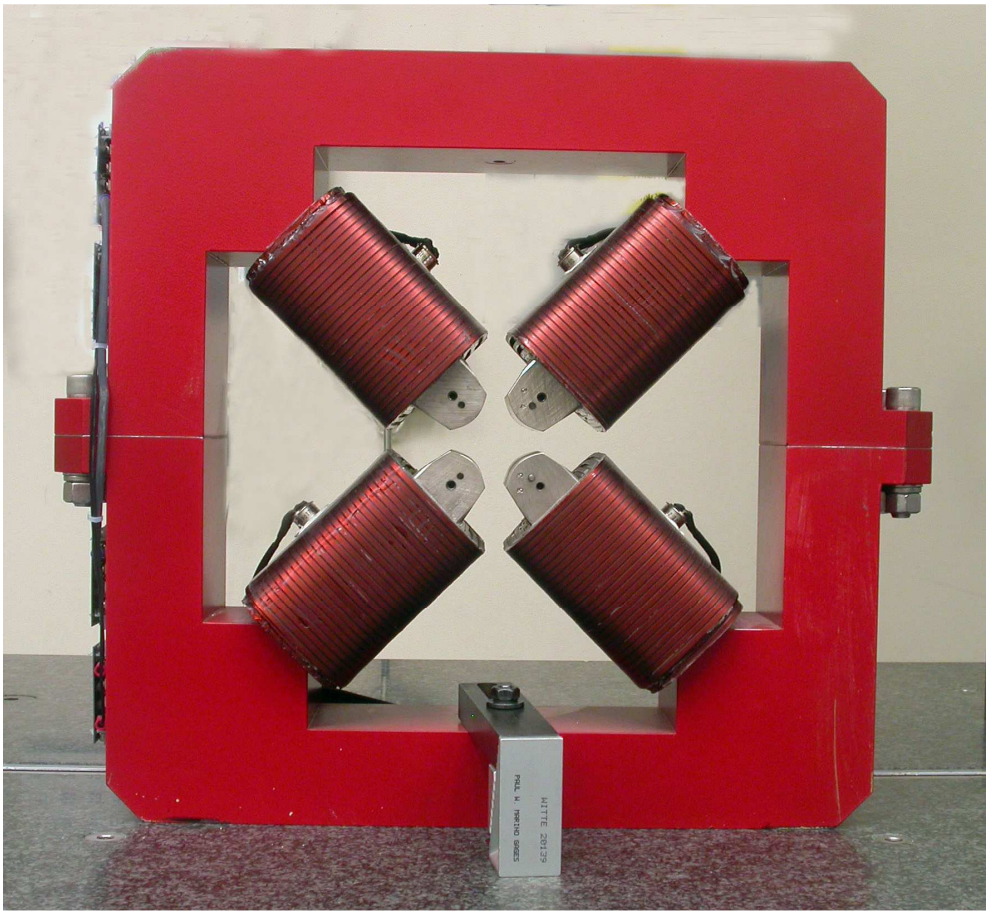
LCLS II Magnet Fiducialization Report
Injector Quadrupole 1.26Q3.5



Inspector : K. Caban

Engineer : J. Amann

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

Barcode No.: 4013

Mfg. S/N : 014

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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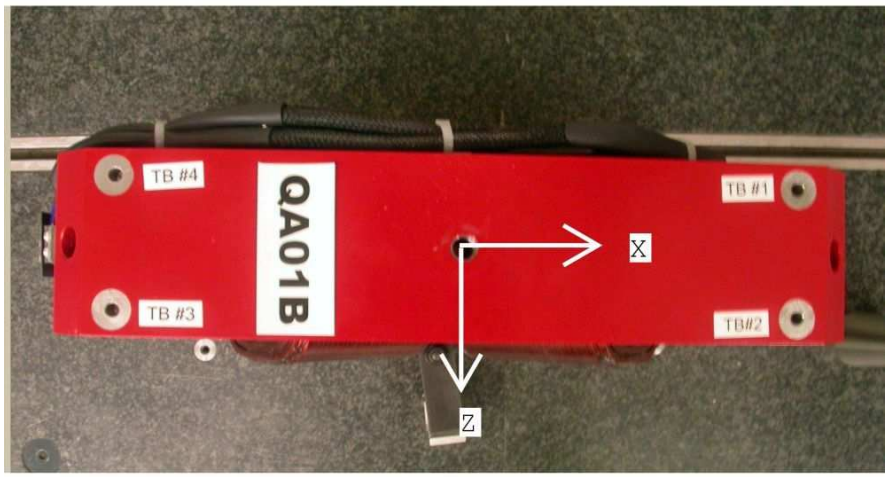
Tooling Ball Locations



Tooling Ball	X Coord.	Y Coord.	Z Coord.
TB 1	6.48718	8.88020	-1.25200
TB 2	6.48733	8.88073	1.24724
TB 3	-6.51044	8.86783	1.24657
TB 4	-6.51180	8.86771	-1.25312
TB A	6.48819	8.19409	-1.25218
TB B	6.48836	8.19356	1.24731
TB C	-6.50972	8.18104	1.24605
TB D	-6.51052	8.18049	-1.25369

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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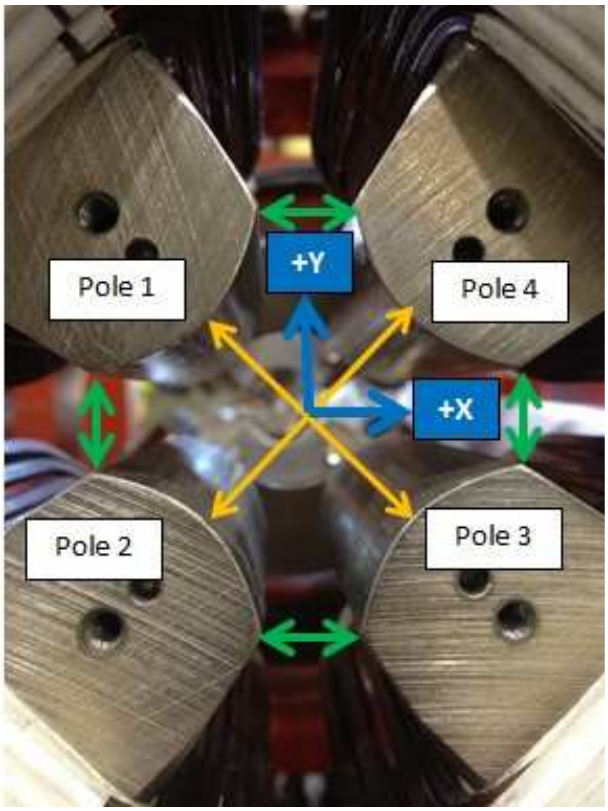
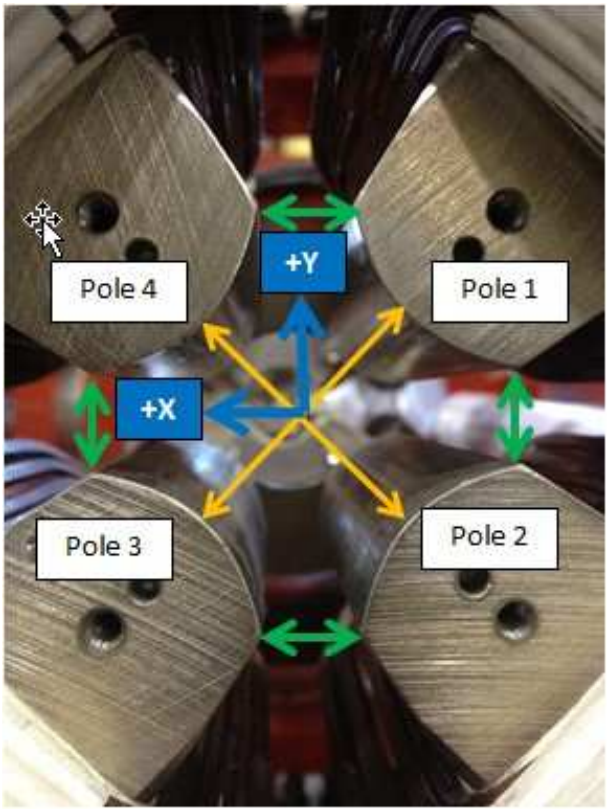
Pole Tip Gap Measurements

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	1.25998	1.2603
Pole Tip Distance 2-4	1.260	1.26007	1.25975
Gap 1-2	.422	0.42213	0.42645
Gap 2-3	.422	0.4276	0.42853
Gap 3-4	.422	0.42007	0.4188
Gap 4-1	.422	0.42124	0.41773

Dimensions in Inch

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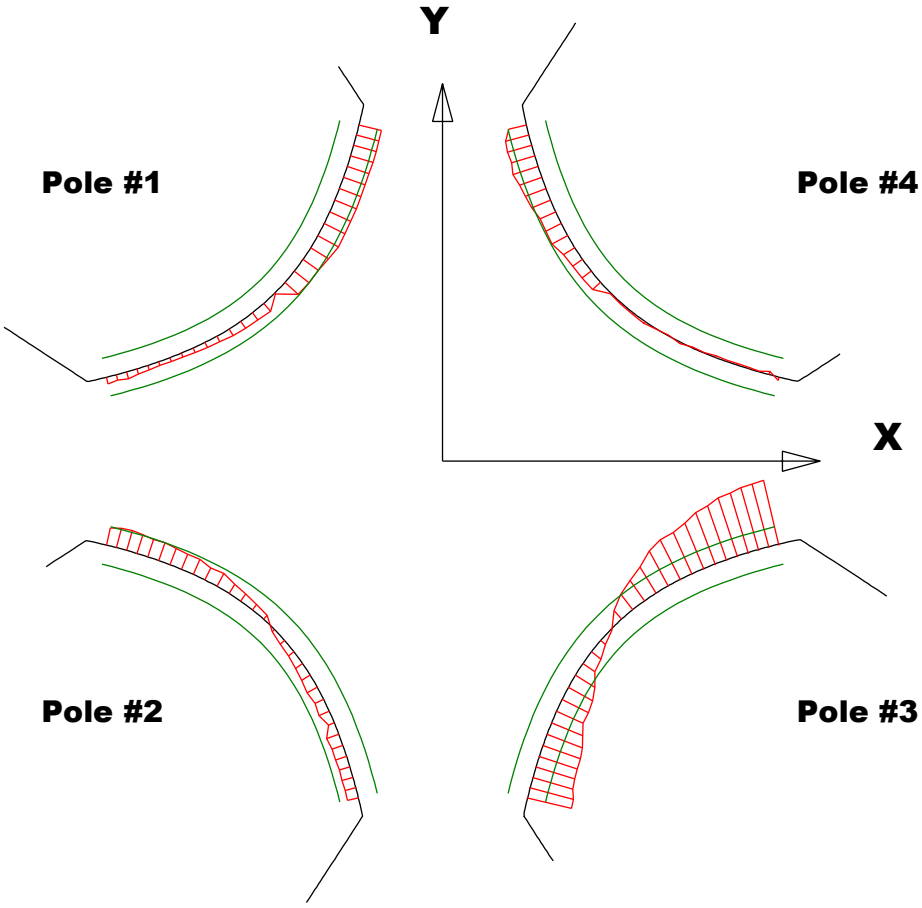
Composite Best-fit of Pole Tips, Downstream



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.	0.00007	-0.00069	-0.00239	-0.00017
Max. Dev.	0.00126	0.0011	0.00348	0.00141

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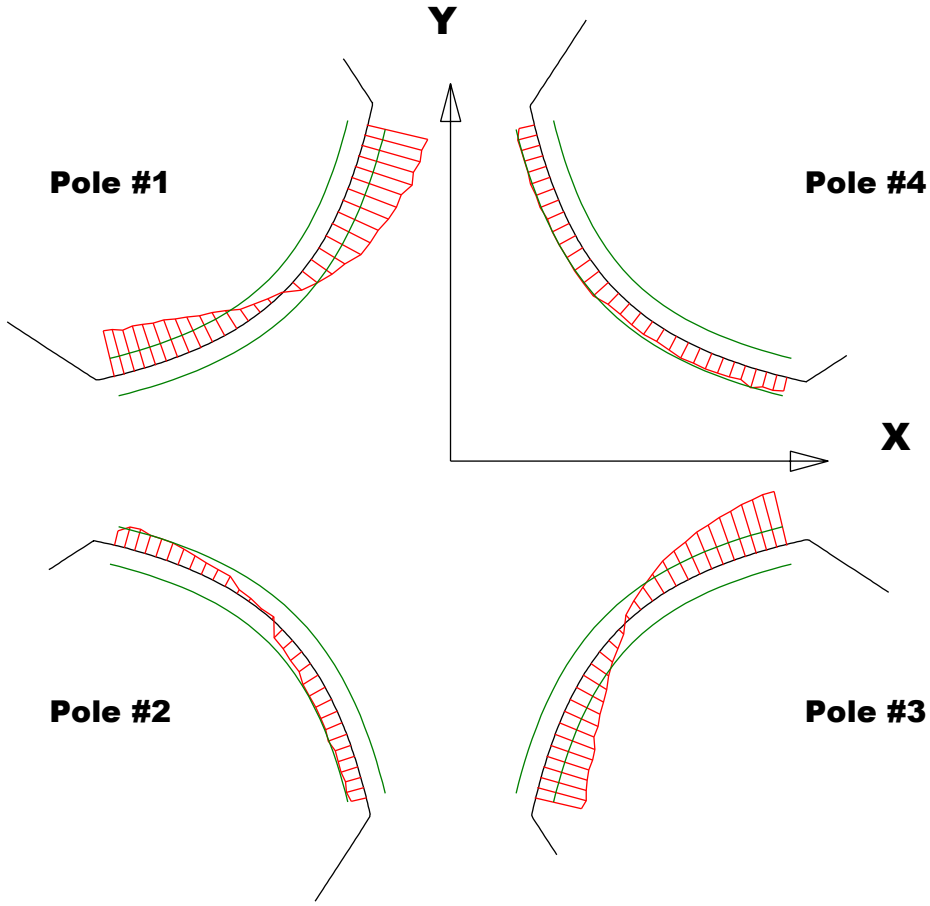
Composite Best-fit of Pole Tips, Upstream



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.	-0.00249	-0.00104	-0.00264	0.00075
Max. Dev.	0.00329	0.00117	0.0029	0.00109

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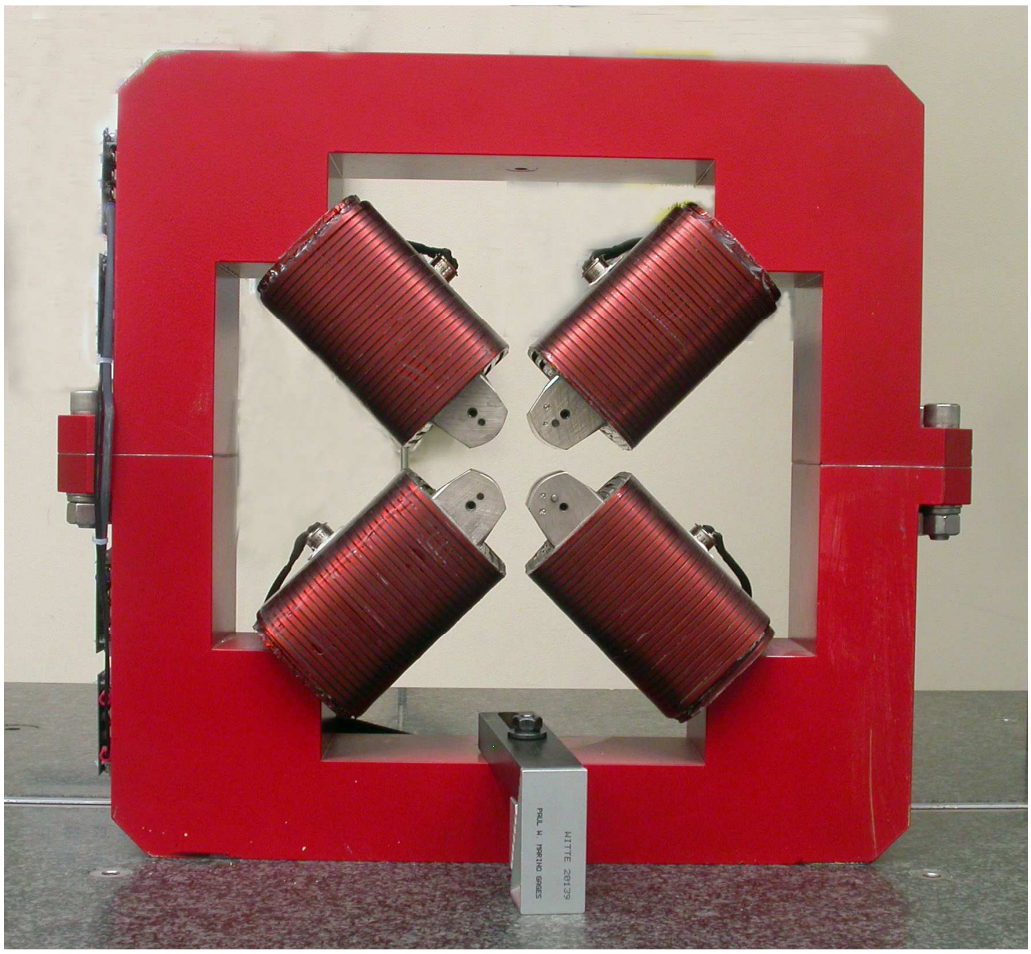
Angle of the Composite Pole Tip Best-Fit In Relation to Tooling Ball Plane



Angle in Decimal Degrees ° = -0.05632

Angle in Milliradians = -0.98289

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