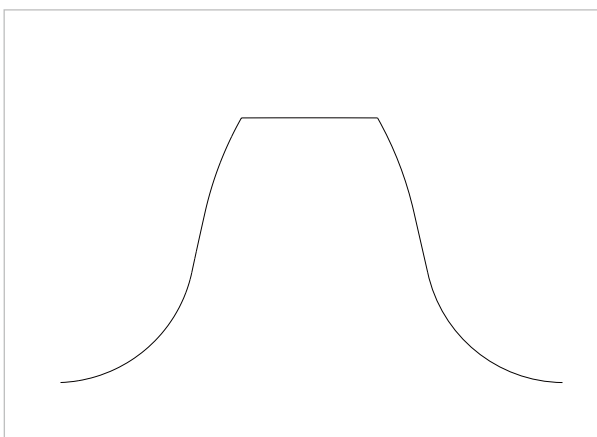
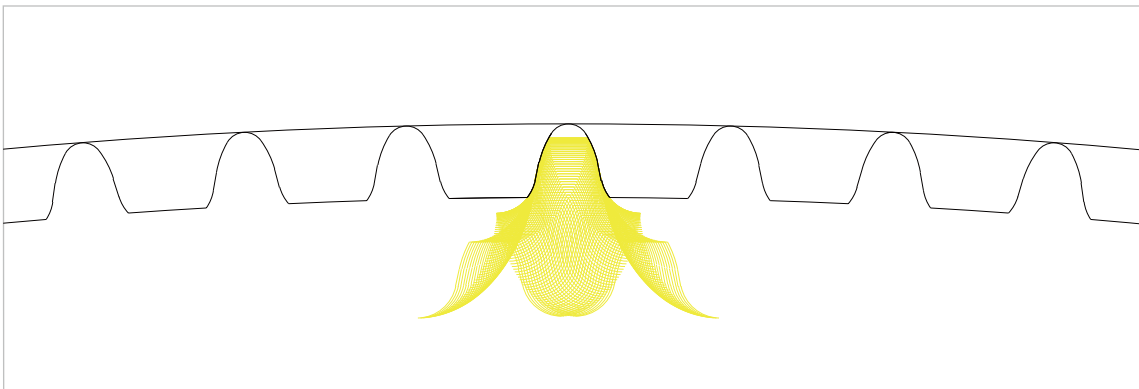


# ■ Tooth profile

- Gear tooth capacity increased by 15%
- Reduce gear fatigue pitting contact area
- Temperature rise decreased by 8-10 degrees
- Service time over 15000 hours

## About LS tooth profile

We have made some upgrades based on the traditional theoretical double arc profile. The tooth profile formed by the original two-curve continuous arc curve is optimized as a continuous arc curve with multiple segments of curvature. To ensure that the gears of reducer are properly meshed, while protecting the risk of grease failure after grease is squeezed by reducing relative sliding friction. Based on the  $\delta$  tooth shape, the load capacity is increased by 15%, the temperature rise is reduced by 8-10 degrees, the gear fatigue pitting contact area is reduced by more than 30%, continuous running and service life is over 15000 hours, which improves the overall performance of the harmonic reducer.



During development, the formation of the soft tooth profile can be determined by the radial displacement of the generator. Different gear reduction ratios can be fitted with various tooth profiles. And the mesh backlash can be conveniently adjusted according to actual conditions. Keep the reducer in the best working condition.

# About grease

## Special grease developed for laifual drive

### Laifual's LF-I grease

Compare with the common greases on the market, Laifual's grease has high efficiency and durable.

### Laifual's LF-II grease

Excellent lubrication when the wave generator is rotated by extruding additives to liquefy.

## Grease characteristics

Model	Color	Operating temperature	Working ambient temperature	Durability	Grease leakage
LF-I	YELLOW	0°C~+40°C	-20°C~+100°C	○	◎
LF-II	GREEN	0°C~+40°C	-20°C~+100°C	○	◎

○ Applicable ◎ Superior

## A suitable grease for different models

Greases for reduction ratio more than 50

Reduction ratio		11	14	17	20	25	32	40
Model	Reduction ratio							
Grease	LF-I	—	—	—	○	○	○	○
	LF-II	○	○	○	□	□	□	□

○ Standard grease □ Quasi-standard grease

## Seal size description

Series	Model	Circular spline		Flexspline	
		Seal size	Slot size	Seal size	Slot size
LHT-I	14	37 * 1	φ37 <sup>-0.1</sup> * φ39.6 <sup>+0.1</sup> * 0.75 <sup>+0.1</sup>	53 * 1.5	φ53 <sup>-0.1</sup> * φ56.8 <sup>+0.1</sup> * 1.15 <sup>+0.1</sup>
	17	46.5 * 1	φ46.5 <sup>-0.1</sup> * φ49.1 <sup>+0.1</sup> * 0.75 <sup>+0.1</sup>	64 * 1	φ64 <sup>-0.1</sup> * φ66.6 <sup>+0.1</sup> * 0.75 <sup>+0.1</sup>
	20	55 * 1	φ55 <sup>-0.1</sup> * φ57.6 <sup>+0.1</sup> * 0.75 <sup>+0.1</sup>	73 * 1.5	φ73 <sup>-0.1</sup> * φ76.8 <sup>+0.1</sup> * 1.15 <sup>+0.1</sup>
LHT-II	25	68 * 1	φ68 <sup>-0.1</sup> * φ70.6 <sup>+0.1</sup> * 0.75 <sup>+0.1</sup>	90 * 1.5	φ90 <sup>-0.1</sup> * φ94.2 <sup>+0.1</sup> * 1.15 <sup>+0.1</sup>
	32	88 * 1.5	φ88 <sup>-0.1</sup> * φ92 <sup>+0.1</sup> * 1.15 <sup>+0.1</sup>	119 * 1.5	φ119 <sup>-0.1</sup> * φ123.1 <sup>+0.1</sup> * 1.15 <sup>+0.1</sup>



# ■ Terms and definitions

## Starting torque

It is the minimum torque value applied to the input end at which the harmonic reducer first starts to rotate with no load.

## Backlash

The clearance between flexspline tooth profile and circular spline tooth profile.

## Rated torque

It indicates allowable continuous output torque at rated input speed.

## Permissible peak torque at start and stop

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

## Permissible maximum value for average load torque

It's the maximum torque when the harmonic reducer keeps continuous operation.

## Permissible maximum momentary torque

It is the momentary peak torque the harmonic reducer may be subjected to the event of a collision or emergency stop.

## Permissible maximum input rotational speed

Don't exceed the permissible rating.

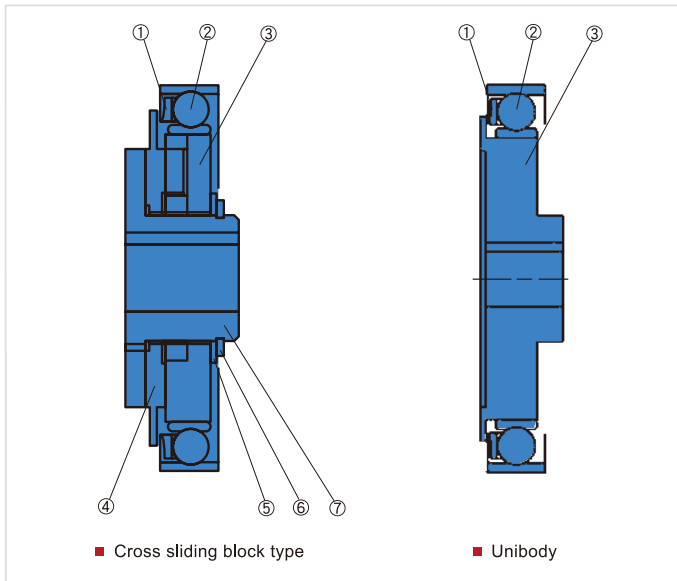
## Permissible average input rotational speed

It's the average value of input speed.

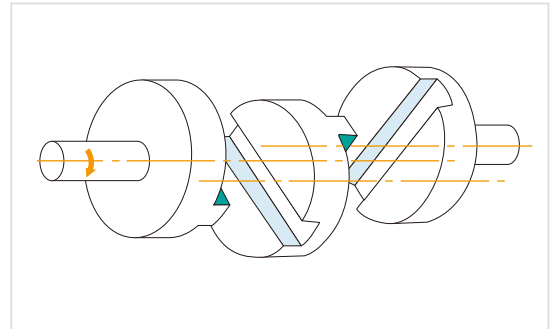
# Wave generator

The wave generator includes a structure of a European-style coupling with a self-aligning structure and an integrated 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:



• Structure of cross sliding block type-Using European coupling structure



- ① Holder of flexible bearing
- ② Flexible bearing
- ③ Wave generator
- ④ Cross sliding block
- ⑤ Gasket
- ⑥ Ring-shield
- ⑦ Power input shaft

## Axial force and axial fixation of wave generator

The axial force on wave generator begins to work due to elastic deformation of flexspline.

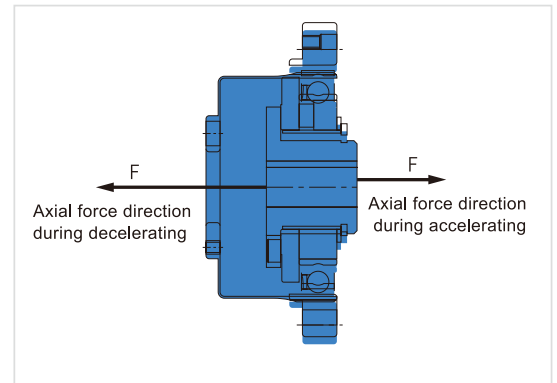
When used as a reducer, the axial force moves towards to the inside of the flexspline.

When used as a speed increaser, the axial force's movement is opposite to the direction of the deceleration.

The design of prevent axial force of 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 aperture size of the unibody wave generator

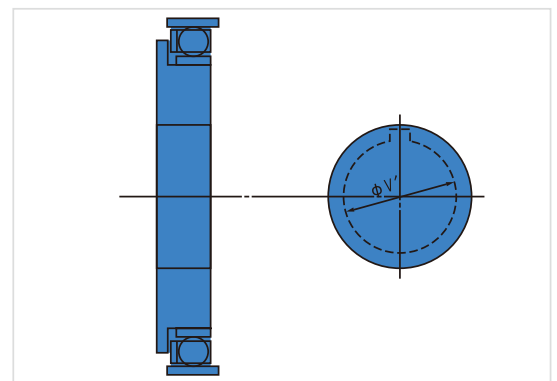
The standard aperture of the wave generator has shown in the outline-drawing, the alteration can be made within maximum size range shown in the table.

We suggest to use GB standard for keyway size. The key's effective length dimension should be designed to fully withstand the value of the transmitted torque.

• Wave generator aperture unit: mm

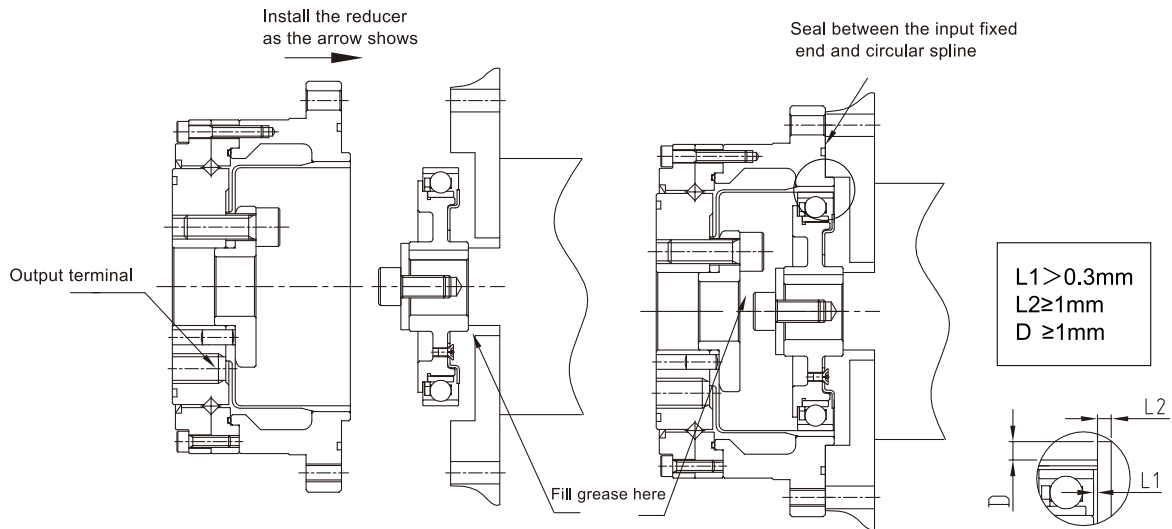
Model	11	14	17	20	25	32	40
Standard size (H7)	6	6	8	8	14	14	14
Minimum size	3	3	4	5	6	6	10
Maximum size	8	17	20	23	28	36	42

The aperture of the wave generator can be customized according to customer requirements. Please contact with the authorized distributor in case of any changes in the table.

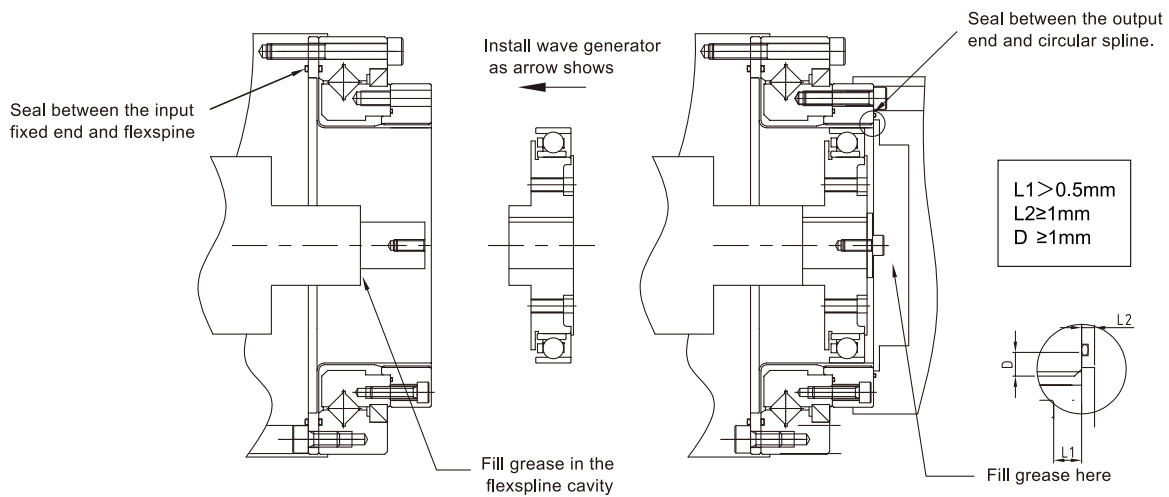


# Installation procedure

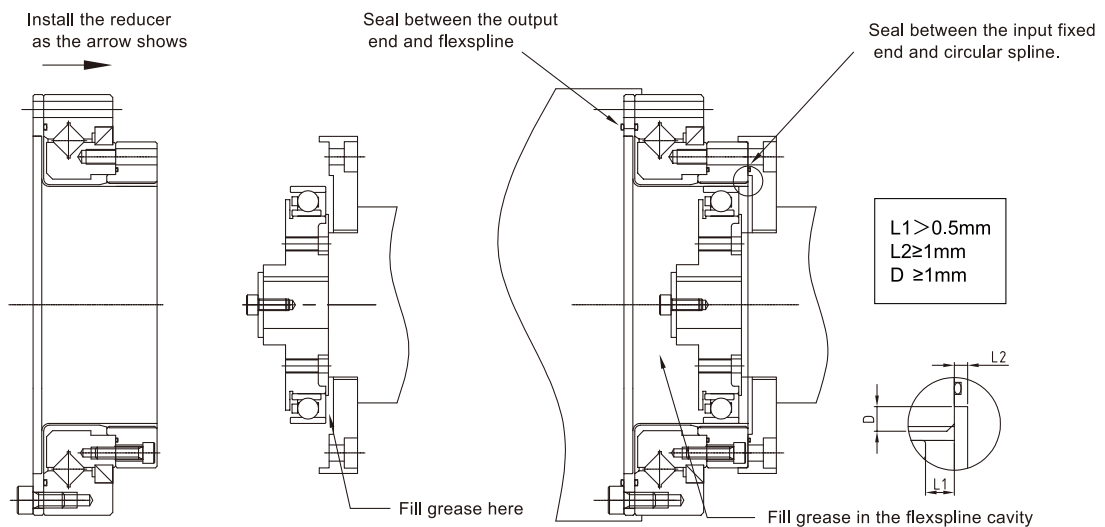
## Installation of LSS series



## The first method of installation for LHT-I/II Series



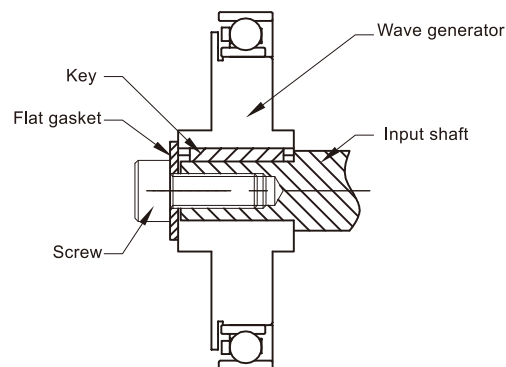
## The second method of installation for LHT-I/II series



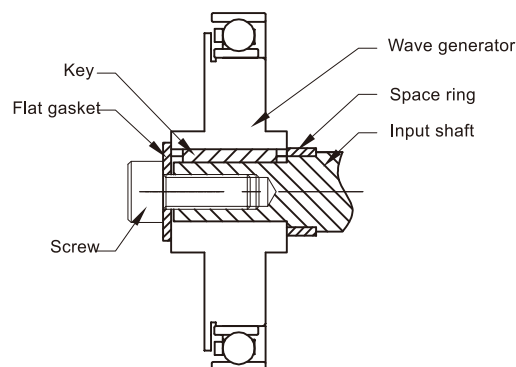
# Installation procedure

## The connecting and fixing method of wave generator

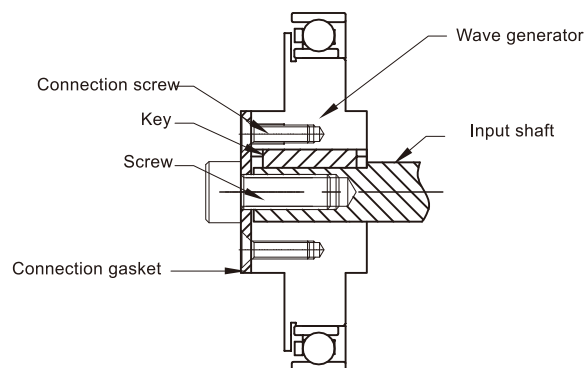
1. Input shaft has a shaft shoulder, it can be connected with wave generator directly. As shown in the figure.



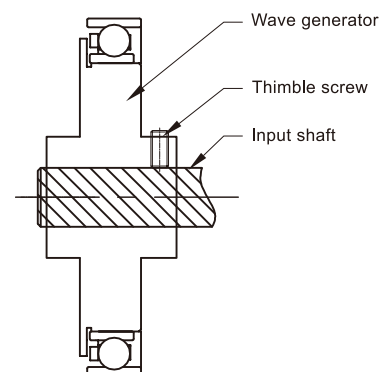
2. Input shaft has a shaft shoulder, but it's too long. You can add a space ring on the shaft (the parallelism of space ring should be within 0.01mm), then connect and fix with the wave generator. As shown in the figure.



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.



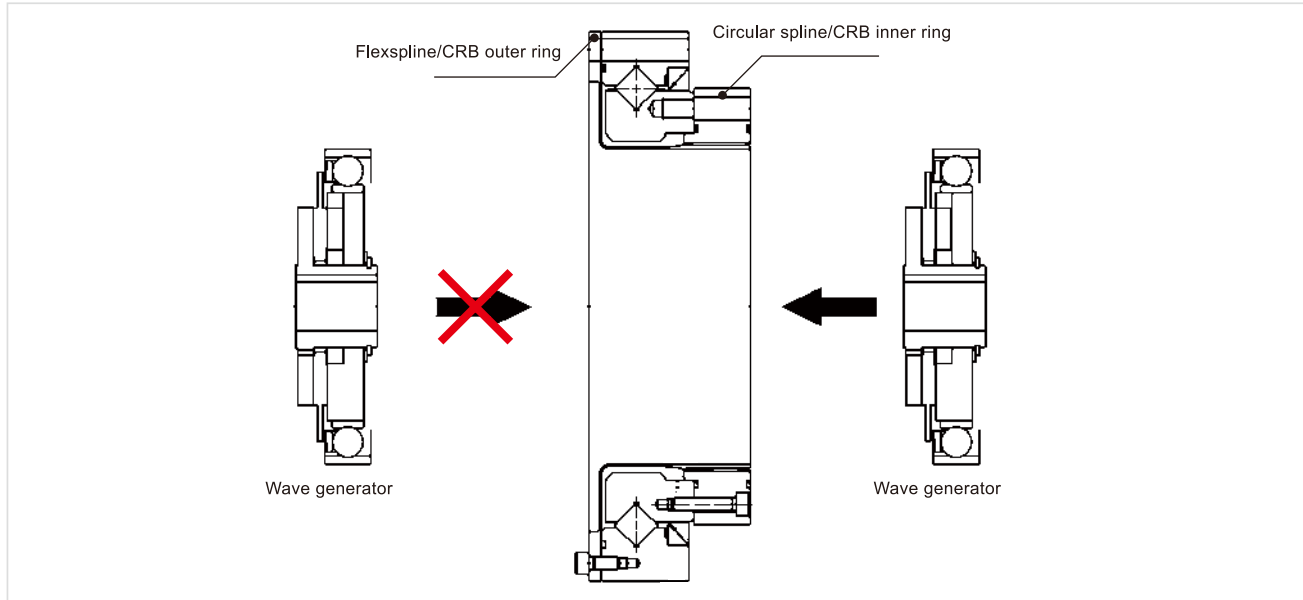
# Assembly considerations

## Assembly procedure

Install the circular spline and flexspline on the device, and then install the wave generator.

Otherwise it may cause stuffing damage to the gear teeth or improper eccentric gear mesh. Please pay close attention to it.

- Correct assembly steps



## Precautions on installation

The improper assembly may cause vibration and noise during operation.

Please assembly base on the following precautions.

- Precautions on wave generator

1. Please avoid applying undue force to the bearing on wave generator during assembly. We suggest to rotate the wave generator while inserting, it will ease the process.
2. If the wave generator does not have an oldham coupling, extra care must be given 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 the chamfering and avoidance machining are performed on the housing assembly, to avoid the 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 bolt, make sure the bolt hole is correct and aligned. Bolts should rotate freely when tightening and should not have any irregularity due to the bolt hole being misaligned or oblique.
6. Don't tighten the bolts with the specified torque all at once. Tighten the bolts temporarily with about half the specified torque, and then tighten them with the specified torque. Tighten them in an even, crisscross pattern.
7. Avoid pinning the circular spline if possible as it can reduce the 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 the chamfering and avoidance machining are performed on the housing assembly, to avoid the interference with the circular spline.
4. When mounting the bolt, make sure the bolt hole is correct and aligned. Bolts should rotate freely when tightening and should not have any irregularity due to the bolt hole being misaligned or oblique.
5. Don't tighten the bolts with the specified torque all at once. Tighten the bolts temporarily with about half the specified torque, and then tighten them with the specified torque. Tighten them in an even, crisscross pattern.
6. Avoid unilateral meshing and deviation when assembling with circular spline.

- Rust prevention

The complete assembly unit has no rust prevention on surface.

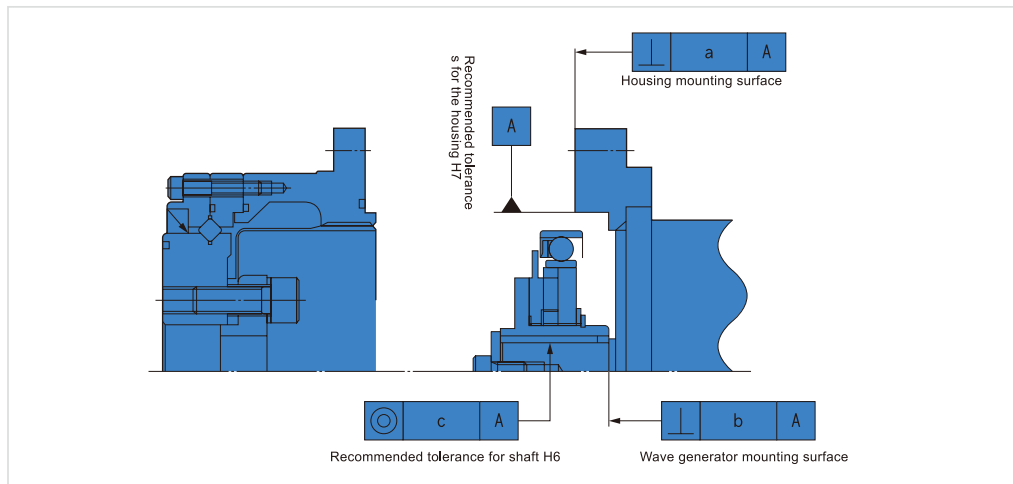
Please daub anti-rust if needed.

Besides, if an anti-rust product is needed, please contact with the authorized distributor.

# Precautions on installation

## Assembly accuracy of LSS series

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



### Recommended accuracy of the assembled housing

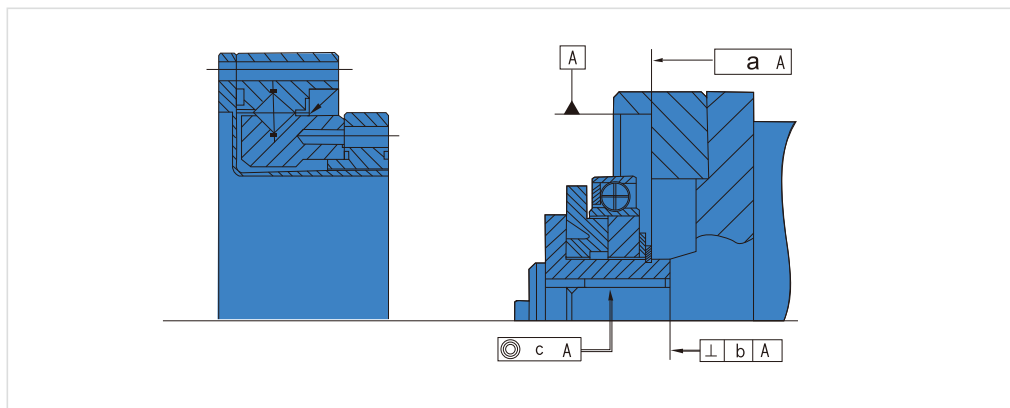
unit: mm

Symbol / Model	14	17	20	25	32
a	0.011	0.015	0.017	0.024	0.026
b	0.017	0.020	0.020	0.024	0.024
	(0.008)	(0.010)	(0.010)	(0.012)	(0.012)
c	0.030	0.034	0.044	0.047	0.050
	(0.016)	(0.018)	(0.019)	(0.022)	(0.022)

\*b,c is the value of the unibody generator (I series) and the cross slider generator (II series).  
The value in ( ) is the value of the unibody generator (I series).

## Assembly accuracy of LHT series

To make sure LHT-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	14	17	20	25	32	40
a	0.011	0.015	0.017	0.024	0.026	0.026
b	0.017	0.020	0.020	0.024	0.024	0.032
	(0.008)	(0.010)	(0.010)	(0.012)	(0.012)	(0.012)
c	0.030	0.034	0.044	0.047	0.047	0.050
	(0.016)	(0.018)	(0.019)	(0.022)	(0.022)	(0.024)

\*b,c is the value of the unibody generator (I series) and the cross slider generator (II series).  
The value in ( ) is the value of the unibody generator (I series).



# Specification of main bearing

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

## Specification of LSS series

Type	Basic rated load				Allowable static moment Mc		Weight
	Basic rated dynamic load Cr		Basic rated static load Cr		Nm	kgfm	
	KN	kgf	KN	kgf			kg
14	4.7	480	6.07	620	41	4.2	0.22
17	5.2	540	7.55	770	64	6.5	0.3
20	5.8	590	9.0	920	91	9.3	0.38
25	9.6	980	15.1	1540	156	16	0.6
32	15	1530	25.1	2550	313	32	1.1

- Basic rated dynamic load refers to static radial load that makes dynamic rated life of bearing reach up to 1 million rotations.
- Basic rated static load refers to static load that exerts a certain level of contact stress(4KN/mm) on the central location between rotor of bearing maximum load and contact part of pathway.
- Allowable static moment refers to the value of the maximum torque exerting on output bearing, within the scope of which, it's workable and the basic performance is possible.

## Starting torque of LSS series

Reduction ratio \ Type	14	17	20	25	32
50	1.2	3	8	11	28
80	1	2	5	12	17
100	1.2	3.6	6.8	12	13
120	—	4.4	5.5	10	22
160	—	—	4.68	—	—

## Specification of LHT series

Type	Basic rated load				Allowable static moment Mc		Weight
	Basic rated dynamic load Cr		Basic rated static load Cr		Nm	kgfm	
	KN	kgf	KN	kgf			kg
14	5.8	590	8.6	880	74	7.6	0.39
17	10.4	1060	16.3	1670	124	12.6	0.56
20	14.6	1490	22	2250	187	19.1	0.73
25	21.8	2230	35.8	3660	258	26.3	1.23
32	38.2	3900	65.4	6680	580	59.1	2.54
40	38.2	4410	65.4	8330	849	86.6	7.2

- Basic rated dynamic load refers to static radial load that makes dynamic rated life of bearing reach up to 1 million rotations.
- Basic rated static load refers to static load that exerts a certain level of contact stress(4KN/mm) on the central location between rotor of bearing maximum load and contact part of pathway.
- Allowable static moment refers to the value of the maximum torque exerting on output bearing, within the scope of which, it's workable and the basic performance is possible.

## Starting torque of hollow type(LHT-III)

unit: cNm

Reduction ratio \ Type	14	17	20	25	32	40
50	9	12	15	15	23	58
80	7	9.4	11	15	22	43
100	7.8	13	8	14	20	45
120	—	13.8	8.5	14	21	45
160	—	—	9.2	—	—	—

## Starting torque of input axial type(LHT-IV)

unit: cNm

Reduction ratio \ Type	14	17	20	25	32
50	2.4	3.6	10	14	26
80	2.2	2.8	14	13	26
100	2	3	10	10	18
120	—	3.3	12	12	18
160	—	—	11.2	—	—

## Axial input (LHT-IV) timing belt tension torque recommended value

unit: Nm

Generator load torque	Model	14	17	20	25	32
Maximum	LHT-IV	13	19	25	25	52

# Moment load table

## Moment load table of LSS(LSG) series

Model	Value	Permissible value at start and stop	Instant permissible value
LSS(LSG)-14	M b di 20Nm	M b peak 40Nm	M b max 80Nm
	F t di 180N	F t peak 320N	F t max 560N
	F a di 180N	F a peak 320N	F a max 560N
LSS(LSG)-17	M b di 30Nm	M b peak 60Nm	M b max 120Nm
	F t di 230N	F t peak 400N	F t max 700N
	F a di 230N	F a peak 400N	F a max 700N
LSS(LSG)-20	M b di 42Nm	M b peak 80Nm	M b max 168Nm
	F t di 270N	F t peak 480N	F t max 830N
	F a di 270N	F a peak 480N	F a max 830N
LSS(LSG)-25	M b di 80Nm	M b peak 160Nm	M b max 313Nm
	F t di 440N	F t peak 770N	F t max 1320N
	F a di 440N	F a peak 770N	F a max 1320N
LSS(LSG)-32	M b di 220Nm	M b peak 440Nm	M b max 890Nm
	F t di 900N	F t peak 1600N	F t max 2700N
	F a di 900N	F a peak 1600N	F a max 2700N

## Moment load table of LHT(LHG) series

Model	Value	Permissible value at start and stop	Instant permissible value
LHT(LHG)-14	M b di 41Nm	M b peak 80Nm	M b max 160Nm
	F t di 270N	F t peak 490N	F t max 830N
	F a di 270N	F a peak 490N	F a max 830N
LHT(LHG)-17	M b di 72Nm	M b peak 140Nm	M b max 290Nm
	F t di 400N	F t peak 700N	F t max 1200N
	F a di 400N	F a peak 700N	F a max 1200N
LHT(LHG)-20	M b di 140Nm	M b peak 280Nm	M b max 560m
	F t di 650N	F t peak 1150N	F t max 1980N
	F a di 650N	F a peak 1150N	F a max 1980N
LHT(LHG)-25	M b di 243Nm	M b peak 480Nm	M b max 974Nm
	F t di 900N	F t peak 1600N	F t max 2800N
	F a di 900N	F a peak 1600N	F a max 2800N
LHT(LHG)-32	M b di 460Nm	M b peak 900Nm	M b max 1860Nm
	F t di 1350N	F t peak 2300N	F t max 4000N
	F a di 1350N	F a peak 2300N	F a max 4000N
LHT(LHG)-40	M b di 600Nm	M b peak 1200Nm	M b max 3000Nm
	F t di 2000N	F t peak 3500N	F t max 6000N
	F a di 2000N	F a peak 3500N	F a max 6000N

■ Note: Output load Mb- Bending moment, Ft-radial force, Fa-axial force

## Moment load table of LSD series

Model	Value	Permissible value at start and stop	Instant permissible value
LSD-14	M b di 20Nm	M b peak 40Nm	M b max 80Nm
	F t di 180N	F t peak 320N	F t max 560N
	F a di 180N	F a peak 320N	F a max 560N
LSD-17	M b di 30Nm	M b peak 60Nm	M b max 120Nm
	F t di 230N	F t peak 400N	F t max 700N
	F a di 230N	F a peak 400N	F a max 700N
LSD-20	M b di 42Nm	M b peak 80Nm	M b max 168Nm
	F t di 270N	F t peak 480N	F t max 830N
	F a di 270N	F a peak 480N	F a max 830N
LSD-25	M b di 80Nm	M b peak 160Nm	M b max 313Nm
	F t di 440N	F t peak 770N	F t max 1320N
	F a di 440N	F a peak 770N	F a max 1320N
LSD-32	M b di 220Nm	M b peak 440Nm	M b max 890Nm
	F t di 900N	F t peak 1600N	F t max 2700N
	F a di 900N	F a peak 1600N	F a max 2700N

## Moment load table of LHD series

Model	Value	Permissible value at start and stop	Instant permissible value
LHD-14	M b di 41Nm	M b peak 80Nm	M b max 160Nm
	F t di 270N	F t peak 490N	F t max 830N
	F a di 270N	F a peak 490N	F a max 830N
LHD-17	M b di 72Nm	M b peak 140Nm	M b max 290Nm
	F t di 400N	F t peak 700N	F t max 1200N
	F a di 400N	F a peak 700N	F a max 1200N
LHD-20	M b di 140Nm	M b peak 280Nm	M b max 560Nm
	F t di 650N	F t peak 1150N	F t max 1980N
	F a di 650N	F a peak 1150N	F a max 1980N
LHD-25	M b di 243Nm	M b peak 480Nm	M b max 974Nm
	F t di 900N	F t peak 1600N	F t max 2800N
	F a di 900N	F a peak 1600N	F a max 2800N
LHD-32	M b di 460Nm	M b peak 900Nm	M b max 1860Nm
	F t di 1350N	F t peak 2300N	F t max 4000N
	F a di 1350N	F a peak 2300N	F a max 4000N
LHD-40	M b di 600Nm	M b peak 1200Nm	M b max 3000Nm
	F t di 2000N	F t peak 3500N	F t max 6000N
	F a di 2000N	F a peak 3500N	F a max 6000N

■ Note: Output load Mb- Bending moment, Ft-radial force, Fa-axial force

# LSS – 14 – 100 – U/C – I

Series	Type	Reduction ratio(Note 1)						Structure code	Style
LSS	11	50	80	100	-	-	-	U: Completely unit C: Component	I: Simple Standard Type II: Simple Cross Slider type
	14	50	80	100	-	-	-		
LSN	17	50	80	100	-	-	-		
LSG	20	50	80	100	120	160	-		
LSD	25	50	80	100	120	-	-		
LFS	32	50	80	100	120	-	-		

■ Note1: Reduction ratio indicates of wave generator as inputting, fixing circular spline, and flexspline as outputting.

## LSS series



### LSS series

A combination product which is easy to operate. Each model has a cross-roller bearing that with high rigidity to support external loads.

### LSN series

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

### LSG series

High torque. Compare with standard products, LSG 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

Metal Machine Tools

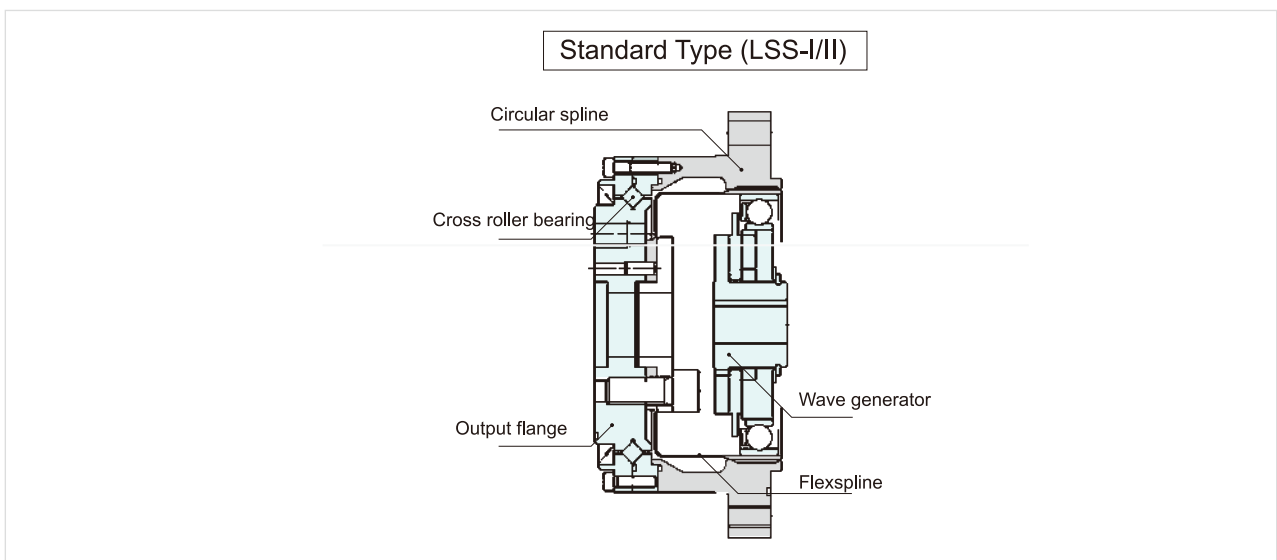
Medical Devices

Analysis, Test Equipment

Energy Related equipment

Papermaking Equipment

### • Combinative structure of LSS series

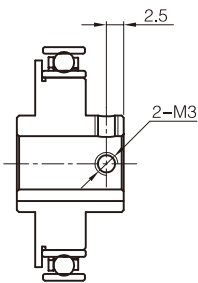
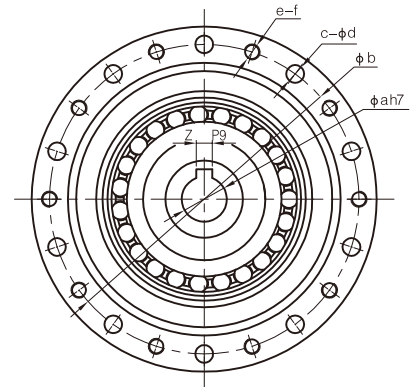
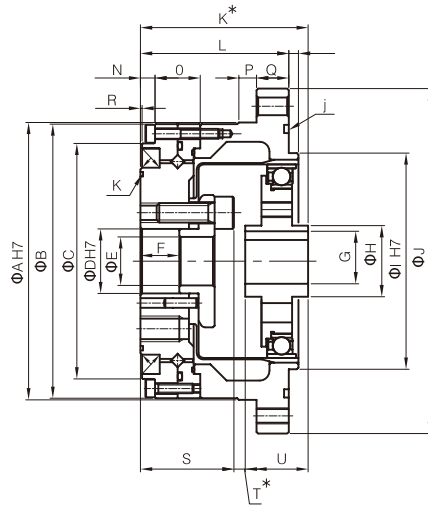
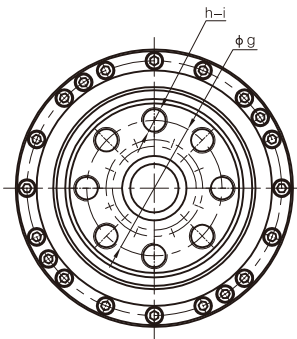


# Rated parameter table of LSS/LSN series

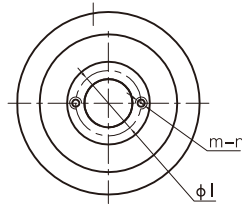
Model	Reduction ratio	Rated torque at 2000r/min input		Permissible peak torque at start and stop		Permissible maximum value for average load torque		Permissible maximum momentary torque		Permissible maximum input rotational speed(Grease)	Permissible average input rotational speed(Grease)	backlash	Design life
		Nm	Kgfm	Nm	Kgfm	Nm	Kgfm	Nm	Kgfm	r/min	r/min	Arc Sec	Hour
11	80	3.8	0.4	8.5	0.9	6.8	0.7	19.1	1.9	8000	3000	≤30	10000
	100	4.1	0.4	8.9	0.9	7.2	0.7	20	2				
14	50	6.2	0.6	20.7	2.1	7.9	0.7	40.3	4.1	7000	3000	≤30	15000
	80	9	0.9	27	2.7	12.7	1.3	54.1	5.5				
	100	9	0.9	32	3.3	12.7	1.3	62.1	6.3				
17	50	18.4	1.9	39	4	29.9	3	80.5	8.2	6500	3000	≤30	15000
	80	25.3	2.6	49.5	5	31	3.2	100.1	10.2				
	100	27.6	2.8	62	6.3	45	4.6	124.2	12.7				
20	50	28.8	2.9	64.4	6.6	39	4	112.7	11.5	5600	3000	≤30	15000
	80	39.1	4	85	8.8	54	5.5	146.1	14.9				
	100	46	4.7	94.3	9.6	56	5.8	169.1	17.2				
	120	46	4.7	100	10.2	56	5.8	169.1	17.2				
	160	46	4.7	112	10.9	56	5.8	169.1	17.2				
25	50	44.9	4.6	113	11.5	63	6.5	213.9	21.8	4800	3000	≤30	15000
	80	72.5	7.4	158	16.1	100	10.2	293.3	29.9				
	100	77.1	7.9	181	18.4	124	12.7	326.6	33.3				
	120	77.1	7.9	192	19.6	124	12.7	349.6	35.6				
32	50	87.4	8.9	248	25.3	124	12.7	439	44.8	4000	3000	≤30	15000
	80	135.7	13.8	350	35.6	192	19.6	653	66.6				
	100	157.6	16.1	383	39.1	248	25.3	744	75.9				
	120	157.6	16.1	406	41.4	248	25.3	789	80.5				

# Rated parameter table of LSG series

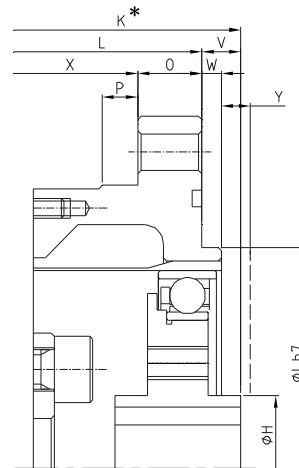
Model	Reduction ratio	Rated torque at 2000r/min input		Permissible peak torque at start and stop		Permissible maximum value for average load torque		Permissible maximum momentary torque		Permissible maximum input rotational speed(Grease)	Permissible average input rotational speed(Grease)	backlash	Design life
		Nm	Kgfm	Nm	Kgfm	Nm	Kgfm	Nm	Kgfm	r/min	r/min	Arc Sec	Hour
11	80	3.8	0.4	8.5	0.9	6.8	0.7	19.1	1.9	8000	3000	≤20	10000
	100	4.1	0.4	8.9	0.9	7.2	0.7	20	2				
14	50	7	0.7	23	2.3	9	0.9	46	4.7	10000	6500	≤20	15000
	80	10	1	30	3.1	14	1.4	61	6.2				
17	100	10	1.0	36	3.7	14	1.4	70	7.2	7500	5600	≤20	20000
	50	21	2.1	44	4.5	34	3.4	91	9				
	80	29	2.9	56	5.7	35	3.6	113	12				
20	100	31	3.2	70	7.2	51	5.2	143	15	7000	4800	≤20	20000
	50	33	3.3	73	7.4	44	4.5	127	13				
	80	44	4.5	96	9.8	61	6.2	165	17				
	120	52	5.3	107	10.9	64	6.5	191	20				
25	160	52	5.3	120	12.2	64	6.5	191	20	5600	4000	≤20	20000
	50	51	5.2	127	13	72	7.3	242	25				
	80	82	8.4	178	18	113	12	332	34				
	100	87	8.9	204	21	140	14	369	38				
32	120	87	8.9	217	22	140	14	395	40	5600	3000	≤20	20000
	50	99	10	281	29	140	14	497	51				
	80	153	16	395	40	217	22	738	75				
	100	178	18	433	44	281	29	841	86				
	120	178	18	459	47	281	29	892	91				



The generator inner hole of type 14 is non-keyway



Generator's location limited mounting hole



Enlarged drawing of input end

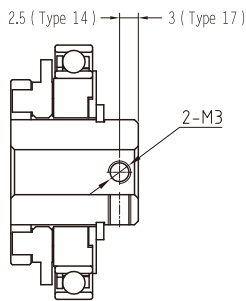
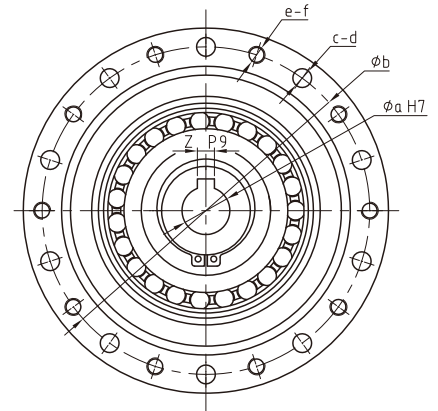
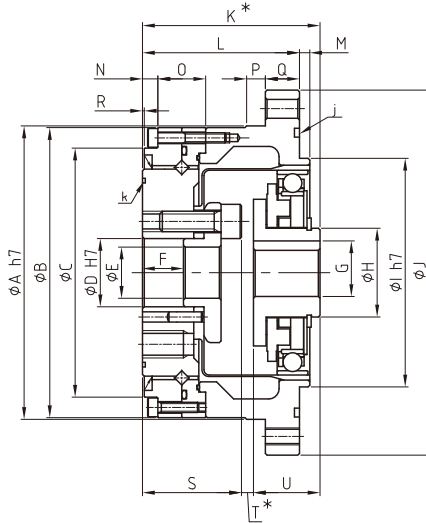
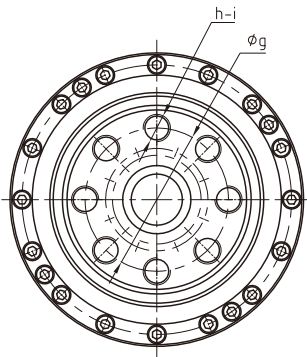
**Note:**

- Please noted that the length of bolt mesh should be kept within the depth of internal thread. If it exceeded symbol  $i$  size, the flexspline will be damaged.
  - $\psi E$  position is through-hole shape which leads to inside of the product. The size of  $*$  in figure is reference dimension of installation, please comply with requirements of such installation size.
  - The output flange will be different based on each type. For details, please contact our authorized distributor.
- \*For detailed information of product, please confirm it with delivery specification figure.

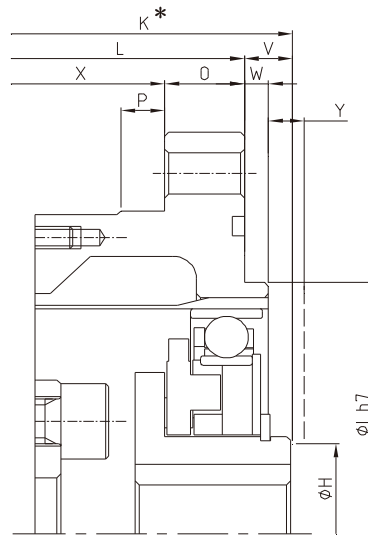
# Size chart

Symbol \ Type	14	17	20	25	32
Φ A h7	56	63	72	86	113
Φ B	55	62	70	85	112
Φ C	42.5	49.5	58	73	96
Φ D H7	11	10	14	20	26
Φ E	8	7	10	15	20
Φ F	9.4	9.5	9	12	14.2
G	$9.4_{0}^{+0.1}$	$9.4_{0}^{+0.1}$	$9.4_{0}^{+0.1}$	$16.3_{0}^{+0.1}$	$21.8_{0}^{+0.1}$
Φ H	14	16	22	22	35
Φ I h7	38	48	56	67	90
Φ J	73	79	93	107	138
K	41	45	45.5	52	62
L	36	37	38	46	57
M	2	2	3	3	3
N	4.5	2.5	4	3.5	5.3
O	12	12	12.5	14	17
P	4	4	5.5	5.5	5.5
Q	7	8	10	10	12
R	0.5	0.5	0.5	0.5	1
S	21.4	23.5	23	29	36.2
T	4.1	2.5	4	3.5	5.3
U	$15.5_{0.1}^{0}$	$19_{0.1}^{0}$	$18.5_{0.1}^{0}$	$19.5_{0.1}^{0}$	$20.5_{0.1}^{0}$
V	5	6	4.5	6	5
X	27	29	28	36	45
Y	1	1	1.5	1.5	1.5
Z P9	3	3	3	5	6
Φ a H7	8	8	8	14	19
Φ b	65	71	82	96	125
c	LSS/LSG	8	8	10	12
	LSSF	6	6	8	12
Φ d	4.5	4.5	5.5	5.5	6.5
e	LSS/LSG	8	8	10	12
	LSSF	6	6	10	12
f	M4	M4	M5	M5	M6
Φ g	23	27	32	42	55
h	6	6	8	8	8
i	M4	M5	M6	M8	M10
j	50x2	56x2	67x2	80x2	105x2
k	29x0.5	34.5x0.8	40.5x1.2	53x1	69x2
Φ l	/	12	18	18	26
m	/	2	2	2	2
n	/	M2.5	M2.5	M2.5	M3

- The size marked with \* symbol refers to the axial connection position and tolerance of three parts, which are wave generator, flexspline, circular spline. The size will have an influence on performance and intensity, therefore, please strictly abide by it.
- There is also difference in tolerance owing to different manufacturing method (casting and machining) for parts and components. For size without giving clear indication of tolerance, please contact with our company or authorized distributor if you needed more information.
- Wave generator is individually packaged when delivering the product.



The generator inner hole of type 14 and 17 is non-keyway



**Note:**

- Please noted that the length of bolt mesh should be kept within the depth of internal thread. If it exceeded symbol i size, the flexspline will be damaged.
  - psi E position is through-hole shape which leads to inside of the product. The size of \* in figure is reference dimension of installation, please comply with requirements of such installation size.
  - The output flange will be different based on each type. For details, please contact our authorized distributor.
- \*For detailed information of product, please confirm it with delivery specification figure.



# Size chart

Type Symbol	14	17	20	25	32	
Φ A h7	56	63	72	86	113	
Φ B	55	62	70	85	112	
Φ C	42.5	49.5	58	73	96	
Φ D H7	11	10	14	20	26	
Φ E	8	7	10	15	20	
Φ F	9.4	9.5	9	12	14.2	
G	/	/	12.8 <sup>+0.1</sup> <sub>0</sub>	16.3 <sup>+0.1</sup> <sub>0</sub>	16.3 <sup>+0.1</sup> <sub>0</sub>	
Φ H	14	18	21	26	26	
Φ I h7	38	48	56	67	90	
Φ J	73	79	93	107	138	
K	41	45	45.5	52	62	
L	34	37	38	46	57	
M	2	2	3	3	3	
N	4.5	4.5	4	4.5	5.5	
O	7	12	12.5	14	17	
P	4	4	5.5	5.5	5.5	
Q	7	8	10	10	12	
R	0.5	0.5	0.5	0.5	1	
S	21.4	23.5	23	29	36.2	
T	2	2	2.4	2.8	3.8	
U	17.6 <sup>0</sup> <sub>-0.1</sub>	19.5 <sup>0</sup> <sub>-0.1</sub>	20.1 <sup>0</sup> <sub>-0.1</sub>	20.2 <sup>0</sup> <sub>-0.1</sub>	22 <sup>0</sup> <sub>-0.1</sub>	
V	2	8	7.5	6	5	
X	27	29	28	36	45	
Y	1	1	1.5	1.5	1.5	
Z P9	/	/	4	5	5	
Φ a H7	6	8	11	14	14	
Φ b	65	71	82	96	125	
c	LSS/LSG	8	8	8	10	12
	LSSF	6	6	6	8	12
Φ d	4.5	4.5	5.5	5.5	6.5	
e	LSS/LSG	8	8	8	10	12
	LSSF	6	6	6	8	12
f	M4	M4	M5	M5	M6	
Φ g	23	27	32	42	55	
h	6	6	8	8	8	
i	M4	M5	M6	M8	M10	
j	50 x2	56 x2	67 x2	80 x2	105 x2	
k	29 x0.5	34.5 x0.8	40.5 x1.2	53 x1	69 x2	

- The size marked with \* symbol refers to the axial connection position and tolerance of three parts, which are wave generator, flexspline, circular spline. The size will have an influence on performance and intensity, therefore, please strictly abide by it.
- There is also difference in tolerance owing to different manufacturing method(casting and machining) for parts and components. For size without giving clear indication of tolerance, please contact with our company or authorized distributor if you needed more information.
- Wave generator is individually packaged when delivering the product.