

# Ultra Flat Component Sets

CSD Series  
Ultra Flat Component Sets



**ELECTROMATE**  
Robotic and Mechatronic Solutions

**(877) 737-8698**

[sales@electromate.com](mailto:sales@electromate.com)  
[www.electromate.com](http://www.electromate.com)



**Total Motion Control**

# Harmonic Drive® gear

Precision Gearing and Motion Control

# High Performance Gearing and Motion Control CSD Series Ultra Flat Component Sets

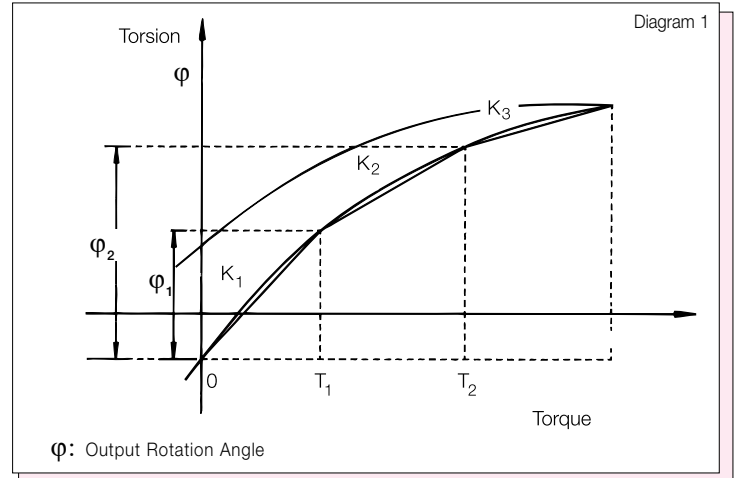
Compact

Lightweight

Zero Backlash

High Accuracy

The axial length of the CSD Series has been reduced by 50% versus the CSF series. This design is made possible by Harmonic Drive LLC patented "S" tooth profile, as well as manufacturing expertise. The CSD series is ideal for many applications including robotics, aerospace, and factory automation. The design of the CSD component set allows the surrounding enclosure to be made very compact for additional size and weight savings.



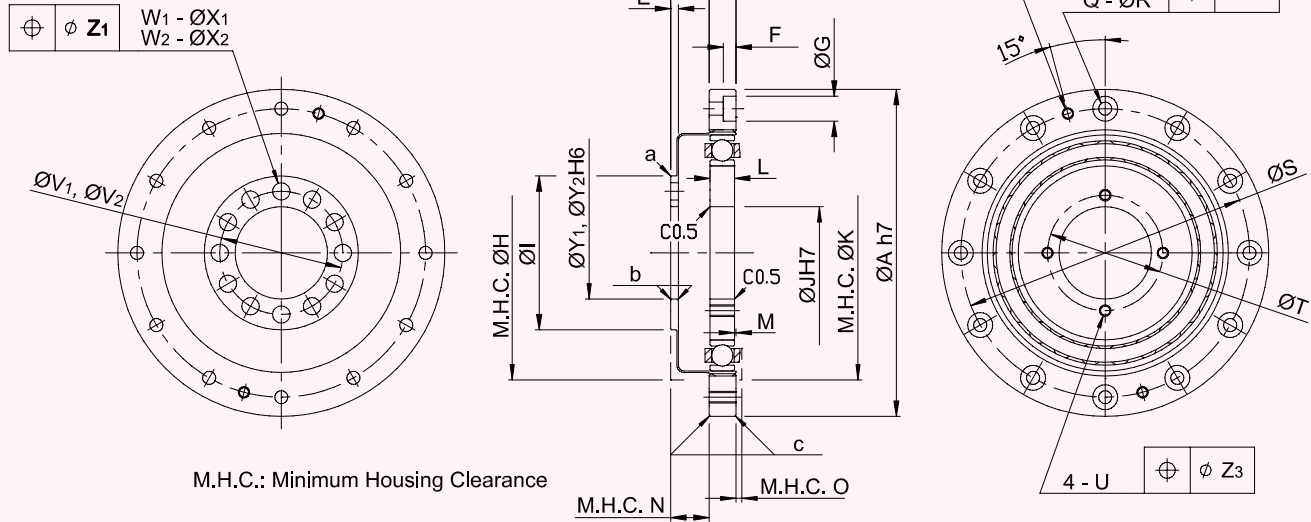
Item	Unit	CSD-20			CSD-25			CSD-32			CSD-40			CSD-50			
		50	100	160	50	100	160	50	100	160	50	100	160	50	100	160	
<b>Gear Ratio</b>		50	100	160	50	100	160	50	100	160	50	100	160	50	100	160	
<b>Rated Input Speed</b>	rpm	2000			2000			2000			2000			2000			
<b>Rated Torque</b>	Nm	17	28	28	27	47	47	53	96	96	96	185	206	172	329	370	
<b>Limit for Repeated Peak Torque</b>	Nm	39	57	64	69	110	123	151	233	261	281	398	453	500	686	823	
<b>Limit for Average Torque</b>	Nm	24	34	34	38	75	75	75	151	151	137	260	316	247	466	590	
<b>Limit for Momentary Peak Torque (Standard Flexspline)</b>	Nm	69	76*	76*	127	152*	152*	268	359*	359*	480	696*	696*	1000	1440	1560*	
<b>Limit for Momentary Peak Torque (Big Bore Flexspline)</b>	Nm	64*	64*	64*	127	135*	135*	268	331*	331*	480	578*	578*	1000	1320*	1320*	
<b>Max. Input Speed</b>	Grease Oil	rpm	6500			5600			4800			4000			3500		
		rpm	10000			7500			7000			5600			4500		
<b>Limit for Average Input Speed</b>	Grease Oil	rpm	3500			3500			3500			3000			2500		
		rpm	6500			5600			4600			3600			3000		
<b>Moment of Inertia</b>	J	$\times 10^{-4}$ kg-m <sup>2</sup> $\times 10^{-5}$ kg-m-s <sup>2</sup>	0.090 0.092			0.282 0.288			1.09 1.12			2.85 2.91			8.61 8.78		
<b>Life W/G LB-10</b>	hr		7000			7000			7000			7000			7000		
<b>Torsional Stiffness (See Diagram 1 for Definition)</b>	T1	Nm	7.0			14			29			54			108		
	K1	$\times 10^4$ Nm/rad	1.1	1.3		2.0	2.7		4.7	6.1		8.8	11		17	21	
	T2	Nm	25			48			108			196			382		
	K2	$\times 10^4$ Nm/rad	1.3	1.7		2.7	3.7		6.1	7.8		11	14		21	29	
	K3	$\times 10^4$ Nm/rad	2.0	2.5		3.7	4.7		8.4	11		15	20		30	37	
<b>Hysteresis Loss</b>		$\times 10^{-4}$ rad	5.8			5.8			5.8			5.8			5.8		
<b>Starting Torque (Max.)</b>	Ncm		7.3	4.3	3.4	13.7	7.9	6.4	28.4	17.6	13.7	50.0	29.4	23.5	94.1	55.9	44.1
<b>No-Load Backdriving Torque (Max.)</b>	Nm		4.4	5.2	6.6	8.3	9.6	12.3	17.1	21.2	28.4	30.0	35.3	45.2	56.5	67.1	84.7
<b>Ratcheting Torque (Min.)</b>	Nm		157	185	157	315	357	315	686	754	686	1300	1500	1300	2600	2880	2530
<b>Positioning Accuracy (Max.)</b>	$\times 10^{-4}$ rad arc-min		2.9 1.0			2.9 1.0			2.9 1.0			2.9 1.0			2.9 1.0		
<b>Lubrication</b>	Grease Oil		Harmonic Grease 4B No.2 Industrial Gear Oil #2 (Extreme Pressure Agent ISO VG68)			Harmonic Grease 4B No.2 Industrial Gear Oil #2 (Extreme Pressure Agent ISO VG68)			Harmonic Grease 4B No.2 Industrial Gear Oil #2 (Extreme Pressure Agent ISO VG68)			Harmonic Grease 4B No.2 Industrial Gear Oil #2 (Extreme Pressure Agent ISO VG68)			Harmonic Grease 4B No.2 Industrial Gear Oil #2 (Extreme Pressure Agent ISO VG68)		
<b>Weight</b>	Kg		0.13			0.24			0.51			0.92			1.9		

\* The Momentary Peak Torque is limited by the tightening torque of the Flexspline Mounting Bolts  
For notes on design and assembly please refer to the CSF catalog.



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SIZE	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
CSD-20	70	14	8	6	2	3.3	6.5	53	32	20	53	5.2	0.3	8	1.5	M3	12	3.4
CSD-25	85	17	10	7	2	3.3	6.5	66	40	24	66	6.3	0.4	10	1.5	M3	12	3.4
CSD-32	110	22	13	9	2.5	4.4	8	86	52	32	86	8.6	0.5	13	2	M4	12	4.5
CSD-40	135	27	16	11	3	5.4	9.5	106	64	40	106	10.3	0.6	16	2.5	M5	12	5.5
CSD-50	170	33	19.5	13.5	3.5	6.5	11	133	80	50	133	12.7	0.8	19.5	3.5	M6	12	6.6

SIZE	Standard Flexspline							Big Bore Flexspline				Z1	Z2	Z3	a	b	c
	S	T	U	V1	W1	X1	Y1	V2	W2	X2	Y2						
CSD-20	62	26	M3	24	9	4.5	16	26	12	3.4	20	0.25	0.2	0.2	C0.3	C0.3	C0.4
CSD-25	75	30	M3	30	9	5.5	20	32	12	4.5	24	0.25	0.2	0.2	C0.3	C0.3	C0.4
CSD-32	100	40	M4	41	11	6.6	30	42	14	5.5	32	0.3	0.25	0.25	C0.3	C0.3	C0.4
CSD-40	120	50	M5	48	10	9	32	52	14	6.6	40	0.5	0.25	0.25	C0.5	C0.5	C0.4
CSD-50	150	60	M6	62	11	11	44	65	14	9	50	0.5	0.3	0.3	C0.5	C0.5	C0.4

### ORDERING CODE

Model	Size	Gear Ratio	Flexspline Configuration	*Option
CSD	20	50 100 160	Standard Flexspline: No Designation is Necessary  Big Bore Flexspline: BB	Our Application Engineers Can Assist With Any Special Configurations And Their Ordering Code
	25	50 100 160		
	32	50 100 160		
	40	50 100 160		
	50	50 100 160		

CSD - 25 - 160 - 2A-GR - *Blank* (Standard Flexspline) - SP\*

CSD - 25 - 160 - 2A-GR - *BB* (Big Bore Flexspline) - SP\*



## Harmonic Drive LLC

### Boston US Headquarters

247 Lynnfield Street  
Peabody, MA 01960

### New York Sales Office

100 Motor Parkway  
Suite 116  
Hauppauge, NY 11788

### California Sales Office

333 W. San Carlos Street  
Suite 1070  
San Jose, CA 95110

### Chicago Sales Office

137 N. Oak Park Ave., Suite 410  
Oak Park, IL 60301

T: 800.921.3332

T: 978.532.1800

F: 978.532.9406

[www.HarmonicDrive.net](http://www.HarmonicDrive.net)



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### Group Companies

Harmonic Drive Systems, Inc.  
6-25-3 Minami-Ohi, Shinagawa-ku  
Tokyo 141-0013, Japan

Harmonic Drive AG  
Hoenbergstrasse, 14, D-6555  
Limburg/Lahn Germany

