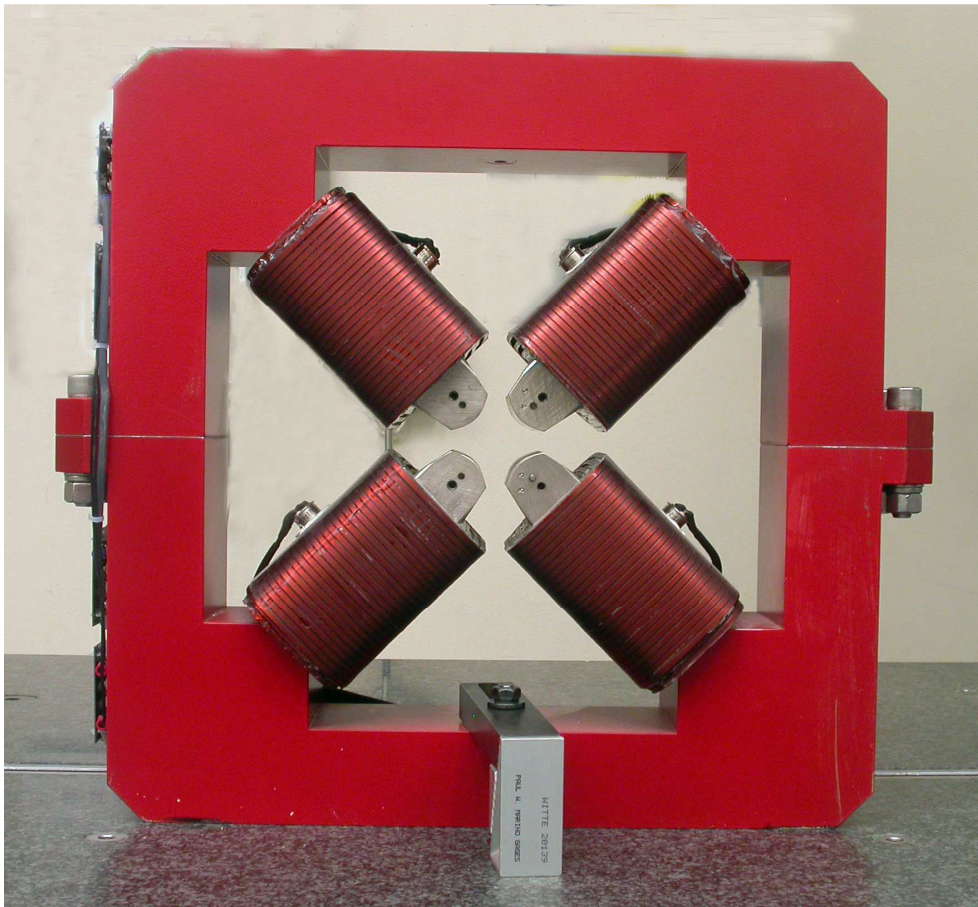


LCLS II Magnet Fiducialization Report

Injector Quadrupole 1.26Q3.5



Inspector : K. Caban

Engineer : J. Amann

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

Barcode No.: 4007

Mfg. S/N : 003

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	6.49560	8.87721	-1.25079
TB 2	6.49499	8.87713	1.24888
TB 3	-6.50521	8.87633	1.24907
TB 4	-6.50545	8.87656	-1.25189
TB A	6.49528	8.19136	-1.24991
TB B	6.49538	8.18984	1.24917
TB C	-6.50419	8.18955	1.24929
TB D	-6.50495	8.19007	-1.25230

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

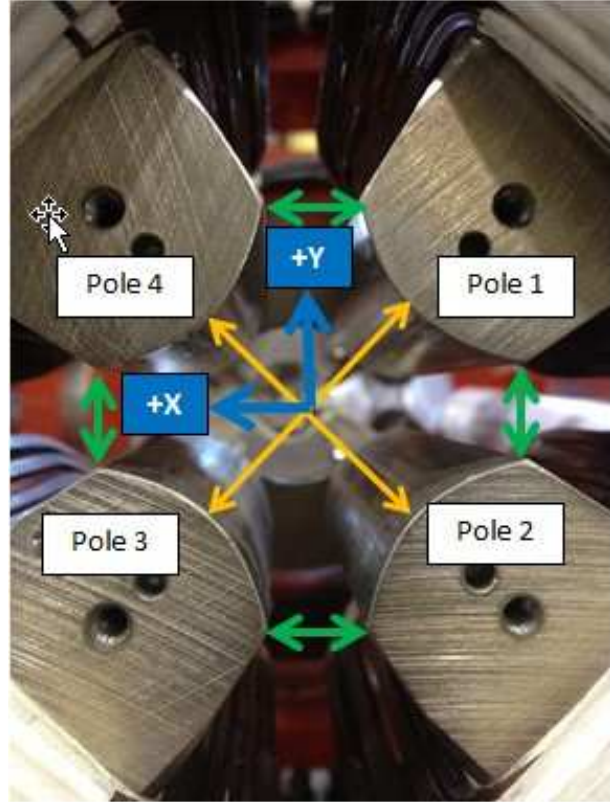
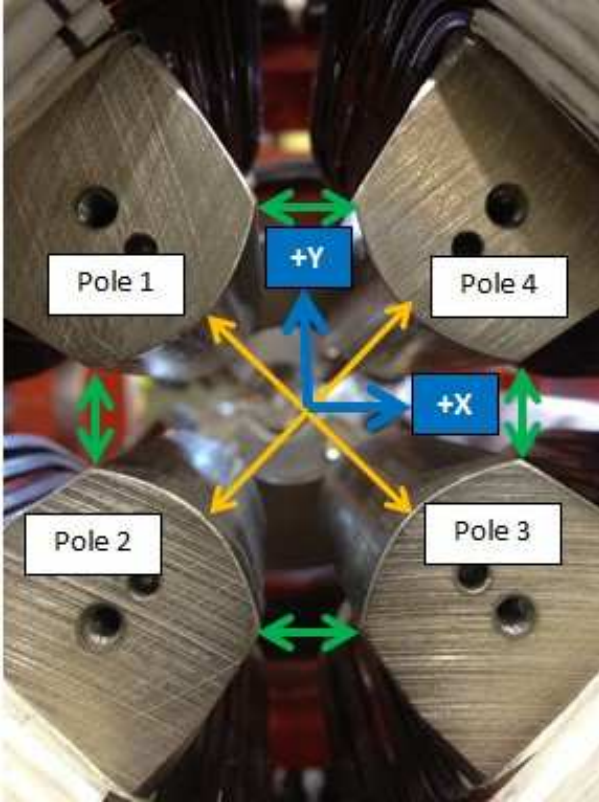
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Pole Tip Gap Measurements

Pole Tips View from Downstream

Pole Tips View from Upstream



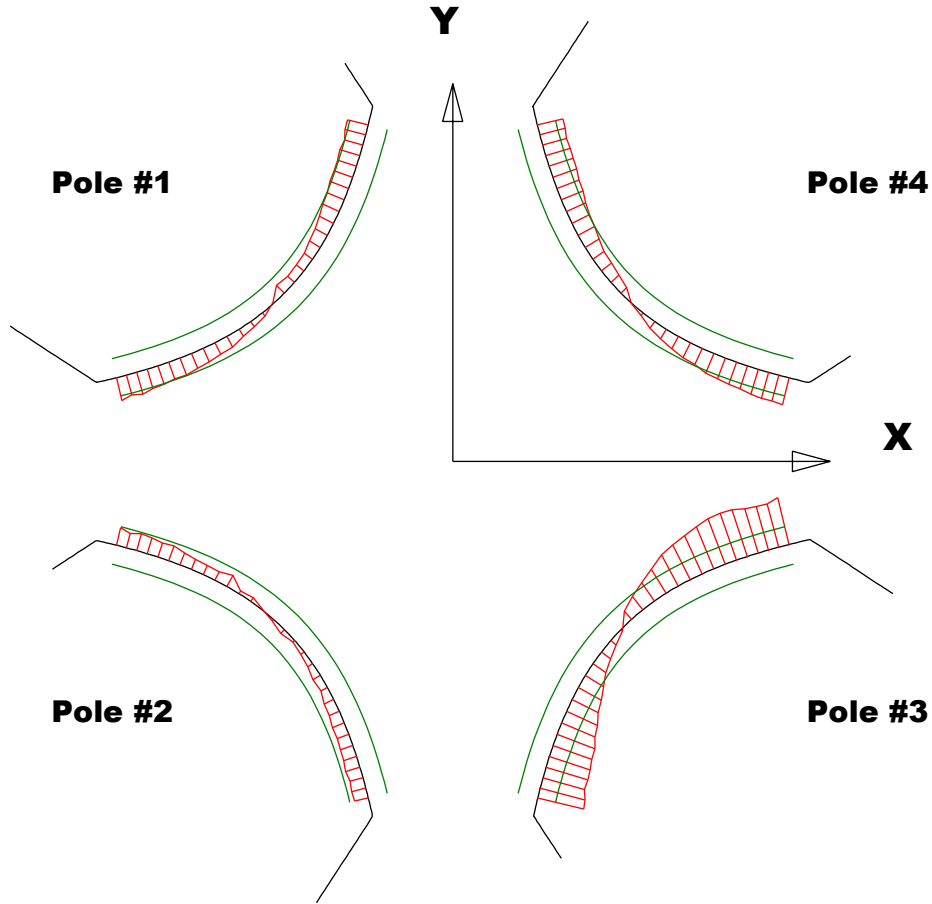
	Nominal Distance	Downstream Pole Ends	Upstream Pole Ends
Pole Tip Distance 1-3	1.260	1.26066	1.26039
Pole Tip Distance 2-4	1.260	1.26065	1.26074
Gap 1-2	.422	0.41933	0.41788
Gap 2-3	.422	0.4281	0.42929
Gap 3-4	.422	0.41629	0.41636
Gap 4-1	.422	0.42459	0.42555

Dimensions in Inch

Barcode # : 4007

Mfg. S/N : 003

Composite Best-fit of Pole Tips, Downstream



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

Dimensions in Inch

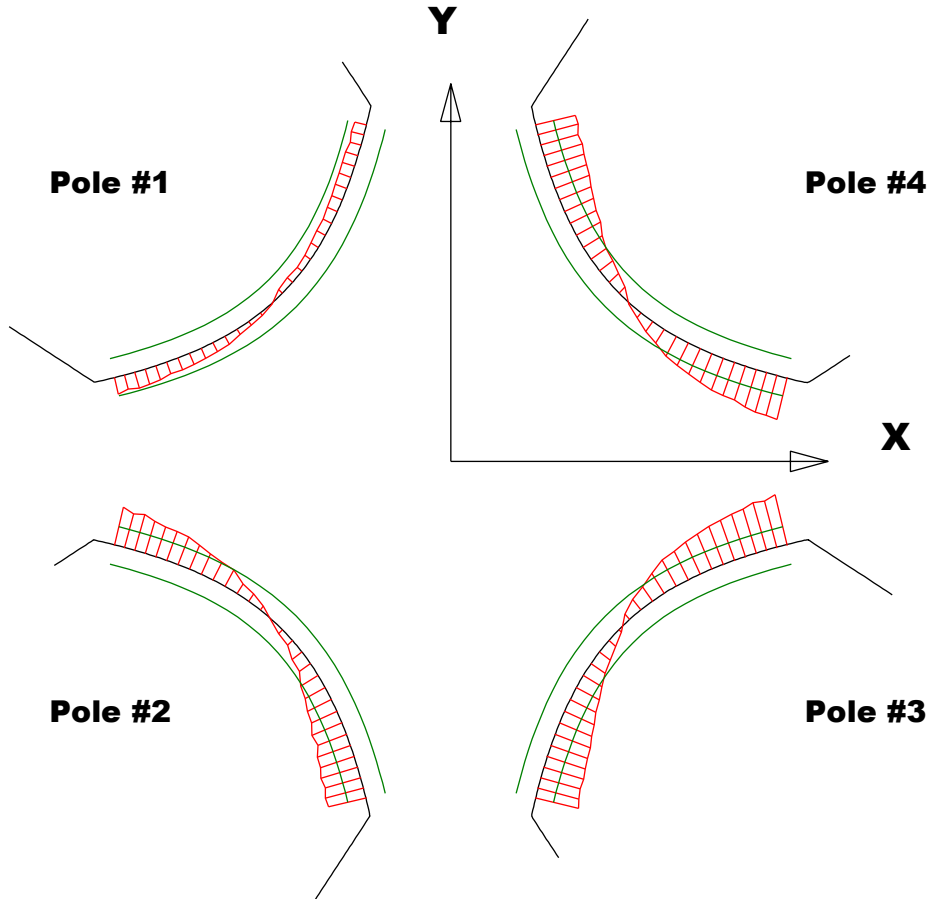
Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.00113	-0.0008	-0.00252	-0.0014
Max. Dev.	0.00126	0.00096	0.00264	0.00148

Barcode # : 4007

Mfg. S/N : 003

Composite Best-fit of Pole Tips, Upstream



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

Dimensions in Inch

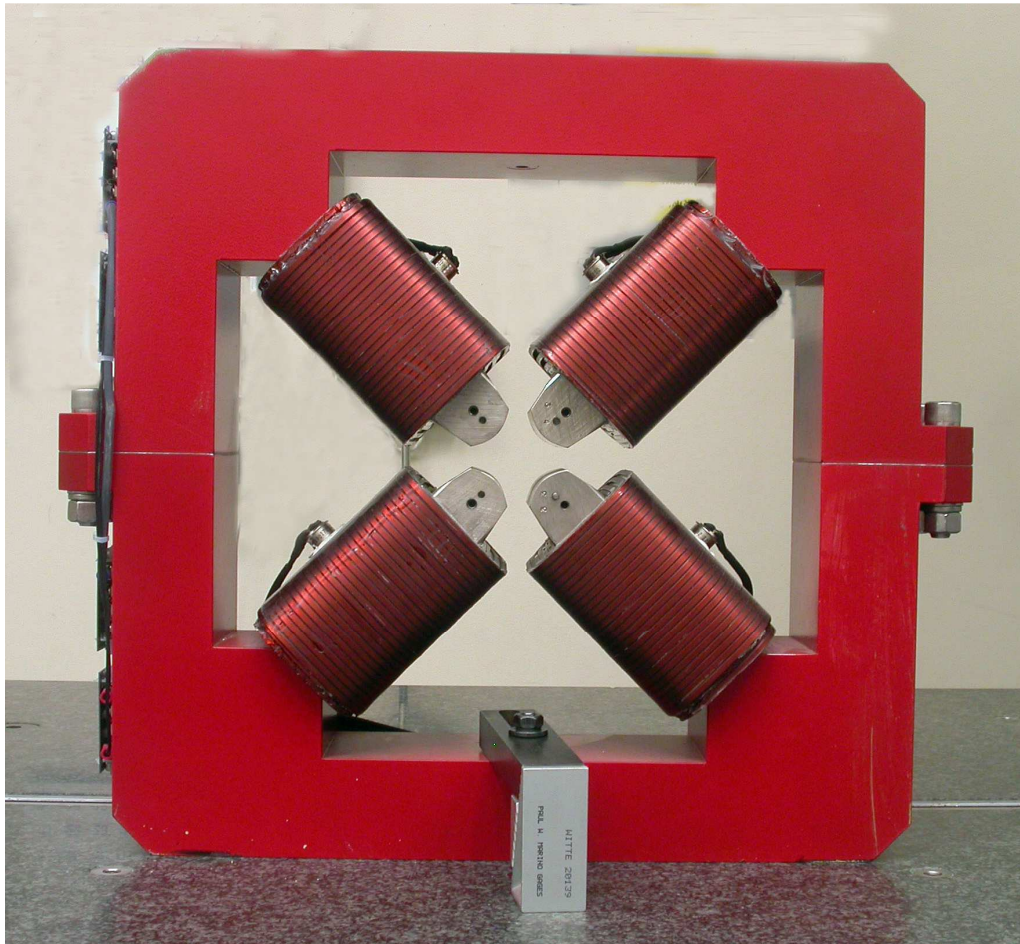
Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.00069	-0.00208	-0.00235	-0.0022
Max. Dev.	0.00091	0.00205	0.00273	0.00226

Barcode # : 4007

Mfg. S/N : 003

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



Angle in Decimal Degrees $^{\circ}$ = -0.00300

Angle in Milliradians = -0.05244

Barcode # : 4007

Mfg. S/N : 003