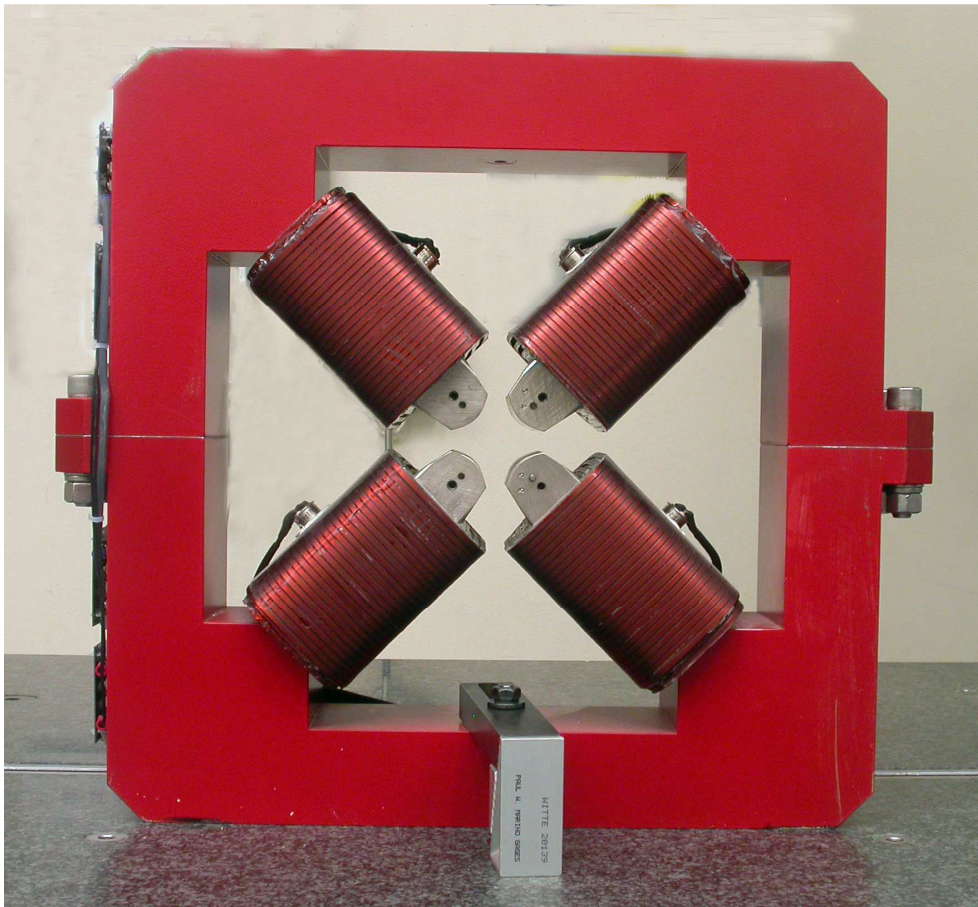


LCLS II Magnet Fiducialization Report

Injector Quadrupole 1.26Q3.5



Inspector : K. Caban

Engineer : J. Amann

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

Barcode No.: 4006

Mfg. S/N : 002

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.

Barcode # : 4006

Mfg. S/N : 002

Tooling Ball Locations



Tooling Ball	X Coord.	Y Coord.	Z Coord.
TB 1	6.50321	8.87045	-1.24722
TB 2	6.50377	8.87032	1.25283
TB 3	-6.49449	8.87727	1.25153
TB 4	-6.49524	8.87738	-1.24856
TB A	6.50337	8.18453	-1.24834
TB B	6.50369	8.18309	1.25194
TB C	-6.49559	8.19085	1.25209
TB D	-6.49616	8.19099	-1.24803

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

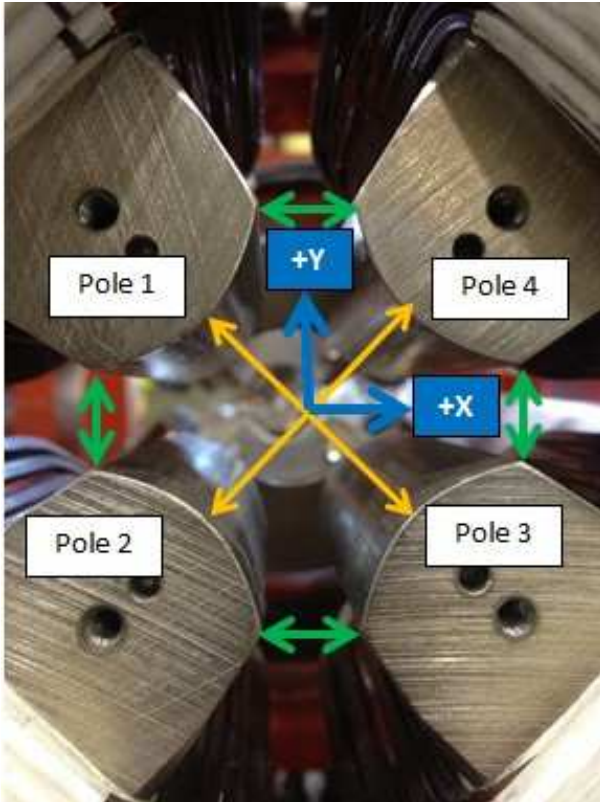
Dimensions in Inch

Barcode # : 4006

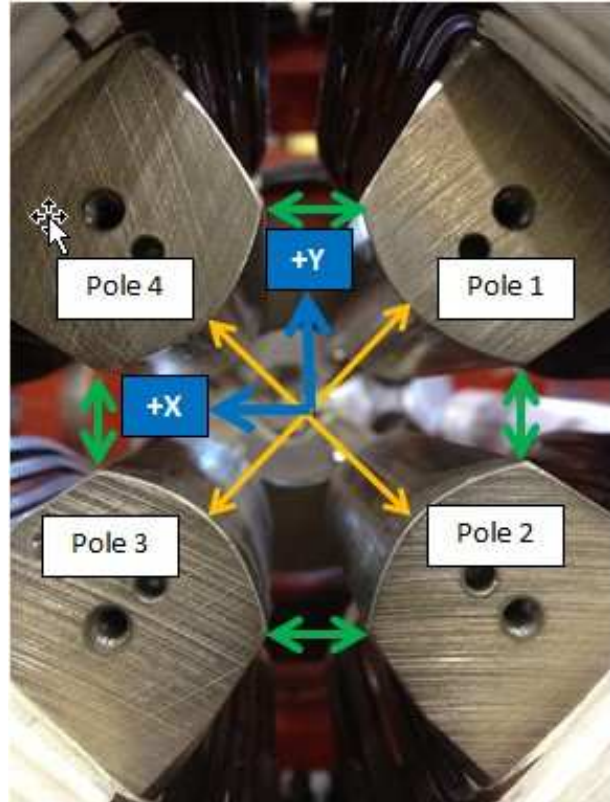
Mfg. S/N : 002

Pole Tip Gap Measurements

Pole Tips View from Downstream



Pole Tips View from Upstream



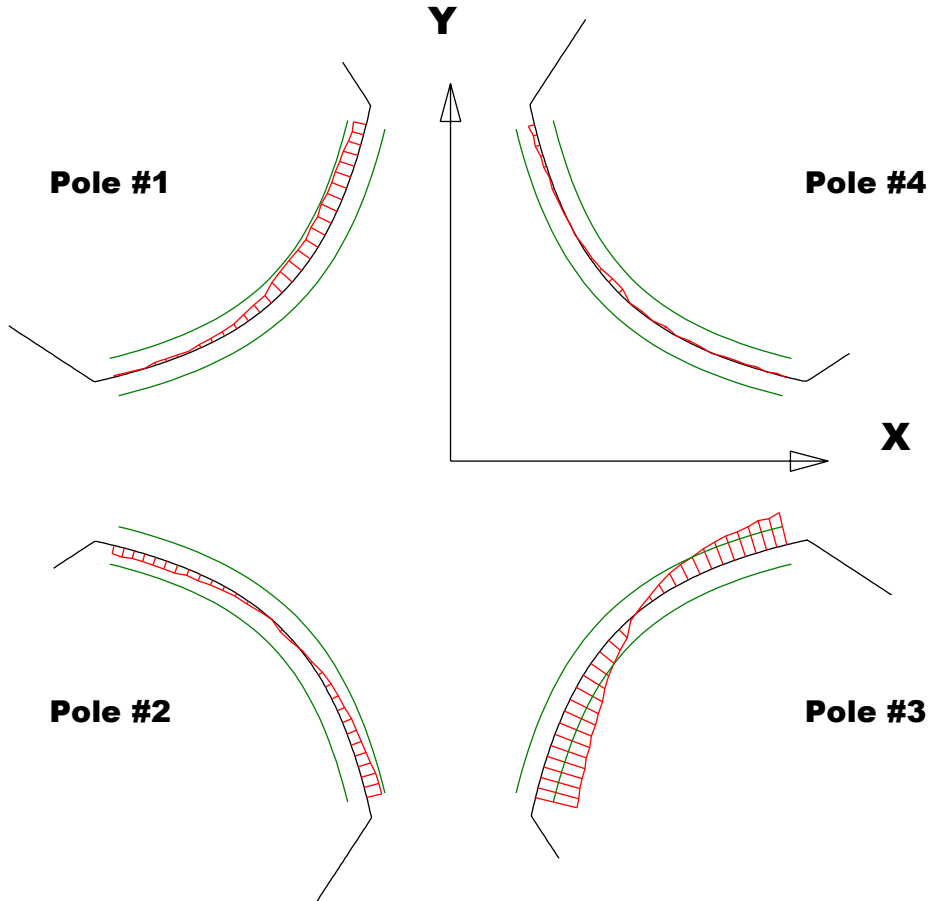
	Nominal Distance	Downstream Pole Ends	Upstream Pole Ends
Pole Tip Distance 1-3	1.260	1.26138	1.26142
Pole Tip Distance 2-4	1.260	1.26041	1.26054
Gap 1-2	.422	0.42293	0.42165
Gap 2-3	.422	0.42381	0.42481
Gap 3-4	.422	0.42062	0.42028
Gap 4-1	.422	0.4226	0.42315

Dimensions in Inch

Barcode # : 4006

Mfg. S/N : 002

Composite Best-fit of Pole Tips, Downstream



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

Dimensions in Inch

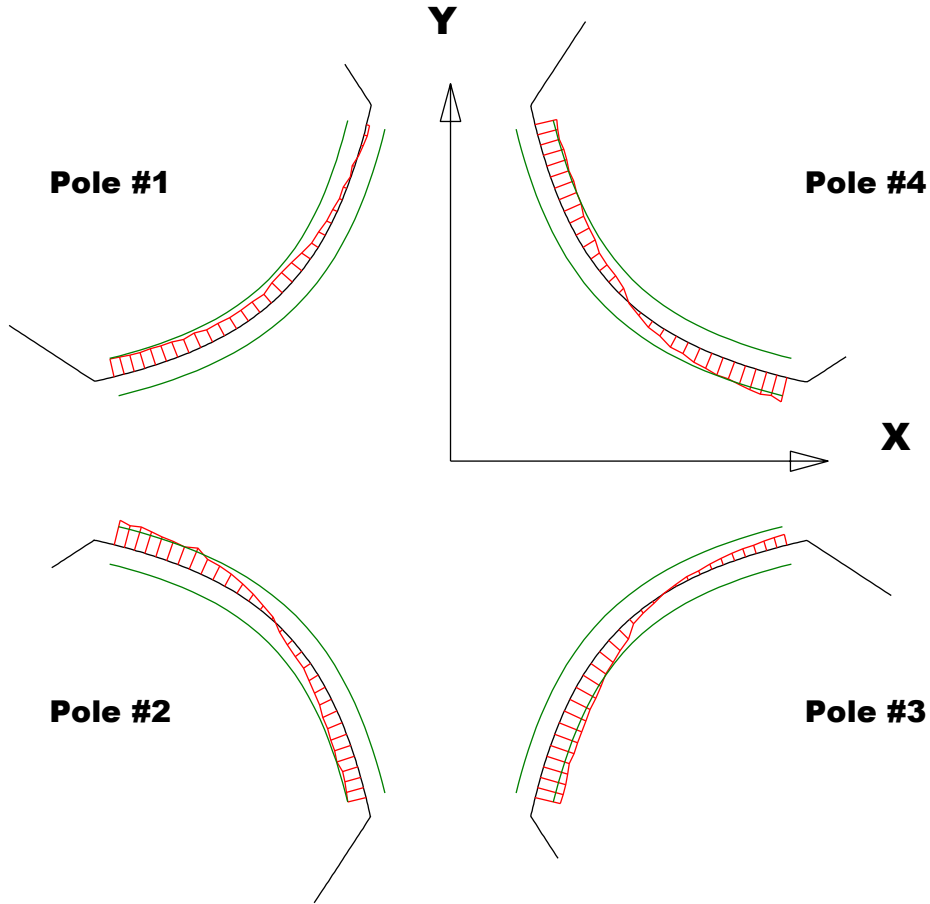
Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.00092	-0.00049	-0.00227	-0.00029
Max. Dev.	-0.00003	0.00081	0.00176	0.00033

Barcode # : 4006

Mfg. S/N : 002

Composite Best-fit of Pole Tips, Upstream



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

Dimensions in Inch

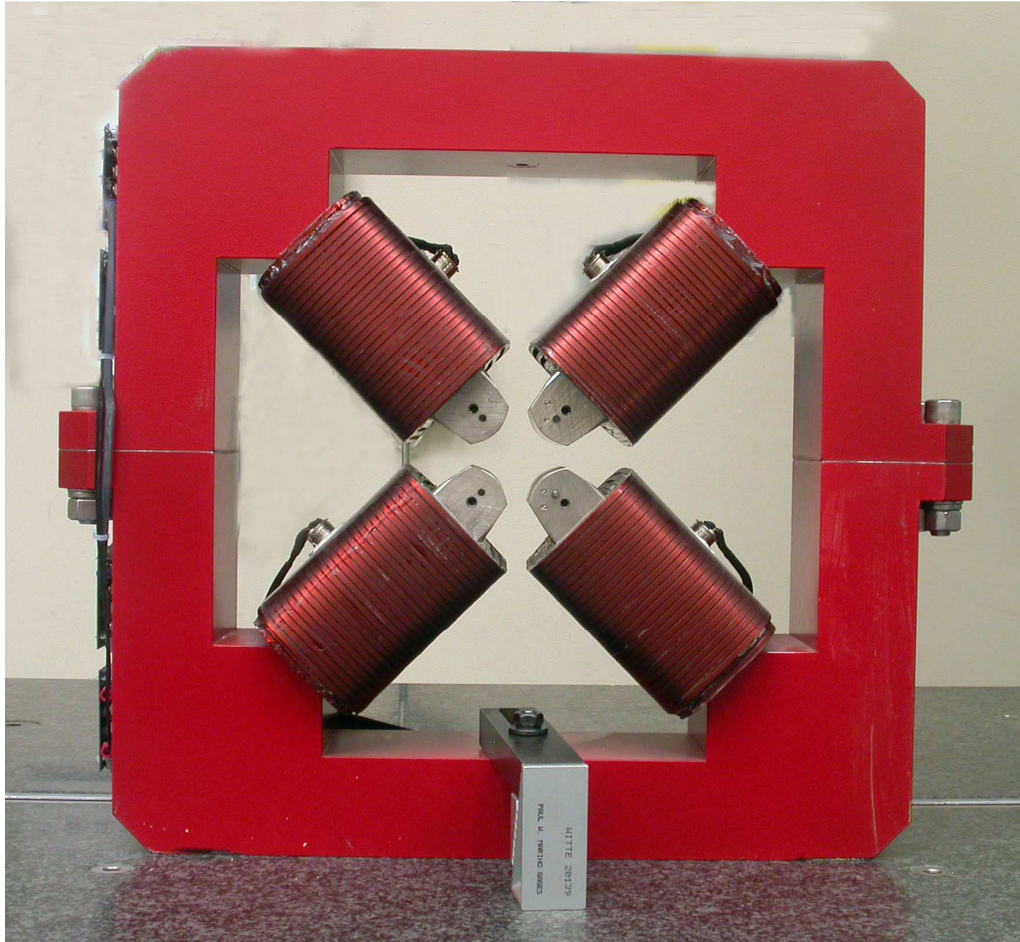
Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.00097	-0.001	-0.0014	-0.00118
Max. Dev.	0.00018	0.00135	0.00059	0.00133

Barcode # : 4006

Mfg. S/N : 002

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



Angle in Decimal Degrees $^{\circ}$ = 0.03086

Angle in Milliradians = 0.53866

Barcode # : 4006

Mfg. S/N : 002