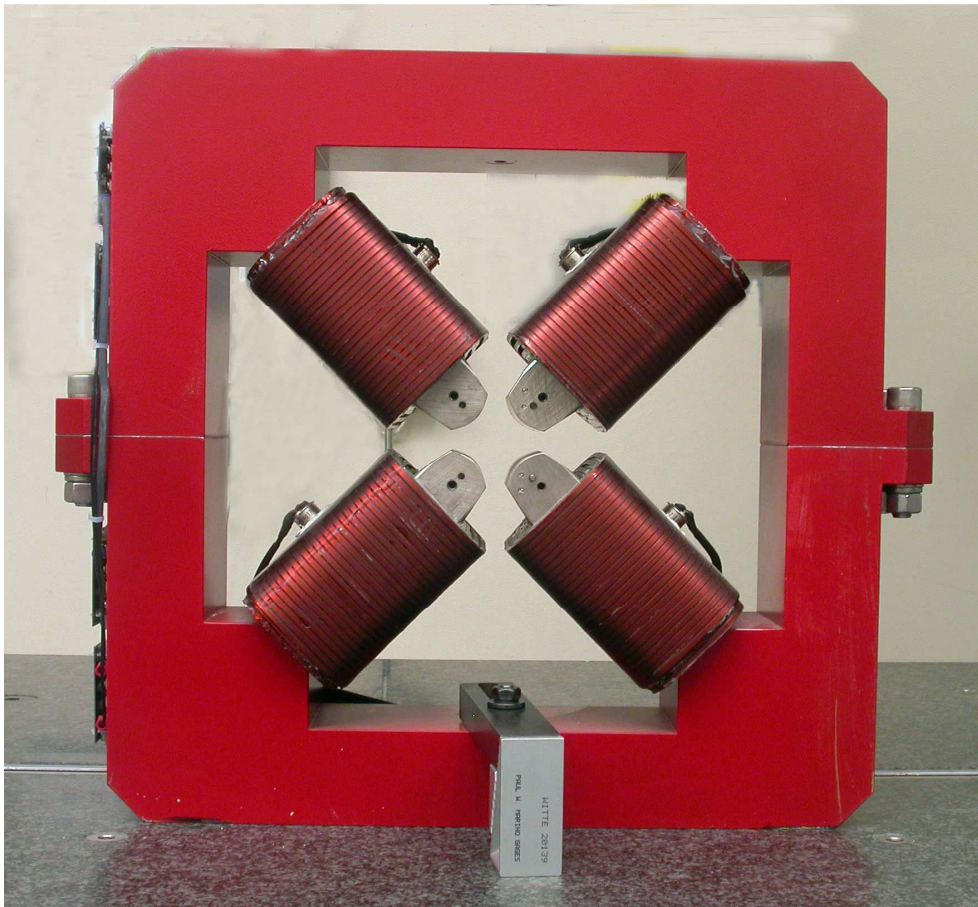


LCLS II Magnet Fiducialization Report

Injector Quadrupole 1.26Q3.5



Inspector : K. Caban

Engineer : J. Amann

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

Barcode No.: 4015

Mfg. S/N : 020

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.

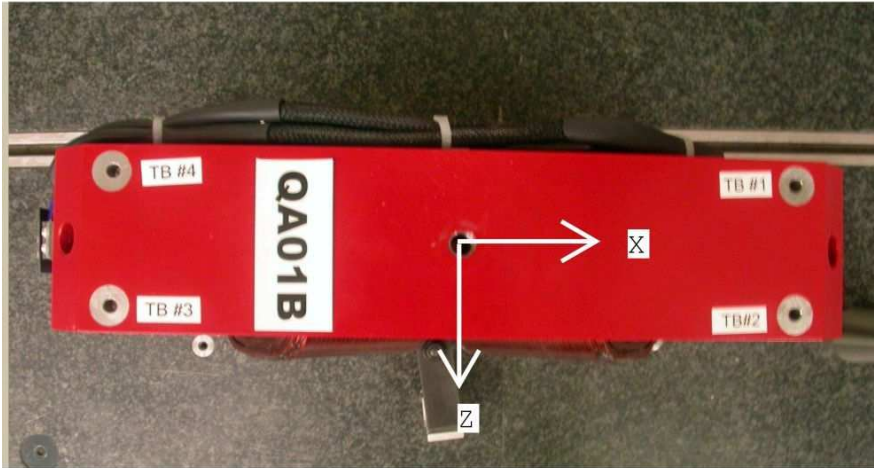
Coordinate Origins

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	6.50391	8.86885	-1.25019
TB 2	6.50482	8.86843	1.25030
TB 3	-6.49447	8.87906	1.25240
TB 4	-6.49427	8.88026	-1.25002
TB A	6.50393	8.18293	-1.24957
TB B	6.50427	8.18095	1.25024
TB C	-6.49517	8.19205	1.25187
TB D	-6.49563	8.19403	-1.24870

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

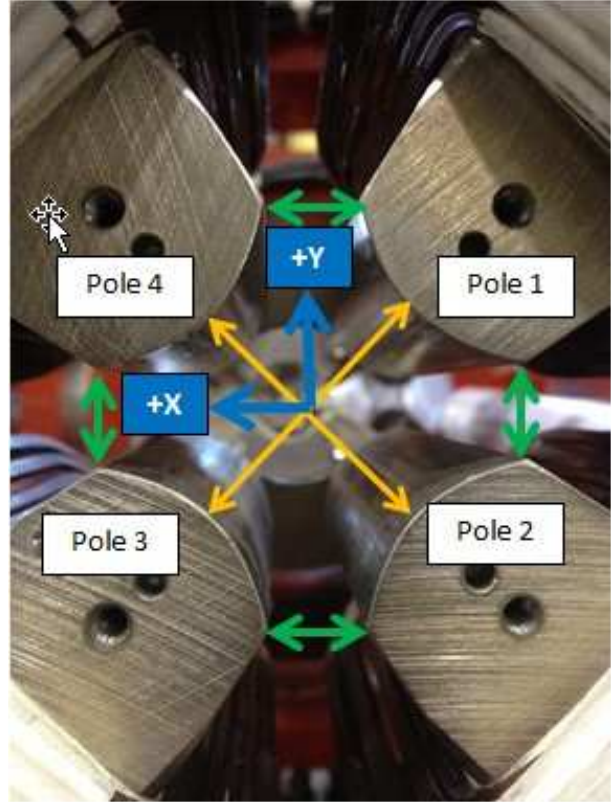
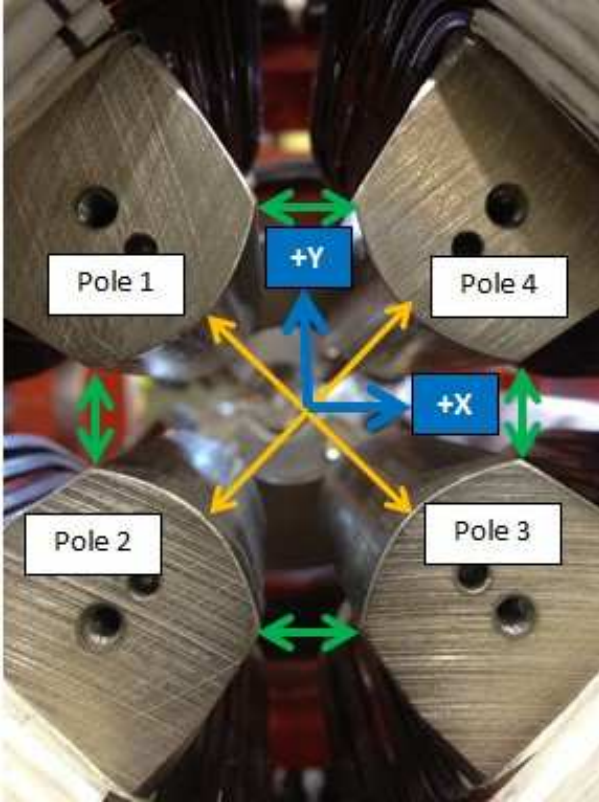
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Pole Tip Gap Measurements

Pole Tips View from Downstream

Pole Tips View from Upstream



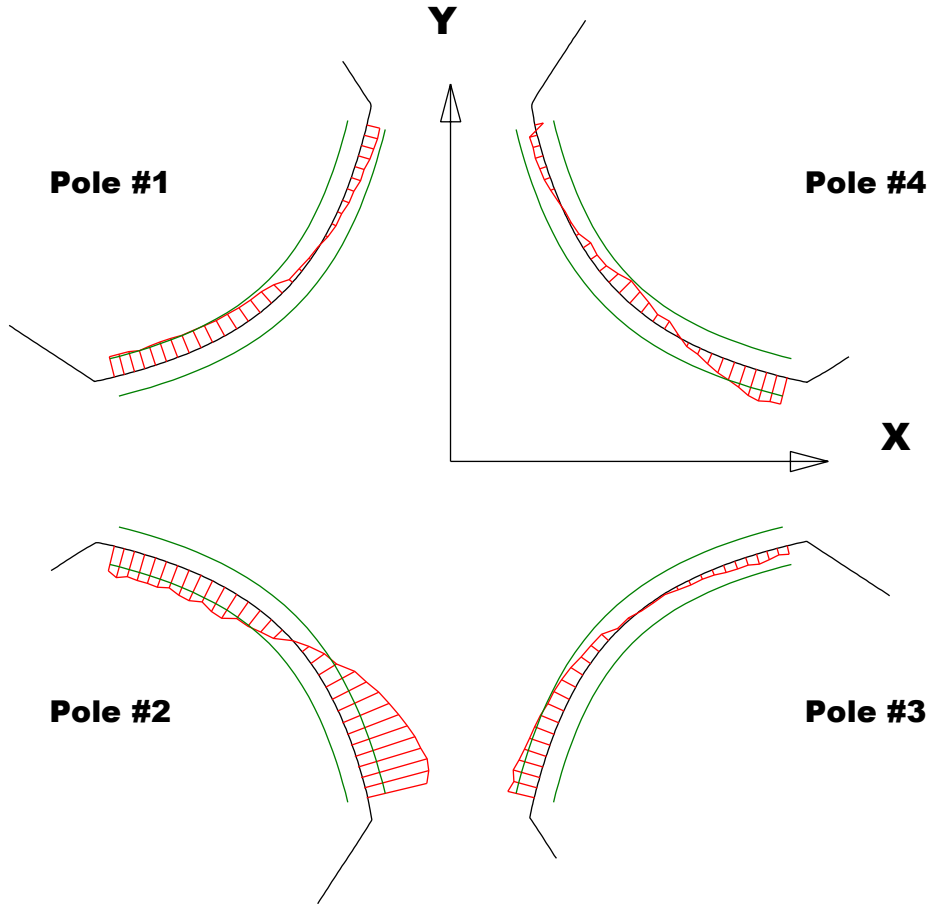
	Nominal Distance	Downstream Pole Ends	Upstream Pole Ends
Pole Tip Distance 1-3	1.260	1.26052	1.26075
Pole Tip Distance 2-4	1.260	1.26134	1.2603
Gap 1-2	.422	0.42693	0.42649
Gap 2-3	.422	0.41854	0.41926
Gap 3-4	.422	0.42135	0.42248
Gap 4-1	.422	0.42564	0.42165

Dimensions in Inch

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Mfg. S/N : 020

Composite Best-fit of Pole Tips, Downstream



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

Dimensions in Inch

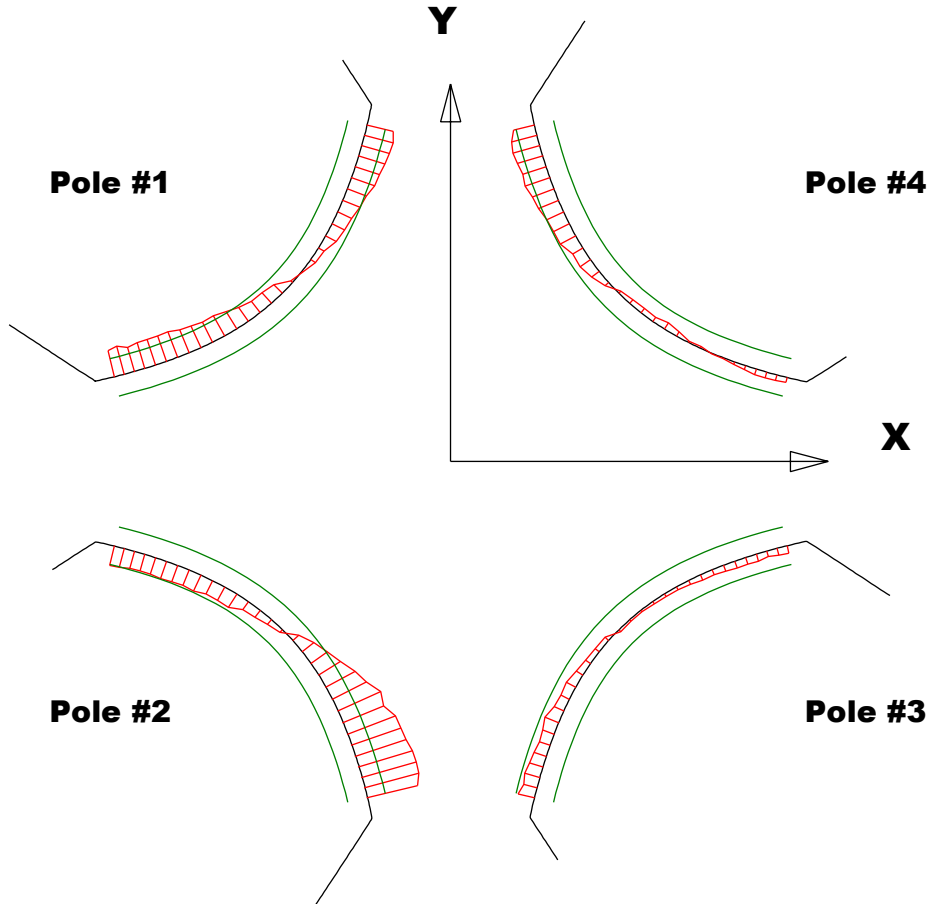
Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.00111	-0.00158	-0.00054	-0.00092
Max. Dev.	0.00072	0.00358	0.00146	0.00157

Barcode # : 4015

Mfg. S/N : 020

Composite Best-fit of Pole Tips, Upstream



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

Dimensions in Inch

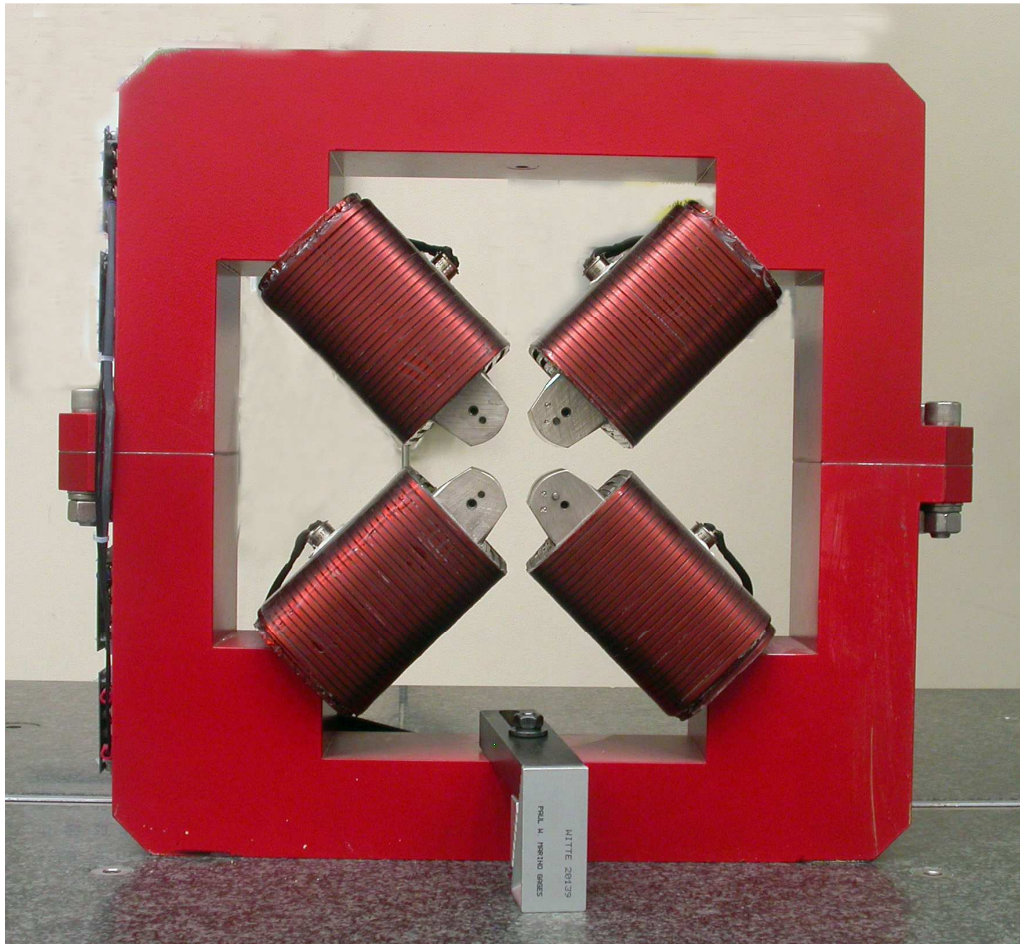
Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.00155	-0.00107	-0.00042	-0.00039
Max. Dev.	0.00158	0.003	0.0009	0.00149

Barcode # : 4015

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



Angle in Decimal Degrees $^{\circ}$ = 0.04631

Angle in Milliradians = 0.80821

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