

# HarmonicDrive®

Flat, Hollow Shaft Design

## CSD Series/SHD Series

New Ratios Added – 80:1 and 120:1



New ratios, 80:1 and 120:1, enhance the already successful product lines. The ultra-flat, zero backlash CSD precision component sets are available with standard hollow bore or an oversized (BB) hollow shaft. CSD and SHD zero-backlash gear units are housed gears available in versatile designs such as hollow shaft and lightweight.

# Rating Tables

## CSD-2A (Component Set)

     = Added ratio

Size	Gear ratio	Rated torque at input speed 2000rpm		Limit for repeated peak torque		Limit for average torque		Limit for momentary peak torque		Maximum input speed (rpm)		Limit for average input speed (rpm)		Moment of inertia	
		Nm	kgfm	Nm	kgfm	Nm	kgfm	Nm	kgfm	Oil lubricant	Grease lubricant	Oil lubricant	Grease lubricant	I x 10 <sup>-4</sup> kgm <sup>2</sup>	J x 10 <sup>-5</sup> kgfms <sup>2</sup>
14	50	3.7	0.38	12	1.2	4.8	0.49	24	2.4	14000	8500	6500	3500	0.021	0.021
	80	5.4	0.55	16	1.6	7.7	0.79	31	3.2						
	100	5.4	0.55	19	1.9	7.7	0.79	31	3.2						
17	50	11	1.1	23	2.3	18	1.8	48	4.9	10000	7300	6500	3500	0.054	0.055
	80	15	1.5	29	3.0	19	1.9	55	5.6						
	100	16	1.6	37	3.8	27	2.8	55	5.6						
20	50	17	1.7	39	4.0	24	2.4	69	7.0	10000	6500	6500	3500	0.090	0.092
	80	24	2.4	51	5.2	33	3.4	76 (65)	7.7 (6.6)						
	100	28	2.9	57	5.8	34	3.5	76 (65)	7.7 (6.6)						
	120	28	2.9	60	6.1	34	3.5	76 (65)	7.7 (6.6)						
25	50	27	2.8	69	7.0	38	3.9	127	13	7500	5600	5600	3500	0.282	0.288
	80	44	4.5	96	9.8	60	6.1	152 (135)	15 (14)						
	100	47	4.8	110	11	75	7.6	152 (135)	15 (14)						
	120	47	4.8	117	12	75	7.6	152 (135)	15 (14)						
32	50	53	5.4	151	15	75	7.6	268	27	7000	4800	4600	3500	1.09	1.11
	80	83	8.5	213	22	117	12	359 (331)	37 (34)						
	100	96	9.8	233	24	151	15	359 (331)	37 (34)						
	120	96	9.8	247	25	151	15	359 (331)	37 (34)						
40	50	96	9.8	281	29	137	14	480	49	5600	4000	3600	3000	2.85	2.91
	80	144	15	364	37	198	20	685 (580)	70 (59)						
	100	185	19	398	41	260	27	694 (580)	71 (59)						
	120	205	21	432	44	315	32	694 (580)	71 (59)						
50	50	172	18	500	51	247	25	1000	102	4500	3500	3000	2500	8.61	8.78
	80	260	27	659	67	363	37	1300	133						
	100	329	34	686	70	466	48	1440 (1315)	147 (134)						
	120	370	38	756	77	569	58	1441	147 (134)						
	160	370	38	823	84	590	60	1577 (1315)	161 (134)						

Note) The parenthesized value indicates the value when the bore of the flexspline has the maximum value (BB).

## CSD-2UH (Gear Unit)

     = Added ratio

Size	Gear ratio	Rated torque at input speed 2000rpm		Limit for repeated peak torque		Limit for average torque		Limit for momentary peak torque		Maximum input speed (rpm)	Limit for average input speed (rpm)	Moment of inertia	
		Nm	kgfm	Nm	kgfm	Nm	kgfm	Nm	kgfm	Grease lubricant	Grease lubricant	I x 10 <sup>-4</sup> kgm <sup>2</sup>	J x 10 <sup>-5</sup> kgfms <sup>2</sup>
14	50	3.7	0.38	12	1.2	4.8	0.49	24	2.4	8500	3500	0.021	0.021
	80	5.4	0.55	16	1.6	7.7	0.79	35	3.6				
	100	5.4	0.55	19	1.9	7.7	0.79	35	3.6				
17	50	11	1.1	23	2.3	18	1.8	48	4.9	7300	3500	0.054	0.055
	80	15	1.5	29	3.0	19	1.9	61	6.2				
	100	16	1.6	37	3.8	27	2.8	71	7.2				
20	50	17	1.7	39	4.0	24	2.4	69	7.0	6500	3500	0.090	0.092
	80	24	2.4	51	5.2	33	3.4	89	9.1				
	100	28	2.9	57	5.8	34	3.5	95	9.7				
	120	28	2.9	60	6.1	34	3.5	95	9.7				
25	50	27	2.8	69	7.0	38	3.9	127	13	5600	3500	0.282	0.288
	80	44	4.5	96	9.8	60	6.1	179	18				
	100	47	4.8	110	11	75	7.6	184	19				
	120	47	4.8	117	12	75	7.6	204	21				
32	50	53	5.4	151	15	75	7.6	268	27	4800	3500	1.09	1.11
	80	83	8.5	213	22	117	12	398	41				
	100	96	9.8	233	24	151	15	420	43				
	120	96	9.8	247	25	151	15	445	45				
40	50	96	9.8	281	29	137	14	480	49	4000	3000	2.85	2.91
	80	144	15	364	37	198	20	686	70				
	100	185	19	398	41	260	27	700	71				
	120	205	21	432	44	315	32	765	78				
50	50	172	18	500	51	247	25	1000	102	3500	2500	8.61	8.78
	80	260	27	659	67	363	37	1300	133				
	100	329	34	686	70	466	48	1440	147				
	120	370	38	756	77	569	58	1565	160				
	160	370	38	823	84	590	60	1715	175				

### CSD-2UF (Hollow Shaft Gear Unit)

Yellow = Added ratio

Size	Gear ratio	Rated torque at input speed 2000rpm		Limit for repeated peak torque		Limit for average torque		Limit for momentary peak torque		Maximum input speed (rpm)	Limit for average input speed (rpm)	Moment of inertia	
		Nm	kgfm	Nm	kgfm	Nm	kgfm	Nm	kgfm			Grease lubricant	Grease lubricant
14	50	3.7	0.38	12	1.2	4.8	0.49	24	2.4	8500	3500	0.021	0.021
	80	5.4	0.55	16	1.6	7.7	0.79	35	3.6				
	100	5.4	0.55	19	1.9	7.7	0.79	35	3.6				
17	50	11	1.1	23	2.3	18	1.8	48	4.9	7300	3500	0.054	0.055
	80	15	1.5	29	3.0	19	1.9	61	6.2				
	100	16	1.6	37	3.8	27	2.8	71	7.2				
	120	16	1.6	37	3.8	27	2.8	71	7.2				
20	50	17	1.7	39	4.0	24	2.4	69	7.0	6500	3500	0.090	0.092
	80	24	2.4	51	5.2	33	3.4	89	9.1				
	100	28	2.9	57	5.8	34	3.5	95	9.7				
	120	28	2.9	60	6.1	34	3.5	95	9.7				
	160	28	2.9	64	6.5	34	3.5	95	9.7				
25	50	27	2.8	69	7.0	38	3.9	127	13	5600	3500	0.282	0.288
	80	44	4.5	96	9.8	60	6.1	179	18				
	100	47	4.8	110	11	75	7.6	184	19				
	120	47	4.8	117	12	75	7.6	204	21				
	160	47	4.8	123	13	75	7.6	204	21				
32	50	53	5.4	151	15	75	7.6	268	27	4800	3500	1.09	1.11
	80	83	8.5	213	22	117	12	398	41				
	100	96	9.8	233	24	151	15	420	43				
	120	96	9.8	247	25	151	15	445	45				
	160	96	9.8	261	27	151	15	445	45				
40	50	96	9.8	281	29	137	14	480	49	4000	3000	2.85	2.91
	80	144	15	364	37	198	20	686	70				
	100	185	19	398	41	260	27	700	71				
	120	205	21	432	44	315	32	765	78				
	160	206	21	453	46	316	32	765	78				

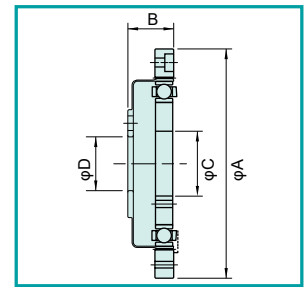
### SHD-2SH/SHD-2UH-LW (Gear Unit)

Yellow = Added ratio

Size	Gear ratio	Rated torque at input speed 2000rpm		Limit for repeated peak torque		Limit for average torque		Limit for momentary peak torque		Maximum input speed (rpm)	Limit for average input speed (rpm)	Moment of inertia (2SH)		Moment of inertia (2UH)	
		Nm	kgfm	Nm	kgfm	Nm	kgfm	Nm	kgfm			Grease lubricant	Grease lubricant	I x 10 <sup>-4</sup> kgm <sup>2</sup>	J x 10 <sup>-5</sup> kgfms <sup>2</sup>
14	50	3.7	0.38	12	1.2	4.8	0.49	23	2.3	8500	3500	0.021	0.021	0.064	0.065
	80	5.4	0.55	16	1.6	7.7	0.79	35	3.6						
	100	5.4	0.55	19	1.9	7.7	0.79	35	3.6						
17	50	11	1.1	23	2.3	18	1.8	48	4.9	7300	3500	0.054	0.055	0.141	0.144
	80	15	1.5	29	3.0	19	1.9	61	6.2						
	100	16	1.6	37	3.8	27	2.8	71	7.2						
	120	16	1.6	37	3.8	27	2.8	71	7.2						
20	50	17	1.7	39	4.0	24	2.4	69	7.0	6500	3500	0.090	0.092	0.271	0.276
	80	24	2.4	51	5.2	33	3.4	89	9.1						
	100	28	2.9	57	5.8	34	3.5	95	9.7						
	120	28	2.9	60	6.1	34	3.5	95	9.7						
	160	28	2.9	64	6.5	34	3.5	95	9.7						
25	50	27	2.8	69	7.0	38	3.9	127	13	5600	3500	0.282	0.288	0.793	0.809
	80	44	4.5	96	9.8	60	6.1	179	18						
	100	47	4.8	110	11	75	7.6	184	19						
	120	47	4.8	117	12	75	7.6	204	21						
	160	47	4.8	123	13	75	7.6	204	21						
32	50	53	5.4	151	15	75	7.6	268	27	4800	3500	1.09	1.11	2.900	2.957
	80	83	8.5	213	22	117	12	398	41						
	100	96	9.8	233	24	151	15	420	43						
	120	96	9.8	247	25	151	15	445	45						
	160	96	9.8	261	27	151	15	445	45						
40	50	96	9.8	281	29	137	14	480	49	4000	3000	2.85	2.91	7.432	7.578
	80	144	15	364	37	198	20	686	70						
	100	185	19	398	41	260	27	700	71						
	120	205	21	432	44	315	32	765	78						
	160	206	21	453	46	316	32	765	78						

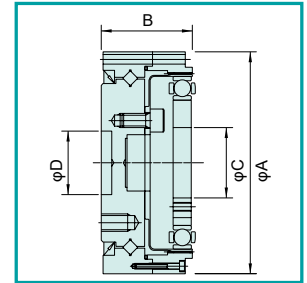
### CSD-2A Outline Dimensions

Symbol	Size	14	17	20	25	32	40	50
$\phi A$ h7		50	60	70	85	110	135	170
B		11	12.5	14	17	22	27	33
$\phi C$ H7		11	15	20	24	32	40	50
$\phi D$ H6	Standard	11	11	16	20	30	32	44
	BB	11	11	20	24	32	40	50



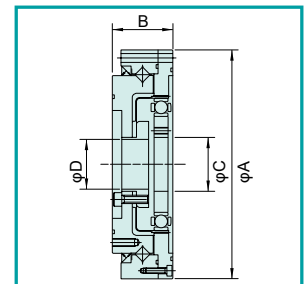
### CSD-2UH Outline Dimensions

Symbol	Size	14	17	20	25	32	40	50
$\phi A$ h7		55	62	70	85	112	126	157
B		25	26.5	29.7	37.1	43	51.7	62.5
$\phi C$ H7		11	15	20	24	32	40	50
$\phi D$ H7		12	14	18	24	32	36	48



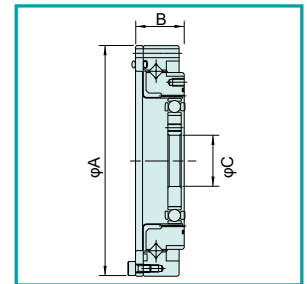
### CSD-2UF Outline Dimensions

Symbol	Size	14	17	20	25	32	40
$\phi A$ h7		70	80	90	110	142	170
B		22	22.7	26.8	31.5	37	45
$\phi C$ H7		11	15	20	24	32	40
$\phi D$		9	9	18	22	29	37



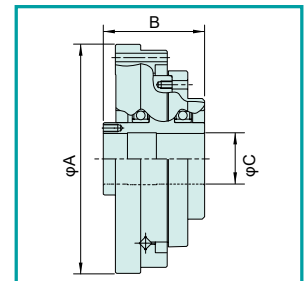
### SHD-2SH Outline Dimensions

Symbol	Size	14	17	20	25	32	40
$\phi A$ h7		70	80	90	110	142	170
B		17.5	18.5	19	22	27.9	33
$\phi C$ H7		11	15	20	24	32	40



### SHD-2UH Outline Dimensions

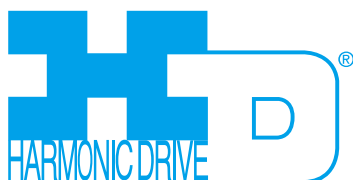
Symbol	Size	14	17	20	25	32	40
$\phi A$ h7		74	84	95	115	147	175
B		45.5	48	42	46.5	55	65
$\phi C$ H7		14	19	21	29	41	51



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