CATALOG
STRAIN WAVE REDUCER

leaderdrive®

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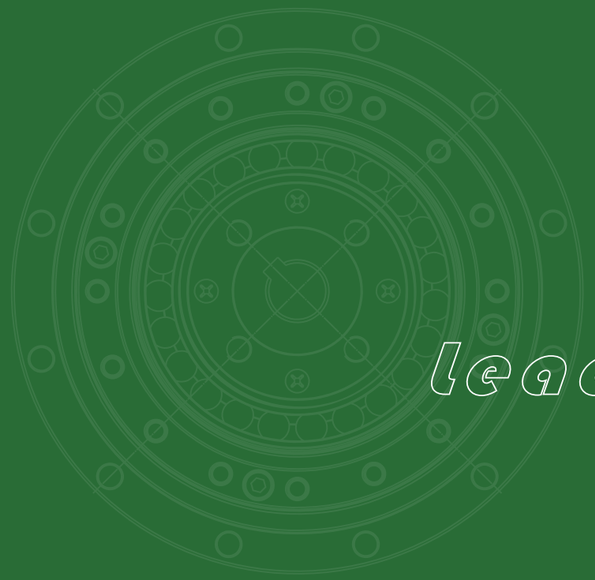
The sole sales agent of Leader Harmonious Drive Systems Co.,Ltd in North America



leaderdrive®

With five major technical breakthroughs, the company stands at the forefront of the strain wave reducer world

01

High torque

02

Smaller size and lighter weight

03

High efficiency and near-zero backlash

04

Long life

05

Unmatched stability at low speed

Company Information

The Leader Harmonious Drive Systems Co., Ltd.was established in 2011 by Dr.Zuo as a company specializing in the research, design, and production of precision strain wave reducers. Located only 30 miles from Shanghai, Suzhou is a dynamic and modern city that promises economic growth in the coming years.

The corporate campus is composed of ten-thousand square meters of standard factory buildings that operate alongside an independent R&D center. Since its founding, the company has attracted top talents in the fields of engineering and strain wave technology. Their hard work and dedication has been validated through 16 national invention patents, 23 new national practical patents, and numerous awards. Collaborating with Jiangsu Reducer Quality Supervision and Inspection Center and Beijing Technology and Business University, Leader Harmonious Drive Co. Ltd proudly accepts the task of setting the national standards for the “Strain Wave Gear Drive Reducers for Robots.”

With advanced engineering and manufacturing, the strain wave reducers produced at Leader Company are cutting edge. The products are ideal for the most demanding of applications such as aerospace, industrial robotics, numerical control machines, semiconductor manufacturing, and precision mechanical control. Products are especially well suited for high precision, low speed, and high torque applications.

The vision of the founders is simple: to make the Leader Harmonious Drive Systems Co., Ltd. the global leader in the field of precision transmission.

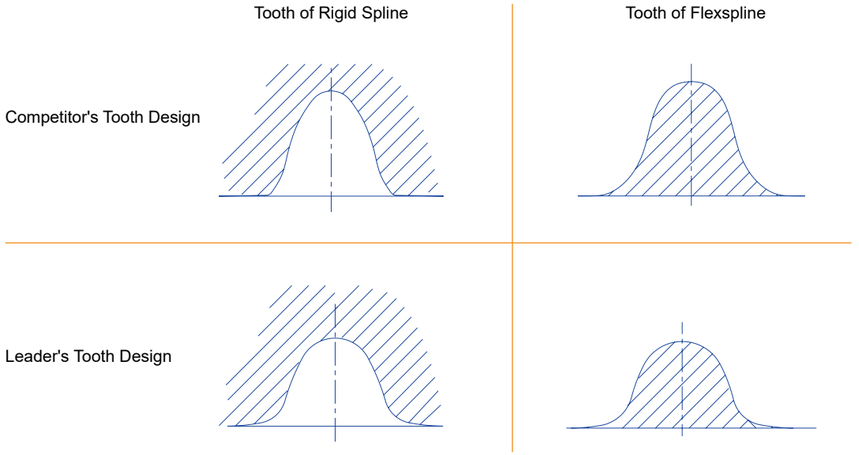
Arcsecond Robotic Components Co., Ltd is the sole sales agent of Leader Harmonious Drive Systems Co., Ltd. in North America market to provide a full range of services from product selection assistance to startup. Honesty, devotion, and diligence are our principles of customer services.

Arcsecond Robotic Components Co., Ltd has grown steadily over the years and is a respected and well-known distributor in the area of precision transmission.

A Unique Perspective on Harmonic Gearing

Traditionally, the design of a rigid gear sold on the market is based on the the Conjugate Meshing Theory (Willis’s Theorem). However, researchers at Leaderdrive have discovered that strain wave gearing meshing is more complex than that. Instead, strain wave gearing meshing can be more accurately described by the Geometric Mapping Theory of Curves. By incorporating this theory into the design, this patented technology has greatly improved the meshing of strain wave gearing, differentiating the product from competitors. The design can also be further extended to high ratio rigid reducers for better precision and control.

The P-type Tooth Profile



The unique P-type profile has distinctive advantages over a typical profile:

1. Lower profile reduces bending stress at the base to improve torque capacity.
2. Wide tooth base and streamlined profile transition reduces core stress concentration.
3. Lower profile reduces displacement and strain in the flexspine, leading to longer flexspline life.
4. More than 20%-30% of tooth compare to other competitor in meshing contact to reduce surface contact pressure.

Model Number Rules

Abbreviation for company

N	Durable type
Z	High rigidity type

Length Code of Flexspline

Code	Length
S	Standard
D	Dwarf

Reduction Ratio

Note
1.30 50 80 100 120 160 are general reduction ratio
2.Reduction ratio can be designed according to customer's demand

Structure Code

Code	Structure
C	Complete type
P	Component type
CL	Light weight of complete type

Z L C S G — 14 ——— 50 — C — II

Shape Code of Flexspline

Code	Shape
C	Cup
H	Hollow

Torque Code of Model

Code	Torque
G	High
null	Normal

P.D.D of Flexspline

Code	PDD (mm)
14	35.6
17	43.2
20	50.8
25	63.5
32	81.3
40	102
50	127
58	147

Connection Type

Between input end and cam of wave generator

Code	Type
I	Standard type
II	Oldham's coupling type
III	Hollow shaft type
IV	Shaft input type

Table of Contents

The catalog is not perfect in view of the time and language constraints, we will continue to improve it.

NLCSG Series of Strain Wave Reducer

NLCSG series with more than 20,000 hours of service life is the latest generation of Leader's strain wave reducer.

NLCSG-I

1. Cup shaped;
2. Hole with key way connected;

NLCSG-II

1. Cup shaped;
2. Oldham's coupling connected;

Parameter Table

Bi-directional Accuracy Arc min						
Model / Reduction Ratio	14	17	20	25	32	40
50	2	2	2	2	2	2
80/100/120/160	1.5	1.5	1.5	1.5	1.5	1.5

Hysteresis Loss Arc min						
Model / Reduction Ratio	14	17	20	25	32	40
50	2.5	2	2	2	2	2
80/100/120/160	2	2	1.5	1.5	1.5	1.5

Torsional Stiffness x10^4 Nm/rad						
Model / Reduction Ratio	14	17	20	25	32	40
50	0.46	1.07	1.8	3.4	7.6	14
80/100/120/160	0.6	1.3	2.3	4.6	9.9	18.6

Starting Torque cNm						
Model / Reduction Ratio	14	17	20	25	32	40
50	5	7	9	18	35	62
80	3.5	5	6	11	22	38
100	3.2	4	5.2	9.5	21	35
120	—	3.5	4	8.5	18	30
160	—	—	3.8	7	15	27

*** Consult factory**

Parameter Table

Ratcheting Torque Nm						
Model	14	17	20	25	32	40
50	110	190	280	580	1200	2300
80	140	260	450	880	1800	3600
100	100	200	330	650	1300	2700
120	—	150	310	610	1200	2400
160	—	—	280	580	1200	2300

Buckling Torque Nm						
Model	14	17	20	25	32	40
All Reduction Ratio	260	500	800	1700	3500	6700

Bending Moment and Thrust Sheet				
Model	Parameter	Rated Value	Parameter	Momentary Value
LCSG-14	M_b	20 Nm	$M_{b\ max}$	40 Nm
	F_t	180 N	$F_{t\ max}$	320 N
	F_a	180 N	$F_{a\ max}$	320 N
LCSG-17	M_b	30 Nm	$M_{b\ max}$	60 Nm
	F_t	230 N	$F_{t\ max}$	400 N
	F_a	230 N	$F_{a\ max}$	400 N
LCSG-20	M_b	42 Nm	$M_{b\ max}$	80 Nm
	F_t	270 N	$F_{t\ max}$	480 N
	F_a	270 N	$F_{a\ max}$	480 N
LCSG-25	M_b	80 Nm	$M_{b\ max}$	160 Nm
	F_t	440 N	$F_{t\ max}$	770 N
	F_a	440 N	$F_{a\ max}$	770 N
LCSG-32	M_b	220 Nm	$M_{b\ max}$	440 Nm
	F_t	900 N	$F_{t\ max}$	1600 N
	F_a	900 N	$F_{a\ max}$	1600 N
LCSG-40	M_b	320 Nm	$M_{b\ max}$	650 Nm
	F_t	1000 N	$F_{t\ max}$	1750 N
	F_a	1000 N	$F_{a\ max}$	1750 N

Note:
M_b: Bending Moment; F_t: Radial Force; F_a: Axial Force.

*** Consult factory**

Parameter Table

Item / Model	Reduction Ratio	Rated Torque at Input 2000 rpm	Peak Torque at start and Stop	Average Torque	Max. Momentary Torque	Max. Input Speed	Average Input Speed	Back Lash	Weight	Design Life
		N m	N m	N m	N m	r/min	r/min	Arc sec	Kg	Hour
14	50	6.6	23	8.6	43	8000	3500	⩽10	0.51	20000
	80	9.6	29	13.5	57			⩽10		20000
	100	9.6	34	13.5	66			⩽10		20000
17	50	19.8	42	32.5	86	7000	3500	⩽10	0.68	20000
	80	27.5	53	33.5	108			⩽10		20000
	100	30	66	48.5	134			⩽10		20000
	120	30	66	48.5	107			⩽10		20000
20	50	32	69	42	121	6000	3500	⩽10	0.98	20000
	80	42	91	58	158			⩽10		20000
	100	50	102	61	182			⩽10		20000
	120	50	108	61	182			⩽10		20000
	160	50	113	61	182			⩽10		20000
25	50	48	121	68.5	230	5500	3500	⩽10	1.47	20000
	80	78	169	107.5	315			⩽10		20000
	100	84	194	133	351			⩽10		20000
	120	84	207	133	376			⩽10		20000
	160	84	217	133	388			⩽10		20000
32	50	94	267	133	472	4500	3500	⩽10	3.19	20000
	80	146	376	206	702			⩽10		20000
	100	169	411	267	800			⩽10		20000
	120	169	436	267	848			⩽10		20000
	160	169	459	267	848			⩽10		20000
40	50	169	497	242	847	4000	3000	⩽10	5.0	20000
	80	255	641	351	1210			⩽10		20000
	100	328	702	460	1334			⩽10		20000
	120	363	762	557	1458			⩽10		20000
	160	363	800	557	1458			⩽10		20000

*** Consult factory**

Parameter Table

Item / Model	Reduction Ratio	Rated Torque at Input 2000 rpm	Peak Torque at start and Stop	Average Torque	Max. Momentary Torque	Max. Input Speed	Average Input Speed	Back Lash	Weight	Design Life
		N m	N m	N m	N m	r/min	r/min	Arc sec	Kg	Hour
14	50	6.6	23	8.6	43	8000	3500	⩽20	0.52	20000
	80	9.6	29	13.5	57			⩽20		20000
	100	9.6	34	13.5	66			⩽20		20000
17	50	19.8	42	32.5	86	7000	3500	⩽20	0.69	20000
	80	27.5	53	33.5	108			⩽20		20000
	100	30	66	48.5	134			⩽20		20000
	120	30	66	48.5	107			⩽20		20000
20	50	32	69	42	121	6000	3500	⩽20	0.99	20000
	80	42	91	58	158			⩽20		20000
	100	50	102	61	182			⩽20		20000
	120	50	108	61	182			⩽20		20000
	160	50	113	61	182			⩽20		20000
25	50	48	121	68.5	230	5500	3500	⩽20	1.48	20000
	80	78	169	107.5	315			⩽20		20000
	100	84	194	133	351			⩽20		20000
	120	84	207	133	376			⩽20		20000
	160	84	217	133	388			⩽20		20000
32	50	94	267	133	472	4500	3500	⩽20	3.2	20000
	80	146	376	206	702			⩽20		20000
	100	169	411	267	800			⩽20		20000
	120	169	436	267	848			⩽20		20000
	160	169	459	267	848			⩽20		20000
40	50	169	497	242	847	4000	3000	⩽20	5.0	20000
	80	255	641	351	1210			⩽20		20000
	100	328	702	460	1334			⩽20		20000
	120	363	762	557	1458			⩽20		20000
	160	363	800	557	1458			⩽20		20000

*** Consult factory**

NLHSG Series of Strain Wave Reducer

NLHSG series with more than 20,000 hours of service life is the latest generation of LeaderC strain wave reducer.

NLHSG-I

1. Hollow shaped;
2. Hole with key way connected;
3. Long service life;

NLHSG-II

1. Hollow shaped;
2. Oldman's coupling connected;
3. Long service life;

NLHSG-III

1. Hollow shaped;
2. Long service life;

NLHSG-III-ST

1. Hollow shaped;
2. Long service life;

NLHSG-CL-III

1. Hollow shaped;
2. Big hole in the wave generator;
3. Long service life;

NLHSG-IV

1. Hollow shaped;
2. Input shaft connected;
3. Long service life;

Parameter Table

Bi-directional Accuracy Arc min						
Model / Reduction Ratio	14	17	20	25	32	40
50	2	2	2	2	2	2
80/100/120/160	1.5	1.5	1.5	1.5	1.5	1.5

Hysteresis Loss Arc min						
Model / Reduction Ratio	14	17	20	25	32	40
50	2.5	2	2	2	2	2
80/100/120/160	2	2	1.5	1.5	1.5	1.5

Torsional Stiffness x10⁴ Nm/rad						
Model / Reduction Ratio	14	17	20	25	32	40
50	0.46	1.07	1.8	3.4	7.6	14
80/100/120/160	0.6	1.3	2.3	4.6	9.9	18.6

Starting Torque cNm						
Model / Reduction Ratio	14	17	20	25	32	40
50	5	7	9	18	35	62
80	3.5	5	6	11	22	38
100	3.2	4	5.2	9.5	21	35
120	—	3.5	4	8.5	18	30
160	—	—	3.8	7	15	27

*** Consult factory**

Parameter Table

Ratcheting Torque Nm						
Model	14	17	20	25	32	40
50	110	190	280	580	1200	2300
80	140	260	450	880	1800	3600
100	100	200	330	650	1300	2700
120	—	150	310	610	1200	2400
160	—	—	280	580	1200	2300

Buckling Torque Nm						
Model	14	17	20	25	32	40
All Reduction Ratio	210	420	700	1300	2800	5200

Bending Moment and Thrust Sheet				
Model	Parameter	Rated Value	Parameter	Momentary Value
LHSG-14	M_b	41 Nm	$M_{b\ max}$	80 Nm
	F_t	270 N	$F_{t\ max}$	490 N
	F_a	270 N	$F_{a\ max}$	490 N
LHSG-17	M_b	72 Nm	$M_{b\ max}$	140 Nm
	F_t	400 N	$F_{t\ max}$	700 N
	F_a	400 N	$F_{a\ max}$	700 N
LHSG-20	M_b	140 Nm	$M_{b\ max}$	280 Nm
	F_t	650 N	$F_{t\ max}$	1150 N
	F_a	650 N	$F_{a\ max}$	1150 N
LHSG-25	M_b	243 Nm	$M_{b\ max}$	480 Nm
	F_t	900 N	$F_{t\ max}$	1600 N
	F_a	900 N	$F_{a\ max}$	1600 N
LHSG-32	M_b	460 Nm	$M_{b\ max}$	900 Nm
	F_t	1350 N	$F_{t\ max}$	2300 N
	F_a	1350 N	$F_{a\ max}$	2300 N
LHSG-40	M_b	600 Nm	$M_{b\ max}$	1200 Nm
	F_t	2000N	$F_{t\ max}$	3500N
	F_a	2000N	$F_{a\ max}$	3500N

Note:
M_b: Bending Moment; F_t: Radial Force; F_a: Axial Force.

*** Consult factory**

Parameter Table

Bi-directional Accuracy Arc min						
Model / Reduction Ratio	14	17	20	25	32	40
50	2	2	2	2	2	2
80/100/120/160	1.5	1.5	1.5	1.5	1.5	1.5

Hysteresis Loss Arc min						
Model / Reduction Ratio	14	17	20	25	32	40
50	2.5	2	2	2	2	2
80/100/120/160	2	2	1.5	1.5	1.5	1.5

Torsional Stiffness x10^4 Nm/rad						
Model / Reduction Ratio	14	17	20	25	32	40
50	0.46	1.07	1.8	3.4	7.6	14
80/100/120/160	0.6	1.3	2.3	4.6	9.9	18.6

Starting Torque cNm						
Model / Reduction Ratio	14	17	20	25	32	40
50	5	7	9	18	35	62
80	3.5	5	6	11	22	38
100	3.2	4	5.2	9.5	21	35
120	—	3.5	4	8.5	18	30
160	—	—	3.8	7	15	27

*** Consult factory**

Parameter Table

Ratcheting Torque Nm						
Model	14	17	20	25	32	40
50	110	190	280	580	1200	2300
80	140	260	450	880	1800	3600
100	100	200	330	650	1300	2700
120	—	150	310	610	1200	2400
160	—	—	280	580	1200	2300

Buckling Torque Nm						
Model	14	17	20	25	32	40
All Reduction Ratio	210	420	700	1300	2800	5200

Bending Moment and Thrust Sheet				
Model	Parameter	Rated Value	Parameter	Momentary Value
LHSG-14	M_b	41 Nm	$M_{b\ max}$	80 Nm
	F_t	270 N	$F_{t\ max}$	490 N
	F_a	270 N	$F_{a\ max}$	490 N
LHSG-17	M_b	72 Nm	$M_{b\ max}$	140 Nm
	F_t	400 N	$F_{t\ max}$	700 N
	F_a	400 N	$F_{a\ max}$	700 N
LHSG-20	M_b	140 Nm	$M_{b\ max}$	280 Nm
	F_t	650 N	$F_{t\ max}$	1150 N
	F_a	650 N	$F_{a\ max}$	1150 N
LHSG-25	M_b	243 Nm	$M_{b\ max}$	480 Nm
	F_t	900 N	$F_{t\ max}$	1600 N
	F_a	900 N	$F_{a\ max}$	1600 N
LHSG-32	M_b	460 Nm	$M_{b\ max}$	900 Nm
	F_t	1350 N	$F_{t\ max}$	2300 N
	F_a	1350 N	$F_{a\ max}$	2300 N
LHSG-40	M_b	600 Nm	$M_{b\ max}$	1200 Nm
	F_t	2000 N	$F_{t\ max}$	3500 N
	F_a	2000 N	$F_{a\ max}$	3500 N

Note:
M_b: Bending Moment; F_t: Radial Force; F_a: Axial Force.

*** Consult factory**

Parameter Table

Bi-directional Accuracy Arc min						
Model / Reduction Ratio	14	17	20	25	32	40
50	2	2	2	2	2	2
80/100/120/160	1.5	1.5	1.5	1.5	1.5	1.5

Hysteresis Loss Arc min						
Model / Reduction Ratio	14	17	20	25	32	40
50	2.5	2	2	2	2	2
80/100/120/160	2	2	1.5	1.5	1.5	1.5

Torsional Stiffness x10^4 Nm/rad						
Model / Reduction Ratio	14	17	20	25	32	40
50	0.46	1.07	1.8	3.4	7.6	14
80/100/120/160	0.6	1.3	2.3	4.6	9.9	18.6

Starting Torque cNm						
Model / Reduction Ratio	14	17	20	25	32	40
50	5	7	9	18	35	62
80	3.5	5	6	11	22	38
100	3.2	4	5.2	9.5	21	35
120	—	3.5	4	8.5	18	30
160	—	—	3.8	7	15	27

Parameter Table

Ratcheting Torque Nm						
Model	14	17	20	25	32	40
50	110	190	280	580	1200	2300
80	140	260	450	880	1800	3600
100	100	200	330	650	1300	2700
120	—	150	310	610	1200	2400
160	—	—	280	580	1200	2300

Buckling Torque Nm						
Model	14	17	20	25	32	40
All Reduction Ratio	210	420	700	1300	2800	5200

Bending Moment and Thrust Sheet				
Model	Parameter	Rated Value	Parameter	Momentary Value
LHSG-14	M_b	41 Nm	$M_{b\ max}$	80 Nm
	F_t	270 N	$F_{t\ max}$	490 N
	F_a	270 N	$F_{a\ max}$	490 N
LHSG-17	M_b	72 Nm	$M_{b\ max}$	140 Nm
	F_t	400 N	$F_{t\ max}$	700 N
	F_a	400 N	$F_{a\ max}$	700 N
LHSG-20	M_b	140 Nm	$M_{b\ max}$	280 Nm
	F_t	650 N	$F_{t\ max}$	1150 N
	F_a	650 N	$F_{a\ max}$	1150 N
LHSG-25	M_b	243 Nm	$M_{b\ max}$	480 Nm
	F_t	900 N	$F_{t\ max}$	1600 N
	F_a	900 N	$F_{a\ max}$	1600 N
LHSG-32	M_b	460 Nm	$M_{b\ max}$	900 Nm
	F_t	1350 N	$F_{t\ max}$	2300 N
	F_a	1350 N	$F_{a\ max}$	2300 N
LHSG-40	M_b	600 Nm	$M_{b\ max}$	1200 Nm
	F_t	2000 N	$F_{t\ max}$	3500 N
	F_a	2000 N	$F_{a\ max}$	3500 N

Note:
M_b: Bending Moment; F_t: Radial Force; F_a: Axial Force.

Parameter Table

Item / Model	Reduction Ratio	Rated Torque at Input 2000 rpm	Peak Torque at start and Stop	Average Torque	Max. Momentary Torque	Max. Input Speed	Average Input Speed	Back Lash	Weight	Design Life
		N m	N m	N m	N m	r/min	r/min	Arc sec	Kg	Hour
14	50	6.6	23	8.6	43	8000	3500	⩽10	0.38	20000
	80	9.6	29	13.5	57			⩽10		20000
	100	9.6	34	13.5	66			⩽10		20000
17	50	19.8	42	32	86	7000	3500	⩽10	0.56	20000
	80	27.5	53	33	108			⩽10		20000
	100	30	66	49	134			⩽10		20000
	120	30	66	49	107			⩽10		20000
20	50	32	69	42	121	6000	3500	⩽10	0.76	20000
	80	42	91	58	158			⩽10		20000
	100	50	102	61	182			⩽10		20000
	120	50	108	61	182			⩽10		20000
	160	50	113	61	182			⩽10		20000
25	50	48	121	68.5	230	5500	3500	⩽10	1.24	20000
	80	78	169	107	315			⩽10		20000
	100	84	194	133	351			⩽10		20000
	120	84	207	133	376			⩽10		20000
	160	84	217	133	388			⩽10		20000
32	50	94	267	133	472	4500	3500	⩽10	2.6	20000
	80	146	376	206	702			⩽10		20000
	100	169	411	267	800			⩽10		20000
	120	169	436	267	848			⩽10		20000
	160	169	459	267	848			⩽10		20000
40	50	169	497	242	847	4000	3000	⩽10	5.0	20000
	80	255	641	351	1210			⩽10		20000
	100	328	702	460	1334			⩽10		20000
	120	363	762	557	1458			⩽10		20000
	160	363	800	557	1458			⩽10		20000

*** Consult factory**

Parameter Table

Item / Model	Reduction Ratio	Rated Torque at Input 2000 rpm	Peak Torque at start and Stop	Average Torque	Max. Momentary Torque	Max. Input Speed	Average Input Speed	Back Lash	Weight	Design Life
		N m	N m	N m	N m	r/min	r/min	Arc sec	Kg	Hour
14	50	6.6	23	8.6	43	8000	3500	⩽20	0.38	20000
	80	9.6	29	13.5	57			⩽20		20000
	100	9.6	34	13.5	66			⩽20		20000
17	50	19.8	42	32	86	7000	3500	⩽20	0.56	20000
	80	27.5	53	33	108			⩽20		20000
	100	30	66	49	134			⩽20		20000
	120	30	66	49	107			⩽20		20000
20	50	32	69	42	121	6000	3500	⩽20	0.76	20000
	80	42	91	58	158			⩽20		20000
	100	50	102	61	182			⩽20		20000
	120	50	108	61	182			⩽20		20000
	160	50	113	61	182			⩽20		20000
25	50	48	121	68.5	230	5500	3500	⩽20	1.24	20000
	80	78	169	107	315			⩽20		20000
	100	84	194	133	351			⩽20		20000
	120	84	207	133	376			⩽20		20000
	160	84	217	133	388			⩽20		20000
32	50	94	267	133	472	4500	3500	⩽20	2.6	20000
	80	146	376	206	702			⩽20		20000
	100	169	411	267	800			⩽20		20000
	120	169	436	267	848			⩽20		20000
	160	169	459	267	848			⩽20		20000
40	50	169	497	242	847	4000	3000	⩽20	5.0	20000
	80	255	641	351	1210			⩽20		20000
	100	328	702	460	1334			⩽20		20000
	120	363	762	557	1458			⩽20		20000
	160	363	800	557	1458			⩽20		20000

*** Consult factory**

Parameter Table

Item / Model	Reduction Ratio	Rated Torque at Input 2000 rpm	Peak Torque at start and Stop	Average Torque	Max. Momentary Torque	Max. Input Speed	Average Input Speed	Back Lash	Max. Tension Force	Weight	Design Life
		N m	N m	N m	N m	r/min	r/min	Arc sec	N	Kg	Hour
14	50	6.6	23	8.6	43	8000	3500	⩽20	⩽77	0.72	20000
	80	9.6	29	13.5	57			⩽10			20000
	100	9.6	34	13.5	66			⩽10			20000
17	50	19.8	42	32	86	7000	3500	⩽20	⩽92	1.0	20000
	80	27.5	53	33	108			⩽10			20000
	100	30	66	49	134			⩽10			20000
	120	30	66	49	107			⩽10			20000
20	50	32	69	42	121	6000	3500	⩽20	⩽136	1.38	20000
	80	42	91	58	158			⩽10			20000
	100	50	102	61	182			⩽10			20000
	120	50	108	61	182			⩽10			20000
	160	50	113	61	182			⩽10			20000
25	50	48	121	68.5	230	5500	3500	⩽20	⩽147	2.15	20000
	80	78	169	107	315			⩽10			20000
	100	84	194	133	351			⩽10			20000
	120	84	207	133	376			⩽10			20000
	160	84	217	133	388			⩽10			20000
32	50	94	267	133	472	4500	3500	⩽20	⩽154	4.3	20000
	80	146	376	206	702			⩽10			20000
	100	169	411	267	800			⩽10			20000
	120	169	436	267	848			⩽10			20000
	160	169	459	267	848			⩽10			20000
40	50	169	497	242	847	4000	3000	⩽10	⩽294	7.8	20000
	80	255	641	351	1210			⩽10			20000
	100	328	702	460	1334			⩽10			20000
	120	363	762	557	1458			⩽10			20000
	160	363	800	557	1458			⩽10			20000

*** Consult factory**

Parameter Table

Item / Model	Reduction Ratio	Rated Torque at Input 2000 rpm	Peak Torque at start and Stop	Average Torque	Max. Momentary Torque	Max. Input Speed	Average Input Speed	Back Lash	Max. Tension Force	Design Life
		N m	N m	N m	N m	r/min	r/min	Arc sec	N	Hour
14	50	6.6	23	8.6	43	8000	3500	⩽20	⩽77	20000
	80	9.6	29	13.5	57			⩽10		20000
	100	9.6	34	13.5	66			⩽10		20000
17	50	19.8	42	32	86	7000	3500	⩽20	⩽92	20000
	80	27.5	53	33	108			⩽10		20000
	100	30	66	49	134			⩽10		20000
	120	30	66	49	107			⩽10		20000
20	50	32	69	42	121	6000	3500	⩽20	⩽136	20000
	80	42	91	58	158			⩽10		20000
	100	50	102	61	182			⩽10		20000
	120	50	108	61	182			⩽10		20000
	160	50	113	61	182			⩽10		20000
25	50	48	121	68.5	230	5500	3500	⩽20	⩽147	20000
	80	78	169	107	315			⩽10		20000
	100	84	194	133	351			⩽10		20000
	120	84	207	133	376			⩽10		20000
	160	84	217	133	388			⩽10		20000
32	50	94	267	133	472	4500	3500	⩽20	⩽154	20000
	80	146	376	206	702			⩽10		20000
	100	169	411	267	800			⩽10		20000
	120	169	436	267	848			⩽10		20000
	160	169	459	267	848			⩽10		20000
40	50	169	497	242	847	4000	3000	⩽10	⩽294	20000
	80	255	641	351	1210			⩽10		20000
	100	328	702	460	1334			⩽10		20000
	120	363	762	557	1458			⩽10		20000
	160	363	800	557	1458			⩽10		20000

*** Consult factory**

Parameter Table

Item / Model	Reduction Ratio	Rated Torque at Input 2000 rpm	Peak Torque at start and Stop	Average Torque	Max. Momentary Torque	Max. Input Speed	Average Input Speed	Back Lash	Max. Tension Force	Weight	Design Life
		N m	N m	N m	N m	r/min	r/min	Arc sec	N	Kg	Hour
14	50	6.6	23	8.6	43	8000	3500	⩽10	⩽77	0.56	20000
	80	9.6	29	13.5	57			⩽10			20000
	100	9.6	34	13.5	66			⩽10			20000
17	50	19.8	42	32	86	7000	3500	⩽10	⩽92	0.80	20000
	80	27.5	53	33	108			⩽10			20000
	100	30	66	49	134			⩽10			20000
	120	30	66	49	107			⩽10			20000
20	50	32	69	42	121	6000	3500	⩽10	⩽136	1.09	20000
	80	42	91	58	158			⩽10			20000
	100	50	102	61	182			⩽10			20000
	120	50	108	61	182			⩽10			20000
	160	50	113	61	182			⩽10			20000
25	50	48	121	68.5	230	5500	3500	⩽10	⩽147	1.70	20000
	80	78	169	107	315			⩽10			20000
	100	84	194	133	351			⩽10			20000
	120	84	207	133	376			⩽10			20000
	160	84	217	133	388			⩽10			20000
32	50	94	267	133	472	4500	3500	⩽10	⩽154	3.50	20000
	80	146	376	206	702			⩽10			20000
	100	169	411	267	800			⩽10			20000
	120	169	436	267	848			⩽10			20000
	160	169	459	267	848			⩽10			20000
40	50	169	497	242	847	4000	3000	⩽10	⩽294	6.35	20000
	80	255	641	351	1210			⩽10			20000
	100	328	702	460	1334			⩽10			20000
	120	363	762	557	1458			⩽10			20000
	160	363	800	557	1458			⩽10			20000

*** Consult factory**

Parameter Table

Item / Model	Reduction Ratio	Rated Torque at Input 2000 rpm	Peak Torque at start and Stop	Average Torque	Max. Momentary Torque	Max. Input Speed	Average Input Speed	Back Lash	Max. Tension Force	Weight	Design Life
		N m	N m	N m	N m	r/min	r/min	Arc sec	N	Kg	Hour
14	50	6.6	23	8.6	43	8000	3500	⩽10	⩽26	0.65	20000
	80	9.6	29	13.5	57			⩽10			20000
	100	9.6	34	13.5	66			⩽10			20000
17	50	19.8	42	32	86	7000	3500	⩽10	⩽32	0.92	20000
	80	27.5	53	33	108			⩽10			20000
	100	30	66	49	134			⩽10			20000
	120	30	66	49	107			⩽10			20000
20	50	32	69	42	121	6000	3500	⩽10	⩽58	1.36	20000
	80	42	91	58	158			⩽10			20000
	100	50	102	61	182			⩽10			20000
	120	50	108	61	182			⩽10			20000
	160	50	113	61	182			⩽10			20000
25	50	48	121	68.5	230	5500	3500	⩽10	⩽71	2.05	20000
	80	78	169	107	315			⩽10			20000
	100	84	194	133	351			⩽10			20000
	120	84	207	133	376			⩽10			20000
	160	84	217	133	388			⩽10			20000
32	50	94	267	133	472	4500	3500	⩽10	⩽114	4.35	20000
	80	146	376	206	702			⩽10			20000
	100	169	411	267	800			⩽10			20000
	120	169	436	267	848			⩽10			20000
	160	169	459	267	848			⩽10			20000
40	50	169	497	242	847	4000	3000	⩽10	⩽294	7.9	20000
	80	255	641	351	1210			⩽10			20000
	100	328	702	460	1334			⩽10			20000
	120	363	762	557	1458			⩽10			20000
	160	363	800	557	1458			⩽10			20000

*** Consult factory**

ZLCSG Series of Strain Wave Reducer

ZLCSG-I

1. Cup shaped;
2. Hole with key way connected;
3. Hiht rigidity type;

Parameter Table

Bi-directional Accuracy Arc min						
Model / Reduction Ratio	—	—	—	25	32	—
50	—	—	—	—	2	—
80/100/120/160	—	—	—	1.5	1.5	—

Hysteresis Loss Arc min						
Model / Reduction Ratio	—	—	—	25	32	—
50	—	—	—	—	2	—
80/100/120/160	—	—	—	1.5	1.5	—

Torsional Stiffness x10^4 Nm/rad						
Model / Reduction Ratio	—	—	—	25	32	—
50	—	—	—	—	8.7	—
80/100/120/160	—	—	—	5.3	11.4	—

Starting Torque cNm						
Model / Reduction Ratio	—	—	—	25	32	—
50	—	—	—	—	35	—
80	—	—	—	11	—	—
100	—	—	—	9.5	—	—
120	—	—	—	8.5	18	—
160	—	—	—	—	—	—

*** Consult factory**

Parameter Table

Ratcheting Torque Nm						
Model	—	—	—	25	32	—
50	—	—	—	—	1200	—
80	—	—	—	880	—	—
100	—	—	—	650	—	—
120	—	—	—	610	1200	—
160	—	—	—	—	—	—

Buckling Torque Nm						
Model	—	—	—	25	32	—
All Reduction Ratio	—	—	—	1700	3500	—

Bending Moment and Thrust Sheet				
Model	Parameter	Rated Value	Parameter	Momentary Value
LCSG-25	M_b	80 Nm	$M_{b\ max}$	160 Nm
	F_t	440 N	$F_{t\ max}$	770 N
	F_a	440 N	$F_{a\ max}$	770 N
LCSG-32	M_b	220 Nm	$M_{b\ max}$	440 Nm
	F_t	900 N	$F_{t\ max}$	1600 N
	F_a	900 N	$F_{a\ max}$	1600 N

Note:
M_b: Bending Moment; F_t: Radial Force; F_a: Axial Force.

*** Consult factory**

ZLHSG Series of Train Wave Reducer

ZLHSG-I

1. Hollow shaped;
2. Hole with key way connected;
3. High rigidity type;

Parameter Table

Bi-directional Accuracy Arc min						
Model / Reduction Ratio	—	—	—	25	32	—
50	—	—	—	—	2	—
80/100/120/160	—	—	—	1.5	1.5	—

Hysteresis Loss Arc min						
Model / Reduction Ratio	—	—	—	25	32	—
50	—	—	—	—	2	—
80/100/120/160	—	—	—	1.5	1.5	—

Torsional Stiffness x10^4 Nm/rad						
Model / Reduction Ratio	—	—	—	25	32	—
50	—	—	—	—	8.7	—
80/100/120/160	—	—	—	5.3	11.4	—

Starting Torque cNm						
Model / Reduction Ratio	—	—	—	25	32	—
50	—	—	—	—	35	—
80	—	—	—	11	—	—
100	—	—	—	9.5	—	—
120	—	—	—	8.5	18	—
160	—	—	—	—	—	—

*** Consult factory**

Parameter Table

Ratcheting Torque Nm						
Model	—	—	—	25	32	—
50	—	—	—	—	1200	—
80	—	—	—	880	—	—
100	—	—	—	650	—	—
120	—	—	—	610	1200	—
160	—	—	—	—	—	—

Buckling Torque Nm						
Model	—	—	—	25	32	—
All Reduction Ratio	—	—	—	1300	2800	—

lexural Moment and Load Sheet (Equal or Less)		
Model	Permissible Valuee	Instantaneous Permissible Value
LHSG-25	$M_{b\,di}$ 243 Nm	$M_{b\,max}$ 480 Nm
	$F_{t\,di}$ 900 N	$F_{t\,max}$ 1600 N
	$F_{a\,di}$ 900 N	$F_{a\,max}$ 1600 N
LHSG-32	$M_{b\,di}$ 460 Nm	$M_{b\,max}$ 900 Nm
	$F_{t\,di}$ 1350 N	$F_{t\,max}$ 2300 N
	$F_{a\,di}$ 1350 N	$F_{a\,max}$ 2300 N
Note: M_b: Bending Moment; F_t: Radial Force; F_a: Axial Force.		

*** Consult factory**

LCD Series of Strain Wave Reducer

LCD

1. Cup shaped;
2. Ultra-flat type;
3. Light weight;
4. Suitable for Robots, semiconductor eqiupment and aerospace;

Parameter Table

Bi-directional Accuracy Arc min						
Model / Reduction Ratio	14	17	20	25	32	40
50	2	2	2	2	2	2
80/100/120/160	1.5	1.5	1.5	1.5	1.5	1.5

Hysteresis Loss Arc min						
Model / Reduction Ratio	14	17	20	25	32	40
50	2.5	2	2	2	2	2
80/100/120/160	2	2	1.5	1.5	1.5	1.5

Torsional Stiffness x10^4 Nm/rad						
Model / Reduction Ratio	14	17	20	25	32	40
50	0.37	0.91	1.46	2.8	6.4	11.6
80/100/120/160	0.48	1.03	1.8	3.7	8.3	15

Starting Torque cNm						
Model / Reduction Ratio	14	17	20	25	32	40
50	4.5	6.5	8.5	16	32	56
80	3.5	4.5	5.5	10	20	38
100	3.2	3.5	5	9	19	32
120	—	3.5	4	8	16	30
160	—	—	3.8	7	15	25

*** Consult factory**

Parameter Table

Ratcheting Torque Nm						
Model	14	17	20	25	32	40
50	88	150	220	450	980	1800
80	84	160	260	500	1000	2100
100	84	160	260	500	1000	2100
120	—	160	260	500	1000	2100
160	—	—	220	450	980	2180

Buckling Torque Nm						
Model	14	17	20	25	32	40
All Reduction Ratio	190	330	560	1000	2200	4300

Bending Moment and Thrust Sheet				
Model	Parameter	Rated Value	Parameter	Momentary Value
LCD-14	M_b	20 Nm	$M_{b\ max}$	40 Nm
	F_t	180 N	$F_{t\ max}$	320 N
	F_a	180 N	$F_{a\ max}$	320 N
LCD-17	M_b	30 Nm	$M_{b\ max}$	60 Nm
	F_t	230 N	$F_{t\ max}$	400 N
	F_a	230 N	$F_{a\ max}$	400 N
LCD-20	M_b	42 Nm	$M_{b\ max}$	80 Nm
	F_t	270 N	$F_{t\ max}$	480 N
	F_a	270 N	$F_{a\ max}$	480 N
LCD-25	M_b	80 Nm	$M_{b\ max}$	160 Nm
	F_t	440 N	$F_{t\ max}$	770 N
	F_a	440 N	$F_{a\ max}$	770 N
LCD-32	M_b	220 Nm	$M_{b\ max}$	440 Nm
	F_t	900 N	$F_{t\ max}$	1600 N
	F_a	900 N	$F_{a\ max}$	1600 N

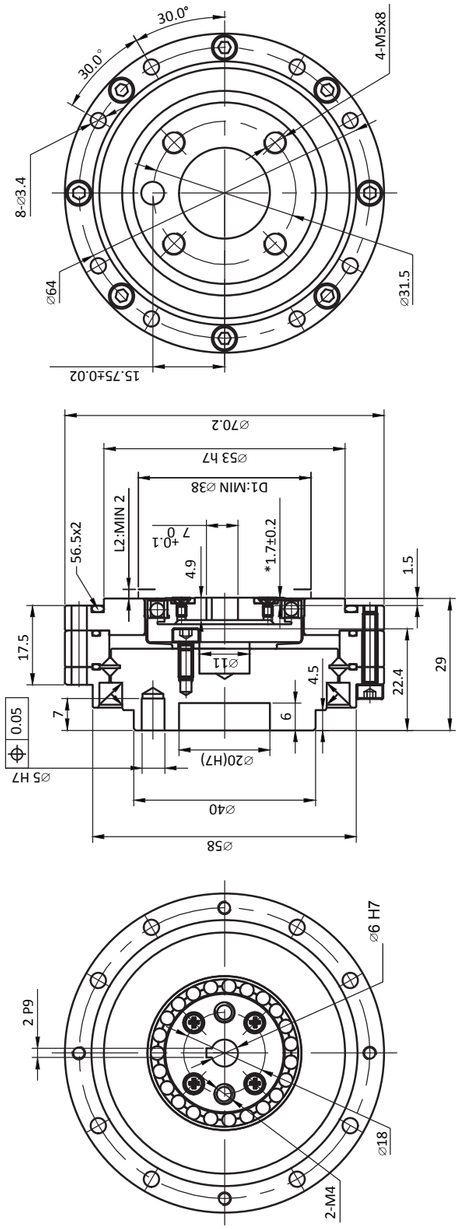
Note:
M_b: Bending Moment; F_t: Radial Force; F_a: Axial Force.

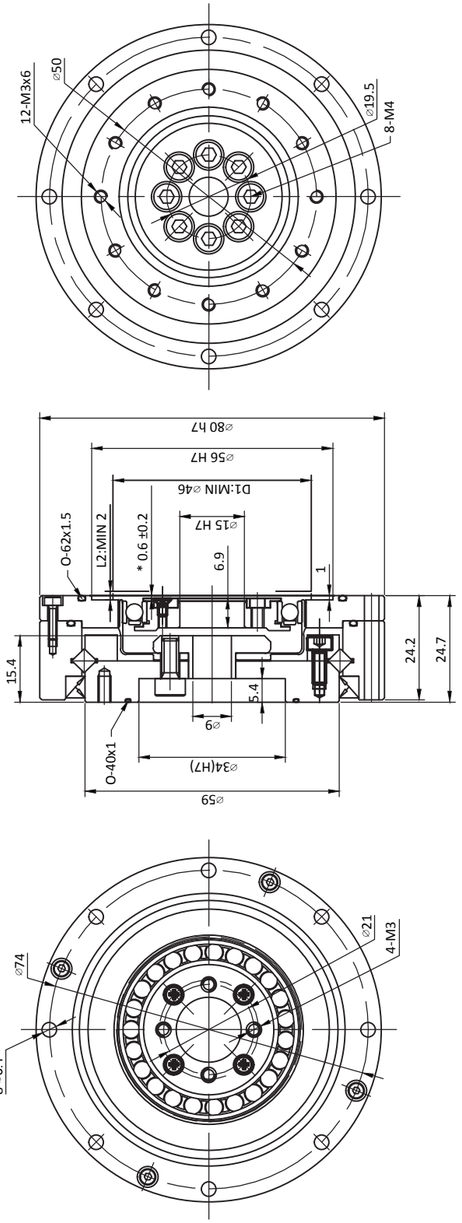
*** Consult factory**

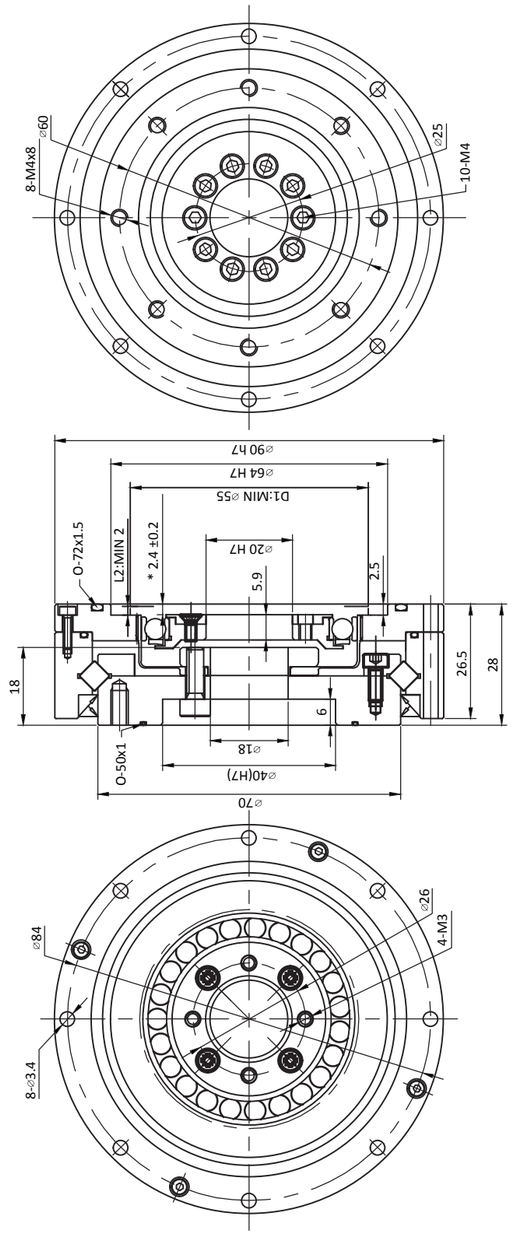
Parameter Table

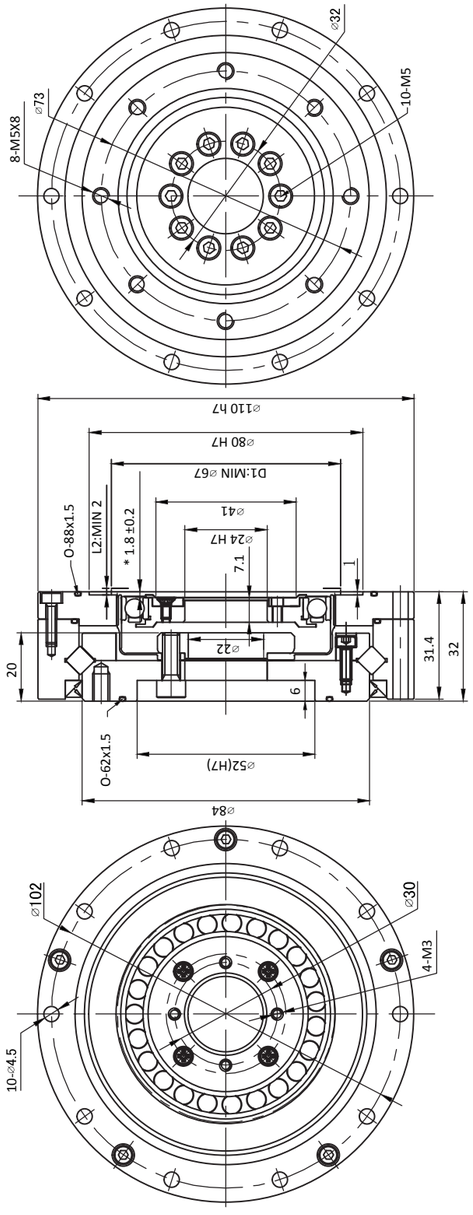
Item / Model	Reduction Ratio	Rated Torque at Input 2000 rpm	Peak Torque at start and Stop	Average Torque	Max. Momentary Torque	Max. Input Speed	Average Input Speed	Back Lash	Weight	Design Life
		N m	N m	N m	N m	r/min	r/min	Arc sec	Kg	Hour
14	50	3.5	11.4	4.6	23	8000	3500	⩽20	0.56	9000
	80	5.1	15	6.2	29			⩽20		10000
	100	5.1	18	7.3	33			⩽20		10000
17	50	10.4	22	17	46	7000	3500	⩽20	0.48	9000
	80	14	29	21	54			⩽20		10000
	100	15	35	26	67			⩽20		10000
20	50	16	37	23	66	6000	3500	⩽20	0.68	9000
	80	23	49	28	78			⩽20		10000
	100	27	54	32	90			⩽20		10000
25	50	26	66	36	121	5500	3500	⩽20	1.3	9000
	80	42	91	62	157			⩽20		10000
	100	45	104	71	175			⩽20		10000
	120	45	111	71	187			⩽20		10000
32	50	50	143	71	255	4500	3500	⩽20	2.5	9000
	80	79	202	126	350			⩽20		10000
	100	91	211	144	399			⩽20		10000
	120	91	235	144	423			⩽20		10000
40	50	91	267	130	456	4000	3000	⩽20	3.8	9000
	80	176	378	247	665			⩽20		10000
	100	196	430	300	727			⩽20		10000

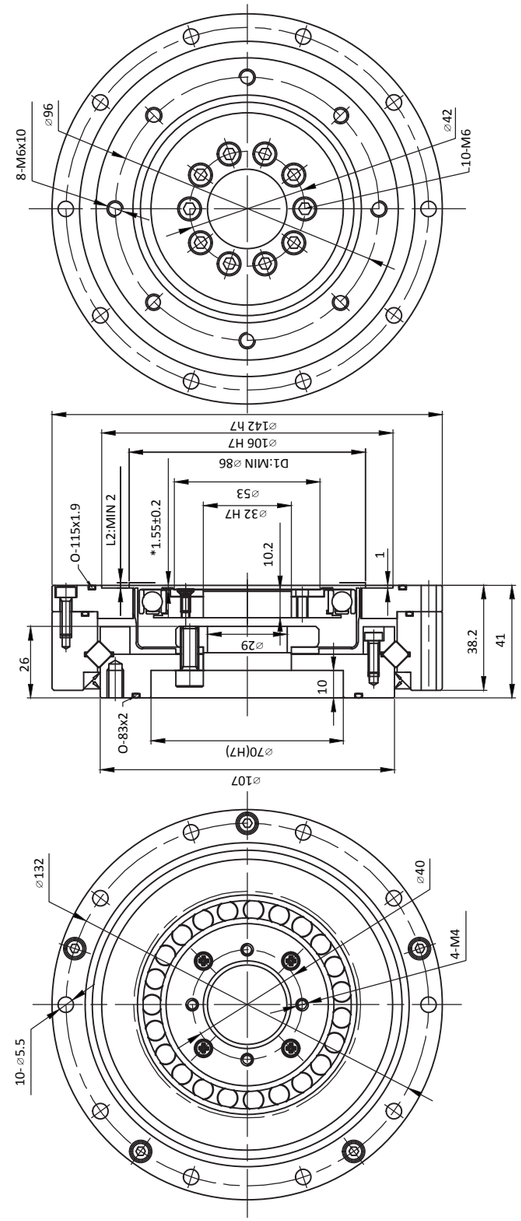
*** Consult factory**




12-M3x6
⌀50
⌀19.5
8-M4
⌀80 h7
⌀56 H7
D1:MIN ⌀46
⌀15 H7
O-62x1.5
L2:MIN 2
* 0.6 ±0.2
6.9
1
15.4
24.2
24.7
5.4
⌀9
O-40x1
⌀34(H7)
⌀59
⌀74
⌀21
4-M3
8-⌀3.4


8-M4x8
⌀60
⌀25
10-M4
⌀90 h7
⌀64 H7
D1:MIN ⌀55
⌀20 H7
O-72x1.5
L2:MIN 2
* 2.4 ±0.2
5.9
2.5
18
26.5
28
6
⌀18
O-50x1
⌀40(H7)
⌀70
⌀84
⌀26
4-M3
8-⌀3.4


8-M5X8
⌀73
⌀32
10-M5
⌀110 h7
⌀80 H7
D1:MIN ⌀67
⌀41
⌀24 H7
7.1
O-88x1.5
L2:MIN 2
* 1.8 ±0.2
1
31.4
32
20
⌀22
6
O-62x1.5
⌀52(H7)
⌀84
⌀102
⌀30
4-M3
10-⌀4.5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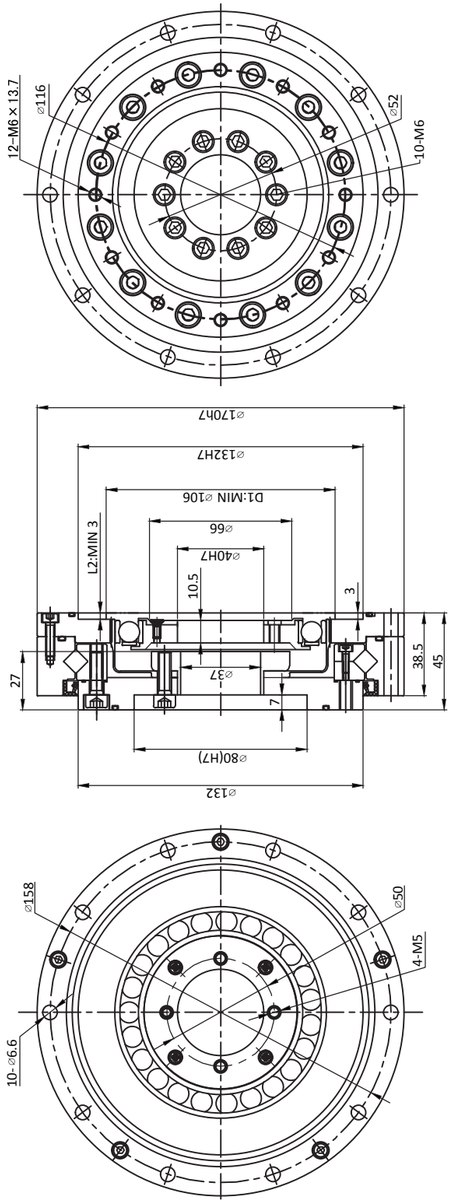
⌀96
⌀42
10-M6
⌀142 h7
⌀106 H7
D1:MIN ⌀86
⌀53
⌀32 H7
O-115x1.9
L2:MIN 2
*1.55±0.2
10.2
1
38.2
41
26
⌀29
10
O-83x2
⌀70(H7)
⌀107
⌀132
⌀40
4-M4
10-⌀5.5



LCS Series of Strain Wave Reducer

LCS-I

1. Cup shaped;
2. Hole with key way connected;

LCS-II

1. Cup shaped;
2. Oldham’s coupling connected;

Parameter Table

Bi-directional Accuracy Arc min						
Model / Reduction Ratio	14	17	20	25	32	40
50	2	2	2	2	2	2
All Reduction Ratio	1.5	1.5	1.5	1.5	1.5	1.5

Hysteresis Loss Arc min						
Model / Reduction Ratio	14	17	20	25	32	40
50	2.5	2	2	2	2	2
All Reduction Ratio	2	2	1.5	1.5	1.5	1.5

Torsional Stiffness x10^4 Nm/rad						
Model / Reduction Ratio	14	17	20	25	32	40
50	0.46	1.07	1.8	3.4	7.6	14
All Reduction Ratio	0.6	1.3	2.3	4.6	9.9	18.6

Starting Torque cNm						
Model / Reduction Ratio	14	17	20	25	32	40
50	4.5	6.5	8.5	16	32	56
80	3.5	4.5	5.5	10	20	38
100	3.2	3.8	5	9	19	32
120	—	3.5	4	8	16	30
160	—	—	3.8	7	15	25

*** Consult factory**

Parameter Table

Ratcheting Torque Nm						
Model	14	17	20	25	32	40
50	88	150	220	450	980	1800
80	110	200	350	680	1400	2800
100	84	160	260	500	1000	2100
120	—	120	240	470	980	1900
160	—	—	220	450	980	1800

Buckling Torque Nm						
Model	14	17	20	25	32	40
All Reduction Ratio	190	330	560	1000	2200	4300

Bending Moment and Thrust Sheet				
Model	Parameter	Rated Value	Parameter	Momentary Value
LCS-14	M_b	20 Nm	$M_{b\ max}$	40 Nm
	F_t	180 N	$F_{t\ max}$	320 N
	F_a	180 N	$F_{a\ max}$	320 N
LCS-17	M_b	30 Nm	$M_{b\ max}$	60 Nm
	F_t	230 N	$F_{t\ max}$	400 N
	F_a	230 N	$F_{a\ max}$	400 N
LCS-20	M_b	42 Nm	$M_{b\ max}$	80 Nm
	F_t	270 N	$F_{t\ max}$	480 N
	F_a	270 N	$F_{a\ max}$	480 N
LCS-25	M_b	80 Nm	$M_{b\ max}$	160 Nm
	F_t	440 N	$F_{t\ max}$	770 N
	F_a	440 N	$F_{a\ max}$	770 N
LCS-32	M_b	220 Nm	$M_{b\ max}$	440 Nm
	F_t	900 N	$F_{t\ max}$	1600 N
	F_a	900 N	$F_{a\ max}$	1600 N
LCS-40	M_b	320 Nm	$M_{b\ max}$	650 Nm
	F_t	1000 N	$F_{t\ max}$	1750 N
	F_a	1000 N	$F_{a\ max}$	1750 N

Note:
M_b: Bending Moment; F_t: Radial Force; F_a: Axial Force.

*** Consult factory**

LCS-I series

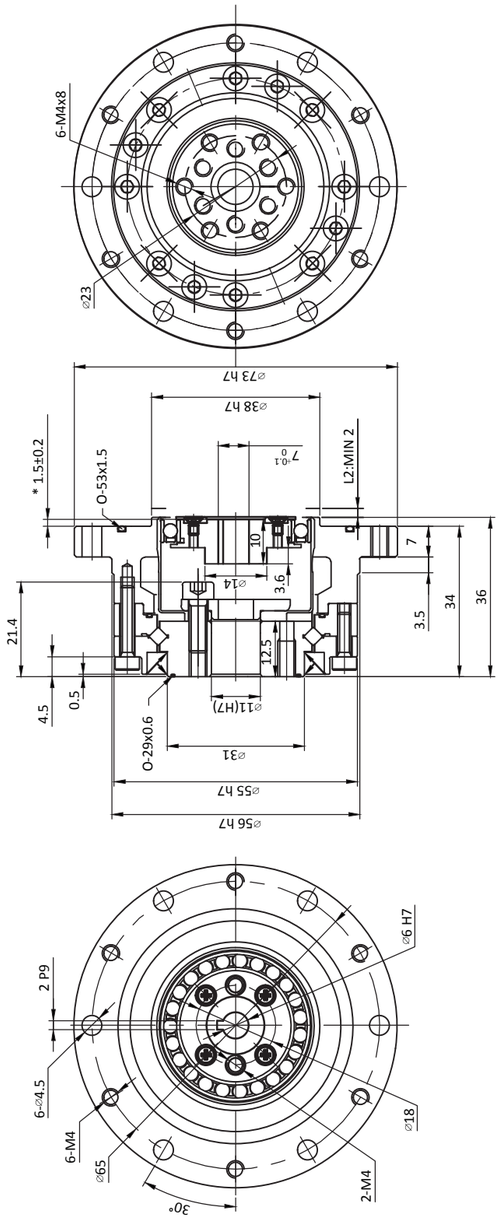
Parameter Table

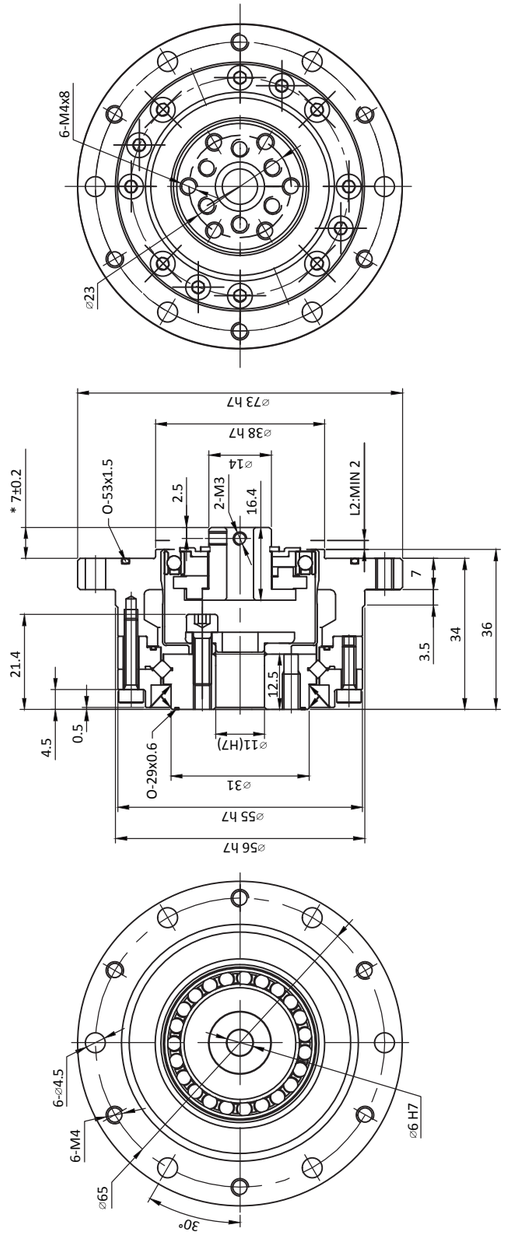
Item / Model No	Reduction Ratio	Rated Torque at Input 2000 rpm	Peak Torque at start and Stop	Average Torque	Max. Momentary Torque	Max. Input Speed	Average Input Speed	Back Lash	Weight	Design Life
		Nm	Nm	Nm	Nm	r/min	r/min	Arc sec	Kg	Hour
14	30	3. 8	8. 5	6. 5	16	8000	3500	≤20	0.51	10000
	50	5. 1	17. 1	6. 6	33			≤20		10000
	80	7. 4	22	10. 5	44			≤20		15000
	100	7. 4	26	10. 5	51			≤20		15000
17	30	8. 4	15	11. 5	28	7000	3500	≤20	0.68	10000
	50	15. 2	32	25	66			≤20		10000
	80	21	41	26	83			≤10		15000
	100	23	51	37	103			≤10		15000
	120	23	51	37	82			≤10		15000
20	30	14	26	19	48	6000	3500	≤20	0.98	10000
	50	24	53	32	93			≤20		10000
	80	32	70	45	121			≤10		15000
	100	38	78	47	140			≤10		15000
	120	38	83	47	140			≤10		15000
	160	38	87	47	140			≤10		15000
25	30	26	48	36	90	5500	3500	≤20	1.47	10000
	50	37	93	52	177			≤20		10000
	80	60	130	83	242			≤10		15000
	100	64	149	103	270			≤10		15000
	120	64	159	103	289			≤10		15000
	160	64	167	103	298			≤10		15000
32	30	51	95	71	190	4500	3500	≤20	3.19	10000
	50	72	205	103	363			≤20		10000
	80	112	289	159	540			≤10		15000
	100	130	316	205	615			≤10		15000
	120	130	335	205	652			≤10		15000
	160	130	353	205	652			≤10		15000
40	50	130	382	186	652	4000	3000	≤20	5. 0	10000
	80	196	493	270	931			≤10		15000
	100	252	540	353	1026			≤10		15000
	120	279	586	429	1121			≤10		15000
	160	279	615	429	1121			≤10		15000
45	50	167	475	252	902	3500	3000	≤20	7. 0	10000
	80	297	671	371	1206			≤10		15000
	100	335	717	475	1491			≤10		15000
	120	382	782	589	1672			≤10		15000
	160	382	838	599	1814			≤10		15000
50	50	233	679	333	1358	3000	2500	≤20	9. 0	10000
	80	353	894	493	1767			≤10		15000
	100	446	931	633	1957			≤10		15000
	120	503	1026	772	1957			≤10		15000
	160	503	1121	801	2327			≤10		15000

LCS-II series

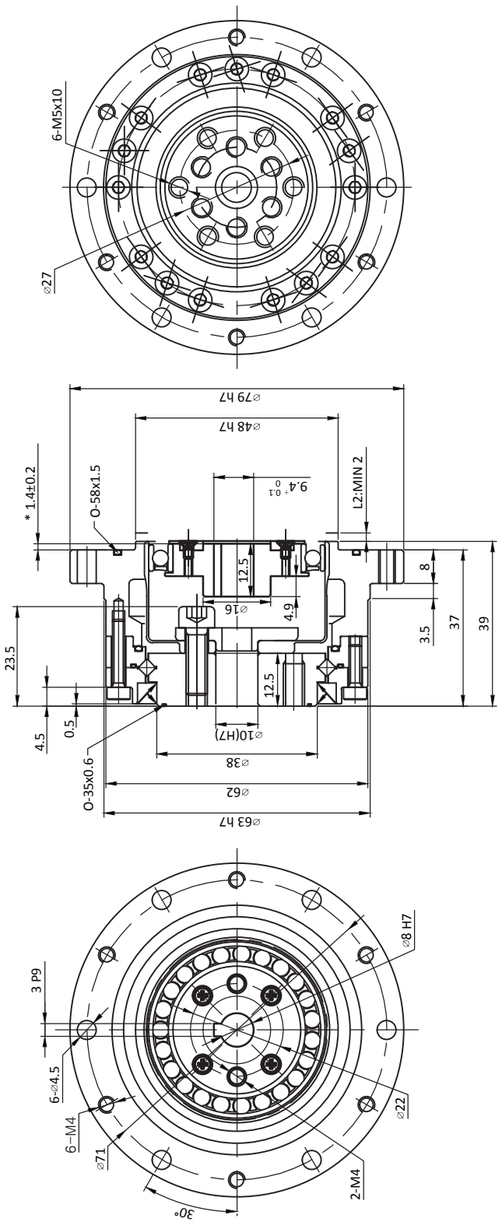
Parameter Table

Item / Model No	Reduction Ratio	Rated Torque at Input 2000 rpm	Peak Torque at start and Stop	Average Torque	Max. Momentary Torque	Max. Input Speed	Average Input Speed	Back Lash	Weight	Design Life
		Nm	Nm	Nm	Nm	r/min	r/min	Arc sec	Kg	Hour
14	30	3. 8	8. 5	6. 5	16	8000	3500	≤20	0.52	10000
	50	5. 1	17. 1	6. 6	33			≤20		10000
	80	7. 4	22	10. 5	44			≤20		15000
	100	7. 4	26	10. 5	51			≤20		15000
17	30	8. 4	15	11. 5	28	7000	3500	≤20	0.69	10000
	50	15. 2	32	25	66			≤20		10000
	80	21	41	26	83			≤20		15000
	100	23	51	37	103			≤20		15000
	120	23	51	37	82			≤20		15000
20	30	14	26	19	48	6000	3500	≤20	0.99	10000
	50	24	53	32	93			≤20		10000
	80	32	70	45	121			≤20		15000
	100	38	78	47	140			≤20		15000
	120	38	83	47	140			≤20		15000
	160	38	87	47	140			≤20		15000
25	30	26	48	36	90	5500	3500	≤20	1.48	10000
	50	37	93	52	177			≤20		10000
	80	60	130	83	242			≤20		15000
	100	64	149	103	270			≤20		15000
	120	64	159	103	289			≤20		15000
	160	64	167	103	298			≤20		15000
32	30	51	95	71	190	4500	3500	≤20	3.2	10000
	50	72	205	103	363			≤20		10000
	80	112	289	159	540			≤20		15000
	100	130	316	205	615			≤20		15000
	120	130	335	205	652			≤20		15000
	160	130	353	205	652			≤20		15000
40	50	130	382	186	652	4000	3000	≤20	5. 0	10000
	80	196	493	270	931			≤20		15000
	100	252	540	353	1026			≤20		15000
	120	279	586	429	1121			≤20		15000
	160	279	615	429	1121			≤20		15000
45	50	167	475	252	902	3500	3000	≤20	7. 0	10000
	80	297	671	371	1206			≤20		15000
	100	335	717	475	1491			≤20		15000
	120	382	782	589	1672			≤20		15000
	160	382	838	599	1814			≤20		15000
50	50	233	679	333	1358	3000	2500	≤20	9. 0	10000
	80	353	894	493	1767			≤20		15000
	100	446	931	633	1957			≤20		15000
	120	503	1026	772	1957			≤20		15000
	160	503	1121	801	2327			≤20		15000

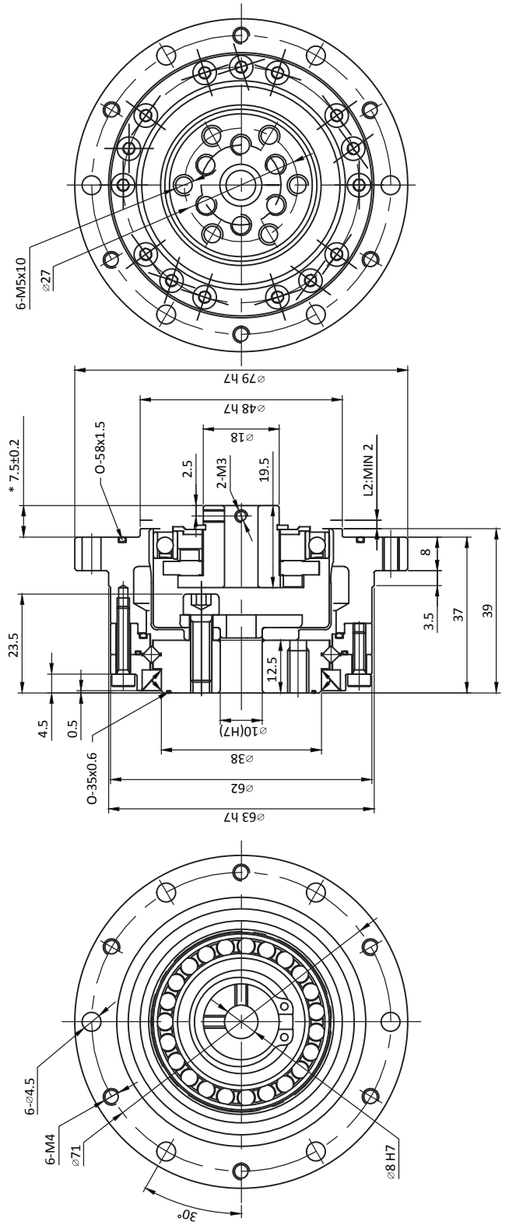

6-M4x8
⌀23
⌀73 h7
⌀38 h7
7 0 -0.1
L2:MIN 2
* 1.5±0.2
O-53x1.5
10
⌀14
3.6
7
3.5
34
36
21.4
4.5
0.5
12.5
⌀11(H7)
O-29x0.6
⌀31
⌀55 h7
⌀56 h7
2 P9
6-⌀4.5
6-M4
⌀65
30°
2-M4
⌀18
⌀6 H7


6-M4x8
⌀23
⌀73 h7
⌀38 h7
⌀14
* 7±0.2
O-53x1.5
2.5
2-M3
16.4
L2:MIN 2
7
3.5
34
36
21.4
4.5
0.5
12.5
⌀11(H7)
O-29x0.6
⌀31
⌀55 h7
⌀56 h7
6-⌀4.5
6-M4
⌀65
30°
⌀6 H7

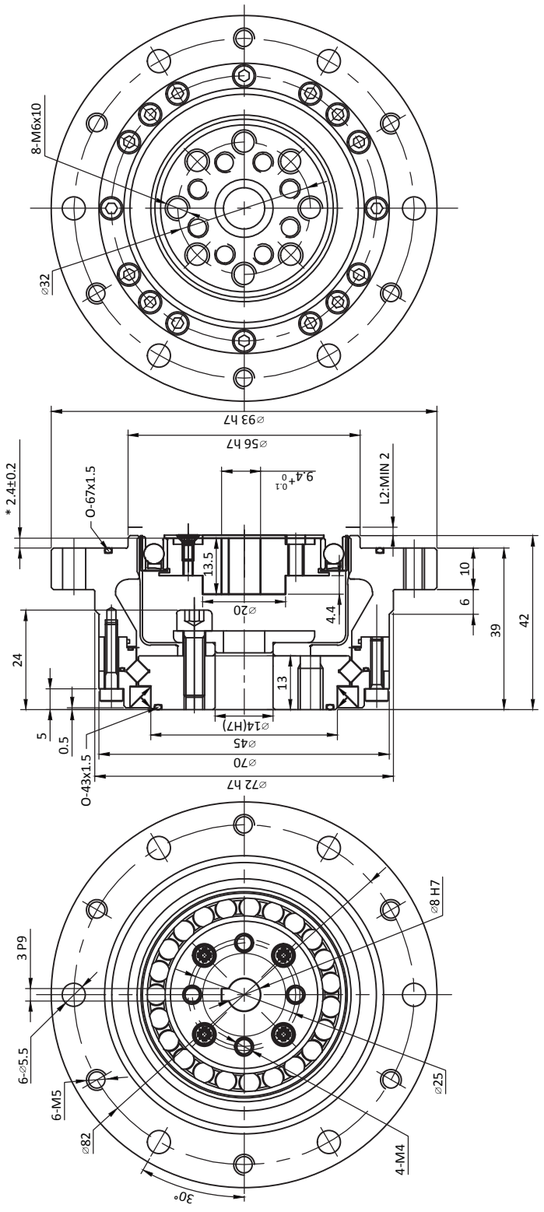
LCS-17-XXX-C-I



LCS-17-XXX-C-II



LCS-20-XXX-C-I



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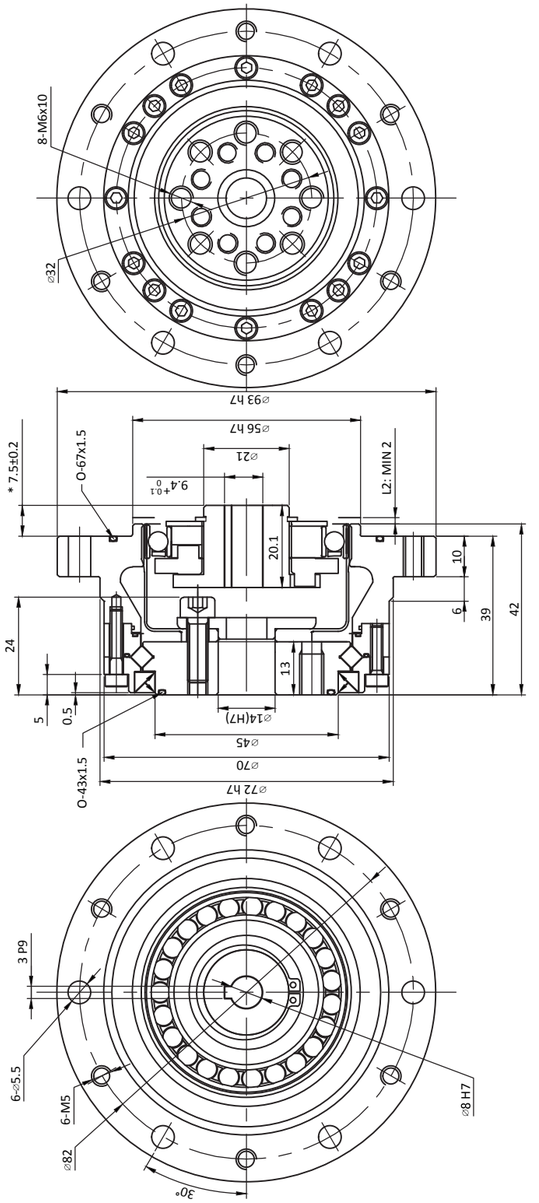

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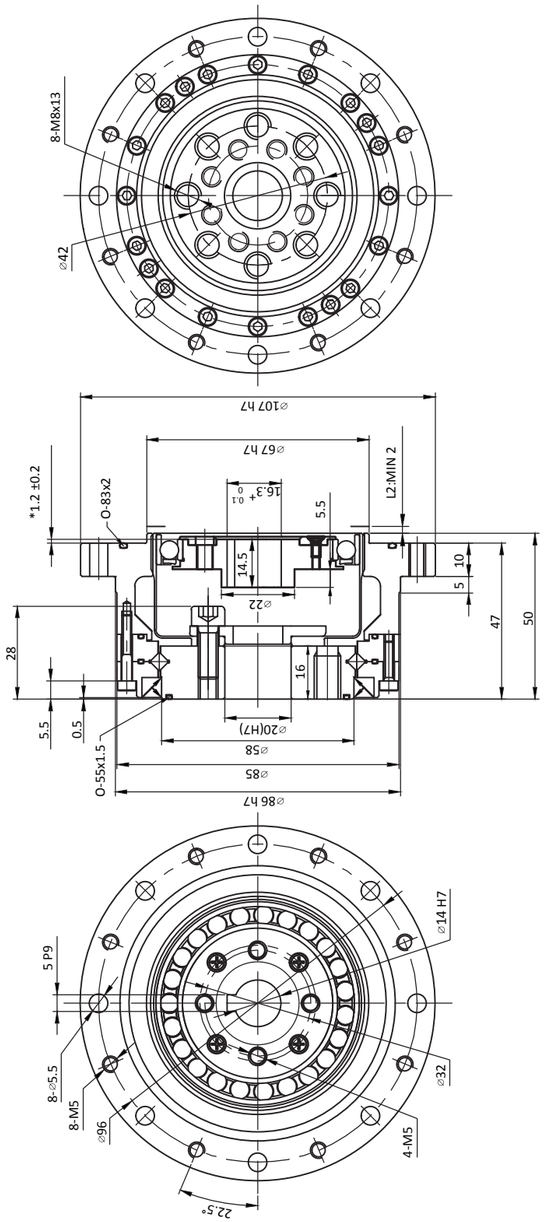
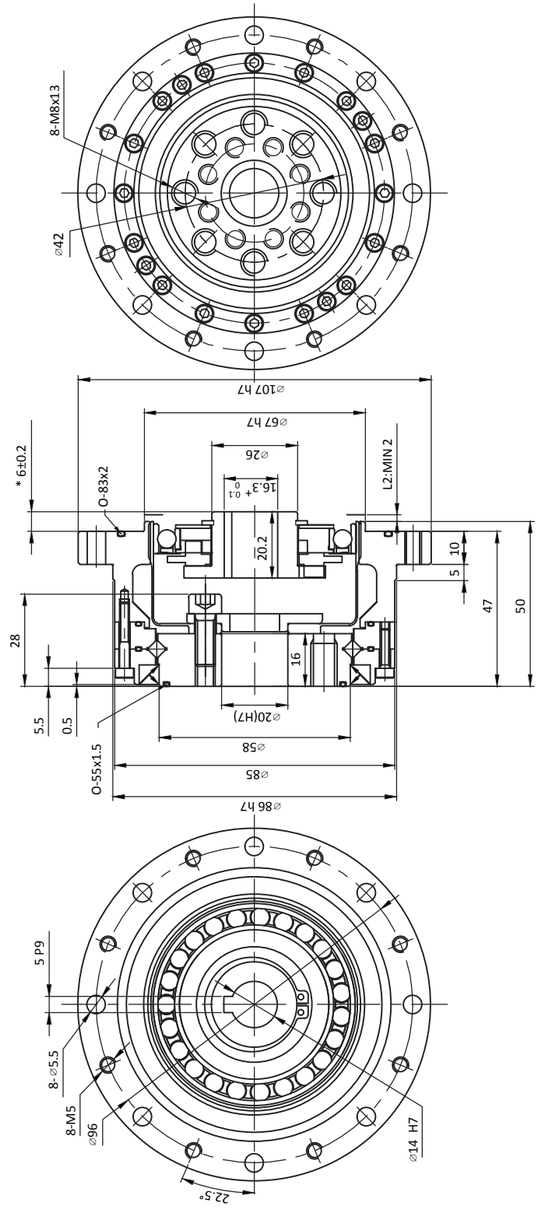
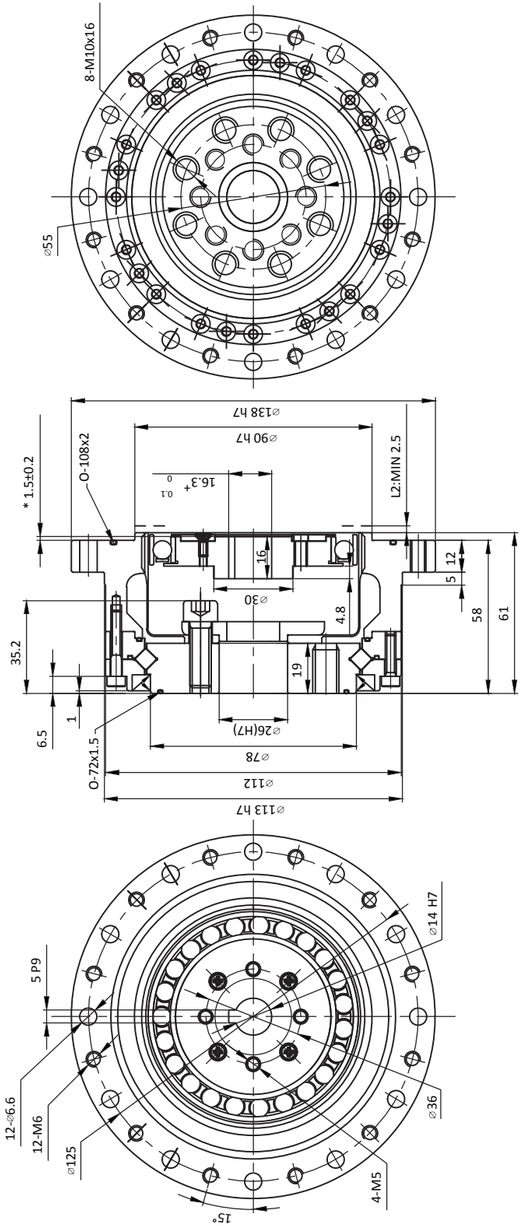


LCS-25-XXX-C-II



LCS-32-XXX-C-I



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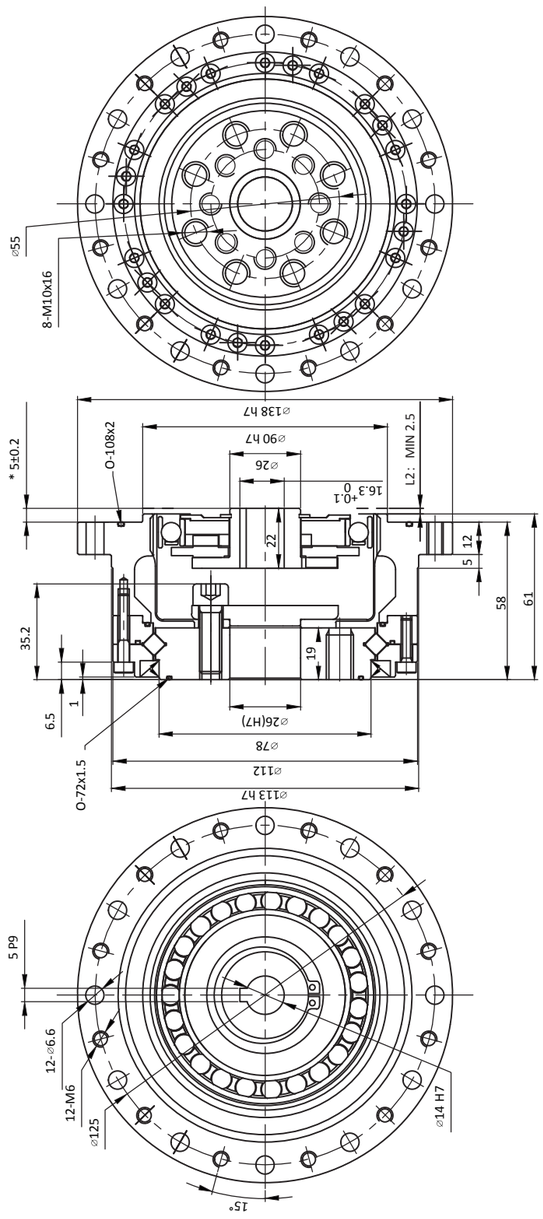

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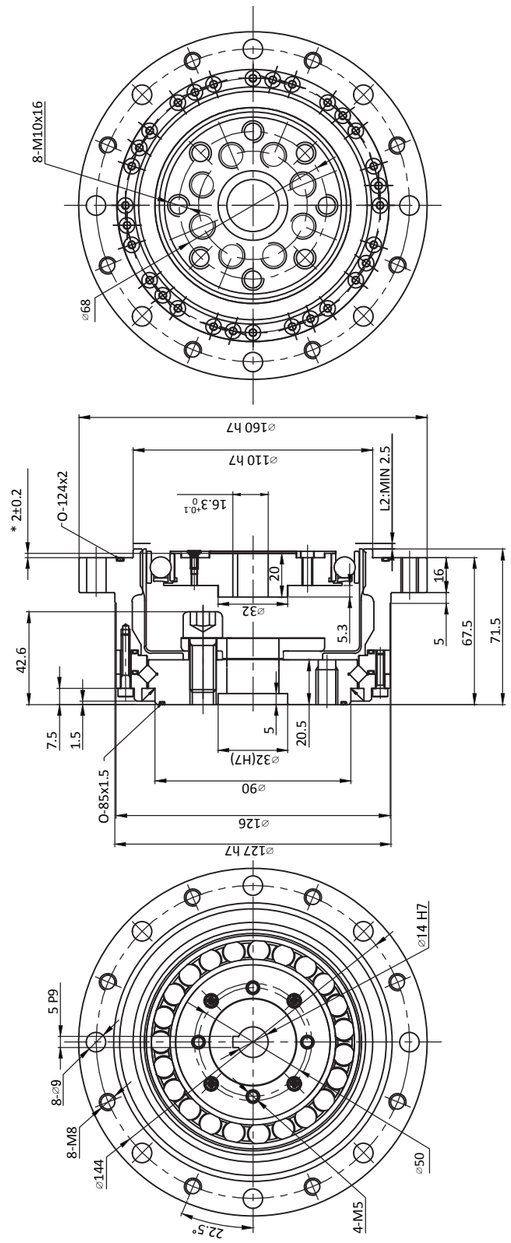

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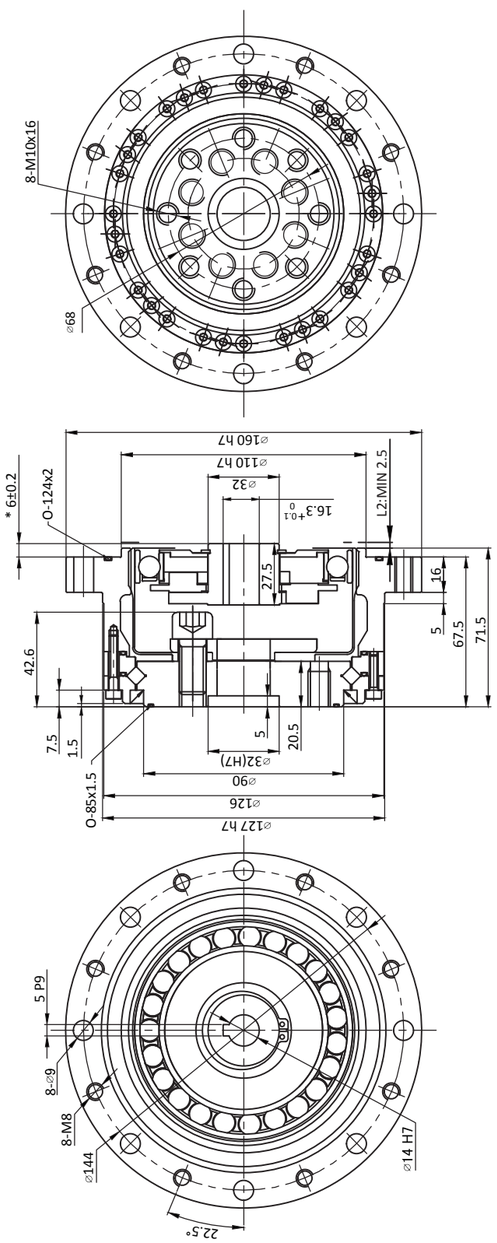


LCSG Series of Strain Wave Reducer

LCSG-I

1. Cup shaped;
2. Hole with key way connected;
3. More 30% torque capacity than LCS series;

LCSG-II

1. Cup shaped;
2. Oldham's coupling type;
3. More 30% torque capacity than LCS series;

Parameter Table

Bi-directional Accuracy Arc min						
Model / Reduction Ratio	14	17	20	25	32	40
50	2	2	2	2	2	2
80/100/120/160	1.5	1.5	1.5	1.5	1.5	1.5

Hysteresis Loss Arc min						
Model / Reduction Ratio	14	17	20	25	32	40
50	2.5	2	2	2	2	2
80/100/120/160	2	2	1.5	1.5	1.5	1.5

Torsional Stiffness x10⁴ Nm/rad						
Model / Reduction Ratio	14	17	20	25	32	40
50	0.46	1.07	1.8	3.4	7.6	14
80/100/120/160	0.6	1.3	2.3	4.6	9.9	18.6

Starting Torque cNm						
Model / Reduction Ratio	14	17	20	25	32	40
50	5	7	9	18	35	62
80	3.5	5	6	11	22	38
100	3.2	4	5.2	9.5	21	35
120	—	3.5	4	8.5	18	30
160	—	—	3.8	7	15	27

*** Consult factory**

Parameter Table

Ratcheting Torque Nm						
Model	14	17	20	25	32	40
50	110	190	280	580	1200	2300
80	140	260	450	880	1800	3600
100	100	200	330	650	1300	2700
120	—	150	310	610	1200	2400
160	—	—	280	580	1200	2300

Buckling Torque Nm						
Model	14	17	20	25	32	40
All Reduction Ratio	260	500	800	1700	3500	6700

Bending Moment and Thrust Sheet				
Model	Parameter	Rated Value	Parameter	Momentary Value
LHSG-14	M_b	20 Nm	$M_{b\ max}$	40 Nm
	F_t	180 N	$F_{t\ max}$	320 N
	F_a	180 N	$F_{a\ max}$	320 N
LHSG-17	M_b	30 Nm	$M_{b\ max}$	60 Nm
	F_t	230 N	$F_{t\ max}$	400 N
	F_a	230 N	$F_{a\ max}$	400 N
LHSG-20	M_b	42 Nm	$M_{b\ max}$	80 Nm
	F_t	270 N	$F_{t\ max}$	480 N
	F_a	270 N	$F_{a\ max}$	480 N
LHSG-25	M_b	80 Nm	$M_{b\ max}$	160 Nm
	F_t	440 N	$F_{t\ max}$	770 N
	F_a	440 N	$F_{a\ max}$	770 N
LHSG-32	M_b	220 Nm	$M_{b\ max}$	440 Nm
	F_t	900 N	$F_{t\ max}$	1600 N
	F_a	900 N	$F_{a\ max}$	1600 N
LHSG-40	M_b	320 Nm	$M_{b\ max}$	650 Nm
	F_t	1000 N	$F_{t\ max}$	1750 N
	F_a	1000 N	$F_{a\ max}$	1750 N

Note:
M_b: Bending Moment; F_t: Radial Force; F_a: Axial Force.

*** Consult factory**

Parameter Table

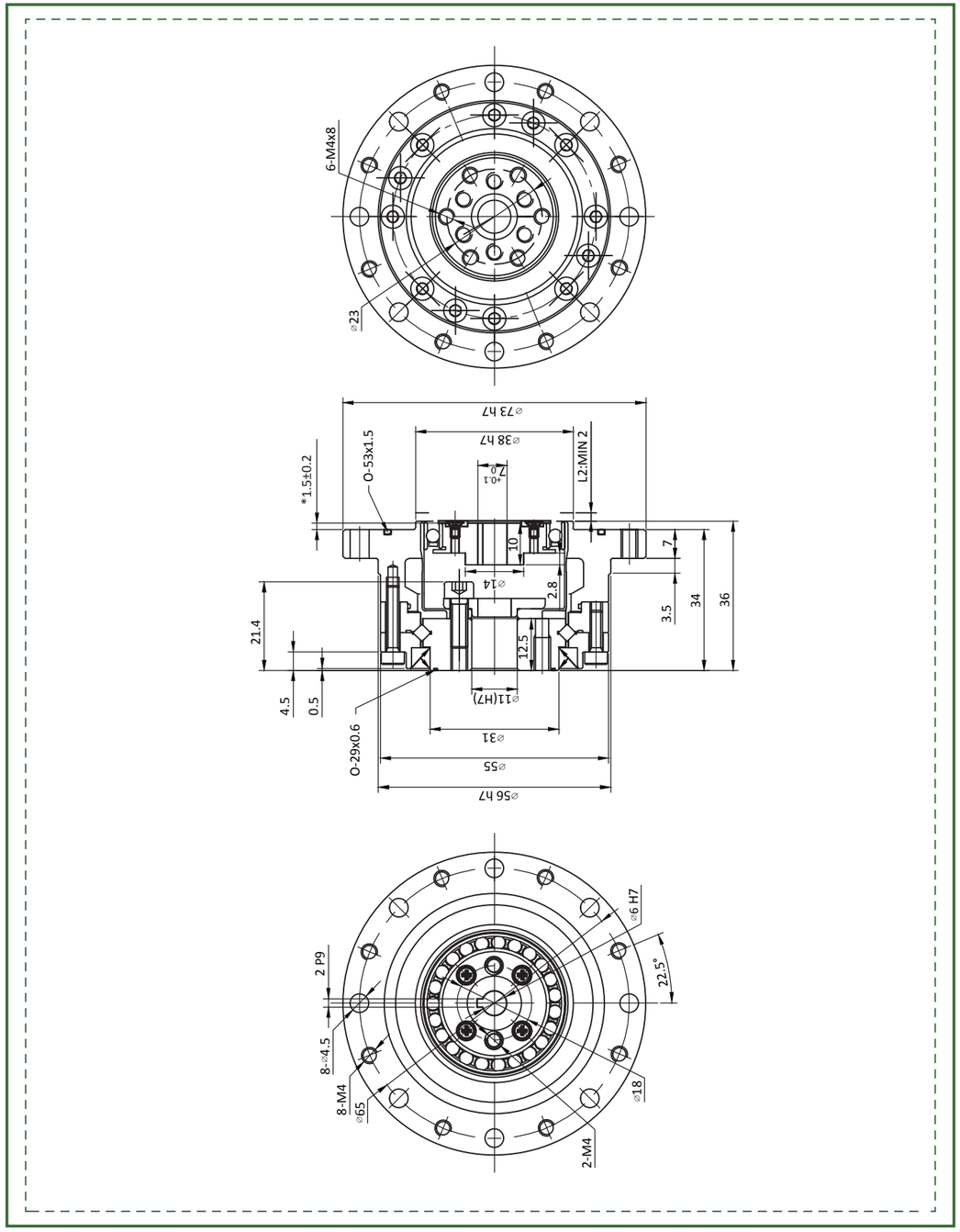
Item / Model No	Reduction Ratio	Rated Torque at Input 2000 rpm	Peak Torque at start and Stop	Average Torque	Max. Momentary Torque	Max. Input Speed	Average Input Speed	Back Lash	Weight	Design Life
		Nm	Nm	Nm	Nm	r/min	r/min	Arc sec	Kg	Hour
14	50	6. 6	23	8. 6	43	8000	3500	⩽10	0. 51	10000
	80	9. 6	29	13. 5	57			⩽10		15000
	100	9. 6	34	13. 5	66			⩽10		15000
17	50	19. 8	42	32. 5	86	7000	3500	⩽10	0. 68	10000
	80	27. 5	53	33. 5	108			⩽10		15000
	100	30	66	48. 5	134			⩽10		15000
	120	30	66	48. 5	107			⩽10		15000
20	50	32	69	42	121	6000	3500	⩽10	0. 98	10000
	80	42	91	58	158			⩽10		15000
	100	50	102	61	182			⩽10		15000
	120	50	108	61	182			⩽10		15000
	160	50	113	61	182			⩽10		15000
25	50	48	121	68. 5	230	5500	3500	⩽10	1. 47	10000
	80	78	169	107. 5	315			⩽10		15000
	100	84	194	133	351			⩽10		15000
	120	84	207	133	376			⩽10		15000
	160	84	217	133	388			⩽10		15000
32	50	94	267	133	472	4500	3500	⩽10	3. 19	10000
	80	146	376	206	702			⩽10		15000
	100	169	411	267	800			⩽10		15000
	120	169	436	267	848			⩽10		15000
	160	169	459	267	848			⩽10		15000
40	50	169	497	242	847	4000	3000	⩽10	5. 0	10000
	80	255	641	351	1210			⩽10		15000
	100	328	702	460	1334			⩽10		15000
	120	363	762	557	1458			⩽10		15000
	160	363	800	557	1458			⩽10		15000
50	80	459	1163	642	2297	3000	2500	⩽10	9. 0	15000
	100	580	1211	823	2545			⩽10		15000
	120	654	1334	1005	2545			⩽10		15000
	160	654	1458	1042	3025			⩽10		15000
58	80	678	1828	951	3026	3000	2200	⩽10	14. 8	15000
	100	860	1964	1309	3927			⩽10		15000
	120	921	2124	1470	4113			⩽10		15000
	160	921	2272	1494	4236			⩽10		15000

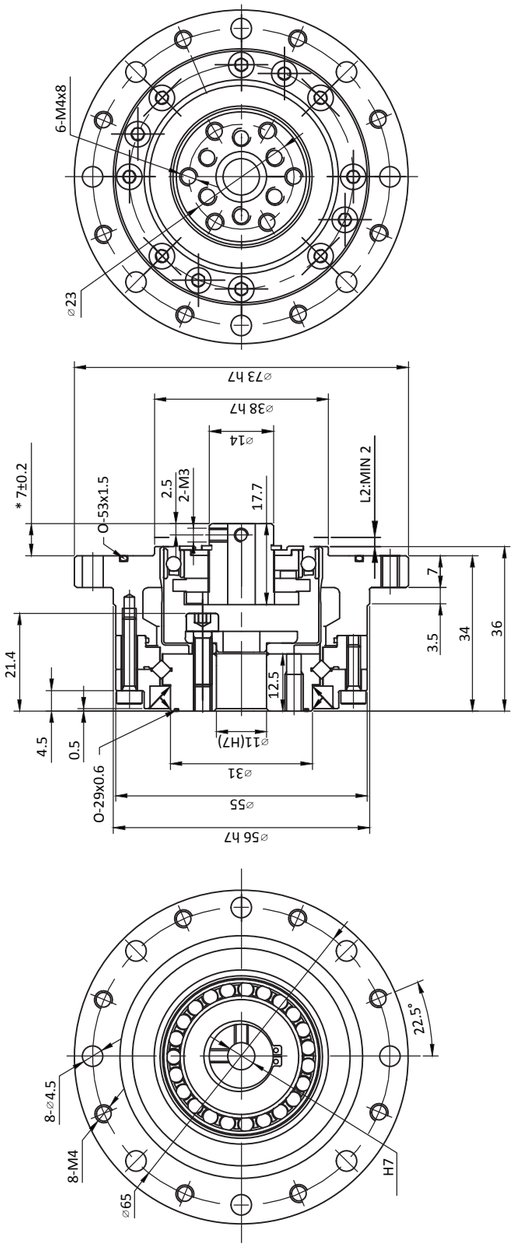
*** Consult factory**

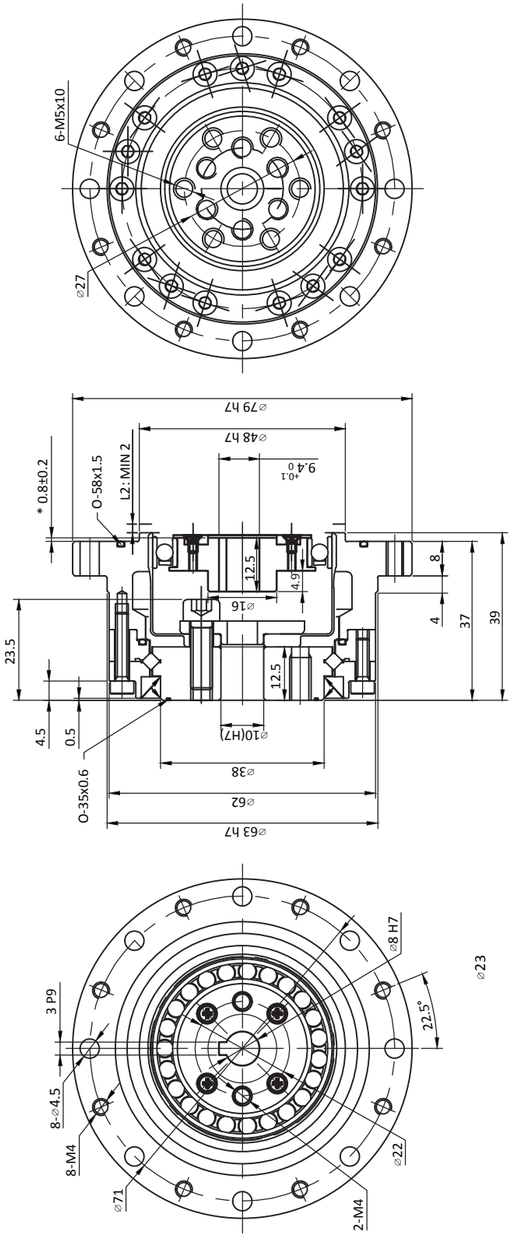
Parameter Table

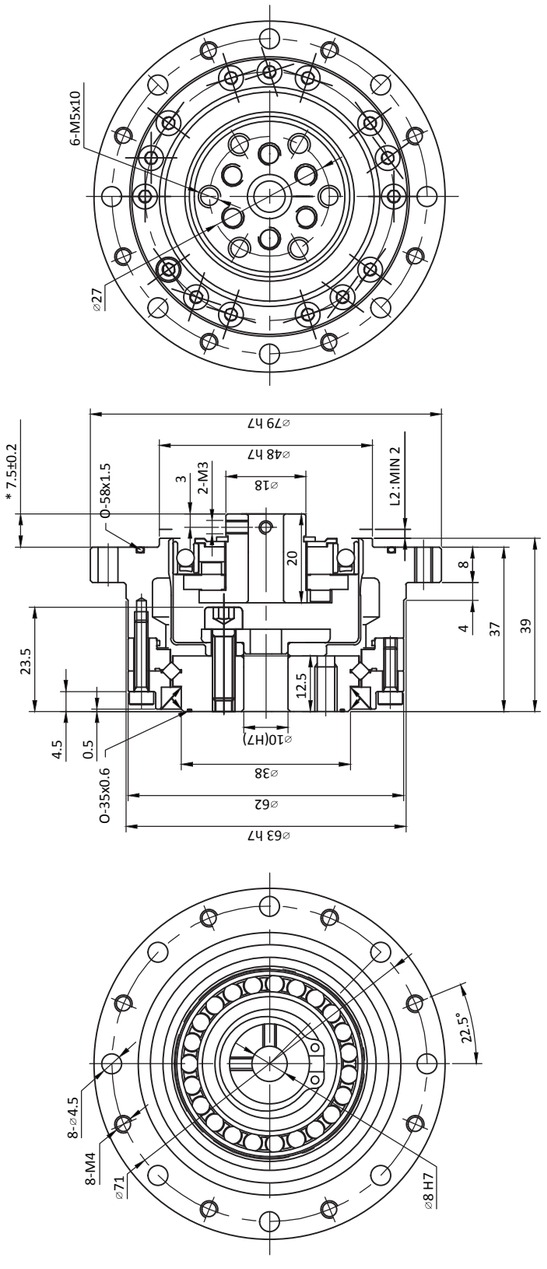
Item / Model No	Reduction Ratio	Rated Torque at Input 2000 rpm	Peak Torque at start and Stop	Average Torque	Max. Momentary Torque	Max. Input Speed	Average Input Speed	Back Lash	Weight	Design Life
		Nm	Nm	Nm	Nm	r/min	r/min	Arc sec	Kg	Hour
14	50	6. 6	23	8. 6	43	8000	3500	≤20	0. 52	10000
	80	9. 6	29	13. 5	57			≤20		15000
	100	9. 6	34	13. 5	66			≤20		15000
17	50	19. 8	42	32. 5	86	7000	3500	≤20	0. 69	10000
	80	27. 5	53	33. 5	108			≤20		15000
	100	30	66	48. 5	134			≤20		15000
	120	30	66	48. 5	107			≤20		15000
20	50	32	69	42	121	6000	3500	≤20	0. 99	10000
	80	42	91	58	158			≤20		15000
	100	50	102	61	182			≤20		15000
	120	50	108	61	182			≤20		15000
	160	50	113	61	182			≤20		15000
25	50	48	121	68. 5	230	5500	3500	≤20	1. 48	10000
	80	78	169	107. 5	315			≤20		15000
	100	84	194	133	351			≤20		15000
	120	84	207	133	376			≤20		15000
	160	84	217	133	388			≤20		15000
32	50	94	267	133	472	4500	3500	≤20	3. 2	10000
	80	146	376	206	702			≤20		15000
	100	169	411	267	800			≤20		15000
	120	169	436	267	848			≤20		15000
	160	169	459	267	848			≤20		15000
40	50	169	497	242	847	4000	3000	≤20	5. 0	10000
	80	255	641	351	1210			≤20		15000
	100	328	702	460	1334			≤20		15000
	120	363	762	557	1458			≤20		15000
	160	363	800	557	1458			≤20		15000
50*	80	459	1163	642	2297	3000	2500	≤20	9. 0	15000
	100	580	1211	823	2545			≤20		15000
	120	654	1334	1005	2545			≤20		15000
	160	654	1458	1042	3025			≤20		15000
58*	80	678	1828	951	3026	3000	2200	≤10	14. 8	15000
	100	860	1964	1309	3927			≤10		15000
	120	921	2124	1470	4113			≤10		15000
	160	921	2272	1494	4236			≤10		15000

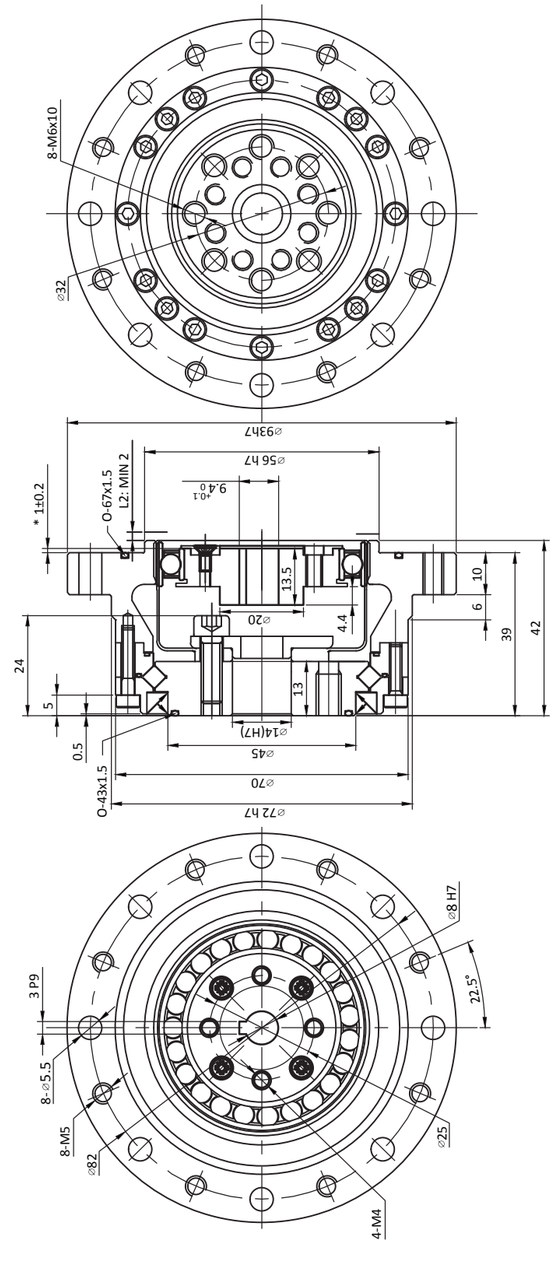
*** Consult factory**

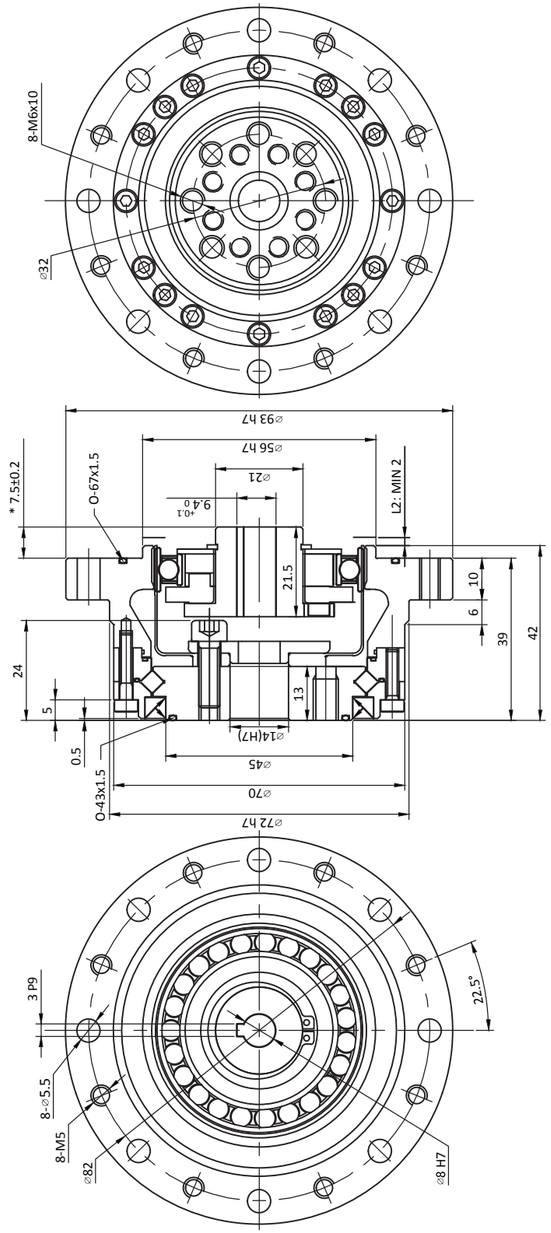


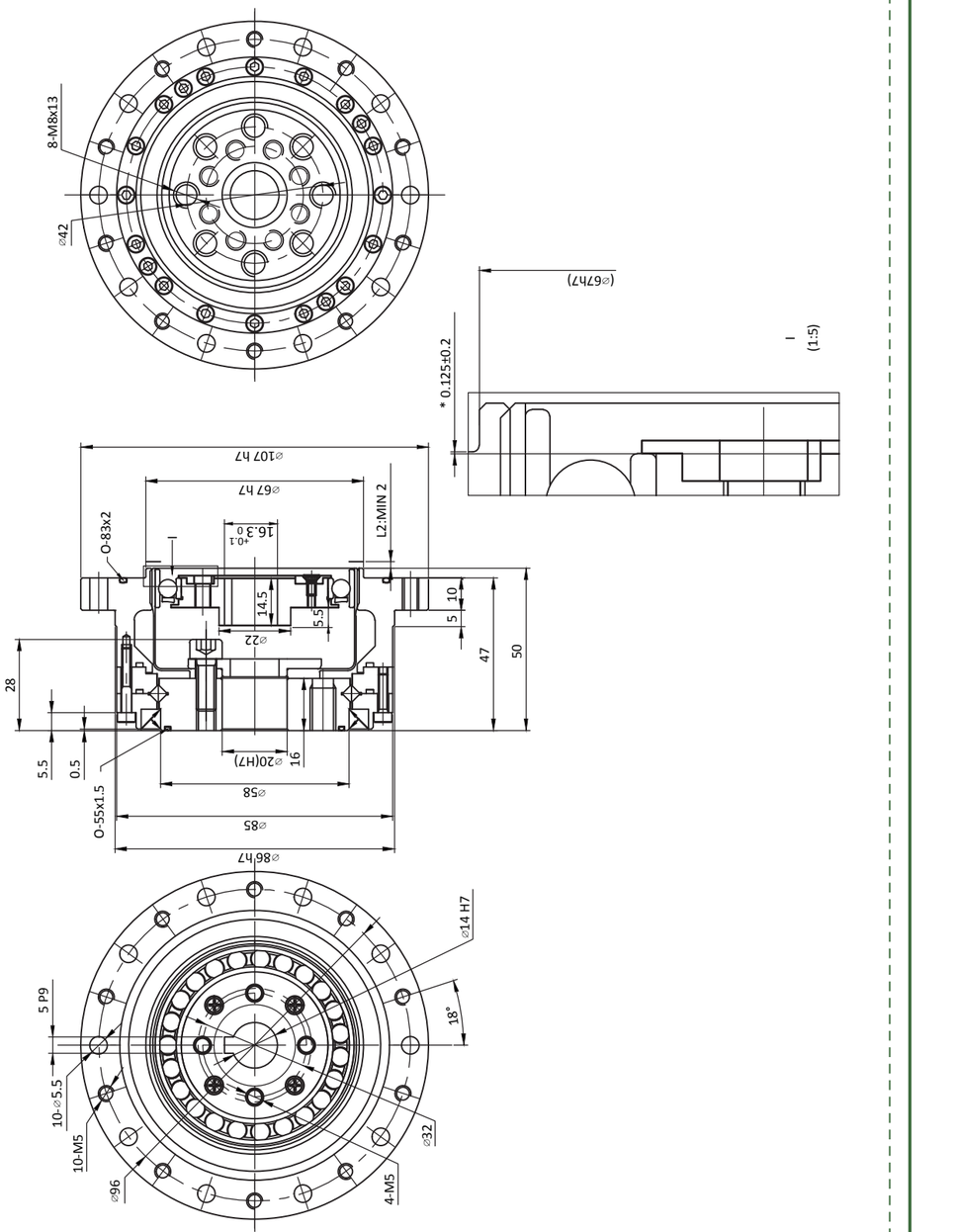

6-M4x8
⌀23
⌀73 h7
⌀38 h7
⌀14
* 7±0.2
O-53x1.5
2.5
2-M3
17.7
L2:MIN 2
7
3.5
34
36
21.4
12.5
4.5
0.5
⌀11(H7)
⌀31
O-29x0.6
⌀55
⌀56 h7
22.5°
8-⌀4.5
8-M4
⌀65
H7

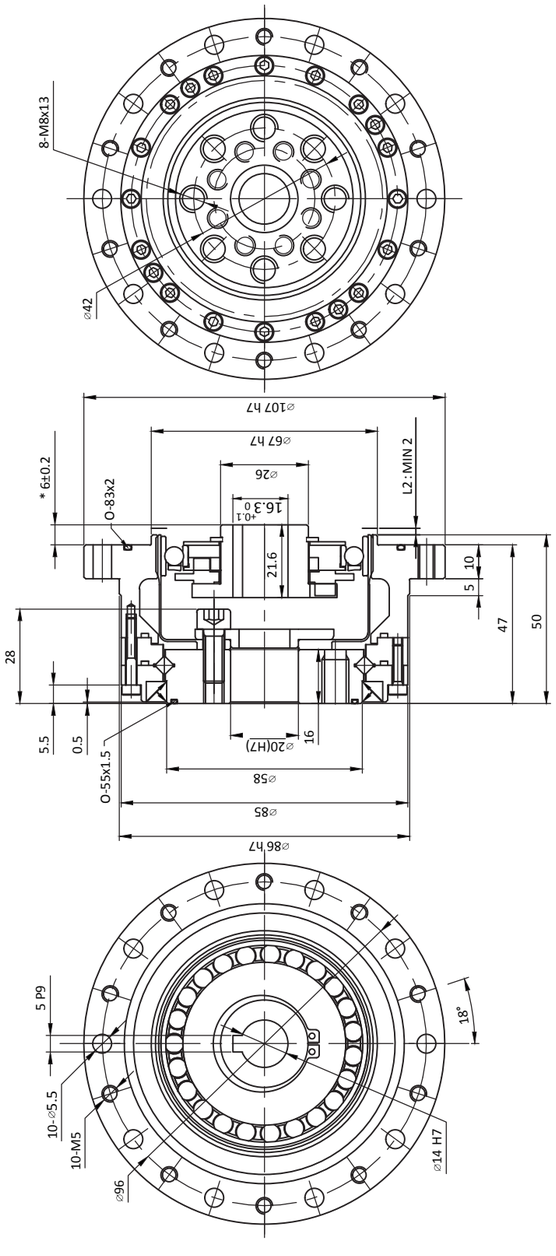

6-M5x10
⌀27
⌀79 h7
⌀48 h7
* 0.8±0.2
O-58x1.5
L2: MIN 2
⌀16
12.5
4.9
8
4
37
39
23.5
12.5
4.5
0.5
⌀10(H7)
⌀38
O-35x0.6
⌀62
⌀63 h7
3 P9
⌀8 H7
22.5°
⌀23
8-⌀4.5
8-M4
⌀71
⌀22
2-M4

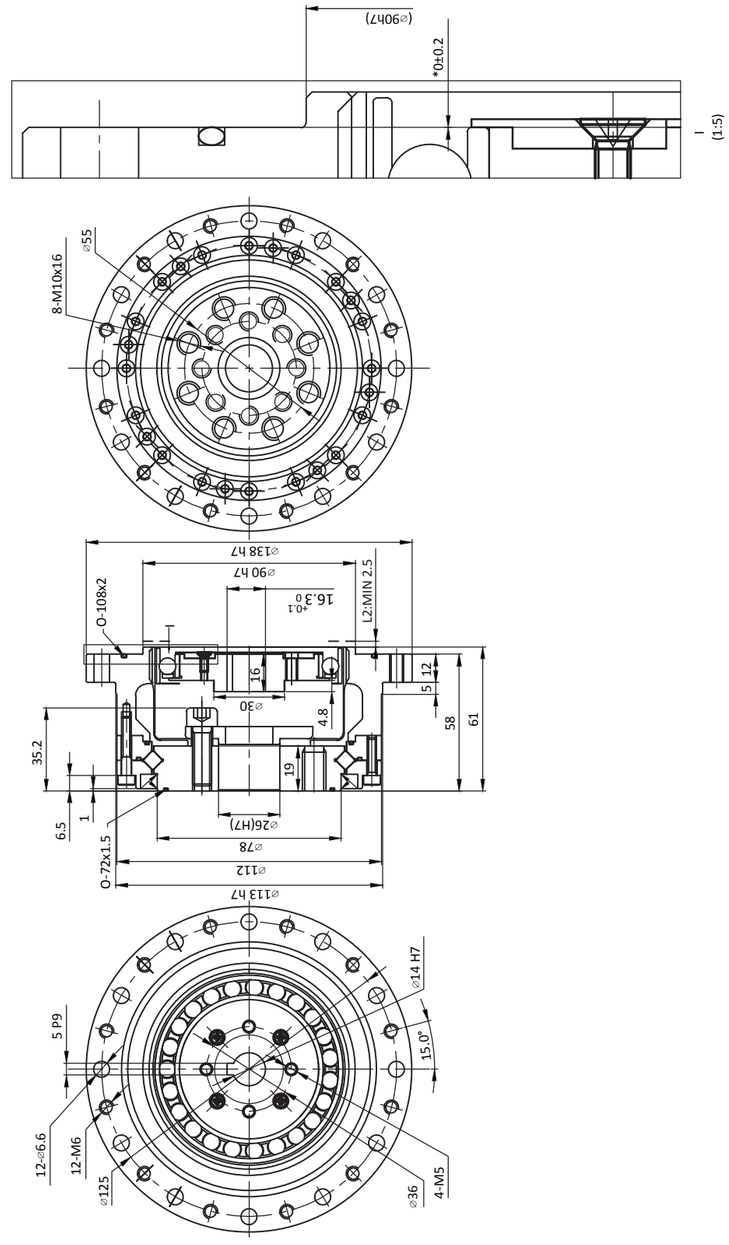

6-M5x10
⌀27
⌀79 h7
⌀48 h7
⌀18
3
2-M3
L2:MIN 2
* 7.5±0.2
O-58x1.5
20
8
4
37
39
23.5
12.5
⌀10(H7)
4.5
0.5
⌀38
O-35x0.6
⌀62
⌀63 h7
22.5°
8-⌀4.5
8-M4
⌀71
⌀8 H7

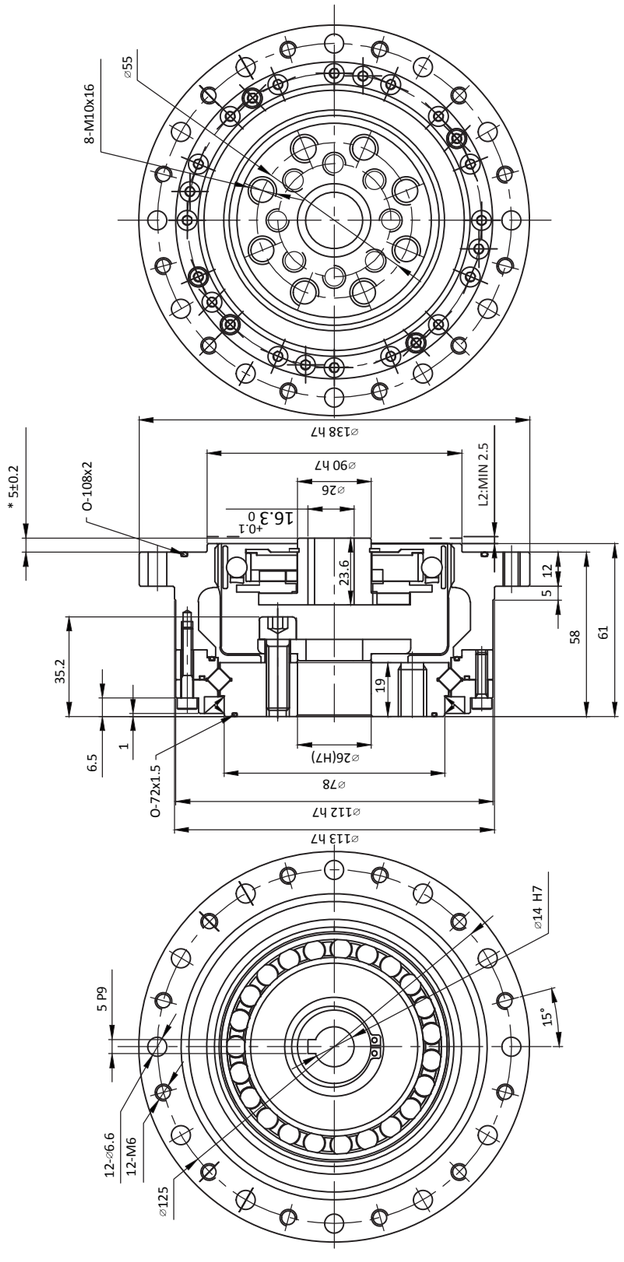

8-M6x10
⌀32
⌀93h7
⌀56 h7
9.4 +0.1 0
* 1±0.2
O-67x1.5
L2: MIN 2
13.5
10
6
39
42
⌀20
4.4
24
5
13
⌀14(H7)
0.5
⌀45
O-43x1.5
⌀70
⌀72 h7
3 P9
8-⌀5.5
8-M5
⌀82
⌀8 H7
22.5°
⌀25
4-M4

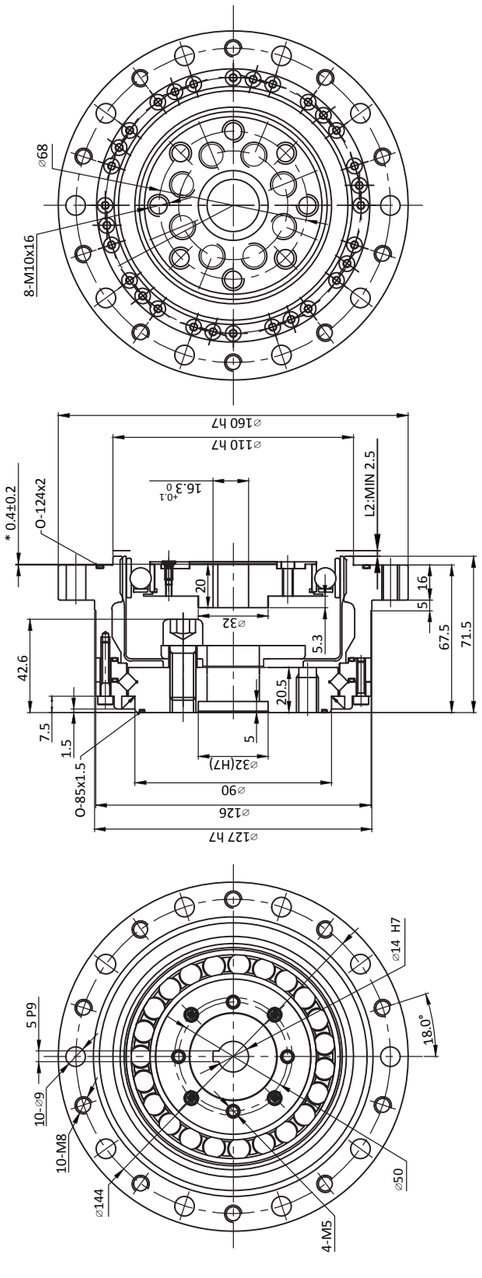

8-M6x10
⌀32
⌀93 h7
⌀56 h7
⌀21
9.4 +0.1 0
L2: MIN 2
* 7.5±0.2
O-67x1.5
21.5
10
6
39
42
24
5
13
⌀14(H7)
⌀45
0.5
O-43x1.5
⌀70
⌀72 h7
3 P9
22.5°
8-⌀5.5
8-M5
⌀82
⌀8 H7

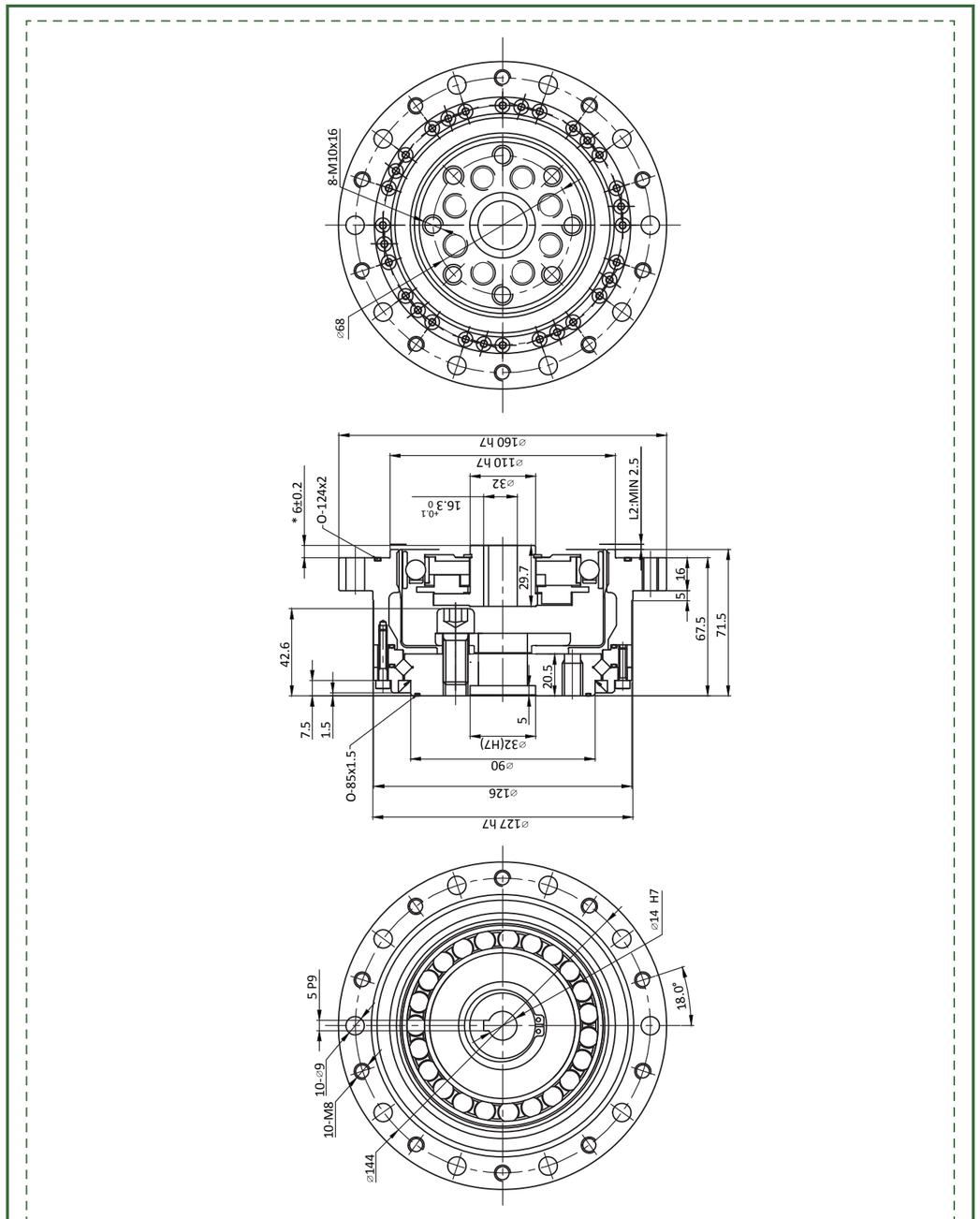

8-M8x13
⌀42
(⌀67h7)
– (1:5)
* 0.125±0.2
⌀107 h7
⌀67 h7
16.3 +0.1 0
L2:MIN 2
O-83x2
14.5
5.5
⌀22
10
5
47
50
28
5.5
0.5
⌀20(H7)
16
⌀58
O-55x1.5
⌀85
⌀86h7
⌀14 H7
5 P9
18°
10-⌀5.5
10-M5
⌀96
⌀32
4-M5


8-M8x13
⌀42
⌀107 h7
⌀67 h7
⌀26
16.3 +0.1 0
* 6±0.2
O-83x2
L2:MIN 2
21.6
9
10
5
47
50
28
5.5
0.5
O-55x1.5
⌀20(H7)
16
⌀58
⌀85
⌀86 h7
5 P9
18°
10-⌀5.5
10-M5
⌀96
⌀14 H7


(⌀90 h7)
*10±0.2
(1:5)
8-M10x16
⌀55
⌀138 h7
⌀90 h7
16.3 +0.1 0
L2:MIN 2.5
O-108x2
16
⌀30
4.8
19
5
12
58
61
35.2
6.5
1
O-72x1.5
⌀26(H7)
⌀78
⌀112
⌀113 h7
5 P9
⌀14 H7
15.0°
12-⌀6.6
12-M6
⌀125
⌀36
4-M5


8-M10x16
⌀55
⌀138 h7
⌀90 h7
⌀26
16.3 +0.1 0
* 5±0.2
O-108x2
L2:MIN 2.5
23.6
12
5
58
61
35.2
19
6.5
1
O-72x1.5
⌀26(H7)
⌀78
⌀112 h7
⌀113 h7
⌀14 H7
5 P9
15°
12-⌀6.6
12-M6
⌀125


⌀68
8-M10x16
⌀160 h7
⌀110 h7
16.3 +0.1 0
* 0.4±0.2
O-124x2
L2:MIN 2.5
20
⌀32
5
16
67.5
71.5
42.6
5.3
20.5
7.5
1.5
5
⌀32(H7)
O-85x1.5
⌀90
⌀126
⌀127 h7
⌀14 H7
5 P9
18.0°
10-⌀9
10-M8
⌀144
⌀50
4-M5



LHD Series of Strain Wave Reducer

LHD-I

1. Hollow shaped;
2. Ultra flat structure;
3. Hole with key way connected;

LHD-III

1. Hollow shaped;
2. Ultra flat structure;
3. Big hole for passing cable through;

Parameter Table

Bi-directional Accuracy Arc min						
Model / Reduction Ratio	14	17	20	25	32	40
50	2	2	2	2	2	2
80/100/120/160	1.5	1.5	1.5	1.5	1.5	1.5

Hysteresis Loss Arc min						
Model / Reduction Ratio	14	17	20	25	32	40
50	2.5	2	2	2	2	2
80/100/120/160	2	2	1.5	1.5	1.5	1.5

Torsional Stiffness x10^4 Nm/rad						
Model / Reduction Ratio	14	17	20	25	32	40
50	0.37	0.91	1.46	2.8	6.4	11.6
80/100/120/160	0.48	1.03	1.8	3.7	8.3	15

Starting Torque cNm						
Model / Reduction Ratio	14	17	20	25	32	40
50	4.5	6.5	8.5	16	32	56
80	3.5	4.5	5.5	10	20	38
100	3.2	3.8	5	9	19	32
120	—	3.5	4	8	16	30
160	—	—	3.8	7	15	25

*** Consult factory**

Parameter Table

Ratcheting Torque Nm						
Model	14	17	20	25	32	40
50	88	150	220	450	980	1800
80	84	160	260	500	1000	2100
100	84	160	260	500	1000	2100
120	—	160	260	500	1000	2100
160	—	—	220	450	980	1800

Buckling Torque Nm						
Model	14	17	20	25	32	40
All Reduction Ratio	130	260	470	850	1800	3600

Bending Moment and Thrust Sheet				
Model	Parameter	Rated Value	Parameter	Momentary Value
LHSG-14	M_b	41 Nm	$M_{b\ max}$	80 Nm
	F_t	270 N	$F_{t\ max}$	490 N
	F_a	270 N	$F_{a\ max}$	490 N
LHSG-17	M_b	59 Nm	$M_{b\ max}$	140 Nm
	F_t	330 N	$F_{t\ max}$	570 N
	F_a	330 N	$F_{a\ max}$	570 N
LHSG-20	M_b	117 Nm	$M_{b\ max}$	230 Nm
	F_t	550 N	$F_{t\ max}$	975 N
	F_a	550 N	$F_{a\ max}$	975 N
LHSG-25	M_b	213 Nm	$M_{b\ max}$	420 Nm
	F_t	790 N	$F_{t\ max}$	1400 N
	F_a	790 N	$F_{a\ max}$	1400 N
LHSG-32	M_b	400 Nm	$M_{b\ max}$	800 Nm
	F_t	1240 N	$F_{t\ max}$	2100 N
	F_a	1240 N	$F_{a\ max}$	2100 N
LHSG-40	M_b	600 Nm	$M_{b\ max}$	1200 Nm
	F_t	1530 N	$F_{t\ max}$	2670 N
	F_a	1530 N	$F_{a\ max}$	2670 N

Note:
M_b: Bending Moment; F_t: Radial Force; F_a: Axial Force.

*** Consult factory**

Parameter Table

Bi-directional Accuracy Arc min						
Model / Reduction Ratio	14	17	20	25	32	40
50	2	2	2	2	2	2
80/100/120/160	1.5	1.5	1.5	1.5	1.5	1.5

Hysteresis Loss Arc min						
Model / Reduction Ratio	14	17	20	25	32	40
50	2.5	2	2	2	2	2
80/100/120/160	2	2	1.5	1.5	1.5	1.5

Torsional Stiffness x10⁴ Nm/rad						
Model / Reduction Ratio	14	17	20	25	32	40
50	0.37	0.91	1.46	2.8	6.4	11.6
80/100/120/160	0.48	1.03	1.8	3.7	8.3	15

Starting Torque cNm						
Model / Reduction Ratio	14	17	20	25	32	40
50	4.5	6.5	8.5	16	32	56
80	3.5	4.5	5.5	10	20	38
100	3.2	3.5	5	9	19	32
120	—	3.5	4	8	16	30
160	—	—	3.8	7	15	25

*** Consult factory**

Parameter Table

Ratcheting Torque Nm						
Model	14	17	20	25	32	40
50	88	150	220	450	980	1800
80	84	160	260	500	1000	2100
100	84	160	260	500	1000	2100
120	—	160	260	500	1000	2100
160	—	—	220	450	980	1800

Buckling Torque Nm						
Model	14	17	20	25	32	40
All Reduction Ratio	130	260	470	850	1800	3600

Bending Moment and Thrust Sheet				
Model	Parameter	Rated Value	Parameter	Momentary Value
LHSG-14	M_b	41 Nm	$M_{b\ max}$	80 Nm
	F_t	270 N	$F_{t\ max}$	490 N
	F_a	270 N	$F_{a\ max}$	490 N
LHSG-17	M_b	59 Nm	$M_{b\ max}$	140 Nm
	F_t	330 N	$F_{t\ max}$	570 N
	F_a	330 N	$F_{a\ max}$	570 N
LHSG-20	M_b	117 Nm	$M_{b\ max}$	230 Nm
	F_t	550 N	$F_{t\ max}$	975 N
	F_a	550 N	$F_{a\ max}$	975 N
LHSG-25	M_b	213 Nm	$M_{b\ max}$	420 Nm
	F_t	790 N	$F_{t\ max}$	1400 N
	F_a	790 N	$F_{a\ max}$	1400 N
LHSG-32	M_b	400 Nm	$M_{b\ max}$	800 Nm
	F_t	1240 N	$F_{t\ max}$	2100 N
	F_a	1240 N	$F_{a\ max}$	2100 N
LHSG-40	M_b	600 Nm	$M_{b\ max}$	1200 Nm
	F_t	1530 N	$F_{t\ max}$	2670 N
	F_a	1530 N	$F_{a\ max}$	2670 N

Note:
M_b: Bending Moment; F_t: Radial Force; F_a: Axial Force.

*** Consult factory**

Parameter Table

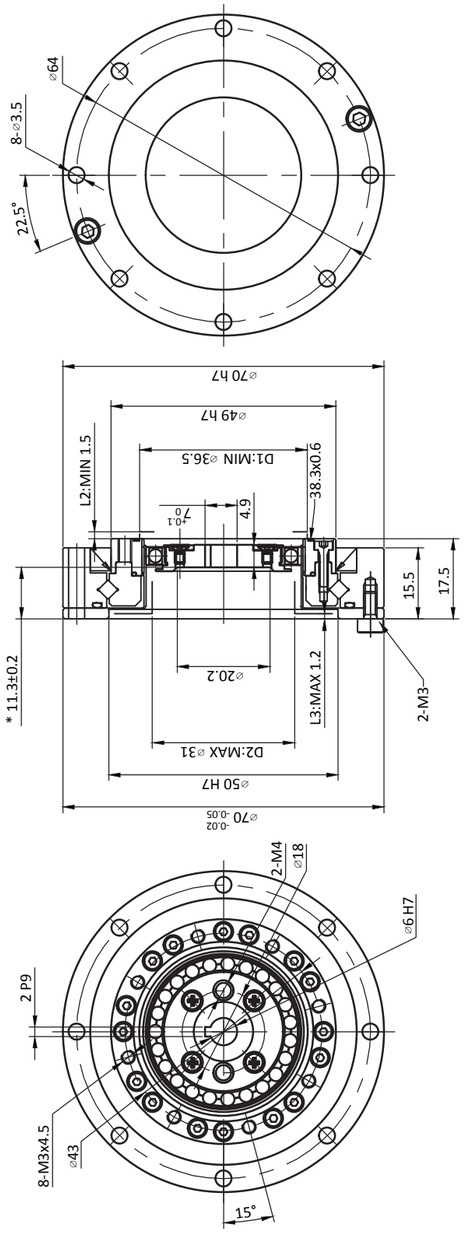
Item / Model	Reduction Ratio	Rated Torque at Input 2000 rpm	Peak Torque at start and Stop	Average Torque	Max. Momentary Torque	Max. Input Speed	Average Input Speed	Back Lash	Weight	Design Life
		N m	N m	N m	N m	r/min	r/min	Arc sec	Kg	Hour
14	50	3.5	11.4	4.6	23	8000	3500	⩽20	0.35	9000
	80	5.1	15	6.2	29			⩽20		10000
	100	5.1	18	7.3	33			⩽20		10000
17	50	10.4	22	17	46	7000	3500	⩽20	0.45	9000
	80	14	29	21	54			⩽20		10000
	100	15.2	35	26	67			⩽20		10000
20	50	16.1	37	23	66	6000	3500	⩽20	0.55	9000
	80	23	49	28	78			⩽20		10000
	100	27	54	32	90			⩽20		10000
25	50	26	66	36	121	5500	3500	⩽20	0.95	9000
	80	42	91	62	157			⩽20		10000
	100	45	105	71	175			⩽20		10000
	120	45	111	71	187			⩽20		10000
32	50	50	143	71	255	4500	3500	⩽20	1.92	9000
	80	79	202	126	350			⩽20		10000
	100	91	211	144	399			⩽20		10000
	120	91	235	144	423			⩽20		10000
40	50	91	267	130	456	4000	3000	⩽20	3.15	9000
	80	176	378	247	665			⩽20		10000
	100	196	430	300	727			⩽20		10000

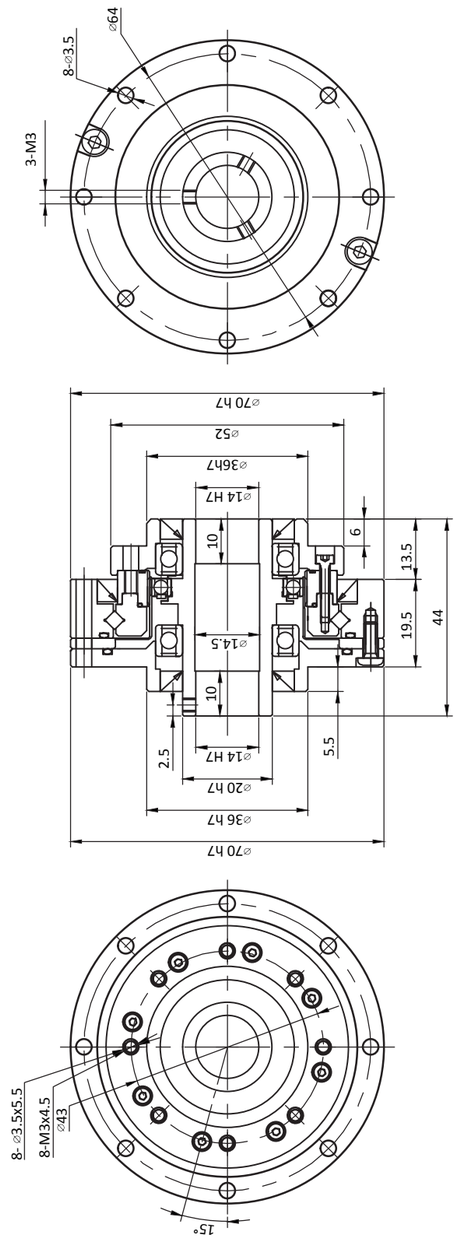
*** Consult factory**

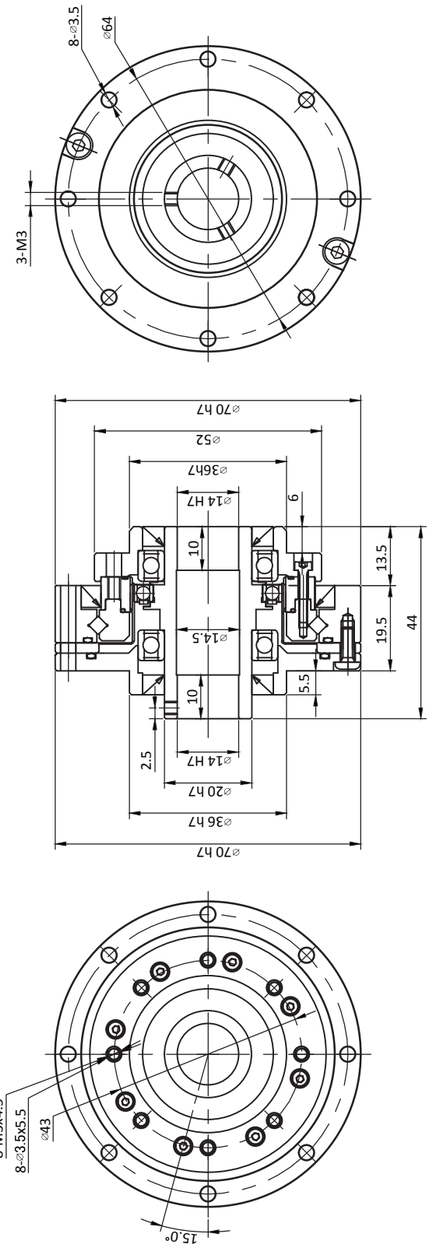
Parameter Table

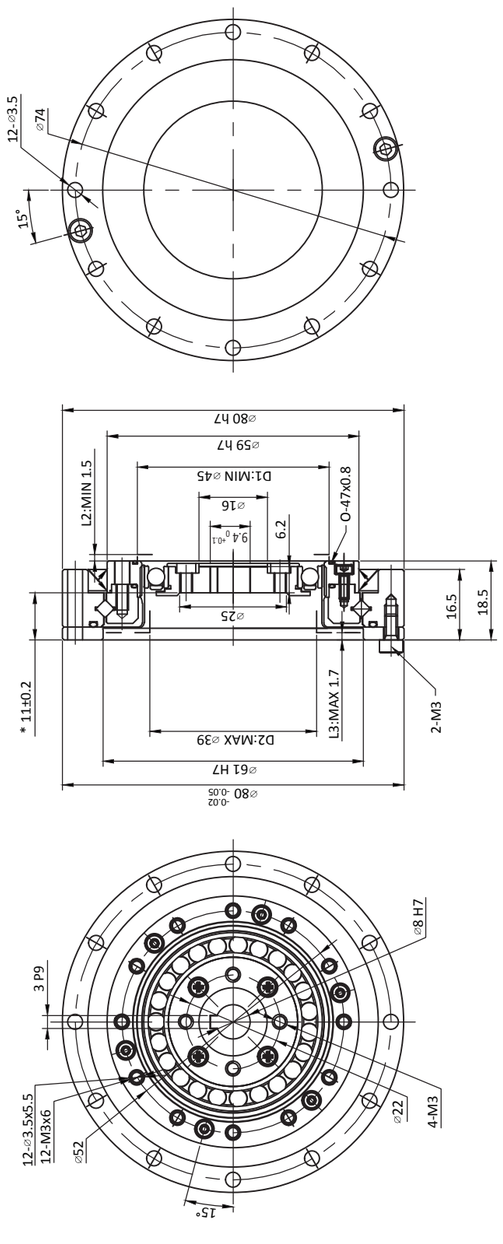
Item / Model	Reduction Ratio	Rated Torque at Input 2000 rpm	Peak Torque at start and Stop	Average Torque	Max. Momentary Torque	Max. Input Speed	Average Input Speed	Back Lash	Weight	Design Life
		N m	N m	N m	N m	r/min	r/min	Arc sec	Kg	Hour
14	50	3.5	11.4	4.6	23	8000	3500	⩽20	0.35	9000
	80	5.1	15	6.2	29			⩽20		10000
	100	5.1	18	7.3	33			⩽20		10000
17	50	10.4	22	17	46	7000	3500	⩽20	0.45	9000
	80	14	29	21	54			⩽20		10000
	100	15.2	35	26	67			⩽20		10000
20	50	16.1	37	23	66	6000	3500	⩽20	0.55	9000
	80	23	49	28	78			⩽20		10000
	100	27	54	32	90			⩽20		10000
25	50	26	66	36	121	5500	3500	⩽20	0.95	9000
	80	42	91	62	157			⩽20		10000
	100	45	105	71	175			⩽20		10000
	120	45	111	71	187			⩽20		10000
32	50	50	143	71	255	4500	3500	⩽20	1.92	9000
	80	79	202	126	350			⩽20		10000
	100	91	221	144	399			⩽20		10000
	120	91	235	144	423			⩽20		10000
40	50	91	267	130	456	4000	3000	⩽20	3.15	9000
	80	176	378	247	665			⩽20		10000
	100	196	430	300	727			⩽20		10000

*** Consult factory**

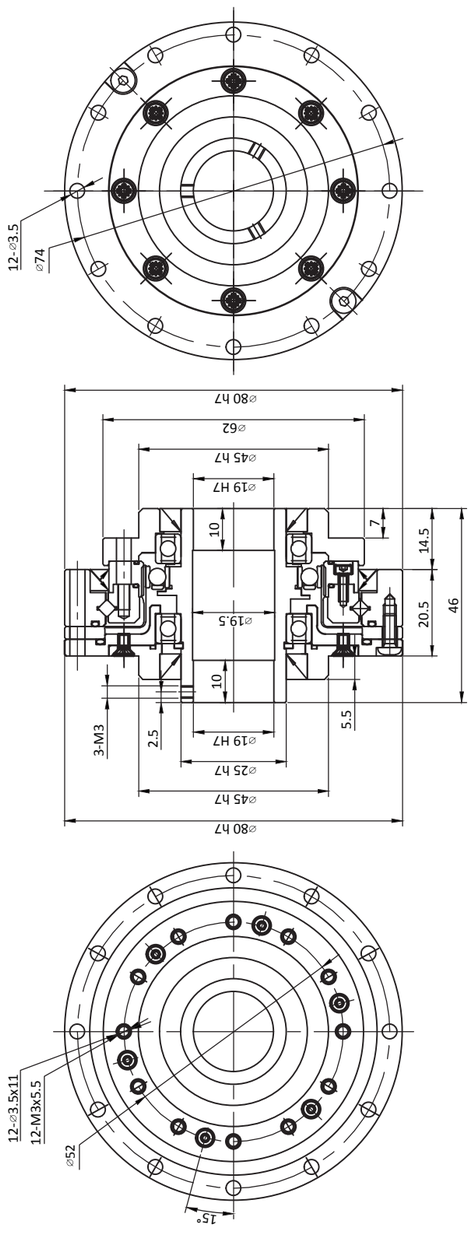

⌀64
8-⌀3.5
22.5°
⌀70 h7
⌀49 h7
D1:MIN ⌀36.5
L2:MIN 1.5
9.0x0.6
38.3x0.6
7 0 -0.1
4.9
15.5
17.5
⌀20.2
L3:MAX 1.2
2-M3
* 11.3±0.2
D2:MAX ⌀31
⌀50 h7
⌀70 -0.02 -0.05
2-M4
⌀18
⌀6 H7
2 P9
8-M3x4.5
⌀43
15°


⌀64
8-⌀3.5
3-M3
⌀70 h7
⌀52
⌀36h7
⌀14 H7
10
6
13.5
19.5
44
⌀14.5
10
2.5
⌀14 H7
5.5
⌀20 h7
⌀36 h7
⌀70 h7
8-⌀3.5x5.5
8-M3x4.5
⌀43
15°

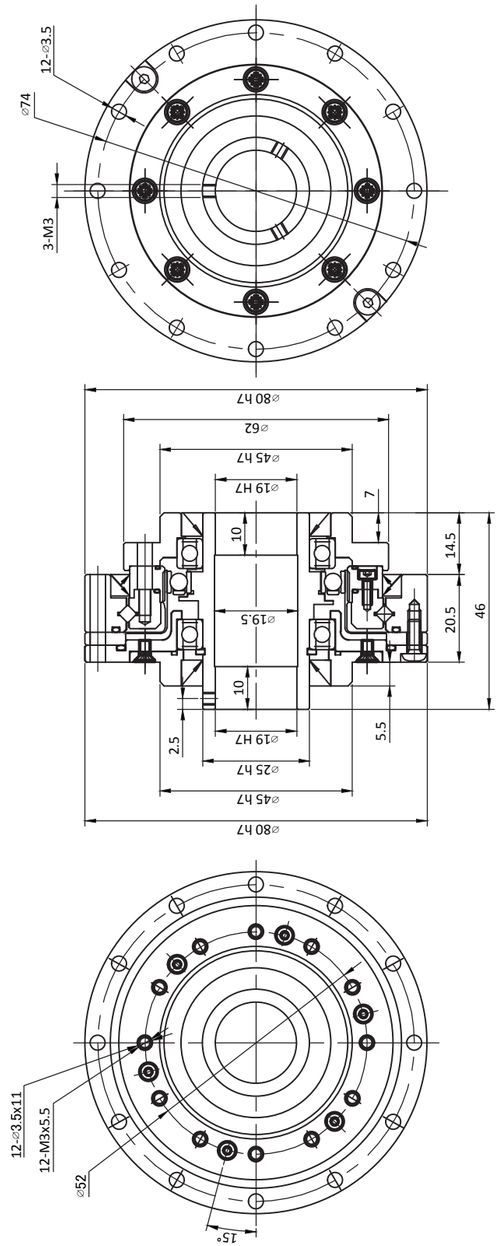

8-⌀3.5
⌀64
3-M3
⌀70 h7
⌀52
⌀36h7
⌀14 H7
6
10
⌀14.5
13.5
19.5
44
5.5
2.5
⌀20 h7
8-M3x4.5
8-⌀3.5x5.5
⌀43
15.0°

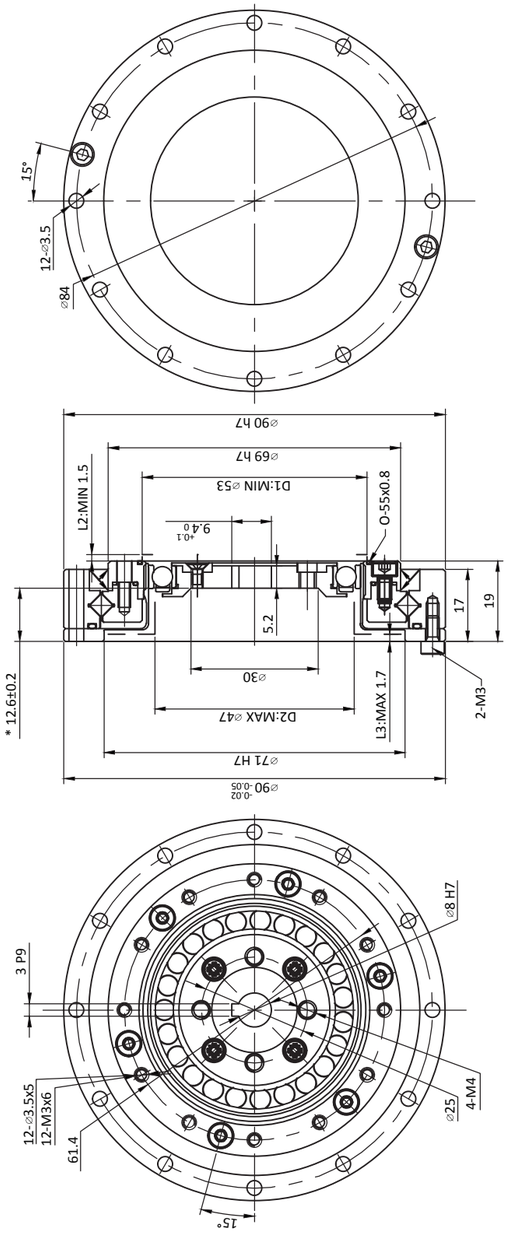

12-⌀3.5
⌀74
15°
⌀80 h7
⌀59 h7
D1:MIN ⌀45
L2:MIN 1.5
⌀16
9.4 +0.1 0
6.2
O-47x0.8
⌀25
16.5
18.5
* 11±0.2
L3:MAX 1.7
2-M3
D2:MAX ⌀39
⌀61 H7
⌀80 -0.02 -0.05
⌀8 H7
3 P9
12-⌀3.5x5.5
12-M3x6
⌀52
⌀22
4-M3
15°

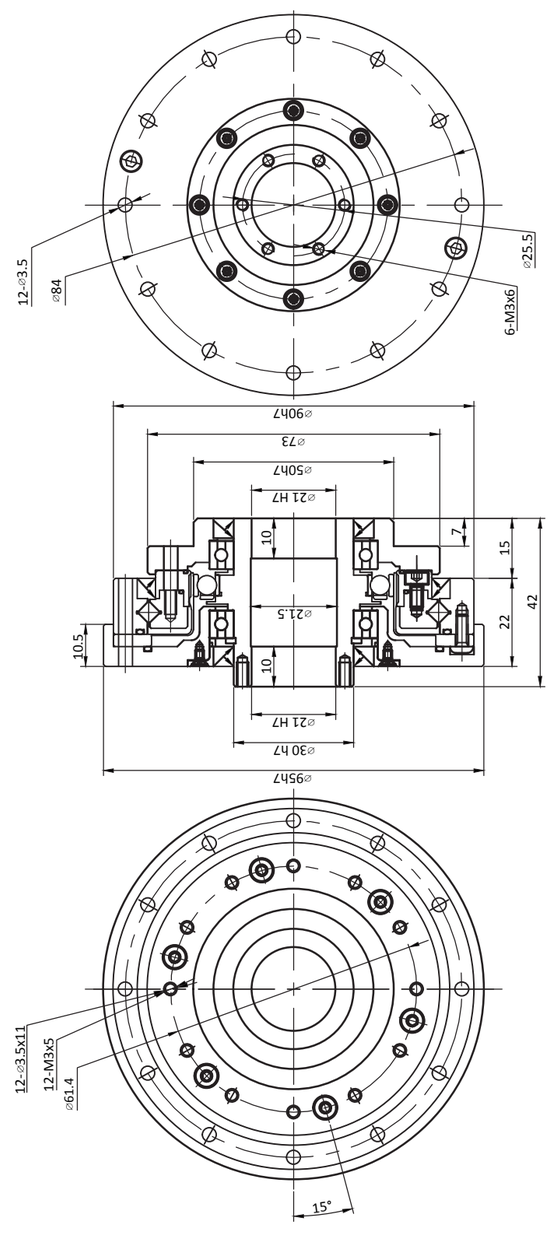
LHD-17-XXX-C-III

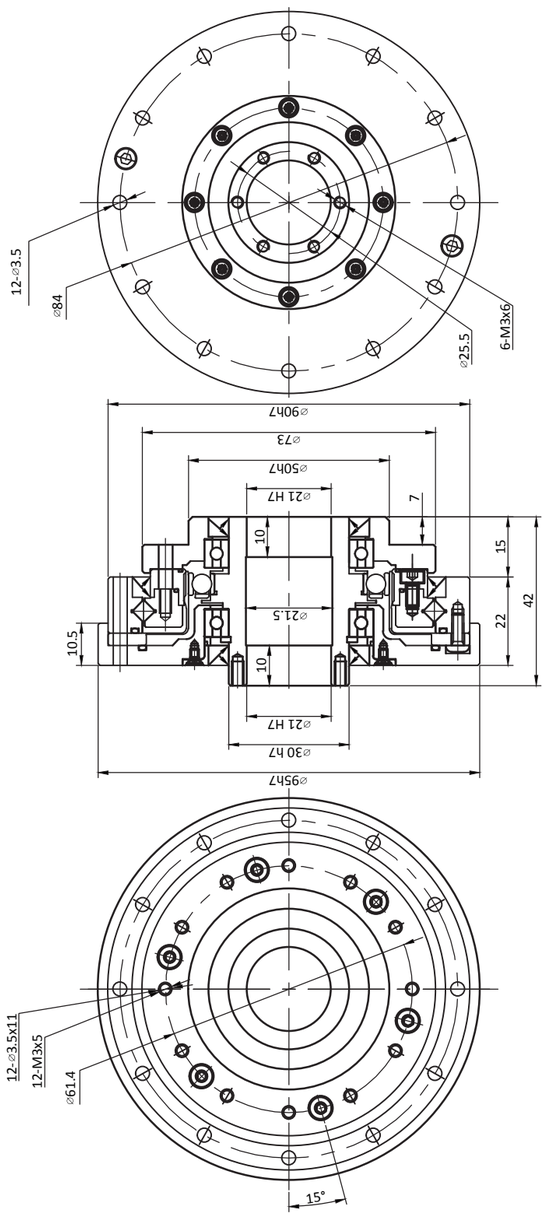


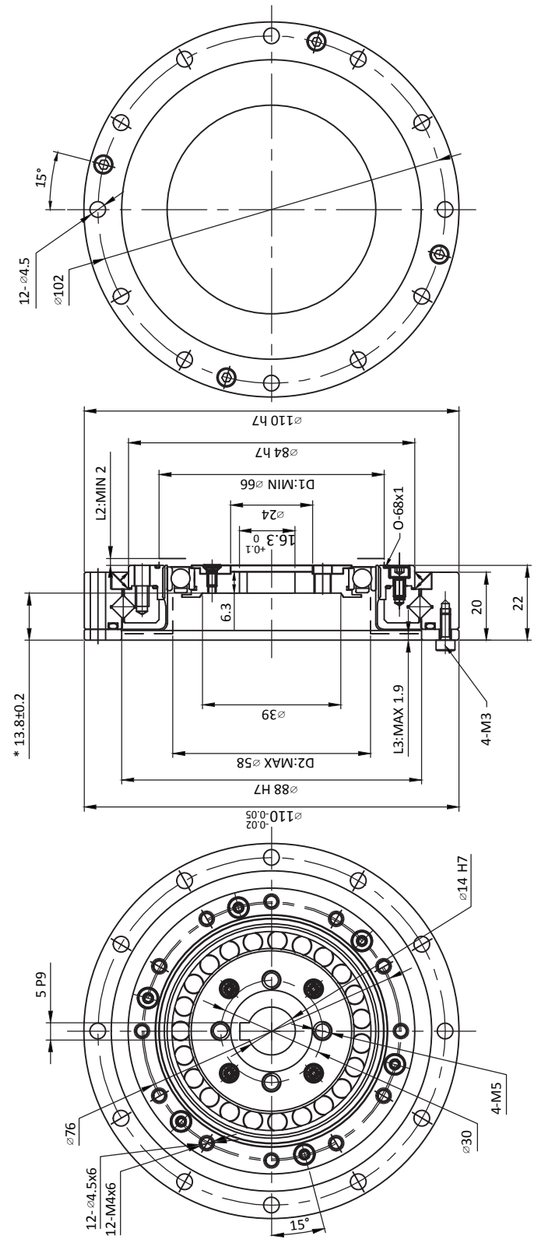
LHD-17-XXX-CL-III

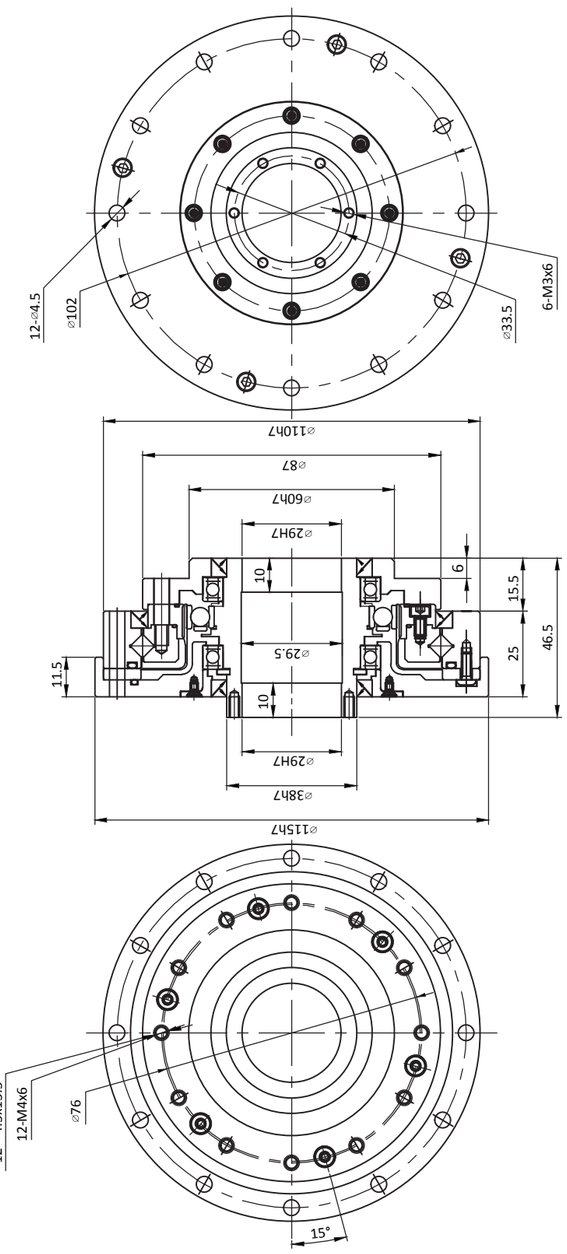


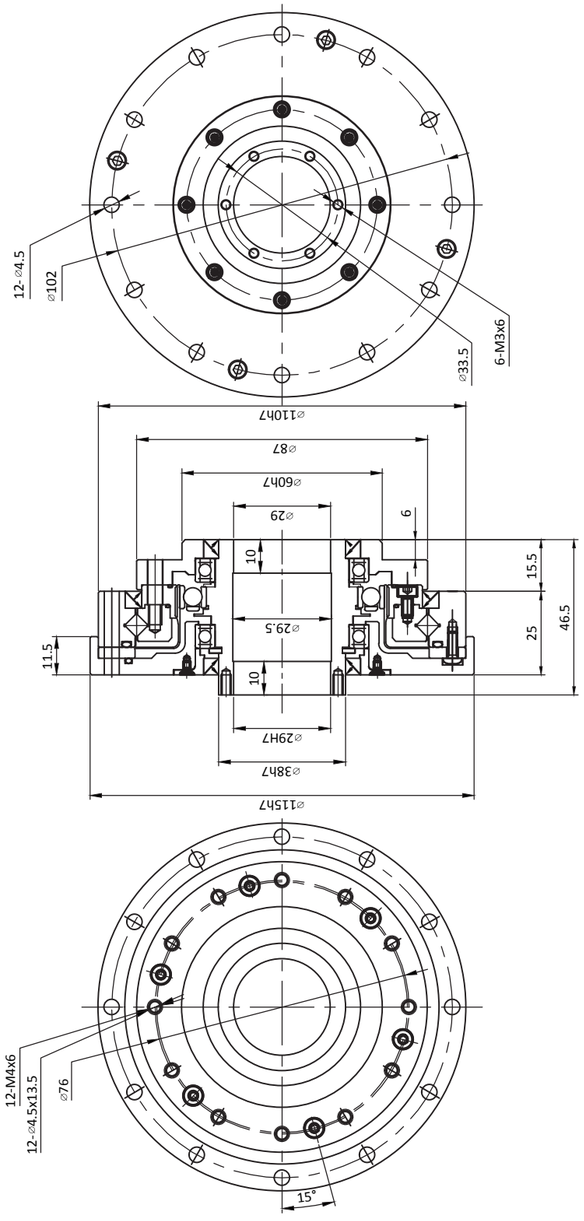

15°
12-⌀3.5
⌀84
⌀90 h7
⌀69 h7
D1:MIN ⌀53
L2:MIN 1.5
O-55x0.8
9.4 +0.1 0
5.2
17
19
⌀30
D2:MAX ⌀47
L3:MAX 1.7
2-M3
* 12.6±0.2
⌀71 H7
⌀90 -0.02 -0.05
⌀8 H7
3 P9
12-⌀3.5x5
12-M3x6
61.4
⌀25
4-M4
15°

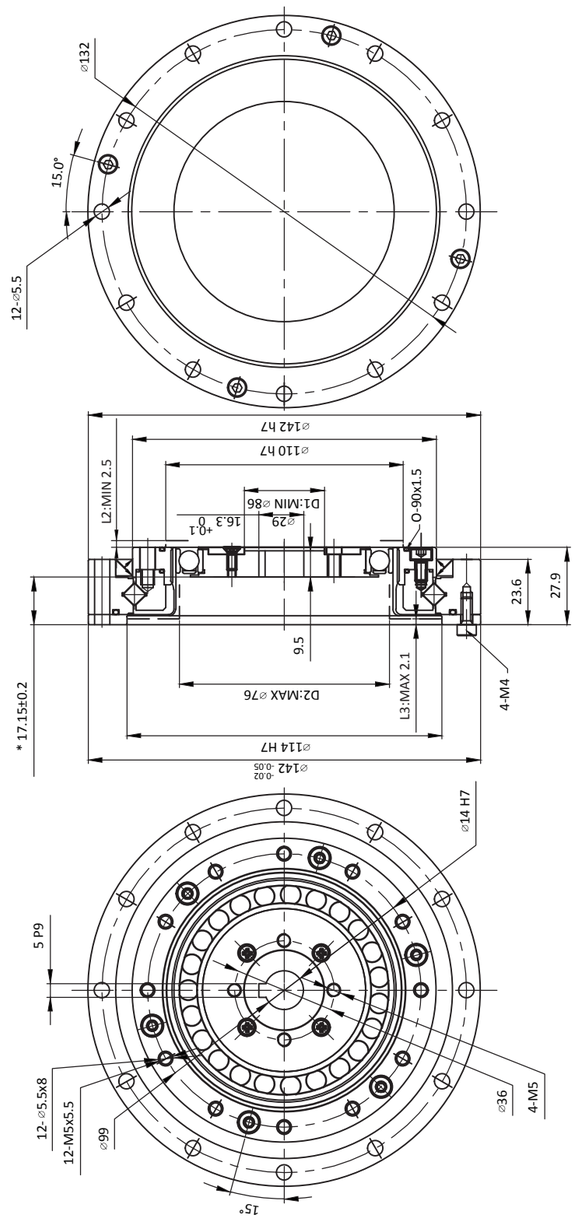

12-⌀3.5
⌀84
⌀25.5
6-M3x6
⌀90 h7
⌀73
⌀50 h7
⌀21 H7
10
7
15
42
22
⌀21.5
10.5
⌀21 H7
⌀30 h7
⌀95 h7
12-⌀3.5x11
12-M3x5
⌀61.4
15°

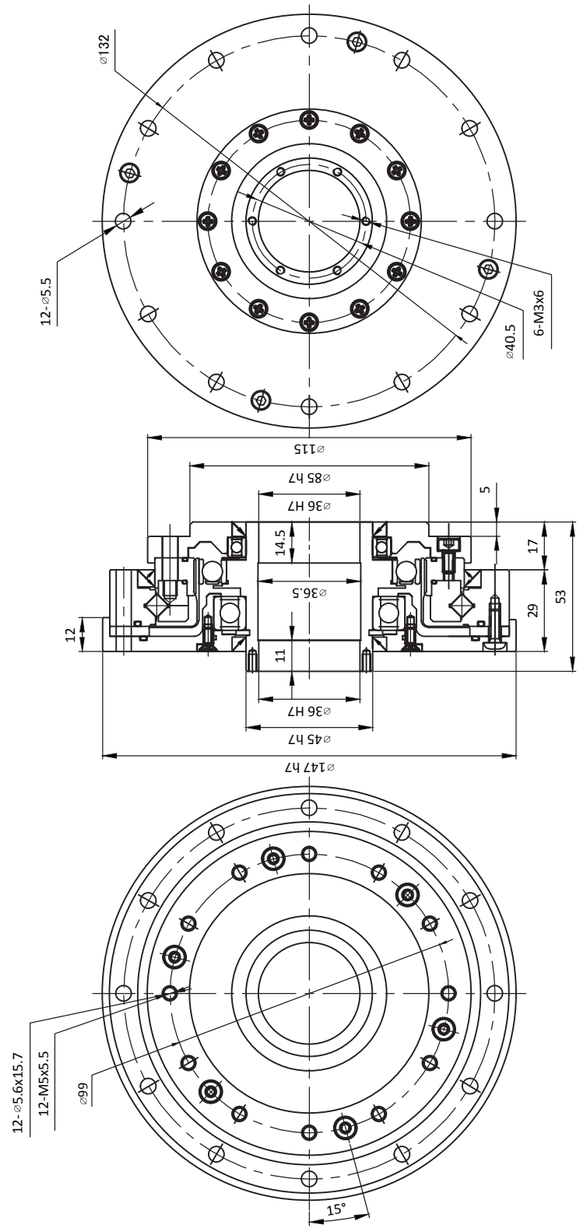

12-⌀3.5
⌀84
⌀25.5
6-M3x6
⌀90h7
⌀73
⌀50h7
⌀21 H7
7
10
15
42
22
10.5
⌀21.5
10
⌀21 H7
⌀30 h7
⌀95h7
12-⌀3.5x11
12-M3x5
⌀61.4
15°

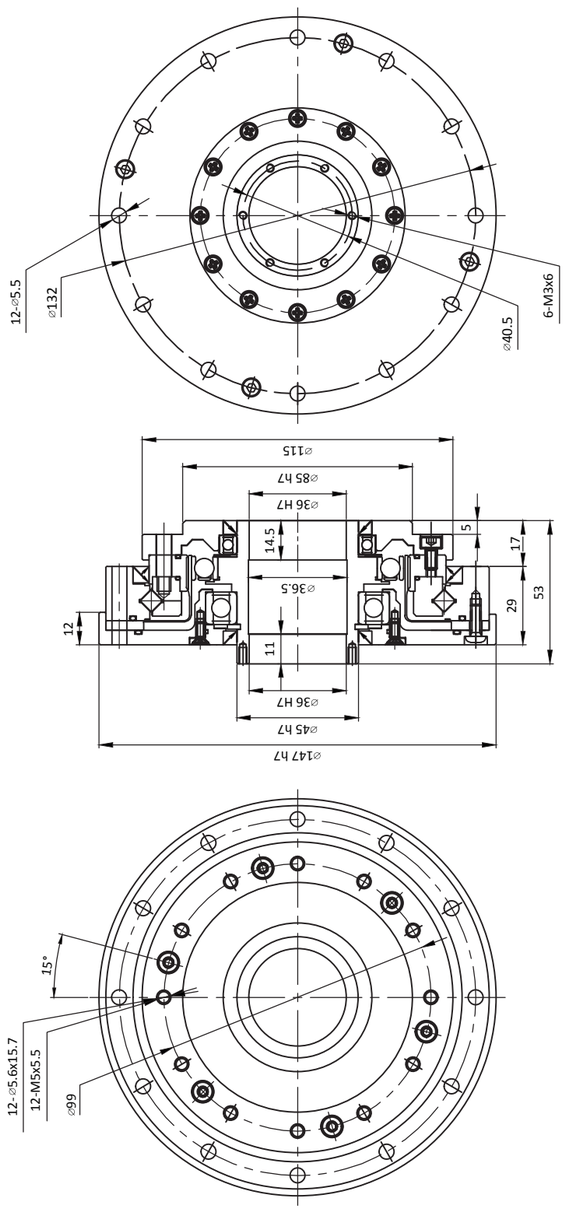

15°
12-⌀4.5
⌀102
⌀110 h7
⌀84 h7
D1:MIN ⌀66
L2:MIN 2
⌀24
16.3 +0.1 0
O-68x1
6.3
20
22
⌀39
* 13.8±0.2
L3:MAX 1.9
4-M3
D2:MAX ⌀58
⌀88 H7
⌀110 -0.02 -0.05
⌀14 H7
5 P9
4-M5
⌀76
⌀30
12-⌀4.5x6
12-M4x6
15°

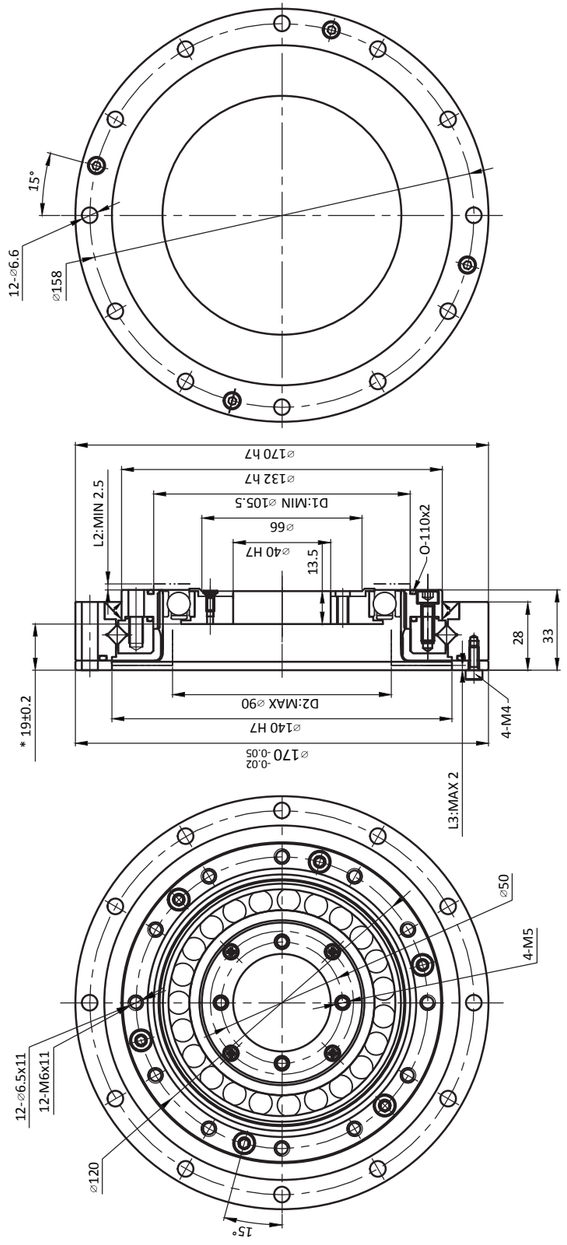

12-⌀4.5
⌀102
6-M3x6
⌀33.5
⌀110h7
⌀87
⌀60h7
⌀29H7
10
6
15.5
25
46.5
⌀29.5
10
11.5
⌀29H7
⌀38h7
⌀115h7
12-⌀4.5x13.5
12-M4x6
⌀76
15°

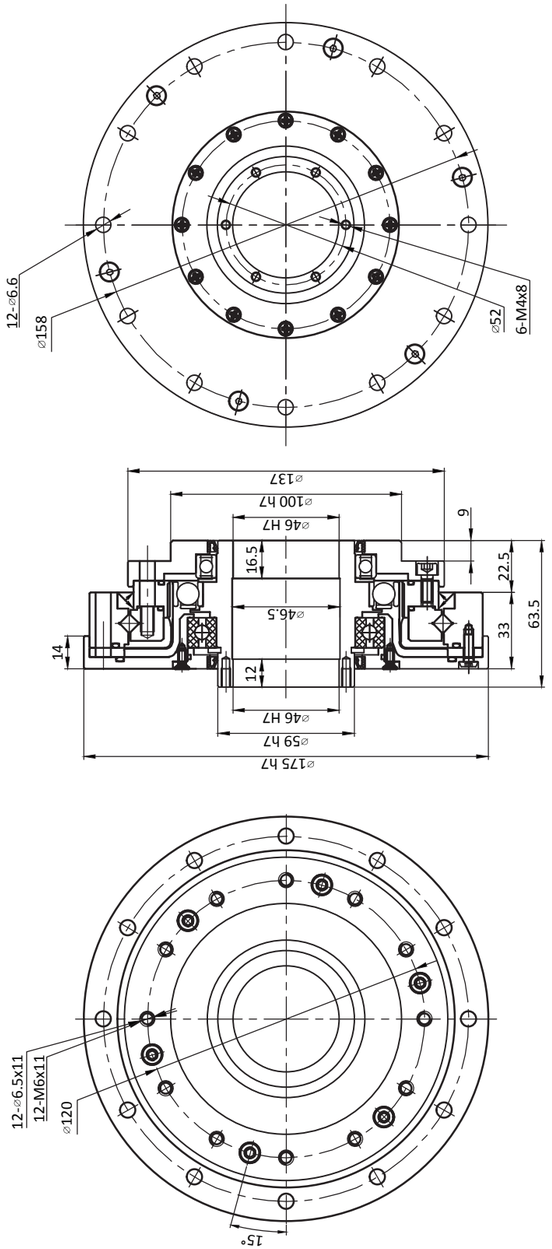

12-⌀4.5
⌀102
6-M3x6
⌀33.5
⌀110h7
⌀87
⌀60h7
⌀29
6
10
15.5
25
46.5
⌀29.5
10
11.5
⌀29H7
⌀38h7
⌀115h7
12-M4x6
12-⌀4.5x13.5
⌀76
15°

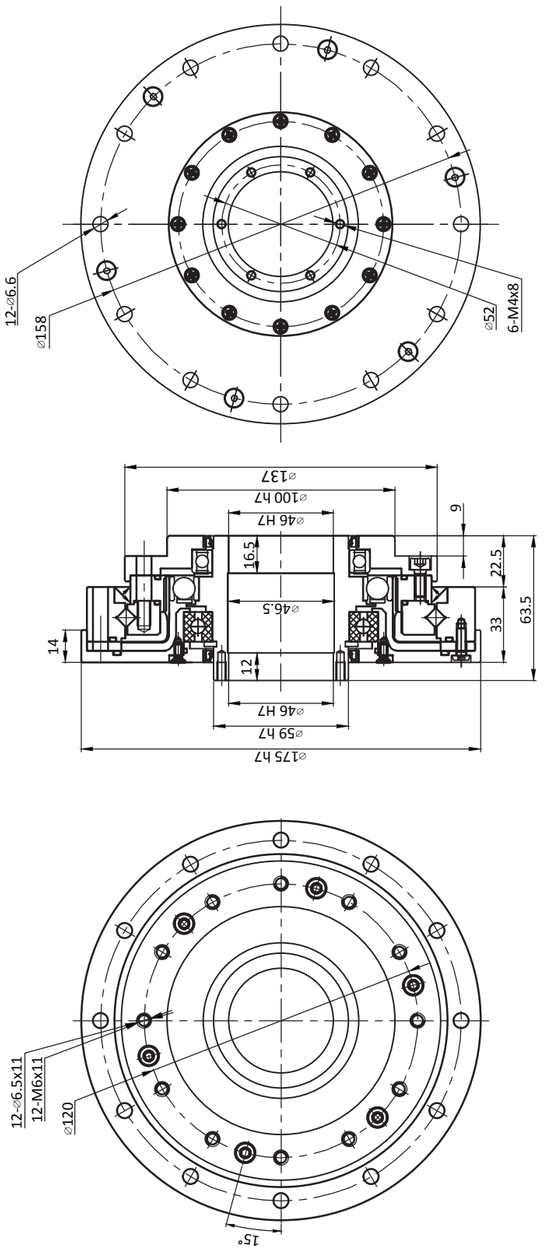

⌀132
15.0°
12-⌀5.5
⌀142 h7
⌀110 h7
L2:MIN 2.5
D1:MIN ⌀86
⌀29
16.3 +0.1 0
O-90x1.5
23.6
27.9
9.5
D2:MAX ⌀76
L3:MAX 2.1
4-M4
* 17.15±0.2
⌀114 h7
⌀142 -0.02 -0.05
⌀14 H7
5 P9
12-⌀5.5x8
12-M5x5.5
⌀99
⌀36
4-M5
15°


⌀132
12-⌀5.5
⌀40.5
6-M3x6
⌀115
⌀85 h7
⌀36 H7
5
14.5
17
⌀36.5
29
53
12
11
⌀36 H7
⌀45 h7
⌀147 h7
12-⌀5.6x15.7
12-M5x5.5
⌀99
15°

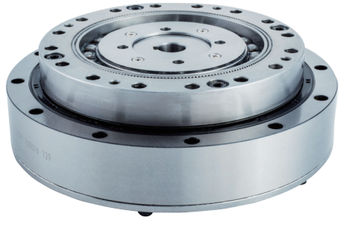

12-⌀5.5
⌀132
6-M3x6
⌀40.5
⌀115
⌀85 h7
⌀36 H7
14.5
⌀36.5
11
⌀36 H7
⌀45 h7
⌀147 h7
5
17
53
29
12
15°
12-⌀5.6x15.7
12-M5x5.5
⌀99


15°
12-⌀6.6
⌀158
⌀170 h7
⌀132 h7
D1:MIN ⌀105.5
⌀66
⌀40 H7
13.5
L2:MIN 2.5
O-110x2
28
33
D2:MAX ⌀90
⌀140 H7
* 19±0.2
⌀170 -0.02 -0.05
4-M4
L3:MAX 2
⌀50
4-M5
12-⌀6.5x11
12-M6x11
⌀120
15°


12-⌀6.6
⌀158
⌀52
6-M4x8
⌀137
⌀100 h7
⌀46 H7
9
16.5
⌀46.5
22.5
33
63.5
14
12
⌀46 H7
⌀59 h7
⌀175 h7
12-⌀6.5x11
12-M6x11
⌀120
15°


12-⌀6.6
⌀158
⌀52
6-M4x8
⌀137
⌀100 h7
⌀46 H7
9
16.5
⌀46.5
22.5
33
63.5
14
12
⌀46 H7
⌀59 h7
⌀175 h7
12-⌀6.5x11
12-M6x11
⌀120
15°

LHS Series of Strain Wave Reducer



LHS-I

1. Hollow shaped;
2. Hole with key way connected;

LHS-II

1. Hollow shaped;
2. Oldham's coupling connected;

LHS-III

1. Hollow shaped;
2. Big hole for passing cable through;

LHS-III-ST

1. Hollow shaped;
2. Big hole for passing cable through;
3. Shorter hat than LHS-III;

LHS-CL-III

1. Hollow shaped;
2. Big hole for passing cable through;
3. Lighter weight than LHS-III;

LHS-IV

1. Hollow shaped;
2. Input shaft;

Parameter Table

Bi-directional Accuracy Arc min						
Model / Reduction Ratio	14	17	20	25	32	40
50	2	2	2	2	2	2
80/100/120/160	1.5	1.5	1.5	1.5	1.5	1.5

Hysteresis Loss Arc min						
Model / Reduction Ratio	14	17	20	25	32	40
50	2.5	2	2	2	2	2
80/100/120/160	2	2	1.5	1.5	1.5	1.5

Torsional Stiffness x10⁴ Nm/rad						
Model / Reduction Ratio	14	17	20	25	32	40
50	0.46	1.07	1.8	3.4	7.6	14
80/100/120/160	0.6	1.3	2.3	4.6	9.9	18.6

Starting Torque cNm						
Model / Reduction Ratio	14	17	20	25	32	40
50	4.5	6.5	8.5	16	32	56
80	3.5	4.5	5.5	10	20	38
100	3.2	3.5	5	9	19	32
120	—	3.5	4	8	16	30
160	—	—	3.8	7	15	25

*** Consult factory**

Parameter Table

Ratcheting Torque Nm						
Model	14	17	20	25	32	40
50	88	150	220	450	980	1800
80	110	200	350	680	1400	2800
100	84	160	260	500	1000	2100
120	—	120	240	470	980	1900
160	—	—	220	450	980	1800

Buckling Torque Nm						
Model	14	17	20	25	32	40
All Reduction Ratio	140	270	440	890	1750	3750

Bending Moment and Thrust Sheet				
Model	Parameter	Rated Value	Parameter	Momentary Value
LHSG-14	M_b	41 Nm	$M_{b\ max}$	80 Nm
	F_t	270 N	$F_{t\ max}$	490 N
	F_a	270 N	$F_{a\ max}$	490 N
LHSG-17	M_b	72 Nm	$M_{b\ max}$	140 Nm
	F_t	400 N	$F_{t\ max}$	700 N
	F_a	400 N	$F_{a\ max}$	700 N
LHSG-20	M_b	140 Nm	$M_{b\ max}$	280 Nm
	F_t	650 N	$F_{t\ max}$	1150 N
	F_a	650 N	$F_{a\ max}$	1150 N
LHSG-25	M_b	243 Nm	$M_{b\ max}$	480 Nm
	F_t	900 N	$F_{t\ max}$	1600 N
	F_a	900 N	$F_{a\ max}$	1600 N
LHSG-32	M_b	460 Nm	$M_{b\ max}$	900 Nm
	F_t	1350 N	$F_{t\ max}$	2300 N
	F_a	1350 N	$F_{a\ max}$	2300 N
LHSG-40	M_b	600 Nm	$M_{b\ max}$	1200 Nm
	F_t	2000 N	$F_{t\ max}$	3500 N
	F_a	2000 N	$F_{a\ max}$	3500 N

Note:
M_b: Bending Moment; F_t: Radial Force; F_a: Axial Force.

*** Consult factory**

Parameter Table

Bi-directional Accuracy Arc min						
Model / Reduction Ratio	14	17	20	25	32	40
50	2	2	2	2	2	2
80/100/120/160	1.5	1.5	1.5	1.5	1.5	1.5

Hysteresis Loss Arc min						
Model / Reduction Ratio	14	17	20	25	32	40
50	2.5	2	2	2	2	2
80/100/120/160	2	2	1.5	1.5	1.5	1.5

Torsional Stiffness x10^4 Nm/rad						
Model / Reduction Ratio	14	17	20	25	32	40
50	0.46	1.07	1.8	3.4	7.6	14
80/100/120/160	0.6	1.3	2.3	4.6	9.9	18.6

Starting Torque cNm						
Model / Reduction Ratio	14	17	20	25	32	40
50	4.5	6.5	8.5	16	32	56
80	3.5	4.5	5.5	10	20	38
100	3.2	3.5	5	9	19	32
120	—	3.5	4	8	16	30
160	—	—	3.8	7	15	25

*** Consult factory**

Parameter Table

Ratcheting Torque Nm						
Model	14	17	20	25	32	40
50	88	150	220	450	980	1800
80	110	200	350	680	1400	2800
100	84	160	260	500	1000	2100
120	—	120	240	470	980	1900
160	—	—	220	450	980	1800

Buckling Torque Nm						
Model	14	17	20	25	32	40
All Reduction Ratio	140	270	440	890	1750	3750

Bending Moment and Thrust Sheet				
Model	Parameter	Rated Value	Parameter	Momentary Value
LHSG-14	M_b	41 Nm	$M_{b\ max}$	80 Nm
	F_t	270 N	$F_{t\ max}$	490 N
	F_a	270 N	$F_{a\ max}$	490 N
LHSG-17	M_b	72 Nm	$M_{b\ max}$	140 Nm
	F_t	400 N	$F_{t\ max}$	700 N
	F_a	400 N	$F_{a\ max}$	700 N
LHSG-20	M_b	140 Nm	$M_{b\ max}$	280 Nm
	F_t	650 N	$F_{t\ max}$	1150 N
	F_a	650 N	$F_{a\ max}$	1150 N
LHSG-25	M_b	243 Nm	$M_{b\ max}$	480 Nm
	F_t	900 N	$F_{t\ max}$	1600 N
	F_a	900 N	$F_{a\ max}$	1600 N
LHSG-32	M_b	460 Nm	$M_{b\ max}$	900 Nm
	F_t	1350 N	$F_{t\ max}$	2300 N
	F_a	1350 N	$F_{a\ max}$	2300 N
LHSG-40	M_b	600 Nm	$M_{b\ max}$	1200 Nm
	F_t	2000 N	$F_{t\ max}$	3500 N
	F_a	2000 N	$F_{a\ max}$	3500 N

Note:
M_b: Bending Moment; F_t: Radial Force; F_a: Axial Force.

*** Consult factory**

Parameter Table

Bi-directional Accuracy Arc min						
Model / Reduction Ratio	14	17	20	25	32	40
50	2	2	2	2	2	2
80/100/120/160	1.5	1.5	1.5	1.5	1.5	1.5

Hysteresis Loss Arc min						
Model / Reduction Ratio	14	17	20	25	32	40
50	2.5	2	2	2	2	2
80/100/120/160	2	2	1.5	1.5	1.5	1.5

Torsional Stiffness x10^4 Nm/rad						
Model / Reduction Ratio	14	17	20	25	32	40
50	0.46	1.07	1.8	3.4	7.6	14
80/100/120/160	0.6	1.3	2.3	4.6	9.9	18.6

Starting Torque cNm						
Model / Reduction Ratio	14	17	20	25	32	40
50	4.5	6.5	8.5	16	32	56
80	3.5	4.5	5.5	10	20	38
100	3.2	3.5	5	9	19	32
120	—	3.5	4	8	16	30
160	—	—	3.8	7	15	25

*** Consult factory**

Parameter Table

Ratcheting Torque Nm						
Model	14	17	20	25	32	40
50	88	150	220	450	980	1800
80	110	200	350	680	1400	2800
100	84	160	260	500	1000	2100
120	—	120	240	470	980	1900
160	—	—	220	450	980	1800

Buckling Torque Nm						
Model	14	17	20	25	32	40
All Reduction Ratio	140	270	440	890	1750	3750

Bending Moment and Thrust Sheet				
Model	Parameter	Rated Value	Parameter	Momentary Value
LHSG-14	M_b	41 Nm	$M_{b\ max}$	80 Nm
	F_t	270 N	$F_{t\ max}$	490 N
	F_a	270 N	$F_{a\ max}$	490 N
LHSG-17	M_b	72 Nm	$M_{b\ max}$	140 Nm
	F_t	400 N	$F_{t\ max}$	700 N
	F_a	400 N	$F_{a\ max}$	700 N
LHSG-20	M_b	140 Nm	$M_{b\ max}$	280 Nm
	F_t	650 N	$F_{t\ max}$	1150 N
	F_a	650 N	$F_{a\ max}$	1150 N
LHSG-25	M_b	243 Nm	$M_{b\ max}$	480 Nm
	F_t	900 N	$F_{t\ max}$	1600 N
	F_a	900 N	$F_{a\ max}$	1600 N
LHSG-32	M_b	460 Nm	$M_{b\ max}$	900 Nm
	F_t	1350 N	$F_{t\ max}$	2300 N
	F_a	1350 N	$F_{a\ max}$	2300 N
LHSG-40	M_b	600 Nm	$M_{b\ max}$	1200 Nm
	F_t	2000 N	$F_{t\ max}$	3500 N
	F_a	2000 N	$F_{a\ max}$	3500 N

Note:
M_b: Bending Moment; F_t: Radial Force; F_a: Axial Force.

*** Consult factory**

Parameter Table

Item / Model No	Reduction Ratio	Rated Torque at Input 2000 rpm	Peak Torque at start and Stop	Average Torque	Max. Momentary Torque	Max. Input Speed	Average Input Speed	Back Lash	Weight	Design Life
		Nm	Nm	Nm	Nm	r/min	r/min	Arc sec	Kg	Hour
14	30	3. 8	8. 6	7. 8	16	8000	3500	≤20	0. 38	10000
	50	5. 1	17	6. 6	33			≤20		10000
	80	7. 4	22	10. 5	45			≤10		15000
	100	7. 4	27	10. 5	51			≤10		15000
17	30	8. 4	15. 2	11. 5	29	7000	3500	≤20	0. 56	10000
	50	15. 2	32	25	66			≤20		10000
	80	21	41	26	83			≤10		15000
	100	23	51	37	104			≤10		15000
	120	23	51	37	82			≤10		15000
20	30	14	26	19	48	6000	3500	≤20	0. 76	10000
	50	24	53	32	93			≤20		10000
	80	32	70	45	121			≤10		15000
	100	38	78	47	140			≤10		15000
	120	38	83	47	140			≤10		15000
	160	38	87	47	140			≤10		15000
25	30	26	48	36	90	5500	3500	≤20	1. 24	10000
	50	37	93	52	177			≤20		10000
	80	60	130	83	242			≤10		15000
	100	64	149	103	270			≤10		15000
	120	64	159	103	289			≤10		15000
	160	64	167	103	298			≤10		15000
32	30	51	95	71	190	4500	3500	≤20	2. 6	10000
	50	72	205	103	363			≤20		10000
	80	112	289	159	540			≤10		15000
	100	130	316	205	615			≤10		15000
	120	130	335	205	652			≤10		15000
	160	130	353	205	652			≤10		15000
40	50	130	382	186	652	4000	3000	≤20	5. 0	10000
	80	196	493	270	931			≤10		15000
	100	252	540	353	1026			≤10		15000
	120	279	586	428	1121			≤10		15000
	160	279	615	428	1121			≤10		15000
50*	50	233	679	333	1358	3000	2500	≤20	9. 5	10000
	80	353	894	493	1767			≤10		15000
	100	446	931	633	1957			≤10		15000
	120	502	1026	772	1957			≤10		15000
	160	502	1121	801	2328			≤10		15000
58*	80	522	1406	732	2328	3000	2200	≤10	13. 6	15000
	100	661	1511	1007	3021			≤10		15000
	120	708	1634	1131	3164			≤10		15000
	160	708	1748	1150	3259			≤10		15000

Parameter Table

Item / Model No	Reduction Ratio	Rated Torque at Input 2000 rpm	Peak Torque at start and Stop	Average Torque	Max. Momentary Torque	Max. Input Speed	Average Input Speed	Back Lash	Weight	Design Life
		Nm	Nm	Nm	Nm	r/min	r/min	Arc sec	Kg	Hour
14	30	3. 8	8. 6	7. 8	16	8000	3500	≤20	0. 38	10000
	50	5. 1	17	6. 6	33			≤20		10000
	80	7. 4	22	10. 5	45			≤20		15000
	100	7. 4	27	10. 5	51			≤20		15000
17	30	8. 4	15. 2	11. 5	29	7000	3500	≤20	0. 56	10000
	50	15. 2	32	25	66			≤20		10000
	80	21	41	26	83			≤20		15000
	100	23	51	37	104			≤20		15000
	120	23	51	37	82			≤20		15000
20	30	14	26	19	48	6000	3500	≤20	0. 76	10000
	50	24	53	32	93			≤20		10000
	80	32	70	45	121			≤20		15000
	100	38	78	47	140			≤20		15000
	120	38	83	47	140			≤20		15000
	160	38	87	47	140			≤20		15000
25	30	26	48	36	90	5500	3500	≤20	1. 24	10000
	50	37	93	52	177			≤20		10000
	80	60	130	83	242			≤20		15000
	100	64	149	103	270			≤20		15000
	120	64	159	103	289			≤20		15000
	160	64	167	103	298			≤20		15000
32	30	51	95	71	190	4500	3500	≤20	2. 6	10000
	50	72	205	103	363			≤20		10000
	80	112	289	159	540			≤20		15000
	100	130	316	205	615			≤20		15000
	120	130	335	205	652			≤20		15000
	160	130	353	205	652			≤20		15000
40	50	130	382	186	652	4000	3000	≤20	5. 0	10000
	80	196	493	270	931			≤20		15000
	100	252	540	353	1026			≤20		15000
	120	279	586	428	1121			≤20		15000
	160	279	615	428	1121			≤20		15000
50*	50	233	679	333	1358	3000	2500	≤20	9. 5	10000
	80	353	894	493	1767			≤20		15000
	100	446	931	633	1957			≤20		15000
	120	502	1026	772	1957			≤20		15000
	160	502	1121	801	2328			≤20		15000
58*	80	522	1406	732	2328	3000	2200	≤10	13. 6	15000
	100	661	1511	1007	3021			≤10		15000
	120	708	1634	1131	3164			≤10		15000
	160	708	1748	1150	3259			≤10		15000

Parameter Table

Item / Model No	Reduction Ratio	Rated Torque at Input 2000 rpm	Peak Torque at start and Stop	Average Torque	Max. Momentary Torque	Max. Input Speed	Average Input Speed	Back Lash	Max. Tension Force	Weight	Design Life
		Nm	Nm	Nm	Nm	r/min	r/min	Arc sec	N	Kg	Hour
14	30	3. 8	8. 6	7. 8	16	8000	3500	≤20	≤77	0. 72	10000
	50	5. 1	17	6. 6	33			≤20			10000
	80	7. 4	22	10. 5	45			≤10			15000
	100	7. 4	27	10. 5	51			≤10			15000
17	30	8. 4	15. 2	11. 5	29	7000	3500	≤20	≤92	1. 0	10000
	50	15. 2	32	25	66			≤20			10000
	80	21	41	26	83			≤10			15000
	100	23	51	37	104			≤10			15000
	120	23	51	37	82			≤10			15000
20	30	14	26	19	48	6000	3500	≤20	≤136	1. 38	10000
	50	24	53	32	93			≤20			10000
	80	32	70	45	121			≤10			15000
	100	38	78	47	140			≤10			15000
	120	38	83	47	140			≤10			15000
	160	38	87	47	140			≤10			15000
25	30	26	48	36	90	5500	3500	≤20	≤147	2. 15	10000
	50	37	93	52	177			≤20			10000
	80	60	130	83	242			≤10			15000
	100	64	149	103	270			≤10			15000
	120	64	159	103	289			≤10			15000
	160	64	167	103	298			≤10			15000
32	30	51	95	71	190	4500	3500	≤20	≤154	4. 3	10000
	50	72	205	103	363			≤20			10000
	80	112	289	159	540			≤10			15000
	100	130	316	205	615			≤10			15000
	120	130	335	205	652			≤10			15000
	160	130	353	205	652			≤10			15000
40	50	130	382	186	652	4000	3000	≤20	≤294	7. 8	10000
	80	196	493	270	931			≤10			15000
	100	252	540	353	1026			≤10			15000
	120	279	586	428	1121			≤10			15000
	160	279	615	428	1121			≤10			15000
50*	50	233	679	333	1358	3000	2500	≤20	≤373	14. 5	10000
	80	353	894	493	1767			≤10			15000
	100	446	931	633	1957			≤10			15000
	120	502	1026	772	1957			≤10			15000
	160	502	1121	801	2328			≤10			15000
58*	80	678	1828	951	3026	3000	2200	≤10	≤1300	20. 0	15000
	100	860	1964	1309	3927			≤10			15000
	120	921	2124	1470	4113			≤10			15000
	160	921	2272	1494	4236			≤10			15000

Parameter Table

Item / Model No	Reduction Ratio	Rated Torque at Input 2000 rpm	Peak Torque at start and Stop	Average Torque	Max. Momentary Torque	Max. Input Speed	Average Input Speed	Back Lash	Max. Tension Force	Design Life
		Nm	Nm	Nm	Nm	r/min	r/min	Arc sec	N	Hour
14	30	3. 8	8. 6	7. 8	16	8000	3500	≤20	≤77	10000
	50	5. 1	17	6. 6	33			≤20		10000
	80	7. 4	22	10. 5	45			≤10		15000
	100	7. 4	27	10. 5	51			≤10		15000
17	30	8. 4	15. 2	11. 5	29	7000	3500	≤20	≤92	10000
	50	15. 2	32	25	66			≤20		10000
	80	21	41	26	83			≤10		15000
	100	23	51	37	104			≤10		15000
	120	23	51	37	82			≤10		15000
20	30	14	26	19	48	6000	3500	≤20	≤136	10000
	50	24	53	32	93			≤20		10000
	80	32	70	45	121			≤10		15000
	100	38	78	47	140			≤10		15000
	120	38	83	47	140			≤10		15000
	160	38	87	47	140			≤10		15000
25	30	26	48	36	90	5500	3500	≤20	≤147	10000
	50	37	93	52	177			≤20		10000
	80	60	130	83	242			≤10		15000
	100	64	149	103	270			≤10		15000
	120	64	159	103	289			≤10		15000
	160	64	167	103	298			≤10		15000
32	30	51	95	71	190	4500	3500	≤20	≤154	10000
	50	72	205	103	363			≤20		10000
	80	112	289	159	540			≤10		15000
	100	130	316	205	615			≤10		15000
	120	130	335	205	652			≤10		15000
	160	130	353	205	652			≤10		15000
40	50	130	382	186	652	4000	3000	≤20	≤294	10000
	80	196	493	270	931			≤10		15000
	100	252	540	353	1026			≤10		15000
	120	279	586	428	1121			≤10		15000
	160	279	615	428	1121			≤10		15000

*** Consult factory**

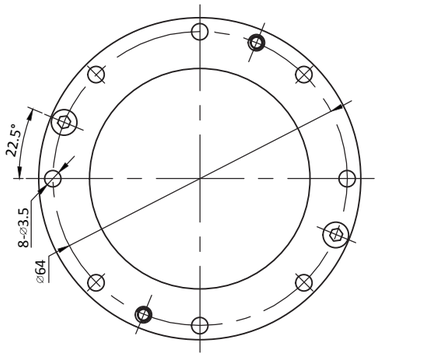
Parameter Table

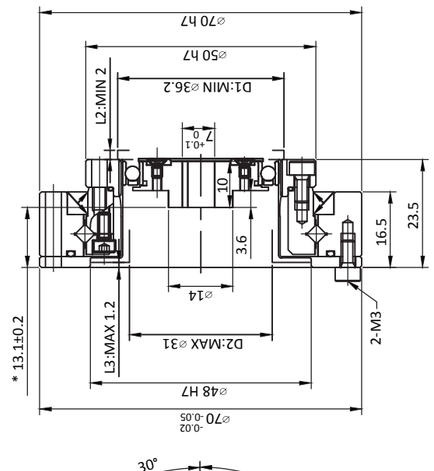
Item / Model No	Reduction Ratio	Rated Torque at Input 2000 rpm	Peak Torque at start and Stop	Average Torque	Max. Momentary Torque	Max. Input Speed	Average Input Speed	Back Lash	Max. Tension Force	Weight	Design Life
		Nm	Nm	Nm	Nm	r/min	r/min	Arc sec	N	Kg	Hour
14	30	3. 8	8. 6	7. 8	16	8000	3500	⩽20	⩽77	0. 56	10000
	50	5. 1	17	6. 6	33			⩽20			10000
	80	7. 4	22	10. 5	45			⩽10			15000
	100	7. 4	27	10. 5	51			⩽10			15000
17	30	8. 4	15. 2	11. 5	29	7000	3500	⩽20	⩽92	0. 80	10000
	50	15. 2	32	25	66			⩽20			10000
	80	21	41	26	83			⩽10			15000
	100	23	51	37	104			⩽10			15000
	120	23	51	37	82			⩽10			15000
20	30	14	26	19	48	6000	3500	⩽20	⩽136	1. 09	10000
	50	24	53	32	93			⩽20			10000
	80	32	70	45	121			⩽10			15000
	100	38	78	47	140			⩽10			15000
	120	38	83	47	140			⩽10			15000
	160	38	87	47	140			⩽10			15000
25	30	26	48	36	90	5500	3500	⩽20	⩽147	1. 70	10000
	50	37	93	52	177			⩽20			10000
	80	60	130	83	242			⩽10			15000
	100	64	149	103	270			⩽10			15000
	120	64	159	103	289			⩽10			15000
	160	64	167	103	298			⩽10			15000
32	30	51	95	71	190	4500	3500	⩽20	⩽154	3. 50	10000
	50	72	205	103	363			⩽20			10000
	80	112	289	159	540			⩽10			15000
	100	130	316	205	615			⩽10			15000
	120	130	335	205	652			⩽10			15000
	160	130	353	205	652			⩽10			15000
40	50	130	382	186	652	4000	3000	⩽20	⩽294	6. 35	10000
	80	196	493	270	931			⩽10			15000
	100	252	540	353	1026			⩽10			15000
	120	279	586	428	1121			⩽10			15000
	160	279	615	428	1121			⩽10			15000
50*	50	233	679	333	1358	3000	2500	⩽20	⩽373	12. 0	10000
	80	353	894	493	1767			⩽10			15000
	100	446	931	633	1957			⩽10			15000
	120	502	1026	772	1957			⩽10			15000
	160	502	1121	801	2328			⩽10			15000
58*	80	678	1828	951	3026	3000	2200	⩽10	⩽1300	16. 5	15000
	100	860	1964	1309	3927			⩽10			15000
	120	921	2124	1470	4113			⩽10			15000
	160	921	2272	1494	4236			⩽10			15000

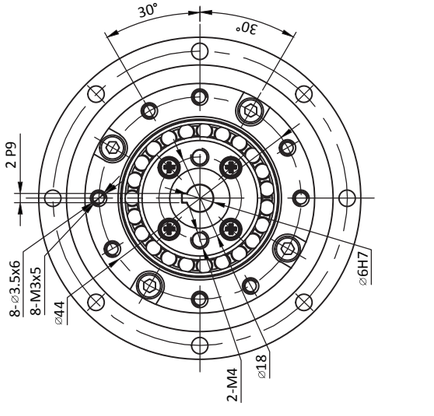
Parameter Table

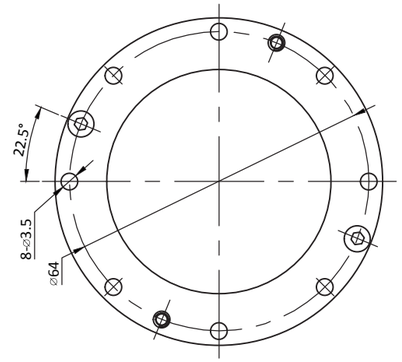
Item / Model No	Reduction Ratio	Rated Torque at Input 2000 rpm	Peak Torque at start and Stop	Average Torque	Max. Momentary Torque	Max. Input Speed	Average Input Speed	Back Lash	Max. Tension Force	Weight	Design Life
		Nm	Nm	Nm	Nm	r/min	r/min	Arc sec	N	Kg	Hour
14	30	3. 8	8. 6	7. 8	16	8000	3500	⩽20	⩽26	0. 65	10000
	50	5. 1	17	6. 6	33			⩽20			10000
	80	7. 4	22	10. 5	45			⩽10			15000
	100	7. 4	27	10. 5	51			⩽10			15000
17	30	8. 4	15. 2	11. 5	29	7000	3500	⩽20	⩽32	0. 92	10000
	50	15. 2	32	25	66			⩽20			10000
	80	21	41	26	83			⩽10			15000
	100	23	51	37	104			⩽10			15000
	120	23	51	37	82			⩽10			15000
20	30	14	26	19	48	6000	3500	⩽20	⩽58	1. 36	10000
	50	24	53	32	93			⩽20			10000
	80	32	70	45	121			⩽10			15000
	100	38	78	47	140			⩽10			15000
	120	38	83	47	140			⩽10			15000
	160	38	87	47	140			⩽10			15000
25	30	26	48	36	90	5500	3500	⩽20	⩽71	2. 05	10000
	50	37	93	52	177			⩽20			10000
	80	60	130	83	242			⩽10			15000
	100	64	149	103	270			⩽10			15000
	120	64	159	103	289			⩽10			15000
	160	64	167	103	298			⩽10			15000
32	30	51	95	71	190	4500	3500	⩽20	⩽114	4. 35	10000
	50	72	205	103	363			⩽20			10000
	80	112	289	159	540			⩽10			15000
	100	130	316	205	615			⩽10			15000
	120	130	335	205	652			⩽10			15000
	160	130	353	205	652			⩽10			15000
40	50	130	382	186	652	4000	3000	⩽20	⩽294	6. 45	10000
	80	196	493	270	931			⩽10			15000
	100	252	540	353	1026			⩽10			15000
	120	279	586	428	1121			⩽10			15000
	160	279	615	428	1121			⩽10			15000

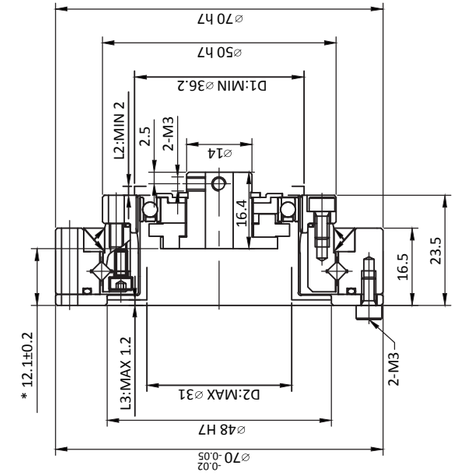
*** Consult factory**

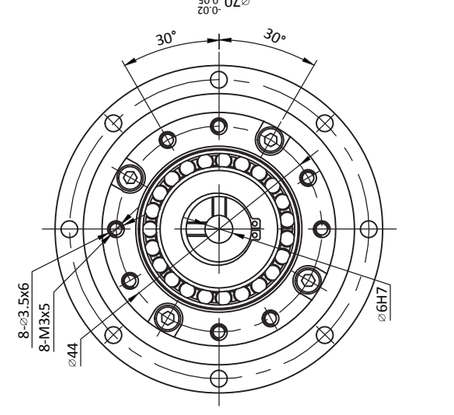

22.5°
8-⌀3.5
⌀64

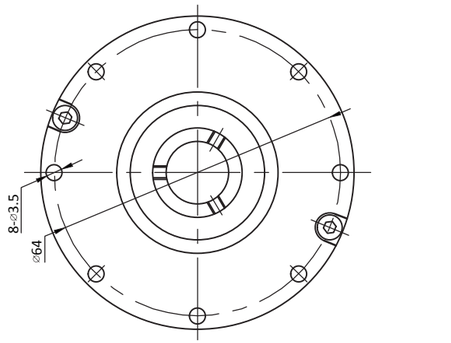

⌀70 h7
⌀50 h7
D1:MIN ⌀36.2
L2:MIN 2
7 +0.1 0
10
3.6
⌀14
16.5
23.5
L3:MAX 1.2
D2:MAX ⌀31
2-M3
* 13.1±0.2
⌀48 H7
⌀70 -0.02 -0.05


30°
30°
2 P9
8-⌀3.5x6
8-M3x5
⌀44
⌀6H7
2-M4
⌀18


22.5°
8-⌀3.5
⌀64


⌀70 h7
⌀50 h7
D1:MIN ⌀36.2
L2:MIN 2
2.5
2-M3
⌀14
16.4
16.5
23.5
L3:MAX 1.2
D2:MAX ⌀31
2-M3
* 12.1±0.2
⌀48 H7
⌀70 -0.02 -0.05


30°
30°
8-⌀3.5x6
8-M3x5
⌀44
⌀6H7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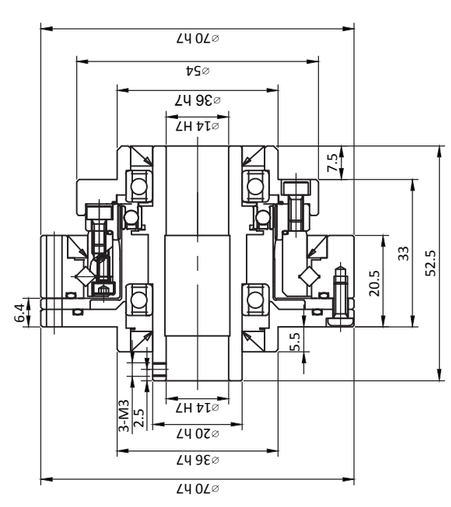
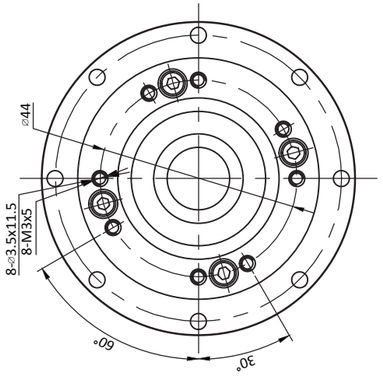
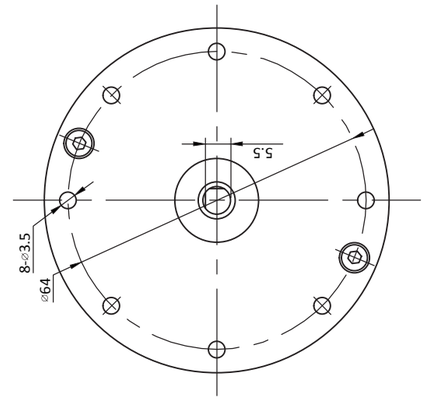
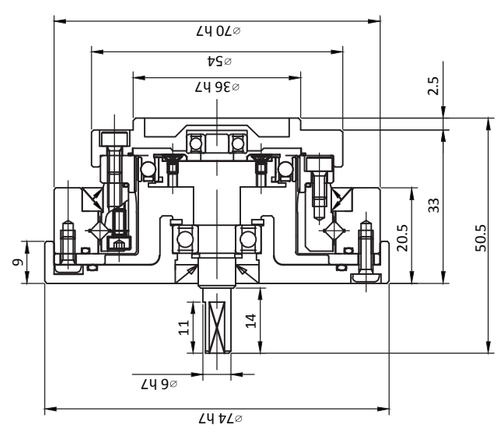
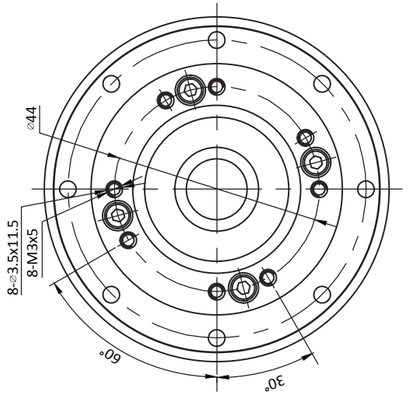
⌀64

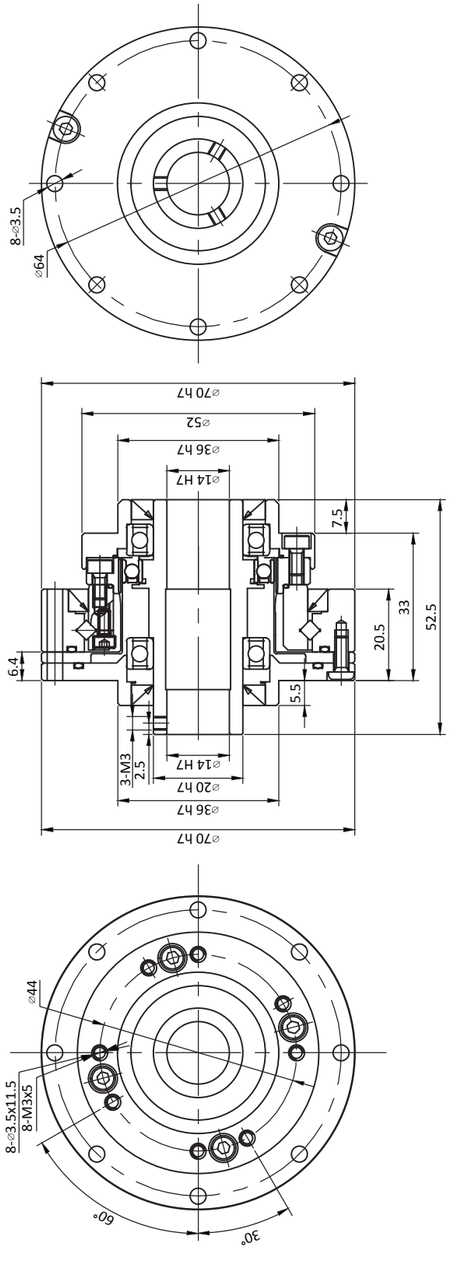

⌀70 h7
⌀54
⌀36 h7
⌀14 H7
7.5
33
52.5
20.5
6.4
5.5
3-M3
2.5
⌀14 H7
⌀20 h7
⌀36 h7
⌀70 h7

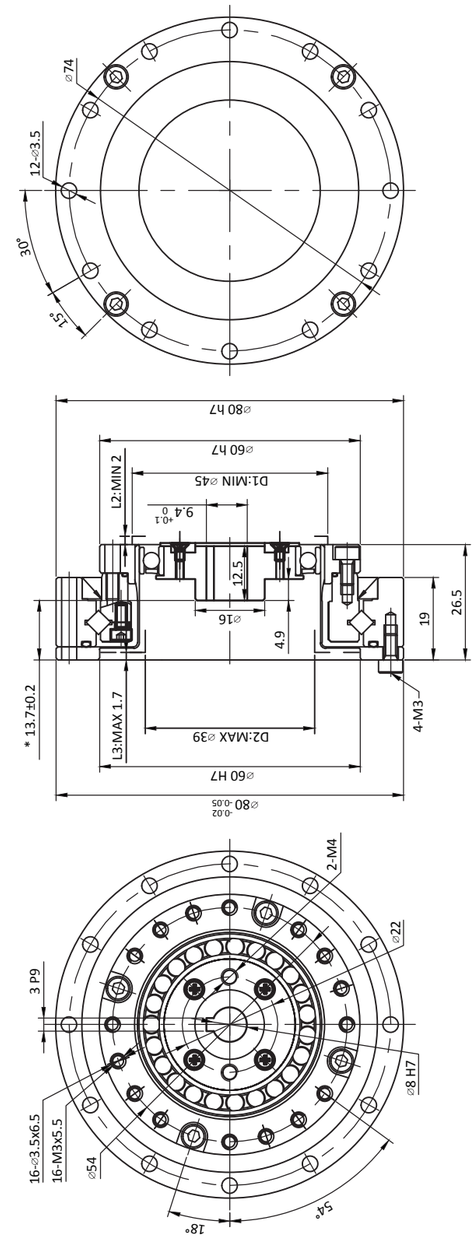

⌀44
8-⌀3.5x11.5
8-M3x5
60°
30°

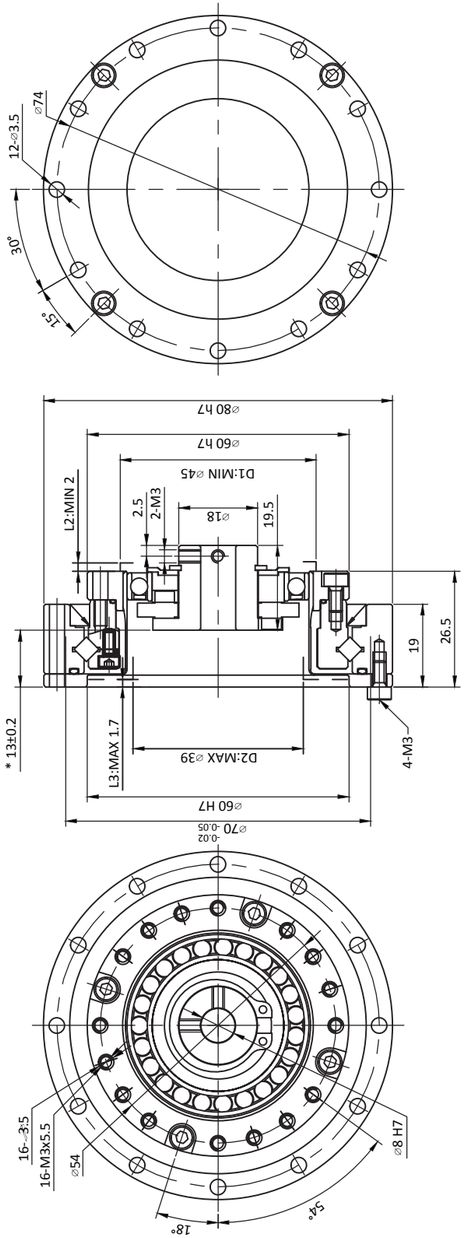

5.5
8-⌀3.5
⌀64


⌀70 h7
⌀54
⌀36 h7
2.5
33
50.5
20.5
9
11
14
⌀6 h7
⌀74 h7


⌀44
8-⌀3.5x11.5
8-M3x5
60°
30°


8-⌀3.5
⌀64
⌀70 h7
⌀52
⌀36 h7
⌀14 H7
7.5
33
52.5
20.5
6.4
5.5
3-M3
2.5
⌀14 H7
⌀20 h7
⌀36 h7
⌀70 h7
⌀44
8-⌀3.5x11.5
8-M3x5
60°
30°


⌀74
12-⌀3.5
30°
45°
⌀80 h7
⌀60 h7
L2:MIN 2
D1:MIN ⌀45
9.4 +0.1 0
12.5
⌀16
4.9
19
26.5
* 13.7±0.2
L3:MAX 1.7
D2:MAX ⌀39
4-M3
⌀60 H7
⌀80 -0.02 -0.05
2-M4
3 P9
⌀22
⌀8 H7
16-⌀3.5x6.5
16-M3x5.5
⌀54
18°
54°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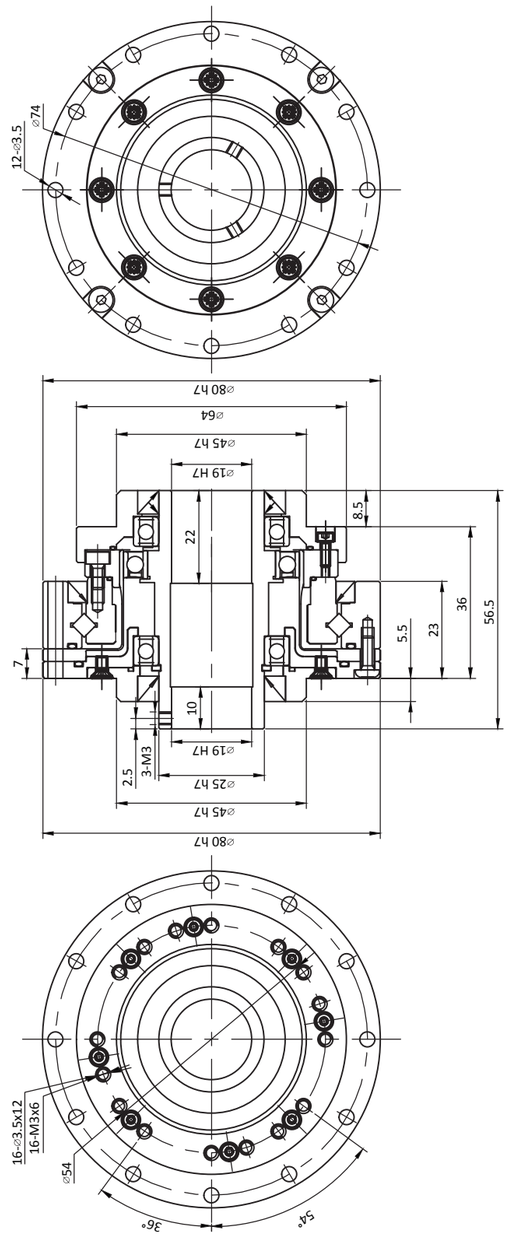
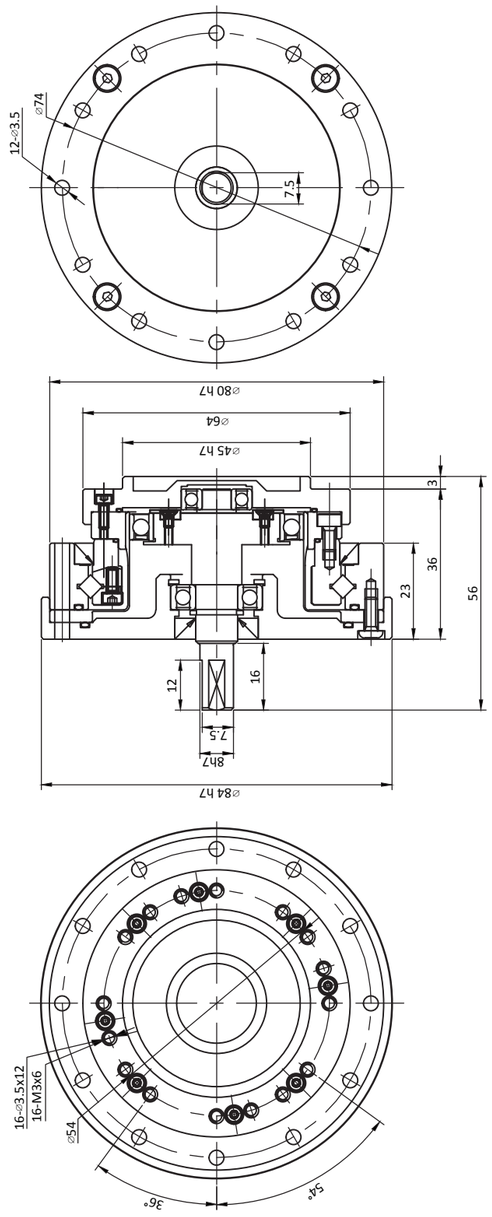
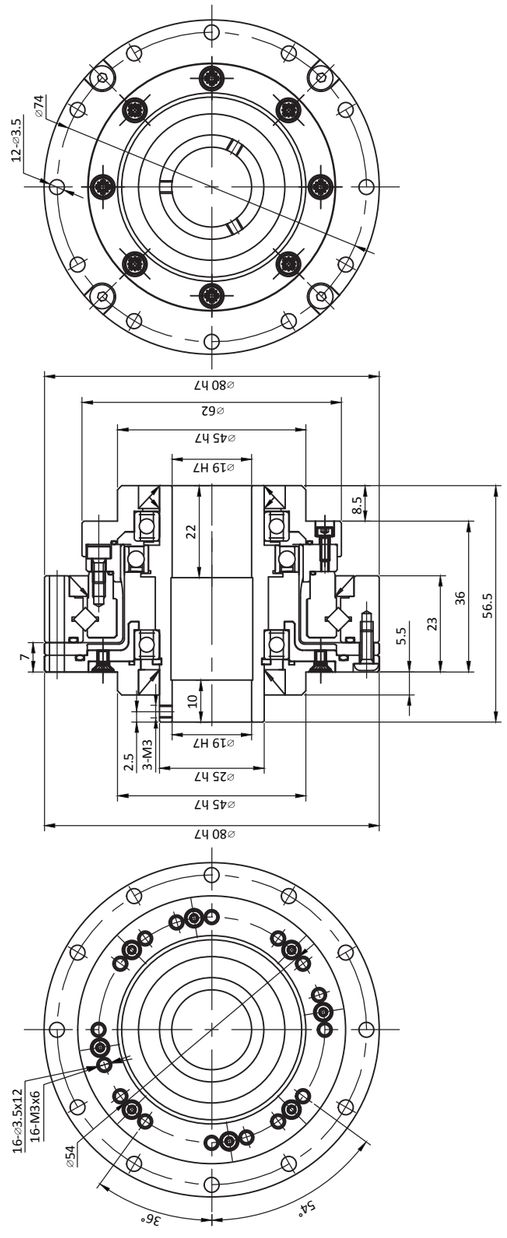
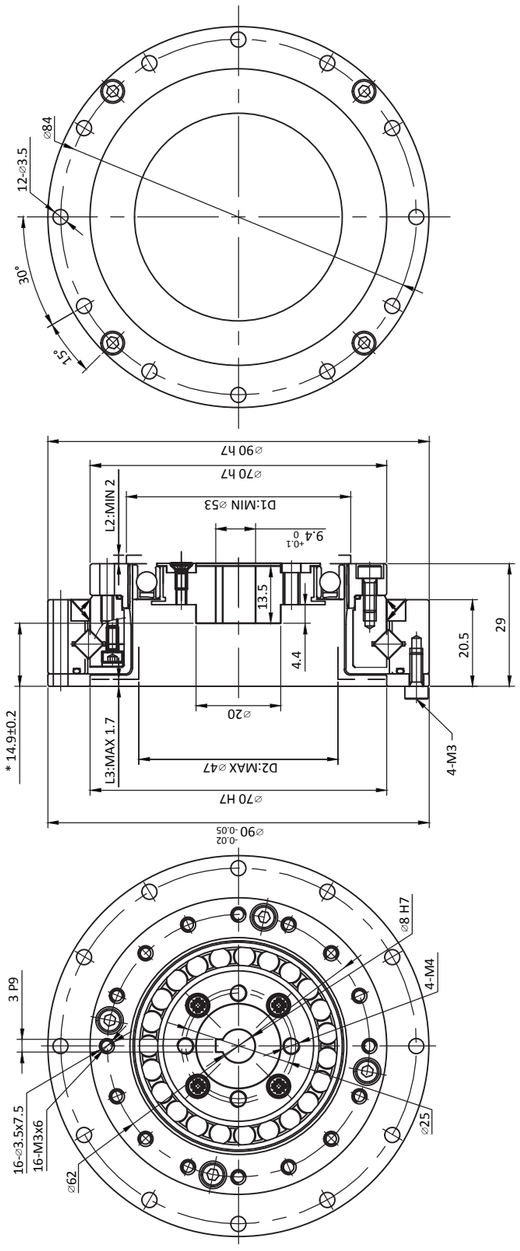
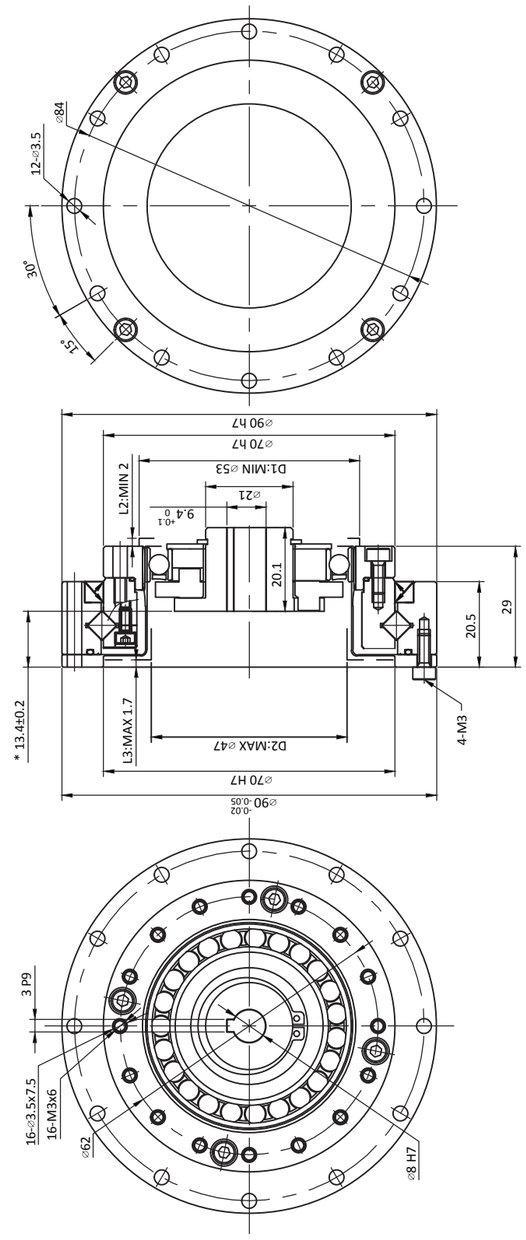
⌀74
30°
15°
⌀80 h7
⌀60 h7
D1:MIN ⌀45
L2:MIN 2
2.5
2-M3
⌀18
19.5
19
26.5
* 13±0.2
L3:MAX 1.7
D2:MAX ⌀39
4-M3
⌀60 H7
⌀70 -0.02 -0.05
16-⌀3.5
16-M3x5.5
⌀54
⌀8 H7
18°
54°

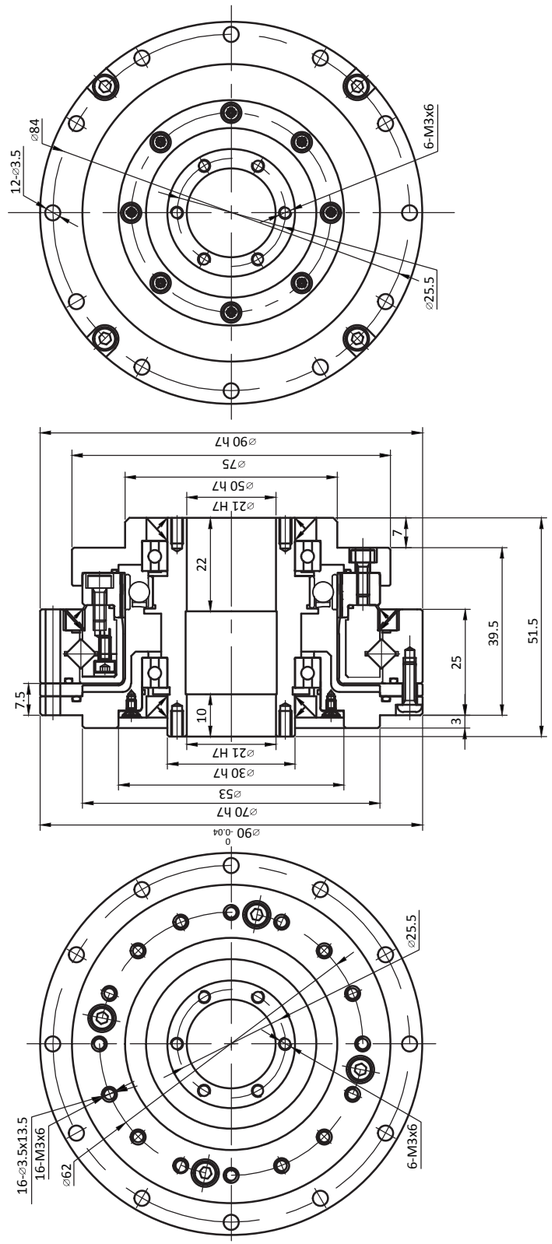

12-⌀3.5
⌀74
⌀80 h7
⌀64
⌀45 h7
⌀19 H7
22
8.5
36
56.5
5.5
23
7
10
2.5
3-M3
⌀19 H7
⌀25 h7
⌀45 h7
⌀80 h7
16-⌀3.5x12
16-M3x6
⌀54
36°
54°

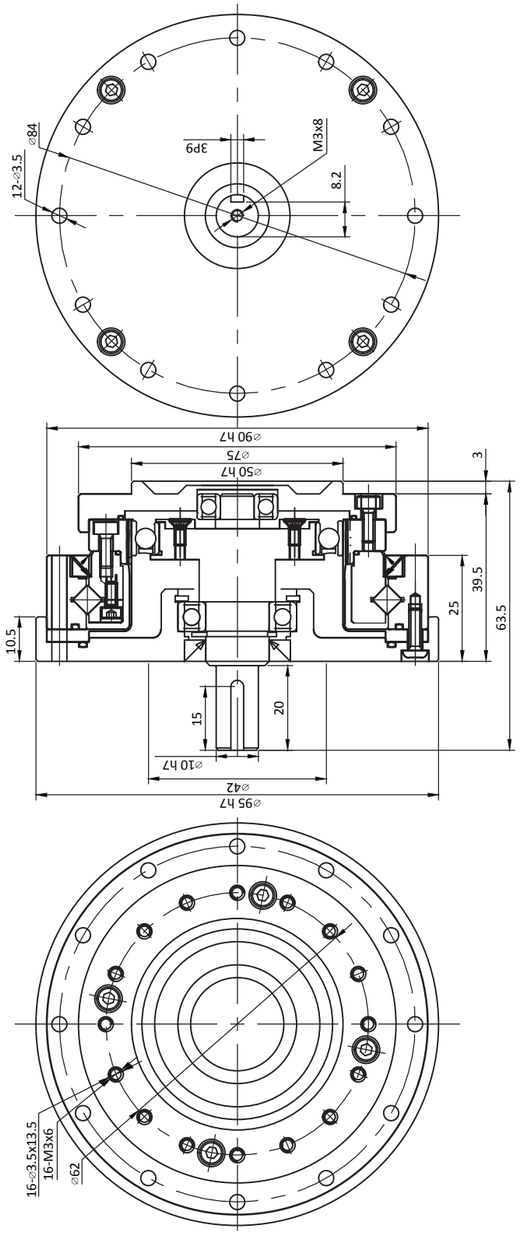

12-⌀3.5
⌀74
7.5
⌀80 h7
⌀64
⌀45 h7
3
36
23
56
12
16
7.5
8h7
⌀84 h7
16-⌀3.5x12
16-M3x6
⌀54
36°
54°

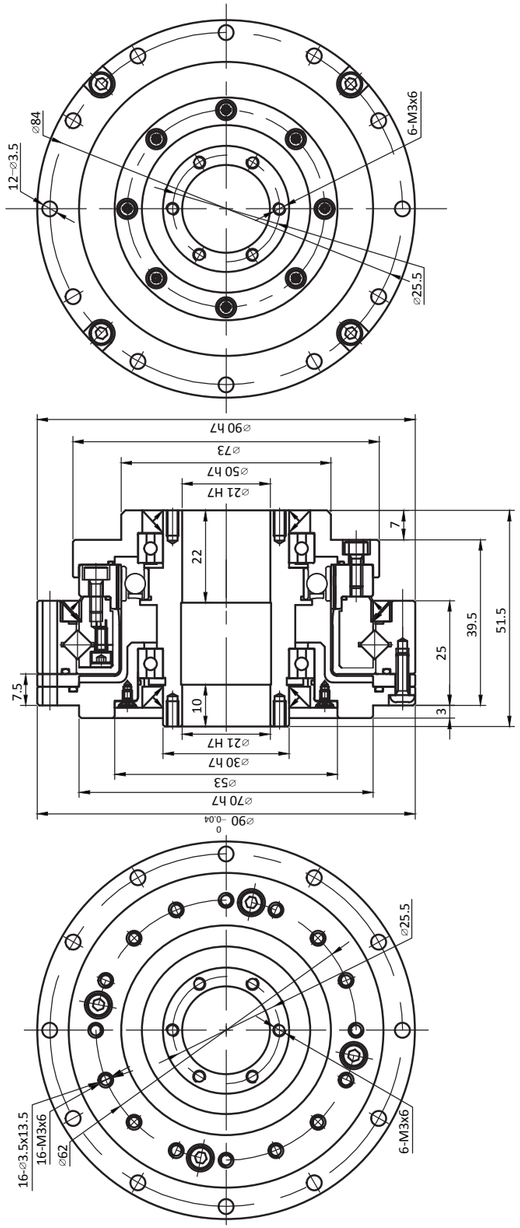

12-⌀3.5
⌀74
⌀80 h7
⌀62
⌀45 h7
⌀19 H7
8.5
22
5.5
23
36
56.5
7
10
2.5
3-M3
⌀19 H7
⌀25 h7
⌀45 h7
⌀80 h7
16-⌀3.5x12
16-M3x6
⌀54
36°
54°

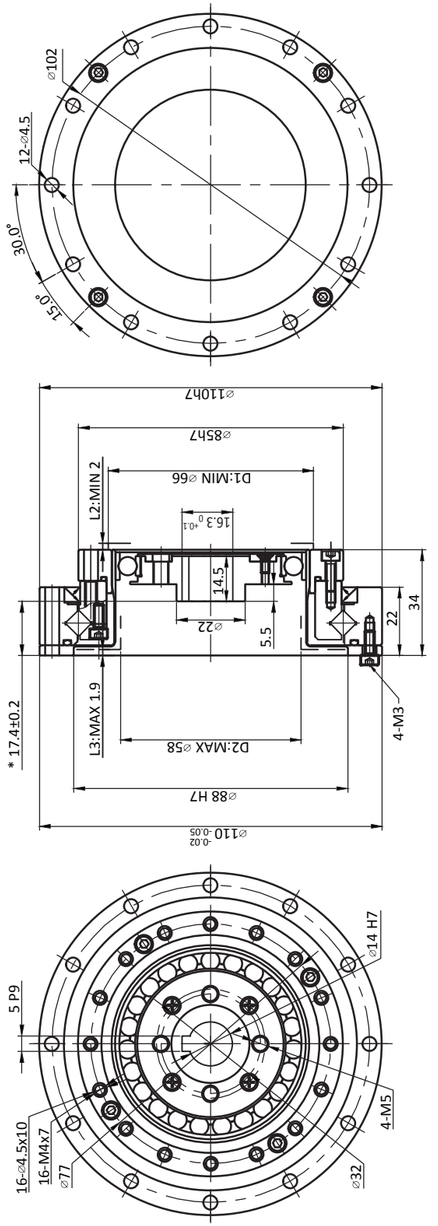

⌀84
12-⌀3.5
30°
15°
⌀90 h7
⌀70 h7
D1:MIN ⌀53
L2:MIN 2
9.4 +0.1 0
13.5
4.4
20.5
29
⌀20
* 14.9±0.2
L3:MAX 1.7
D2:MAX ⌀47
⌀70 H7
4-M3
⌀90 -0.02 -0.05
3 P9
⌀8 H7
4-M4
16-⌀3.5x7.5
16-M3x6
⌀62
⌀25

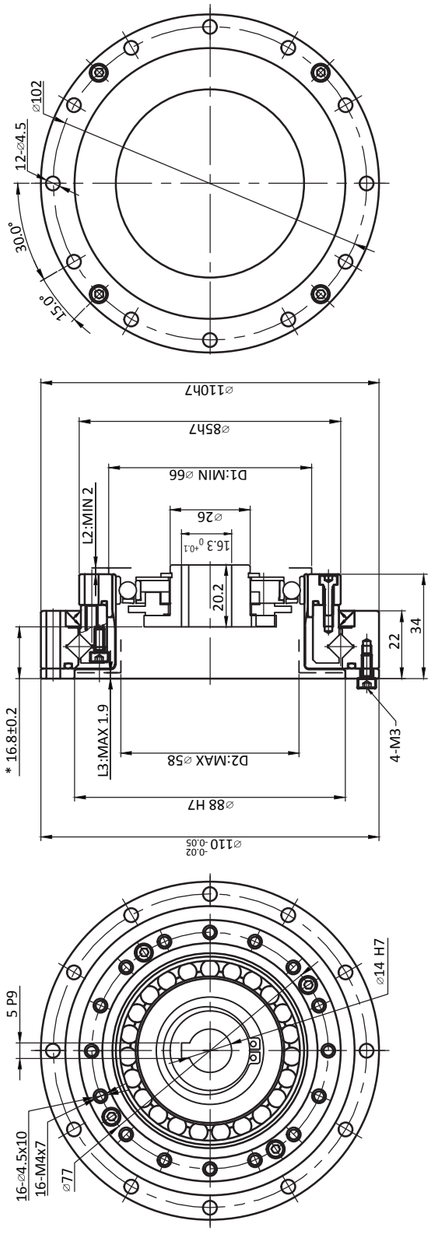

⌀84
12-⌀3.5
30°
15°
⌀90 h7
⌀70 h7
D1:MIN ⌀53
L2:MIN 2
⌀21
9.4 +0.1 0
20.1
20.5
29
* 13.4±0.2
L3:MAX 1.7
D2:MAX ⌀47
⌀70 H7
4-M3
⌀90 -0.02 -0.05
3 P9
16-⌀3.5x7.5
16-M3x6
⌀62
⌀8 H7

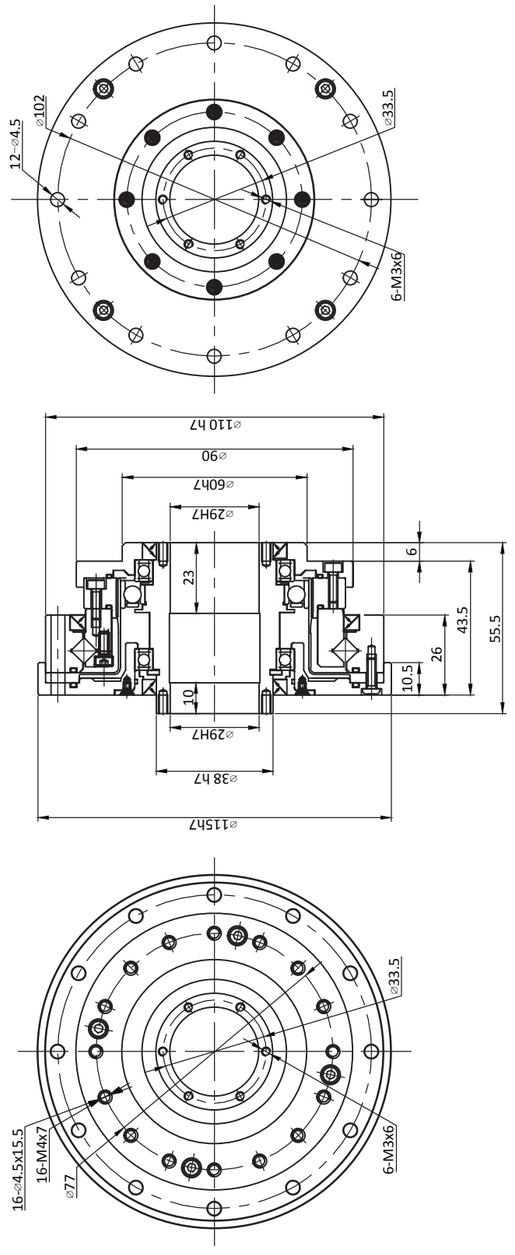

12-⌀3.5
⌀84
6-M3x6
⌀25.5
⌀90 h7
⌀75
⌀50 h7
⌀21 H7
7
22
25
39.5
51.5
7.5
10
3
⌀21 H7
⌀30 h7
⌀53
⌀70 h7
⌀90 -0.04 0
16-⌀3.5x13.5
16-M3x6
⌀62
⌀25.5
6-M3x6

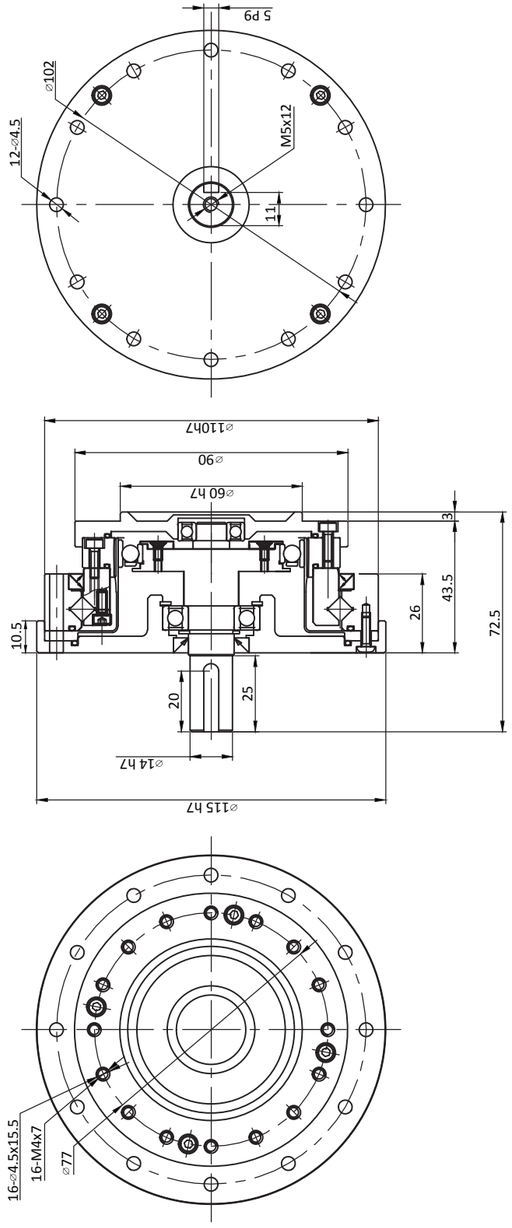

12-⌀3.5
⌀84
3P9
M3x8
8.2
⌀90 h7
⌀75
⌀50 h7
3
39.5
25
63.5
10.5
15
20
⌀10 h7
⌀42
⌀95 h7
16-⌀3.5x13.5
16-M3x6
⌀62

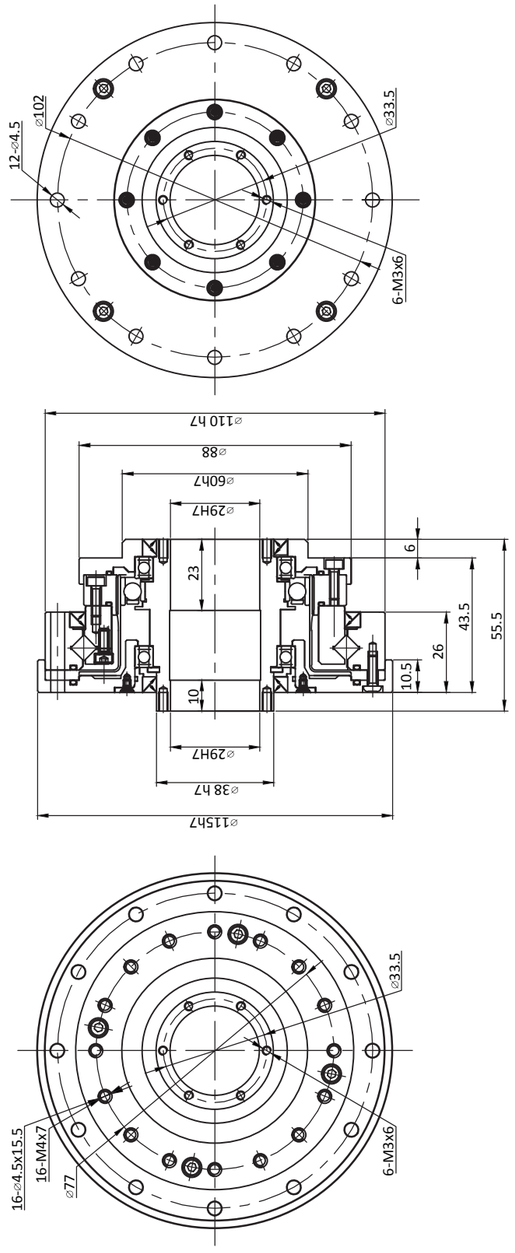

⌀84
12-⌀3.5
6-M3x6
⌀25.5
⌀90 h7
⌀73
⌀50 h7
⌀21 H7
7
22
25
39.5
51.5
7.5
10
3
⌀21 H7
⌀30 h7
⌀53
⌀70 h7
⌀90 0 -0.04
⌀25.5
16-⌀3.5x13.5
16-M3x6
⌀62
6-M3x6

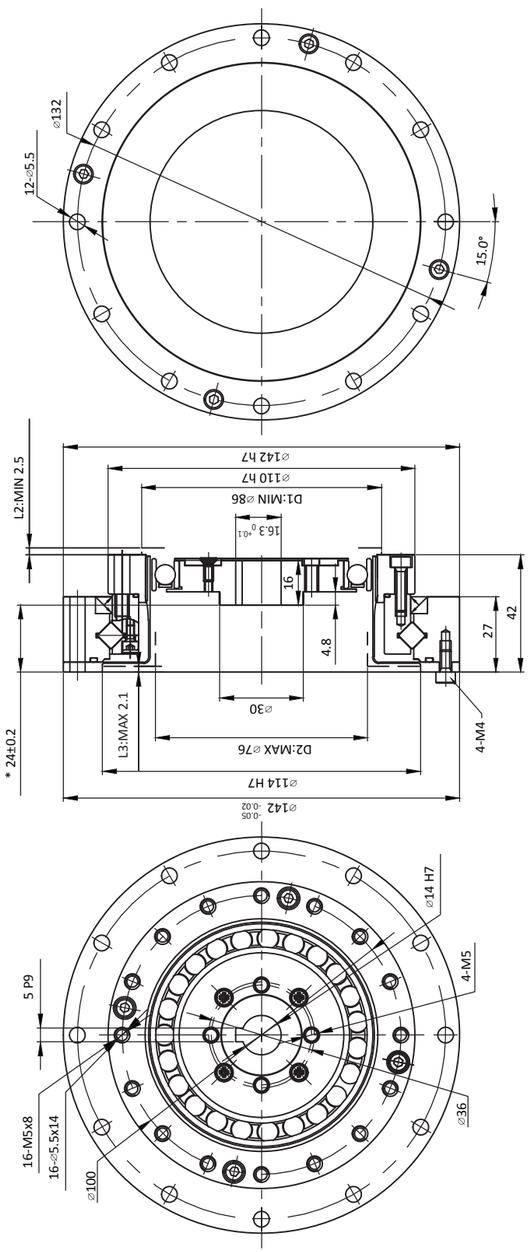

⌀102
12-⌀4.5
30.0°
15.0°
⌀110 h7
⌀85 h7
D1:MIN ⌀66
L2:MIN 2
16.3 0 +0.1
14.5
⌀22
5.5
22
34
* 17.4±0.2
L3:MAX 1.9
D2:MAX ⌀58
4-M3
⌀88 H7
⌀110 0 -0.05 -0.02
5 P9
⌀14 H7
16-⌀4.5x10
16-M4x7
⌀77
⌀32
4-M5

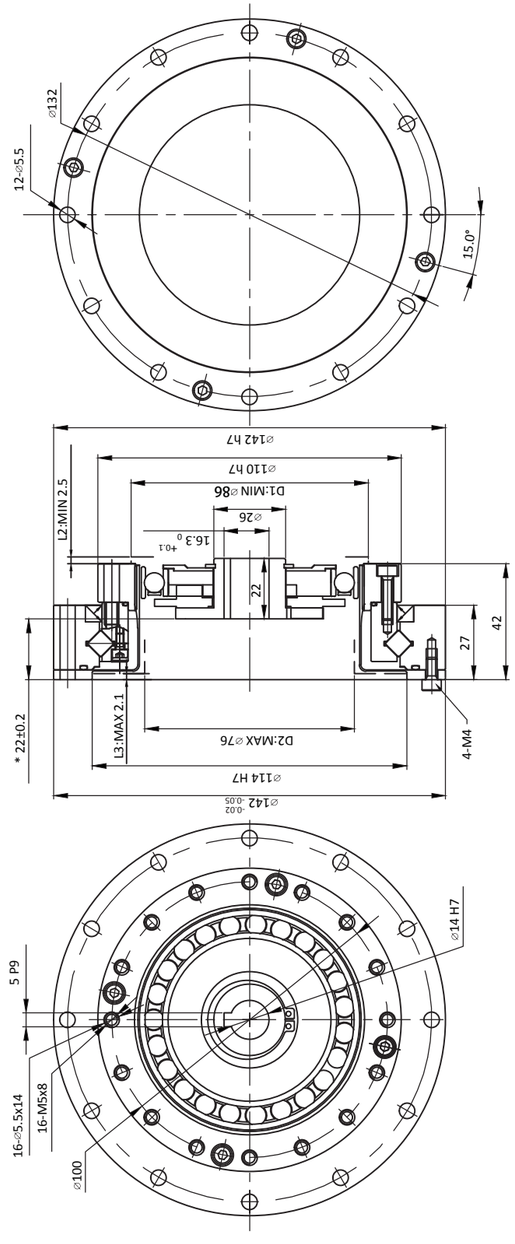

12-⌀4.5
⌀102
30.0°
15.0°
⌀110h7
⌀85h7
D1:MIN ⌀66
L2:MIN 2
⌀26
16.3 0 +0.1
20.2
34
22
* 16.8±0.2
L3:MAX 1.9
D2:MAX ⌀58
4-M3
⌀88 H7
⌀110 -0.02 -0.05
5 P9
⌀14 H7
16-⌀4.5x10
16-M4x7
⌀77

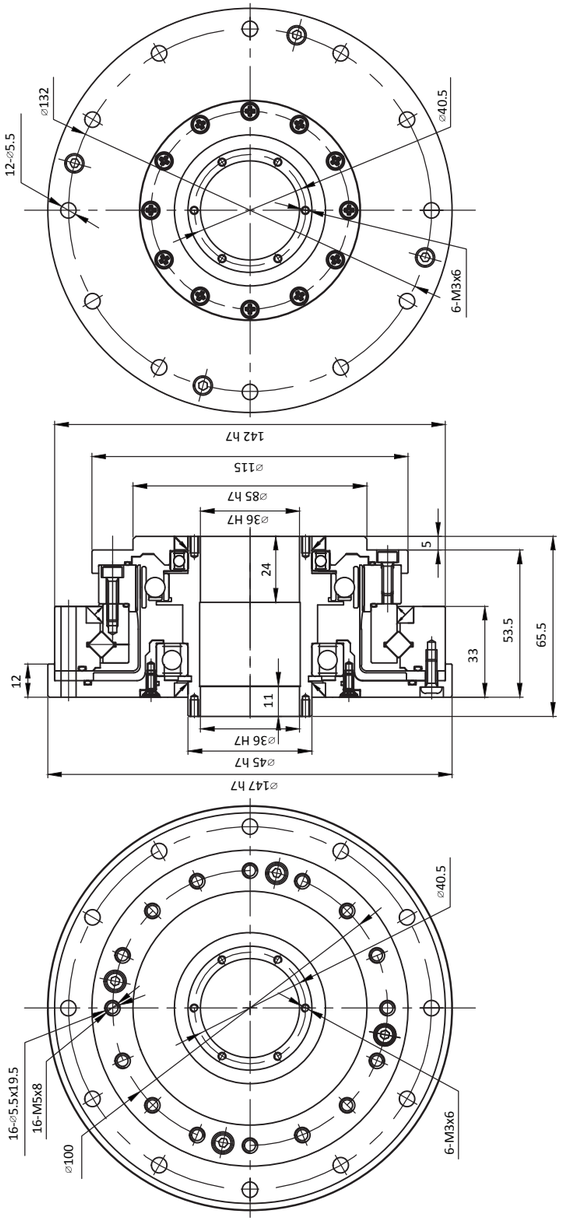

12-⌀4.5
⌀102
⌀33.5
6-M3x6
⌀110 h7
⌀90
⌀60h7
⌀29H7
9
6
23
43.5
55.5
26
10.5
10
⌀29H7
⌀38 h7
⌀115h7
⌀33.5
16-⌀4.5x15.5
16-M4x7
⌀77
6-M3x6

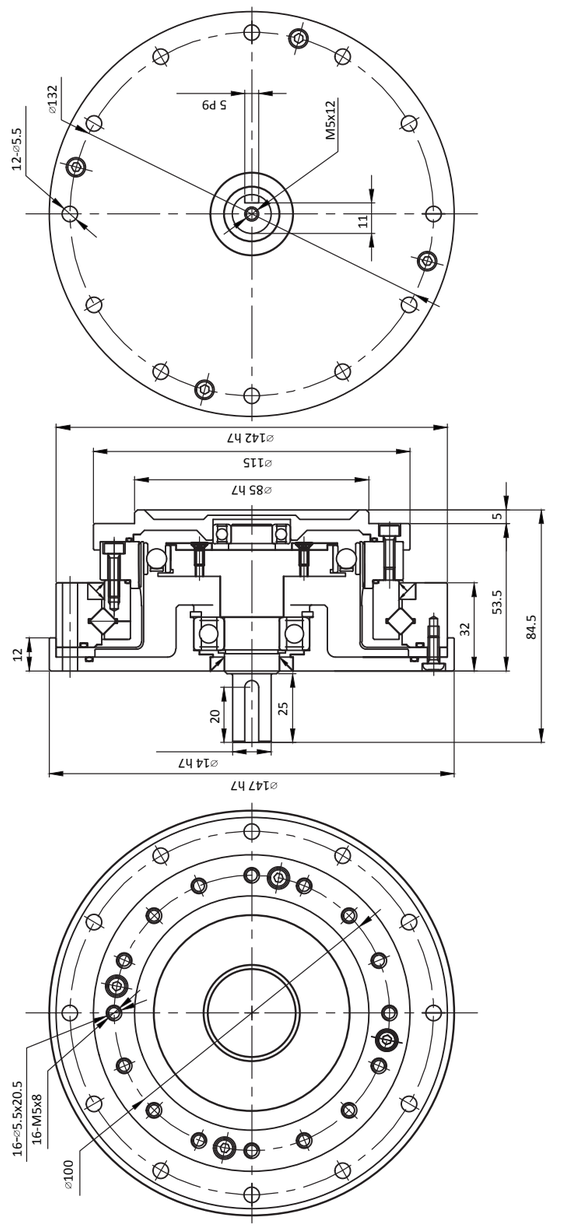

5 P9
⌀102
12-⌀4.5
M5x12
11
⌀110h7
⌀90
⌀60 h7
3
43.5
26
72.5
10.5
20
25
⌀14 h7
⌀115 h7
16-⌀4.5x15.5
16-M4x7
⌀77

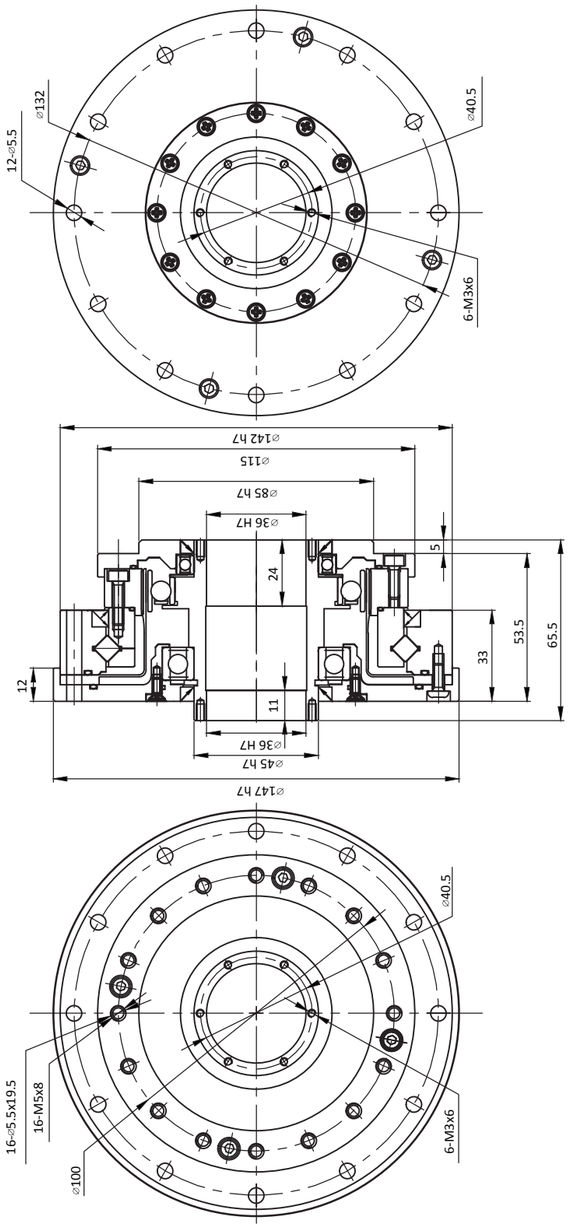

12-⌀4.5
⌀102
⌀33.5
6-M3x6
⌀110 h7
⌀88
⌀60h7
⌀29H7
6
23
43.5
55.5
26
10.5
10
⌀29H7
⌀38 h7
⌀115h7
16-⌀4.5x15.5
16-M4x7
⌀77

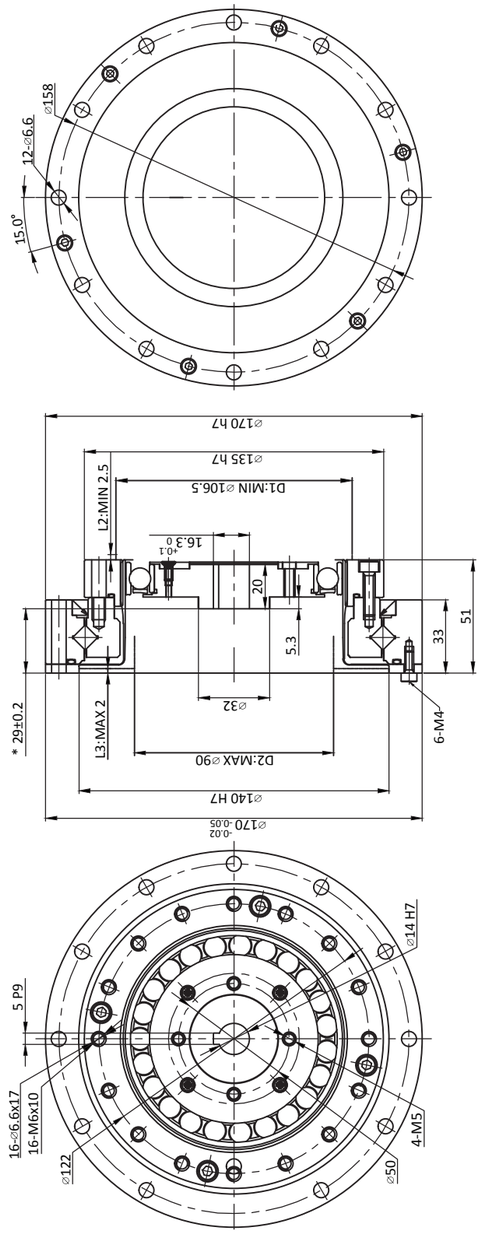

⌀132
12-⌀5.5
15.0°
L2:MIN 2.5
⌀142 h7
⌀110 h7
D1:MIN ⌀86
16.3 0 -0.1
16
4.8
27
42
⌀30
L3:MAX 2.1
D2:MAX ⌀76
* 24±0.2
4-M4
⌀114 H7
⌀142 -0.02 -0.05
⌀14 H7
5 P9
4-M5
16-M5x8
16-⌀5.5x14
⌀100
⌀36

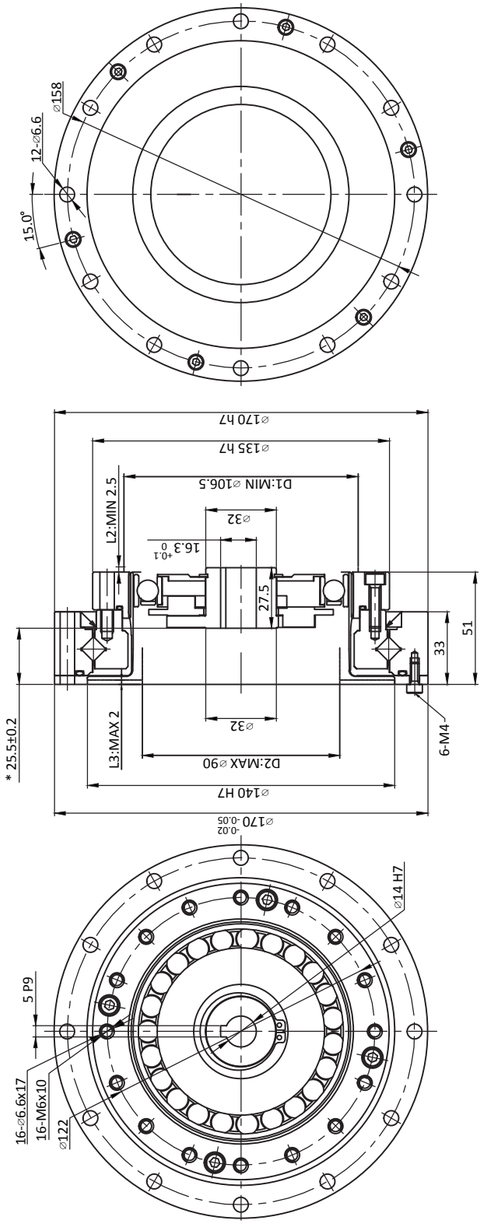

⌀132
12-⌀5.5
15.0°
⌀142 h7
⌀110 h7
D1:MIN ⌀86
⌀26
16.3 0 -0.1
L2:MIN 2.5
22
27
42
L3:MAX 2.1
D2:MAX ⌀76
* 22±0.2
4-M4
⌀114 H7
⌀142 -0.02 -0.05
⌀14 H7
5 P9
16-⌀5.5x14
16-M5x8
⌀100

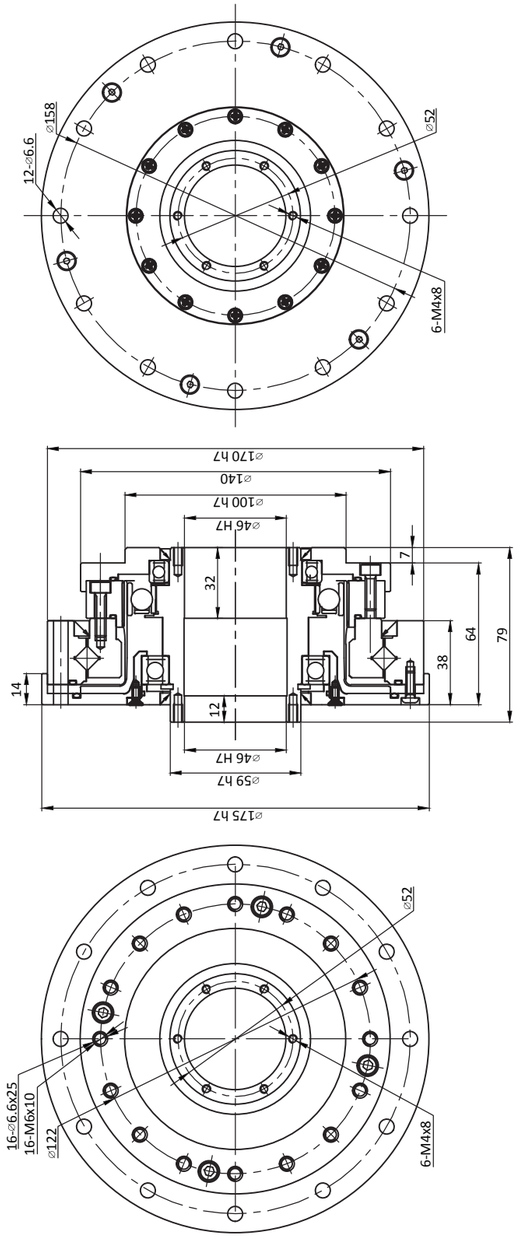

⌀132
12-⌀5.5
⌀40.5
6-M3x6
142 h7
⌀115
⌀85 h7
⌀36 H7
24
5
53.5
65.5
33
12
11
⌀36 H7
⌀45 h7
⌀147 h7
⌀40.5
16-⌀5.5x19.5
16-M5x8
⌀100
6-M3x6

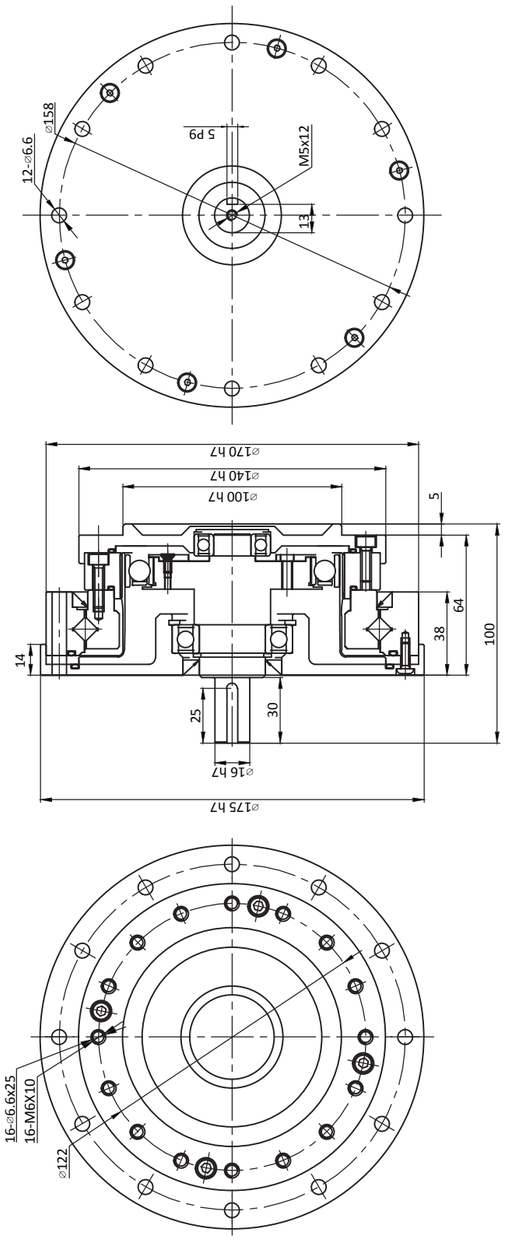

⌀132
12-⌀5.5
5 P9
M5x12
11
⌀142 h7
⌀115
⌀85 h7
5
53.5
84.5
32
12
20
25
⌀14 h7
⌀147 h7
16-⌀5.5x20.5
16-M5x8
⌀100

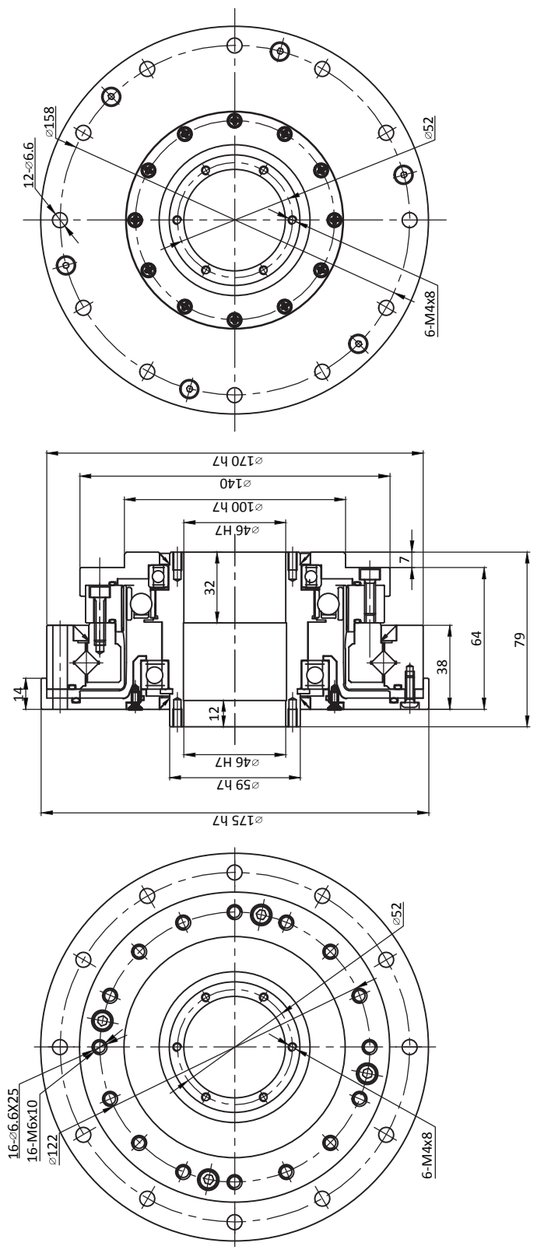

12-⌀5.5
⌀132
⌀40.5
6-M3x6
⌀142 h7
⌀115
⌀85 h7
⌀36 H7
5
24
33
53.5
65.5
12
11
⌀36 h7
⌀45 h7
⌀147 h7
⌀40.5
16-⌀5.5x19.5
16-M5x8
⌀100
6-M3x6


⌀158
12-⌀6.6
15.0°
⌀170 h7
⌀135 h7
D1:MIN ⌀106.5
L2:MIN 2.5
16.3 +0.1 0
20
5.3
33
51
⌀32
* 29±0.2
L3:MAX 2
D2:MAX ⌀90
6-M4
⌀140 H7
⌀170 -0.02 -0.05
5 P9
⌀14 H7
16-⌀6.6x17
16-M6x10
⌀122
⌀50
4-M5


⌀158
12-⌀6.6
15.0°
⌀170 h7
⌀135 h7
D1:MIN ⌀106.5
L2:MIN 2.5
⌀32
16.3 +0.1 0
27.5
51
33
6-M4
⌀32
L3:MAX 2
D2:MAX ⌀90
⌀140 H7
* 25.5±0.2
⌀170 -0.02 -0.05
⌀14 H7
5 P9
16-⌀6.6x17
16-M6x10
⌀122


⌀158
12-⌀6.6
⌀52
6-M4x8
⌀170 h7
⌀140
⌀100 h7
⌀46 H7
7
32
64
79
38
14
12
⌀46 H7
⌀59 h7
⌀175 h7
16-⌀6.6x25
16-M6x10
⌀122
⌀52
6-M4x8


⌀158
12-⌀6.6
5 P9
M5x12
13
⌀170 h7
⌀140 h7
⌀100 h7
5
64
38
100
14
25
30
⌀16 h7
⌀175 h7
16-⌀6.6x25
16-M6X10
⌀122


⌀158
12-⌀6.6
⌀52
6-M4x8
⌀170 h7
⌀140
⌀100 h7
⌀46 H7
7
32
64
79
38
14
12
⌀46 H7
⌀59 h7
⌀175 h7
16-⌀6.6x25
16-M6x10
⌀122

LHSG Series of Strain Wave Reducer

LHSG-I

1. Hollow shaped;
2. More 30% torque capability than LHS series;
3. Hole with key way connected;

LHSG-II

1. Hollow shaped;
2. More 30% torque capability than LHS series;
3. Oldham's coupling connected;

LHSG-III

1. Hollow shaped;
2. More 30% torque capability than LHS series;
3. Big hole for passing cable through;

LHSG-III-ST

1. Hollow shaped;
2. Lighter weight than LHSG-III;

LHSG-CL-III

1. Hollow shaped;
2. Lighter weight and higher torque than LHSG-III;

LHSG-IV

1. Hollow shaped;
2. Higher 30% torque than LHS;

Parameter Table

Bi-directional Accuracy Arc min						
Model / Reduction Ratio	14	17	20	25	32	40
50	2	2	2	2	2	2
80/100/120/160	1.5	1.5	1.5	1.5	1.5	1.5

Hysteresis Loss Arc min						
Model / Reduction Ratio	14	17	20	25	32	40
50	2.5	2	2	2	2	2
80/100/120/160	2	2	1.5	1.5	1.5	1.5

Torsional Stiffness x10^4 Nm/rad						
Model / Reduction Ratio	14	17	20	25	32	40
50	0.46	1.07	1.8	3.4	7.6	14
80/100/120/160	0.6	1.3	2.3	4.6	9.9	18.6

Starting Torque cNm						
Model / Reduction Ratio	14	17	20	25	32	40
50	5	7	9	18	35	62
80	3.5	5	6	11	22	38
100	3.2	4	5.2	9.5	21	35
120	—	3.5	4	8.5	18	30
160	—	—	3.8	7	15	27

*** Consult factory**

Parameter Table

Ratcheting Torque Nm						
Model	14	17	20	25	32	40
50	110	190	280	580	1200	2300
80	140	260	450	880	1800	3600
100	100	200	330	650	1300	2700
120	—	150	310	610	1200	2400
160	—	—	280	580	1200	2300

Buckling Torque Nm						
Model	14	17	20	25	32	40
All Reduction Ratio	210	420	700	1300	2800	5200

Bending Moment and Thrust Sheet				
Model	Parameter	Rated Value	Parameter	Momentary Value
LHSG-14	M_b	41 Nm	$M_{b\,max}$	80 Nm
	F_t	270 N	$F_{t\,max}$	490 N
	F_a	270 N	$F_{a\,max}$	490 N
LHSG-17	M_b	72 Nm	$M_{b\,max}$	140 Nm
	F_t	400 N	$F_{t\,max}$	700 N
	F_a	400 N	$F_{a\,max}$	700 N
LHSG-20	M_b	140 Nm	$M_{b\,max}$	280 Nm
	F_t	650 N	$F_{t\,max}$	1150 N
	F_a	650 N	$F_{a\,max}$	1150 N
LHSG-25	M_b	243 Nm	$M_{b\,max}$	480 Nm
	F_t	900 N	$F_{t\,max}$	1600 N
	F_a	900 N	$F_{a\,max}$	1600 N
LHSG-32	M_b	460 Nm	$M_{b\,max}$	900 Nm
	F_t	1350 N	$F_{t\,max}$	2300 N
	F_a	1350 N	$F_{a\,max}$	2300 N
LHSG-40	M_b	600 Nm	$M_{b\,max}$	1200 Nm
	F_t	2000 N	$F_{t\,max}$	3500 N
	F_a	2000 N	$F_{a\,max}$	3500 N

Note:
M_b: Bending Moment; F_t: Radial Force; F_a: Axial Force.

*** Consult factory**

Parameter Table

Bi-directional Accuracy Arc min						
Model / Reduction Ratio	14	17	20	25	32	40
50	2	2	2	2	2	2
80/100/120/160	1.5	1.5	1.5	1.5	1.5	1.5

Hysteresis Loss Arc min						
Model / Reduction Ratio	14	17	20	25	32	40
50	2.5	2	2	2	2	2
80/100/120/160	2	2	1.5	1.5	1.5	1.5

Torsional Stiffness x10^4 Nm/rad						
Model / Reduction Ratio	14	17	20	25	32	40
50	0.46	1.07	1.8	3.4	7.6	14
80/100/120/160	0.6	1.3	2.3	4.6	9.9	18.6

Starting Torque cNm						
Model / Reduction Ratio	14	17	20	25	32	40
50	5	7	9	18	35	62
80	3.5	5	6	11	22	38
100	3.2	4	5.2	9.5	21	35
120	—	3.5	4	8.5	18	30
160	—	—	3.8	7	15	27

*** Consult factory**

Parameter Table

Ratcheting Torque Nm						
Model	14	17	20	25	32	40
50	110	190	280	580	1200	2300
80	140	260	450	880	1800	3600
100	100	200	330	650	1300	2700
120	—	150	310	610	1200	2400
160	—	—	280	580	1200	2300

Buckling Torque Nm						
Model	14	17	20	25	32	40
All Reduction Ratio	210	420	700	1300	2800	5200

Bending Moment and Thrust Sheet				
Model	Parameter	Rated Value	Parameter	Momentary Value
LHSG-14	M_b	41 Nm	$M_{b\ max}$	80 Nm
	F_t	270 N	$F_{t\ max}$	490 N
	F_a	270 N	$F_{a\ max}$	490 N
LHSG-17	M_b	72 Nm	$M_{b\ max}$	140 Nm
	F_t	400 N	$F_{t\ max}$	700 N
	F_a	400 N	$F_{a\ max}$	700 N
LHSG-20	M_b	140 Nm	$M_{b\ max}$	280 Nm
	F_t	650 N	$F_{t\ max}$	1150 N
	F_a	650 N	$F_{a\ max}$	1150 N
LHSG-25	M_b	243 Nm	$M_{b\ max}$	480 Nm
	F_t	900 N	$F_{t\ max}$	1600 N
	F_a	900 N	$F_{a\ max}$	1600 N
LHSG-32	M_b	460 Nm	$M_{b\ max}$	900 Nm
	F_t	1350 N	$F_{t\ max}$	2300 N
	F_a	1350 N	$F_{a\ max}$	2300 N
LHSG-40	M_b	600 Nm	$M_{b\ max}$	1200 Nm
	F_t	2000 N	$F_{t\ max}$	3500 N
	F_a	2000 N	$F_{a\ max}$	3500 N

Note:
M_b: Bending Moment; F_t: Radial Force; F_a: Axial Force.

*** Consult factory**

Parameter Table

Bi-directional Accuracy Arc min						
Model / Reduction Ratio	14	17	20	25	32	40
50	2	2	2	2	2	2
80/100/120/160	1.5	1.5	1.5	1.5	1.5	1.5

Hysteresis Loss Arc min						
Model / Reduction Ratio	14	17	20	25	32	40
50	2.5	2	2	2	2	2
80/100/120/160	2	2	1.5	1.5	1.5	1.5

Torsional Stiffness x10^4 Nm/rad						
Model / Reduction Ratio	14	17	20	25	32	40
50	0.46	1.07	1.8	3.4	7.6	14
80/100/120/160	0.6	1.3	2.3	4.6	9.9	18.6

Starting Torque cNm						
Model / Reduction Ratio	14	17	20	25	32	40
50	5	7	9	18	35	62
80	3.5	5	6	11	22	38
100	3.2	4	5.2	9.5	21	35
120	—	3.5	4	8.5	18	30
160	—	—	3.8	7	15	27

*** Consult factory**

Parameter Table

Ratcheting Torque Nm						
Model	14	17	20	25	32	40
50	110	190	280	580	1200	2300
80	140	260	450	880	1800	3600
100	100	200	330	650	1300	2700
120	—	150	310	610	1200	2400
160	—	—	280	580	1200	2300

Buckling Torque Nm						
Model	14	17	20	25	32	40
All Reduction Ratio	210	420	700	1300	2800	5200

Bending Moment and Thrust Sheet				
Model	Parameter	Rated Value	Parameter	Momentary Value
LHSG-14	M_b	41 Nm	$M_{b\ max}$	80 Nm
	F_t	270 N	$F_{t\ max}$	490 N
	F_a	270 N	$F_{a\ max}$	490 N
LHSG-17	M_b	72 Nm	$M_{b\ max}$	140 Nm
	F_t	400 N	$F_{t\ max}$	700 N
	F_a	400 N	$F_{a\ max}$	700 N
LHSG-20	M_b	140 Nm	$M_{b\ max}$	280 Nm
	F_t	650 N	$F_{t\ max}$	1150 N
	F_a	650 N	$F_{a\ max}$	1150 N
LHSG-25	M_b	243 Nm	$M_{b\ max}$	480 Nm
	F_t	900 N	$F_{t\ max}$	1600 N
	F_a	900 N	$F_{a\ max}$	1600 N
LHSG-32	M_b	460 Nm	$M_{b\ max}$	900 Nm
	F_t	1350 N	$F_{t\ max}$	2300 N
	F_a	1350 N	$F_{a\ max}$	2300 N
LHSG-40	M_b	600 Nm	$M_{b\ max}$	1200 Nm
	F_t	2000 N	$F_{t\ max}$	3500 N
	F_a	2000 N	$F_{a\ max}$	3500 N

Note:
M_b: Bending Moment; F_t: Radial Force; F_a: Axial Force.

*** Consult factory**

Parameter Table

Item / Model No	Reduction Ratio	Rated Torque at Input 2000 rpm	Peak Torque at start and Stop	Average Torque	Max. Momentary Torque	Max. Input Speed	Average Input Speed	Back lash	Weight	Design Life
		Nm	Nm	Nm	Nm	r/min	r/min	Arc sec	Kg	Hour
14	50	6. 6	23	8. 6	43	8000	3500	⩽10	0. 38	10000
	80	9. 6	29	13. 5	57			⩽10		15000
	100	9. 6	34	13. 5	66			⩽10		15000
17	50	19. 8	42	32	86	7000	3500	⩽10	0. 56	10000
	80	27. 5	53	33	108			⩽10		15000
	100	30	66	49	134			⩽10		15000
	120	30	66	49	107			⩽10		15000
20	50	32	69	42	121	6000	3500	⩽10	0. 76	10000
	80	42	91	58	158			⩽10		15000
	100	50	102	61	182			⩽10		15000
	120	50	108	61	182			⩽10		15000
	160	50	113	61	182			⩽10		15000
25	50	48	121	68. 5	230	5500	3500	⩽10	1. 24	10000
	80	78	169	107	315			⩽10		15000
	100	84	194	133	351			⩽10		15000
	120	84	207	133	376			⩽10		15000
	160	84	217	133	388			⩽10		15000
32	50	94	267	133	472	4500	3500	⩽10	2. 6	10000
	80	146	376	206	702			⩽10		15000
	100	169	411	267	800			⩽10		15000
	120	169	436	267	848			⩽10		15000
	160	169	459	267	848			⩽10		15000
40	50	169	497	242	847	4000	3000	⩽10	5. 0	10000
	80	255	641	351	1210			⩽10		15000
	100	328	702	460	1334			⩽10		15000
	120	363	762	557	1458			⩽10		15000
	160	363	800	557	1458			⩽10		15000
50*	80	459	1163	642	2297	3000	2500	⩽10	9. 5	15000
	100	580	1211	823	2545			⩽10		15000
	120	654	1334	1005	2545			⩽10		15000
	160	654	1458	1042	3025			⩽10		15000
58*	80	678	1828	951	3026	3000	2200	⩽10	13. 6	15000
	100	860	1964	1309	3927			⩽10		15000
	120	921	2124	1470	4113			⩽10		15000
	160	921	2722	1494	4236			⩽10		15000

* Consult factory

Parameter Table

Item / Model No	Reduction Ratio	Rated Torque at Input 2000 rpm	Peak Torque at start and Stop	Average Torque	Max. Momentary Torque	Max. Input Speed	Average Input Speed	Back lash	Weight	Design Life
		Nm	Nm	Nm	Nm	r/min	r/min	Arc sec	Kg	Hour
14	50	6. 6	23	8. 6	43	8000	3500	⩽20	0. 38	10000
	80	9. 6	29	13. 5	57			⩽20		15000
	100	9. 6	34	13. 5	66			⩽20		15000
17	50	19. 8	42	32	86	7000	3500	⩽20	0. 56	10000
	80	27. 5	53	33	108			⩽20		15000
	100	30	66	49	134			⩽20		15000
	120	30	66	49	107			⩽20		15000
20	50	32	69	42	121	6000	3500	⩽20	0. 76	10000
	80	42	91	58	158			⩽20		15000
	100	50	102	61	182			⩽20		15000
	120	50	108	61	182			⩽20		15000
	160	50	113	61	182			⩽20		15000
25	50	48	121	68. 5	230	5500	3500	⩽20	1. 24	10000
	80	78	169	107	315			⩽20		15000
	100	84	194	133	351			⩽20		15000
	120	84	207	133	376			⩽20		15000
	160	84	217	133	388			⩽20		15000
32	50	94	267	133	472	4500	3500	⩽20	2. 6	10000
	80	146	376	206	702			⩽20		15000
	100	169	411	267	800			⩽20		15000
	120	169	436	267	848			⩽20		15000
	160	169	459	267	848			⩽20		15000
40	50	169	497	242	847	4000	3000	⩽20	5. 0	10000
	80	255	641	351	1210			⩽20		15000
	100	328	702	460	1334			⩽20		15000
	120	363	762	557	1458			⩽20		15000
	160	363	800	557	1458			⩽20		15000
50*	80	459	1163	642	2297	3000	2500	⩽10	9. 5	15000
	100	580	1211	823	2545			⩽10		15000
	120	654	1334	1005	2545			⩽10		15000
	160	654	1458	1042	3025			⩽10		15000
58*	80	678	1828	951	3026	3000	2200	⩽10	13. 6	15000
	100	860	1964	1309	3927			⩽10		15000
	120	921	2124	1470	4113			⩽10		15000
	160	921	2722	1494	4236			⩽10		15000

* Consult factory

Parameter Table

Item / Model No	Reduction Ratio	Rated Torque at Input 2000 rpm	Peak Torque at start and Stop	Average Torque	Max. Momentary Torque	Max. Input Speed	Average Input Speed	Back lash	Max. Tension Force	Weight	Design Life
		Nm	Nm	Nm	Nm	r/min	r/min	Arc sec	N	Kg	Hour
14	50	6. 6	23	8. 6	43	8000	3500	≤20	≤77	0. 72	10000
	80	9. 6	29	13. 5	57			≤10			15000
	100	9. 6	34	13. 5	66			≤10			15000
17	50	19. 8	42	32	86	7000	3500	≤20	≤92	1. 0	10000
	80	27. 5	53	33	108			≤10			15000
	100	30	66	49	134			≤10			15000
	120	30	66	49	107			≤10			15000
20	50	32	69	42	121	6000	3500	≤20	≤136	1. 38	10000
	80	42	91	58	158			≤10			15000
	100	50	102	61	182			≤10			15000
	120	50	108	61	182			≤10			15000
	160	50	113	61	182			≤10			15000
25	50	48	121	68. 5	230	5500	3500	≤20	≤147	2. 15	10000
	80	78	169	107	315			≤10			15000
	100	84	194	133	351			≤10			15000
	120	84	207	133	376			≤10			15000
	160	84	217	133	388			≤10			15000
32	50	94	267	133	472	4500	3500	≤20	≤154	4. 3	10000
	80	146	376	206	702			≤10			15000
	100	169	411	267	800			≤10			15000
	120	169	436	267	848			≤10			15000
	160	169	459	267	848			≤10			15000
40	50	169	497	242	847	4000	3000	≤10	≤294	7. 8	10000
	80	255	641	351	1210			≤10			15000
	100	328	702	460	1334			≤10			15000
	120	363	762	557	1458			≤10			15000
	160	363	800	557	1458			≤10			15000
50*	80	459	1163	641	2297	3000	2500	≤10	≤373	14. 5	15000
	100	580	1211	823	2545			≤10			15000
	120	654	1334	1004	2545			≤10			15000
	160	654	1458	1041	3025			≤10			15000
58*	80	678	1828	951	3026	3000	2200	≤10	≤1300	20. 0	15000
	100	860	1964	1309	3927			≤10			15000
	120	921	2124	1470	4113			≤10			15000
	160	921	2272	1494	4236			≤10			15000

* Consult factory

Parameter Table

Item / Model	Reduction Ratio	Rated Torque at Input 2000 rpm	Peak Torque at start and Stop	Average Torque	Max. Momentary Torque	Max. Input Speed	Average Input Speed	Back Lash	Weight	Design Life
		N m	N m	N m	N m	r/min	r/min	Arc sec	Kg	Hour
14	50	6.6	23	8.6	43	8000	3500	≤20	≤77	10000
	80	9.6	29	13.5	57			≤10		15000
	100	9.6	34	13.5	66			≤10		15000
17	50	19.8	42	32	86	7000	3500	≤20	≤92	10000
	80	27.5	53	33	108			≤10		15000
	100	30	66	49	134			≤10		15000
	120	30	66	49	107			≤10		15000
20	50	32	69	42	121	6000	3500	≤20	≤136	10000
	80	42	91	58	158			≤10		15000
	100	50	102	61	182			≤10		15000
	120	50	108	61	182			≤10		15000
	160	50	113	61	182			≤10		15000
25	50	48	121	68.5	230	5500	3500	≤20	≤147	10000
	80	78	169	107	315			≤10		15000
	100	84	194	133	351			≤10		15000
	120	84	207	133	376			≤10		15000
	160	84	217	133	388			≤10		15000
32	50	94	267	133	472	4500	3500	≤20	≤154	10000
	80	146	376	206	702			≤10		15000
	100	169	411	267	800			≤10		15000
	120	169	436	267	848			≤10		15000
	160	169	459	267	848			≤10		15000
40	50	169	497	242	847	4000	3000	≤10	≤294	10000
	80	255	641	351	1210			≤10		20000
	100	328	702	460	1334			≤10		20000
	120	363	762	557	1458			≤10		20000
	160	363	800	557	1458			≤10		20000

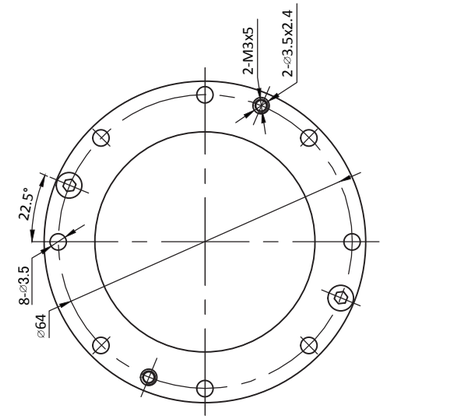
* Consult factory

Parameter Table

Item / Model No	Reduction Ratio	Rated Torque at Input 2000 rpm	Peak Torque at start and Stop	Average Torque	Max. Momentary Torque	Max. Input Speed	Average Input Speed	Back lash	Max. Tension Force	Weight	Design Life
		Nm	Nm	Nm	Nm	r/min	r/min	Arc sec	N	Kg	Hour
14	50	6. 6	23	8. 6	43	8000	3500	⩽10	⩽77	0. 56	10000
	80	9. 6	29	13. 5	57			⩽10			15000
	100	9. 6	34	13. 5	66			⩽10			15000
17	50	19. 8	42	32	86	7000	3500	⩽10	⩽92	0. 80	10000
	80	27. 5	53	33	108			⩽10			15000
	100	30	66	49	134			⩽10			15000
	120	30	66	49	107			⩽10			15000
20	50	32	69	42	121	6000	3500	⩽10	⩽136	1. 09	10000
	80	42	91	58	158			⩽10			15000
	100	50	102	61	182			⩽10			15000
	120	50	108	61	182			⩽10			15000
	160	50	113	61	182			⩽10			15000
25	50	48	121	68. 5	230	5500	3500	⩽10	⩽147	1. 70	10000
	80	78	169	107	315			⩽10			15000
	100	84	194	133	351			⩽10			15000
	120	84	207	133	376			⩽10			15000
	160	84	217	133	388			⩽10			15000
32	50	94	267	133	472	4500	3500	⩽10	⩽154	3. 50	10000
	80	146	376	206	702			⩽10			15000
	100	169	411	267	800			⩽10			15000
	120	169	436	267	848			⩽10			15000
	160	169	459	267	848			⩽10			15000
40	50	169	497	242	847	4000	3000	⩽10	⩽294	6. 35	10000
	80	255	641	351	1210			⩽10			15000
	100	328	702	460	1334			⩽10			15000
	120	363	762	557	1458			⩽10			15000
	160	363	800	557	1458			⩽10			15000
50*	80	459	1163	641	2297	3000	2500	⩽10	⩽373	12. 0	15000
	100	580	1211	823	2545			⩽10			15000
	120	654	1334	1004	2545			⩽10			15000
	160	654	1458	1041	3025			⩽10			15000
58*	80	678	1828	951	3026	3000	2200	⩽10	⩽1300	16. 5	15000
	100	860	1964	1309	3927			⩽10			15000
	120	921	2124	1470	4113			⩽10			15000
	160	921	2272	1494	4236			⩽10			15000

Parameter Table

Item / Model No	Reduction Ratio	Rated Torque at Input 2000 rpm	Peak Torque at start and Stop	Average Torque	Max. Momentary Torque	Max. Input Speed	Average Input Speed	Back lash	Max. Tension Force	Weight	Design Life
		Nm	Nm	Nm	Nm	r/min	r/min	Arc sec	N	Kg	Hour
14	50	6. 6	23	8. 6	43	8000	3500	⩽10	⩽26	0. 65	10000
	80	9. 6	29	13. 5	57			⩽10			15000
	100	9. 6	34	13. 5	66			⩽10			15000
17	50	19. 8	42	32	86	7000	3500	⩽10	⩽32	0. 92	10000
	80	27. 5	53	33	108			⩽10			15000
	100	30	66	49	134			⩽10			15000
	120	30	66	49	107			⩽10			15000
20	50	32	69	42	121	6000	3500	⩽10	⩽58	1. 36	10000
	80	42	91	58	158			⩽10			15000
	100	50	102	61	182			⩽10			15000
	120	50	108	61	182			⩽10			15000
	160	50	113	61	182			⩽10			15000
25	50	48	121	68. 5	230	5500	3500	⩽10	⩽71	2. 05	10000
	80	78	169	107	315			⩽10			15000
	100	84	194	133	351			⩽10			15000
	120	84	207	133	376			⩽10			15000
	160	84	217	133	388			⩽10			15000
32	50	94	267	133	472	4500	3500	⩽10	⩽114	4. 35	10000
	80	146	376	206	702			⩽10			15000
	100	169	411	267	800			⩽10			15000
	120	169	436	267	848			⩽10			15000
	160	169	459	267	848			⩽10			15000
40	50	169	497	242	847	4000	3000	⩽10	⩽294	7. 9	10000
	80	255	641	351	1210			⩽10			15000
	100	328	702	460	1334			⩽10			15000
	120	363	762	557	1458			⩽10			15000
	160	363	800	557	1458			⩽10			15000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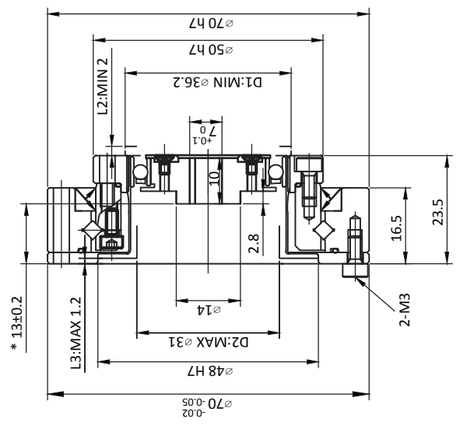
22.5°
8-⌀3.5
⌀64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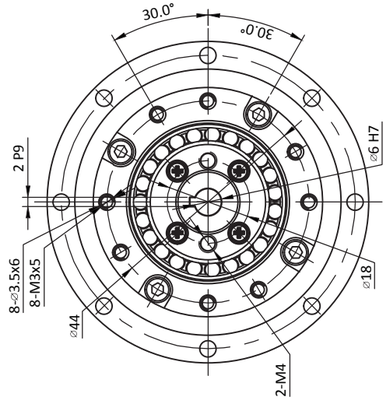
⌀50 h7
D1:MIN ⌀36.2
L2:MIN 2
7 +0.1 0
10
2.8
16.5
23.5
⌀14
2-M3
* 13±0.2
L3:MAX 1.2
D2:MAX ⌀31
⌀48 H7
⌀70 -0.02 -0.05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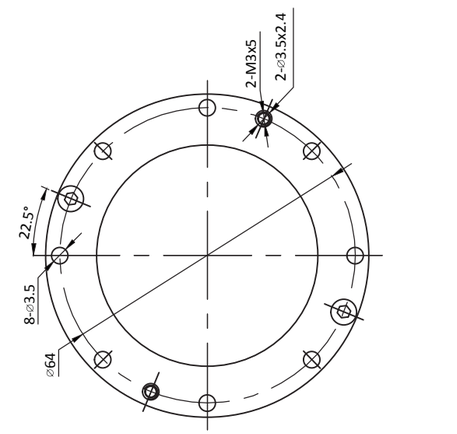
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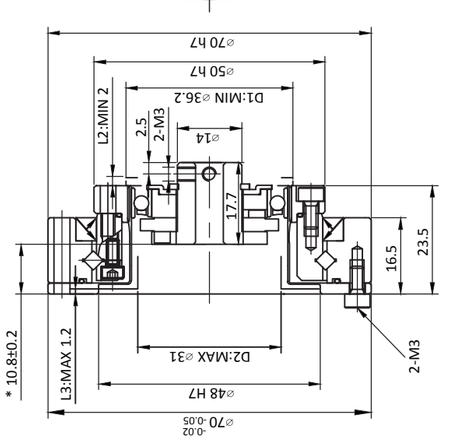
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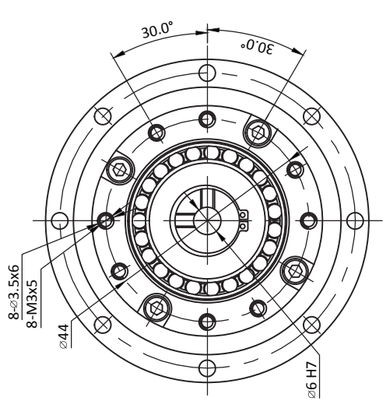
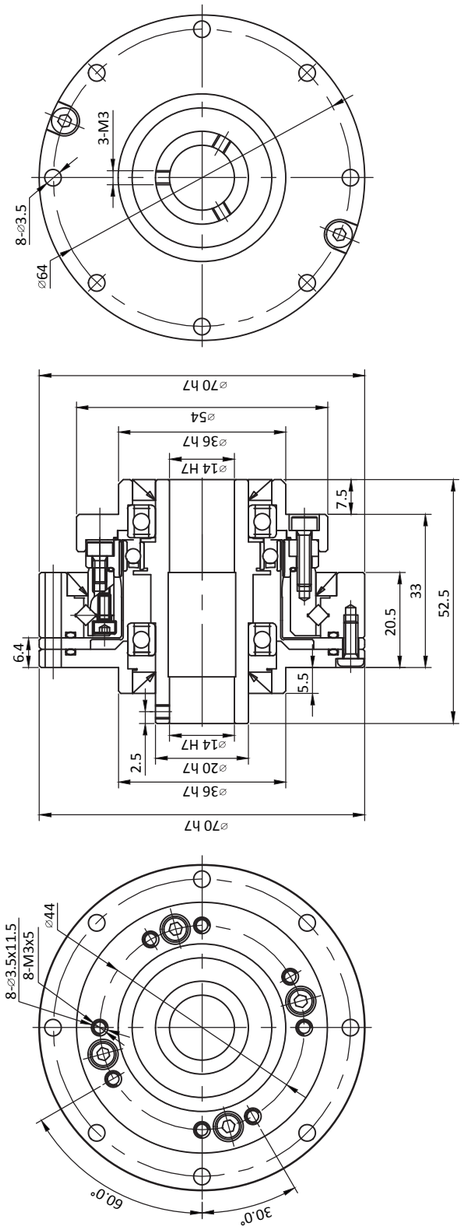
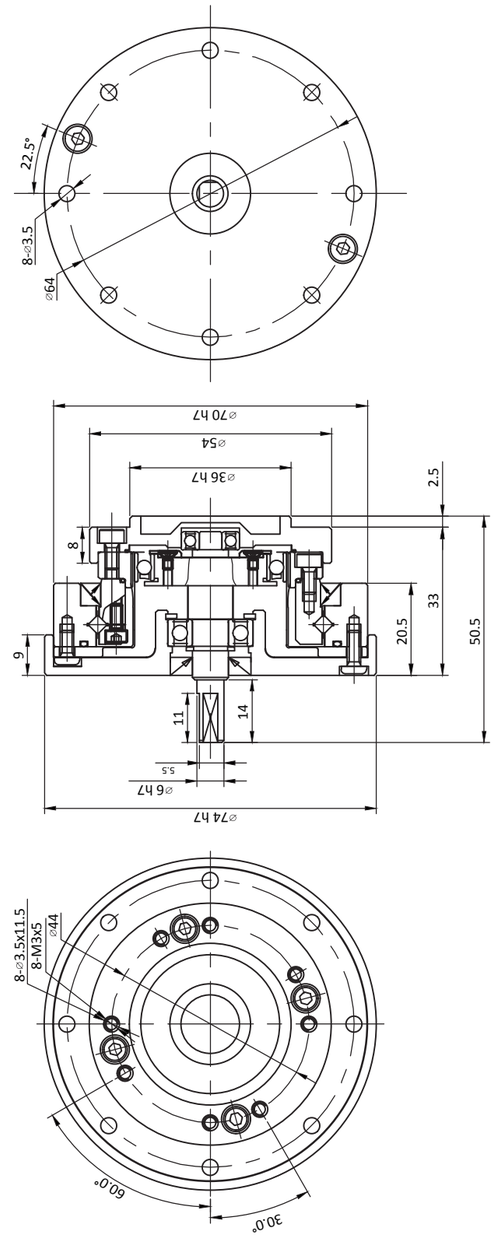
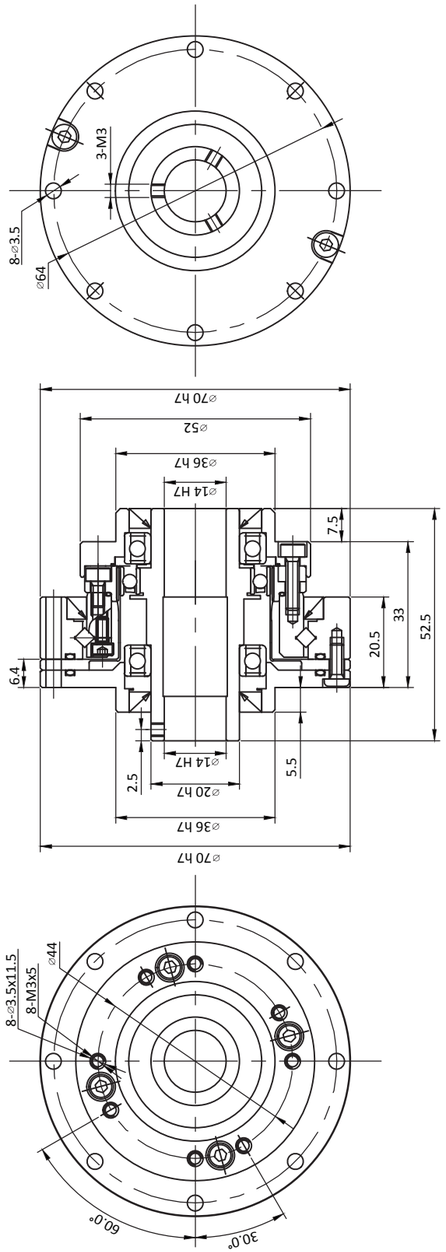
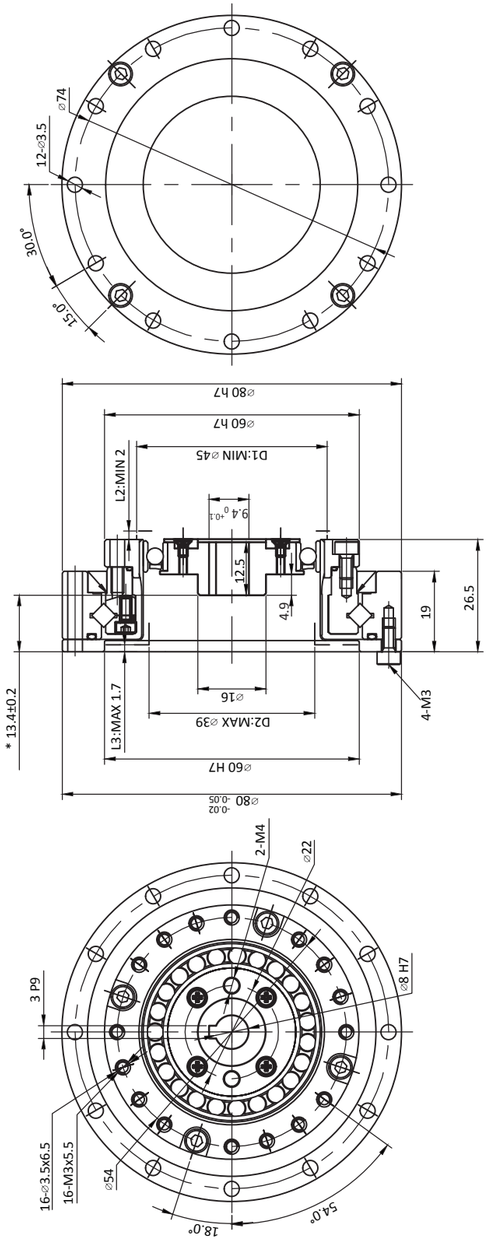
L2:MIN 2
2.5
2-M3
⌀14
17.7
16.5
23.5
* 10.8±0.2
L3:MAX 1.2
D2:MAX ⌀31
⌀48 H7
⌀70 -0.02 -0.05

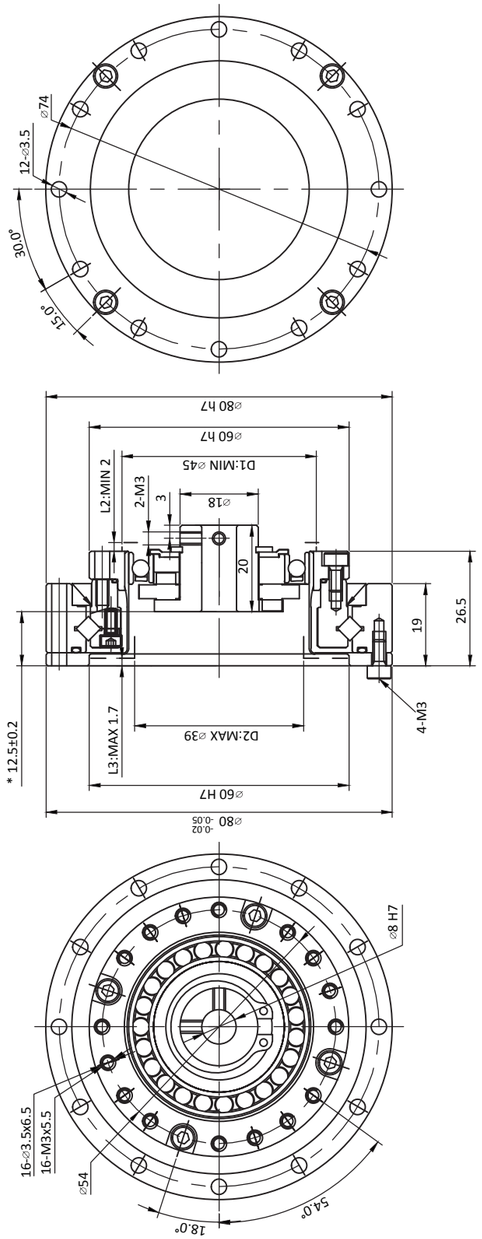

30.0°
30.0°
2 P9
8-⌀3.5x6
8-M3x5
⌀44
⌀6 H7

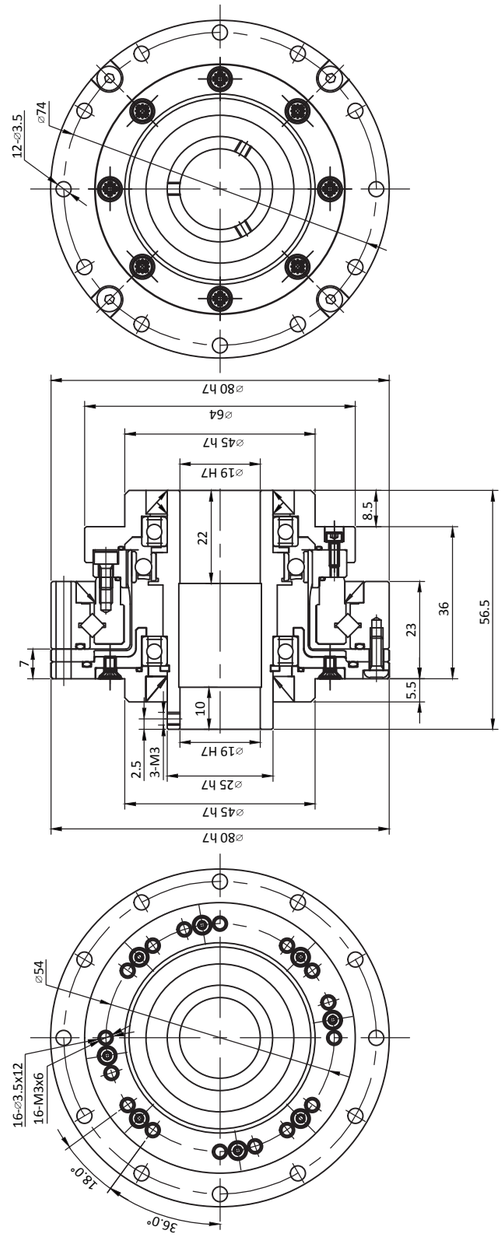

3-M3
8-⌀3.5
⌀64
⌀70 h7
⌀54
⌀36 h7
⌀14 H7
7.5
33
52.5
20.5
6.4
5.5
2.5
⌀14 H7
⌀20 h7
⌀36 h7
⌀70 h7
8-⌀3.5x11.5
8-M3x5
⌀44
60.0°
30.0°

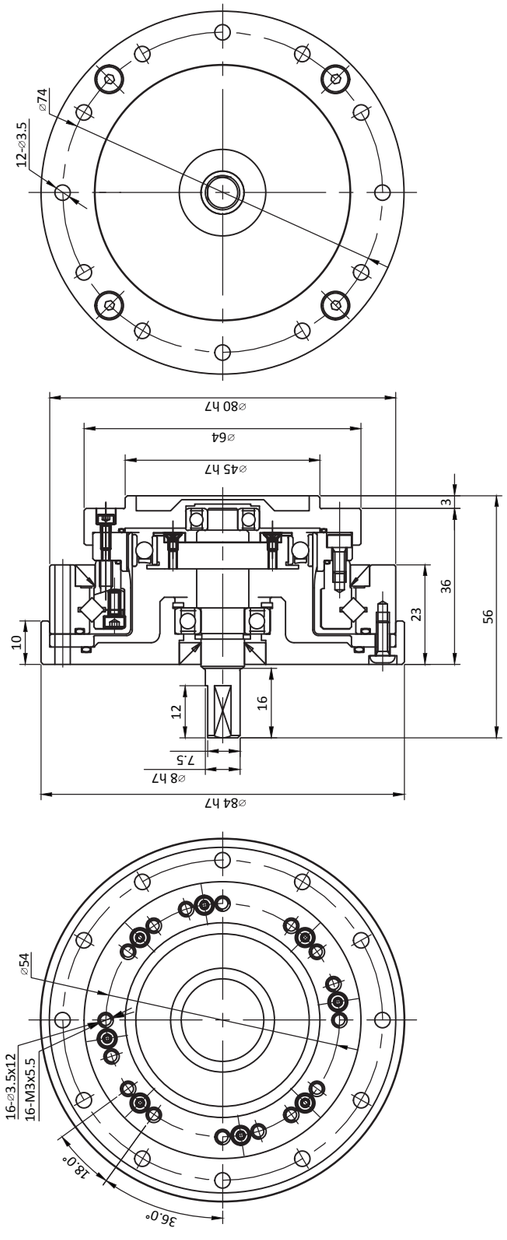

22.5°
8-⌀3.5
⌀64
⌀70 h7
⌀54
⌀36 h7
2.5
8
33
50.5
20.5
9
11
14
5.5
⌀6 h7
⌀74 h7
8-⌀3.5x11.5
8-M3x5
⌀44
60.0°
30.0°

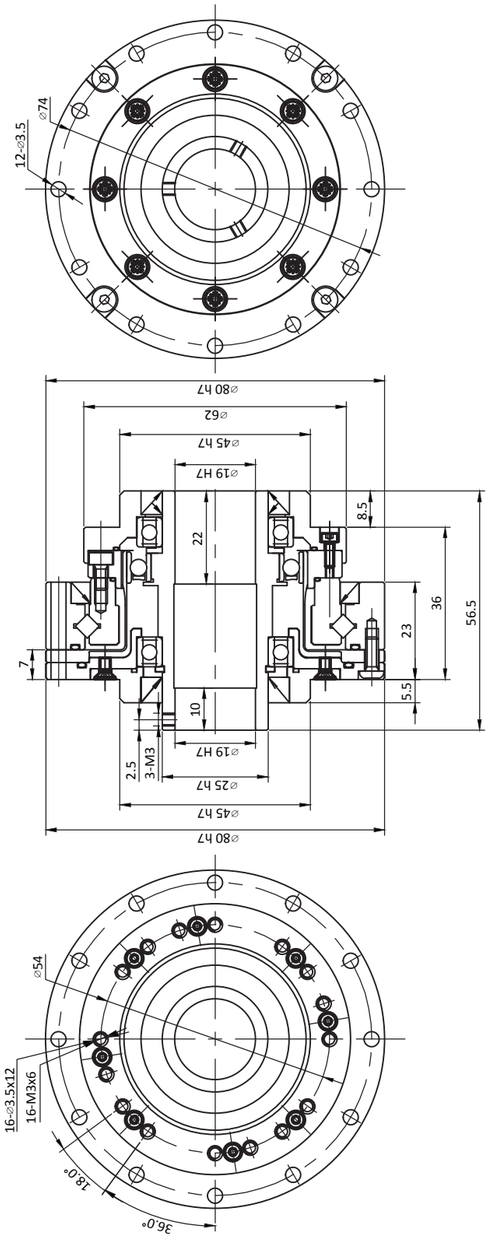

3-M3
8-⌀3.5
⌀64
⌀70 h7
⌀52
⌀36 h7
⌀14 H7
7.5
33
52.5
20.5
6.4
2.5
⌀14 H7
⌀20 h7
5.5
⌀36 h7
⌀70 h7
8-⌀3.5x11.5
8-M3x5
⌀44
60.0°
30.0°

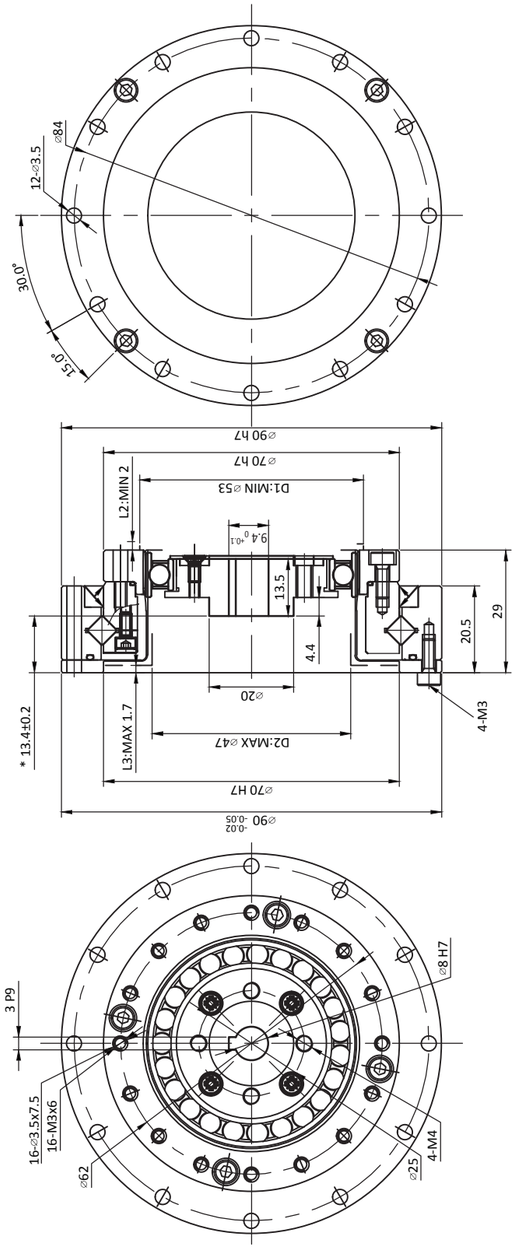

⌀74
12-⌀3.5
30.0°
15.0°
⌀80 h7
⌀60 h7
D1:MIN ⌀45
L2:MIN 2
9.4 +0.1 0
12.5
4.9
19
26.5
⌀16
D2:MAX ⌀39
L3:MAX 1.7
4-M3
* 13.4±0.2
⌀60 H7
⌀80 -0.02 -0.05
2-M4
⌀22
3 P9
⌀8 H7
16-⌀3.5x6.5
16-M3x5.5
⌀54
18.0°
54.0°

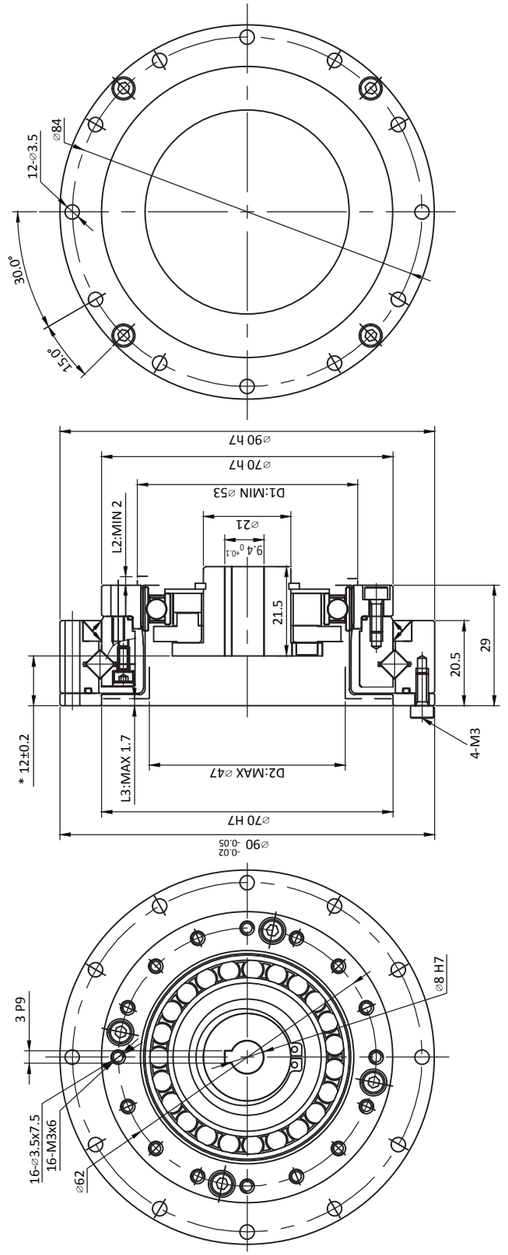

ø74
12-ø3.5
30.0°
15.0°
ø80 h7
ø60 h7
D1:MIN ø45
L2:MIN 2
2-M3
3
ø18
20
19
26.5
4-M3
D2:MAX ø39
L3:MAX 1.7
* 12.5±0.2
ø60 H7
ø80 -0.02 -0.05
ø8 H7
16-ø3.5x6.5
16-M3x5.5
ø54
18.0°
54.0°

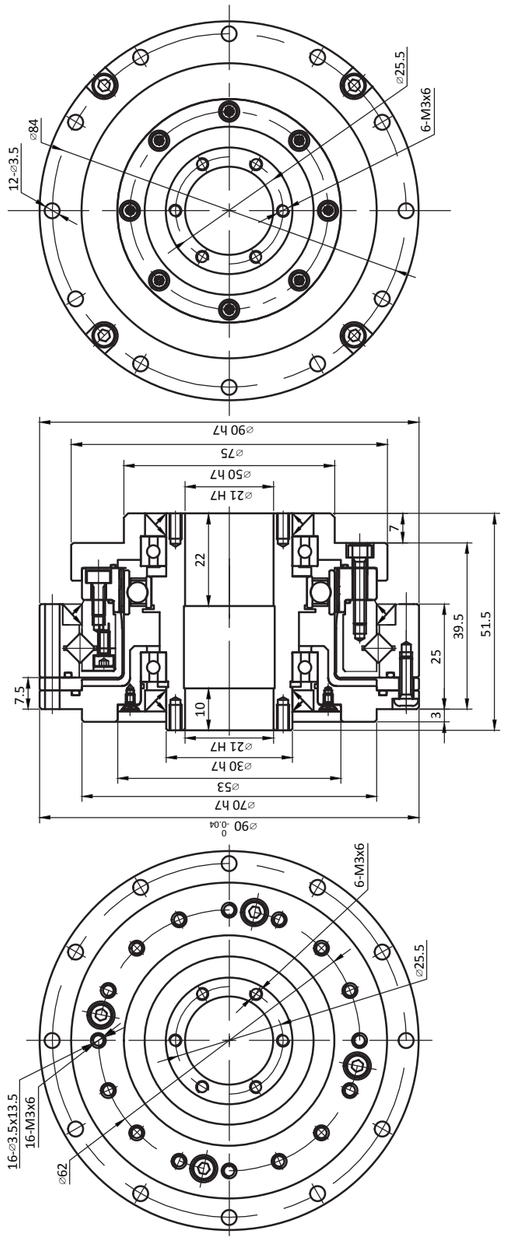

ø74
12-ø3.5
ø80 h7
ø64
ø45 h7
ø19 H7
22
8.5
36
56.5
23
5.5
10
7
2.5
3-M3
ø25 h7
ø45 h7
ø80 h7
ø54
16-ø3.5x12
16-M3x6
18.0°
36.0°

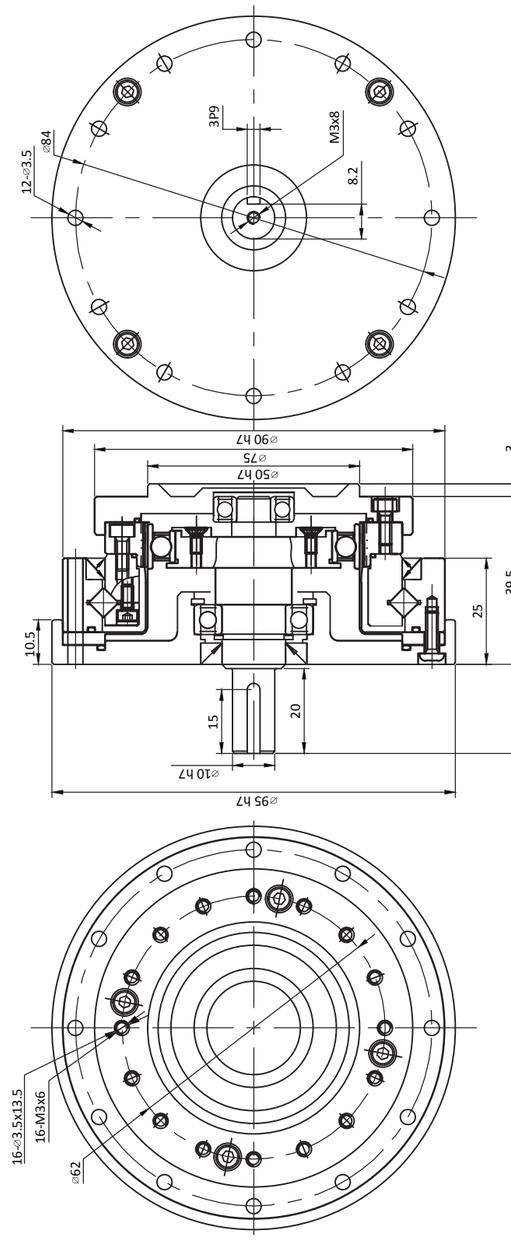

⌀74
12-⌀3.5
⌀80 h7
⌀64
⌀45 h7
3
36
56
23
10
12
16
7.5
⌀8 h7
⌀84 h7
⌀54
16-⌀3.5x12
16-M3x5.5
18.0°
36.0°

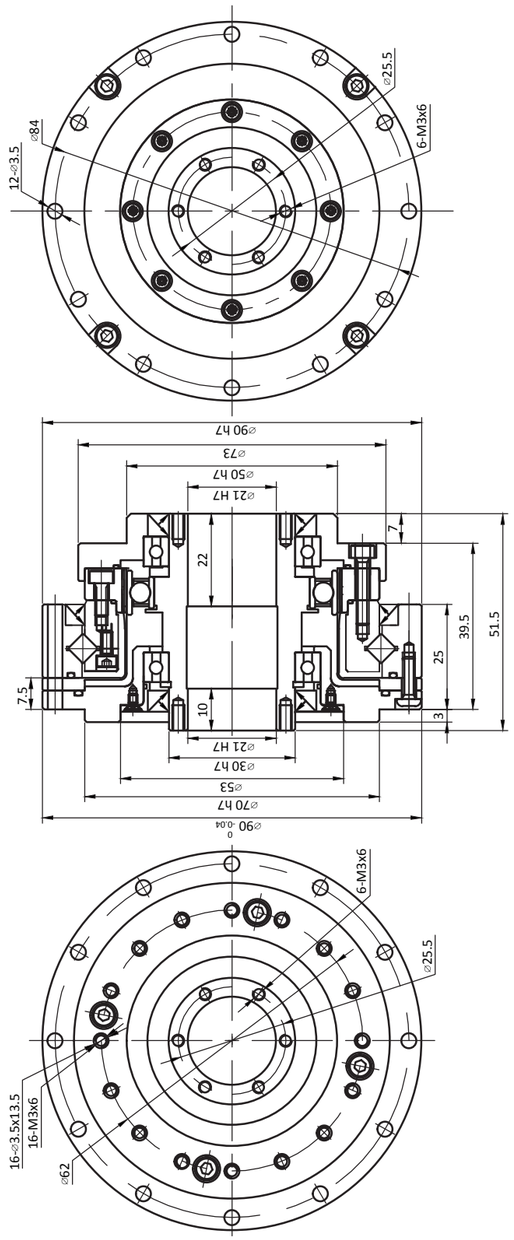

⌀74
12-⌀3.5
⌀80 h7
⌀62
⌀45 h7
⌀19 H7
8.5
22
36
56.5
23
5.5
7
10
2.5
3-M3
⌀25 h7
⌀54
16-⌀3.5x12
16-M3x6
18.0°
36.0°

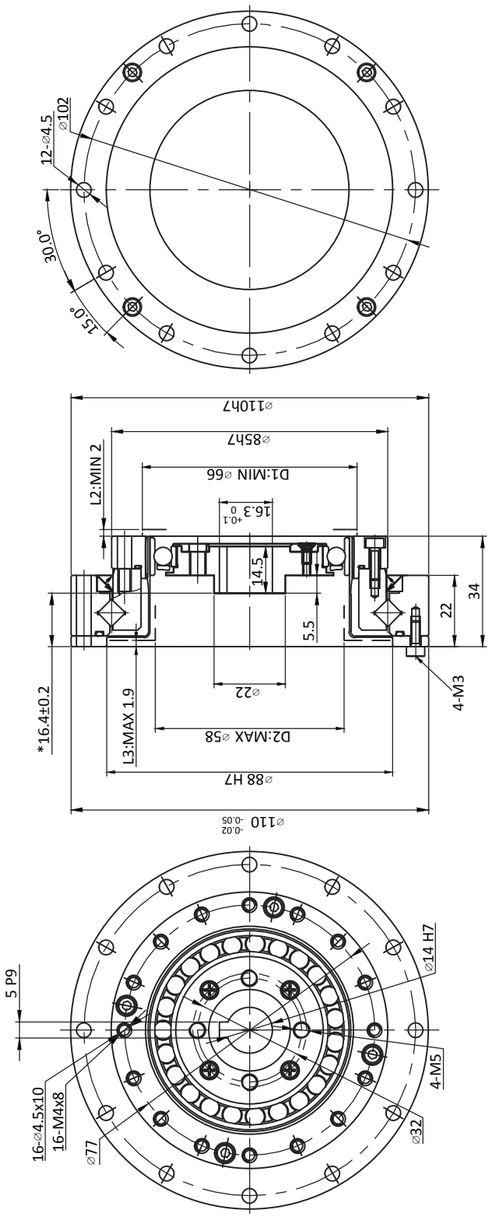

12-⌀3.5
⌀84
30.0°
15.0°
⌀90 h7
⌀70 h7
D1:MIN ⌀53
L2:MIN 2
9.4 +0.1 0
13.5
4.4
20.5
29
⌀20
D2:MAX ⌀47
L3:MAX 1.7
* 13.4±0.2
4-M3
⌀70 H7
⌀90 -0.02 -0.05
3 P9
⌀8 H7
16-⌀3.5x7.5
16-M3x6
⌀62
⌀25
4-M4

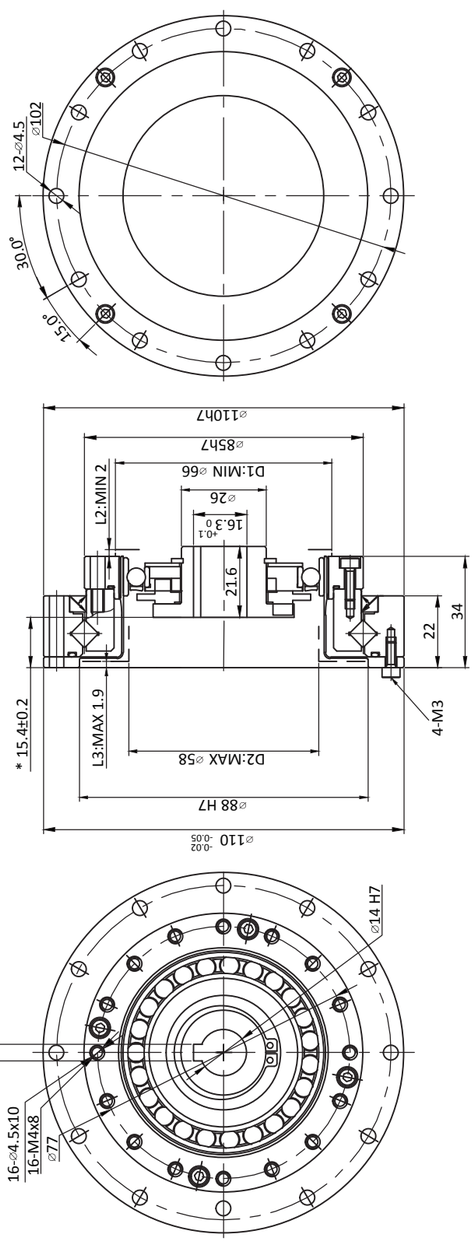

12-⌀3.5
⌀84
30.0°
15.0°
⌀90 h7
⌀70 h7
D1:MIN ⌀53
L2:MIN 2
⌀21
9.4 +0.1 0
21.5
20.5
29
D2:MAX ⌀47
L3:MAX 1.7
* 12±0.2
4-M3
⌀70 H7
⌀90 -0.02 -0.05
3 P9
⌀8 H7
16-⌀3.5x7.5
16-M3x6
⌀62

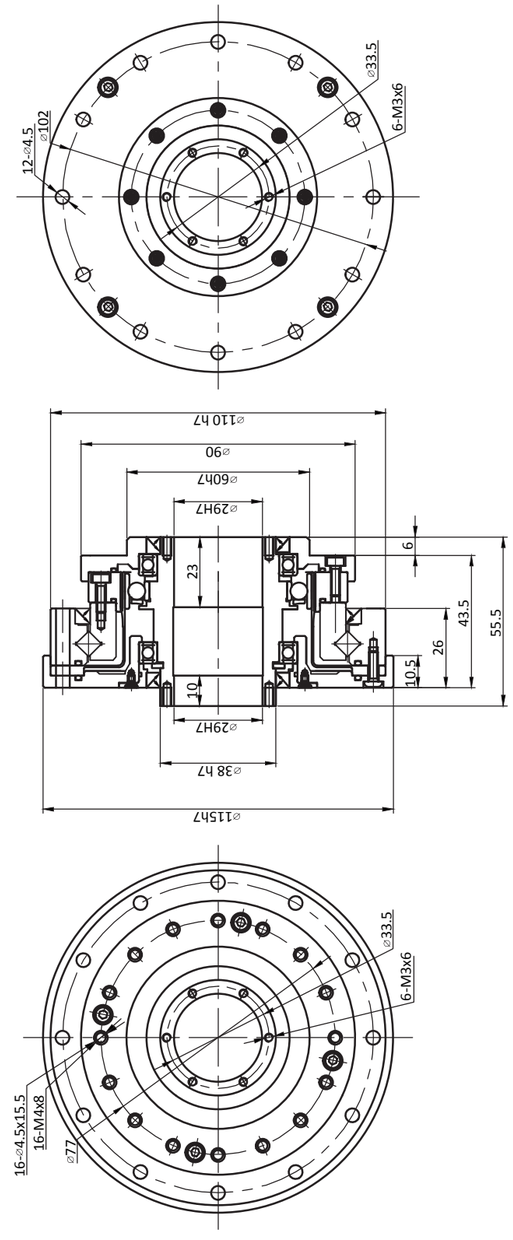

⌀84
12-⌀3.5
⌀25.5
6-M3x6
⌀90 h7
⌀75
⌀50 h7
⌀21 H7
7
22
51.5
39.5
25
3
10
7.5
⌀21 H7
⌀30 h7
⌀53
⌀70 h7
⌀90 0 -0.04
6-M3x6
⌀25.5
16-⌀3.5x13.5
16-M3x6
⌀62

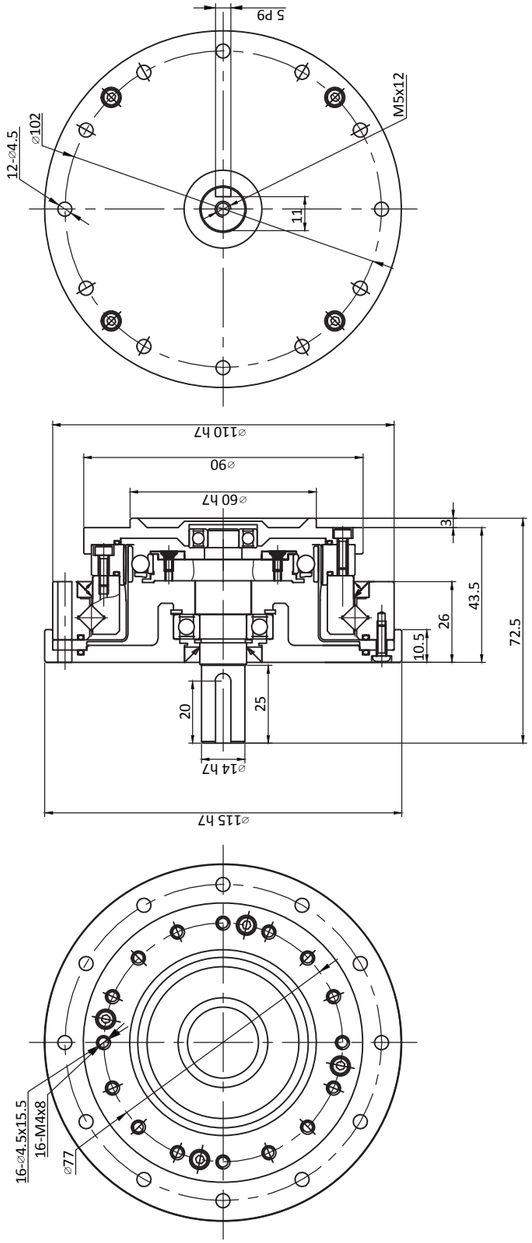

⌀84
12-⌀3.5
3P9
M3x8
8.2
⌀90 h7
⌀75
⌀50 h7
3
63.5
39.5
25
10.5
15
20
⌀10 h7
⌀95 h7
16-⌀3.5x13.5
16-M3x6
⌀62

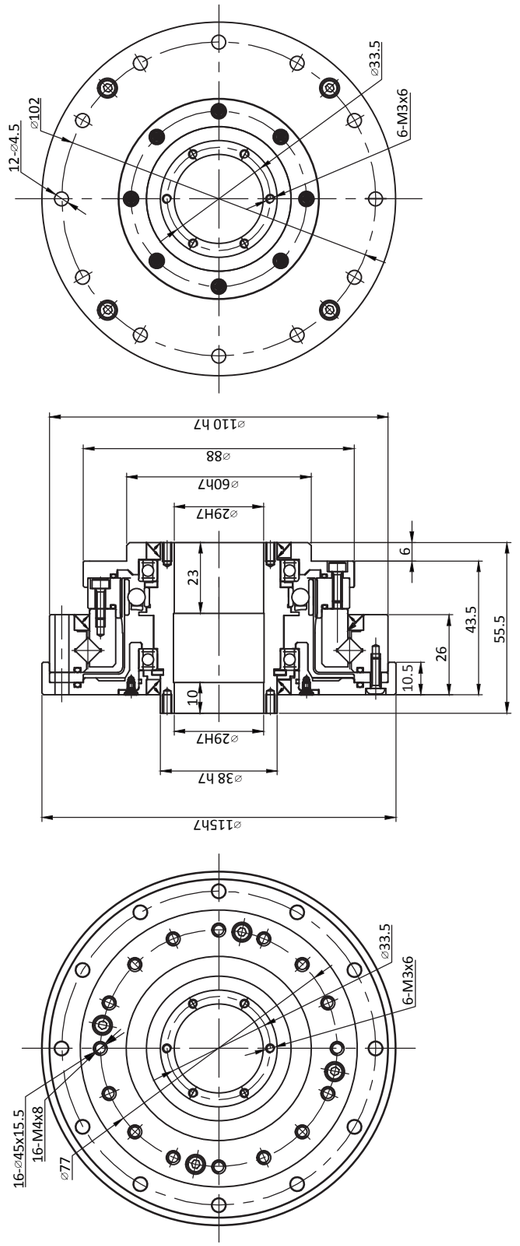

12-⌀3.5
⌀84
⌀25.5
6-M3x6
⌀90 h7
⌀73
⌀50 h7
⌀21 H7
7
22
10
7.5
25
39.5
51.5
3
⌀21 H7
⌀30 h7
⌀53
⌀70 h7
⌀90 -0.04 0
6-M3x6
⌀25.5
16-⌀3.5x13.5
16-M3x6
⌀62

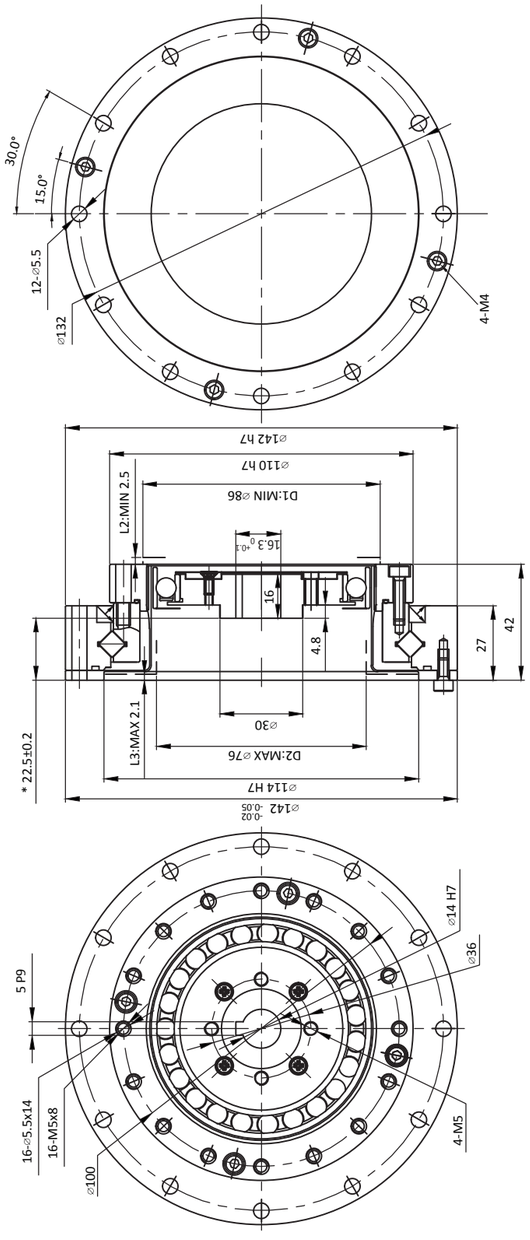

12-⌀4.5
⌀102
30.0°
15.0°
⌀110h7
⌀85h7
L2:MIN 2
D1:MIN ⌀66
16.3 +0.1 0
14.5
5.5
22
34
⌀22
4-M3
*16.4±0.2
L3:MAX 1.9
D2:MAX ⌀58
⌀88 H7
⌀110 -0.02 -0.05
5 P9
⌀14 H7
4-M5
16-⌀4.5x10
16-M4x8
⌀77
⌀32

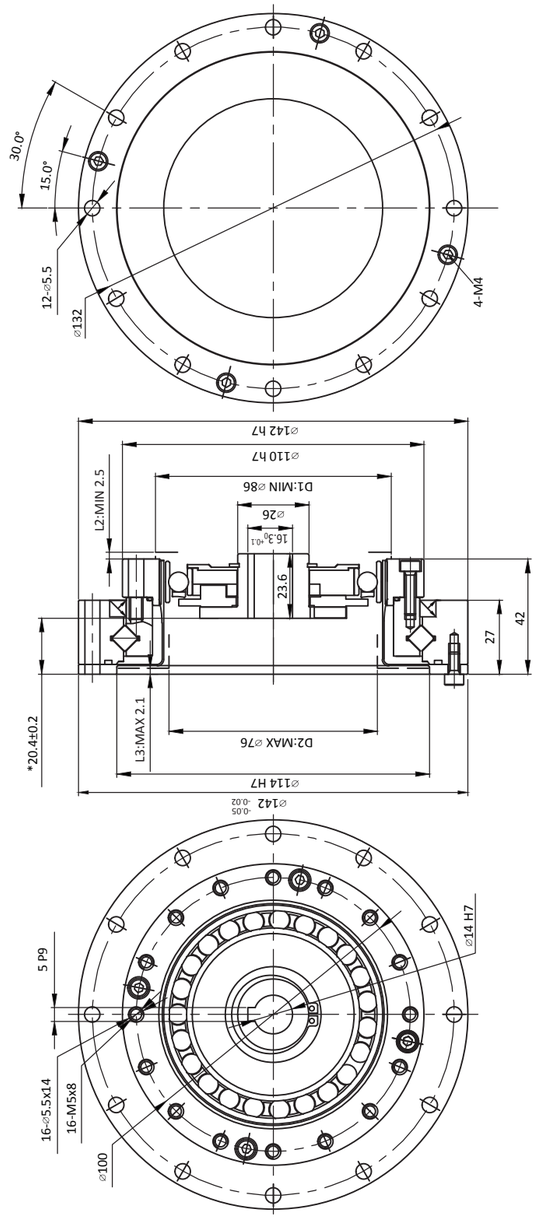

12-⌀4.5
⌀102
30.0°
15.0°
⌀110h7
⌀85h7
D1:MIN ⌀66
L2:MIN 2
⌀26
16.3 +0.1 0
21.6
22
34
* 15.4±0.2
L3:MAX 1.9
D2:MAX ⌀58
4-M3
⌀88 H7
⌀110 -0.02 -0.05
5 P9
⌀14 H7
16-⌀4.5x10
16-M4x8
⌀77

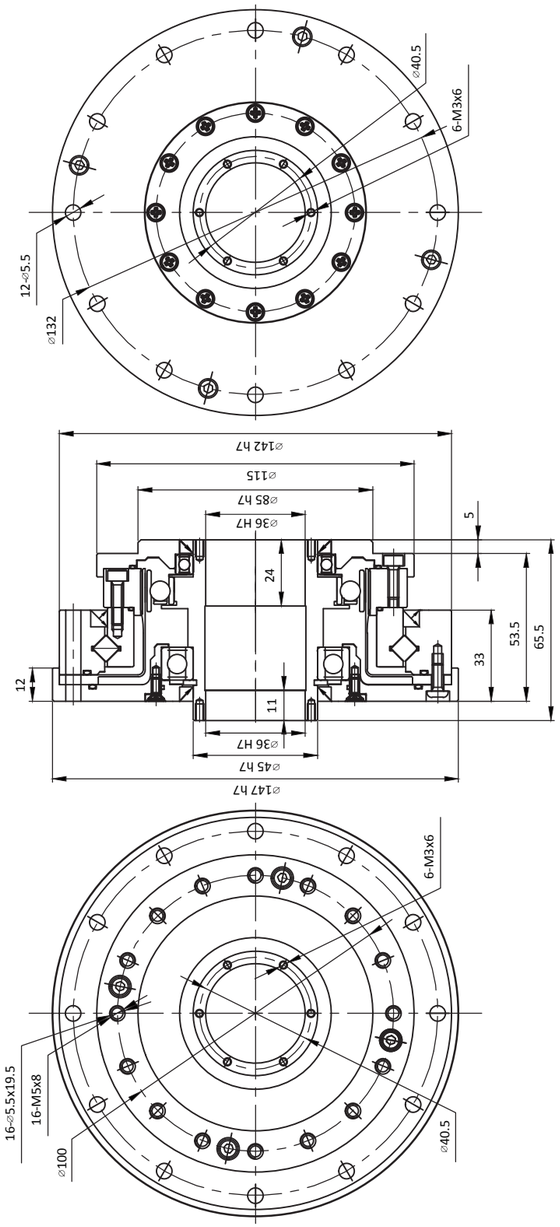

12-⌀4.5
⌀102
⌀33.5
6-M3x6
⌀110 h7
⌀90
⌀60h7
⌀29H7
6
23
43.5
55.5
26
10.5
10
⌀29H7
⌀38 h7
⌀115h7
16-⌀4.5x15.5
16-M4x8
⌀77

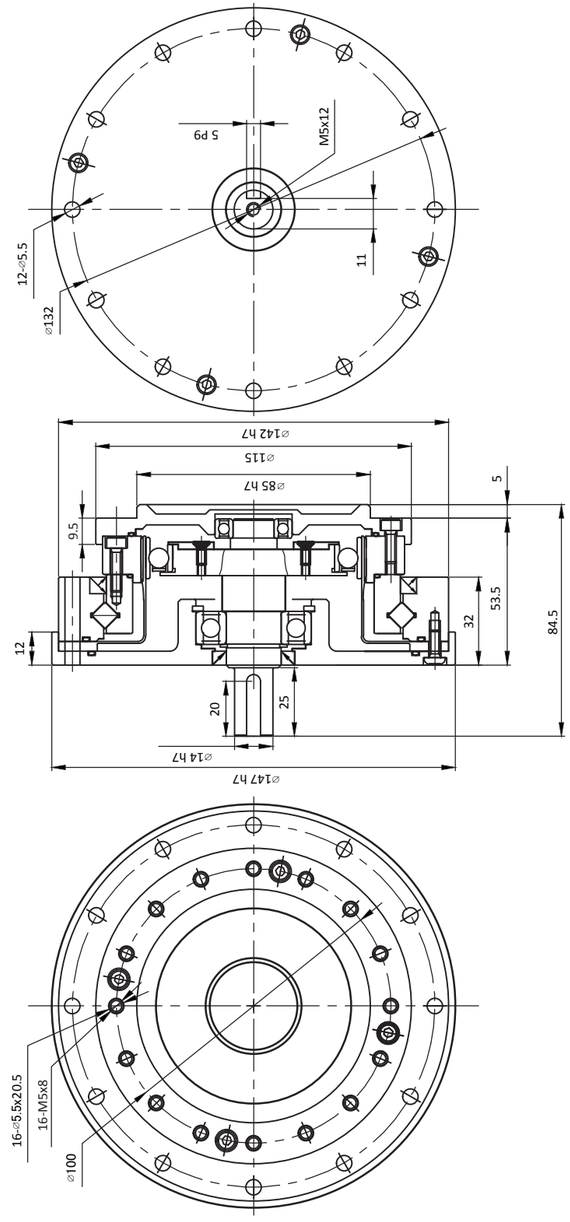

5 P9
M5x12
12-⌀4.5
⌀102
11
⌀110 h7
⌀90
⌀60 h7
3
43.5
26
10.5
72.5
20
25
⌀14 h7
⌀115 h7
16-⌀4.5x15.5
16-M4x8
⌀77

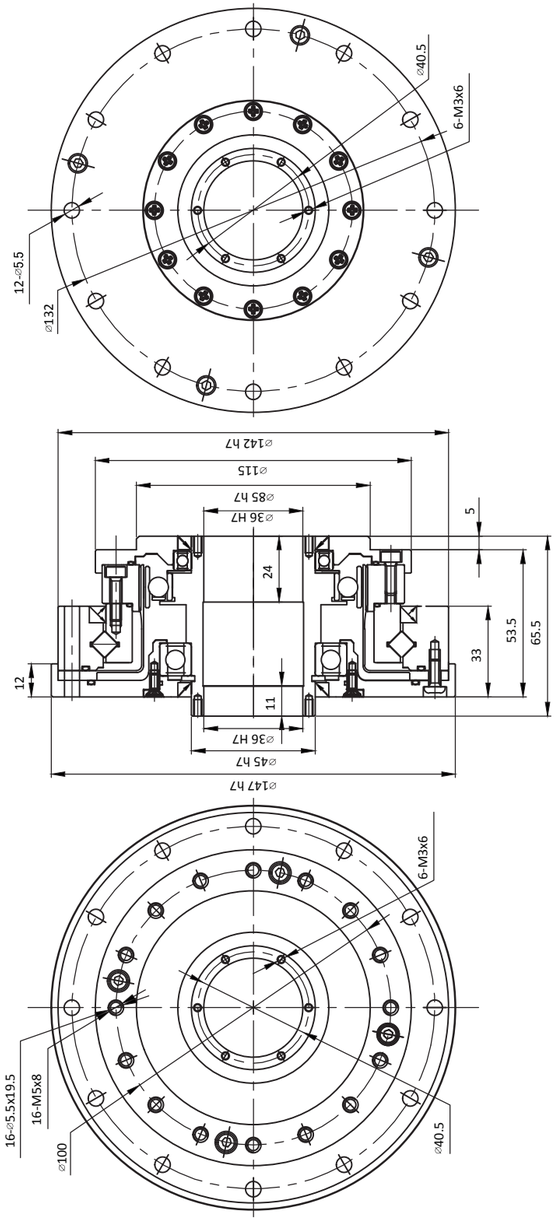

⌀33.5
6-M3x6
12-⌀4.5
⌀102
⌀110 h7
⌀88
⌀60h7
⌀29H7
6
23
43.5
55.5
26
10.5
10
⌀29H7
⌀38 h7
⌀115h7
16-⌀45x15.5
16-M4x8
⌀77

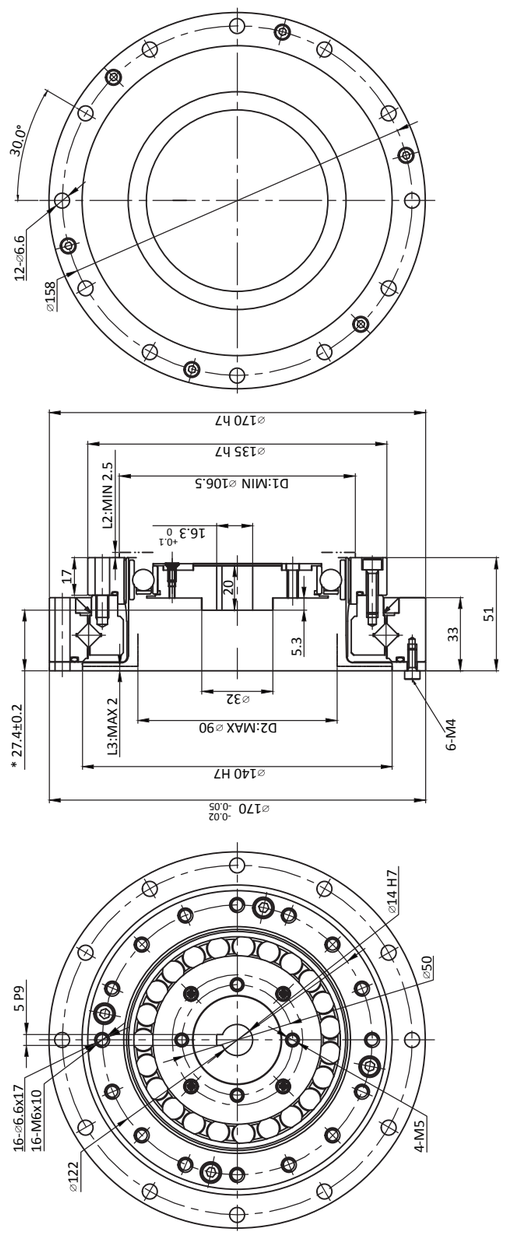

30.0°
15.0°
12-⌀5.5
⌀132
4-M4
⌀142 h7
⌀110 h7
D1:MIN ⌀86
L2:MIN 2.5
16.3 0 -0.1
16
4.8
27
42
⌀30
L3:MAX 2.1
D2:MAX ⌀76
⌀114 H7
* 22.5±0.2
⌀142 -0.02 -0.05
⌀14 H7
⌀36
5 P9
16-⌀5.5x14
16-M5x8
⌀100
4-M5

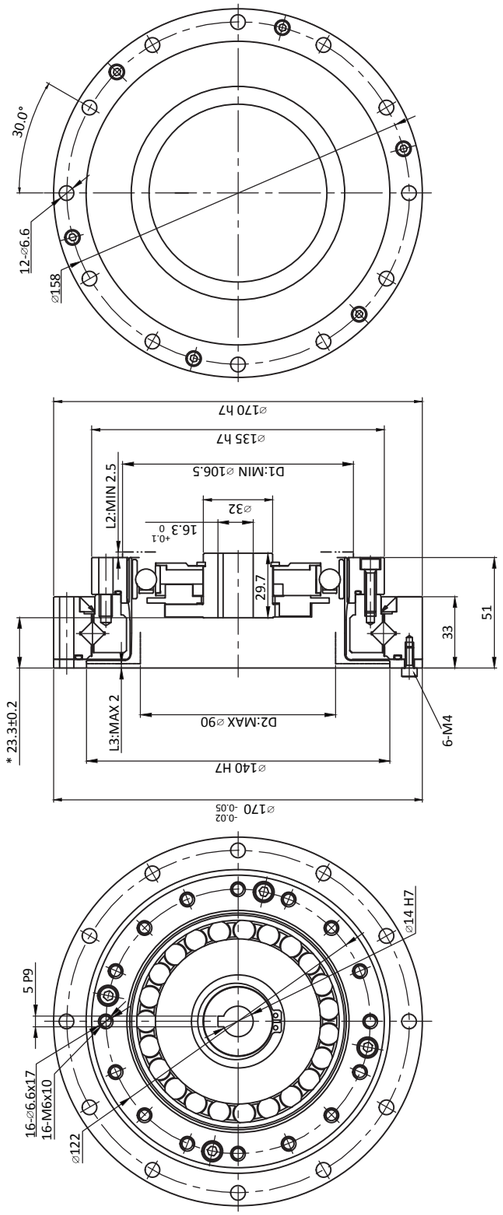

30.0°
15.0°
12-⌀5.5
⌀132
4-M4
⌀142 h7
⌀110 h7
D1:MIN ⌀86
⌀26
16.3 0 -0.1
L2:MIN 2.5
23.6
27
42
L3:MAX 2.1
D2:MAX ⌀76
⌀114 H7
*20.4±0.2
⌀142 -0.02 -0.05
⌀14 H7
5 P9
16-⌀5.5x14
16-M5x8
⌀100

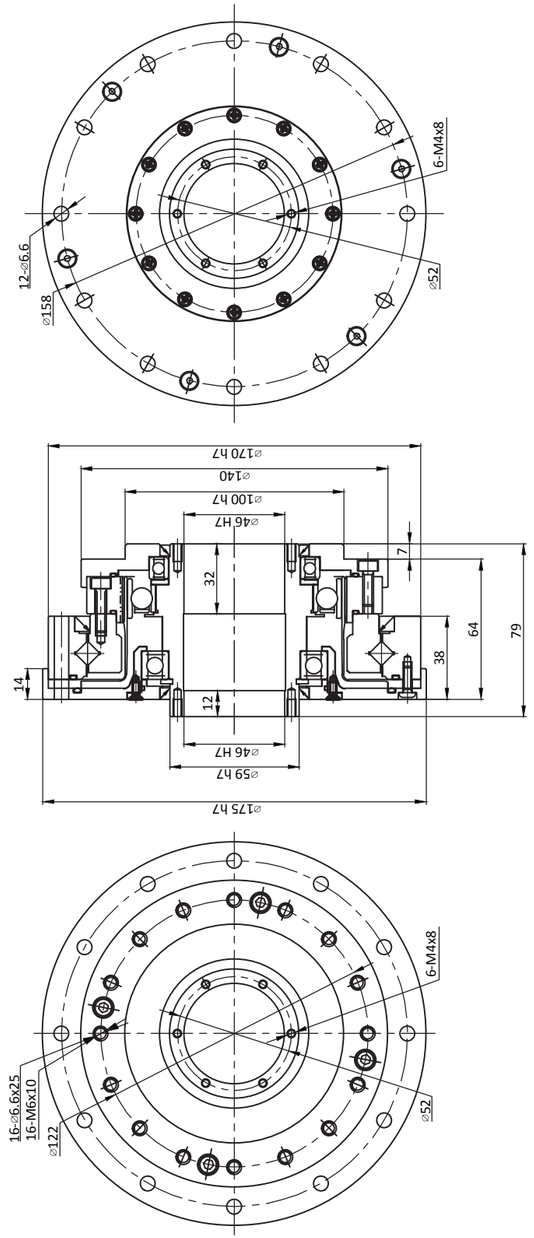

⌀40.5
6-M3x6
12-⌀5.5
⌀132
⌀142 h7
⌀115
⌀85 h7
⌀36 H7
5
24
11
33
53.5
65.5
12
⌀36 H7
⌀45 h7
⌀147 h7
6-M3x6
16-⌀5.5x19.5
16-M5x8
⌀100
⌀40.5

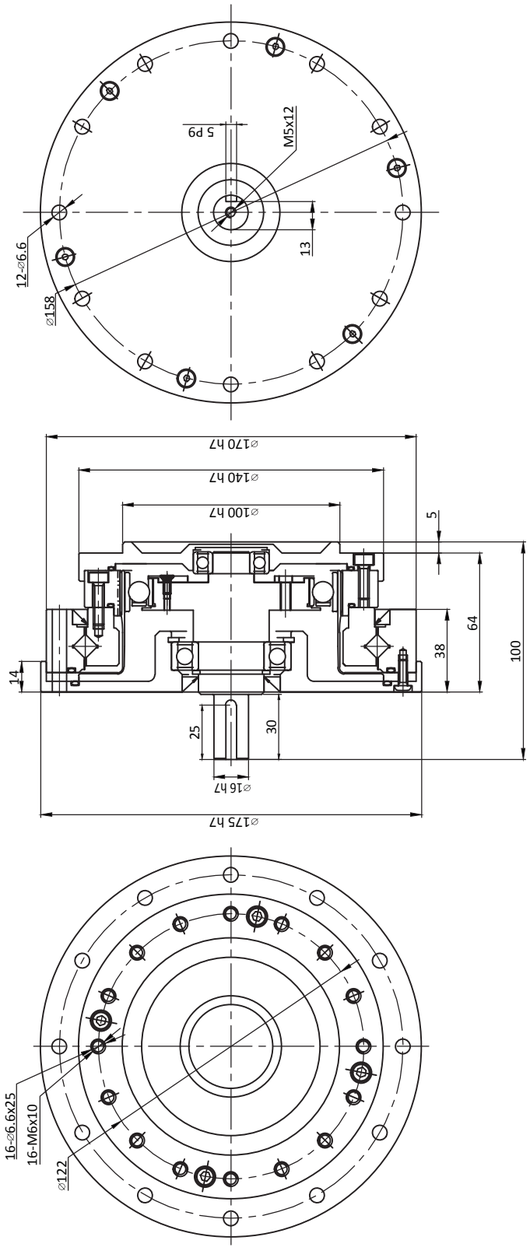

5 P9
M5x12
11
12-⌀5.5
⌀132
⌀142 h7
⌀115
⌀85 h7
5
9.5
12
20
25
32
53.5
84.5
⌀14 h7
⌀147 h7
16-⌀5.5x20.5
16-M5x8
⌀100

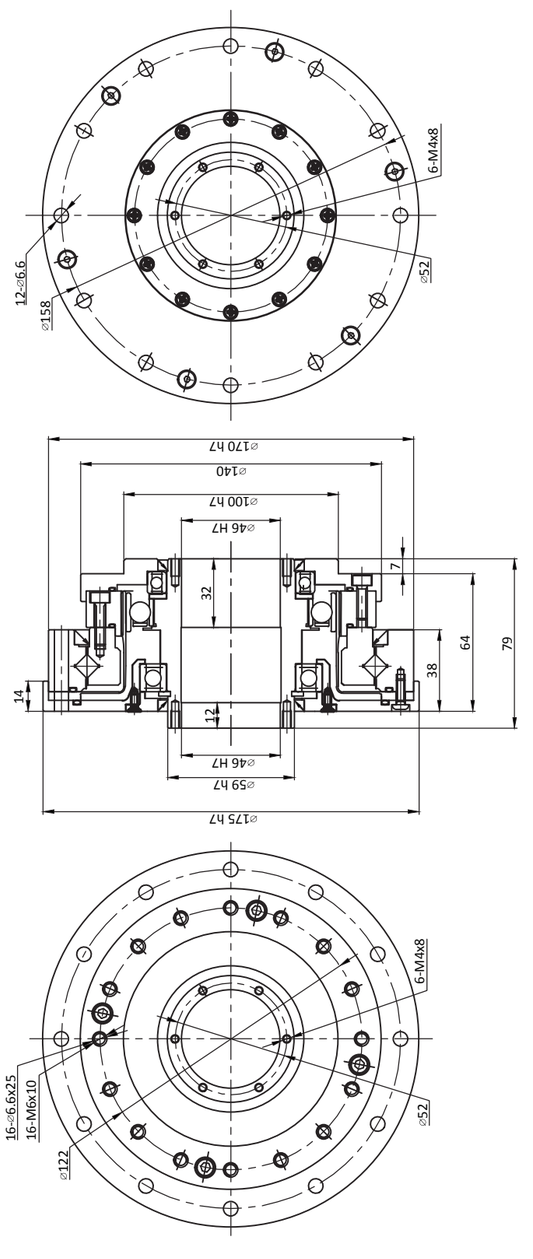

⌀40.5
6-M3x6
12-⌀5.5
⌀132
⌀142 h7
⌀115
⌀85 h7
⌀36 H7
5
24
53.5
65.5
33
12
11
⌀36 h7
⌀45 h7
⌀147 h7
6-M3x6
16-⌀5.5x19.5
16-M5x8
⌀100
⌀40.5


30.0°
12-⌀6.6
⌀158
⌀170 h7
⌀135 h7
D1:MIN ⌀106.5
L2:MIN 2.5
16.3 +0.1 0
17
20
5.3
33
51
⌀32
D2:MAX ⌀90
L3:MAX 2
* 27.4±0.2
⌀140 H7
⌀170 -0.02 -0.05
6-M4
⌀14 H7
⌀50
5 P9
16-⌀6.6x17
16-M6x10
⌀122
4-M5


30.0°
12-⌀6.6
⌀158
⌀170 h7
⌀135 h7
D1:MIN ⌀106.5
L2:MIN 2.5
⌀32
16.3 +0.1 0
29.7
33
51
L3:MAX 2
D2:MAX ⌀90
* 23.3±0.2
⌀140 H7
⌀170 -0.02 -0.05
6-M4
⌀14 H7
5 P9
16-⌀6.6x17
16-M6x10
⌀122


6-M4x8
12-⌀6.6
⌀158
⌀52
⌀170 h7
⌀140
⌀100 h7
⌀46 H7
7
32
64
79
38
14
12
⌀46 H7
⌀59 h7
⌀175 h7
6-M4x8
16-⌀6.6x25
16-M6x10
⌀122
⌀52


5 P9
M5x12
13
12-⌀6.6
⌀158
⌀170 h7
⌀140 h7
⌀100 h7
5
14
38
64
100
25
30
⌀16 h7
⌀175 h7
16-⌀6.6x25
16-M6x10
⌀122


6-M4x8
⌀52
12-⌀6.6
⌀158
⌀170 h7
⌀140
⌀100 h7
⌀46 H7
7
32
14
38
64
79
12
⌀46 H7
⌀59 h7
⌀175 h7
16-⌀6.6x25
16-M6x10
⌀122

General Installation Cautions

1.The assembly of a strain wave reducer must be carried out in a clean environment to avoid the introduction of any foreign objects which may cause premature failure.

2.Be sure to have adequate lubrication on the tooth surface and flexible bearing. Avoid application design to have the tooth face in constant upward position which could cause lubrication deficienc . If a constant upward gear face position can not be avoided, fill grease cavity to fully submerge the meshing splines

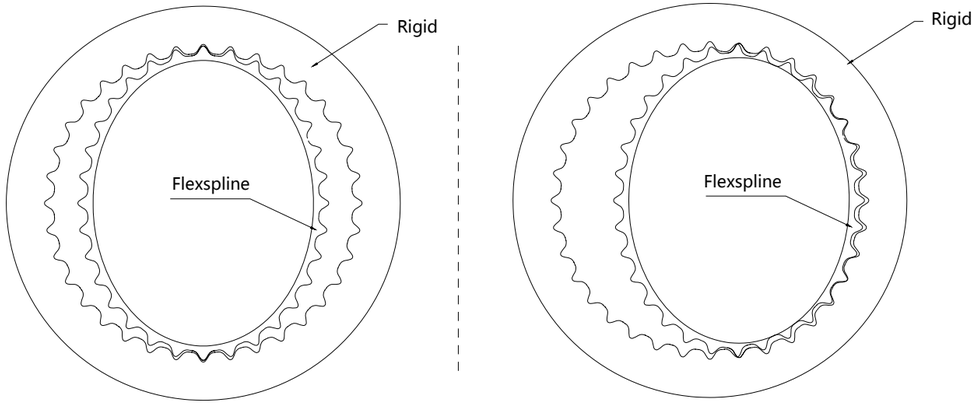
3.When installing the cam, make sure the meshing is exactly at 6 o′ clock and 12 o′ clock as shown in picture 1. Should it be off from the line of symmetry as shown in picture 2, the assembly will vibrate and fail

4.After assembly, trail run at a low speed of 100 rpm. Should any unusual vibration or noise is observed, stop and double check the assembly. Contact a manufacturer representative immediately for assistance.

5.Only use the factory specified grease, do not use a substitute without factory approval

6.Only use grade 12.9 fasteners, and use thread loctite to prevent fasteners from loosening during operation.

7.The mounting surface must the flat within 0.01 mm and perpendicular to the axis within 0.01mm. The mounting threaded holes or through holes must be within 0.1 mm of the theoretical location.

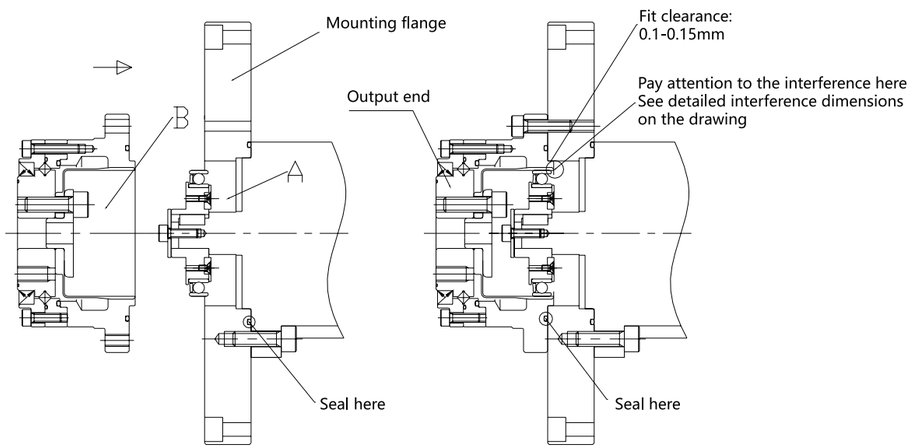


Correct

Incorrect

Model Specific Assembly Instructions

LCD/LCS Series--Rigid spline stationary, flex spline output, and standard ratio installatio



1. Apply a generous amount of grease on the flexible bearing. Fill the "A" cavity with grease to 80% full. Install the wave generator on the input shaft and secure with a bolt and washer.

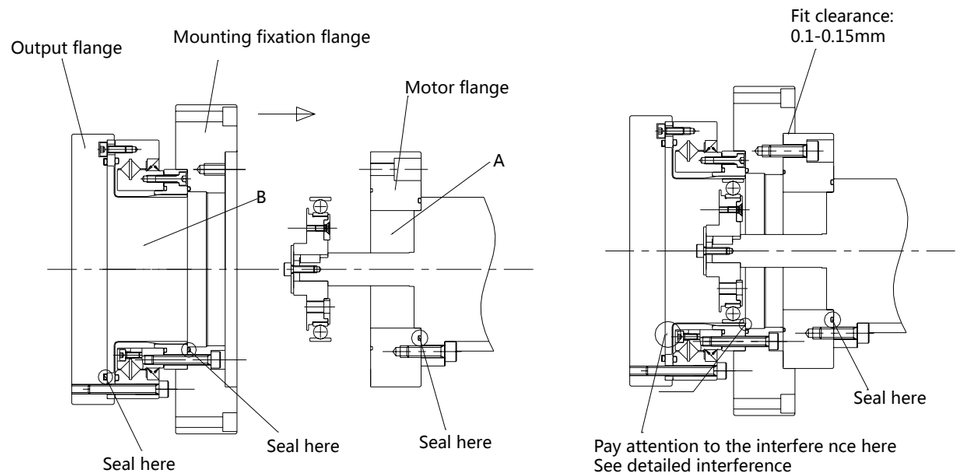
2. Evenly apply grease to the inner wall of the flex spline, and then fill the "B" cavity with grease to 80% full

3. Engage the meshing by following the arrow in the illustration. The long axis of the wave generator must coincide with the long axis of the flex spline. Install fasteners to a gentle snug

4. Set the input shaft speed at 100 rpm and start. Tighten the bolts gradually in a crisscross pattern until the desired torque is reached.

Model Specific Assembly Instructions

LHD/LHS Series Option 1-- Rigid spline stationary, flex spline output, and standard ratio installatio



1.Mount the strain wave reducer on the output flange, and then mount the rigid spline to the stationary flang

2.Apply a generous amount of grease on the flexible bearing. Fill the “A” cavity with grease to 80% full. Install the wave generator on the input shaft and secure with a bolt and washer.

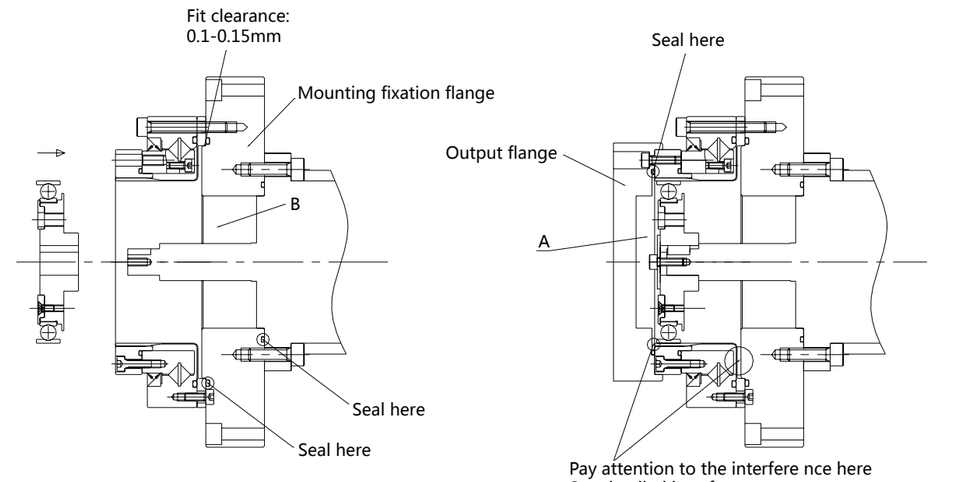
3.Evenly apply grease to the inner wall of the flex spline, and then fill the “B” cavity with grease to 80% full

4.Engage the meshing by following the arrow in the illustration. The long axis of the wave generator must coincide with the long axis of the flex spline. Install fasteners to a gentle snug

5.Set the input shaft speed at 100 rpm and start. Tighten the bolts gradually in a crisscross pattern until the desired torque is reached.

Model Specific Assembly Instructions

LHD/LHS Series Option 2-- Flexspline stationary, rigid spline output, and standard ratio+1 installation



1.Mount the strain wave reducer main assembly on the mounting flange; gently snug the fasteners.

2.Apply a generous amount of grease on the flex spline. Fill the “B” cavity with grease to 80% full.

3.Install the wave generator on the input shaft. Engage the meshing by following the arrow in the illustration. The long axis of the wave generator must coincide with the long axis of the flex spline. Turn the wave generator to align the key way on the cam and the input shaft. Apply Loctite 638 on the key and install. Secure the wave generator with a bolt and washer on to the input shaft.

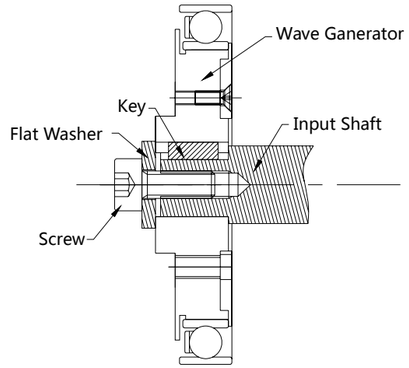
4.Apply grease to the flexible bearing, and then fill the “A” cavity with grease to 80% ful

5.Set the input shaft speed at 100 rpm and start. Tighten the bolts gradually in a crisscross pattern until the desired torque is reached. Bolt the output flange to the drive in a similar fashion

Table 1. Wave Generator and Input Shaft Connection Options

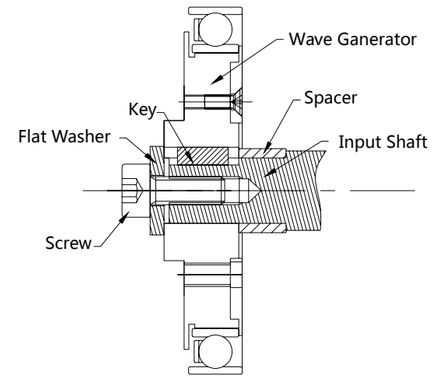
1

Direct connection for input shaft with appropriate shoulder location



2

Spacer connection for input shaft extending too long after the shoulder



3

Special shaft end connection cap for input shaft without a shoulder

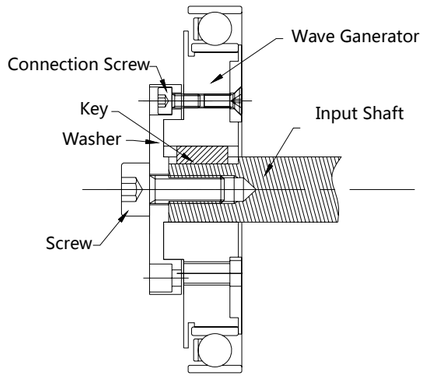
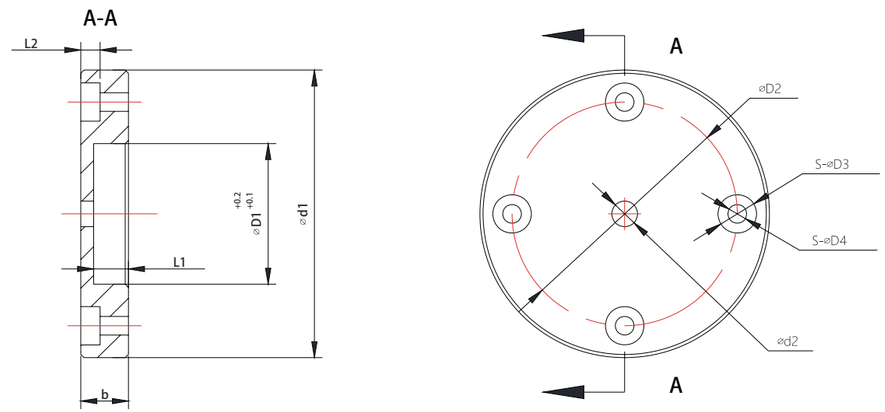


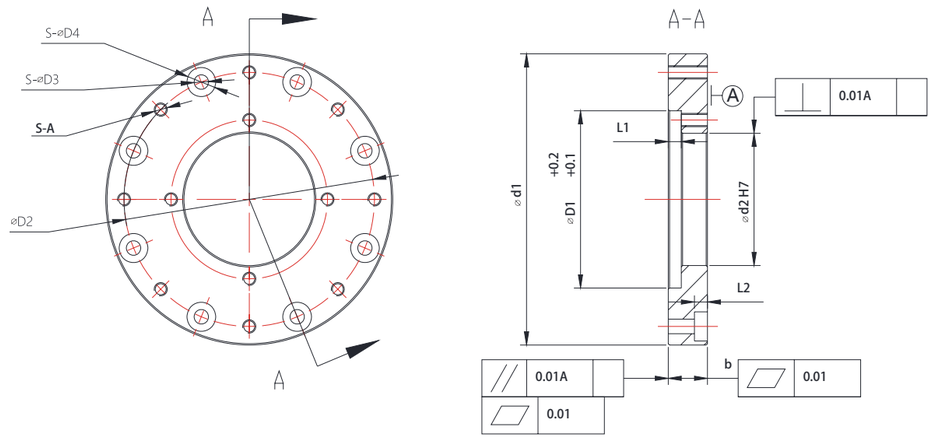
Table 2: Reference Dimensions of Shaft End Connection Cap for Cam Type 1.(For reference only)



Model No	ΦD1	ΦD2	ΦD3	ΦD4	S	b	L1	L2	Φd1	Φd2	Connecting screw
14	Φ14	Φ19	Φ5	Φ2.4	4	5.8	2.6	3	Φ26	Varies with application	M2x6
17	Φ16	Φ23	Φ5	Φ2.4	4	5.8	4.7	3	Φ30		M2x6
20	Φ20	Φ27	Φ5	Φ3	4	5.8	4.2	3	Φ37		M2.5x6
25	Φ22	Φ35	Φ5	Φ3	4	7.6	5.3	4.5	Φ45		M2.5x6
32	Φ30	Φ38	Φ6	Φ3.5	4	7.6	4.6	5	Φ50		M3x6
40	Φ32	Φ50	Φ9	Φ5.5	4	10	5	6	Φ68		M5x10

Table 3: Reference Dimensions of Motor Mounting Flange on LCS (LCSG)

Series Reducer(For reference only)



Model No	ΦD1	ΦD2	ΦD3	ΦD4	A	S	L1	Φd1	Φd2	b	L2
LCS-14	⌀Φ38	Φ65	Φ4.5	Φ8	M4	6	4	Varies with application			
LCSG-14	⌀Φ38	Φ65	Φ4.5	Φ8	M4	8	4				
LCS-17	⌀Φ48	Φ71	Φ4.5	Φ8	M4	6	4				
LCSG-17	⌀Φ48	Φ71	Φ4.5	Φ8	M4	8	4				
LCS-20	⌀Φ56	Φ82	Φ5.5	Φ9	M5	6	5				
LCSG-20	⌀Φ56	Φ82	Φ5.5	Φ9	M5	8	5				
LCS-25	⌀Φ67	Φ96	Φ5.5	Φ9	M5	8	5				
LCSG-25	⌀Φ67	Φ96	Φ5.5	Φ9	M5	10	5				
LCS-32	⌀Φ90	Φ125	Φ6.6	Φ11	M6	12	5				
LCSG-32	⌀Φ90	Φ125	Φ6.6	Φ11	M6	12	5				
LCS-40	⌀Φ110	Φ144	Φ9	Φ13	M8	8	6				
LCSG-40	⌀Φ110	Φ144	Φ9	Φ13	M8	10	6				

Table 4: Dimensions of O-ring and Groove

Model	Flange on flexspline				Flange on circular spline					
	O-ring	O-ring groove			O-ring	O-ring groove				
		ΦD1	ΦD2	L1		ΦD3	ΦD4	ΦD5	L2	L3
LHS(LHSG)-14	55x1.5	51.5	55.5	1.2	37.8x0.6	38	36.5	36.2	0.45	0.15
LHS(LHSG)-17	64x1.5	60.5	64.5	1.2	47x1	48	45.5	45	0.75	0.2
LHS(LHSG)-20	72x1.5	70	74	1.2	56x1	56.2	53.8	53	0.75	0.2
LHS(LHSG)-25	90x1.8(Inside diameter*Wire diameter)	89.8	94.6	1.4	70x1.5	70.5	66.8	66	1.2	0.3
LHS(LHSG)-32	120x1.9	115.5	120.5	1.5	90x1.5	91	87	86	1.2	0.3
LHS(LHSG)-40	145x2.4	140	147	1.9	110x2	112.9	107.5	106.5	1.5	0.4
LHD-14	55x1.5	51.5	55.5	1.2	37.1x0.6(Inside diameter*Wire diameter)					
LHD-17	64x1.5	60.5	64.5	1.2	47x0.8					
LHD-20	72x1.5	70	74	1.2	55x0.8					
LHD-25	95x2	90.4	95.8	1.5	68x1					
LHD-32	120x1.9	115.5	120.5	1.5	90x1.5					
LHD-40	145x2.4	140	147	1.9	110x2					

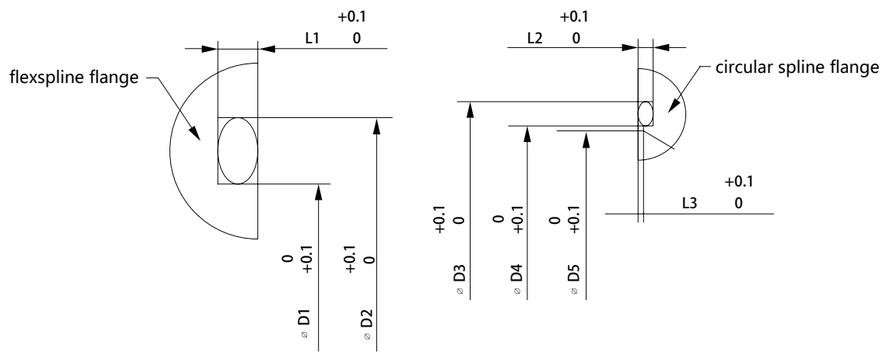


Table 5: Grease Amount for Wave Generator I/II

Model	Grease amount (ml)	Model	Grease amount (ml)	Model	Grease amount (ml)	Model	Grease amount (ml)
LCS(G)-14	10	LHS(G)-14	13.5	LCD-14	4	LHD-14	10
LCS(G)-17	16	LHS(G)-17	22.5	LCD-17	6.5	LHD-17	15
LCS(G)-20	24	LHS(G)-20	32	LCD-20	11.5	LHD-20	24
LCS(G)-25	45.5	LHS(G)-25	60	LCD-25	21.5	LHD-25	40
LCS(G)-32	100	LHS(G)-32	125	LCD-32	44	LHD-32	80
LCS(G)-40	180	LHS(G)-40	225	LCD-40	95	LHD-40	135

Table 6: Fastener Tightening Sequence

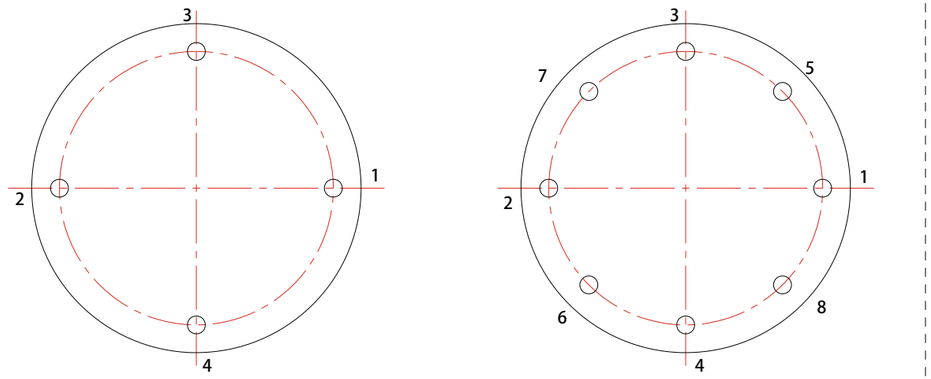


Table 7: Fastening Torque

Function grade of screws	Grade 12.9							
Thread nominal diameter	mm	3	4	5	6	8	10	12
Tightening torque	N.m	2	4	9	15	35	70	125

Grease Lubrication

All train wave reducer are lubricated by grease. Hollow shaft III series and solid shaft IV series are grease filled in the factory. There is no need to add grease at installation. The other series internal chambers are grease filled. Need to add grease when installing wave generators.

Types of Grease

LD Super No. 096:

Specially formulated for strain wave reducer application. It provides more excellent lubrication, higher efficiency at the harmonic meshing, protects components from wear and extends component life.

LD Super No. 098:

Specially formulated for small strain wave reducer application. It provides excellent lubrication when turning wave generation by liquefying extreme pressure additive.

LD Super No. 098:

It has flow characteristic for longer service life, and also can be used in larger temperature range.

Grease characteristics				
Grease No.	Leakage	Low temperature	Micro vibration and wear resistance	Endurance
#096	○	◎	◎	◎
#098	△	◎	◎	◎
#099	◎	◎	○	○

Excellent ◎ Good ○ Use caution △

Grease	#096	#098	#099
Base	Refined mineral oil	Synthetic hydrocarbon oil	Synthetic hydrocarbon oil
Thickening agent	Special lithium base	Lithium based thickening agent	Lithium based thickening agent
Additive	Anti-wear addictive and extreme-pessure addictive	Anti-wear addictive and others	Anti-wear addictive and others
Viscosity(25℃)	265- 295	295- 315	260- 280
Temperature range	-40~150℃	-40~120℃	-40~120℃
Drop point	198℃	180℃	180℃
Appearance	Yellow	Yellow	Yellow
Storage life	5 year in sealed condition	5 year in sealed condition	5 year in sealed condition
Viscosity-temperature index	Base oil VI＞120	Base oil VI＞120	Base oil VI＞120

Grease Application Notes:

1. The seals at the input and output have to be carefully design. Dynamic seal should be a lip seal with structural support and the stationary seal can be O-ring type or RTV. The sealing surface must have high surface finish and not defective.
2. Must use the factory recommended grease and not to mix with any other grease.
3. The grease application must be in accordance with the factory instructions.
4. If the strain wave reducer unit is operating in constant upright position, lubrication deficiency may occur, need to use extra grease.
5. The grease properties will vary with temperature. It degrades faster at high temperature. For optimum lubrication conditions, the harmonic drive should operate below 70 degree C. The temperature rise should be less then 40 degree C.
6. The grease quality will have direct effect on the wear of the internal components. The recommended grease change interval is every 3000 operating hours.

Authentication Certificate

ISO 9001:2015

ISO 14001:2015