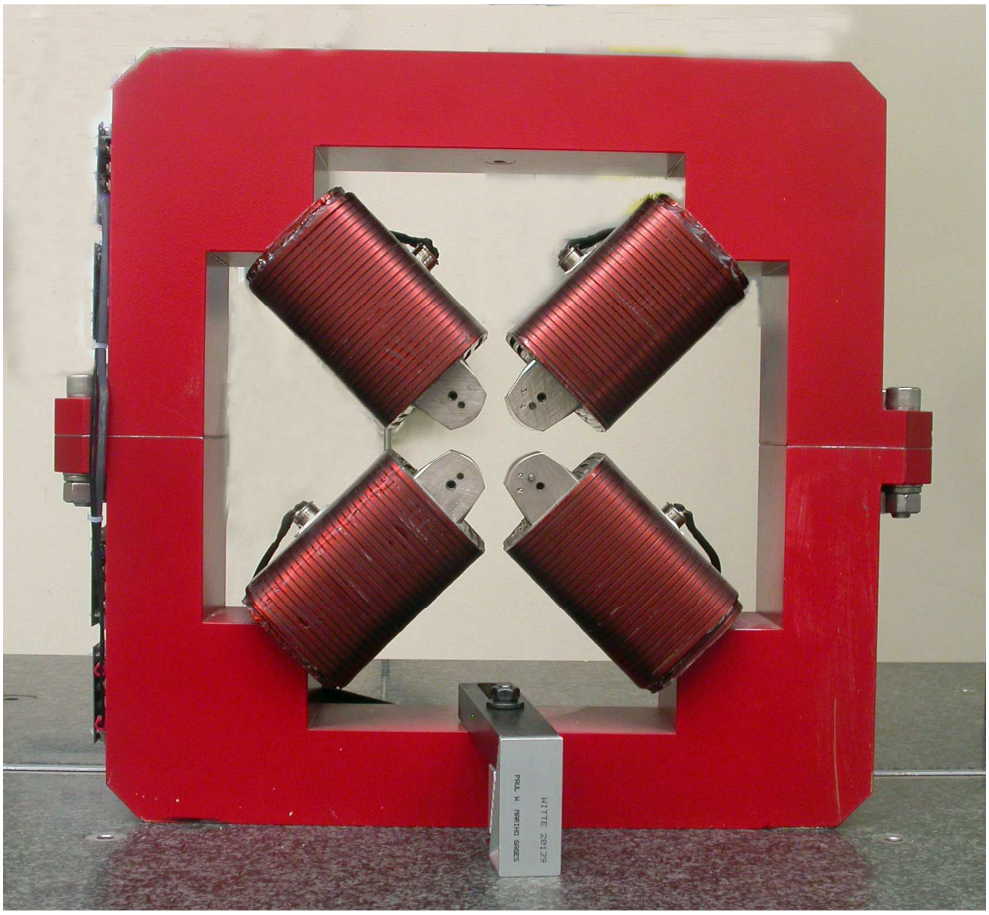
LCLS II Magnet Fiducialization Report
Injector Quadrupole 1.26Q3.5



Inspector : K. Caban

Engineer : J. Amann

Drawing No. : SA-380-309-12 R1

Barcode No.: 4032

Mfg. S/N : 032

Coordinate System Setup

Spatial Alignment

The Spatial Alignment of the magnet is created through a composite best-fit of the pole tips. Each pole tip scanned .150 inch inboard from the upstream magnet face and the downstream magnet face. A composite best-fit of the upstream poles and the downstream poles is made with the nominal pole tip shape and location. An axis is created through the two best-fit centerpoints. This axis is the spatial alignment of the magnet and defines the Z axis.

Planar Alignment

The Planar Alignment of the magnet is the created by averaging the rotations of the composite best-fits of the upstream pole tips and downstream pole tips. This direction defines the Y and X directions of the magnet.

Coordinate Origins

The origins of the magnet coordinate system are as follows. The XY origin lies on the axis of spatial alignment. The Z origin is the intersection of the mid-plane between the upstream and downstream magnet faces and the Z axis.

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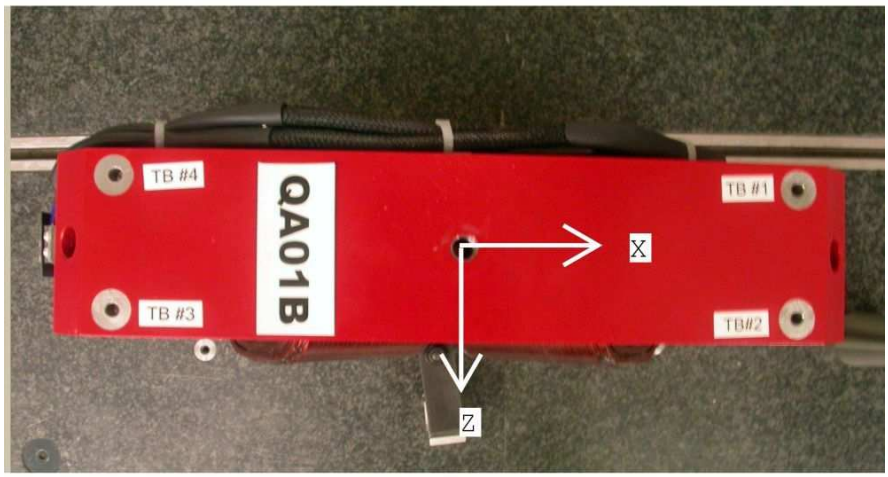
Tooling Ball Locations



Tooling Ball	X Coord.	Y Coord.	Z Coord.
TB 1	6.5028	8.8693	-1.2468
TB 2	6.5035	8.8682	1.2528
TB 3	-6.4952	8.8789	1.2537
TB 4	-6.4958	8.8798	-1.2465
TB A	6.5023	8.1821	-1.2473
TB B	6.5031	8.1810	1.2525
TB C	-6.4966	8.1910	1.2526
TB D	-6.4968	8.1928	-1.2464

Tooling Ball Locations (1-4) are 1 inch above unpainted surface pads
Tooling Ball Locations (A-D) are 5/16 inch above unpainted surface pads

Dimensions in Inch

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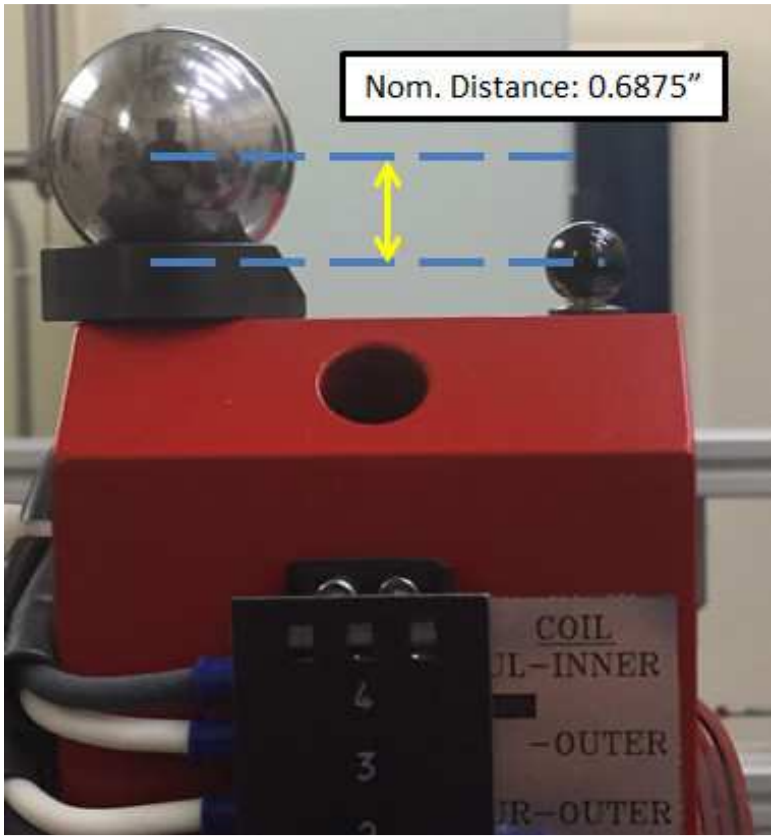
1" Tooling Ball to 5/16" Tooling Ball Difference



Tooling Ball	Nom Dist.	Actual Dist.
TB 1	0.6875 ± 0.001	0.68714
TB 2	0.6875 ± 0.001	0.68723
TB 3	0.6875 ± 0.001	0.68788
TB 4	0.6875 ± 0.001	0.68704

Dimensions in Inch

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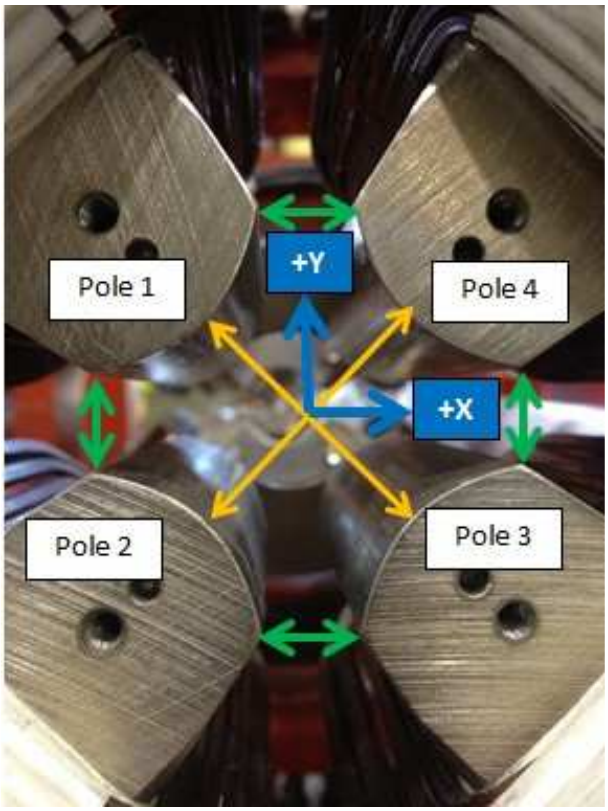
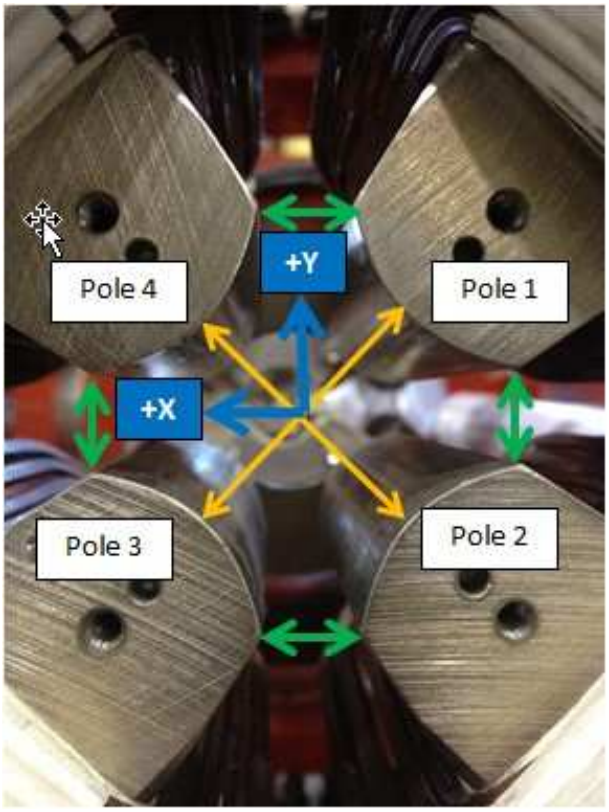
Pole Tip Gap Measurements

Pole Tips View from Downstream



Pole Tips View from Upstream



	Nominal Distance	Downstream Pole Ends	Upstream Pole Ends
Pole Tip Distance 1-3	1.260	1.26034	1.26143
Pole Tip Distance 2-4	1.260	1.26222	1.26098
Gap 1-2	.422	0.42416	0.42236
Gap 2-3	.422	0.42137	0.42236
Gap 3-4	.422	0.4182	0.4175
Gap 4-1	.422	0.42115	0.42158

Dimensions in Inch

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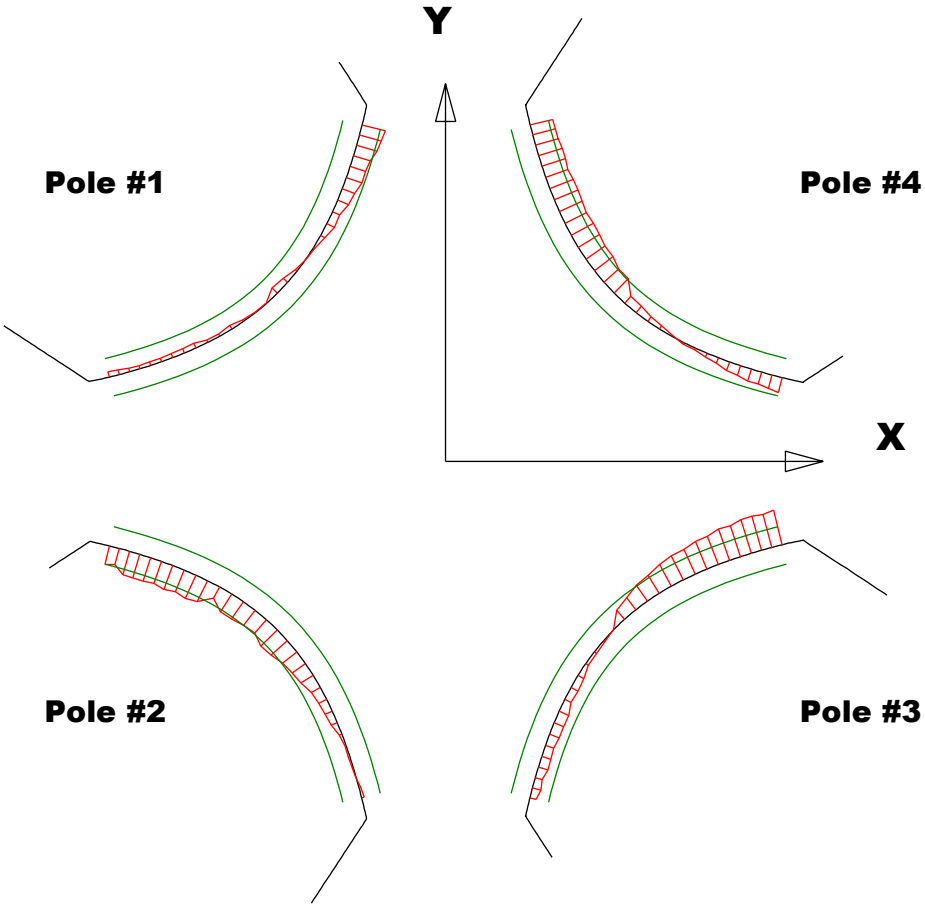
Composite Best-fit of Pole Tips, Downstream



Black = Nominal Pole Tip
Red = Pole Tip Deviations
Green = +/- .001 Tolerance

Dimensions in Inch

Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.0004	-0.00136	-0.00056	-0.00136
Max. Dev.	0.00127	0.00015	0.00189	0.00082

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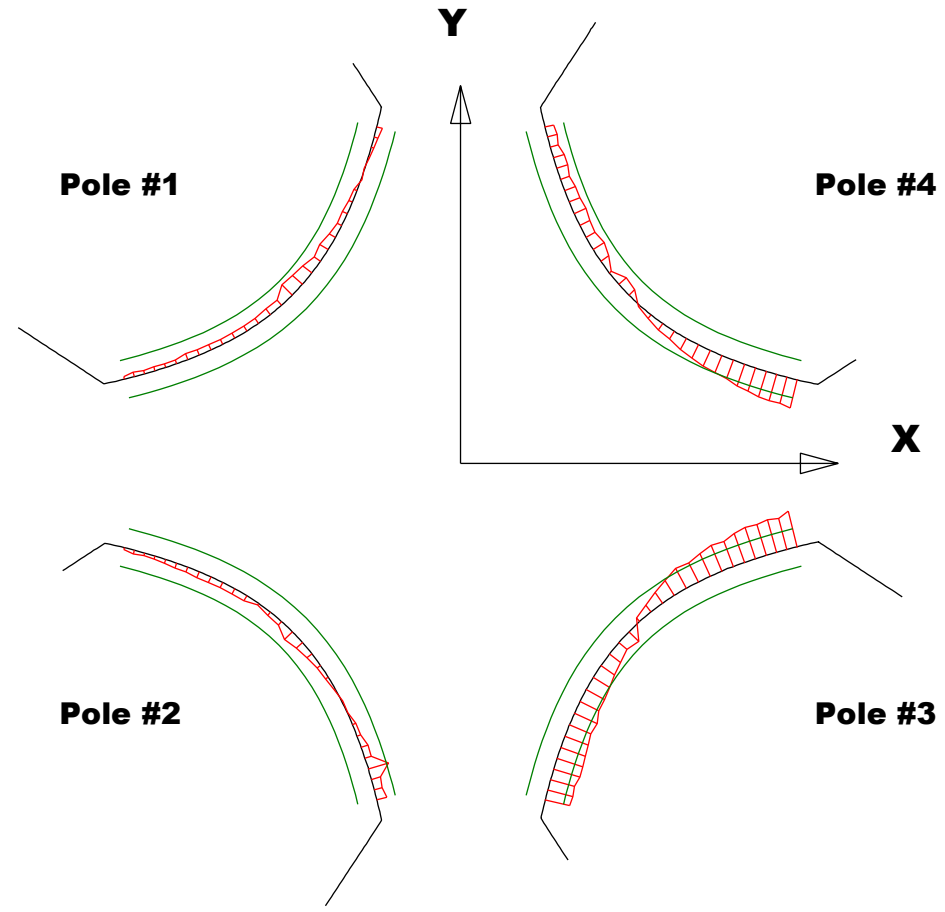
Composite Best-fit of Pole Tips, Upstream



Black = Nominal Pole Tip
Red = Pole Tip Deviations
Green = +/- .001 Tolerance

Dimensions in Inch

Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.00078	-0.00058	-0.00146	-0.00069
Max. Dev.	0.00031	0.00112	0.00196	0.00153

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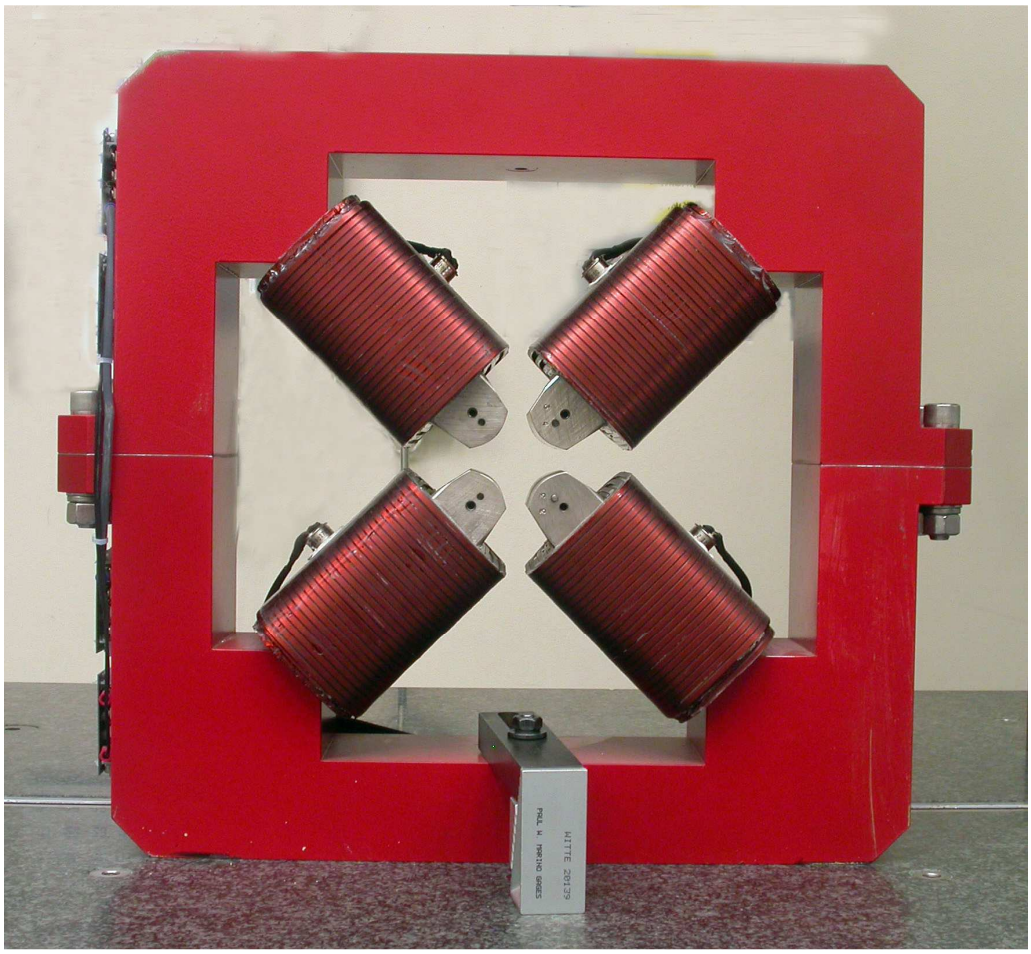
Angle of the Composite Pole Tip Best-Fit In Relation to Tooling Ball Plane



Angle in Decimal Degrees ° = 0.04468

Angle in Milliradians = 0.77980

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