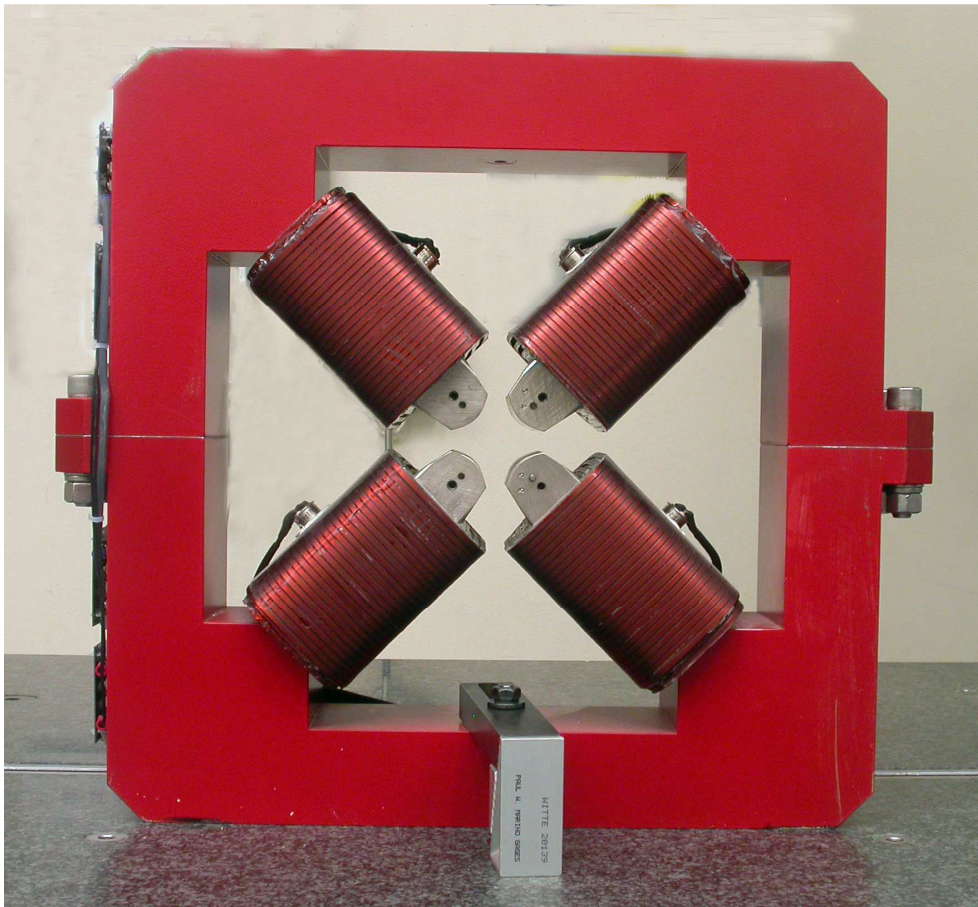


LCLS II Magnet Fiducialization Report

Injector Quadrupole 1.26Q3.5



Inspector : K. Caban

Engineer : J. Amann

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

Barcode No.: 4012

Mfg. S/N : 013

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.

Barcode # : 4012

Mfg. S/N : 013

Tooling Ball Locations



Tooling Ball	X Coord.	Y Coord.	Z Coord.
TB 1	6.49957	8.87554	-1.25151
TB 2	6.50128	8.87553	1.24982
TB 3	-6.49908	8.87636	1.24925
TB 4	-6.49907	8.87695	-1.25299
TB A	6.49964	8.18837	-1.25207
TB B	6.50104	8.18813	1.24893
TB C	-6.49899	8.18913	1.24821
TB D	-6.49963	8.18878	-1.25115

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

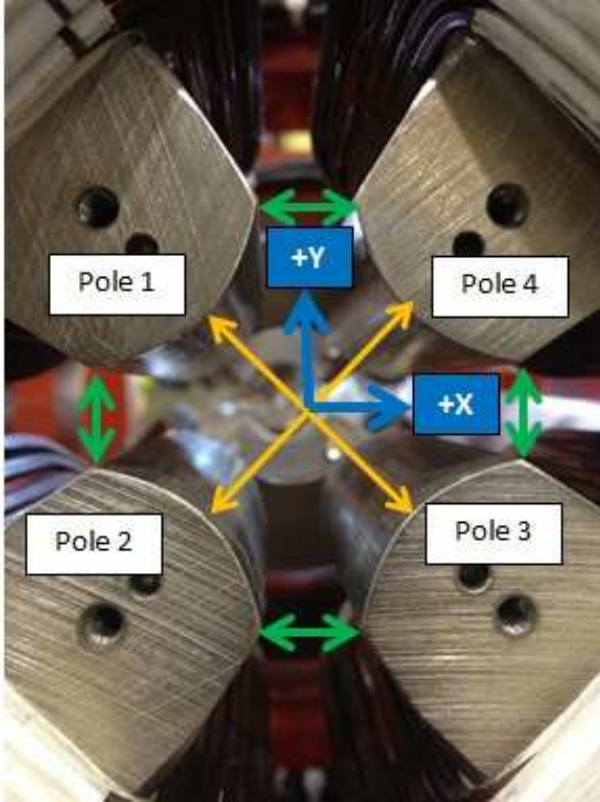
Dimensions in Inch

Barcode # : 4012

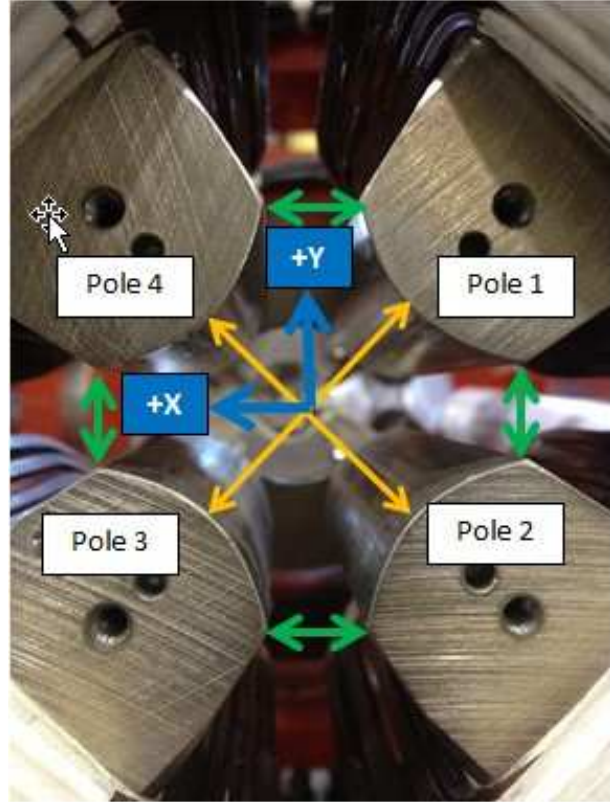
Mfg. S/N : 013

Pole Tip Gap Measurements

Pole Tips View from Downstream



Pole Tips View from Upstream



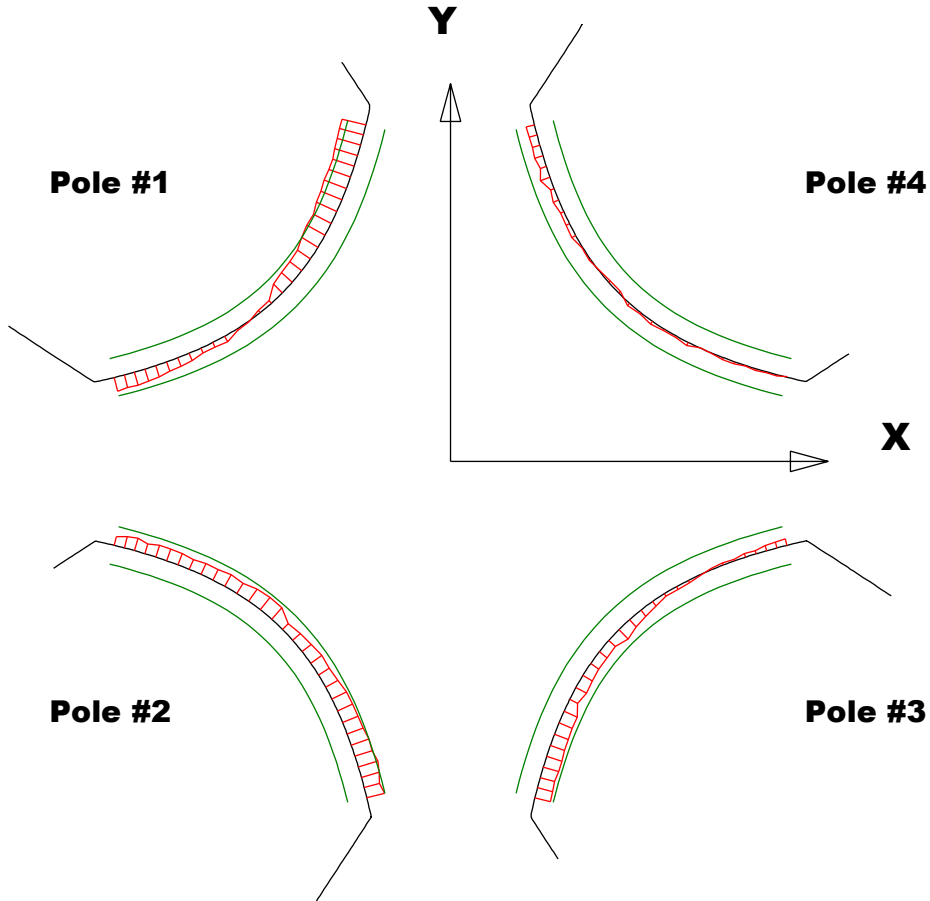
	Nominal Distance	Downstream Pole Ends	Upstream Pole Ends
Pole Tip Distance 1-3	1.260	1.26135	1.26326
Pole Tip Distance 2-4	1.260	1.25961	1.25967
Gap 1-2	.422	0.42215	0.42191
Gap 2-3	.422	0.42298	0.42454
Gap 3-4	.422	0.42224	0.42358
Gap 4-1	.422	0.42504	0.4246

Dimensions in Inch

Barcode # : 4012

Mfg. S/N : 013

Composite Best-fit of Pole Tips, Downstream



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

Dimensions in Inch

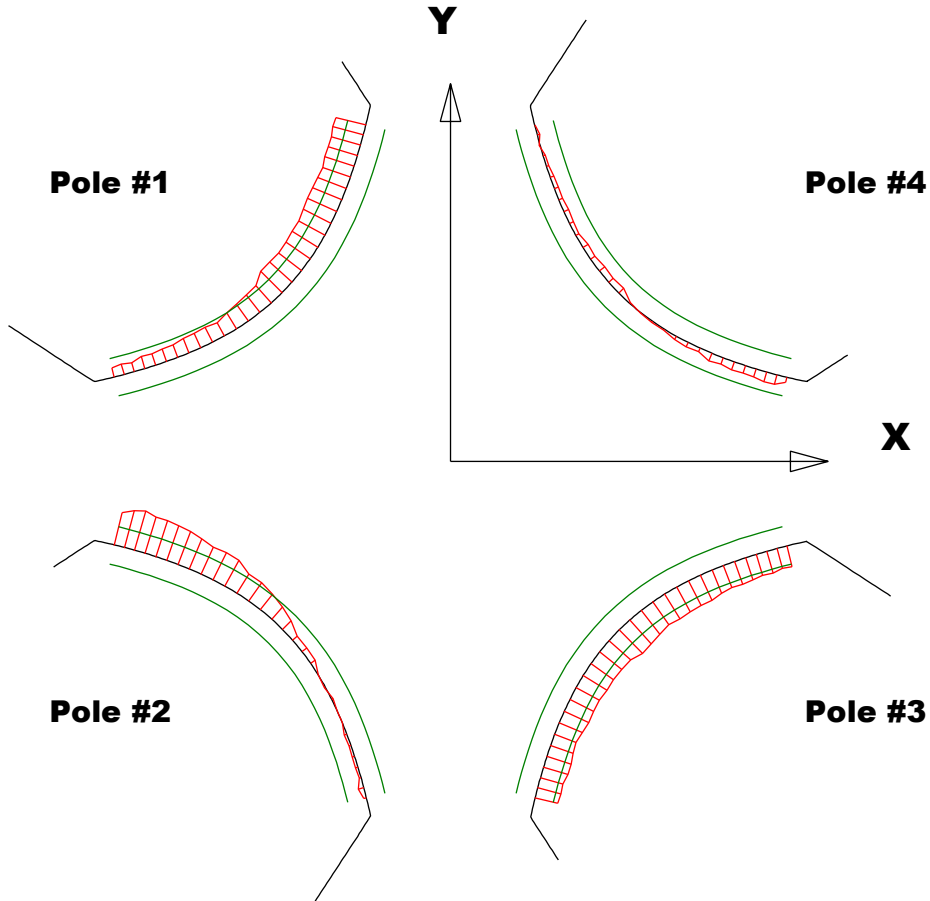
Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.00131	0.00042	-0.00085	-0.00014
Max. Dev.	0.00076	0.00108	0.00034	0.00055

Barcode # : 4012

Mfg. S/N : 013

Composite Best-fit of Pole Tips, Upstream



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

Dimensions in Inch

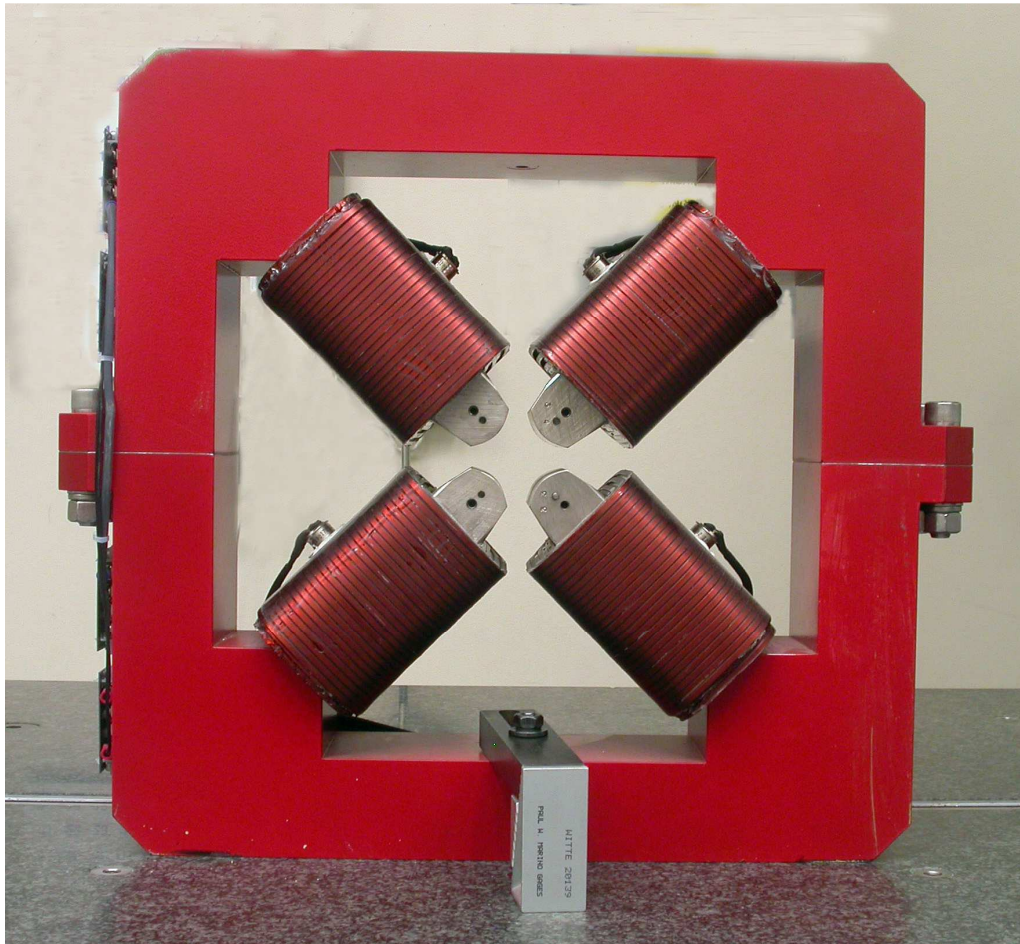
Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.0017	-0.0003	-0.00175	-0.00036
Max. Dev.	-0.00049	0.00216	-0.0011	0.00054

Barcode # : 4012

Mfg. S/N : 013

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



Angle in Decimal Degrees $^{\circ}$ = 0.00294

Angle in Milliradians = 0.05125

Barcode # : 4012

Mfg. S/N : 013