892	91					15000
40	50	178	18	523	53	255	26	892	91	4000	3000	≤20	4.4	15000
	80	268	27	675	69	369	38	1270	130					15000
	100	345	35	738	75	484	49	1400	143					15000
	120	382	39	802	82	586	60	1530	156					15000
	160	382	39	841	86	586	60	1530	156					15000

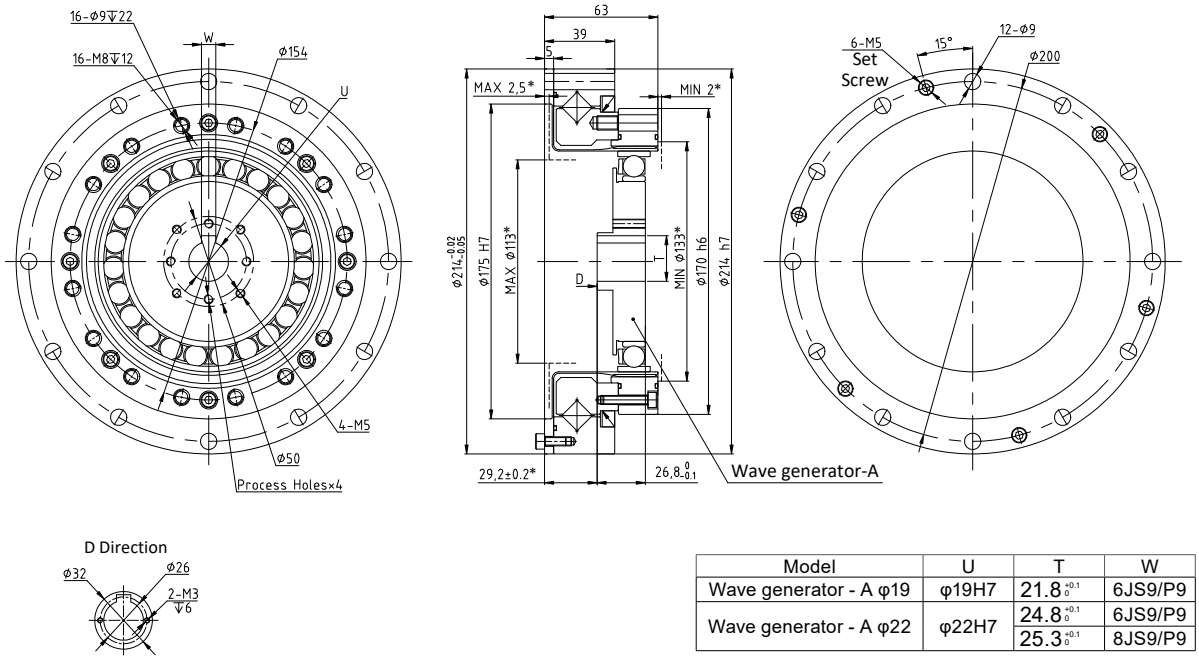
OUTLINE DRAWING

FHG-45-XX-U-I



Model	U	T	W
Wave generator - A φ19	φ19H7	21.8 +0.1 0	6JS9/P9
Wave generator - A φ22	φ22H7	24.8 +0.1 0	6JS9/P9
		25.3 +0.1 0	8JS9/P9

FHG-50-XX-U-I

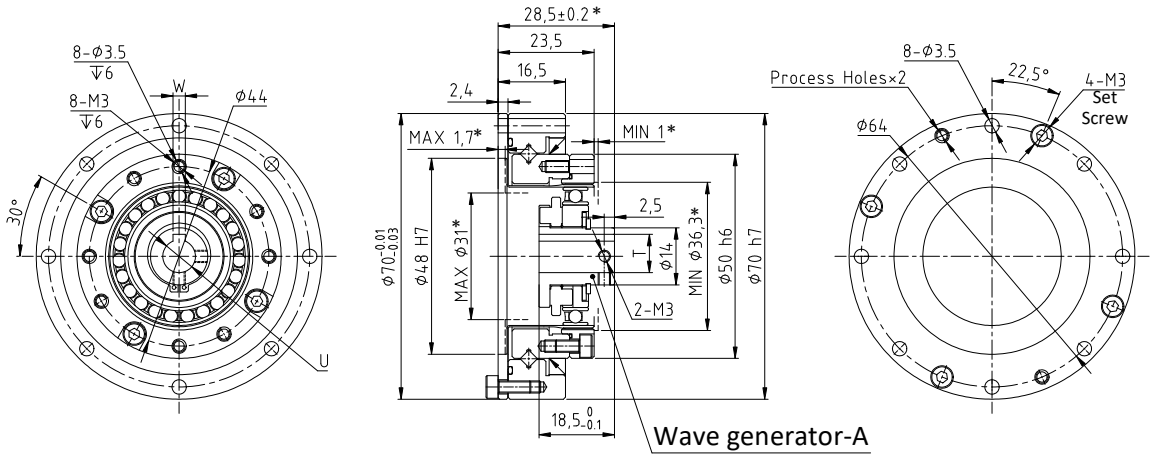


Model	U	T	W
Wave generator - A φ19	φ19H7	21.8 +0.1 0	6JS9/P9
Wave generator - A φ22	φ22H7	24.8 +0.1 0	6JS9/P9
		25.3 +0.1 0	8JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
45	50	229	23	650	66	345	35	1235	126	3800	3000	≤20	6.5	15000
	80	407	41	918	94	507	52	1651	168					15000
	100	459	47	982	100	650	66	2041	208					15000
	120	523	53	1070	109	806	82	2288	233					15000
	160	523	53	1147	117	819	84	2483	253					15000
50	80	484	49	1223	125	675	69	2418	247	3500	2500	≤20	9.6	15000
	100	611	62	1247	130	866	88	2678	273					15000
	120	688	70	1404	143	1057	108	2678	273					15000

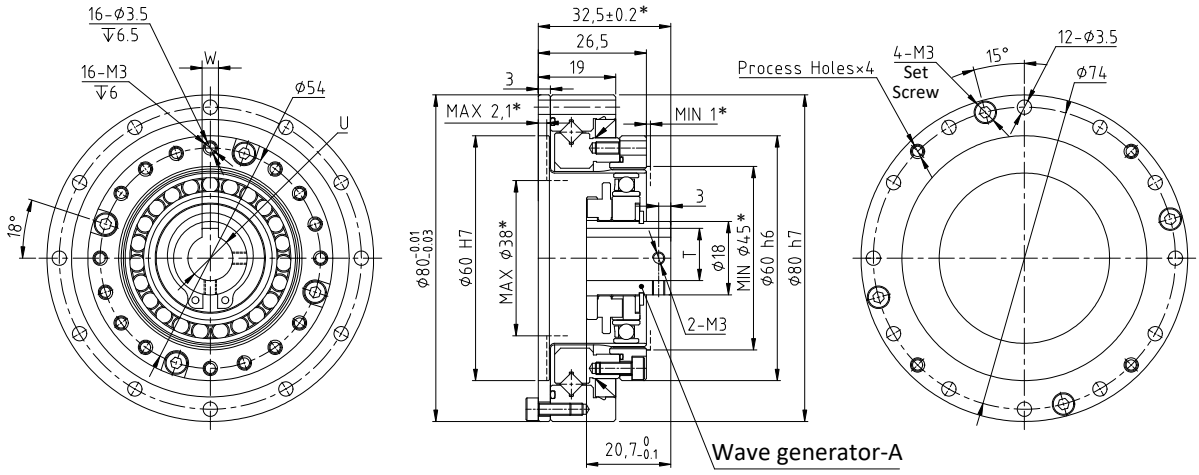
OUTLINE DRAWING

FHG-14-XX-U-II



Model	U	T	W
Wave generator - A φ6	φ6H7		
Wave generator - A φ6	φ6H7	$7^{+0.1}_{0}$	2JS9/P9
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9

FHG-17-XX-U-II

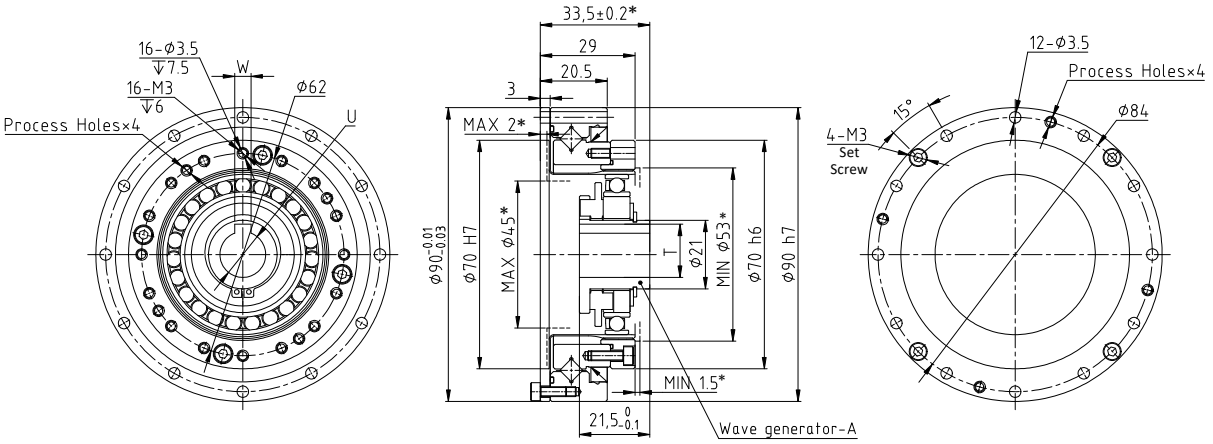


Model	U	T	W
Wave generator - A φ8	φ8H7		
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9
Wave generator - A φ11	φ11H7	$12.8^{+0.1}_{0}$	4JS9/P9

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
14	50	7	0.7	23	2.3	9	0.9	46	4.7	8500	3500	≤20	0.4	15000
	80	10	1	30	3.1	14	1.4	61	6.2					15000
	100	10	1	36	3.7	14	1.4	70	7.2					15000
17	50	21	2.1	44	4.5	34	3.4	91	9	7300	3500	≤20	0.54	15000
	80	29	2.9	56	5.7	35	3.6	113	12					15000
	100	31	3.2	70	7.2	51	5.2	143	15					15000
	120	31	3.2	70	7.2	51	5.2	112	11					15000

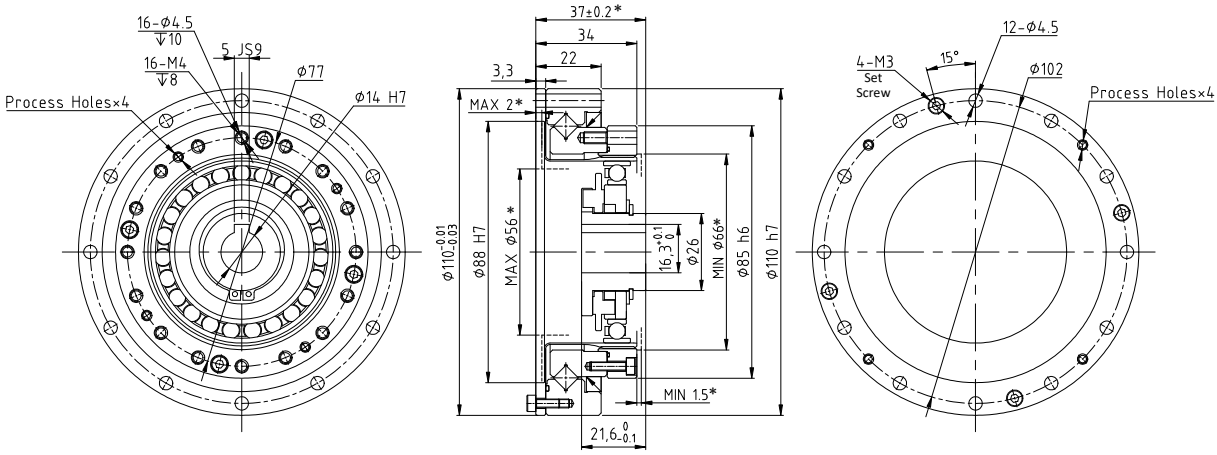
OUTLINE DRAWING

FHG-20-XX-U-II



Model	U	T	W
Wave generator - A φ8	φ8H7	9.4 +0.1 0	3JS9/P9
Wave generator - A φ11	φ11H7	12.8 +0.1 0	4JS9/P9
Wave generator - A φ14	φ14H7	16.3 +0.1 0	5JS9/P9

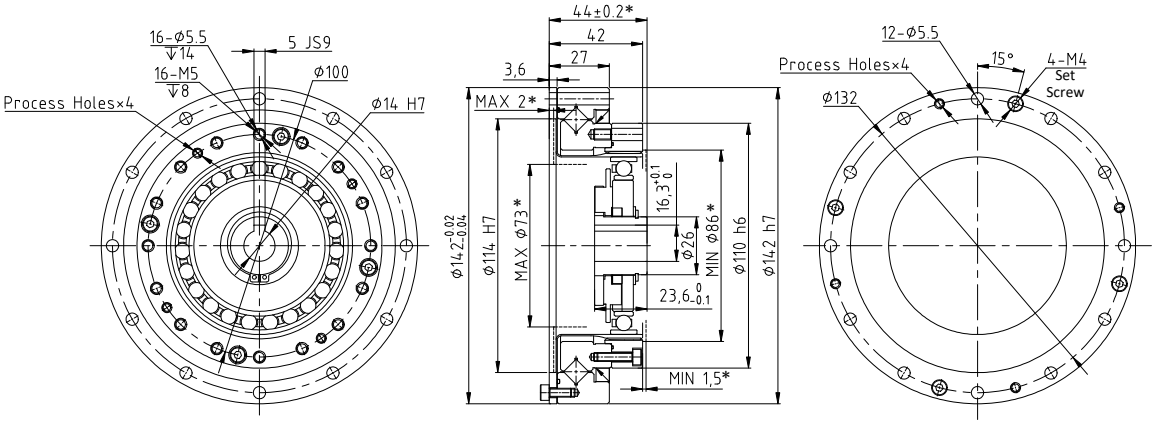
FHG-25-XX-U-II



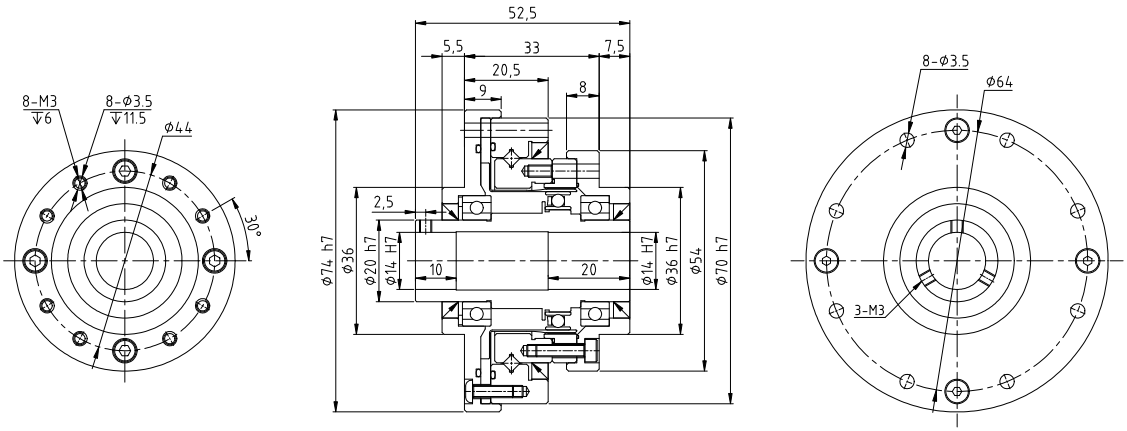
Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
20	50	33	3.3	73	7.4	44	4.5	127	13	6500	3500	≤20	0.72	15000
	80	44	4.5	96	9.8	61	6.2	165	17					15000
	100	52	5.3	107	10.9	64	6.5	191	20					15000
	120	52	5.3	113	11.5	64	6.5	191	20					15000
	160	52	5.3	120	12.2	64	6.5	191	20					15000
25	50	51	5.2	127	13	72	7.3	242	25	5600	3500	≤20	1.22	15000
	80	82	8.4	178	18	113	12	332	34					15000
	100	87	8.9	204	21	140	14	369	38					15000
	120	87	8.9	217	22	140	14	395	40					15000
	160	87	8.9	229	23	140	14	408	42					15000

OUTLINE DRAWING

FHG-32-XX-U-II



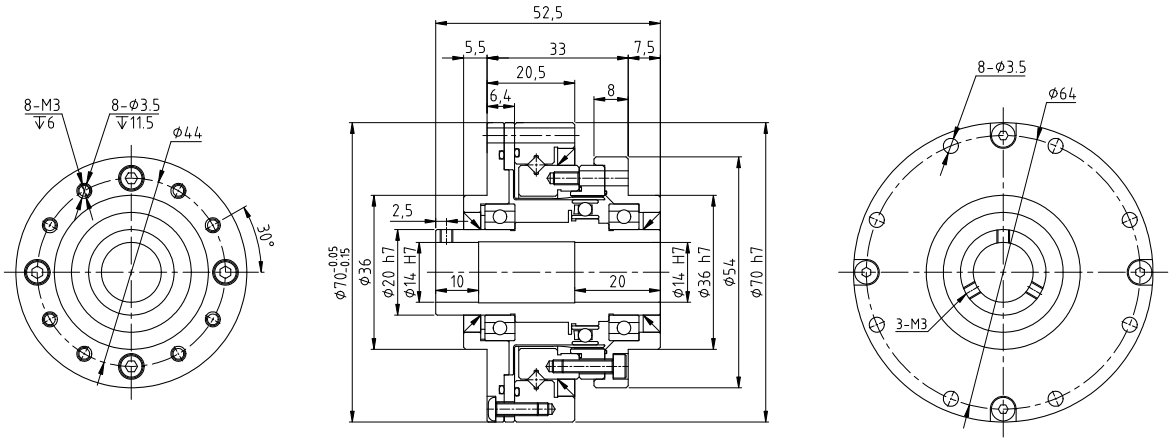
FHG-14-XX-U-III



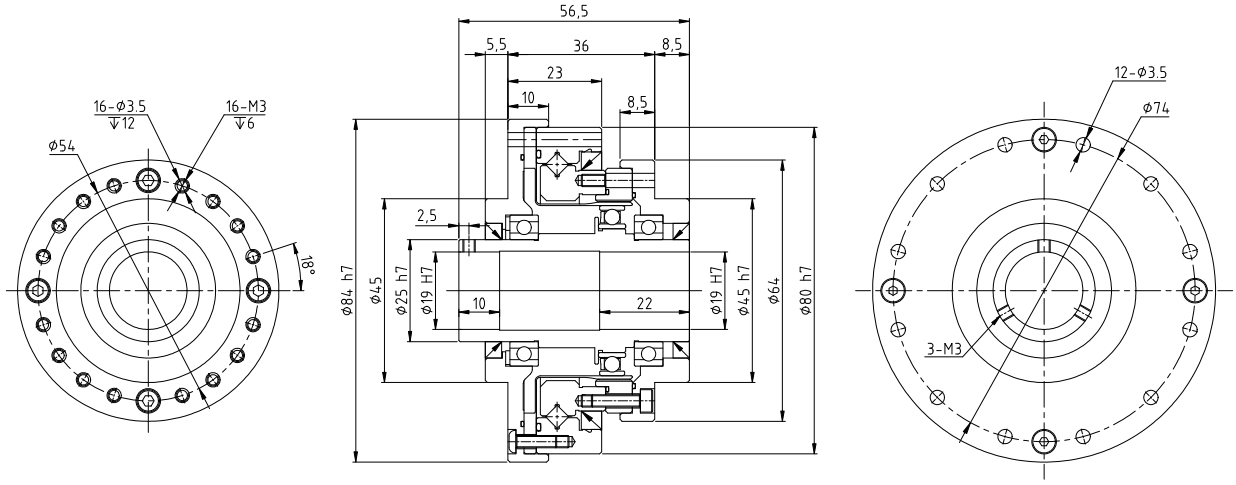
Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
32	50	99	10	281	29	140	14	497	51	4800	3500	≤20	2.54	15000
	80	153	16	395	40	217	22	738	75					15000
	100	178	18	433	44	281	29	841	86					15000
	120	178	18	459	47	281	29	892	91					15000
	160	178	18	484	49	281	29	892	91					15000
14	50	7	0.7	23	2.3	9	0.9	46	4.7	8500	3500	≤20	0.7	15000
	80	10	1	30	3.1	14	1.4	61	6.2					15000
	100	10	1	36	3.7	14	1.4	70	7.2					15000

OUTLINE DRAWING

FHG-14-XX-U-III-DL



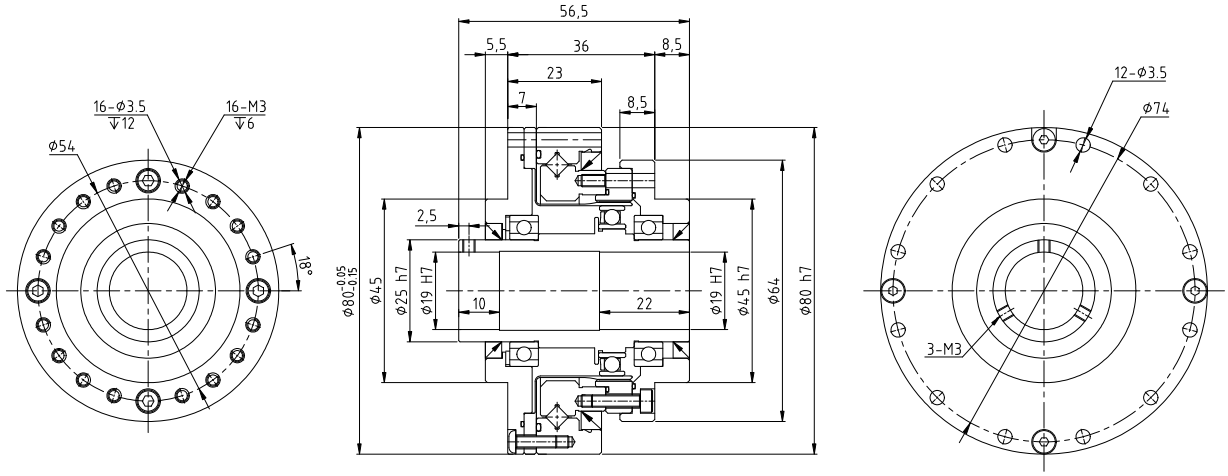
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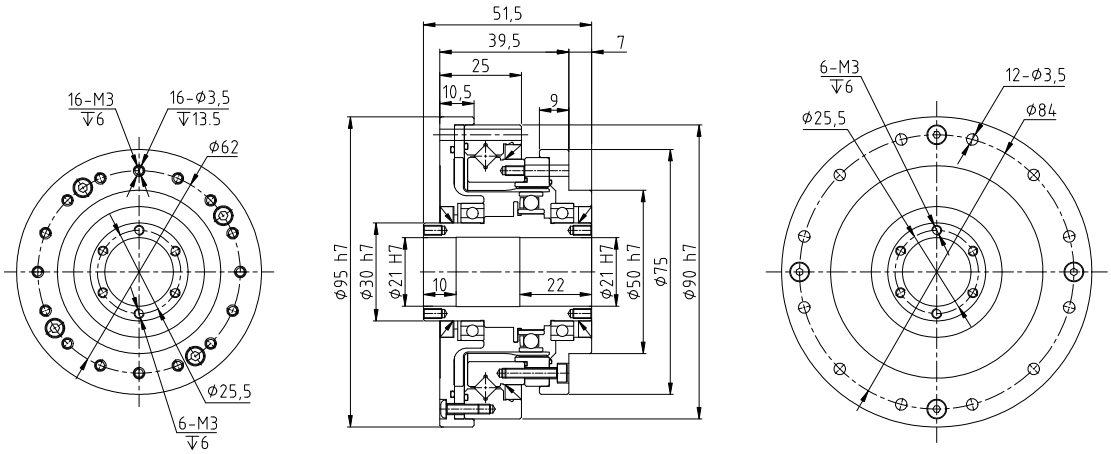
Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
14	50	7	0.7	23	2.3	9	0.9	46	4.7	8500	3500	≤20	0.7	15000
	80	10	1	30	3.1	14	1.4	61	6.2					15000
	100	10	1	36	3.7	14	1.4	70	7.2					15000
17	50	21	2.1	44	4.5	34	3.4	91	9	7300	3500	≤20	0.99	15000
	80	29	2.9	56	5.7	35	3.6	113	12					15000
	100	31	3.2	70	7.2	51	5.2	143	15					15000
	120	31	3.2	70	7.2	51	5.2	112	11					15000

OUTLINE DRAWING

FHG-17-XX-U-III-DL



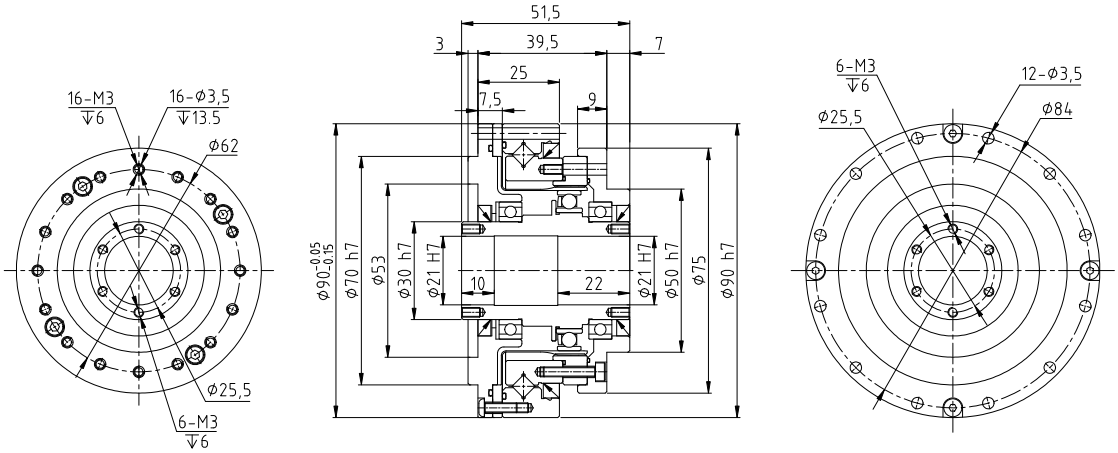
FHG-20-XX-U-III



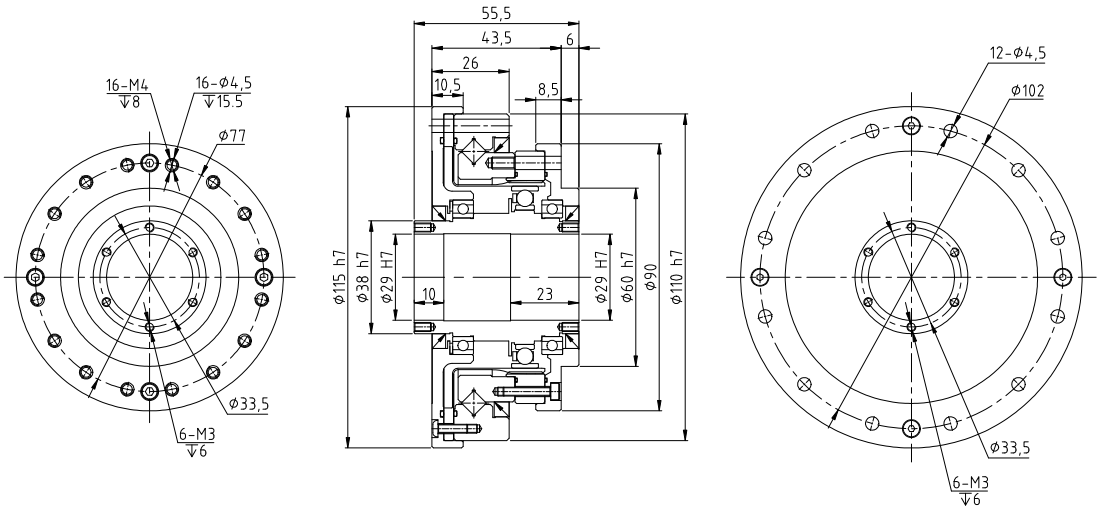
Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
17	50	21	2.1	44	4.5	34	3.4	91	9	7300	3500	≤20	0.99	15000
	80	29	2.9	56	5.7	35	3.6	113	12					15000
	100	31	3.2	70	7.2	51	5.2	143	15					15000
	120	31	3.2	70	7.2	51	5.2	112	11					15000
20	50	33	3.3	73	7.4	44	4.5	127	13	6500	3500	≤20	1.32	15000
	80	44	4.5	96	9.8	61	6.2	165	17					15000
	100	52	5.3	107	10.9	64	6.5	191	20					15000
	120	52	5.3	113	11.5	64	6.5	191	20					15000
	160	52	5.3	120	12.2	64	6.5	191	20					15000

OUTLINE DRAWING

FHG-20-XX-U-III-DL



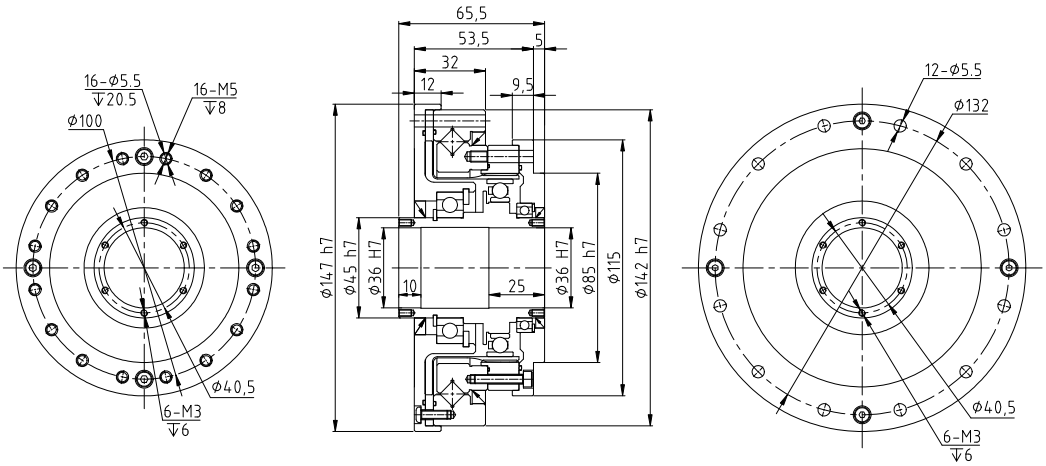
FHG-25-XX-U-III



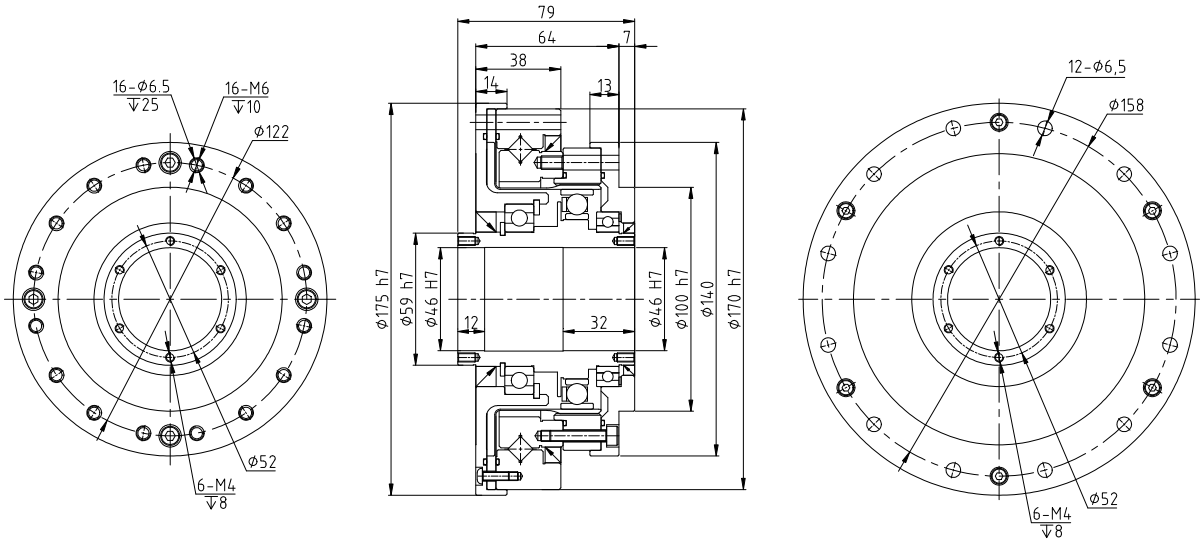
Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
20	50	33	3.3	73	7.4	44	4.5	127	13	6500	3500	≤20	1.32	15000
	80	44	4.5	96	9.8	61	6.2	165	17					15000
	100	52	5.3	107	10.9	64	6.5	191	20					15000
	120	52	5.3	113	11.5	64	6.5	191	20					15000
	160	52	5.3	120	12.2	64	6.5	191	20					15000
25	50	51	5.2	127	13	72	7.3	242	25	5600	3500	≤20	2.02	15000
	80	82	8.4	178	18	113	12	332	34					15000
	100	87	8.9	204	21	140	14	369	38					15000
	120	87	8.9	217	22	140	14	395	40					15000
	160	87	8.9	229	23	140	14	408	42					15000

OUTLINE DRAWING

FHG-32-XX-U-III



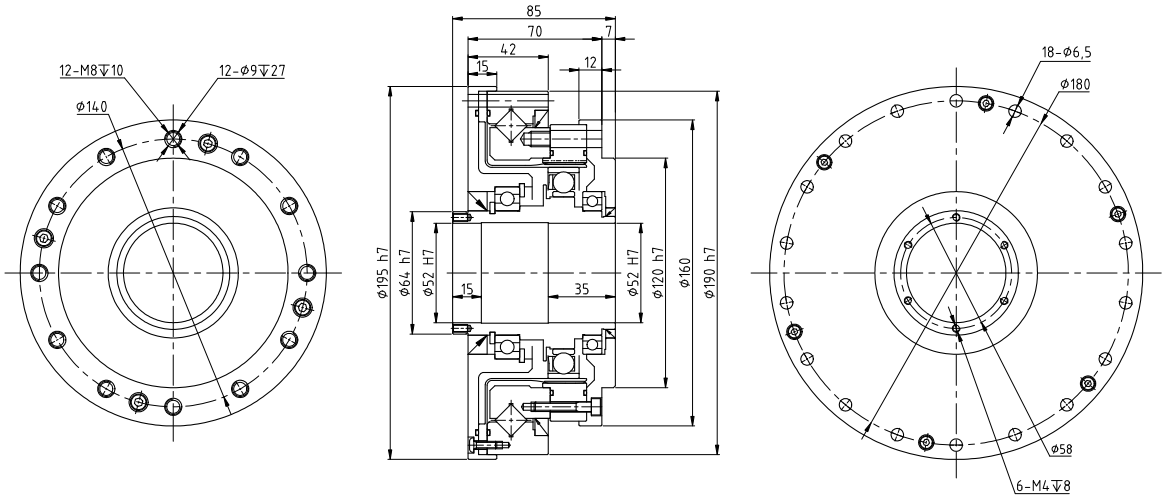
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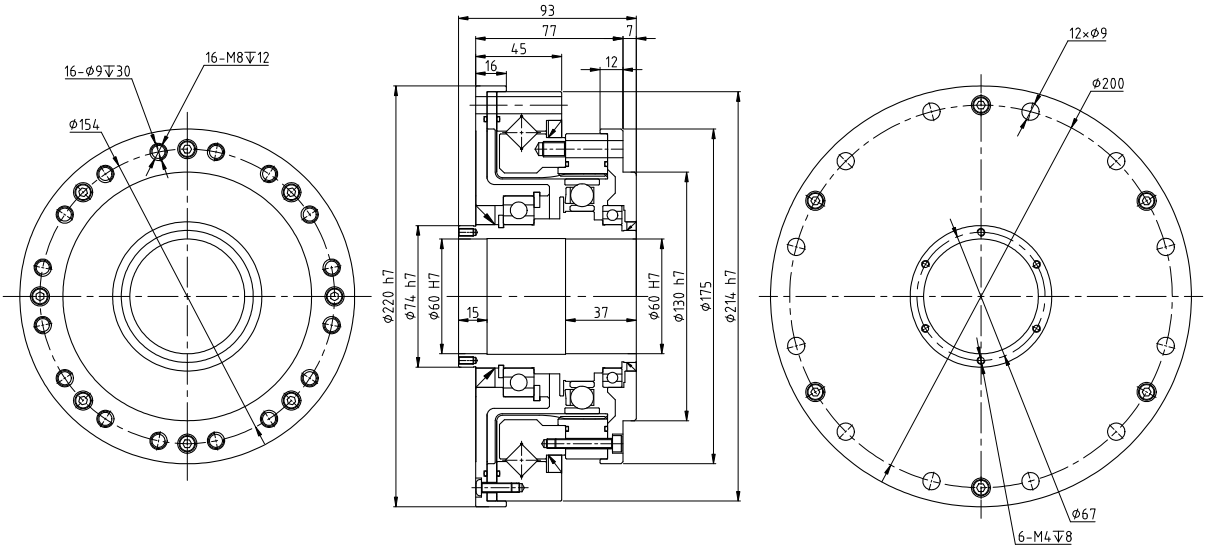
Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
32	50	99	10	281	29	140	14	497	51	4800	3500	≤20	4.2	15000
	80	153	16	395	40	217	22	738	75					15000
	100	178	18	433	44	281	29	841	86					15000
	120	178	18	459	47	281	29	892	91					15000
	160	178	18	484	49	281	29	892	91					15000
40	50	178	18	523	53	255	26	892	91	4000	3500	≤20	7.2	15000
	80	268	27	675	69	369	38	1270	130					15000
	100	345	35	738	75	484	49	1400	143					15000
	120	382	39	802	82	586	60	1530	156					15000
	160	382	39	841	86	586	60	1530	156					15000

OUTLINE DRAWING

FHG-45-XX-U-III



FHG-50-XX-U-III

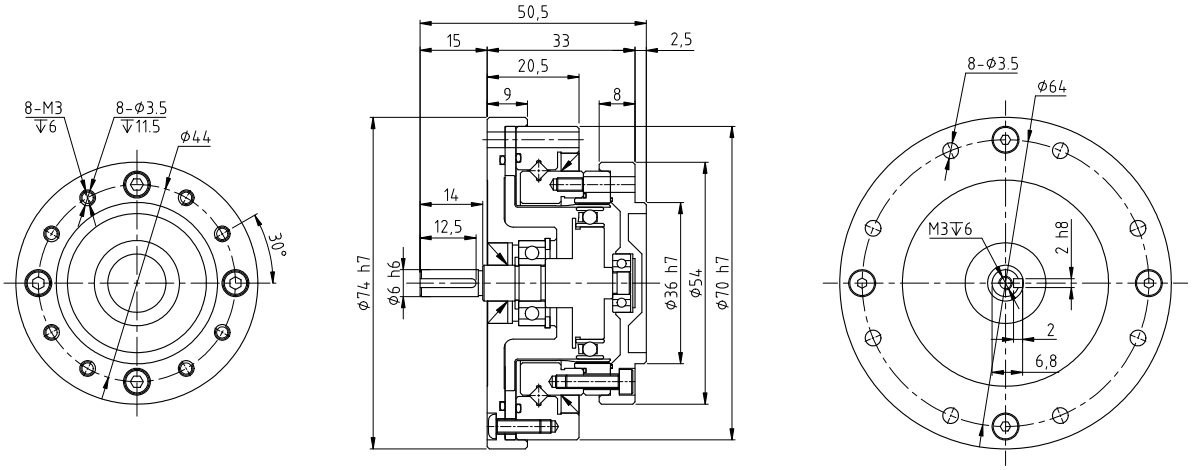


Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
45	80	407	41	918	94	507	52	1651	168	3800	3500	≤20	6.5	15000
	100	459	47	982	100	650	66	2041	208					15000
	120	523	53	1070	109	806	82	2288	233					15000
50	80	484	49	1223	125	675	69	2418	247	3500	3500	≤20	14.5	15000
	100	611	62	1247	130	866	88	2678	273					15000
	120	688	70	1404	143	1057	108	2678	273					15000

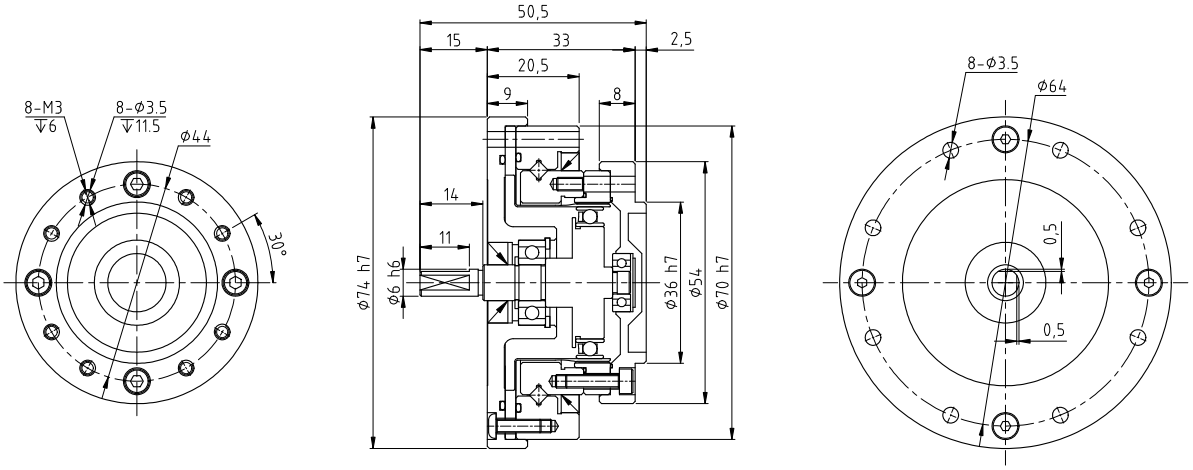
OUTLINE DRAWING

FHG-14-XX-U-IV

with keyway



without keyway

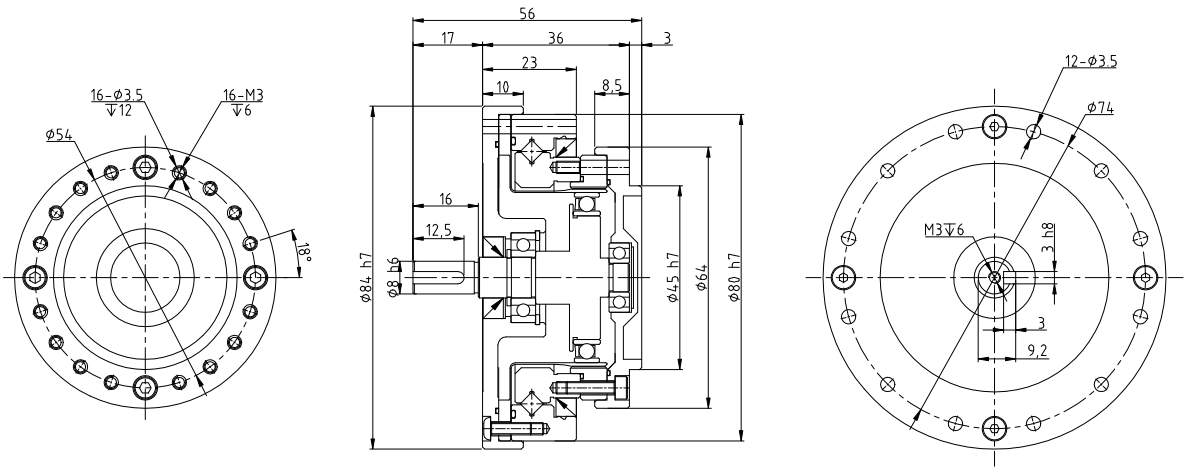


Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
14	50	7	0.7	23	2.3	9	0.9	46	4.7	8500	3500	≤20	0.66	15000
	80	10	1	30	3.1	14	1.4	61	6.2					15000
	100	10	1	36	3.7	14	1.4	70	7.2					15000

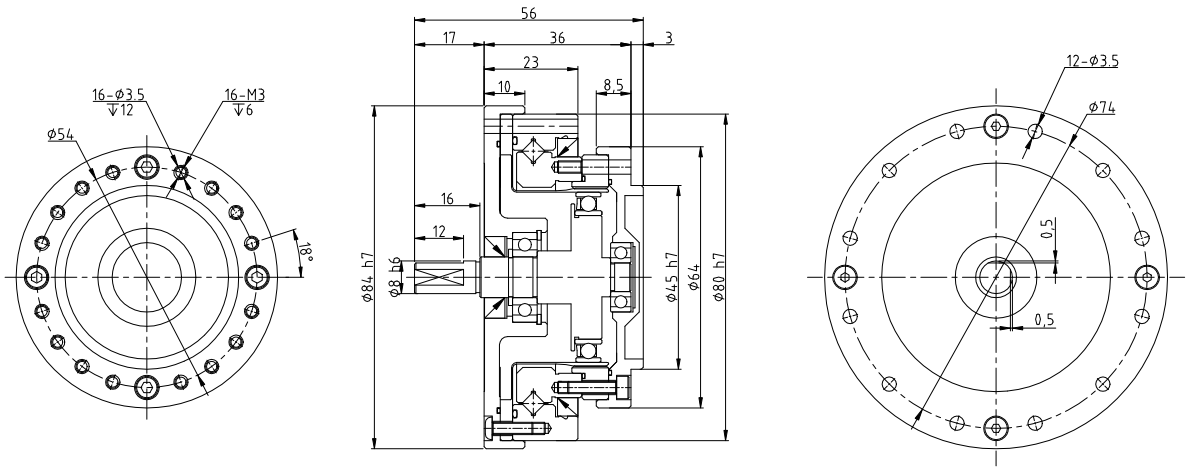
OUTLINE DRAWING

FHG-17-XX-U-IV

with keyway



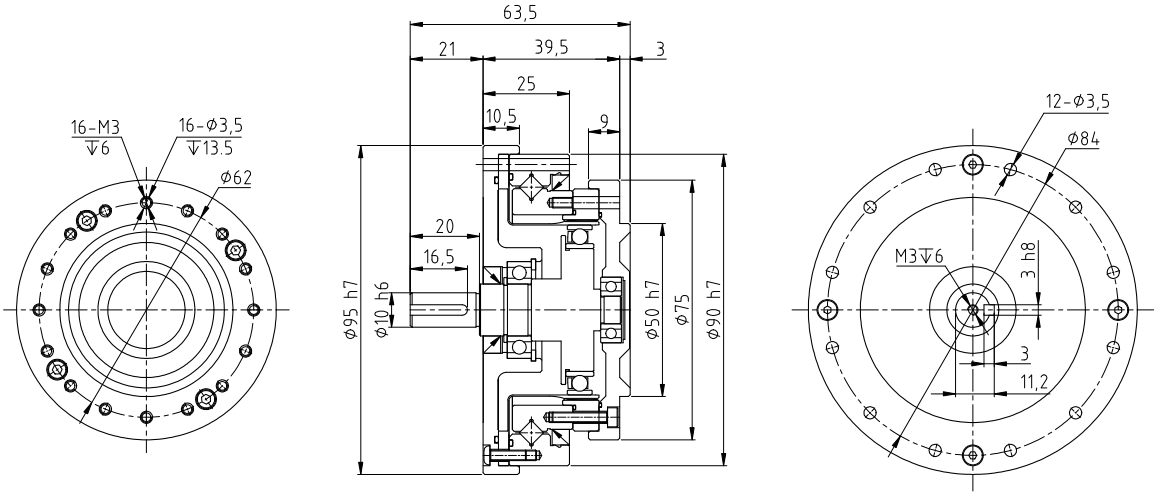
without keyway



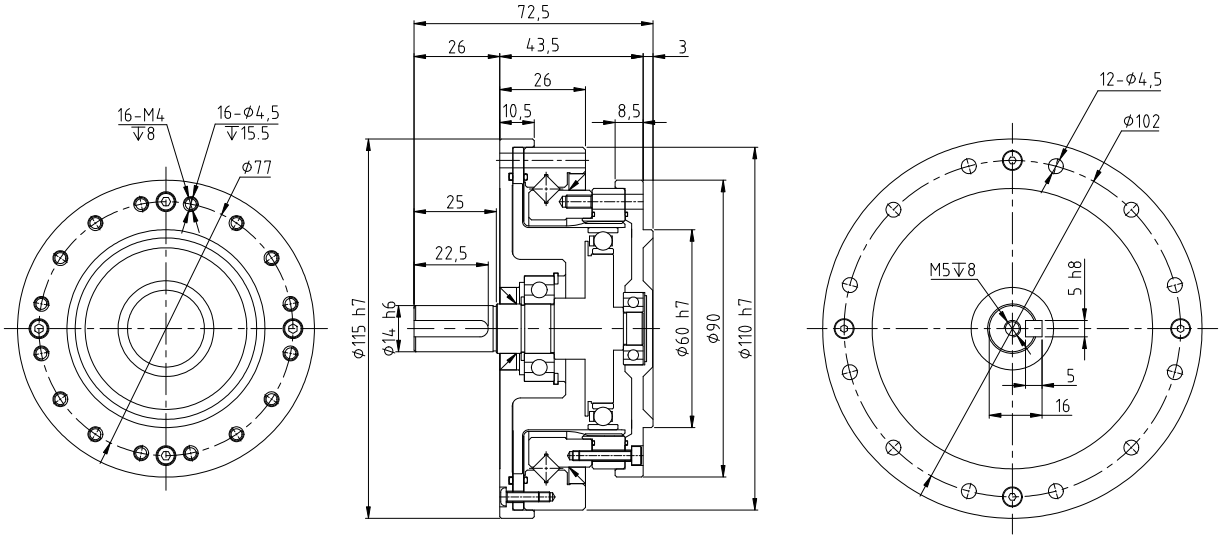
Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
17	50	21	2.1	44	4.5	34	3.4	91	9	7300	3500	≤20	0.9	15000
	80	29	2.9	56	5.7	35	3.6	113	12					15000
	100	31	3.2	70	7.2	51	5.2	143	15					15000
	120	31	3.2	70	7.2	51	5.2	112	11					15000

OUTLINE DRAWING

FHG-20-XX-U-IV



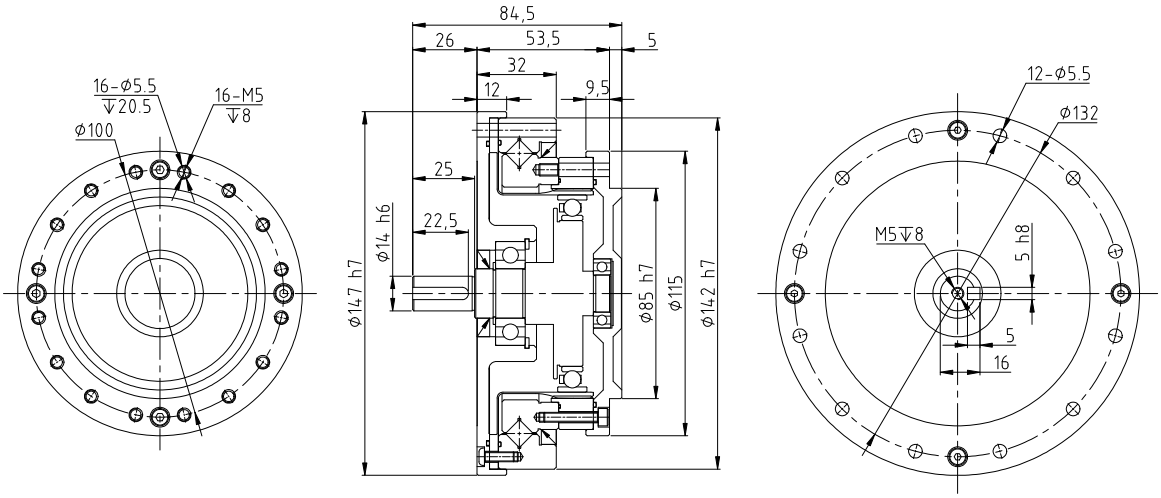
FHG-25-XX-U-IV



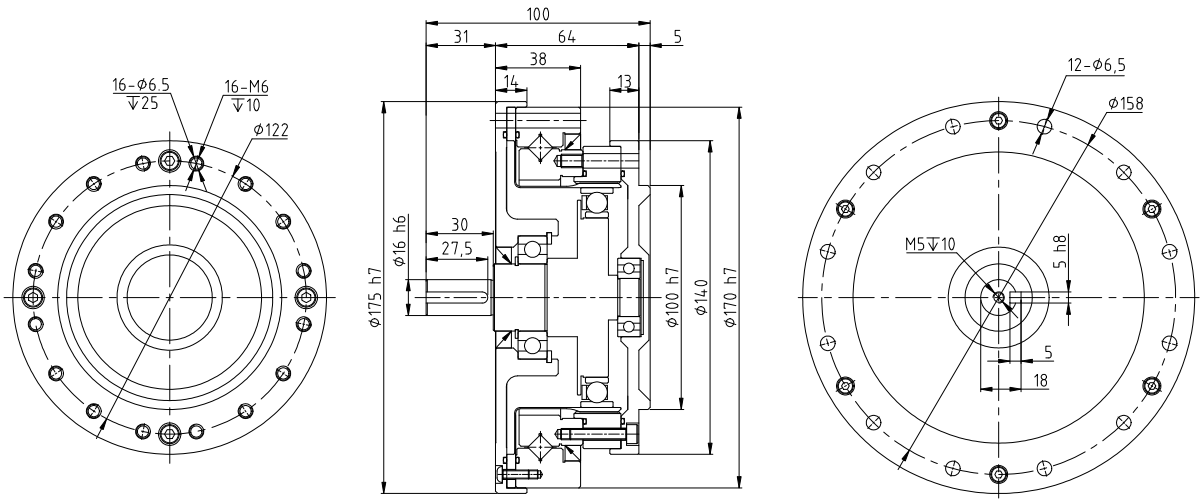
Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
20	50	33	3.3	73	7.4	44	4.5	127	13	6500	3500	≤20	1.29	15000
	80	44	4.5	96	9.8	61	6.2	165	17					15000
	100	52	5.3	107	10.9	64	6.5	191	20					15000
	120	52	5.3	113	11.5	64	6.5	191	20					15000
	160	52	5.3	120	12.2	64	6.5	191	20					15000
25	50	51	5.2	127	13	72	7.3	242	25	5600	3500	≤20	1.99	15000
	80	82	8.4	178	18	113	12	332	34					15000
	100	87	8.9	204	21	140	14	369	38					15000
	120	87	8.9	217	22	140	14	395	40					15000
	160	87	8.9	229	23	140	14	408	42					15000

OUTLINE DRAWING

FHG-32-XX-U-IV



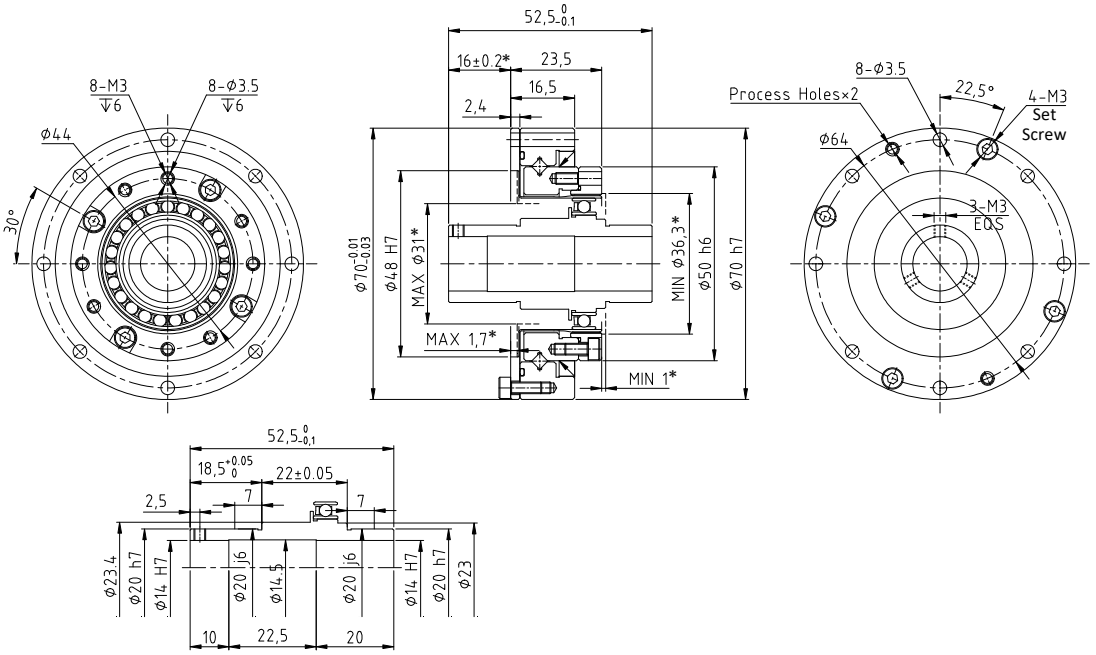
FHG-40-XX-U-IV



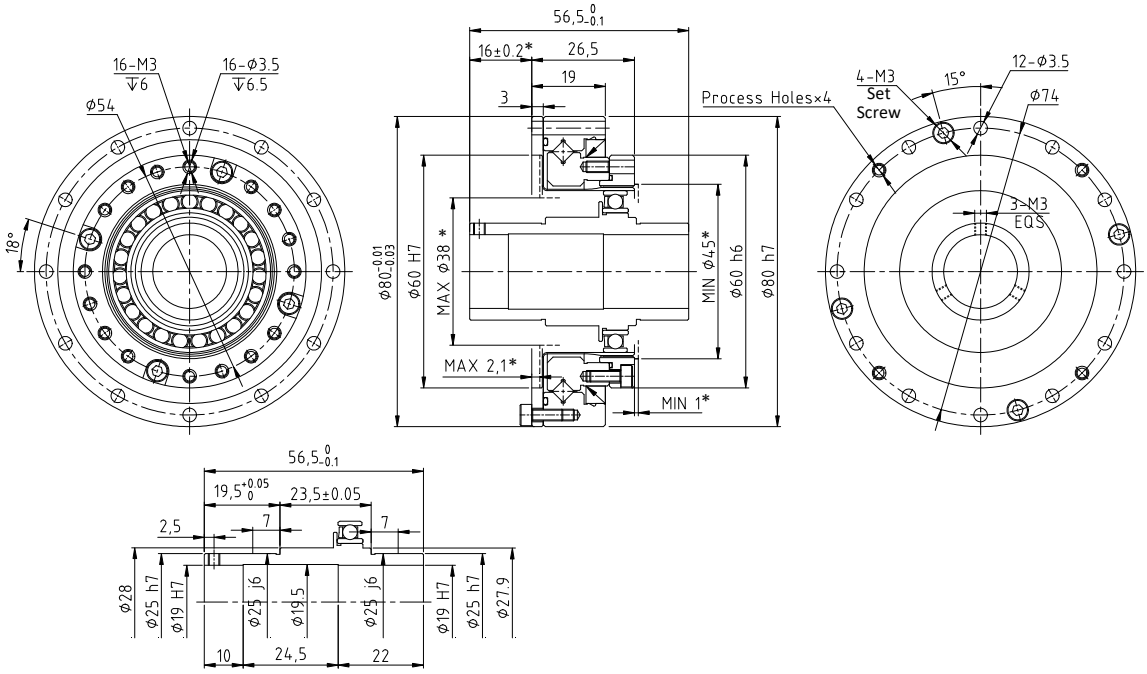
Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
32	50	99	10	281	29	140	14	497	51	4800	3500	≤20	4	15000
	80	153	16	395	40	217	22	738	75					15000
	100	178	18	433	44	281	29	841	86					15000
	120	178	18	459	47	281	29	892	91					15000
	160	178	18	484	49	281	29	892	91					15000
40	50	178	18	523	53	255	26	892	91	4000	3500	≤20	7	15000
	80	268	27	675	69	369	38	1270	130					15000
	100	345	35	738	75	484	49	1400	143					15000
	120	382	39	802	82	586	60	1530	156					15000
	160	382	39	841	86	586	60	1530	156					15000

OUTLINE DRAWING

FHG-14-XX-U-V



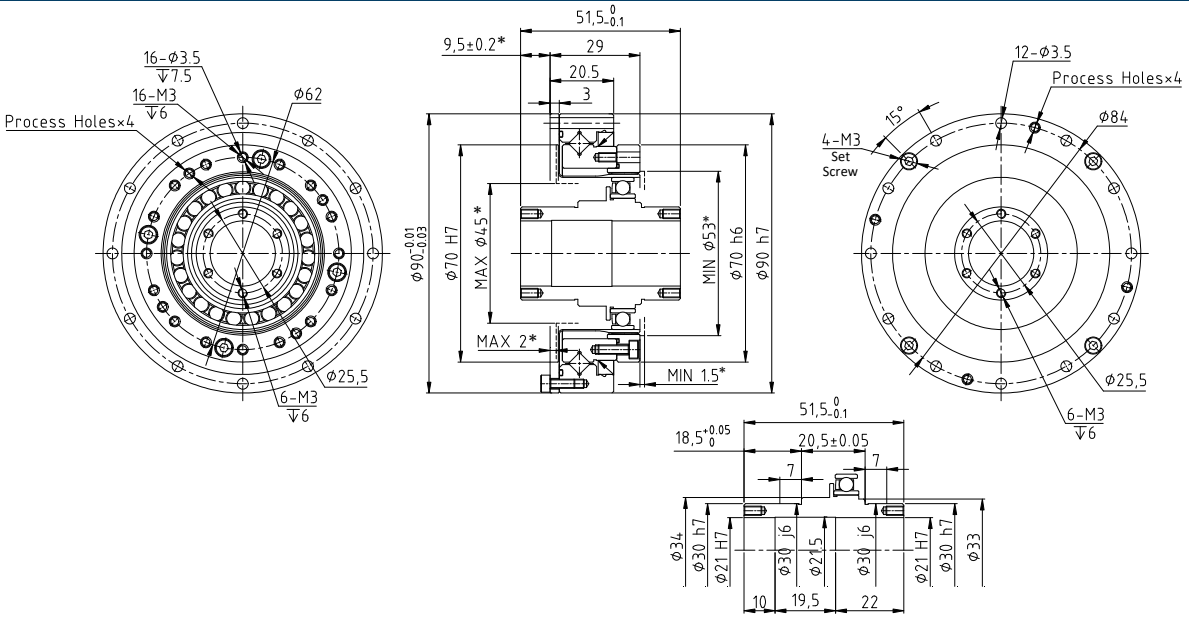
FHG-17-XX-U-V



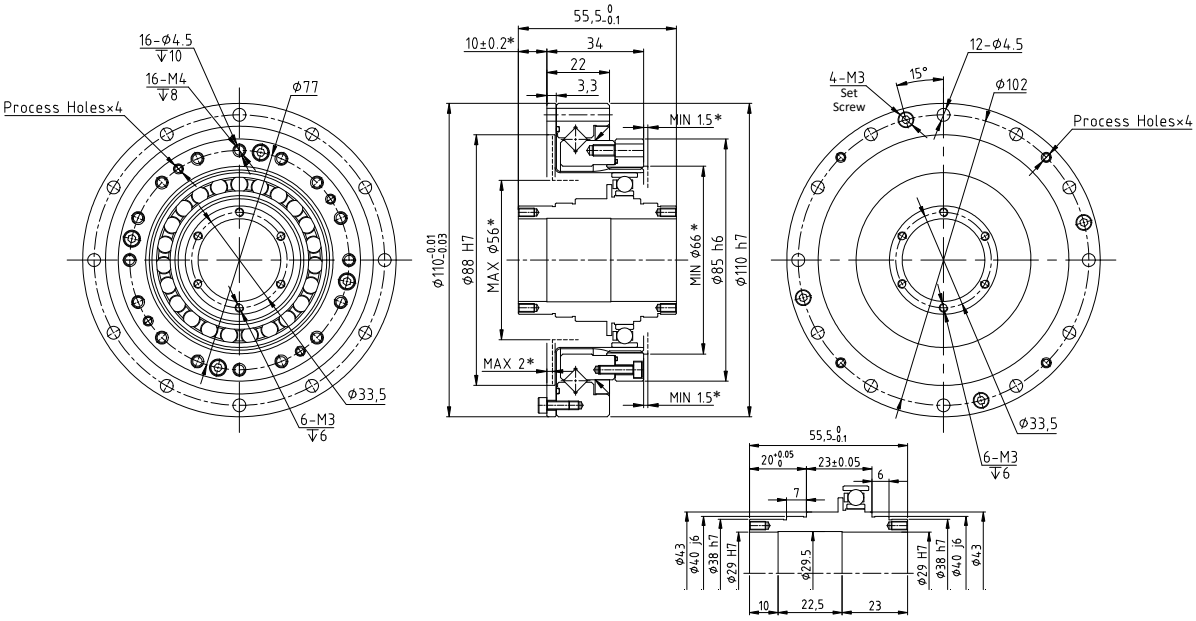
Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
14	50	7	0.7	23	2.3	9	0.9	46	4.7	8500	3500	≤20	0.4	15000
	80	10	1	30	3.1	14	1.4	61	6.2					15000
	100	10	1	36	3.7	14	1.4	70	7.2					15000
17	50	21	2.1	44	4.5	34	3.4	91	9	7300	3500	≤20	0.62	15000
	80	29	2.9	56	5.7	35	3.6	113	12					15000
	100	31	3.2	70	7.2	51	5.2	143	15					15000
	120	31	3.2	70	7.2	51	5.2	112	11					15000

OUTLINE DRAWING

FHG-20-XX-U-V



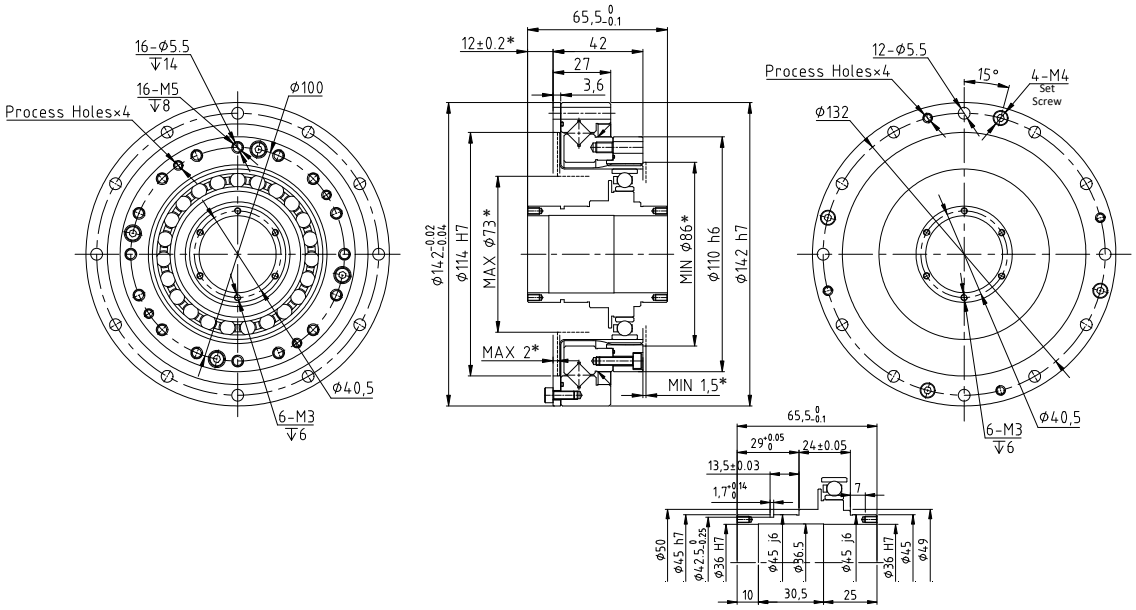
FHG-25-XX-U-V



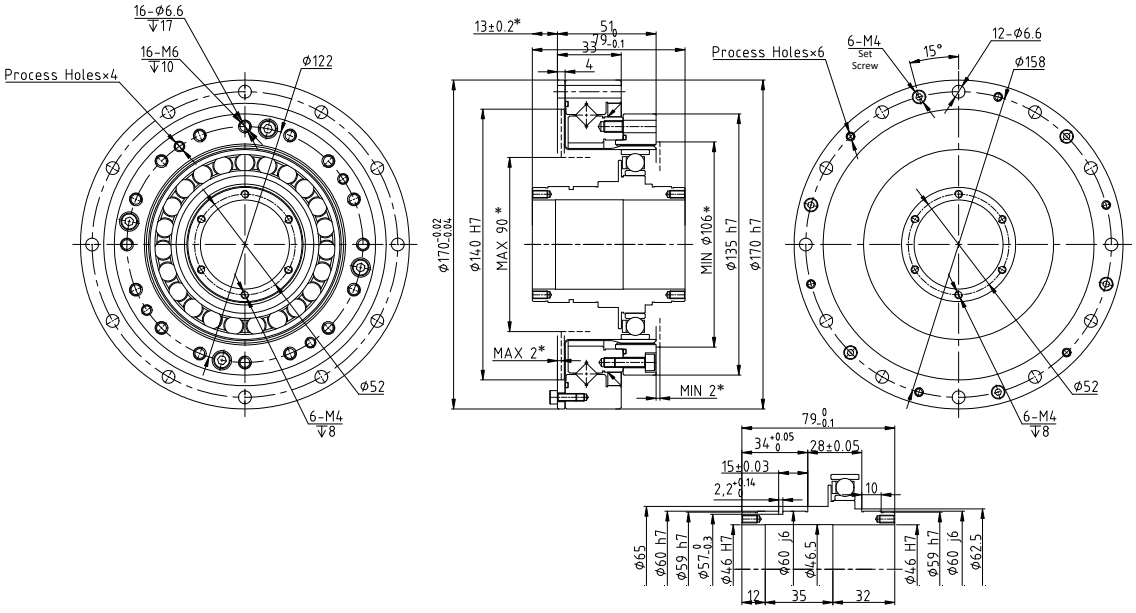
Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
20	50	33	3.3	73	7.4	44	4.5	127	13	6500	3500	≤20	0.82	15000
	80	44	4.5	96	9.8	61	6.2	165	17					15000
	100	52	5.3	107	10.9	64	6.5	191	20					15000
	120	52	5.3	113	11.5	64	6.5	191	20					15000
	160	52	5.3	120	12.2	64	6.5	191	20					15000
25	50	51	5.2	127	13	72	7.3	242	25	5600	3500	≤20	1.4	15000
	80	82	8.4	178	18	113	12	332	34					15000
	100	87	8.9	204	21	140	14	369	38					15000
	120	87	8.9	217	22	140	14	395	40					15000
	160	87	8.9	229	23	140	14	408	42					15000

OUTLINE DRAWING

FHG-32-XX-U-V



FHG-40-XX-U-V



Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
32	50	99	10	281	29	140	14	497	51	4800	3500	≤20	2.7	15000
	80	153	16	395	40	217	22	738	75					15000
	100	178	18	433	44	281	29	841	86					15000
	120	178	18	459	47	281	29	892	91					15000
	160	178	18	484	49	281	29	892	91					15000
40	50	178	18	523	53	255	26	892	91	4000	3500	≤20	5.4	15000
	80	268	27	675	69	369	38	1270	130					15000
	100	345	35	738	75	484	49	1400	143					15000
	120	382	39	802	82	586	60	1530	156					15000
	160	382	39	841	86	586	60	1530	156					15000

INTRODUCTION OF FHD



FHD-I



FHD-III

FHD

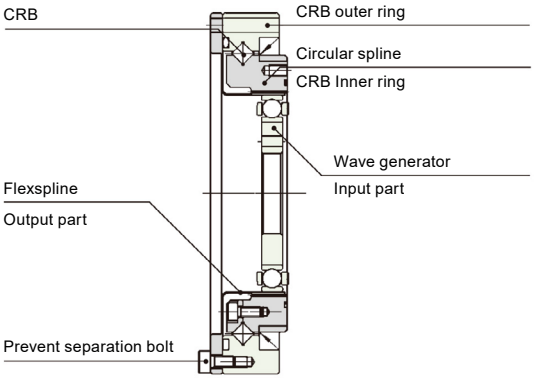
Introduction

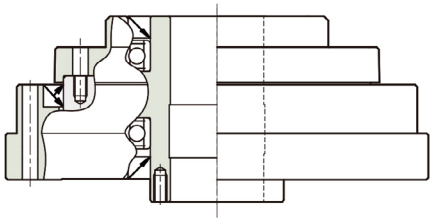
FHD flexspline with flanging ultra short tube structure. Which can be used when circular spline fixed, and the flexspline as end output. It can also used to fix the flexspline, and the circular spline as end output. The axial length of FHD-I is shortened by 50%, FHD-III is shortened by 15% without changing product performance.

Application

- **Humanoid robot**
- **Semiconductor manufacturing equipment**
- **FPD manufacturing equipment**
- **Industrial robot**
- **Space equipment**

Unit type structure of FHD





TECHNICAL DATA OF FHD

Rating table of FHD

Model	Reduction ratio	Rated torque at input 2000r/min	Permissible peak torque at start/stop	Permissible max. value of ave.load torque	Instantaneous permissible max. torque	Permissible max. input rotational speed Grease lubricant	Permissible ave. input rotational speed Grease lubricant	Backlash	Weight	Design life
		N·m	N·m	N·m	N·m	r/min	r/min	Arc Sec	kg	Hour
8	50	1.25	2.3	1.6	4.6	8500	3500	≤40	0.06	9000
	100	1.65	3.3	2.3	6.3					10000
11	50	2.4	5.8	3.5	11.5	8000	3500	≤30	0.13	9000
	100	3.5	7.7	6.2	17.5					10000
14	50	3.7	12	4.8	23	8500	3500	≤20	FHD-I:0.34 FHD-III:0.64	9000
	80	5.4	16	7.7	35					10000
	100	5.4	19	7.7	35					10000
17	50	11	23	18	48	7300	3500	≤20	FHD-I:0.42 FHD-III:0.87	9000
	80	15	29	19	61					10000
	100	16	37	27	71					10000
20	50	17	39	24	69	6500	3500	≤20	FHD-I:0.54 FHD-III:1.14	9000
	80	24	51	33	89					10000
	100	28	57	34	95					10000
25	50	27	69	38	127	5600	3500	≤20	FHD-I:0.95 FHD-III:1.75	9000
	80	44	96	60	179					10000
	100	47	110	75	184					10000
32	50	53	151	75	268	4800	3500	≤20	FHD-I:1.90 FHD-III:3.56	9000
	80	83	213	117	398					10000
	100	96	233	151	420					10000

Transmission accuracy

unit: arc min

Type / Reduction ratio	14	17	20	25	32
above 50	1.5	1.5	1	1	1

Hysteresis loss

unit: arc min

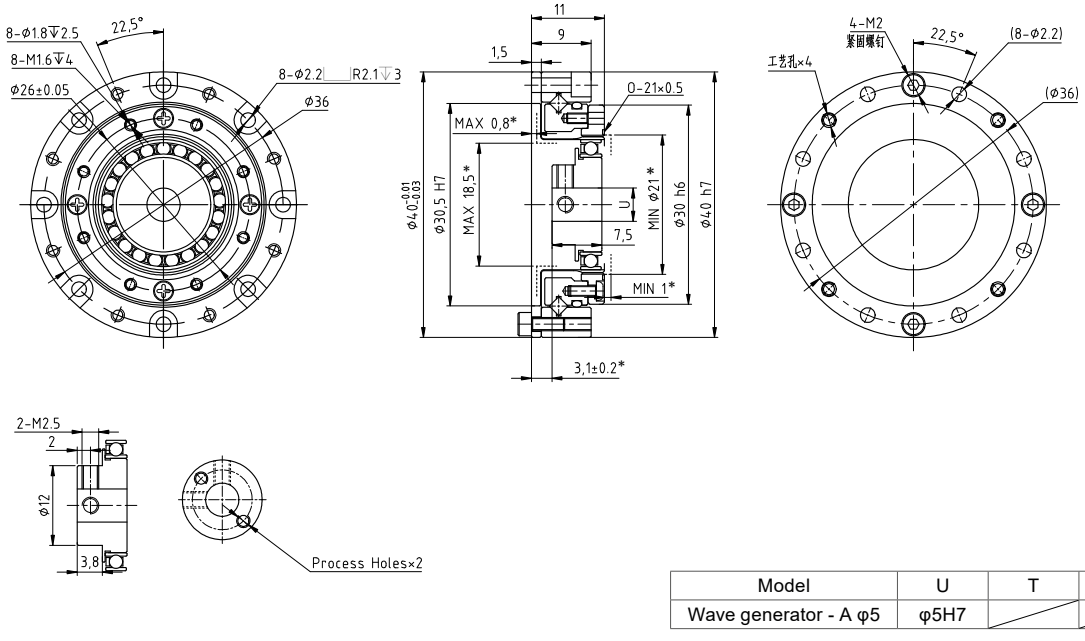
Type / Reduction ratio	14	17	20	25	32
50	2.5	2	2	2	2
above 80	2	1	1	1	1

Torsional stiffness

Project		Unit / Model	14	17	20	25	32
T1		N·m	2	3.9	7	14	29
T2		N·m	6.9	12	25	48	108
Reduction 50	K1	× 10^4 N·m/rad	0.29	0.67	1.1	2	4.7
	K2	× 10^4 N·m/rad	0.37	0.88	1.3	2.7	6.1
	K3	× 10^4 N·m/rad	0.47	1.2	2	3.7	8.4
Reduction ratio above 80	K1	× 10^4 N·m/rad	0.4	0.84	1.3	2.7	6.1
	K2	× 10^4 N·m/rad	0.44	0.94	1.7	3.7	7.8
	K3	× 10^4 N·m/rad	0.61	1.3	2.5	4.7	11

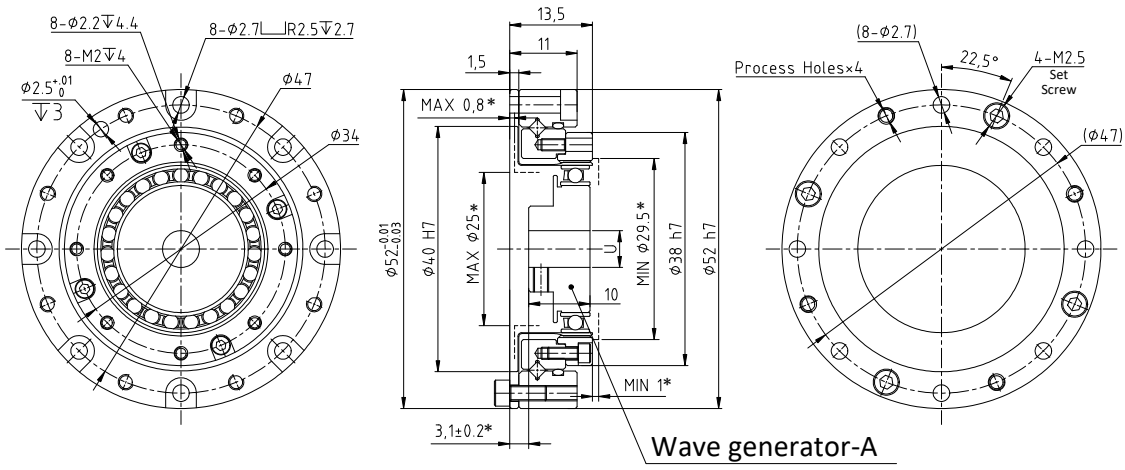
OUTLINE DRAWING

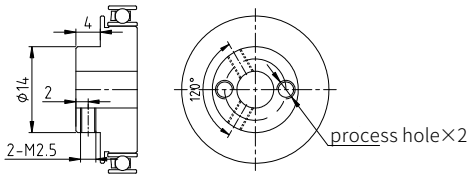
FHD-8-XX-U-I



Model	U	T	W
Wave generator - A φ5	φ5H7		

FHD-11-XX-U-I



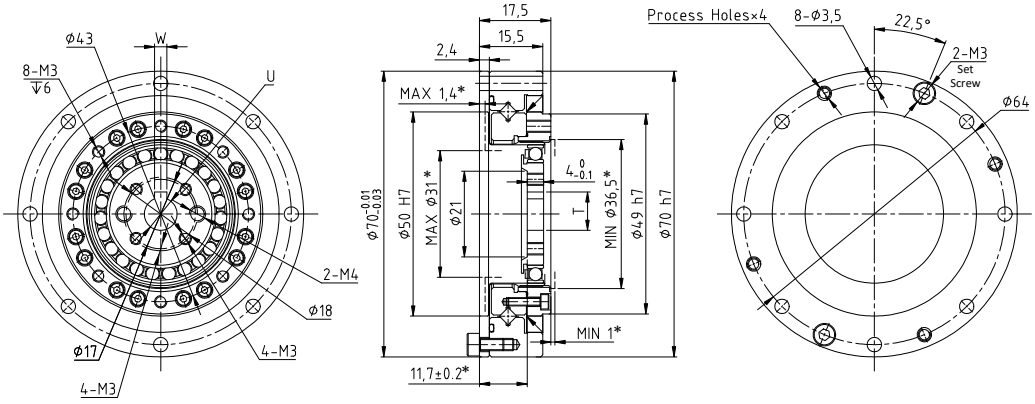


Model	U	T	W
Wave generator - A φ5	φ5H7		
Wave generator - A φ6	φ6H7		

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
8	50	1.25	0.13	2.3	0.23	1.6	0.16	4.6	0.47	8000	3500	≤40	0.06	9000
	100	1.65	0.17	3.3	0.34	2.3	0.23	6.3	0.64					10000
11	50	2.4	0.24	5.8	0.59	3.5	0.36	11.5	1.17	8000	3500	≤30	0.13	9000
	100	3.5	0.36	7.7	0.79	6.2	0.63	17.5	1.79					10000

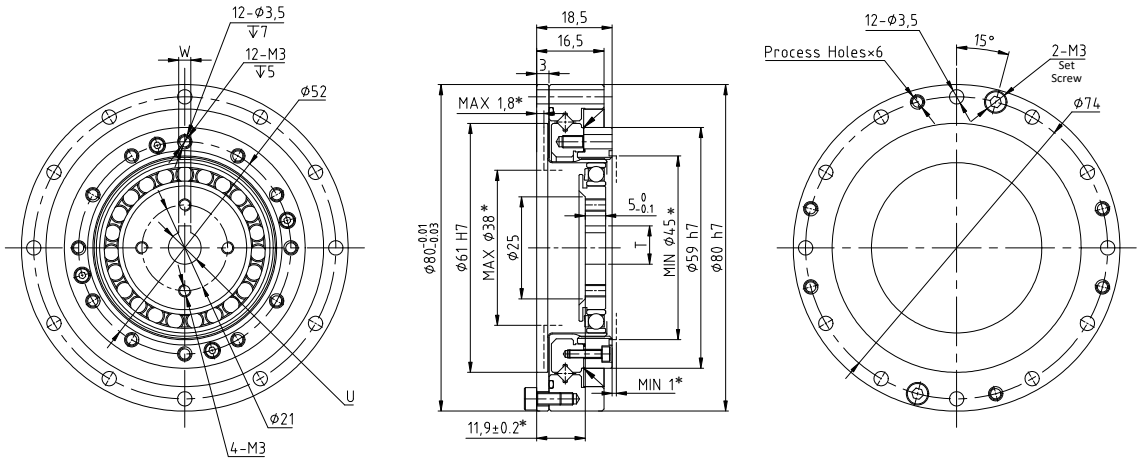
OUTLINE DRAWING

FHD-14-XX-U-I



Model	U	T	W
Wave generator - A φ6	φ6H7	$7^{+0.1}_{0}$	2JS9/P9
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9
Wave generator - A φ11	φ11H7		

FHD-17-XX-U-I

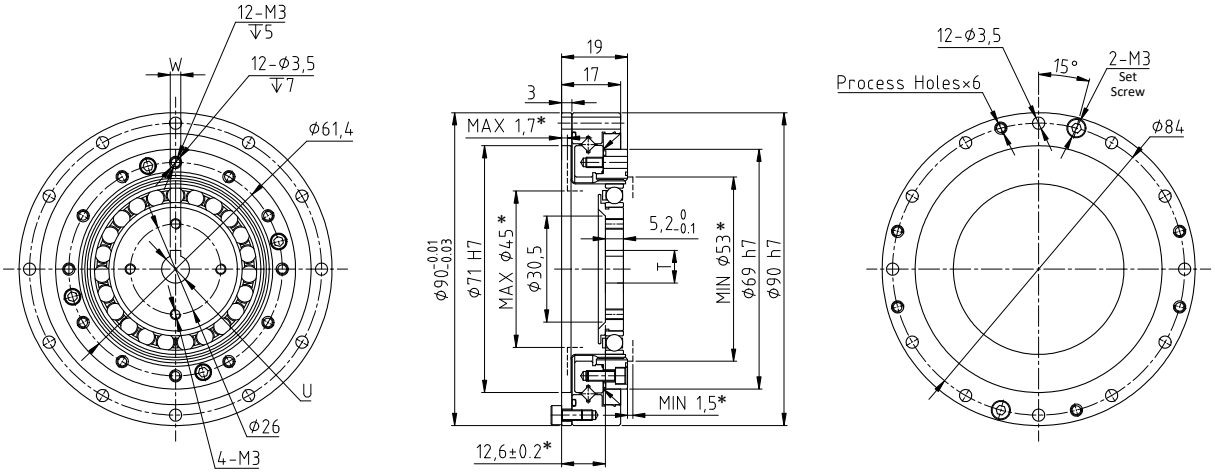


Model	U	T	W
Wave generator - A φ6	φ6H7	$7^{+0.1}_{0}$	2JS9/P9
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9
Wave generator - A φ11	φ11H7		
Wave generator - A φ15	φ15H7		

Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
14	50	3.7	0.38	12	1.2	4.8	0.49	24	2.4	8500	3500	≤20	0.34	9000
	80	5.4	0.55	16	1.6	7.7	0.79	35	3.6					10000
	100	5.4	0.55	19	1.9	7.7	0.79	35	3.6					10000
17	50	11	1.1	23	2.3	18	1.8	48	4.9	7300	3500	≤20	0.42	9000
	80	15	1.5	29	3	19	1.9	61	6.2					10000
	100	16	1.6	37	3.8	27	2.8	71	7.2					10000

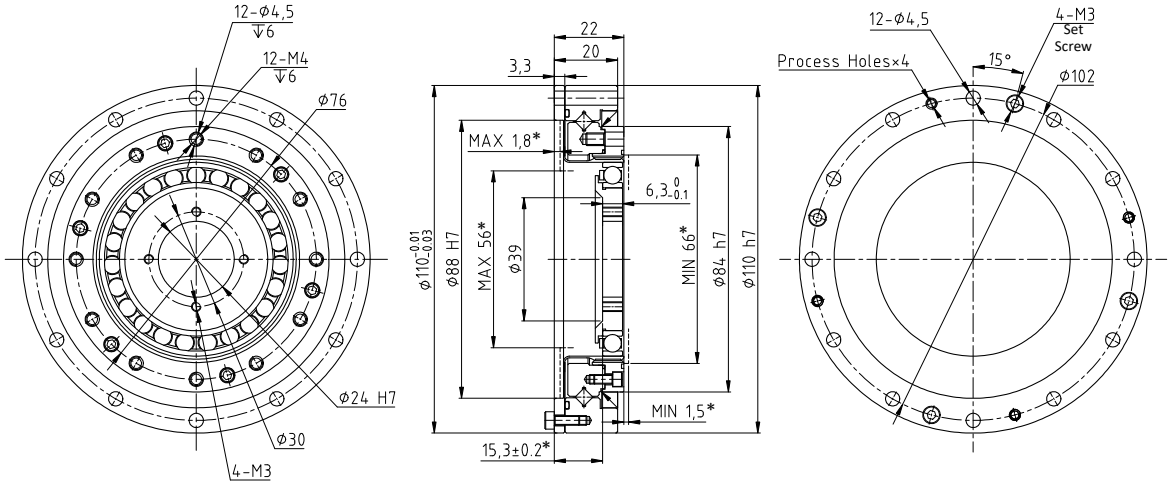
OUTLINE DRAWING

FHD-20-XX-U-I



Model	U	T	W
Wave generator - A φ8	φ8H7	$9.4^{+0.1}_{0}$	3JS9/P9
Wave generator - A φ20	φ20H7		

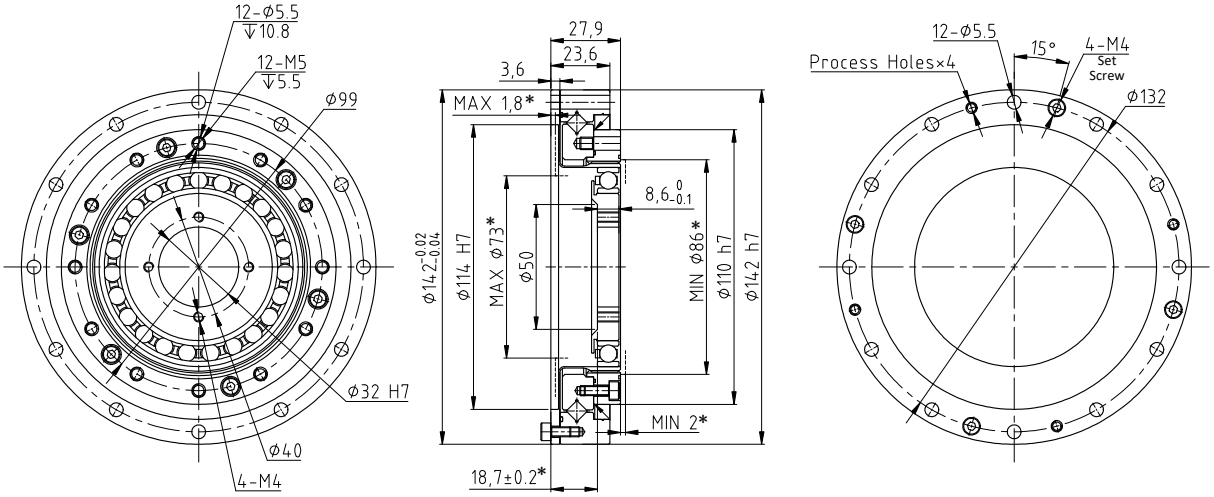
FHD-25-XX-U-I



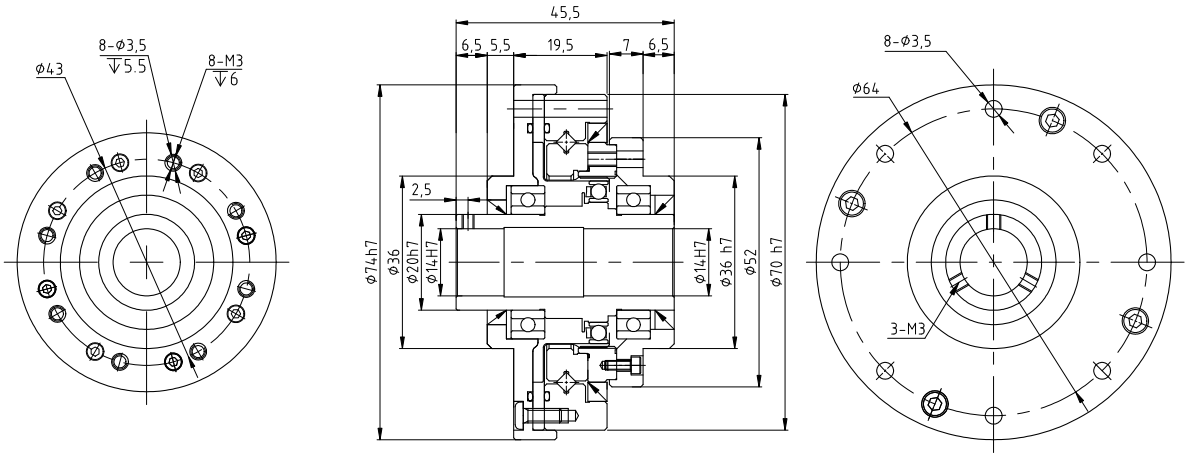
Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
20	50	17	1.7	39	4	24	2.4	69	7	6500	3500	≤20	0.54	9000
	80	24	2.4	51	5.2	33	3.4	89	9.1					10000
	100	28	2.9	57	5.8	34	3.5	95	9.7					10000
25	50	27	2.8	69	7	38	3.9	127	13	5600	3500	≤20	0.95	9000
	80	44	4.5	96	9.8	60	6.1	179	18					10000
	100	47	4.8	110	11	75	7.6	184	19					10000

OUTLINE DRAWING

FHD-32-XX-U-I



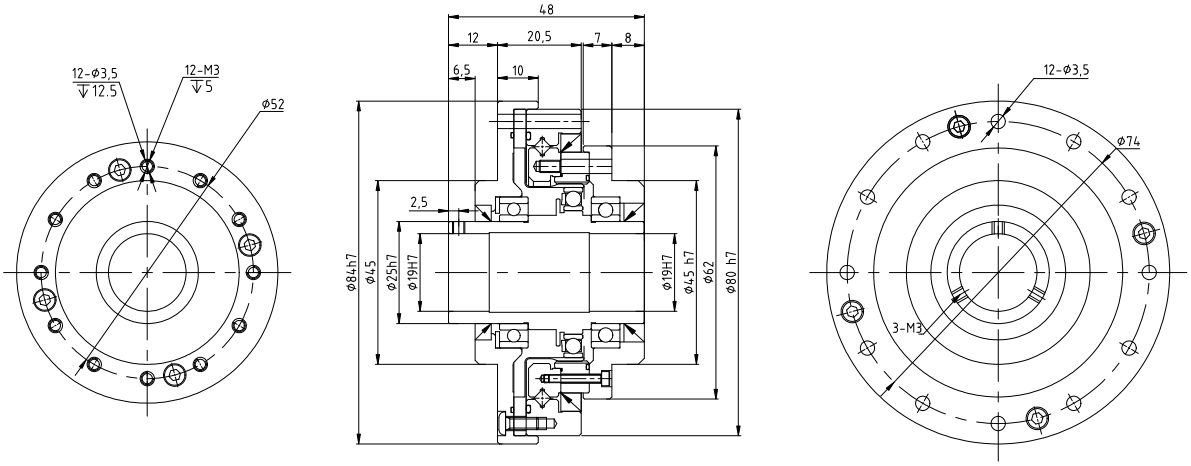
FHD-14-XX-U-III



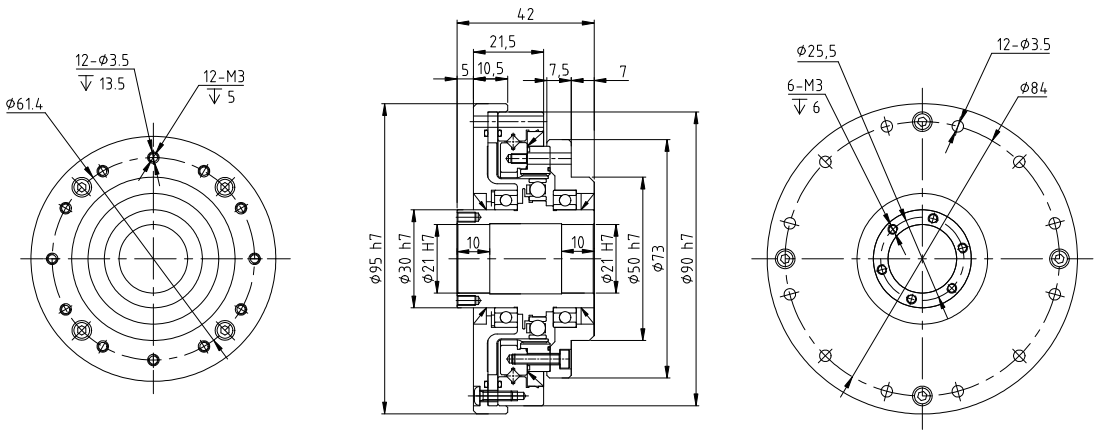
Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
32	50	53	5.4	151	15	75	7.6	268	27	4800	3500	≤20	1.9	9000
	80	83	8.5	213	22	117	12	398	41					10000
	100	96	9.8	233	24	151	15	420	43					10000
14	50	3.7	0.38	12	1.2	4.8	0.49	24	2.4	8500	3500	≤20	0.64	9000
	80	5.4	0.55	16	1.6	7.7	0.79	35	3.6					10000
	100	5.4	0.55	19	1.9	7.7	0.79	35	3.6					10000

OUTLINE DRAWING

FHD-17-XX-U-III



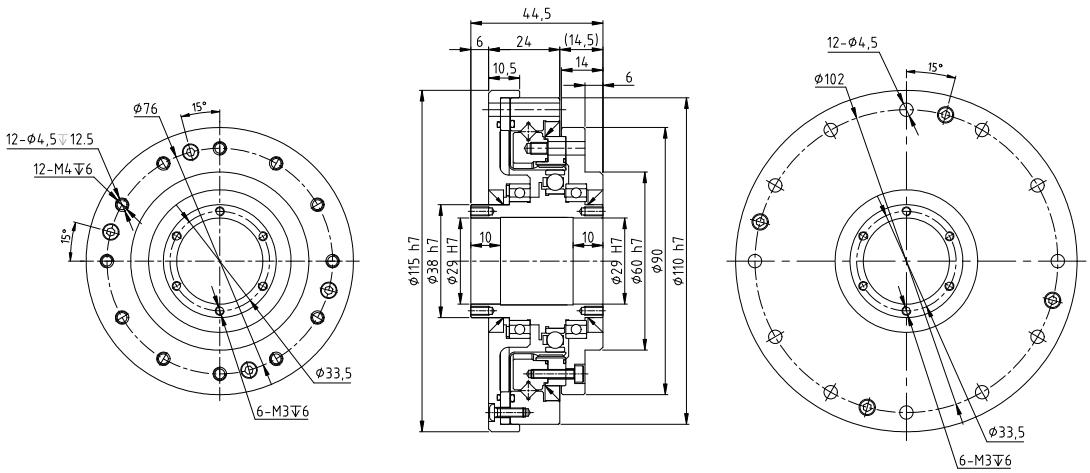
FHD-20-XX-U-III



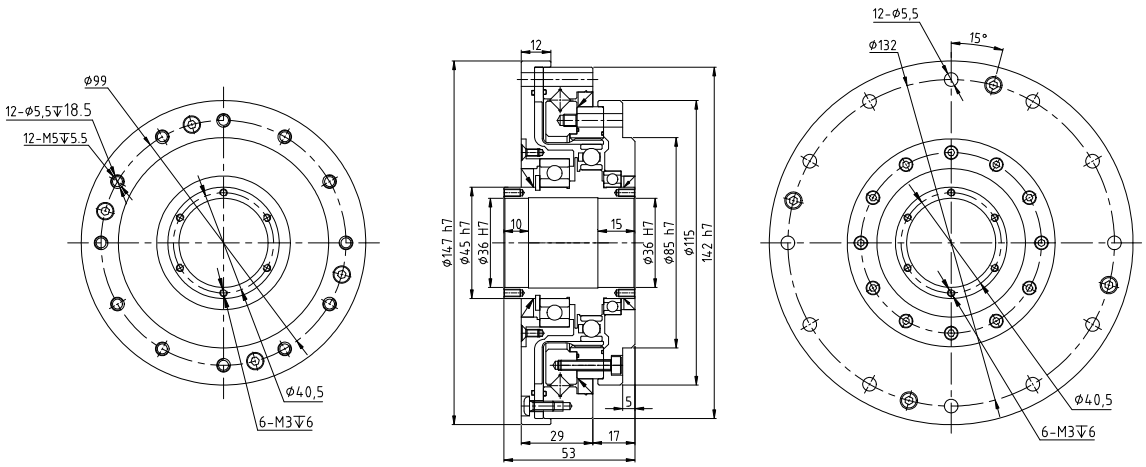
Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
17	50	11	1.1	23	2.3	18	1.8	48	4.9	7300	3500	≤20	0.87	9000
	80	15	1.5	29	3	19	1.9	61	6.2					10000
	100	16	1.6	37	3.8	27	2.8	71	7.2					10000
20	50	17	1.7	39	4	24	2.4	69	7	6500	3500	≤20	1.14	9000
	80	24	2.4	51	5.2	33	3.4	89	9.1					10000
	100	28	2.9	57	5.8	34	3.5	95	9.7					10000

OUTLINE DRAWING

FHD-25-XX-U-III



FHD-32-XX-U-III



Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash	Weight	Design life
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec	kg	Hour
25	50	27	2.8	69	7	38	3.9	127	13	5600	3500	≤20	1.75	9000
	80	44	4.5	96	9.8	60	6.1	179	18					10000
	100	47	4.8	110	11	75	7.6	184	19					10000
32	50	53	5.4	151	15	75	7.6	268	27	4800	3500	≤20	3.56	9000
	80	83	8.5	213	22	117	12	398	41					10000
	100	96	9.8	233	24	151	15	420	43					10000



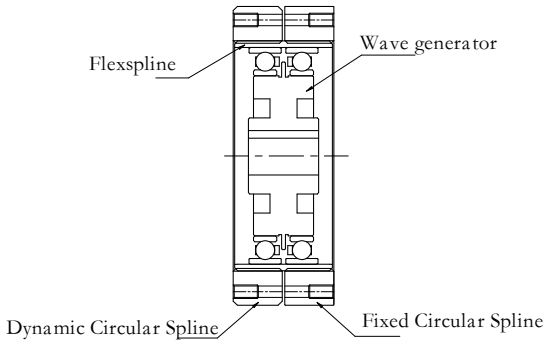
FB 系列

INTRODUCTION OF FB SERIES



FBS-C

Structure of FBS



FB Series

FBS-C

With the FB tooth profile, the FBS-U-C provides roughly a 15% higher load-bearing capacity than standard profiles, making it well-suited for demanding dynamic loads and ensuring the reducer maintains optimal performance in any operating environment.

Application

- Humanoid Robot
- Medical Machine
- Precision CNC Machine
- Industrial Robot

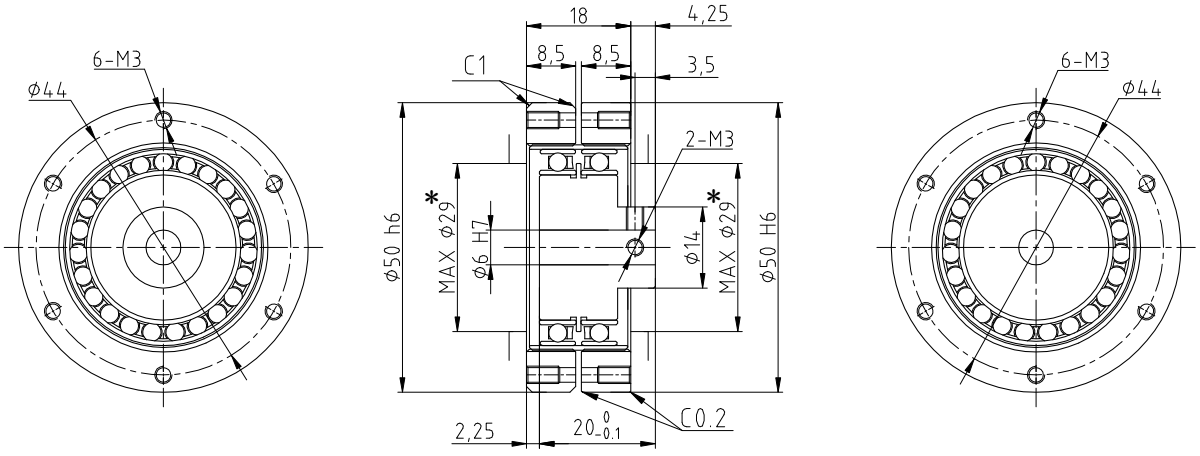
TECHNICAL DATA OF FBS

Rating table of FBS-C-I

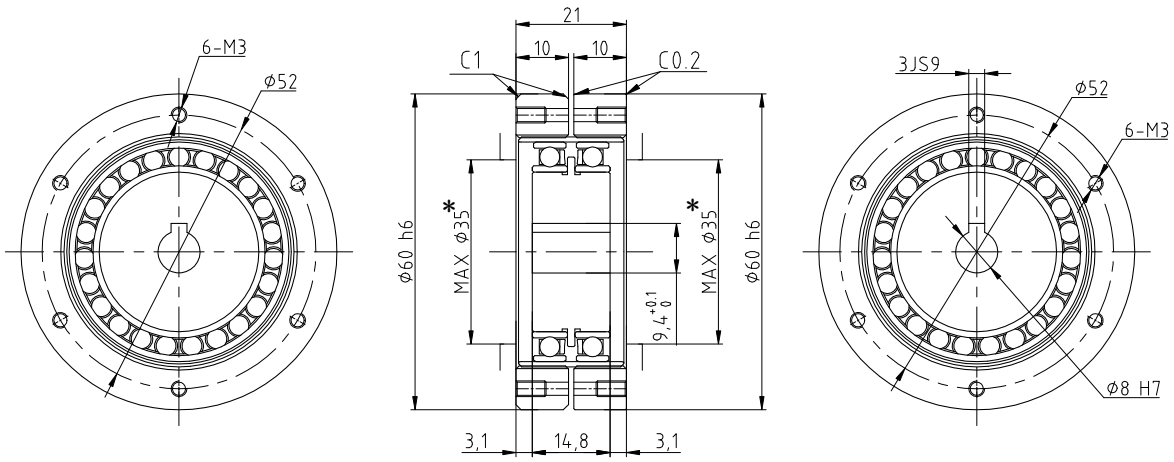
Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec
11	50	3.5	0.36	8.3	0.85	5.5	0.56	17	1.7	3600	2500	⩽40
	80	5	0.51	11	1.12	8.9	0.91	25	2.55			
	100	5	0.51	11	1.1	8.9	0.91	25	2.6			
14	50	5.4	0.55	18	1.8	6.9	0.7	35	3.6	3600	2500	⩽40
	80	7.8	0.8	23	2.4	11	1.1	47	4.8			
	100	7.8	0.8	28	2.9	11	1.1	54	5.5			
17	50	16	1.6	34	3.5	26	2.6	70	7.1	3600	2500	⩽40
	80	22	2.2	43	4.4	27	2.7	87	8.9			
	100	24	2.4	54	5.5	39	4	108	11			
20	50	25	2.5	56	5.7	34	3.5	98	10	3600	2500	⩽40
	80	34	3.5	74	7.5	47	4.8	127	13			
	100	40	4.1	82	8.4	49	5	147	15			
25	50	39	4	98	10	55	5.6	186	19	3600	2500	⩽40
	80	63	6.4	137	14	87	8.9	255	26			
	100	67	6.8	157	16	108	11	284	29			
32	50	76	7.8	216	22	108	11	382	39	3600	2300	⩽40
	80	118	12	304	31	167	17	568	58			
	100	137	14	333	34	216	22	647	66			

OUTLINE DRAWING

FBS-14-XX-C-I



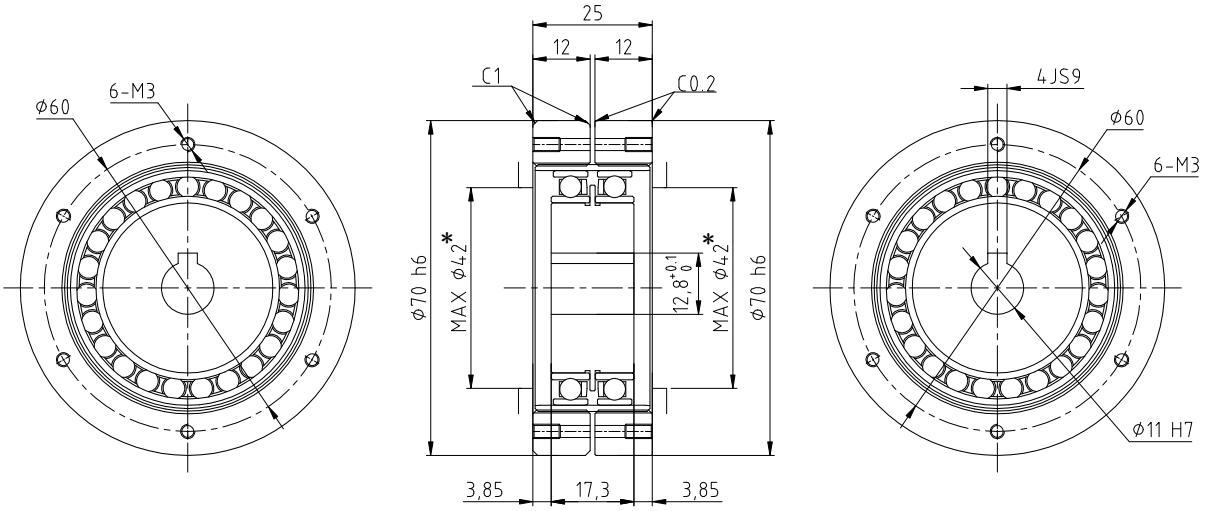
FBS-17-XX-C-I



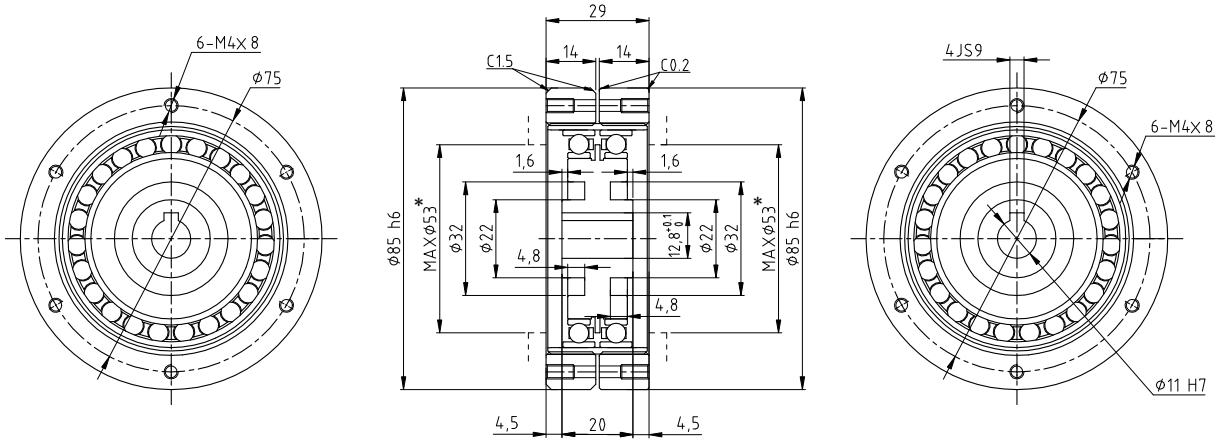
Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec
14	50	5.4	0.55	18	1.8	6.9	0.7	35	3.6	3600	2500	⩽40
	80	7.8	0.8	23	2.4	11	1.1	47	4.8			
	100	7.8	0.8	28	2.9	11	1.1	54	5.5			
17	50	16	1.6	34	3.5	26	2.6	70	7.1	8500	3500	⩽30
	80	22	2.2	43	4.4	27	2.7	87	8.9			
	100	24	2.4	54	5.5	39	4	108	11			

OUTLINE DRAWING

FBS-20-XX-C-I



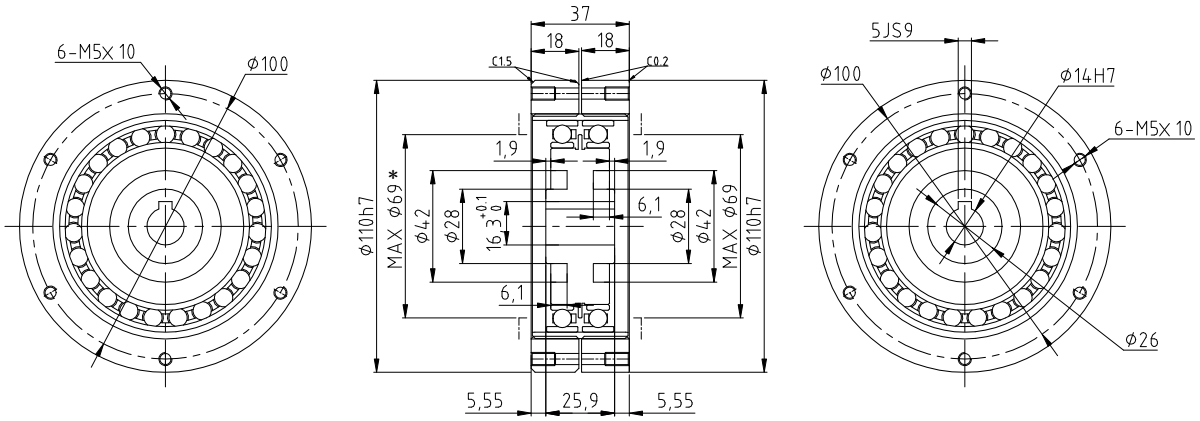
FBS-25-XX-C-I



Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec
20	50	25	2.5	56	5.7	34	3.5	98	10	3600	2500	⩽40
	80	34	3.5	74	7.5	47	4.8	127	13			
	100	40	4.1	82	8.4	49	5	147	15			
25	50	39	4	98	10	55	5.6	186	19	3600	2500	⩽40
	80	63	6.4	137	14	87	8.9	255	26			
	100	67	6.8	157	16	108	11	284	29			

OUTLINE DRAWING

FBS-32-XX-C-I



Model	Reduction ratio	Rated torque at input 2000r/min		Permissible peak torque at start/stop		Permissible max. value of ave.load torque		Instantaneous permissible max. torque		Permissible max. input rotational speed	Permissible ave. input rotational speed	Backlash
		N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	N·m	Kgf·m	r/min	r/min	Arc Sec
32	50	76	7.8	216	22	108	11	382	39	3600	2300	⩽40
	80	118	12	304	31	167	17	568	58			
	100	137	14	333	34	216	22	647	66			

Others

WARRANTY

Regulations of warranty period and warranty scope of Laifual Drive as follows:

Warranty period

Under the condition that the products are handled, used and maintained properly, all the products are warranted against defects in workmanship and materials for the shorter period of either one year after delivery or 2,000 hours of operation time.

Warranty scope

Our company is responsible for maintenance or replacement of the product when malfunction resulting from manufacturing defect under warranty period. However, following situations are out of warranty scope.

1. Damage results from unsuitable operation or illegal use by clients.
2. Damage results from modification or repair that is not carried out by our company.
3. Damage not caused by the product.
4. Damage results from natural disaster and the like but not the responsibility of our company. What's more, the warranty mentioned here is only for our product.

The warranty terms are only valid for Laifual products.

Laifual shall not be liable for consequential damages of others equipment cause by the defective products. and shall not be liable for the incidental and consequential expenses and the labor costs for detaching and installing to the driven equipment.

TRADEMARK

The following trademarks have been registered in China

Laifual

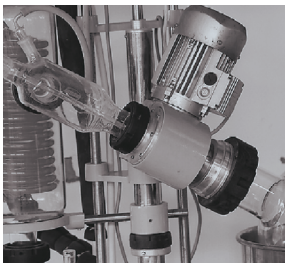
APPLICATION



Metal Working Machine



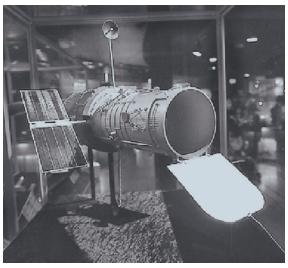
Processing Machines



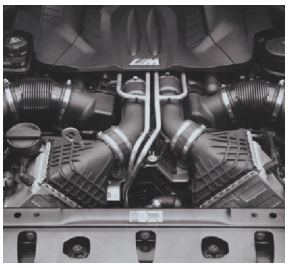
Measurement, Analytical and Test Systems



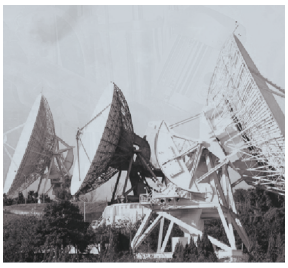
Medical Equipment



Medical Equipment



Energy



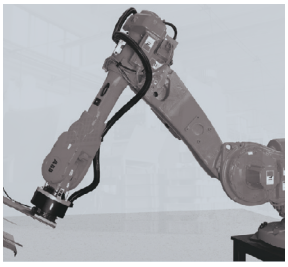
Communication Equipment



Crating and Packaging Machines



Space Equipment



Robots



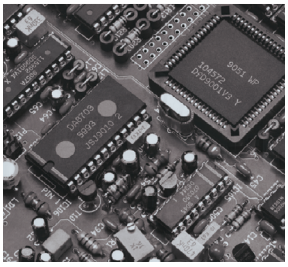
Humanoid Robots



Glass and Ceramic Manufacturing Systems



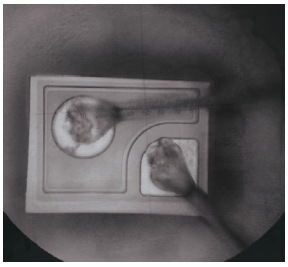
Printing, Bookbinding and Paper



Printed Circuit Board Manufacturing Machines



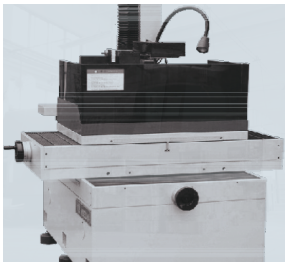
Aircraft



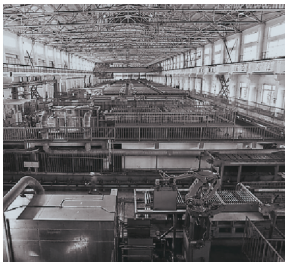
Semiconductor Manufacturing Systems



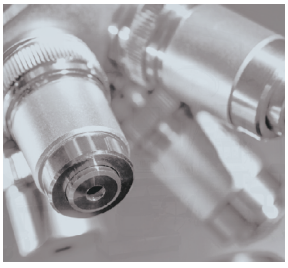
Flat Panel Display Manufacturing Systems



Wood, Light Metal and Plastic Machine Tools



Manufacturing Machine



Optical Machines

SAFE USE

Warning Means that improper use or handling could result in a risk of death or serious injury

Caution Means that improper use or handling could result in a risk of death or serious injury

Application restriction: This product cannot be used for the following applications:

- Space flight facility
- Aircraft equipment
- Nuclear power equipment
- Equipment and apparatus used in domestic homes
- Vacuum equipment
- Automotive equipment
- Personal recreation equipment
- Equipment that directly works on human bodies
- Equipment for transport of humans
- Equipment for use in a special environment

Please consult with our authorized distributor in advance for applications mentioned above

Fail-safe devices that prevent an accident must be designed into the equipment when the products are used in any equipment that could result in personal injury or damage to property in the event of product failure.

Design Precaution: Be certain to read the catalog when designing the equipment

Caution

Use only in the proper environment
Please ensure to comply with the following environmental conditions:
- Ambient temperature 0-40°C.
- No splashing of water or oil.
- Do not expose to corrosive or explosive gas.
- No dust such as metal powder.

Caution

Install the equipment properly
- Carry out the assembly and installation precisely as specified in the catalog.
- Observe our recommended fastening methods (including bolts used and tightening torques). Improper assembly may cause problems such as vibration,reduction in life,deterioration of precision and product failure in operation.

Caution

Install the equipment with the required precision
- Please design and assemble parts correctly, to ensure the recommended installation accuracy in the catalog.
- Failure to hold the recommended tolerances may cause problems such as vibration, reduction in life, deterioration of precision and product failure.

Caution

Use the specified lubricant
- It may reduce the tifespan of the productif not using the greasei by we recommend .Replace the lubricant as recommended.
- The complete units are factory lubricated. Do not mix with Others kinds of grease.

Precautions for use: Be sure to read the catalog when operating

Caution

Please take the product and parts carefully
- Please do not use a hammer etc to strike all parts and assembly units forcefully. In addition, please make sure fissure and scars won't be taken place because of Filling down etc. Otherswise it will lead to damage.
- The performance cannot be guaranteed when is used under the condition of damage. It might lead to failures like damage etc.

Caution

Please do not exceed its allowable torgue when used
- Please do not exceed allowable maximum torque of first moment when exerting torque. Otherswise untight bolt, waggle and damage of buck-up part might be occurred which will lead to malfunction.
- If output shaft is directly linked to articulated arm etc, theres 's a chance that it might be damaged because of collision of articulated arm, which the output shaft cannot not be controlled.

Caution

Please do not alter matching components
- All components of the product is made out of processing a complete set.
- Specified properties cannot be guaranteed when using it with others sets.

Caution

Please do not disassemble combo products
- Disassembling and reassembling the combo product are strictly prohibited. Otherswise, there is no way to regain its original performance.

Usage of lubricating grease

Caution

Installation notes
An inflammation may be caused if it splashes into eyes. Please wear protective glasses etc when operation in order to keep it from the eyes.
- An inflammation may be caused if it touches the skin. Please wear protective gloves etc when operation in order to keep it from the skin.
- Please do not devour(diarrhea and vomit etc will be caused)
- Please note do not cut your finger when opening the container.
- Please wear protective gloves well.Please keep it away from children.

Treatment of waste oil and container
Regulations require the user is in duty bound to carry out treatment method.
- Please handle it properly according to relevant laws and regulations. When in doubt, please consult the authorized agent first, then handle it correctly.
- Please do not exert pressure to an empty container. By doing this may cause it fracture.
- Please do not weld, heat, trepan or trim to the container. Otherswise, it may burn up the residue inside.

Caution

Emergency management
- Once it splashes into eyes, please wash it for 15 minutes with clean water immediately and receive treatment.
- Once it touches the skin, please use the water and soap to wash it fully.
- Once it's being swallowed, please do not try hard vomiting but immediately receive the doctor's treatment.

Caution

Storage methods
- Please seal it tight after used, in order to prevent dusts and moisture etc from mixing in. Avoid direct sunlight.
- As to products with long-term inventory, make sure performance and rust protection.
- For surface treatment, please refer to the delivery figure.

About scrapping

Caution

Disposal should be carried out in accordance with the industrial waste standard.
- Please process it in accordance with industrial waste when scrapping.

20260928

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Laifual Drive Co., Ltd.