Ultra Flat Component Sets

CSD Series
Ultra Flat Component Sets

HD SYSTEMS

The Leader in
Ultra Precision Motion

harmonic drive gearing

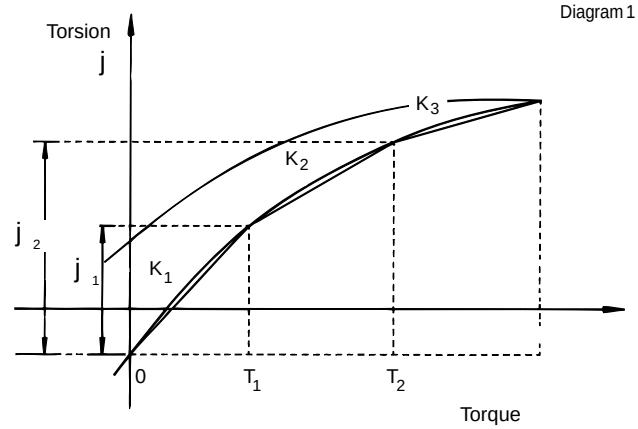
Precision Gearing & Motion Control

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 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.

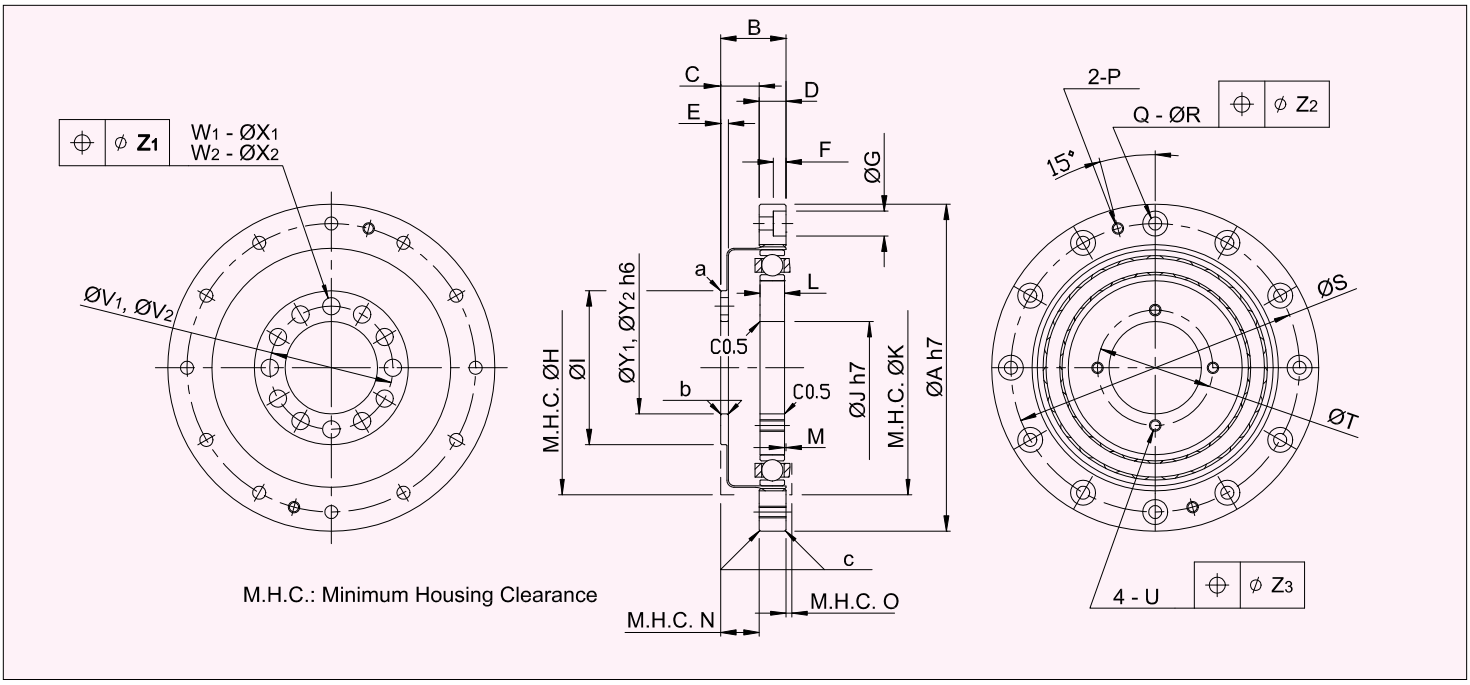
Diagram 1



j: Output Rotation Angle

Item		Unit	CSD-20			CSD-25			CSD-32			CSD-40			CSD-50		
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	6500			5600			4800			4000			3500		
	Oil	rpm	10000			7500			7000			5600			4500		
Limit for Average Input Speed	Grease	rpm	3500			3500			3500			3000			2500		
	Oil	rpm	6500			5600			4600			3600			3000		
Moment of Inertia	J	$x10^{-4}$ kg-m^2	0.090			0.282			1.09			2.85			8.61		
		$x10^{-5}$ 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	T1	Nm	7.0			14			29			54			108		
(See Diagram 1	K1	$x10^4$ Nm/rad	1.1	1.3		2.0	2.7		4.7	6.1		8.8	11		17	21	
for Definition)	T2	Nm	25			48			108			196			382		
	K2	$x10^4$ Nm/rad	1.3	1.7		2.7	3.7		6.1	7.8		11	14		21	29	
	K3	$x10^4$ Nm/rad	2.0	2.5		3.7	4.7		8.4	11		15	20		30	37	
Hysteresis Loss		$x10^{-4}$ 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.)		$x10^{-4}$ 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.



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

				Standard Flexspline				Big Bore Flexspline									
SIZE	S	T	U	V1	W1	X1	Y1	V2	W2	X2	Y2	Z1	Z2	Z3	a	b	c
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 25 32 40 50	50 100 160 50 100 160 50 100 160 50 100 160 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

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

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