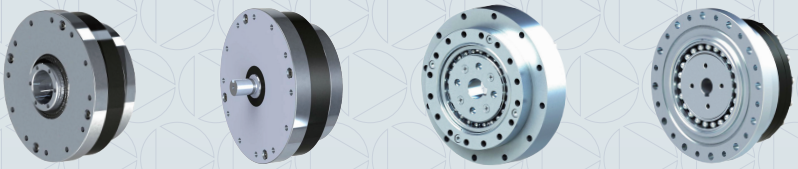
RS Series



HARMONIC REDUCERS

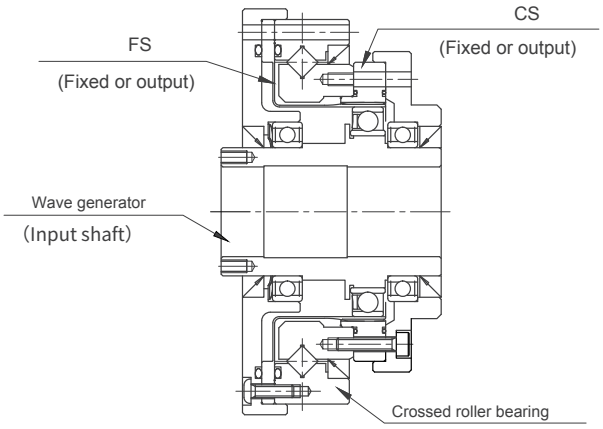
RS Series Standard Flex Spline

- **Maximum torque capacity and stiffness.**
- **High transmission accuracy with zero backlash.**
- **Ideal when performance is paramount.**

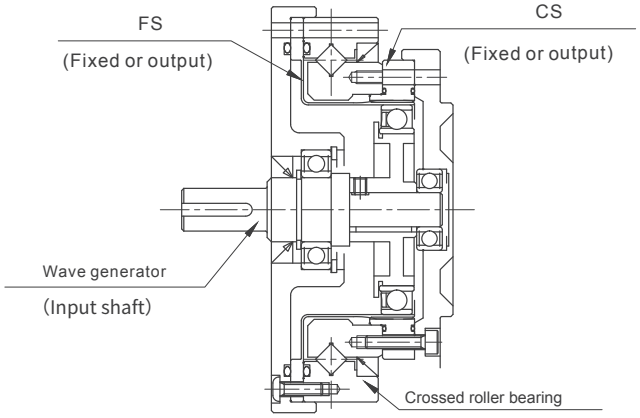
INFRANOR
MOTION EXCELLENCE

HARMONIC REDUCERS

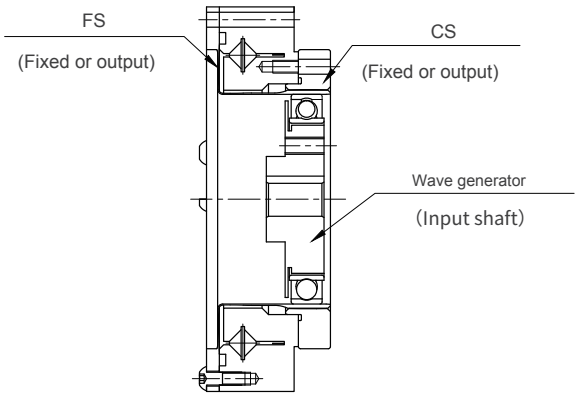
DESIGN OF INPUT CONNECTION



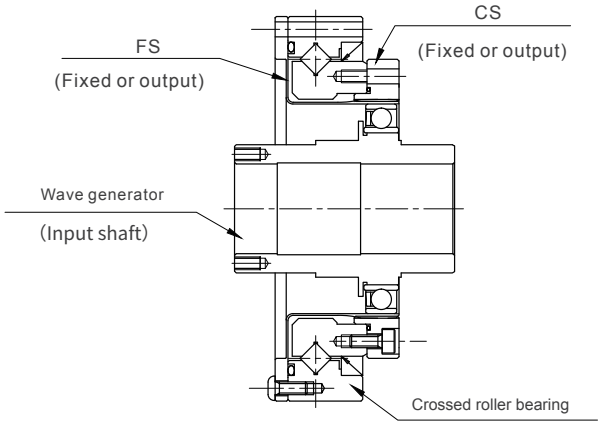
Hollow Shaft (H)



Solid Shaft (S)



Rigid Joint (R)



Simplified Hollow Shaft

NAMING RULE:

RSHT-14-50-M-H21

PRODUCT CATEGORY
R: Harmonic Reducers

LENGTH OF FLEXSPLINE
S: Standard | C: Compact

SHAPE OF GEARBOX
H: Hat shape | U: Cup shape

TORQUE
T: high torque | Ommitted: Standard torque

MODEL SIZE

REDUCTION RATIO

STRUCTURE CODE
M: Module I C: Component

DESIGN OF INPUT JOINT
H: Hollow shaft I S: Solid shaft I R: Rigid joint

HOLE OR SHAFT SIZE (mm)

RATING TABLE

Size	Ratio	Rated torque at 2000rpm(Nm)	limit for repeated peak torque(Nm)	Limit for average torque(Nm)	Limit for momentary peak torque(Nm)	Maximum input speed(r/min)	Limit for average input speed(r/min)
14	50	7	23	9	46	8500	3500
	80	10	30	14	61		
	100	10	36	14	70		
17	50	21	44	34	91	7300	3500
	80	29	56	35	113		
	100	31	70	51	143		
	120	31	70	51	112		
20	50	33	73	44	127	6500	3500
	80	44	96	61	165		
	100	52	107	64	191		
	120	52	113	64	191		
	160	52	120	64	191		
25	50	51	127	72	242	5600	3500
	80	82	178	113	332		
	100	87	204	140	369		
	120	87	217	140	395		
	160	87	229	140	408		
32	50	99	281	140	497	4800	3500
	80	153	395	217	738		
	100	178	433	281	841		
	120	178	459	281	892		
	160	178	484	281	892		
40	50	178	523	255	892	4000	3000
	80	268	675	369	1270		
	100	345	738	484	1400		
	120	382	802	586	1530		
	160	382	841	586	1530		
45	50	229	650	345	1235	3800	3000
	80	407	918	507	1651		
	100	459	982	650	2041		
	120	523	1070	806	2288		
	160	523	1147	819	2483		

POSITIONAL ACCURACY

Ratio \ Size	Unit	14	17	20	25	32	40	45
Reduction ratio	arc sec	75	75	50	50	50	60	60

HYSTERESIS LOSS

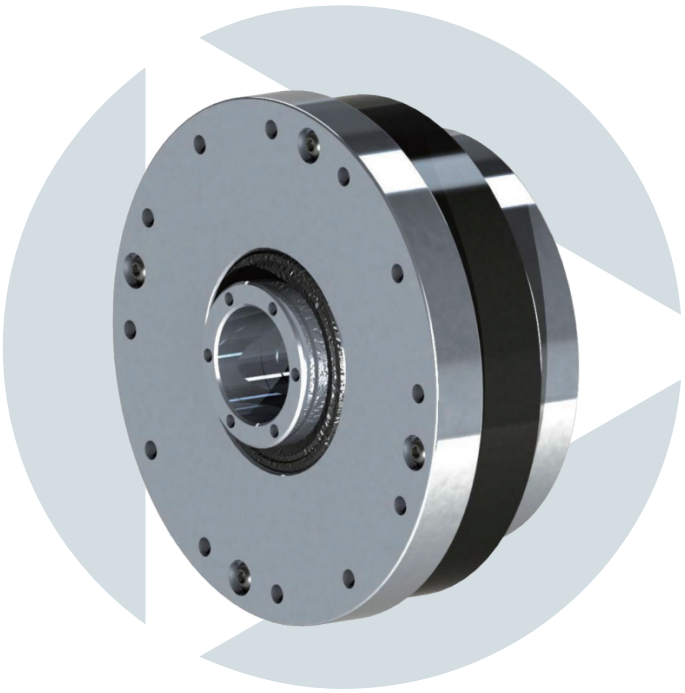
Ratio \ Size	Unit	14	17	20	25	32	40	45
50	arc min	2.0	2.0	2.0	2.0	2.0	2.0	2.0
80 or more	arc min	1.0	1.0	1.0	1.0	1.0	1.0	1.0

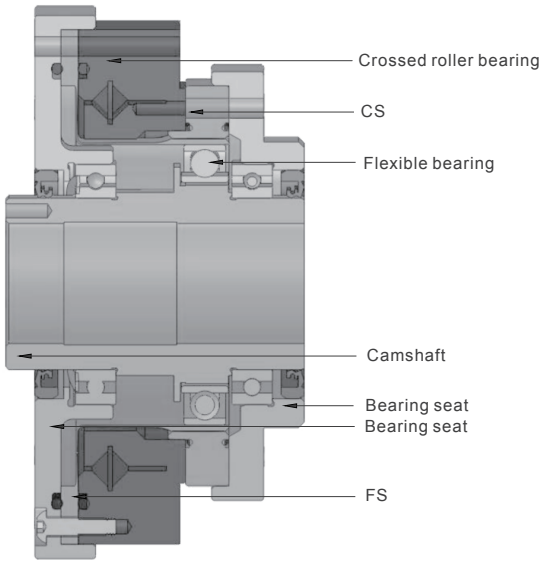
TORSIONAL STIFFNESS

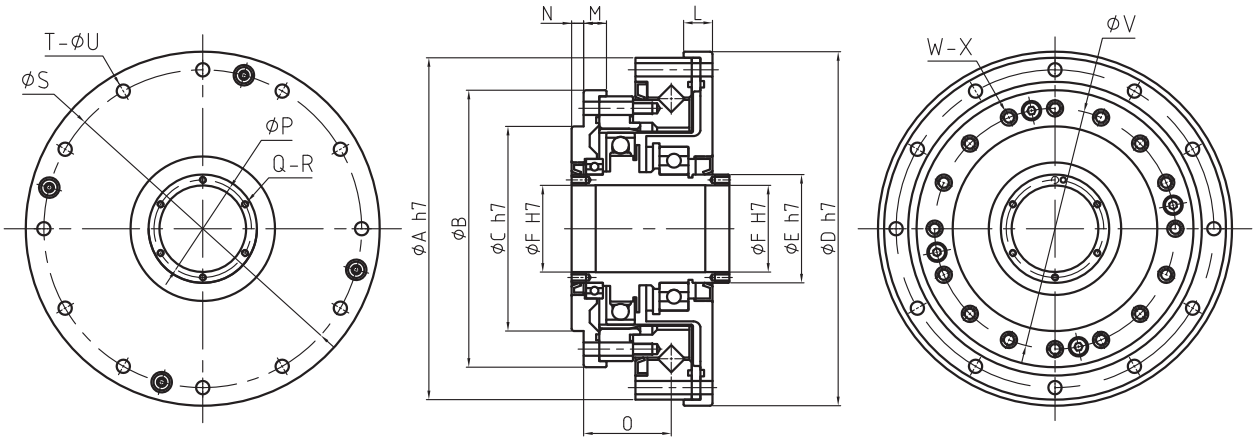
Ratio \ Size			14	17	20	25	32	40	45
T_1		Nm	2.0	3.9	7.0	14	29	54	76
T_2		Nm	6.9	12	25	48	108	196	275
Reduction ratio 50	K_1	Nm/arc min	1.05	2.55	4.1	7.9	17.2	32.3	46.4
	K_2	Nm/arc min	1.5	3.4	5.6	10.7	24.7	45.3	64.7
	K_3	Nm/arc min	1.8	4.3	7.2	14	31.2	57.2	82
Reduction ration 80 or more	K_1	Nm/arc min	1.5	3.2	5.0	9.9	21.5	41	58.3
	K_2	Nm/arc min	1.9	4.3	8.0	16.1	34.5	64.7	91.7
	K_3	Nm/arc min	2.2	4.9	9.1	18.3	39.8	73.4	104.6

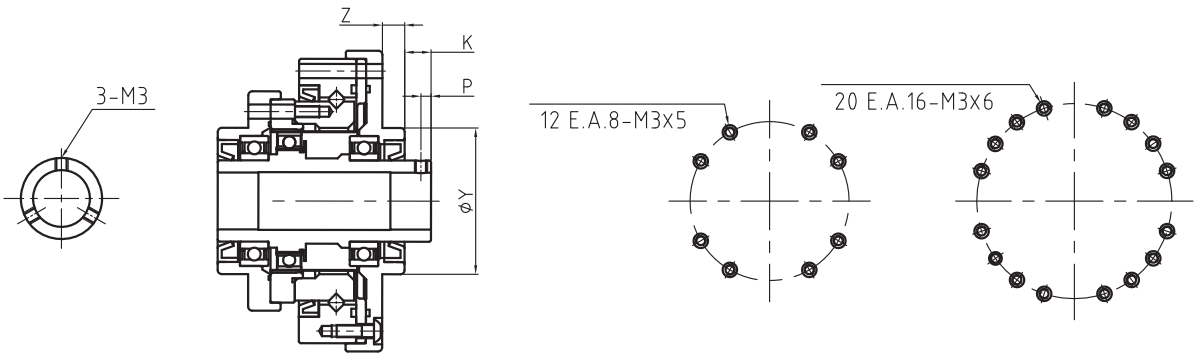
RSH SERIES HARMONIC REDUCERS

RSHT-H SERIES









Shape of input part of size 14,17 | Size 14 | Size 17

DIMENSIONS

Unit:mm

Symbol \ Size	14	17	20	25	32	40	45
ϕA h 7	70	80	90	110	142	170	190
ϕB	54	64	75	90	115	140	160
ϕC h 7	36	45	50	60	85	100	120
ϕD h 7	74	84	95	115	147	175	195
ϕE h 7	20	25	30	38	45	59	64
ϕF H 7	14	19	21	29	36	46	52
G	52.5	56.5	51.5	55.5	65.5	79	85
H	—	—	5	6	7	8	8
I	20.5	23	25	26	32	38	42
J	20	21.5	21.5	23.5	26.5	33	35
K	6.5	6.5	—	—	—	—	—
L	9	10	10.5	10.5	12	14	15
M	8	8.5	9	8.5	9.5	13	12
N	7.5	8.5	7	6	5	7	7
O	21.7	23.9	25.5	29.6	36.4	44	47.5
ϕ P(P)	(2.5)	(2.5)	25.5	33.5	40.5	52	58
Q	3	3	6	6	6	6	6
R	M3	M3	M3×6	M3×6	M3×6	M4×8	M4×8
ϕS	64	74	84	102	132	158	180
T	8	12	12	12	12	12	18
ϕU	3.5	3.5	3.5	4.5	5.5	6.6	6.6
ϕV	44	54	62	77	100	122	140
W	12E.A.8	20E.A.16	16	16	16	16	12
X	M3×6	M3×6	M3×6	M4×7	M5×8	M6×10	M8×10
	ϕ3.5×11.5	ϕ3.5×12	ϕ3.5×13.5	ϕ4.5×15.5	ϕ5.5×20.5	ϕ6.6×25	ϕ9×27
ϕY	36	45	—	—	—	—	—
z	5.5	5.5	—	—	—	—	—
weight(kg)	0.41	0.8	1.1	1.72	3.7	7.7	9.62

MOMENT OF INERTIA

Parameter \ Size	14	17	20	25	32	40	45
Moment of inertia ($\times 10^{-4} kgm^2$)	0.091	0.193	0.404	1.070	2.850	9.280	13.800

STARTING TORQUE

Unit:cNm

Ratio \ Size	14	17	20	25	32	40	45
50	8.5	16.7	22.6	37	60	165	165
80	7.1	14.4	19.4	30	47	117	138
100	6.8	13.7	18.7	28.8	46	112	131
120	-	13.4	18.2	28	43	110	126
160	-	-	17.6	26.9	41	105	122

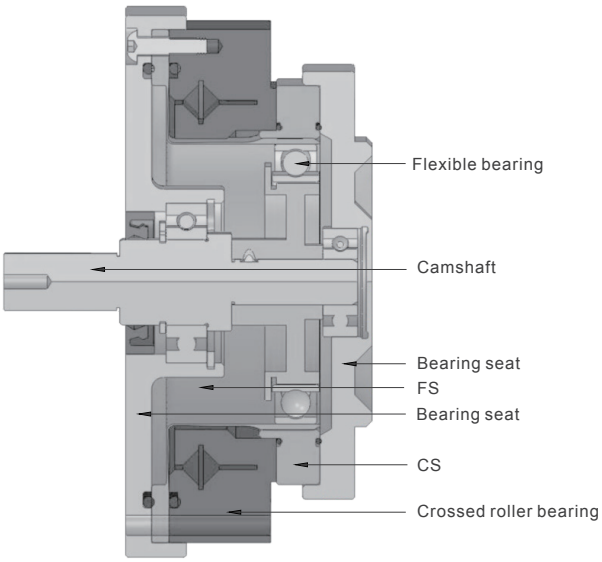
BACKDRIVING TORQUE

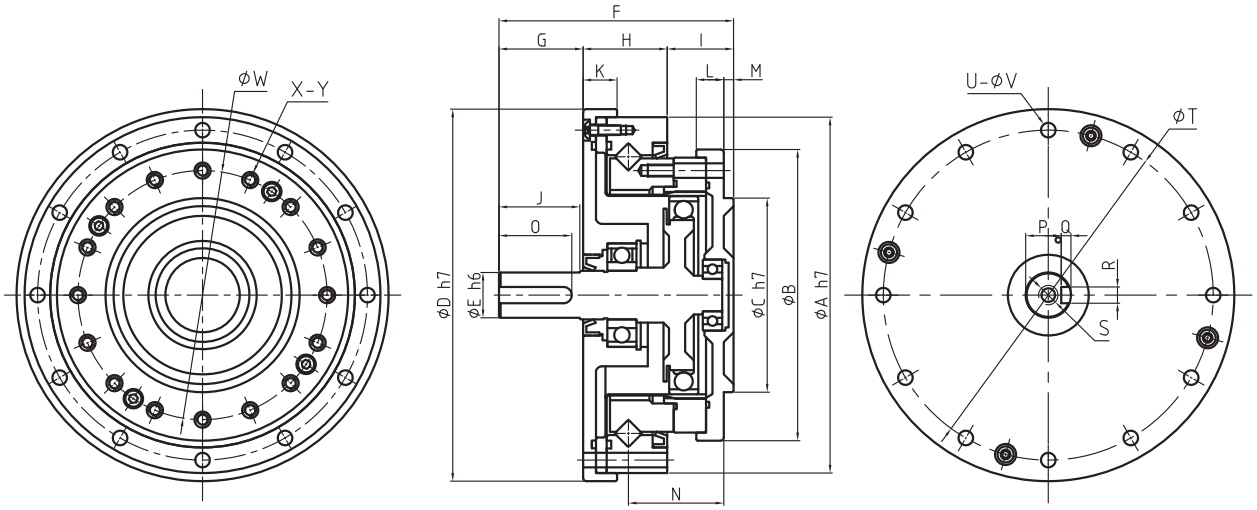
Unit:Nm

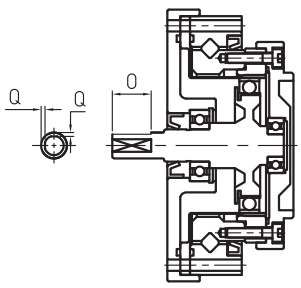
Ratio \ Size	14	17	20	25	32	40	45
50	5.3	16	22	34	51	82	99
80	7.2	24	31	48	70	112	133
100	8.2	29	38	59	86	134	158
120	-	34	45	69	97	158	182
160	-	-	59	90	128	201	233

RSH SERIES HARMONIC REDUCERS

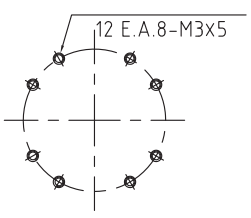
RSHT-S SERIES



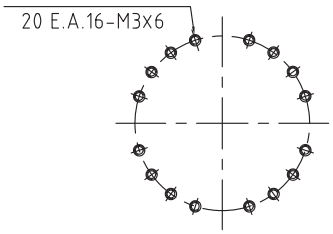




Shape of input part of size 14,17



Size 14



Size 17

DIMENSIONS

Unit:Nm

Symbol \ Size	14	17	20	25	32	40	45
ϕA h 7	70	80	90	110	142	170	190
ϕB	54	64	75	90	115	140	160
ϕC h 7	36	45	50	60	85	100	120
ϕD h 7	74	84	95	115	147	175	195
ϕE h 6	6	8	10	14	14	16	19
F	50.5	56	63.5	72.5	84.5	100	108
G	15	17	21	26	26	31	31
H	20.5	23	25	26	32	38	42
I	15	16	17.5	20.5	26.5	31	35
J	14	16	20	25	25	30	30
K	9	10	10.5	10.5	12	14	15
L	8	8.5	9	8.5	9.5	13	12
M	2.5	3	3	3	5	5	7
N	21.7	23.9	25.5	29.6	36.4	44	47.5
O	11	12	16.5	22.5	22.5	27.5	28
P	—	—	$8.2^{0}_{-0.1}$	$11^{0}_{0-0.1}$	$11^{0}_{0-0.1}$	$13^{0}_{-0.1}$	$15.5^{0}_{-0.1}$
Q	0.5	0.5	-	-	-	-	-
R P 9	—	—	3	5	5	5	6
S	M3×6	M3×6	M3×6	M5×10	M5×10	M5×10	M6×12
ϕT	64	74	84	102	132	158	180
U	8	12	12	12	12	12	18
ϕV	3.5	3.5	3.5	4.5	5.5	6.6	6.6
ϕW	44	54	62	77	100	122	140
X	12 E.A.8	20 E.A.16	16	16	16	16	12
Y	M3×6	M3×6	M3×6	M4×7	M5×8	M6×10	M8×10
	ϕ3 .5×11.5	ϕ3 .5×12	ϕ3 .5×13.5	ϕ4 .5×15.5	ϕ5 .5×20.5	ϕ6.6×25	ϕ9×28
weight(kg)	0.66	0.73	1.05	1.64	3.6	7.3	9.8

MOMENT OF INERTIA

Parameter \ Size	14	17	20	25	32	40	45
Moment of inertia ($\times 10^{-4} kgm^2$)	0.025	0.059	0.137	0.320	1.200	3.410	5.800

STARTING TORQUE

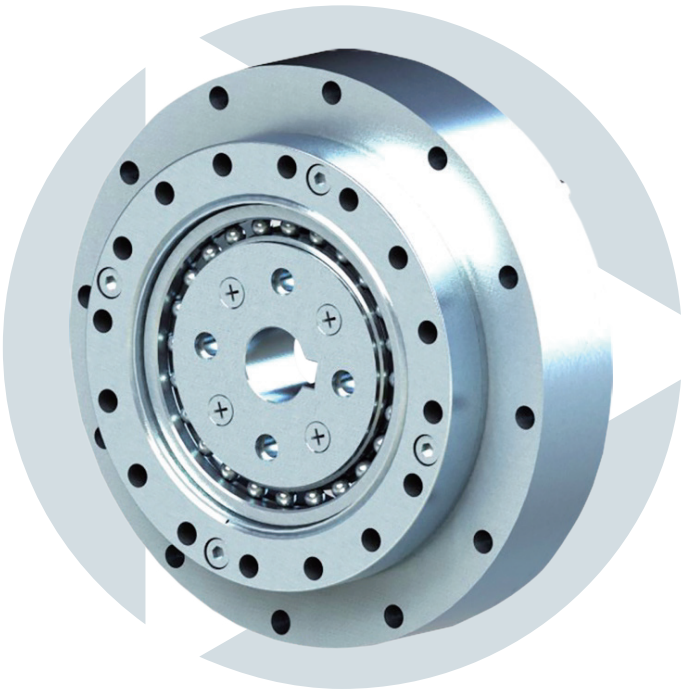
Unit:cNm

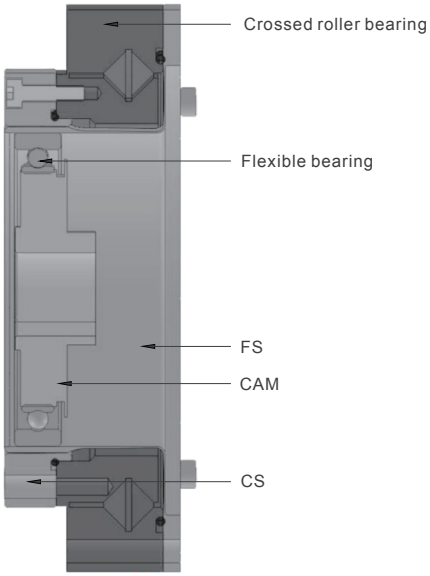
Ratio \ Size	14	17	20	25	32	40	45
50	5.5	8.2	11.1	19.5	38	72	94
80	4.1	5.9	7.9	12.5	25	52	68
100	3.8	5.2	7.2	11.3	24	47	60
120	-	4.9	6.7	10.5	21	44	55
160	-	-	6.1	9.4	19	39	50

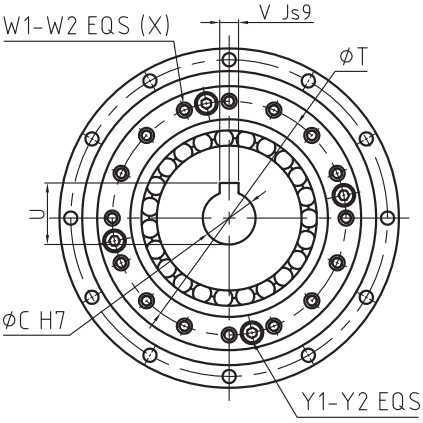
BACKDRIVING TORQUE

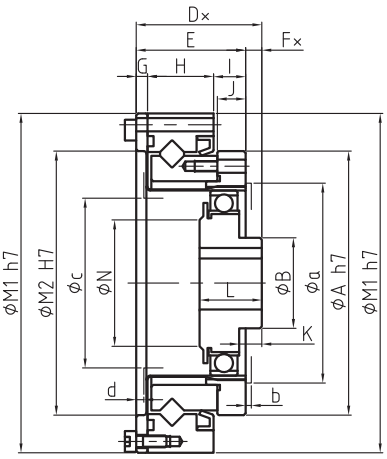
Unit:Nm

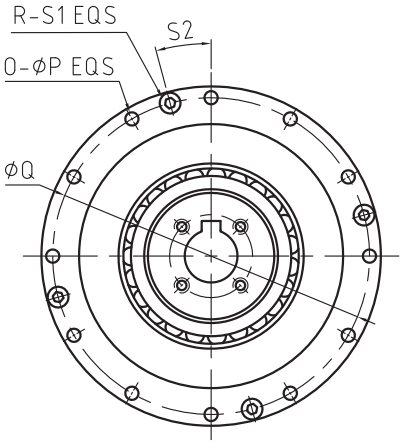
Ratio \ Size	14	17	20	25	32	40	45
50	3.4	5.8	8.4	13	25	43	56
80	4.2	6.9	10	15	28	50	65
100	4.5	7.8	12	17	33	56	72
120	-	8.9	13	19	34	63	79
160	-	-	17	23	43	75	96

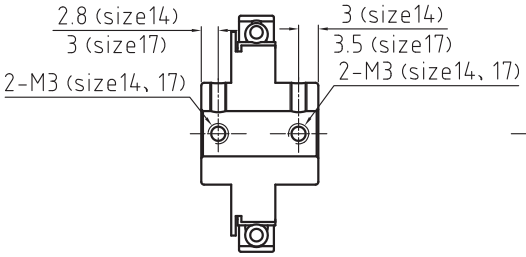




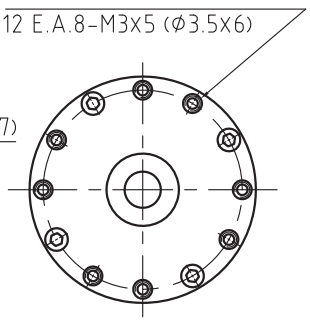




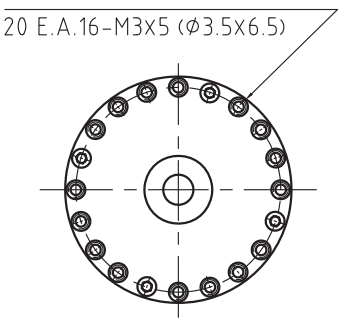




size 14,17 configuration of wave generator



Size 14



Size 17

DIMENSIONS

Unit:mm

Size / Symbol	14	17	20	25	32	40	45
ϕA h6	50	60	70	85	110	135	155
ϕB h7	16	18	24	30	32	32	32
ΦC H7	8	8	14	14	19	14	19
D*	28.3±0.2	32.3±0.2	33.3±0.2	$36.7^{+0.3}_{-0.2}$	43.7±0.3	$53^{0}_{-0.6}$	$58^{0}_{-0.6}$
E	23.5	26.5	29	34	42	51	56.5
F*	4.8±0.2	5.8±0.2	4.3±0.2	$2.7^{+0.3}_{-0.2}$	1.7±0.3	2±0.2	1.5±0.2
G	2.4	3	3	3.3	3.6	4	4.5
H	14.1	16	17.5	18.7	23.4	29	32
I	7	7.5	8.5	12	15	18	20
J	6	6.5	7.5	10	14	17	19
K	6.4	7.6	6	6.4	6.2	7.6	7.6
L	18.5	20.7	16.5	16.5	18.6	29.7	30.5
Φ M1 h7	70	80	90	110	142	170	190
Φ M2 H7	48	60	70	88	110	140	158
ΦN	18	18	33.5	39.5	42.5	75	75
O	8	12	12	12	12	12	18
ΦP	3.5	3.5	3.5	4.5	5.5	6.6	6.6
ΦQ	64	74	84	102	132	158	180
R	2	4	4	4	4	6	6
S1	M3×8	M3×8	M3×8	M3×8	M4×10	M4×10	M4×8
S2(Winkel Angle)	22.5	15	15	15	15	15	10
ΦT	44	54	62	77	100	122	140
U	-	-	$16.3^{+0.1}_{0}$	$16.3^{+0.1}_{0}$	$21.8^{+0.2}_{0}$	$16.3^{+0.1}_{0}$	$21.8^{+0.2}_{0}$
V Js9	-	-	5	5	6	5	6
W1	12 E.A.8	20 E.A.16	16	16	16	16	12
W2	M3x6	M3x6	M3x6	M4x7	M5x8	M6×10	M8×10
X	ϕ 3.5x6	ϕ 3.5x6.5	ϕ 3.5x7.5	ϕ 4.5x10	ϕ 5.5x14	ϕ6.6×17	ϕ9×19
Y1	4	4	4	4	4	4	4
Y2	M3x8	M3x8	M3x8	M3x12	M4x16	M5×20	M5×20
ϕa	38	45	53	66	86	106	119
b	1	1	1.5	1.5	1.5	2	2
ϕc	31	38	45	56	73	90	101
d	1.7	2.1	2	2	2	2	2.3
weight(kg)	0.41	0.57	0.81	1.31	2.94	5.1	6.5

Notes: 1. As size F shall affect the performance and strength, so please strictly observe it.
2. Since the FS will be deformed elastically, in order to prevent it from coming into contact with the housing, please pay attention to the four sizes φa, b, φc, and d.

MOMENT OF INERTIA

Parameter \ Size	14	17	20	25	32	40	45
Moment of inertia ($\times 10^{-4} kgm^2$)	0.033	0.079	0.193	0.413	1.690	3.663	8.23

STARTING TORQUE

Unit:cNm

Ratio \ Size	14	17	20	25	32	40	45
50	4.5	6.7	8.6	17	34	61	85
80	3.1	4.4	5.4	10	21	39	54
100	2.8	3.7	4.7	8.8	20	34	47
120	-	3.4	4.2	8.0	17	31	43
160	-	-	3.6	6.9	15	26	36

BACKDRIVING TORQUE

Unit:Nm

Ratio \ Size	14	17	20	25	32	40	45
50	1.8	3.3	5.2	9.9	20	36	52
80	1.8	3.3	5.3	10	21	36	53
100	2.2	3.6	5.6	11	22	40	56
120	-	3.9	6.1	12	24	43	61
160	-	-	7	14	29	51	70

RATING TABLE

Size	Ratio	Rated torque at 2000rpm(Nm)	limit for repeated peak torque(Nm)	Limit for average torque(Nm)	Limit for momentary peak torque(Nm)	Maximum input speed(r/min)	Limit for average input speed(r/min)
14	50	7	23	9	46	8500	3500
	80	10	30	14	61		
	100	10	36	14	70		
17	50	21	44	34	91	7300	3500
	80	29	56	35	113		
	100	31	70	51	143		
	120	31	70	51	112		
20	50	33	73	44	127	6500	3500
	80	44	96	61	165		
	100	52	107	64	191		
	120	52	113	64	191		
	160	52	120	64	191		
25	50	51	127	72	242	5600	3500
	80	82	178	113	332		
	100	87	204	140	369		
	120	87	217	140	395		
	160	87	229	140	408		
32	50	99	281	140	497	4800	3500
	80	153	395	217	738		
	100	178	433	281	841		
	120	178	459	281	892		
	160	178	484	281	892		
40	50	178	523	255	892	4000	3000
	80	268	675	369	1270		
	100	345	738	484	1400		
	120	382	802	586	1510		
	160	382	841	586	1510		
45	50	229	650	345	1235	3800	3000
	80	407	918	507	1651		
	100	459	982	650	2041		
	120	523	1070	806	2288		
	160	523	1147	819	2483		

POSITIONAL ACCURACY

Ratio \ Size	Unit	14	17	20	25	32	40	45
Reduction ratio	arc sec	75	75	50	50	50	60	60

HYSTERESIS LOSS

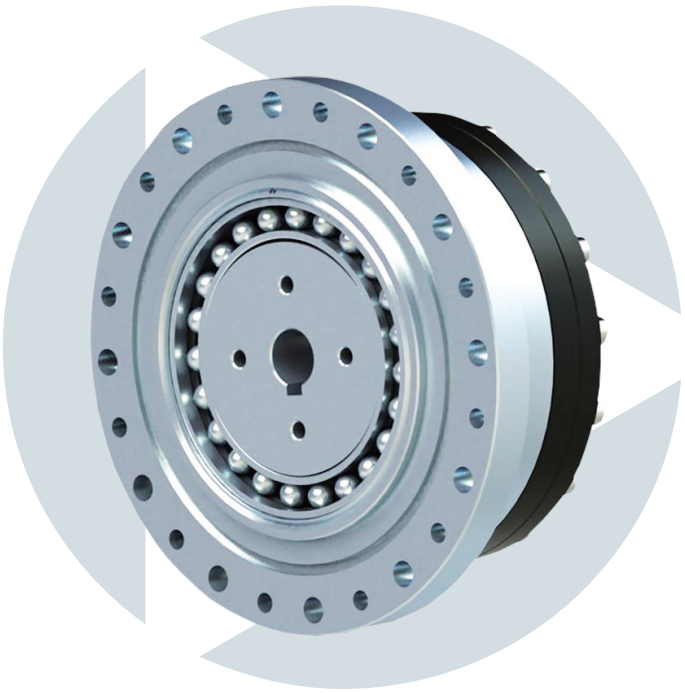
Ratio \ Size	Unit	14	17	20	25	32	40	45
50	arc min	2.5	1.5	1.5	1.5	1.5	2.0	2.0
80 or more	arc min	2.0	1.0	1.0	1.0	1.0	1.0	1.0

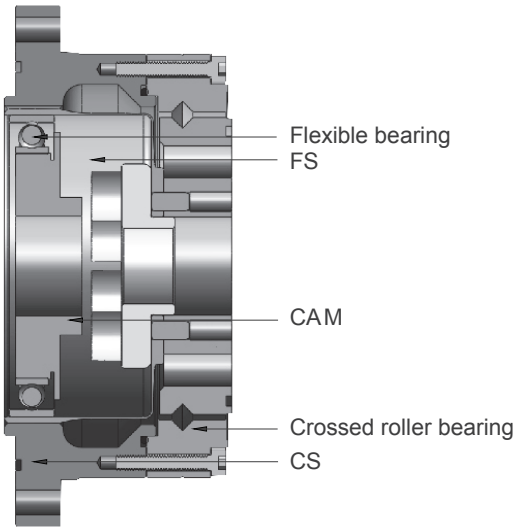
TORSIONAL STIFFNESS

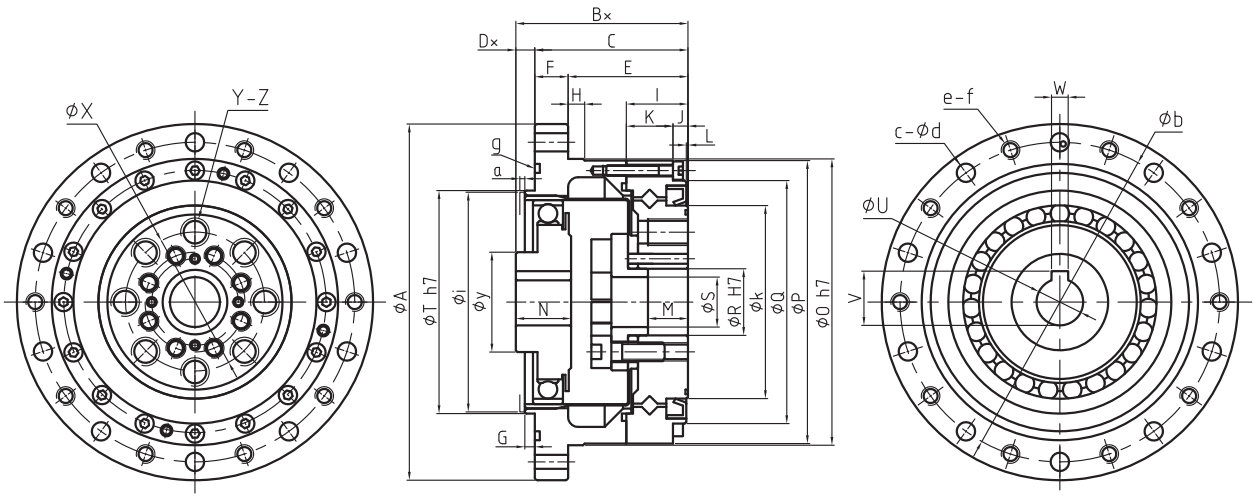
Ratio \ Size			14	17	20	25	32	40	45
T_1		Nm	2.0	3.9	7.0	14	29	54	76
T_2		Nm	6.9	12	25	48	108	196	275
Reduction ration 50	K_1	Nm/arc min	1.05	2.55	4.1	7.9	17.2	32.4	46.4
	K_2	Nm/arc min	1.5	3.4	5.6	10.7	24.7	45.3	64.7
	K_3	Nm/arc min	1.8	4.3	7.2	14	31.2	57.2	82
Reduction ration 80 or more	K_1	Nm/arc min	1.5	3.2	5.0	9.9	21.5	41	58.3
	K_2	Nm/arc min	1.9	4.3	8.0	16.1	34.5	64.7	91.7
	K_3	Nm/arc min	2.2	4.9	9.1	18.3	39.8	73.4	104.6

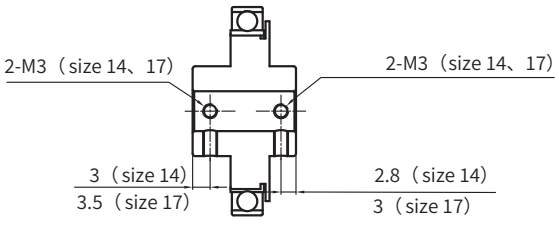
RSU SERIES HARMONIC REDUCERS

RSUT-R SERIES









DIMENSIONS

Symbol \ Size	14	17	20	25	32	40	45
ΦA	73	79	93	107	138	160	180
B *	40.8±0.2	44.8±0.2	45.3±0.2	51.7 $^{+0.3}_{-0.2}$	61.7±0.3	71.5±0.3	79.5 $^{0}_{-1.2}$
C	34	37	38	46	57	67.5	74
D *	6.8±0.2	7.8±0.2	7.3±0.2	5.7 $^{+0.3}_{-0.2}$	4.7±0.3	5.9±0.3	5.5 $^{0}_{-1.2}$
E	27	29	28	36	45	51.5	58
F	7	8	10	10	12	16	16
G	2	2	3	3	3	4	4
H	3.5	4	5	5	5	4.5	6
I	16.5	16.5	16.5	18.5	22.5	24	-
J	4.5	4.5	4	4.5	5.5	7.5	-
K	12	12	12.5	14	17	16.5	-
L	0.5	0.6	0.5	0.5	1	1.5	-
M	9.4	9.5	9	12	15	16.5	6
N	18.5	20.7	16.5	16.6	18.6	20	30.5
ΦO h7	56	63	72	86	113	127	148
ΦP	55	62	70	85	112	126	147
ΦQ	42.5	49.5	58	73	96	109	127
ΦR H7	11	10	14	20	26	32	32
Φ S	8	7	10	15	20	24	25
ΦT h7	38	48	56	67	90	110	124
ΦU H7	8	8	14	14	19	22	19
V	-	-	16.3	16.3	21.8	24.8	21.8
W	-	-	5	5	6	6	6
ΦX	23	27	32	42	55	68	82
Y	6	6	8	8	8	8	8
Z	M4x8	M5x10	M6x12	M8x13	M10x15	M10×15	M12×18
a	1	1	1.5	1.5	1.5	2	0.5
Φb	65	71	82	96	125	144	164
c Version A	8	8	8	10	12	10	12
c Version B	6	6	6	8	12	10	12
Φd	4.5	4.5	5.5	5.5	6.5	9	9
e Version A	8	8	8	10	12	10	12
e Version B	6	6	6	8	12	10	12
F	M4	M4	M5	M5	M6	M8	M8
G	O-Ring 28*0.5	O-Ring 34.5*0.8	O-Ring 40*1	O-Ring 54*1	O-Ring 69*2	O-Ring 128*2	O-Ring 144*2
H	O-Ring 50*1.5	O-Ring 56*1.5	O-Ring 65*2	O-Ring 78*2	O-Ring 103*2	O-Ring 82.5*1.8	O-Ring 98*2
Φ i	38	45	53	66	86	106	119
Φ k	38	48	56	58	78	90	107
R	21.4	23.5	23	29	37	32	32
Φy h7	16	18	24	30	32	32	32
weight(kg)	0.52	0.68	0.98	1.5	3.2	4.79	7

Notes: 1. As size G shall affect the performance and strength, so please strictly observe it.
2. Since the FS will be deformed elastically, in order to prevent it from coming into contact with the housing, please pay attention to the two sizes a,Φi.

MOMENT OF INERTIA

Size / Parameter	14	17	20	25	32	40	45
Moment of inertia ($\times 10^{-4} kgm^2$)	0.033	0.079	0.193	0.413	1.690	5.490	8.230

STARTING TORQUE

Unit:cNm

Size / Ratio	14	17	20	25	32	40	45
50	4.5	6.7	8.6	17	34	61	85
80	3.1	4.4	5.4	10	21	39	54
100	2.8	3.7	4.7	8.8	20	34	47
120	-	3.4	4.2	8.0	17	31	43
160	-	-	3.6	6.9	15	26	36

BACKDRIVING TORQUE

Unit:Nm

Size / Ratio	14	17	20	25	32	40	45
50	1.8	3.3	5.2	9.9	20	36	52
80	1.8	3.3	5.3	10	21	36	53
100	2.0	3.6	5.6	11	22	40	56
120	-	3.9	6.1	12	24	43	61
160	-	-	7	14	29	51	70