

LBLN Precision Measurement

One Cyclotron Road, 77/125
 Berkeley CA, 94720
 Ph. (510) 486-7611



Measurement Plan
 ECHO Undulator



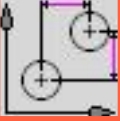



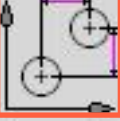

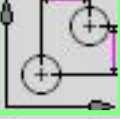
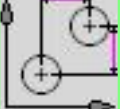
Date
 January 8, 2010

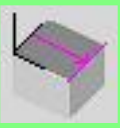
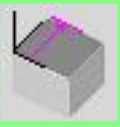
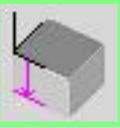
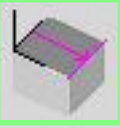
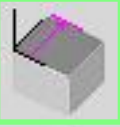
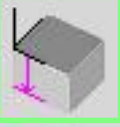
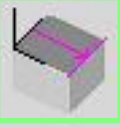

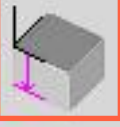
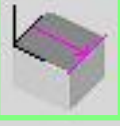

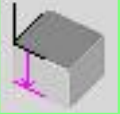
Order
 Gaps and Fiducial

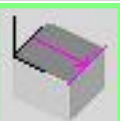

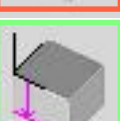
Length unit
 MM

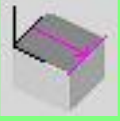
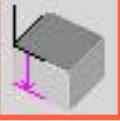
Time
 9:25:30 am

Incremental Part Number
 1

	Actual	Nominal	Upper Tol.	Lower Tol.	Deviation
 Flatness Plane Lower Keepers	0.1134	0.0000	0.0500		0.0634 0.1134
 Flatness Plane Upper Keepers	0.1347	0.0000	0.0500		0.0847 0.1347
 Distance Between Keepers	4.3536	4.5000	0.0500	-0.0500	-0.0964 -0.1464
 Parallel Upper Keepers to Lower Keepers	0.1705	0.0000	0.0500		0.1205 0.1705
 Flatness Plane Lower Magnets	0.2498	0.0000	0.0500		0.1998 0.2498
 Flatness Plane Upper Magnets	0.1856	0.0000	0.0500		0.1356 0.1856
 Distance Between Magnets	5.9345	6.0000	0.0500	-0.0500	-0.0155 -0.0655
 Parallel Upper Magnets to Lower Magnets	0.2167	0.0000	0.0500		0.1667 0.2167
 Distance Upper Keeper Point to End	77.9976	77.9988	0.1500	-0.1500	- -0.0012
 Distance Lower Keeper Point to End	77.8484	77.8487	0.1500	-0.1500	- -0.0003

	Actual	Nominal	Upper Tol.	Lower Tol.	Deviation
 X Value_Ball_1 20.4862	20.4789	0.1000	-0.1000	┆	0.0074
 Y Value_Ball_1 -32.4963	-32.6091	0.1500	-0.1500	┆---	0.1129
 Z Value_Ball_1 43.2727	43.1701	0.1500	-0.1500	┆--	0.1026
 X Value_Ball_2 20.4978	20.4942	0.1000	-0.1000	┆	0.0036
 Y Value_Ball_2 65.5602	65.4422	0.1500	-0.1500	┆---	0.1180
 Z Value_Ball_2 33.8911	33.7588	0.1500	-0.1500	┆---	0.1322
 X Value_Ball_3 20.5029	20.5131	0.1000	-0.1000	┆	-0.0102
 Y Value_Ball_3 87.3974	87.2664	0.1500	-0.1500	┆---	0.1310
 Z Value_Ball_3 0.0152	-0.1214	0.0500	-0.0500	0.0866	0.1366
 X Value_Ball_4 360.3918	360.3828	0.2000	-0.2000	┆	0.0090
 Y Value_Ball_4 -32.4708	-32.5868	0.1500	-0.1500	┆---	0.1160
 Z Value_Ball_4 43.3287	43.3362	0.1500	-0.1500	┆	-0.0075

	Actual	Nominal	Upper Tol.	Lower Tol.	Deviation
 X Value_Ball_5 360.3725	360.5032	0.2000	-0.2000	--	-0.1307
 Y Value_Ball_5 65.5965	65.4425	0.1500	-0.1500	0.0040	0.1540
 Z Value_Ball_5 33.9607	33.9191	0.1500	-0.1500	--	0.0417
 X Value_Ball_6 360.3472	360.5191	0.2000	-0.2000	---	-0.1719
 Y Value_Ball_6 87.4195	87.2667	0.1500	-0.1500	0.0027	0.1527
 Z Value_Ball_6 0.0456	0.0388	0.0500	-0.0500		0.0068
 X Value_Ball_1 Magnet 20.4920	20.4993	0.1000	-0.1000	-	-0.0073
 Y Value_Ball_1 Magnet -32.4674	-32.6213	0.1500	-0.1500	0.0039	0.1539
 Z Value_Ball_1 Magnet 43.2953	43.3015	0.1500	-0.1500	-	-0.0062
 X Value_Ball_2 Magnet 20.5014	20.5103	0.1000	-0.1000	-	-0.0089
 Y Value_Ball_2 Magnet 65.5828	65.4327	0.1500	-0.1500	0.0001	0.1501
 Z Value_Ball_2 Magnet 33.8505	33.9185	0.1500	-0.1500	--	-0.0680

	Actual	Nominal	Upper Tol.	Lower Tol.	Deviation
 X Value_Ball_3 Magnet 20.5043	20.5133	0.1000	-0.1000	-	-0.0090
 Y Value_Ball_3 Magnet 87.3984	87.2667	0.1500	-0.1500	---	0.1317
 Z Value_Ball_3 Magnet -0.0403	0.0445	0.0500	-0.0500		-0.0348 -0.0848
 X Value_Ball_4 Magnet 360.3976	360.4033	0.2000	-0.2000	-	-0.0057
 Y Value_Ball_4 Magnet -32.4430	-32.5993	0.1500	-0.1500		0.0063 0.1563
 Z Value_Ball_4 Magnet 43.3053	43.3075	0.1500	-0.1500	-	-0.0022
 X Value_Ball_5 Magnet 360.3772	360.5193	0.2000	-0.2000	--	-0.1421
 Y Value_Ball_5 Magnet 65.6185	65.4327	0.1500	-0.1500		0.0359 0.1859
 Z Value_Ball_5 Magnet 33.8732	33.9185	0.1500	-0.1500	--	-0.0453
 X Value_Ball_6 Magnet 360.3468	360.5193	0.2000	-0.2000	---	-0.1724
 Y Value_Ball_6 Magnet 87.4194	87.2667	0.1500	-0.1500		0.0027 0.1527
 Z Value_Ball_6 Magnet -0.0564	0.0445	0.0500	-0.0500		-0.0509 -0.1009