PRECISION IN MOTION Strain Wave Gear Reducer Catalog







PRODUCT GUIDE►►►

nnovations

Unique tooth profile

circular tooth profile adopted, with meshing teeth up to 30%

High load-bearing torque

Twice the torque of the traditional involute strain wave reducer

Small sized and light weighted

The length-to-diameter ratio of the flexible gear is as high as 1/2

Productfeatures

Precision

zero side clearance, small backlash, backlash less than 10 arc seconds

Easy to replace

standardized connection Excellent versatility

Smooth transmission

M ultiple teeth engaged simultaneously for smooth motion

High transmission accuracy

Transmission error \leq 40 arcsec, backlash \leq 10 arcsec

Durable

High quality imported raw materials adopted and the specially optimized heat treatment greatly improve the service life of the reducer

Stable

Low noise, low vibration, smooth operation stable performance, safe and reliable

Product Series

Nowadays, a series of reducers based on the company's independent core technology have entered the mass production stage. we have successfully developed hundreds of strain wave reducers of different specifications and models, covering the intelligent manufacturing industry and meeting applications in different markets and fields such as industrial robots.

NS-HS-1

NS-HD-1



NS-CS-1







NS-CS-5







NS-HD-SH



NS-HS-3



NS-CD-UH

APPLICATION GUIDE ►►►

currently, there are more than 500 users of the strain wave reducers, and these products have been sold to more than ten countries including the United States, EU, Japan, and South Korea.



Aviation equipment



Industrial robot applications



Medical equipment



collaborative robots



Automation equipment



communication equipment



Principle of The Strain Wave Gear **>>>**

Strain Wave Gear (Harmonic drive) is a kind of transmission that relies on a wave generator to

generate controllable elastic deformation waves in flexible gears to achieve motion and power transmission. The strain wave reducer was born during the lunar exploration period of the United states and the soviet Union in the last century, mainly to solve the urgent need of aerospace motion agencies for reducers with compact structure, light weight, small size, large reduction ratio, high transmission efficiency and high transmission precision.



The principle of Strain Wave Gear mechanical drive was first proposed by the for soviet engineer A. M othayukin in 1947, and C. walton M usser from the United states invented the strain wave reducer in 1953 based on the needs of space

applications and obtained a U.s. patent in 1955. In 1960, the actual strain wave reducer was exhibited in New york. In 1961, strain wave reducers were introduced into China, and since then, domestic research on the design, manufacturing and application of strain wave reducers has begun. Aerospace industry powers such as the United states, Japan and Germany all have research institutes and companies specializing in space strain wave production and research.

Structure of The Strain Wave Gear Reducer



Wave generator

A thin ball bearing is embedded in the outer ring of the elliptical rotor, and the entire piece is an oval-shaped part. The inner ring of the bearing is fixed on the cam, and the outer ring is elastically deformed by the balls. It is usually installed on the input shaft.

Flexspline

It is a metal elastomer part with a thin-walled cup shape, and the outer ring of the opening is engraved with a tooth shape. The bottom of the flexspline is called the membrane and is usually mounted to the output shaft.

Rigid spline

It is a rigid circular part, and the inner side is engraved with teeth of the same as the flexspline with the number of 2 more than the flexspline. Usually mounted on the casing.

TRANSMISSION SCHEMATIC



The flexspline is bent into an elliptical shape by the wave generator, and thus meshed with the gear in the long axis part, while for the short axis part, it is completely disengaged from the gear.



Rigid spline, after the wave generator rotates in a clockwise direction, it causes the flexspline to elastically deform, and the position of the gear meshing with the rigid spline will move sequentially.



After the wave generator rotates 1800 clockwise, the flexspline only moves one tooth counterclockwise.



After the wave generator rotates one revolution (3600), since the flexspline has 2 fewer teeth than the rigid, it moves 2 teeth in the counterclockwise direction. This action is generally performed as output

TECHNICAL CHARACTERISTICS ►►►

1.High deceleration ratio

single-stage coaxial achieving a high reduction ratio from 1/30 to 1/320. simple structure with high reduction ratio.

2.Small backlash

NEWSTART Motion is different from meshing of ordinary gears, the backlash is extremely small. Thi s feature is indispensable for the application in the field of controllers.

3. High precision

M ultiple teeth are engaged simultaneously and symmetrically at 180 degrees. Therefore, the influence of gear pitch error and cumulative pitch error on rotational accuracy is relatively average, enabling the positional accuracy and rotational accuracy to reach a very high level.

4. Few components and easy installation

A high reduction ratio can be achieved by three basic components, and these components are coaxial, so the kit is easy to install and the design is simple.

5.Small sized and light weighted

The volume and weight are o nly 1/3 and 1/2 of the traditional g ear device respectively, b ut it can achieve the same torque capacity and reduction ratio, achieving miniaturization and weight reduction.

6. High torque capacity

High fatigue strength special steel adopted for the lexspline. Diferent from ordinary transmission devices, the number of teeth meshing at the same time accounts for about 30% of the total, and the meshing parts are in surface contact, so the pressure endured by each tooth is reduced, thus a high torque capacity can be obtained.

7. High efficiency

There are very little slide at the meshing part of the gear, which reducing the power loss caused by friction. Therefore, while obtaining a high reduction ratio, it can maintain high efficiency and achieve miniaturization of the driving motor.

8.Low noise

The circumferential speed at the g ear meshing point is low, and the transmission of motion force is balanced, resulting in quiet operation and minimal vibration.

Newstart Motion Industry



TERMINOLOGY OF HARMONIC DRIVE ►►►

• Starting torque

The required torque to be applied during no-load start.

. Rated torque

The continuous load torque allowed at the output end when the input speed is 2000r/min.

Maximum allowable average load

The average load value calculated based on changes in input speed and torque, which cannot exceed the rated value.

Instantaneous maximum allowable torque

The maximum allowable value of unpredictable external impact torque beyond the normal load torque and the load torque at start stop.

. Empty travel

The hysteresis of the output shaft angle when the input shaft rotates from forward to reverse in working state.

. Backlash

The slight angular displacement at the input end of the reducer when rotating clockwise and counterclockwise while fixing both the o utput end and the housing of the reducer, and applying $\pm 2\%$ of the rated torque at the input end.

Transmission error

In the working state, the difference between the actual and the theoretical rotation angle of the output shaft under the input shaft rotating in one direction.

Design lifespan

The lifespan of the reducer at an input speed of 2000r/min and an output torque of rated torque.

. Pawl torque

During the operation of the reducer, if it is subjected to excessive impact torque and the flexible wheel is not damaged, the meshing between the flexspline and the rigid spline teeth will experience a certain deviation. This phenomenon is called pawling, and the torque at this time is called pawl torque. If pawl torque occurs, the flexspline teeth will deviate unilaterally, causing abnormal gear meshing, and if the reducer continues to operate at this time, vibration will occur, leading to damage to the flexspline.

NUMBERING RULES



CLASSIFICATION OF STRAIN WAVE REDUCER

1、According to the structural of the flexspline, it can be divided into two categories: Cup shaped and hollow hat shaped. The reducer using cup shaped flexspline is represented by the capital letter C (as shown in the figure below), while for the reducer using hollow hat shaped flexspline, it is represented by the capital letter H (as shown in the figure below)



(Cup shaped)

2. Cup type and hollow type reducers are divided into two types based on the length of the flexspline: standard and Dwarf. The reducer using standard length flexspline is represented by the capital letter s, while for the reducer using dwarf flexspline is represented by the capital letter D.

 $3_{\rm c}$ Each type of reducer can be divided into standard and High torque type based on the torque it will carry. High torque is represented by G, and none identification for the standard type.



(Top Hat Type)



TYPE SELECTION►►►

The selection process of strain wave reducer models



REDUCTION RATIO AND DIRECTIONF ROTATION

Reduction ratio:

The reduction ratio of the strain wave reducer is determined by the number of teeth of the flexspline and rigid spline:

Input: wave generator Reduction rati

Output: flexspline .

Fixed: rigid spline

R" represents the reduction ratio

"1" means that the direction of the input rotation is opposite to that of the output



CS (cup type)







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$$io = \frac{-1}{R}$$



$$io = \frac{1}{R+1}$$





INPUT TYPE

According to the connection method of the input end, there are four types, namely:

Type 1: Standard type, the input shaft matches with the inner of the cam and is connected by a flat key.

Type 2: cross slider coupling, the input shaft and cam are connected by a cross slider.

Type 3: Hollow type, the input shaft is connected to the hollow cam through a synchronous wheel.

Type 4: Solid shaft input type, the input shaft is connected through a synchronous wheel.



Type 1: Standard type



Type 3: cylindrical hollow type



Type 2: cross slider coupling type



Type 4: Solid shaft input type

Hollow flanged standard cylinder structure st NS -HS 1 strain wave reducer

b Introduction to NS -HS 1 strain wave reducer

The flexspline of the NS -HS 1 series products is a hollow flanged standard cylinder structure, with a compact overall structure. The input shaft is directly matched with the inner of the wave g enerator and connected by a flat key. It can be used in the connection mode of fixing the rigid spline end and outputting the flexspline end, and can also be used in the connection mode of fixing the flexspline end and outputting the rigid spline end.

Performance parameter table of NS -HS 1 typestrain wave reducer

Model\ Items	Reducti on ratio	Rated torque at 2000 rpm input	Maximum allowable torque when starting and stopping	Maximum allowable torque at average load	Instantan eous maximum allowable torque	Maximum allowable input speed (grease)	Allowable average input speed (grease)	Backlash	Design lifespan
		NM	NM	NM	NM	RPM	RPM	Arc Sec	Hours
	50	5.4	18	6.9	35			≤30	>10000
14	80	7.8	23	11	47	7500	3500	≤30	>10000
	100	7.8	28	11	54			≤30	>10000
	50	16	34	26	70		3500	≤30	>10000
17	80	22	43	27	87	7000		≤30	>10000
	100	24	54	39	110			≤30	>10000
	50	25	56	34	98	6000	3500	≤30	>10000
20	80	34	74	47	127			≤30	>10000
20	100	40	82	49	147			≤30	>10000
	120	40	87	49	147			≤30	>10000
	50	39	98	55	186			≤30	>10000
25	80	63	137	87	245	5500	2500	≤30	>10000
25	100	67	157	108	284	5500	3500	≤30	>10000
	120	67	167	108	304			≤30	>10000
	50	76	216	108	382			≤30	>10000
22	80	118	304	167	568	5000	2500	≤30	>10000
52	100	137	333	216	647		3500	≤30	>10000
	120	137	353	216	686			≤30	>10000

Model description of NS -HS 1 strain wave reducer

1.The representation method for the model of the Newstart hollow langed standardcylinder structure strain wave reducer: NS-HS - model (e.g. -14) - reduction ratio (e.g. -50) connection method (e.g. -1) , for example NS-H S-14-50-1.

2.connection method: component type; connected by lat key.

ʻain wave





















NS-HS		
Hollow flanged	standard	cv

N S - H S 2 strain wave reducer

Introduction to NS -HS 2 strain wave reducer

The flexspline of the NS -HS 2 series products is a hollow flanged standard cylinder structure, with a compact overall structure. The input shaft is connected to the inner hole of the wave generator through a cross slider coupling. It can be used in the connection mode of fixing the rigid spline end and outputting the flexspline end, and can also be used in the connection mode of fixing the flexspline end and outputting the rigid spline end.

b Performance parameter table of NS -HS 2 typestrain wave reducer

Model\ Items	Reducti on ratio	Rated torque at 2000 rpm input	Maximum allowable torque when starting and stopping	Maximum allowable torque at average load	Instantan eous maximum allowable torque	Maximum allowable input speed (grease)	Allowable average input speed (grease)	Backlash	Design lifespan
		NM	NM	NM	NM	RPM	RPM	Arc Sec	Hours
	50	5.4	18	6.9	35			≤30	>10000
14	80	7.8	23	11	47	7500	3500	≤30	>10000
	100	7.8	28	11	54	1	0.000	≤30	>10000
	50	16	34	26	70			≤30	>10000
17	80	22	43	27	87	7000	3500	≤30	>10000
	100	24	54	39	110			≤30	>10000
	50	25	56	34	98	6000	3500	≤30	>10000
20	80	34	74	47	127			≤30	>10000
20	100	40	82	49	147			≤30	>10000
	120	40	87	49	147			≤30	>10000
	50	39	98	55	186			≤30	>10000
25	80	63	137	87	245	5500	2500	≤30	>10000
25	100	67	157	108	284	5500	3500	≤30	>10000
	120	67	167	108	304			≤30	>10000
	50	76	216	108	382			≤30	>10000
22	80	118	304	167	568	5000	2500	≤30	>10000
32	100	137	333	216	647		3500	≤30	>10000
	120	137	353	216	686			≤30	>10000

Model description of NS -HS 2 strain wave reducer

1. The representation method for the model of the Newstart hollow langed standard cylinderstructure strain wave reducer: NS -HS - model (e.g. -14) - reduction ratio (e.g. -50) connection method (e.g. -2) , for example NS-HS -14-50-2.

2. connection method: component type; The input shaft is connected to the inner of the wavegenerator through a cross slider coupling.

ain wave



















NS-HS
Hollow flanged standard cylinder structure stra
NS -HS 3 strain wave reducer

Introduction to NS -HS 3 strain wave reducer

T he flexspline of NS -HS 3 series products has a hollow flanged standard cylinder structure. There is a hollow shaft with large-diameter hole in the middle of the wave generator cam. The reducer is designed with a support bearing inside, which is fully sealed and easy to install, and is very suitable for use in situations where wires need to be threaded from the center of the reducer.

> Performance parameter table of NS -HS 3 typestrain wave reducer

Model\ Items	Reducti on ratio	Rated torque at 2000 rpm input	Maximum allowable torque when starting and stopping	Maximum allowable torque at average load	Instantan eous maximum allowable torque	Maximum allowable input speed (grease)	Allowable average input speed (grease)	Backlash	Design lifespan
		NM	NM	NM	NM	RPM	RPM	Arc Sec	Hours
	50	5.4	18	6.9	35			≤30	>10000
14	80	7.8	23	11	47	7500	3500	≤30	>10000
	100	7.8	28	11	54			≤30	>10000
	50	16	34	26	70		3500	≤30	>10000
17	80	22	43	27	87	7000		≤30	>10000
	100	24	54	39	110			≤30	>10000
	50	25	56	34	98	6000	3500	≤30	>10000
20	80	34	74	47	127			≤30	>10000
20	100	40	82	49	147			≤30	>10000
	120	40	87	49	147			≤30	>10000
	50	39	98	55	186			≤30	>10000
25	80	63	137	87	245	5500	2500	≤30	>10000
25	100	67	157	108	284	5500	3500	≤30	>10000
	120	67	167	108	304			≤30	>10000
	50	76	216	108	382			≤30	>10000
22	80	118	304	167	568	5000	3500	≤30	>10000
32	100	137	333	216	647		3500	≤30	>10000
	120	137	353	216	686			≤30	>10000

Model description of NS -HS 3 strain wave reducer

for example NS -HS-14-50-3

generator cam.



- 1. The representation method for the model of the Newstart hollow langed standard cylinderstructure strain wave reducer: NS -HS model (e.g. -14) reduction ratio (e.g. -50) connection method (e.g. -3) ,
- 2. connection method: combination type; there is a hollow shaft with large hole in the middle of thewave





















NS-HS

Hollow flanged standard cylinder structure strain wave NS -HS 4 strain wave reducer

Introduction to NS -HS 4 strain wave reducer

The flexspline of NS -HS4 series products has a hollow flanged standard cylinder structure. The wave generator cam has its own input shaft. The reducer is designed with a support bearing inside, which is a fully sealed and easy to install. It is very suitable for use in situations where umbrella gears or synchronous belts need to be installed at the input end for transmission.

▶ Performance parameter table of NS -HS 4 typestrain wave reducer

Model\ Items	Reducti on ratio	Rated torque at 2000 rpm input	Maximum allowable torque when starting and stopping	Maximum allowable torque at average load	Instantan eous maximum allowable torque	Maximum allowable input speed (grease)	Allowable average input speed (grease)	Backlash	Design lifespan
		NM	NM	NM	NM	RPM	RPM	Arc Sec	Hours
	50	5.4	18	6.9	35			≤30	>10000
14	80	7.8	23	11	47	7500	3500	≤30	>10000
	100	7.8	28	11	54			≤30	>10000
	50	16	34	26	70			≤30	>10000
17	80	22	43	27	87	7000	3500	≤30	>10000
	100	24	54	39	110			≤30	>10000
	50	25	56	34	98	6000	3500	≤30	>10000
20	80	34	74	47	127			≤30	>10000
20	100	40	82	49	147			≤30	>10000
	120	40	87	49	147			≤30	>10000
	50	39	98	55	186			≤30	>10000
25	80	63	137	87	245	5500	2500	≤30	>10000
25	100	67	157	108	284	5500	3500	≤30	>10000
	120	67	167	108	304			≤30	>10000
	50	76	216	108	382			≤30	>10000
22	80	118	304	167	568	5000	3500	≤30	>10000
32	100	137	333	216	647	5000	3500	≤30	>10000
	120	137	353	216	686			≤30	>10000

Model description of NS -HS 4 strain wave reducer

1. The representation method for the model of the Newstart hollow langed standard cylinderstructure strain wave reducer: NS -HS - model (e.g. -14) - reduction ratio (e.g. -50) connection method (e.g. -4) , for example NS-HS-14-50-4

2. connection method: combination type; The wave generator cam comes with its own input shaft.

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Newstart planetary Gear Boxes Co., Ltd.





NS-CS

NS - CS 1 strain wave reducer

Introduction to NS -CS 1 strain wave reducer

The flexspline of NS - CS 1 series products has a cup type standard cylinder structure, and the input shaft directly matches with the inner of the wave generator. Connected by flat keys or screws. Generally for the connection, the rigid spline end is fixed and the flexible spline end is act as output end.

performance parameter table of NS -CS 1 type strain wave reducer

Model\ Items	Reducti on ratio	Rated torque at 2000 rpm input	Maximum allowable torque when starting and stopping	Maximum allowable torque at average load	Instantan eous maximum allowable torque	Maximum allowable input speed (grease)	Allowable average input speed (grease)	Backlash	Design lifespan
		NM	NM	NM	NM	RPM	RPM	Arc Sec	Hours
	50	5.4	18	6.9	35			≤30	>10000
14	80	7.8	23	11	47	7500	3500	≤30	>10000
	100	7.8	28	11	54			≤30	>10000
	50	16	34	26	70		3500	≤30	>10000
17	80	22	43	27	87	7000		≤30	>10000
	100	24	54	39	110			≤30	>10000
	50	25	56	34	98	6000	3500	≤30	>10000
20	80	34	74	47	127			≤30	>10000
20	100	40	82	49	147			≤30	>10000
	120	40	87	49	147	1		≤30	>10000
	50	39	98	55	186			≤30	>10000
25	80	63	137	87	245	5500	3500	≤30	>10000
25	100	67	157	108	284	5500	3500	≤30	>10000
	120	67	167	108	304	1		≤30	>10000
	50	76	216	108	382	-		≤30	>10000
22	80	118	304	167	568	5000	3500	≤30	>10000
32	100	137	333	216	647		3500	≤30	>10000
	120	137	353	216	686			≤30	>10000

Model description of NS -CS 1 strain wave reducer

1. The representation method for the model of the Newstart cup type standard cylinder structure strain wave reducer: NS-CS - model (e.g. -14) - reduction ratio (e.g. -50) connection method (e.g. -1) , for example NS-CS -14-50-1.

2. Connection method: Component type; connected by lat key or by screw.



















NS-CS
Cup type standard cylinder structure strain way
NS -CS 2 strain wave reducer

b Introduction to NS -CS 2 strain wave reducer

The flexspline of NS -CS 2 series products has a cup type standard cylinder structure, and the input shaft is connected to the inner of the wave generator through a cross slider coupling. Generally for the connection, the rigid spline end is fixed and the flexible spline end is act as output end.

b Performance parameter table of NS -CS 2 typestrain wave reducer

Model\ Items	Reducti on ratio	Rated torque at 2000 rpm input	Maximum allowable torque when starting and stopping	Maximum allowable torque at average load	Instantan eous maximum allowable torque	Maximum allowable input speed (grease)	Allowable average input speed (grease)	Backlash	Design lifespan
		NM	NM	NM	NM	RPM	RPM	Arc Sec	Hours
	50	5.4	18	6.9	35			≤30	>10000
14	80	7.8	23	11	47	7500	3500	≤30	>10000
	100	7.8	28	11	54			≤30	>10000
	50	16	34	26	70		20 	≤30	>10000
17	80	22	43	27	87	7000	3500	≤30	>10000
	100	24	54	39	110			≤30	>10000
	50	25	56	34	98	6000	3500	≤30	>10000
20	80	34	74	47	127			≤30	>10000
20	100	40	82	49	147			≤30	>10000
	120	40	87	49	147			≤30	>10000
	50	39	98	55	186			≤30	>10000
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	50	76	216	108	382			≤30	>10000
22	80	118	304	167	568	5000	2500	≤30	>10000
52	100	137	333	216	647	5000	3500	≤30	>10000
	120	137	353	216	686			≤30	>10000

b Model description of NS -CS 2 strain wave reducer

1. The representation method for the model of the Newstart cup type standard cylinder structure strain wave reducer: NS-CS - model (e.g. -14) - reduction ratio (e.g. -5-) connection method (e.g. 2) , for example NS-CS-14 -50-2.

2. Connection method: Component type; The input shaft is connected to the inner of the wavegenerator through a cross slider coupling.

ive



















NS-HD
Hollow flanged dwarf cylinder structure strain w
NS -HD 1 strain wave reducer

Introduction to NS -HD 1 strain wave reducer

The flexspline of the NS -HD 1 series products is a ultra thin hollow flanged structure, with a compact overall structure. The input shaft is directly matched with the inner of the wave generator and connected by a flat key or by screw. It can be used in the connection mode of fixing the rigid spline end and outputting the flexspline end, and can also be used in the connection mode of fixing the flexspline end and outputting the rigid spline end.

b Performance parameter table of NS -HD 1 typestrain wave reducer

Model\ Items	Reducti on ratio	Rated torque at 2000 rpm input	Maximum allowable torque when starting and stopping	Maximum allowable torque at average load	Instantan eous maximum allowable torque	Maximum allowable input speed (grease)	Allowable average input speed (grease)	Backlash	Design lifespan
		NM	NM	NM	NM	RPM	RPM	Arc Sec	Hours
	50	5.4	18	6.9	35			≤30	>10000
14	80	7.8	23	11	47	7500	3500	≤30	>10000
	100	7.8	28	11	54			≤30	>10000
	50	16	34	26	70			≤30	>10000
17	80	22	43	27	87	7000	3500	≤30	>10000
	100	24	54	39	110			≤30	>10000
	50	25	56	34	98		3500	≤30	>10000
20	80	34	74	47	127	6000		≤30	>10000
20	100	40	82	49	147	6000		≤30	>10000
	120	40	87	49	147		-	≤30	>10000
	50	39	98	55	186			≤30	>10000
25	80	63	137	87	245	5500	2500	≤30	>10000
25	100	67	157	108	284	5500	3500	≤30	>10000
	120	67	167	108	304			≤30	>10000
	50	76	216	108	382			≤30	>10000
22	80	118	304	167	568	5000	2500	≤30	>10000
32	100	137	333	216	647	5000	3500	≤30	>10000
	120	137	353	216	686			≤30	>10000

Model description of NS-HD 1 strain wave reducer

1. The representation method for the model of the Newstart hollow langed dwarf cylinderstructure strain wave reducer: NS-HD - model (e.g. -14) - reduction ratio (e.g. -50) connection method (e.g. -1) , for example NS-HD-14 -50-1.

2. connection method: component type; connected by screw.





















NS-HD

Hollow flanged dwarf cylinder structure strain wave NS-HDSH strain wave reducer

Introduction to NS -HDSH strain wave reducer

The flexspline of the NS -SH series products is a ultra thin hollow flanged structure, with a compact overall structure. The input shaft is directly matched with the inner of the wave generator and connected by screw. It can be used in the connection mode of fixing the rigid spline end and outputting the flexspline end, and can also be used in the connection mode of fixing the flexspline end and outputting the rigid spline end.



Performance parameter table of NS -HDSH typestrain wave reducer

Model\ Items	Reducti on ratio	Rated torque at 2000 rpm input	Maximum allowable torque when starting and stopping	Maximum allowable torque at average load	Instantan eous maximum allowable torque	Maximum allowable input speed (grease)	Allowable average input speed (grease)	Backlash	Design lifespan
		NM	NM	NM	NM	RPM	RPM	Arc Sec	Hours
	50	5.4	18	6.9	35			≤30	>10000
14	80	7.8	23	11	47	7500	3500	≤30	>10000
	100	7.8	28	11	54			≤30	>10000
	50	16	34	26	70			≤30	>10000
17	80	22	43	27	87	7000	3500	≤30	>10000
	100	24	54	39	110			≤30	>10000
	50	25	56	34	98		3500	≤30	>10000
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	120	40	87	49	147			≤30	>10000
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25	100	67	157	108	284	5500	3500	≤30	>10000
	120	67	167	108	304	1		≤30	>10000
	50	76	216	108	382			≤30	>10000
22	80	118	304	167	568	5000	3500	≤30	>10000
32	100	137	333	216	647	5000	3500	≤30	>10000
	120	137	353	216	686			≤30	>10000

Model description of NS -HDSH strain wave reducer

1. The representation method for the model of the Newstart hollow langed dwarf cylinderstructure strain wave reducer: NS-HD - model (e.g. -14) - reduction ratio (e.g. -50) connection method (e.g. -SH) , for example NS-HD- 14-50-SH.

2. connection method: component type; connected by screw.















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NS-CD

Cup type dwarf cylinder structure strain wave NS -CD 1 strain wave reducer

Introduction to NS -CD 1 strain wave reducer

The flexspline of the NS -CD 1 series products is a cup type dwarf cylinder structure. The input shaft is directly matched with the inner of the wave generator and connected by a flat key or by screw. Generally, it is used in the connection mode of fixing the rigid spline end and outputting the flexspline end.



Performance parameter table of NS -CD 1 typestrain wave reducer

Model\ Items	Reducti on ratio	Rated torque at 2000 rpm input	Maximum allowable torque when starting and stopping	Maximum allowable torque at average load	Instantan eous maximum allowable torque	Maximum allowable input speed (grease)	Allowable average input speed (grease)	Backlash	Design lifespan
		NM	NM	NM	NM	RPM	RPM	Arc Sec	Hours
	50	5.4	18	6.9	35			≤30	>10000
14	80	7.8	23	11	47	7500	3500	≤30	>10000
	100	7.8	28	11	54			≤30	>10000
	50	16	34	26	70			≤30	>10000
17	80	22	43	27	87	7000	3500	≤30	>10000
	100	24	54	39	110			≤30	>10000
	50	25	56	34	98			≤30	>10000
20	80	34	74	47	127	6000	2500	≤30	>10000
20	100	40	82	49	147		3500	≤30	>10000
	120	40	87	49	147			≤30	>10000
	50	39	98	55	186			≤30	>10000
25	80	63	137	87	245	5500	2500	≤30	>10000
25	100	67	157	108	284	5500	3500	≤30	>10000
	120	67	167	108	304			≤30	>10000
	50	76	216	108	382			≤30	>10000
22	80	118	304	167	568	5000	3500	≤30	>10000
32	100	137	333	216	647	5000	3500	≤30	>10000
	120	137	353	216	686			≤30	>10000

Model description of NS -CD 1 strain wave reducer

1. The representation method for the model of the Newstart cup type dwarf cylinder structure strain wave reducer: NS-CD - model (e.g. -14) - reduction ratio (e.g. -50) connection method (e.g. -1) ,for example NS-CD -14-50-1.

2. Connection method: Component type; connected by flat key or by screw.















NS-CD

Cup type dwarf cylinder structure strain wave reduce

NS -CD UH strain wave reducer

Introduction to NS -CD UH strain wave reducer

The flexspline of the NS -CD UH series products is a cup type dwarf cylinder structure. The input shaft is directly matched with the inner of the wave generator and connected by screw. Generally, it is used in the connection mode of fixing the rigid spline end and o utputting the flexspline end.



Performance parameter table of NS -CD UH typestrain wave reducer

Model\ Items	Reducti on ratio	Rated torque at 2000 rpm input	Maximum allowable torque when starting and stopping	Maximum allowable torque at average load	Instantan eous maximum allowable torque	Maximum allowable input speed (grease)	Allowable average input speed (grease)	Backlash	Design lifespan
		NM	NM	NM	NM	RPM	RPM	Arc Sec	Hours
	50	5.4	18	6.9	35			≤30	>10000
14	80	7.8	23	11	47	7500	3500	≤30	>10000
	100	7.8	28	11	54			≤30	>10000
	50	16	34	26	70			≤30	>10000
17	80	22	43	27	87	7000	3500	≤30	>10000
	100	24	54	39	110			≤30	>10000
	50	25	56	34	98			≤30	>10000
20	80	34	74	47	127	6000	2500	≤30	>10000
20	100	40	82	49	147		3500	≤30	>10000
	120	40	87	49	147			≤30	>10000
	50	39	98	55	186			≤30	>10000
25	80	63	137	87	245		2500	≤30	>10000
25	100	67	157	108	284	5500	3500	≤30	>10000
	120	67	167	108	304			≤30	>10000
	50	76	216	108	382			≤30	>10000
22	80	118	304	167	568	5000	2500	≤30	>10000
32	100	137	333	216	647	5000	3500	≤30	>10000
	120	137	353	216	686			≤30	>10000

Model description of NS -CD UH strain wave reducer

1. The representation method for the model of the Newstart cup type dwarf cylinder structure strain wave reducer: NS-CD - model (e.g. -14) - reduction ratio (e.g. -50) connection method (e.g. -UH) ,for example NS -CD-14-50-UH.

2. Connection method: Component type; connected by screw.























INSTALLATION OF HARMONIC REDUCER

Drawing of flange for mounting of CS component motor:

when connecting the reducer assembly to the motor, a flange is required. For flange size and tolerance requirements, refer to the following table:

Specification Size	14	17	20	25	32
E	73	79	93	107	138
F	38H7	48H7	56H7	67H7	90H7
t	3	3	4.5	4.5	4.5
а	0.02	0.02	0.02	0.02	0.025
b	0.02	0.02	0.02	0.03	0.03



CS component installation method I:

Installation steps:

- 1、Install the motor on the flange
- 2、Install the wave generator on the motor shaft
- 3、Fix the assembly in place



CS component installation method II:

Installation steps:

- 1. Install the installation flange onto the assembly
- 2. Install the wave generator on the motor output shaft
- 3、Install the motor onto the mounting flange (combination type)



Type I installation diagram of HS component:



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Installation of oil seal:

when installing, leave a gap of at least 1mm between the installation surface and the oil seal on the other side to ensure that the installation surface does not interfere with the oil seal.



Avoidance of housing installation:

In combined installation, in order to prevent the housing mounting from interfering with the M part shown in the figure below, perform avoidance processing when processing the housing.



Installation precautions:

If installed improperly, the reducer may produce vibration, abnormal noise, and even damage during operation. So make sure to follow the following installation instructions:

1. Before installation, confirm the flatness of the installation plate and make sure that there are no protrusions or foreign objects around the screw holes

2, Apply an oil film on the outer circle of the wave generator before installing it into the flexspline. The wave generator cannot be forced into the flexspline at an angle, and avoid applying excessive force to the bearing part of the wave generator. The flexspline can be inserted smoothly by rotating the wave generator.

3. To prevent asymmetric meshing of the flexspline teeth and the rigid spline due to poor assembly, test run the motor at low speed (below 100r/M in) after assembly, and the reducer should not make abnormal noises.

PRECISION OF REDUCER IN STALLATION HOUSING ►►►

Recommended accuracy for CS component:



Specification Size	14	17	
а	0.012	0.015	T
b	0.012	0.012	
с	0.016	0.02	1

Recommended accuracy for HS component:



Specification	14	17	20	25	32			
a	0.012	0.015	0.018	0.02	0.025			
b	0.012	0.012	0.015	0.018	0.018			
с	0.016	0.02	0.02	0.025	0.025			



(mm) 0.018 0.02 0.025 0.018 0.015 0.018 0.02 0.025 0.025

Installation housing



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- 1
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MECHANICAL ACCURACY PARAMETERS OF REDUCER

CS component mechanical accuracy:



Specification Size(mm)	14	17	20	25	32
a	0.010	0.010	0.010	0.015	0.015
b	0.010	0.012	0.012	0.013	0.013
с	0.024	0.025	0.038	0.045	0.055
d	0.010	0.010	0.010	0.010	0.010
e	0.035	0.038	0.045	0.049	0.054

HS component mechanical accuracy:

Flex spline ixed Rigid spline output





Hollow type (III)

Axis input type (lv)

Specification	14	17	20	25	32
а	0.033	0.038	0.040	0.045	0.052
b	0.035	0.035	0.040	0.040	0.045
с	0.060	0.071	0.079	0.085	0.090
d	0.050	0.050	0.060	0.060	0.070
е	0.040	0.045	0.050	0.057	0.065
f	0.035	0.038	0.047	0.048	0.052

Flex spline output Rigid spline ixed



Specification e(mm)	14	17	20	25	32
a	0.037	0.038	0.045	0.045	0.055
b	0.031	0.030	0.038	0.038	0.045
с	0.060	0.070	0.079	0.085	0.090
d	0.050	0.050	0.059	0.060	0.070





TORQUE TRANSMISSION Torque transmission of CS component:



Spec Category	ification	14	17	20	25	32
Number of bolts		6	6	8	8	8
Scre specifica	w itions	M4	M5	M6	M8	M10
Bolt	(N.m)	4.5	9	15.3	37	74
tightening	(Kgfm)	0.46	0.92	1.56	3.8	7.6
Bolt transmissi on torque	(N.m)	49	91	204	486	1108
	(Kgfm)	5	9.3	21	50	104

Installation and torque transmission of the output flange side of the csseries

Installation and torgue transmission of the housing side of the csseries

Category	Specification	14	17	20	25	32
Number of bolts		6	6	6	8	12
Screw specific	ations	M4	M4	M5	M5	M6
Bolt tightening torque	(N.m)	4.5	4.5	9.0	9.0	15.3
	(Kgfm)	0.46	0.46	0.92	0.92	1.56
Bolt transmission torque	(N.m)	137	147	274	431	1200
	(Kgfm)	14	15	28	44	122

Grade 12.9 screw recommended

Torque transmission of HS component:



Installation and torgue transmission of the lexspline side of the Hs series

Callegory	per fication	14				
Number of bolts		8	16	16	16	16
Screw specifications		MB	M3	M3	M4	M5
Bolt tightening torque	(N.m)	2.0	2.0	2.0	4.5	9.0
	(Kgfm)	0.2	0.2	0.2	0.46	0.92
Bolt transmission torque	(N.m)	108	186	206	431	892
	(Kgfm)	11	19	21	44	91

Installation and torgue transmission of the rigid spline side of the Hs series

Category	pecification	14				
Number of bolts		8	16	16	16	16
Screw speci	fications	M3	MB	M3	M4	M5
Bolt tightening torque	(N.m)	2.0	2.0	2.0	4.5	9.0
	(Kgfm)	0.2	0.2	0.2	0.46	0.92
Bolt transmission torque	(N.m)	108	186	206	431	892
	(Kgfm)	11	19	21	44	91

Grade 12.9 screw recommended

USE OF LUBRICATING GREASE ►►►

Grease selection:

A kind of specialized lubricating grease are adopted for Newstart strain wave reducers, which haslow characteristics that suitable for a longer service life. In addition, it can be used in a widertemperature range.

1. To lubricate the rotating parts and connecting contact surfaces of the reducer.

2, when using, be sure to implement lubrication to the sealing components.

3. Use spring pressed oil seals for lubrication and sealing of the rotating part.

and lubricate the 0-ring or sealant.

Instructions for using of lubricating grease

Safety precautions

1, splashing into the eyes may cause inflammation. when operating, please wear protective goggles, etc.

2. Individuals with skin allergies or scratches should avoid direct contact.

3、 Do not swallow (may cause diarrhea, vomiting, etc.) .

4、 please keep out of reach of children.

5. After use, please seal it tightly to prevent dust, moisture, and other contaminants from entering.

6, store in a cool place and avoid direct sunlight.

promptly.

8. In case of contacting with damaged skin, wash thoroughly with water and soap.

9. If swallowing occurs, do not force it to vomit and seek medical attention immediately.

Regarding the softening of the lubricating grease:

Therefore, the following softening treatment methods are recommended:

treatment cannot be carried out) .

speed will achieve better results.

3, softening treatment time: M aintain for at least 20 minutes.

- 4, pay attention to whether the plane connecting the contact part is skewed or there are scratches,

- 7. If splashes into eyes, immediately rinse with water for 5 minutes and seek medical attention

- softening treatment before operation can soften the filled lubricating grease, allowing it to flow to the various contact parts of the reducer, thereby achieving better lubrication performance.
- 1、Ensure that the internal temperature of the reducer is below 80 气 (rapid high-temperature aging
- 2. Input speed: between 1 000r/min and 3 000r/min. w ithin this range, running at the lowest possible
- 4, softening treatment action range: Try to expand the output rotation angle as much as possible.



Attention: When using the CS component with the wave generator facing up or down, fill the gap between the wave generator and the mounting housing (motor flange) with lubricating grease.



Attention: The combination type products are lubricated with grease before leaving the factory and does not need to be lubricated again during assembly; While for the simple model, it is not sealed with grease when leaving factory and needs to be filled during assembly. Avoid mi xing with other types of lubricating grease.



PRODUCT WARRANTY AND SAFETY PRECAUTIONS

warranty period and warranty scope are as follows

Y Warranty period

Based on the normal assembly and operation recorded in the NS standard documents, and the rated load operation, sufficient lubrication, the warranty period is 12 months from the date of delivery.

. Warranty scope

During the warranty period mentioned above, if the malfunction is caused by our companyls manufacturing defects, our company is responsible for repairing or replacing of the product. However, product malfunctions caused by the following situations are not covered by the warranty:

- 1, poor storage e nvironment, abnormal caused by d ust, moisture, water i mmersion, etc.
- 2、 product modification o r d isassembly n ot carried o ut by o ur company.
- 3. M alfunctions caused by improper installation or o peration by customers.
- 4. M alfunctions caused by factors other than the q uality of o ur company ls p roducts.
- 5. M alfunctions caused by m ajeure s uch as weather a nd w ar.

Safety precautions for use

Y Operation environment:

Environmental temperature: 0 气~ 士40 气; No corrosive or explosive gases, no metal dust, no splashing water, no flammable fuel, etc.

- Y Pay attention to the handle of the products and components.
- 1, check if the product packaging is intact, handle with care;
- 2. Do not use tools such as hammers to forcefully strike various components and combination units;

3, prevent breakage, deformation, and other damages caused by falling, bumping, and other reasons;

cannot be guaranteed, and it may cause damage to the product.

Y Do not operate under conditions that exceed the allowable torgue for a long time.

1, when applying torque, do not exceed the maximum allowable instantaneous torque, otherwise there may be bolt loosening of the tightening part, shaking, damage, etc., which may cause the product to malfunction.

2. If the output shaft is directly connected to the articulated arm, the product may be damaged due to collision with the articulated arm, making it impossible to control the output shaft.

Y Do not change or disassemble the supporting components

1. Each component of this product is processed as a complete set. If mixed with other kits, its normal accuracy, performance and lifespan cannot be guaranteed;

2. It is strictly prohibited to disassemble and reassemble the combined products, otherwise the original accuracy, performance and lifespan will not be restored.

Proclamation: When the product is used for the following purposes, it needs to be confirmed with our technical personnel.

%Atomic energy facilities %vacuum equipment XA utomotive equipment **XA** musement equipment *Equipments that directly act on the human body

- When the product is used under a damaged state, its normal accuracy, performance, and lifespan

*****Special environment equipment ※Equipment for transporting of people



PRECISION IN MOTION





