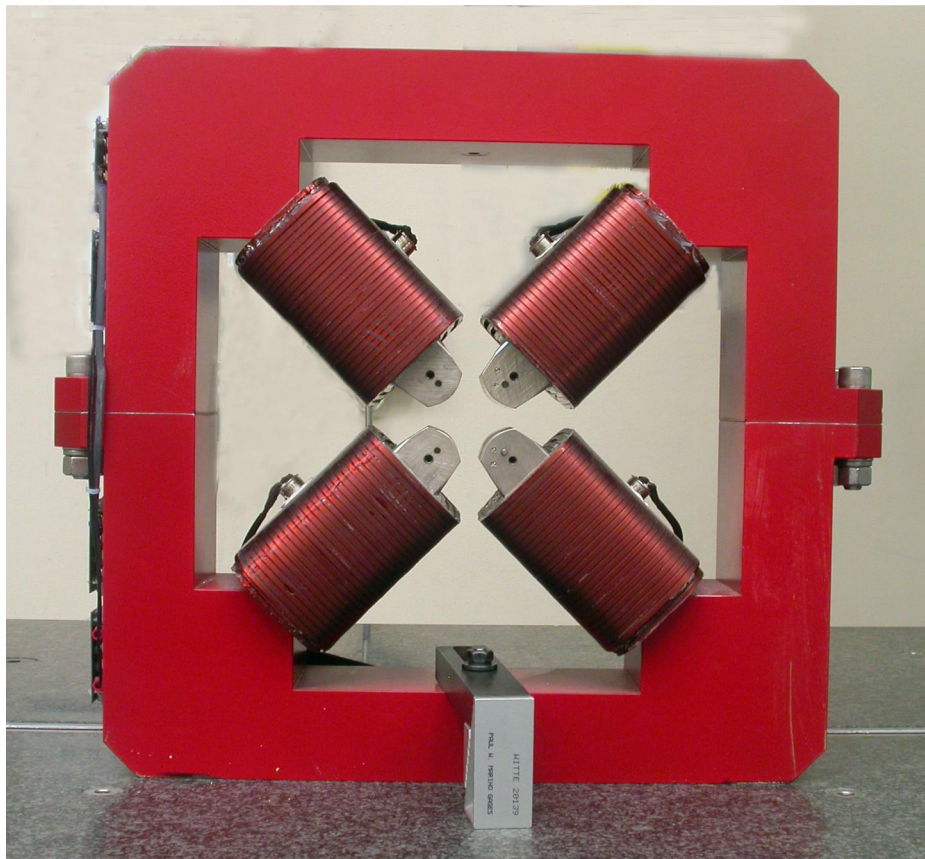


LCLS II Magnet Fiducialization Report

Injector Quadrupole 1.26Q3.5



Inspector : K. Caban

Engineer : J. Amann

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

Barcode No.: 4017

Mfg. S/N : 021

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.

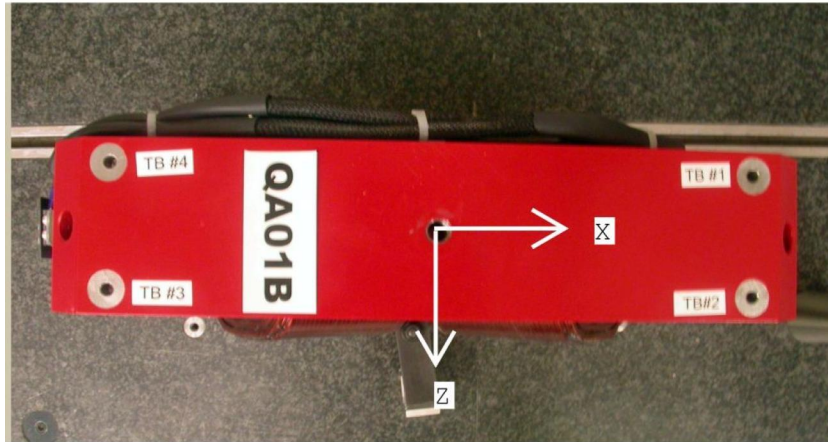
Coordinate Origins

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	6.48884	8.87958	-1.24773
TB 2	6.48870	8.88013	1.25280
TB 3	-6.51036	8.86652	1.25294
TB 4	-6.51098	8.86617	-1.24650
TB A	6.48955	8.19218	-1.24725
TB B	6.48917	8.19260	1.25321
TB C	-6.51050	8.17914	1.25328
TB D	-6.51046	8.17883	-1.24607

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

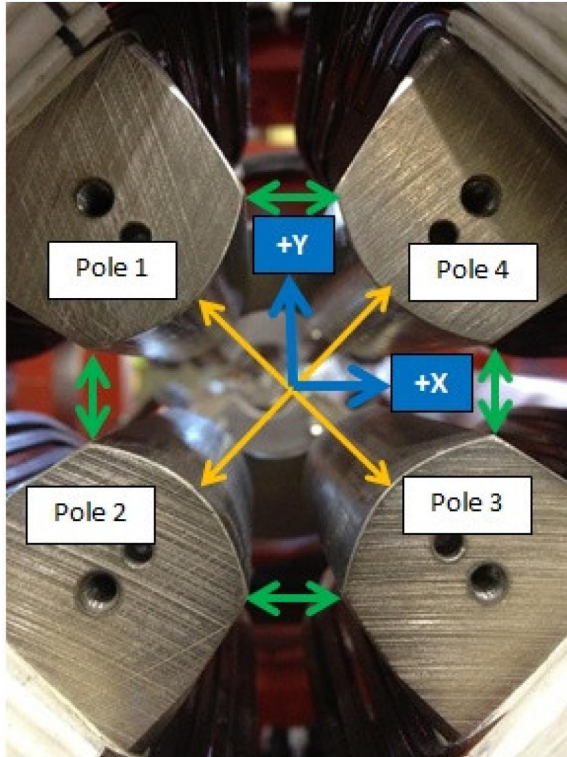
Dimensions in Inch

Barcode # : 4017

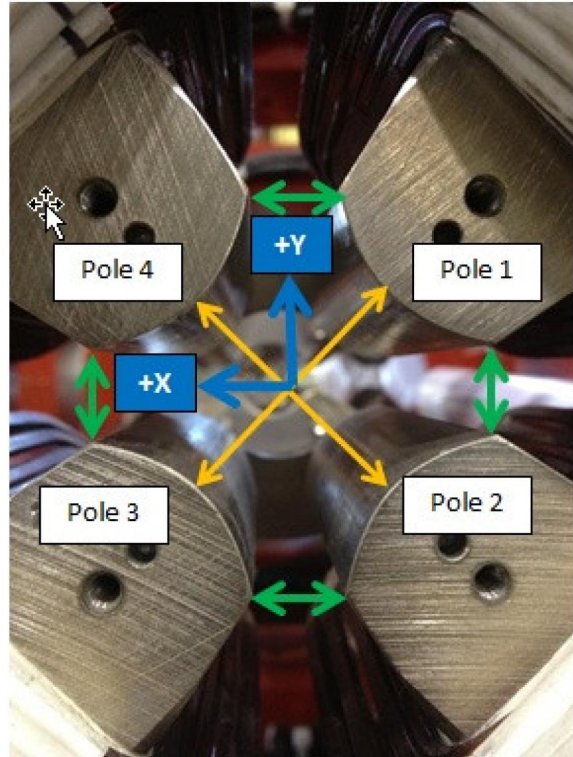
Mfg. S/N : 021

Pole Tip Gap Measurements

Pole Tips View from Downstream



Pole Tips View from Upstream



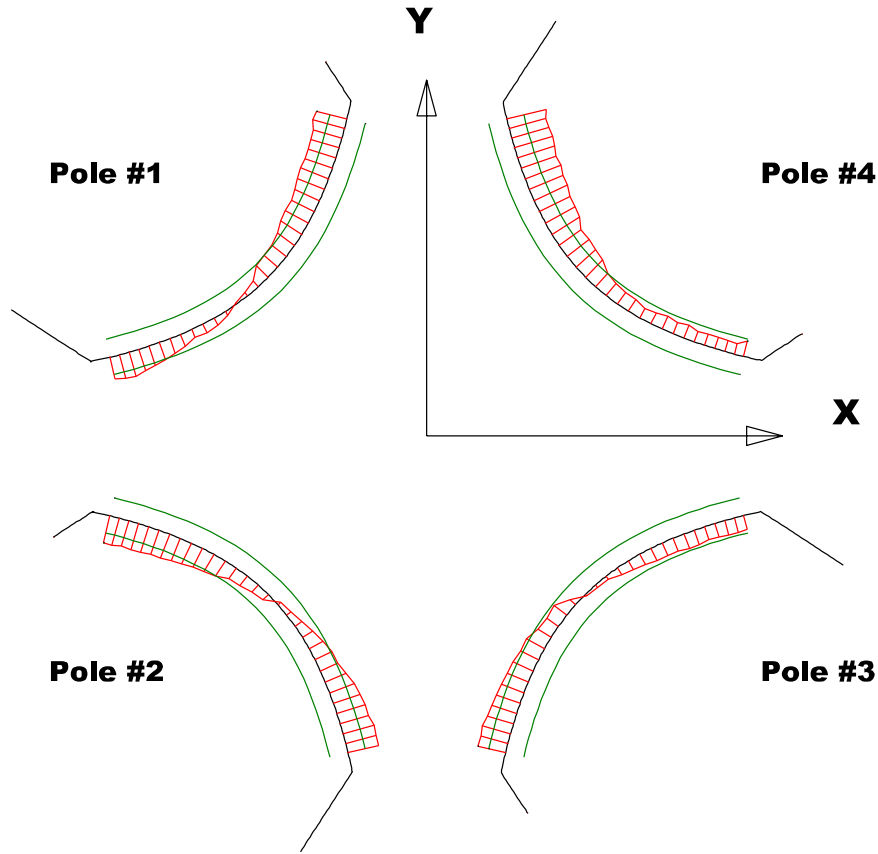
	Nominal Distance	Downstream Pole Ends	Upstream Pole Ends
Pole Tip Distance 1-3	1.260	1.26094	1.2614
Pole Tip Distance 2-4	1.260	1.26175	1.2611
Gap 1-2	.422	0.42326	0.42265
Gap 2-3	.422	0.41947	0.41804
Gap 3-4	.422	0.42529	0.42551
Gap 4-1	.422	0.42809	0.43015

Dimensions in Inch

Barcode # : 4017

Mfg. S/N : 021

Composite Best-fit of Pole Tips, Downstream



Black = Nominal Pole Tip

Red = Pole Tip Deviations

Green = +/- .001 Tolerance

Dimensions in Inch

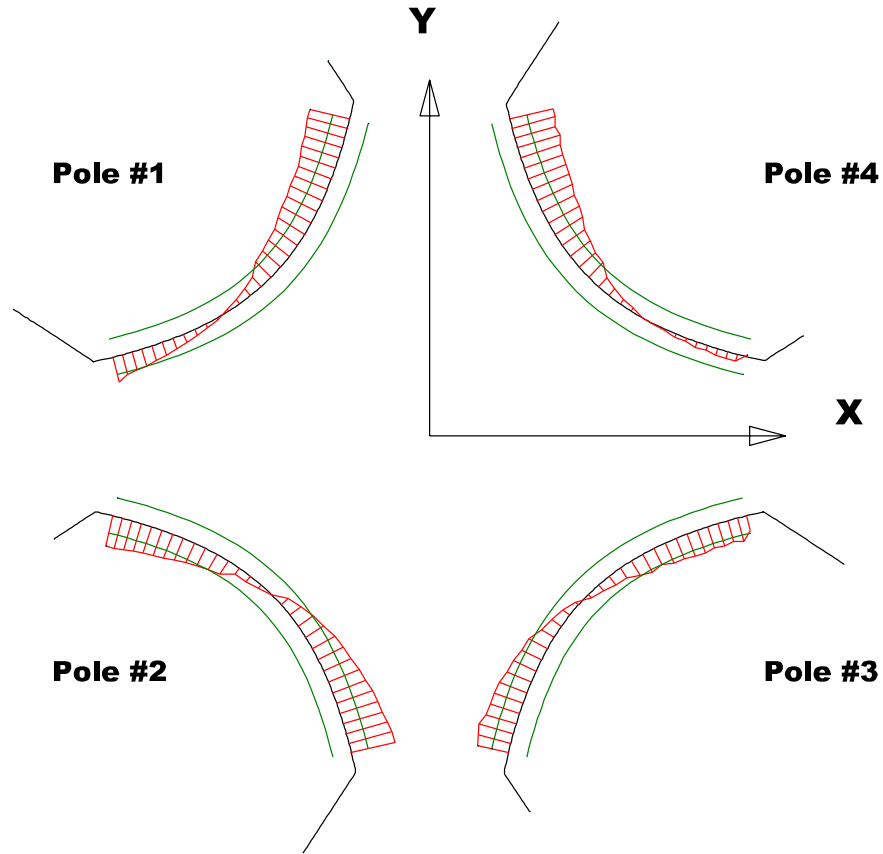
Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.00185	-0.00158	-0.00088	-0.00229
Max. Dev.	0.00143	0.00183	0.00165	-0.00059

Barcode # : 4017

Mfg. S/N : 021

Composite Best-fit of Pole Tips, Upstream



Black = Nominal Pole Tip

Red = Pole Tip Deviations

Green = ± 0.001 Tolerance

Dimensions in Inch

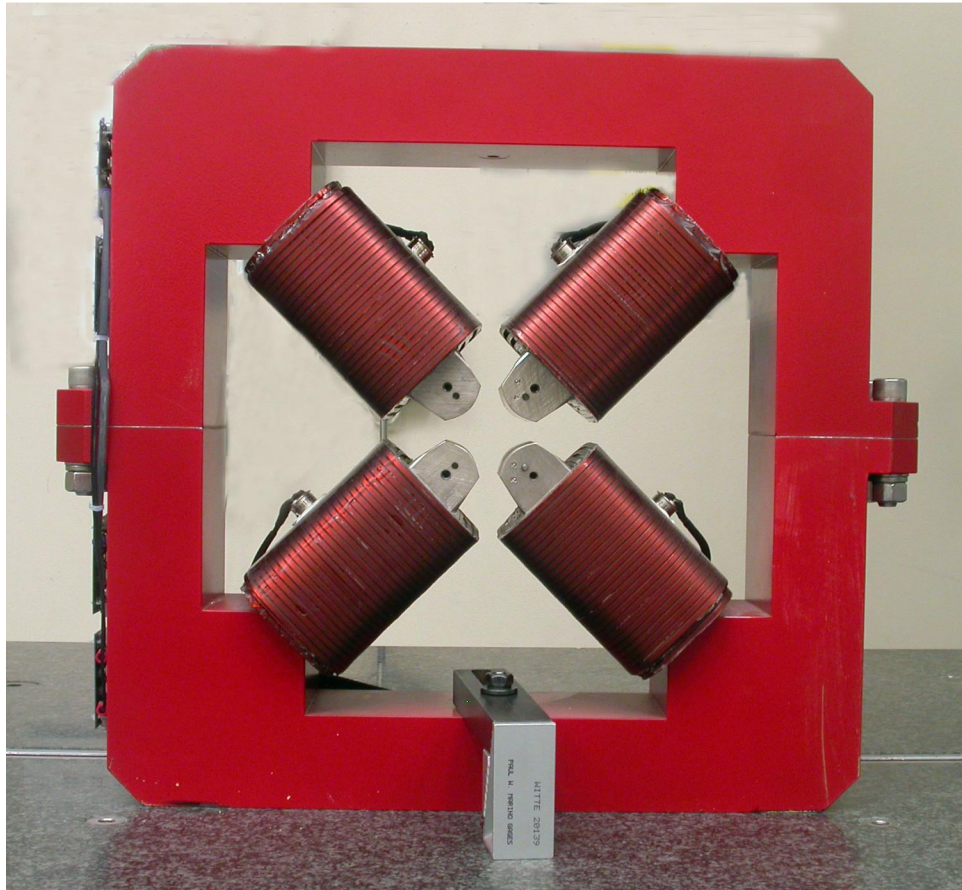
Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.00233	-0.00178	-0.00138	-0.0025
Max. Dev.	0.00145	0.00253	0.00204	0.0004

Barcode # : 4017

Mfg. S/N : 021

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



Angle in Decimal Degrees ° = -0.05988

Angle in Milliradians = -1.04517

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