

Ultra Flat Component Sets

CSD Series
Ultra Flat Component Sets



ELECTROMATE
Robotic and Mechatronic Solutions

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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

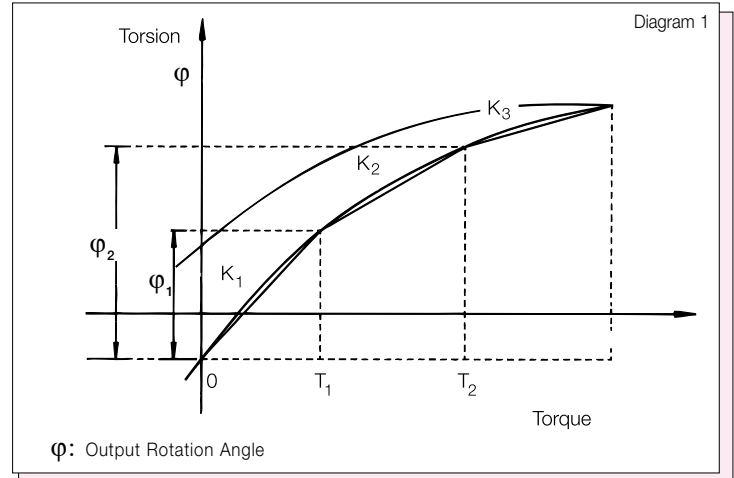
Compact

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							
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 ²		0.090		0.282		1.09		2.85		8.61											
		$\times 10^{-5}$ kg-m-s ²		0.092		0.288		1.12		2.91		8.78											
Life W/G LB-10	hr	7000			7000			7000			7000			7000									
Torsional Stiffness (See Diagram 1 for Definition)	T1	Nm			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	
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 (Extreme Pressure Agent ISO VG68)			Industrial Gear Oil #2 (Extreme Pressure Agent ISO VG68)			Industrial Gear Oil #2 (Extreme Pressure Agent ISO VG68)			Industrial Gear Oil #2 (Extreme Pressure Agent ISO VG68)			Industrial Gear Oil #2 (Extreme Pressure Agent ISO VG68)									
Weight	Kg	0.13			0.24			0.51			0.92			1.9									

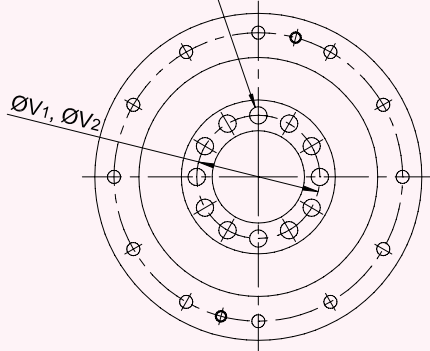
* The Momentary Peak Torque is limited by the tightening torque of the Flexspline Mounting Bolts
For notes on design and assembly please refer to the CSF catalog.



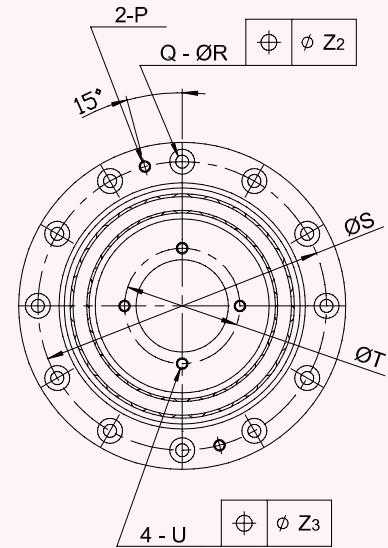
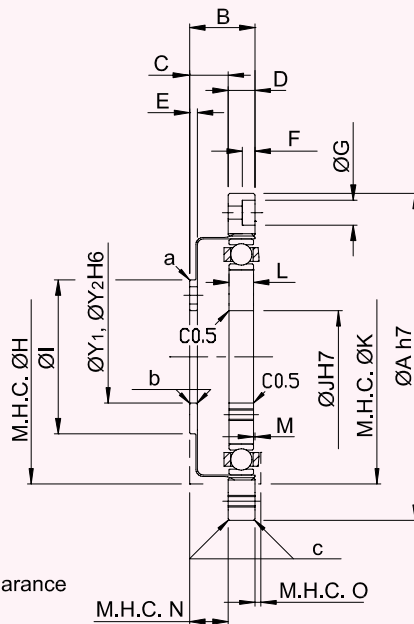
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$\oplus \phi Z_1$ W1 - ϕX_1
W2 - ϕX_2



M.H.C.: Minimum Housing Clearance



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								a	b	c
	S	T	U	V1	W1	X1	Y1	V2	W2	X2	Y2	Z1	Z2	Z3				
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	2A-GR	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*



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