

# Ultra Flat Component Sets

CSD Series  
Ultra Flat Component Sets



The Leader in  
Ultra Precision Motion

# harmonic drive gearino

Precision Gearing & Motion Control

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

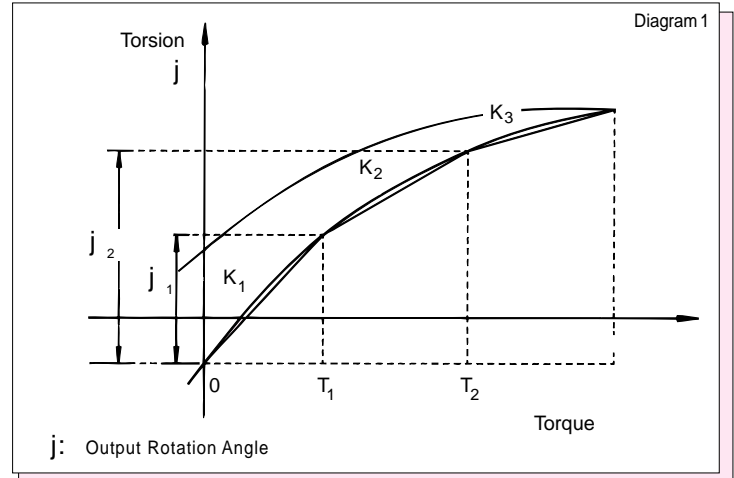
Compact

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 HD Systems 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
Gear Ratio		50	100	160	50	100	160	50	100	160	50	100	160	50	100	160
Rated Input Speed	rpm	2000			2000			2000			2000			2000		
Rated Torque	Nm	17	28	28	27	47	47	53	96	96	96	185	206	172	329	370
Limit for Repeated Peak Torque	Nm	39	57	64	69	110	123	151	233	261	281	398	453	500	686	823
Limit for Average Torque	Nm	24	34	34	38	75	75	75	151	151	137	260	316	247	466	590
Limit for Momentary Peak Torque (Standard Flexspline)	Nm	69	76*	76*	127	152*	152*	268	359*	359*	480	696*	696*	1000	1440	1560*
Limit for Momentary Peak Torque (Big Bore Flexspline)	Nm	64*	64*	64*	127	135*	135*	268	331*	331*	480	578*	578*	1000	1320*	1320*
Max. Input Speed	Grease	rpm			rpm			rpm			rpm			rpm		
	Oil	rpm			rpm			rpm			rpm			rpm		
Limit for Average Input Speed	Grease	rpm			rpm			rpm			rpm			rpm		
	Oil	rpm			rpm			rpm			rpm			rpm		
Moment of Inertia	J	$\times 10^{-4}$ kg-m <sup>2</sup>			$\times 10^{-4}$ kg-m <sup>2</sup>			$\times 10^{-4}$ kg-m <sup>2</sup>			$\times 10^{-4}$ kg-m <sup>2</sup>			$\times 10^{-4}$ kg-m <sup>2</sup>		
		$\times 10^{-5}$ kg-m-s <sup>2</sup>			$\times 10^{-5}$ kg-m-s <sup>2</sup>			$\times 10^{-5}$ kg-m-s <sup>2</sup>			$\times 10^{-5}$ kg-m-s <sup>2</sup>			$\times 10^{-5}$ kg-m-s <sup>2</sup>		
Life W/G LB-10	hr	7000			7000			7000			7000			7000		
Torsional Stiffness	T1	Nm			Nm			Nm			Nm			Nm		
(See Diagram 1 for Definition)	K1	$\times 10^4$ Nm/rad			$\times 10^4$ Nm/rad			$\times 10^4$ Nm/rad			$\times 10^4$ Nm/rad			$\times 10^4$ Nm/rad		
	T2	Nm			Nm			Nm			Nm			Nm		
	K2	$\times 10^4$ Nm/rad			$\times 10^4$ Nm/rad			$\times 10^4$ Nm/rad			$\times 10^4$ Nm/rad			$\times 10^4$ Nm/rad		
	K3	$\times 10^4$ Nm/rad			$\times 10^4$ Nm/rad			$\times 10^4$ Nm/rad			$\times 10^4$ Nm/rad			$\times 10^4$ Nm/rad		
Hysteresis Loss	$\times 10^{-4}$ rad	5.8			5.8			5.8			5.8			5.8		
Starting Torque (Max.)	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
No-Load Backdriving Torque (Max.)	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
Ratcheting Torque (Min.)	Nm	157	185	157	315	357	315	686	754	686	1300	1500	1300	2600	2880	2530
Positioning Accuracy (Max.)	$\times 10^{-4}$ rad	2.9			2.9			2.9			2.9			2.9		
	arc-min	1.0			1.0			1.0			1.0			1.0		
Lubrication	Grease	Harmonic Grease 4B No.2			Harmonic Grease 4B No.2			Harmonic Grease 4B No.2			Harmonic Grease 4B No.2			Harmonic Grease 4B No.2		
	Oil	Industrial Gear Oil #2			Industrial Gear Oil #2			Industrial Gear Oil #2			Industrial Gear Oil #2			Industrial Gear Oil #2		
		(Extreme Pressure Agent ISO VG68)			(Extreme Pressure Agent ISO VG68)			(Extreme Pressure Agent ISO VG68)			(Extreme Pressure Agent ISO VG68)			(Extreme Pressure Agent ISO VG68)		
Weight	Kg	0.13			0.24			0.51			0.92			1.9		

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\* 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.

