KOFON®
Drive the World

Elitewave by KOFON

Strain Wave Gear

2024 Edition

Elitewave®
by KOFON®

Strain Wave Gear

Product Catalog

Elitewave®

Elitewave® is the core sub-brand under flag of KOFON® Motion Group. The Elitewave focuses on the strain wave gear technology and manufacturing. It is dedicated to serve global automation customers with high level strain wave gear products and professional motion technical service.

The KOFON® possesses expertise for the mastery of high precision motion control technologies. The company group esbalished in 2010.
Now it employs over 950 staffs worldwide. We focus on the development, manufacturing and sales of the high precison planetary gearbox, strain wave gear, spiral bevel gearbox, planetary roller screw and KGV solutions. Our reliable competence industry including high precision machine tools, intelligent logistic systems, robotics and new energy.
Kofon Motion aim to be dedicated to serve global customers with the reliable precision motion solutions.

- The strain wave gears are the unique gearing playing important roles in the industrial and scientific technologies field like robots, semiconductor manufacturing systems, medical equipment, factory automation equipment, measuring equipment, printing machines .....
- Furthermore, the strain wave gears also offer many advantages in various applications of electro-mechanical products units that require high precision motion control.
- Kofon Motion Technology is dedicated to offering global customers high precision motion mechanical gearing solutions.

Content

The History

The strain wave gear was invented by Walton Musser in 1957. It was firstly applied in the electrically-driven wheels of the Apollo Lunar Rover. Through 60 years development, now in various applications in high level industry.

The Operational Principle

The flex-spline is slightly smaller in diameter than the circular-spline resulting in it having two fewer teeth on its outer circumference. It is held in an elliptical shape by the wave-generator and its teeth engage with the teeth of the circular-spline across the major axis of the ellipse.

When the wave-generator starts to rotate clockwise, the zone of tooth engagement travels with the major elliptical axis. When the wave- generator has turned through 180 degrees clockwise the flex-spline has regressed by one tooth relative to the circular-spline. Each turn of the wave-generator moves the flex-spline two teeth anti-clockwise relative to the circular-spline.

As its unique operational principle applying elastodynamics of metals, the strain wave gear tooth behavior can achieve free backlash motion and high positioning repeat-ability. More than 30% of all teeth engages in two locations in 180° symmetry to reach high efficiency and high torque capability.

The Components

Flex-Spline

The flex-spline is a non-rigid, thin cylindrical cup with external teeth on a slightly smaller diameter than the circular-spline. It fits over and is held in an elliptical shape by the wave-generator.

Wave-Generator

The wave-generator is a shin raced ball bearing fitted onto an elliptical cam. Normally it is mounted onto the input shaft. The output cam can be customized as per the specific application request.

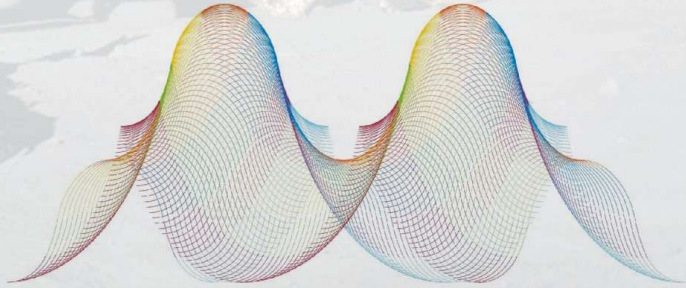
Circular-Spline

The circular-spline is a rigid ring with internal teeth, engaging the teeth of the flex-spline across the major axis of the wave-generator. The circular-spline has two more teeth than the flex-spline and is mounted onto housing.

Gearing Engagement

The New Generation Elitewave® Tooth Profile

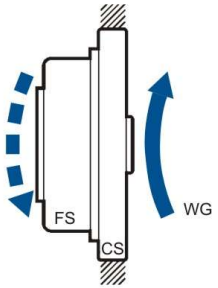
The great upgrades has been made on the last generation double arc tooth profile, there are extra more 30% teeth participate the engagement, the wave gear tooth engagement ratio be greatly improved. Furtherly the tooth engagement sliding ratio be reduced by 20%. The complete strain wave gear can reach high level service lifetime and noise control.



Driving Arrangement

Numerous differential functions can be obtained by combinations of the speed and rotational direction of the three basic elements.

Reduction Gearing System

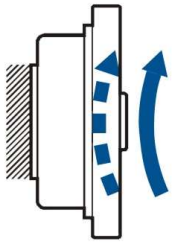


1) Reduction Gearing System
Wave-Generator (WG): Input
Circular-Spline (CS) : Fixed
Flex-Spline (FS): Output

$$i = \frac{-1}{R} = \frac{Zr\text{-}Zg}{Zr} = \frac{-2}{Zr}$$

i: ratio
Zr: FS teeth number
Zg: CS teeth number

Input and output rotate in opposite directions.

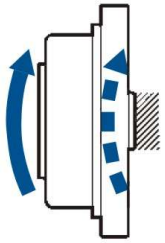


2) Reduction Gearing System
Wave-Generator (WG): Input
Circular-Spline (CS) : Output
Flex-Spline (FS): Fixed

$$i = \frac{1}{R+1} = \frac{1}{0.5Zr+1}$$

i: ratio
Zr: FS teeth number
Zg: CS teeth number

Input and output rotate in the same direction.



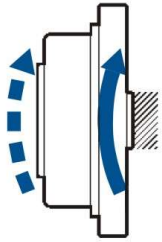
3) Reduction Gearing System
Wave-Generator (WG): Fixed
Circular-Spline (CS) : Output
Flex-Spline (FS): Input

$$i = \frac{R}{R+1} = \frac{0.5Zr}{0.5Zr+1}$$

i: ratio
Zr: FS teeth number
Zg: CS teeth number

Input and output rotate in the same direction.

Speed Increaser Gearing System

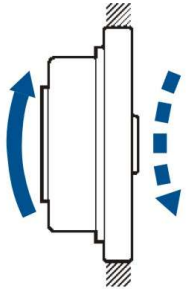


1) Speed Increaser Gearing System
Wave-Generator (WG): Fixed
Circular-Spline (CS) : Input
Flex-Spline (FS): Output

$$i = \frac{R+1}{R} = \frac{0.5Zr+1}{0.5Zr}$$

i: ratio
Zr: FS teeth number
Zg: CS teeth number

Input and output rotate in the same direction.

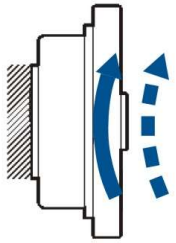


2) Speed Increaser Gearing System
Wave-Generator (WG): Output
Circular-Spline (CS) : Fixed
Flex-Spline (FS): Input

$$i = -R = 0.5Zr$$

i: ratio
Zr: FS teeth number
Zg: CS teeth number

Input and output rotate in opposite directions.



3) Speed Increaser Gearing System
Wave-Generator (WG): Output
Circular-Spline (CS) : Input
Flex-Spline (FS): Fixed

$$i = R + 1 = 0.5Zr + 1$$

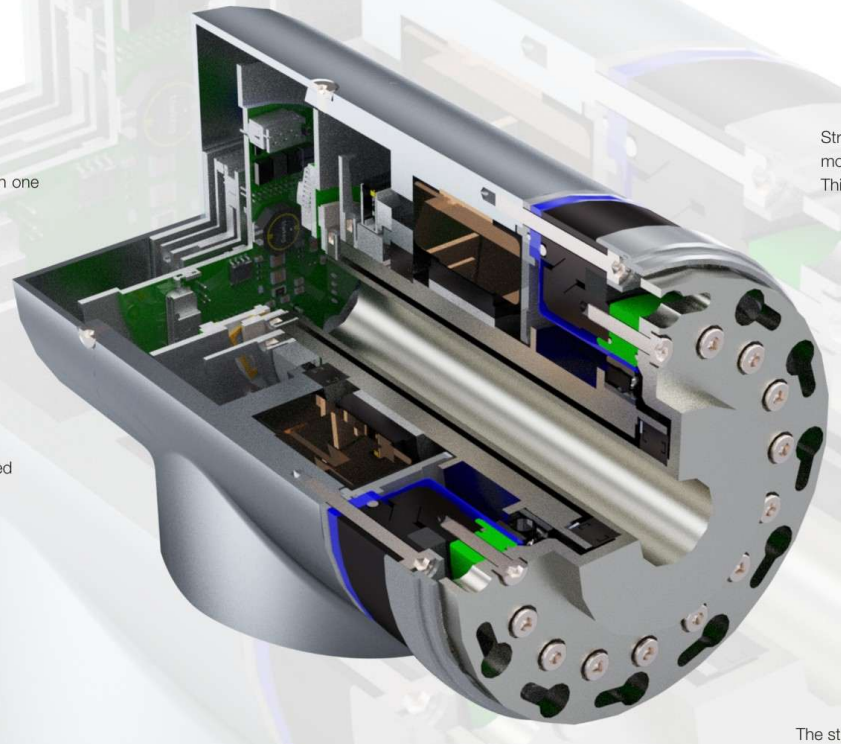
i: ratio
Zr: FS teeth number
Zg: CS teeth number

Input and output rotate in same directions.

The Advantages

Since power is transmitted through multiple tooth engagement, strain wave gear offers high output torque capacity.

Strain wave gears exhibit very high torsional stiffness over the whole torque range, as well as almost linear hysteresis behaviour.



Strain wave gear are backlash-free. Positioning accuracy can be within one arc-min. Repeatability accuracy can be within 5 arc-sec.

Strain wave gearing the teeth come in contact with an almost pure-radial motion, and have essentially zero sliding velocity, even at high input speeds. This results in minimal wear and long operating life.

Strain wave gear units are reversible and can be used for speed increase as well as speed reduction.

High efficiency is available up to 85 %.

With only three elements high single stage reduction ratios ranging from 50:1 to 320:1 can be achieved.

The strain wave gears can provide the option of a central hollow shaft which can be used to pass cables, shafts through the centre of the gear.

Industrial Applications

Robots

Machine	Applications
• Industrial robots	• Indirect drive
• Robot peripheral equipment	• Hand drive
• Collaborative robots	• Traveling shaft drive
• Scara robots	• Precision joint drive

Metal Tooling Machines

Machine	Applications
• Machining center	• Tool revolver drive
• Grinding machine	• Tool change drive
• EDM systems	• Tool Manazine drive
	• Work positioning drive
	• Rotary table drive
	• Tool positioning device drive
	• Direct transmission shaft drive
	• Other shaft drive

Printing and Paper Processing Machines

Machine	Applications
• Printing machine	• Tension controller
• Folding machine	• Cutting blad positioning device
• Paper changing machine	• Phase adjusting device
	• Paper surface/back controlling device
	• Roller position adjusting device
	• Roller height adjustment device

Semiconductor Manufacturing Systems

Machine	Applications
• Mask manufacturing equipment	• Transfer system
• Reticule manufacturing equipment	• Positioning drive
• Wafer fabrication system	• Indexing table
• Wafer processing system	• Direct transmission table
• Assembly system	• Work reversing device
• Inspection system	• Tension controller device
• Work transfer system	• Hatch open/close drive

Measurement, Analytical and Test Systems

Machine	Applications
• Photometric equipment	• Transfer system
• Three dimensional measuring instrument	• Positioning drive
• Metal tensile test machine	• Prism positioning drive
	• Indexing table
	• Work reversing device

Medical Equipments

Machine	Applications
• Medical Equipments	• Precision joint drive
• Three-dimensional manipulator	• Bed lifting drive
• X-ray photography system	• Bed inclination drive
• CT system	• Positioning table drive
• X-ray film developing machine	
• X-ray film take-off machine	
• Surgical operation assistant robot	

Optical Machines

Machine	Applications
• X-ray analytical system	• Positioning table drive
• Optical component inspection system	• Lens positioning drive
• Laser oscillation machine	• Laser mirror drive
• Optical measuring instrument	• Prism drive
• Surface inspection system	• Probe drive
• Optical disc manufacturing system	• Sensor positioning drive
• Laser marker machine	

Wood, Light Metal and Plastic Tooling Machine

Machine	Applications
• Wood working machine	• Milling head drive
• 5 axis machining center	• Tool revolver drive
• Large 3D processing machine	• Tool changer drive
• Work transfer system	• Tool magazine drive
	• Work positioning device
	• Rotray table drive
	• Tool positioning device drive
	• Direct transmission shaft drive
	• Other shaft drive

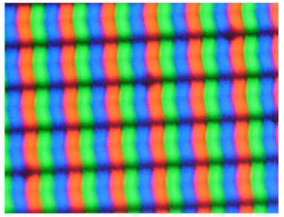
Paper Making Machine

Machine	Applications
• Paper making machine	• Coating process roller positioning drive
• Corrugated fiberboard box making machine	• Paper thickness adjusting mechanism drive
• Corrugated fiberboard box printing machine	• Cutter knife positioning
	• Cutter knife traveling drive

Crating and Packing Machines

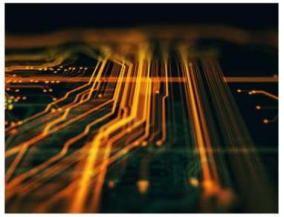
Machine	Applications
• Sealing machine	• Shaft synchronizing drive
• Label printing machine	• Roll synchronizing drive
• Label attaching machine	• Joint drive
• Packing robot	• Trolley drive
• Work transfer system	

Flat Panel Display Manufacturing Systems



Machine	Applications
• Array process equipment	• Transfer system
• Cell process equipment	• Parts positioning drive
• Assembly process equipment	• Indexing table
• Work transfer system	• Direct transmission table
	• Work reversing device
	• Tension controller
	• Hatch open/close drive
	• Joint drive
	• Trolley drive

PCB (Printed Circuit Board) Manufacturing Machines



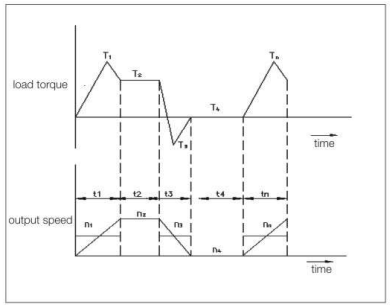
Machine	Applications
• Electronic component insertion machine	• Milling head drive
• Cream solder printing machine	• Tool revolver drive
• Dispensers	• Tool changer drive
• Board inspection systems	• Tool magazine drive
• Transfer system	• Work positioning device
	• Rotray table drive
	• Tool positioning device drive
	• Direct transmission shaft drive
	• Other shaft drive

Selection Guide

Large torque applies at the starting and stopping moment of the gear. In addition, during normal operation, there might be unexpected impact torque. In order to confirm gear size and ratio, those dynamic load torques have to be converted to an average torque.

■ Load Torque Characteristics

Calculation of average load torque and average output speed.



Calculation Instruction

Parameters:

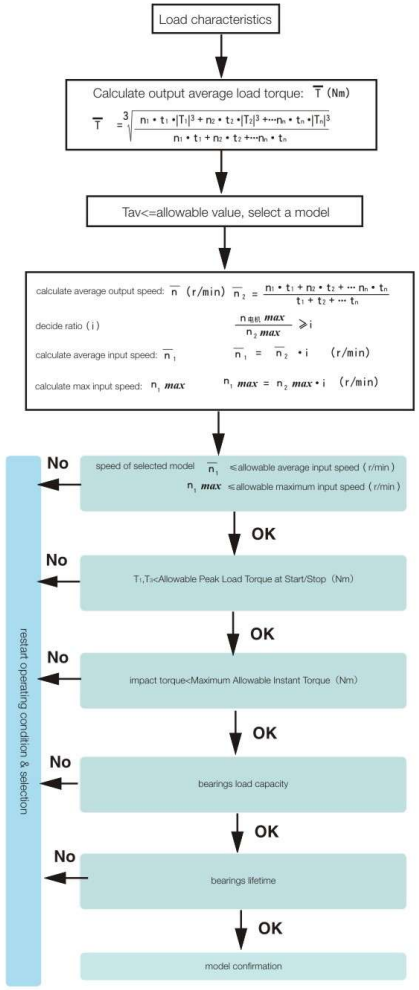
Load Torque	T_n (Nm)
Time	t_n (sec)
Output Speed	n_n (r/min)

Symbols:

Acceleration	T_1、t_1、n_1
Normal Operation	T_2、t_2、n_2
Deceleration	T_3、t_3、n_3
Dwell	T_4、t_4、n_4
Max output speed	$n_{2\,max}$
Max input speed	$n_{1\,max}$
Reduction ratio	i

■ Flow Chart of Selection

Please use the chart below for size selection.
Any parameter exceeding rated performance results in a different size or changing load torque.



Terms and Definitions

Rated Speed

Allowable continuous load torque at rated input speed of 2000r/min.

Allowable Peak Load Torque at Start/Stop

During acceleration and deceleration, due to moment of inertia of loads, additional loads larger than normal torque could apply to the gear. The allowable value of this peak torque is indicated in performance table.

Maximum Allowable Average Load Torque

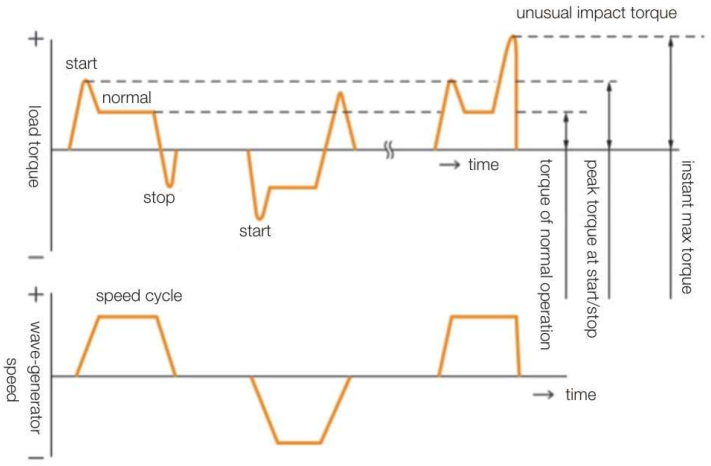
As of various load torque and input speed, an average value has to be calculated. Allowable value is indicated in performance table. Please be careful, as grease deterioration and gear wear may occur due to heat, if average value exceeds allowable maximum value.

Maximum Allowable Instant Torque

There might be external unexpected impact torque. Allowable value of this torque is indicated in performance table. Also, there is a limit of applying frequency of impact torque.

Allowable Maximum Input/Average Speed

Please note that input speed must not exceed the allowable value indicated in the performance table.



Ordering Code

KSB - HO - 14 - 50

① ② ③ ④

	Product Type	Transmission type
①Product Type	KC Assembly Type	SO Solid shaft
②Transmission type	KB Combination Type	HO Hollow type
③Gear Size	KSB Simple Combination Type	MC Motor shaft
④Gear Ratio	KCG High Torque Assembly Type	MO Motor shaft
	KBG High Torque Combination Type	HF Flange output
	KSBG High Torque Simple Combination Type	
	KBD Short Barrel Simple Combination Type	

Installation instruction

The correction of installation, use and maintenance are important parts to ensure the normal operation of mechanical equipment. Therefore, as you install the KOFON strain wave gear, please strictly follow the instructions below and use them seriously.

■ Installation Considerations

1. Strain wave gear must be installed under clean circumstances, with no dust in it to ensure its continuous operation.
2. Please make sure the tooth flank of strain and flexible bearing wave gear are well lubricated. It is not recommended for putting the tooth flank upward, which will affect the performance of lubrication.
3. Please make sure the engagement between flex-spline and circular-spline is 180 degree symmetry (Figure 1) after the installation of cam. If not (Figure 2), it will trigger vibration and damage.
4. Please run it at a low speed first (50 RPM) when the installation is finished. If there is any abnormal vibration or noise, please stop the machine and contact us in order to avoid damage caused by incorrect installation.

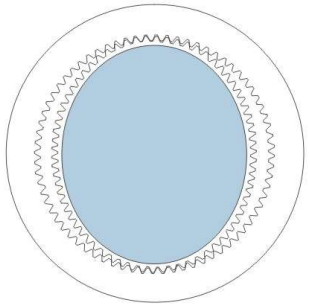


Figure 1

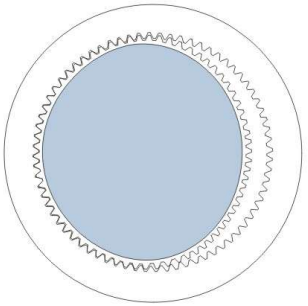
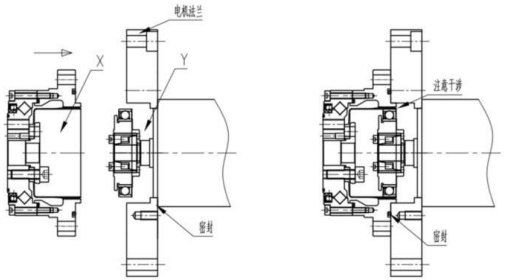


Figure 2

KB-MC Series

(circular-spline fixed, flex-spline output)



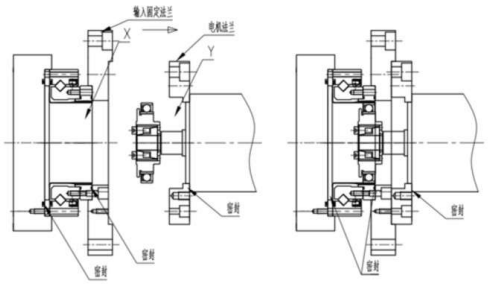
1. Grease the flexible bearing and inject 80% lubrication at X Cavity (Please use the specific grease and don't change it casually to avoid damage.) Then place the wave-generator on the input motor shaft or connecting shaft, fixed with screws and washers.
2. Grease the flex-spline in-wall first and inject grease capacity of 80% flex-spline into post flex-spline Y Cavity. According to the direction shown on the figure, install the strain wave gear. The major axis of the wave-generator should be aligned with the major axis of flexspline, and fixed with screws slightly tightly.
3. Turn on the motor at 100 RPM, and screws are locked in a crossed way to increase the corresponding clamping force in four to five times. All connecting and fixed screws should be Grade 12.9 and coated with Loctite 243 thread glue to prevent losing efficacy or loosening during operation.
4. Plane processing aligned with reducer requirements: flatness 0.01mm and axis perpendicular 0.01mm threaded hole or through hole and axis concentricity 0.1mm.

Notes

When the output terminal is always downward(not suggested), the grease flexspline inwall injected should exceed the tooth surface(the X and Y Cavity should be full with grease), or you can contact us. Please use the designated grease and don't change it to avoid damage. The installation plane between circular-spline and input terminal should be static seal to guarantee no leakage of grease during operation and prevent damage when machine is working with little grease of no grease.

KSB-MO Series

(circular-spline fixed, flex-spline output)



1. Place the strain wave gear on the input terminal, fixed with screws slightly tightly.
2. Grease the flex-spline in-wall first and inject the grease capacity of 80% flex-spline into post flexspline Y Cavity.
3. Install the wave-generator according to the direction shown on the figure. The major axis of wave-generator should be aligned with the major axis of flex-spline and rotate the wave-generator making the keyway on the cam aligned with the keyway on the input shaft. Install the key(key should be coated with Loctite 638 glue) and fix the wave-generator with screws and large washers.
4. The flexible bearing is evenly coated with grease, and 80% grease is injected into the X Cavity.
5. Turn on the motor at 100 RPM, and screws is locked in a crossed way to increase the corresponding clamping force in four to five times. All connecting and fixed screws should be Grade 12.9 and coated with Loctite 243 thread glue to prevent losing efficacy or loosening during operation
6. Refer to the step 5 to install output terminal.All connecting and fixed screws should be Grade 12.9 and coated with Loctite 243 thread glue to prevent losing efficacy or loosening during operation.
7. Plane processing aligned with reducer requirements: flatness 0.01mm and axis perpendicular 0.01mm threaded hole or through hole and axis concentricity 0.1mm.

Notes

When the output terminal is always downward(not suggested), the grease flexspline inwall injected should exceed the tooth surface(the X and Y Cavity should be full with grease), or you can contact us. Please use the designated grease and don't change it to avoid damage. The installation plane between circular-spline and input terminal should be static seal to guarantee no leakage of grease during operation and prevent damage when machine is working with little grease of no grease.

Notes for Use of Grease:

1. The input and output terminal of strain wave gear must design strictly seal mechanism. The motive seal is recommended for frame oil seals. Static seal is recommended for oring and sealant and guarantees the seal face straight and without scratch.
2. It must use specific strain wave gear grease and no mixed use of other grease.
3. The use of grease must be in accordance with the requirements of our installation instructions. Please note that the amount of grease injected and applied is different for different models.
4. If the wave-generator is always upward during the operation, it may cause insufficient lubrication. Under these circumstances, you should increase lubrication or contact with us.
5. The performance of grease will change with temperature, and the higher the temperature, the faster the deterioration. For its better condition, the thermal balance temperature of the high temperature end of the strain wave gear should be lower than 70℃, and the temperature rise should be less than 40℃.
6. The strain wave gear adopts the static seal and motive seal and the essence of it is the balance of pressure. Seal components can withstand about 0.03 mpa. The oil pressure inside the strain wave gear increases the temperature of it.
7. According to the different grease and condition, it is recommended for using grease accounting for the 50% to 70% inner space. Under the condition of no leakage, the oil should be added as much as possible to ensure it has a good lubrication effect in a long time.

The Use of Grease

Total GR2 oil, temperature range:

1-40℃(ambient temperature) The application of grease: Apply lubricant to all parts of the strain wave gear according to the following requirements.

Amount of lubricating grease applied:

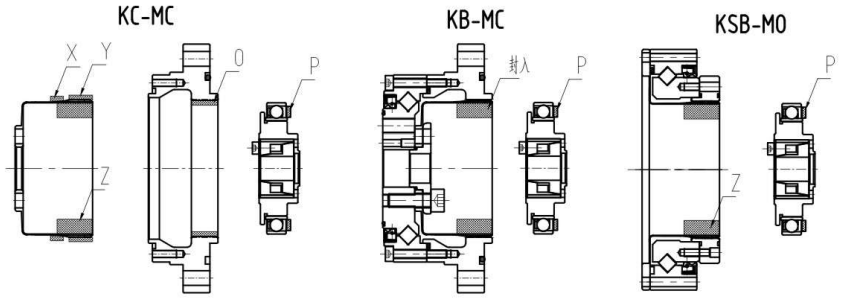
According to the strain wave gear and direction (output side is horizontal, upward,downward), change the grease amount of part Z.

Input 50% grease of motor flange space.

Please consult our company when the lubricating grease is insuf ficient due to the motorflange design.

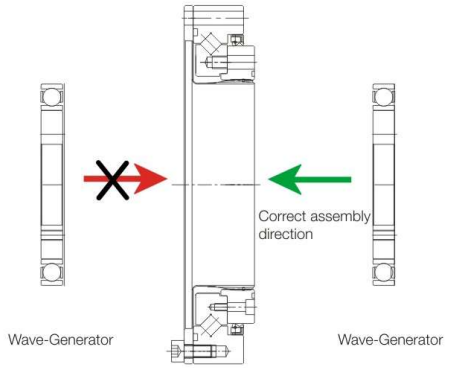
Size	Application Site						
	X	Y	Z(horizontal)	Z(upward)	Z(downward)	O	P
14	0.3	0.3	6	8	9	0.3	0.3
17	0.5	0.5	10	12	14	0.5	0.5
20	0.8	0.8	16	18	21	0.8	0.8
25	1.5	1.5	30	35	40	1.5	1.5
32	3	3	60	70	80	3	3

Lubricating grease application site



■ Correct assembly steps for simple combination models

After installing the rigid wheel and flexible wheel combination on the device, assemble the wave generator.
The wave generator should be installed from the toothed side of the flexible wheel.



(Note) Do not assemble the wave generator from the diaphragm side of the flex-spline.

■ Screws Locking Torque

Size		M3	M4	M5	M6	M8	M10
Locking torque	Nm	1.9	4.3	8.7	15	36	71

Recommended screws: Strength ≥ 12.9

KB/KBG-HO

Box Unit Hollow Shaft Open Flexspline Type
Provide G Code Reinforced Torque Type Option

Advantages

- Hollow Shaft
- High postioning and rotational accuracy
- High repeatability accuracy
- High torque
- High torsional stifiness
- High Efficiency
- Long service life

Main Applications

- Robotics
- Packing & Printing Machine
- Tooling Machine
- Medical Equipment
- Semi-Conductor

Technical Specifications

Series	Size	Ratio	Max Output Torque	Average Output Torque	Rated Output Toruqe at rated speed 2000 rpm	Emergency Stop Torque	Max input speed	Average input speed	Moment of inertia	Weight
			Nm	Nm	Nm	Nm	r/min	r/min	x10^{4}kgm^{2}	kg
KB-HO	14	50	17	6.6	5.1	33	4500	3000	0.091	0.71
		80	22	10	7.4	45				
		100	27	10	7.4	51				
	17	50	32	25	15	67	4500	3000	0.193	1
		80	41	26	21	83				
		100	51	37	23	105				
		120	51	37	23	82				
	20	50	53	32	24	93	4500	3000	0.404	1.38
		80	70	45	32	121				
		100	78	47	38	140				
		120	83	47	38	140				
		160	87	47	38	140				
	25	50	88	50	35	167	4500	3000	1.07	2.1
		80	130	83	60	242				
		100	149	103	64	270				
		120	159	103	64	289				
		160	167	103	64	298				
	32	50	205	103	72	363	4500	3000	2.85	4.5
		80	289	159	112	540				
		100	316	205	130	615				
		120	335	205	130	652				
		160	353	205	130	652				
	40	50	382	186	130	652	4500	3000	9.28	7.7
		80	493	270	196	931				
		100	540	353	252	1026				
		120	586	428	279	1121				
		160	615	428	279	1121				
	45	50	475	252	167	903	4500	3000	13.8	10.1
		80	671	371	297	1207				
		100	717	475	335	1492				
		120	782	589	382	1672				
		160	838	599	382	1815				
	50	80	894	493	353	1767	4500	3000	57.2	14.5
		100	931	633	447	1957				
		120	1026	772	503	1957				
		160	1121	801	503	2328				

Technical Specifications

Series	Size	Ratio	Max Output Torque	Average Output Torque	Rated Output Toruqe at rated speed 2000 rpm	Emergency Stop Torque	Max input speed	Average input speed	Moment of inertia	Weight
			Nm	Nm	Nm	Nm	r/min	r/min	x10⁴kgm²	kg
KBG-HO	14	50	17	6.6	5.1	33	4500	3000	0.18	0.71
		80	22	10	7.4	45				
		100	27	10	7.4	51				
	17	50	32	25	15	67	4500	3000	0.34	1
		80	41	26	21	83				
		100	51	37	23	105				
		120	51	37	23	82				
	20	50	53	32	24	93	4500	3000	0.58	1.38
		80	70	45	32	121				
		100	78	47	38	140				
		120	83	47	38	140				
		160	87	47	38	140				
	25	50	88	50	35	167	4500	3000	1.23	2.1
		80	130	83	60	242				
		100	149	103	64	270				
		120	159	103	64	289				
		160	167	103	64	298				
	32	50	205	103	72	363	4500	3000	3.66	4.5
		80	289	159	112	540				
		100	316	205	130	615				
		120	335	205	130	652				
		160	353	205	130	652				
	40	50	382	186	130	652	4500	3000	9.28	7.7
		80	493	270	196	931				
		100	540	353	252	1026				
		120	586	428	279	1121				
		160	615	428	279	1121				
	45	50	475	252	167	903	4500	3000	13.8	10.1
		80	671	371	297	1207				
		100	717	475	335	1492				
		120	782	589	382	1672				
		160	838	599	382	1815				
	50	80	894	493	353	1767	4500	3000	57.2	14.5
		100	931	633	447	1957				
		120	1026	772	503	1957				
		160	1121	801	503	2328				

KB/KBG-HO Basic performance parameters

Accuracy parameters/arc min			
Gear Size	14	17	≥20
Transmission Accuracy	<1.5	<1.5	<1
Hysteresis Accuracy	<1		
Empty	<1		
Repeat positioning accuracy	<±0.1		

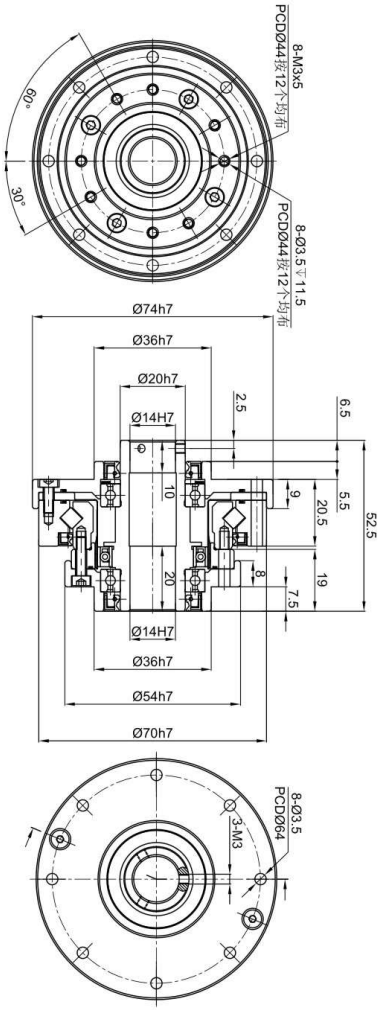
Rigidity									
Gear Size			14	17	20	25	32	40	45	50
T_1			2	3.9	7	14	29	54	76	108
T_2			6.9	12	25	48	108	196	275	382
Stiffness	i=50	T_1 x10⁴Nm/rad	0.39	0.93	1.50	2.88	6.21	11.50	17.25	23.00
		T_2 x10⁴Nm/rad	0.54	1.27	2.07	3.91	8.97	16.10	23.00	32.20
		T_3 x10⁴Nm/rad	0.63	1.43	2.53	4.84	10.78	19.80	28.60	37.40
	i>50	T_1 x10⁴Nm/rad	0.52	1.10	1.76	3.41	7.37	14.30	19.80	27.50
		T_2 x10⁴Nm/rad	0.67	1.54	2.75	5.50	12.10	22.00	31.90	44.00
		T_3 x10⁴Nm/rad	0.78	1.76	3.19	6.27	13.20	25.30	36.30	48.40

Starting Torque/cNm								
	14	17	20	25	32	40	45	50
i=50	6.5	8.1	11	18	33	49	65	103
i=80	5.6	7.5	8.9	15	25	40	55	91
i=≥100	5.2	7.1	8.2	13	21	38	51	88

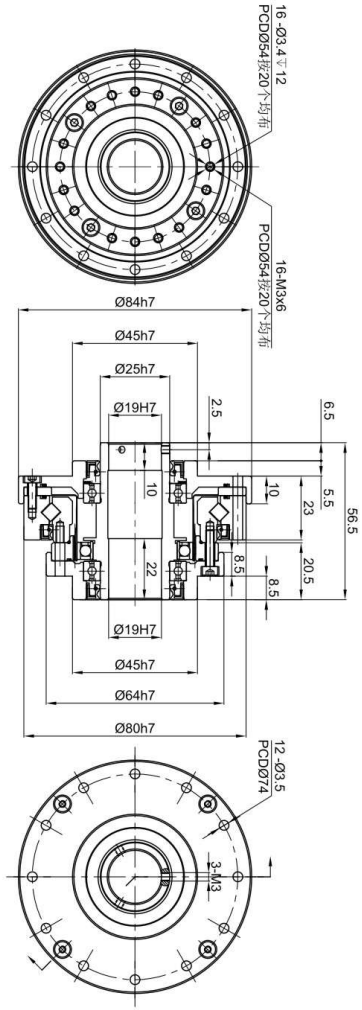
Reverse Starting Torque/Nm								
	14	17	20	25	32	40	45	50
i=50	4.6	5.8	7.9	12.9	23.6	35.0	46.4	73.6
i=80	6.4	8.6	10.2	17.1	28.6	45.7	62.9	104.0
i=100	7.4	10.1	11.7	18.6	30.0	54.3	72.9	125.7
i=120	/	12.2	14.1	22.3	36.0	65.1	87.4	150.9
i=160	/	/	18.7	29.7	48.0	86.9	116.6	201.1

Gear Dimensions

Simplicity Box KB/KBG-HO-14

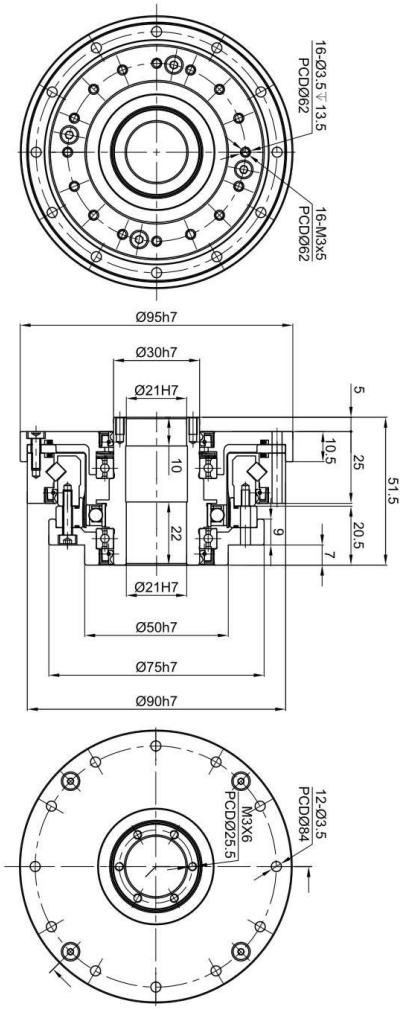


Simplicity Box KB/KBG-HO-17

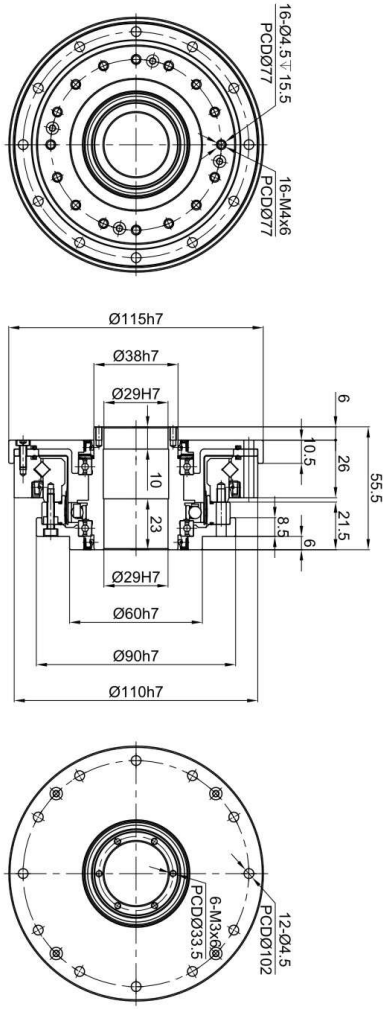


Gear Dimensions

Simplicity Box KB/KBG-HO-20

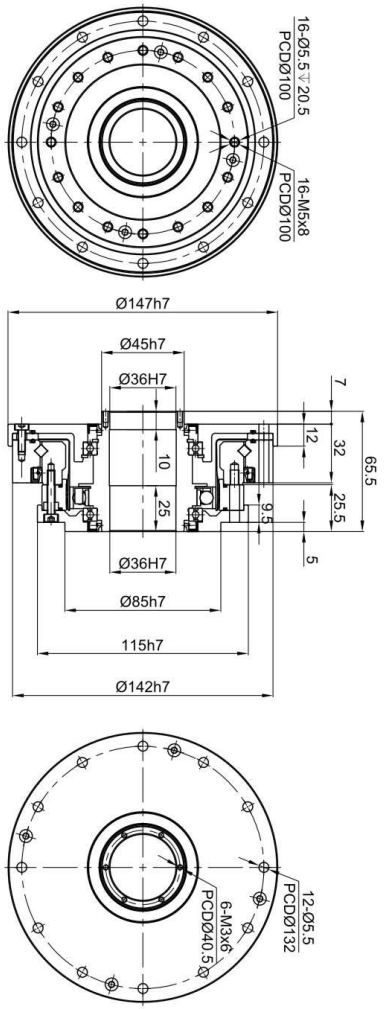


Simplicity Box KB/KBG-HO-25

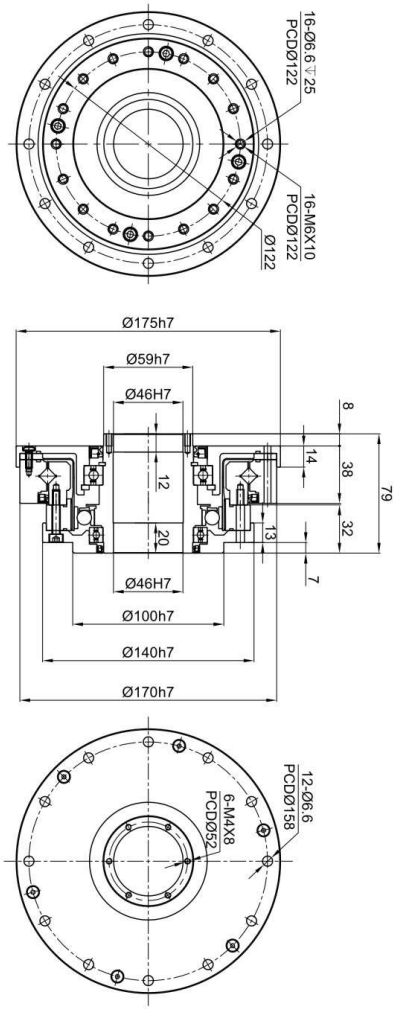


Gear Dimensions

Simplicity Box KB/KBG-HO-32

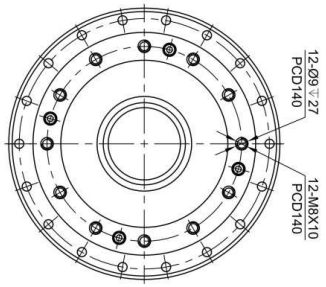


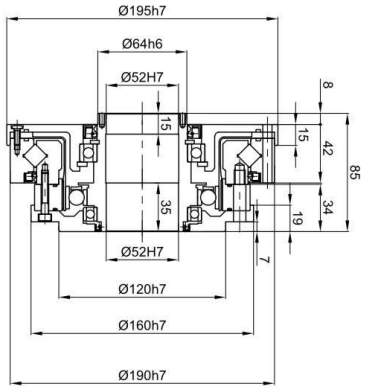
Simplicity Box KB/KBG-HO-40

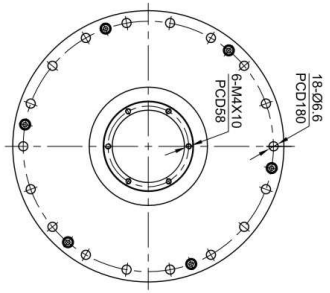


Gear Dimensions

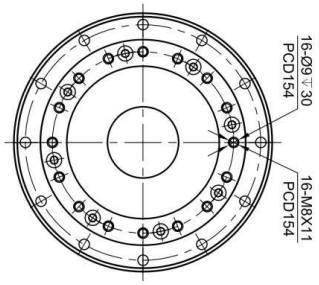
Simplicity Box KB/KBG-HO-45

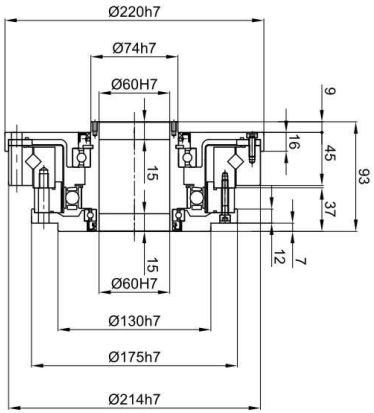


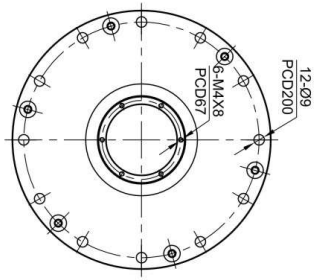




Simplicity Box KB/KBG-HO-50







Technical Memo

Technical Memo