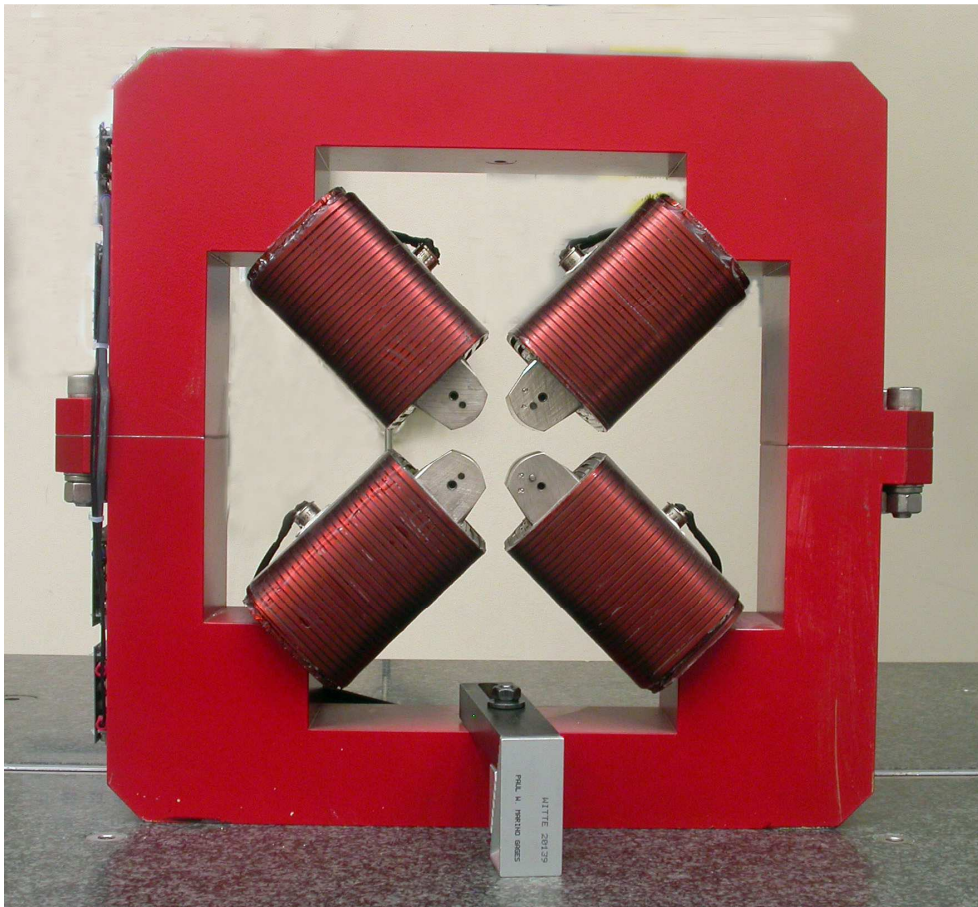


LCLS II Magnet Fiducialization Report

Injector Quadrupole 1.26Q3.5



Inspector : K. Caban

Engineer : J. Amann

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

Barcode No.: 4014

Mfg. S/N : 015

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 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	6.49101	8.87763	-1.25208
TB 2	6.49053	8.87797	1.24698
TB 3	-6.50751	8.86893	1.24483
TB 4	-6.50714	8.86931	-1.25438
TB A	6.49085	8.19088	-1.25256
TB B	6.49101	8.19079	1.24659
TB C	-6.50796	8.18222	1.24520
TB D	-6.50713	8.18185	-1.25459

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

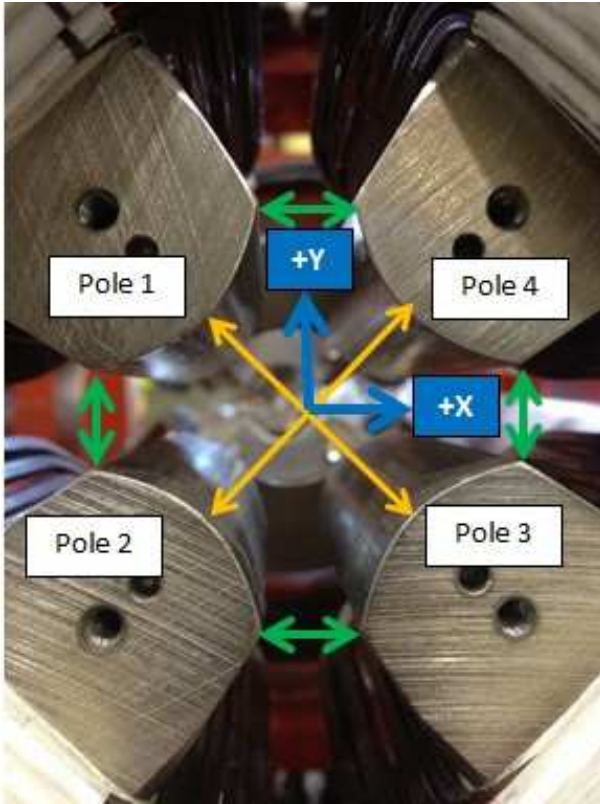
Dimensions in Inch

Barcode # : 4014

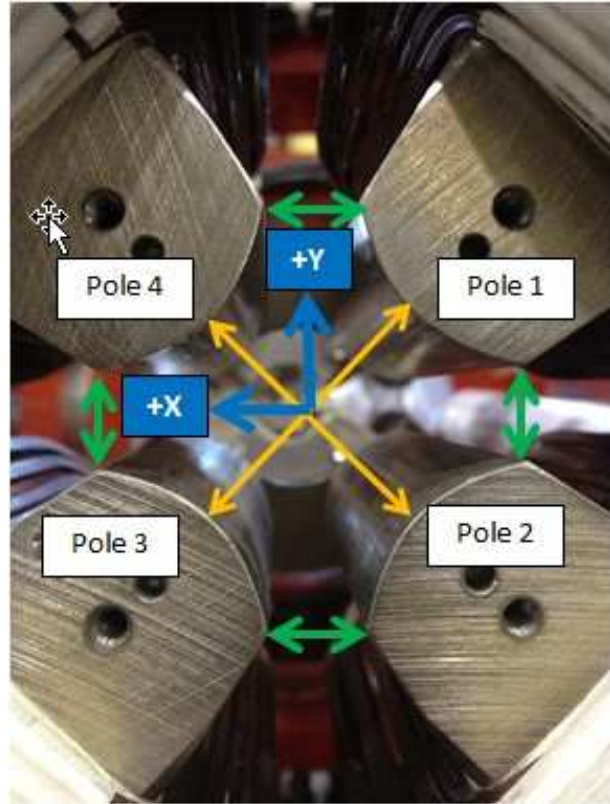
Mfg. S/N : 015

Pole Tip Gap Measurements

Pole Tips View from Downstream



Pole Tips View from Upstream



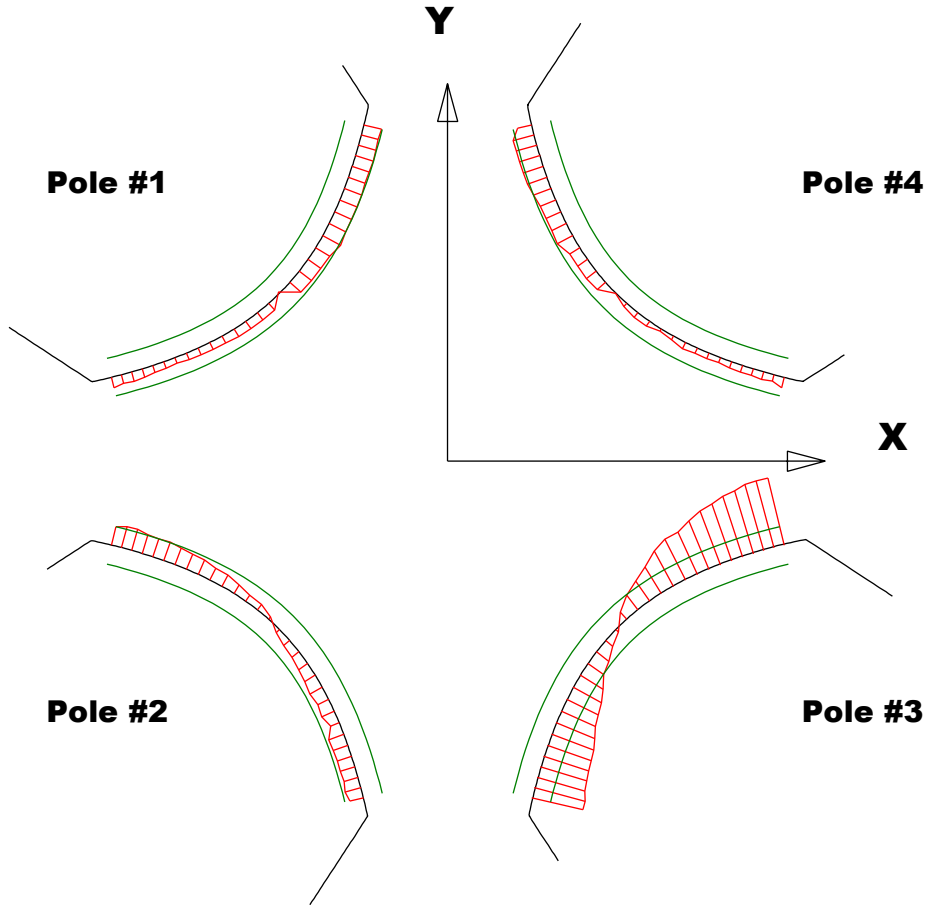
	Nominal Distance	Downstream Pole Ends	Upstream Pole Ends
Pole Tip Distance 1-3	1.260	1.26024	1.26029
Pole Tip Distance 2-4	1.260	1.26015	1.25983
Gap 1-2	.422	0.4214	0.42415
Gap 2-3	.422	0.42832	0.43027
Gap 3-4	.422	0.41919	0.41892
Gap 4-1	.422	0.42226	0.41815

Dimensions in Inch

Barcode # : 4014

Mfg. S/N : 015

Composite Best-fit of Pole Tips, Downstream



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

Dimensions in Inch

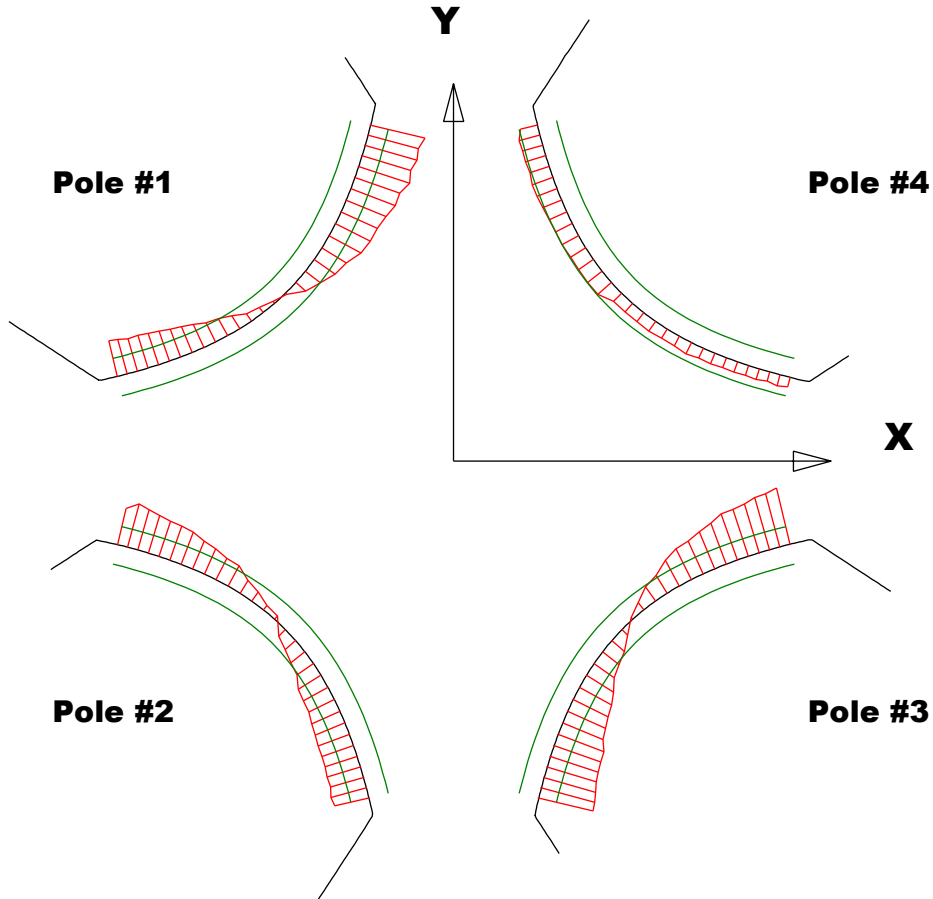
Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.00006	-0.00086	-0.00274	0.00002
Max. Dev.	0.00107	0.00117	0.00362	0.00114

Barcode # : 4014

Mfg. S/N : 015

Composite Best-fit of Pole Tips, Upstream



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

Dimensions in Inch

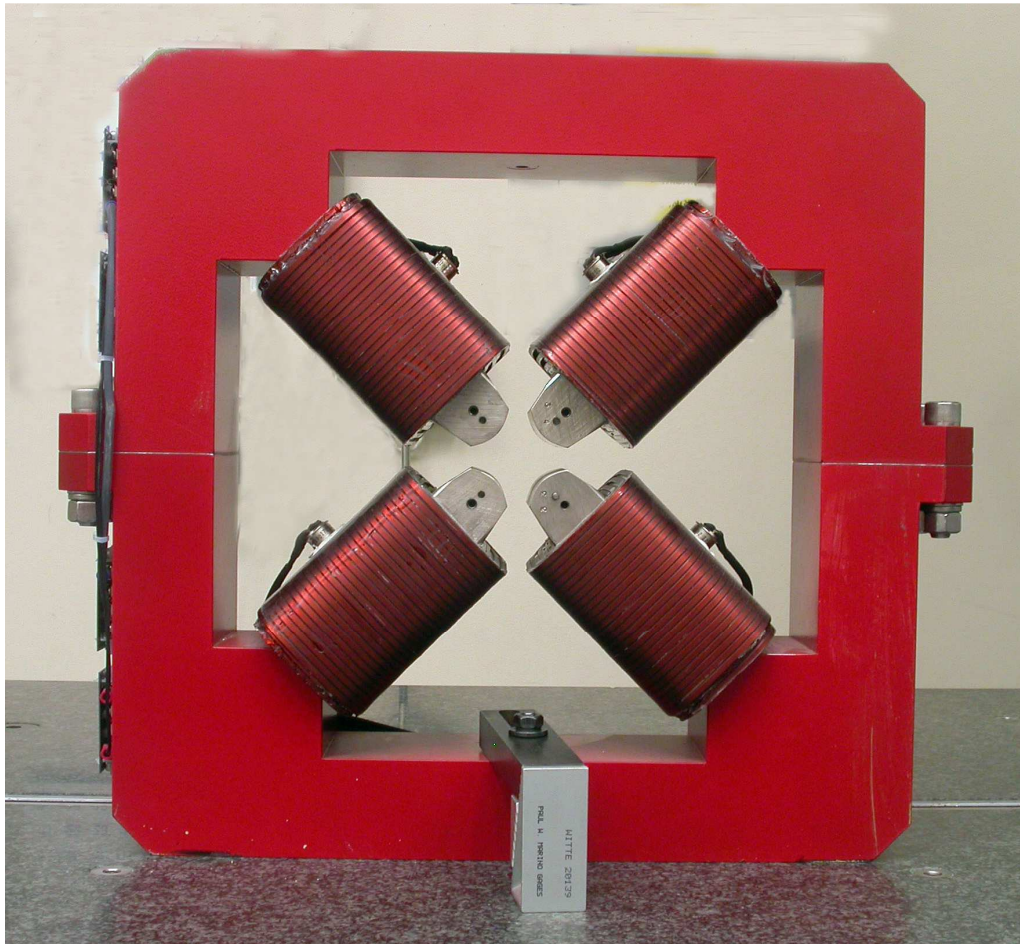
Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.00195	-0.00196	-0.00296	0.0005
Max. Dev.	0.00298	0.00236	0.00307	0.00117

Barcode # : 4014

Mfg. S/N : 015

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



Angle in Decimal Degrees $^{\circ}$ = -0.04073

Angle in Milliradians = -0.71081

Barcode # : 4014

Mfg. S/N : 015