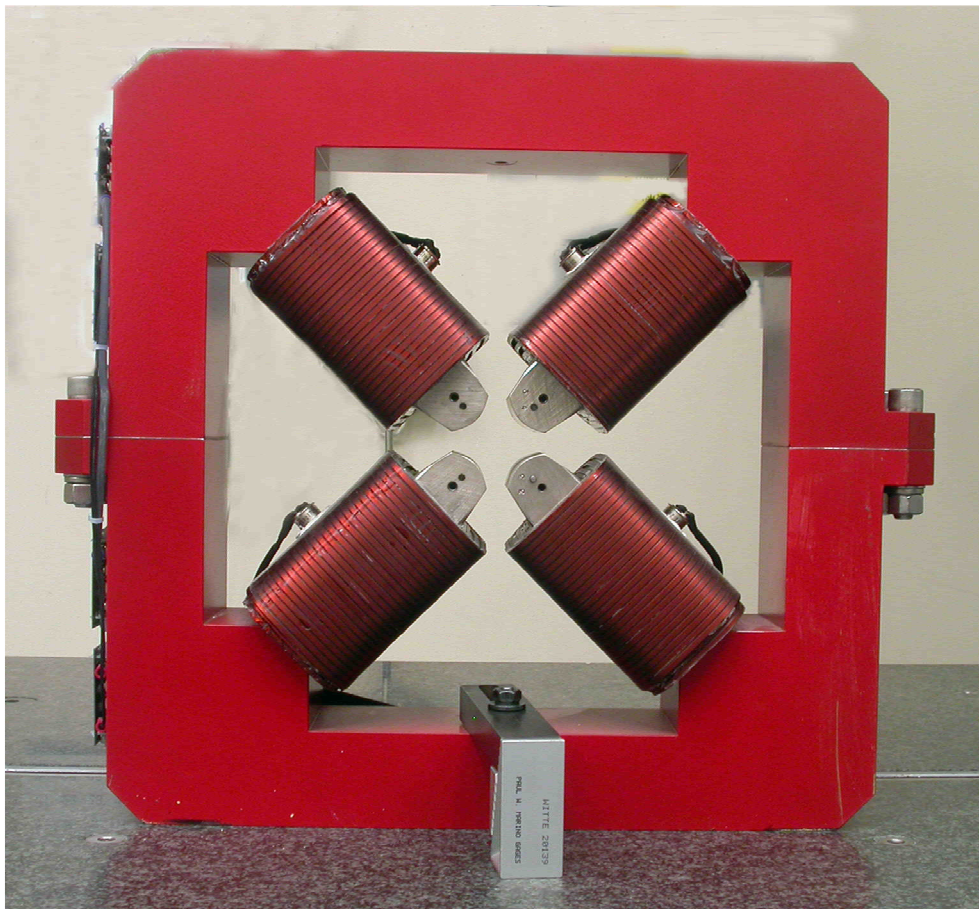# LCLS II Injector Quadrupole Fiducialization Report

Barcode # : 002735

Beamline Name: QA01B

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 alinment 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 axi

Barcode # : 002735
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Tooling Ball Locations
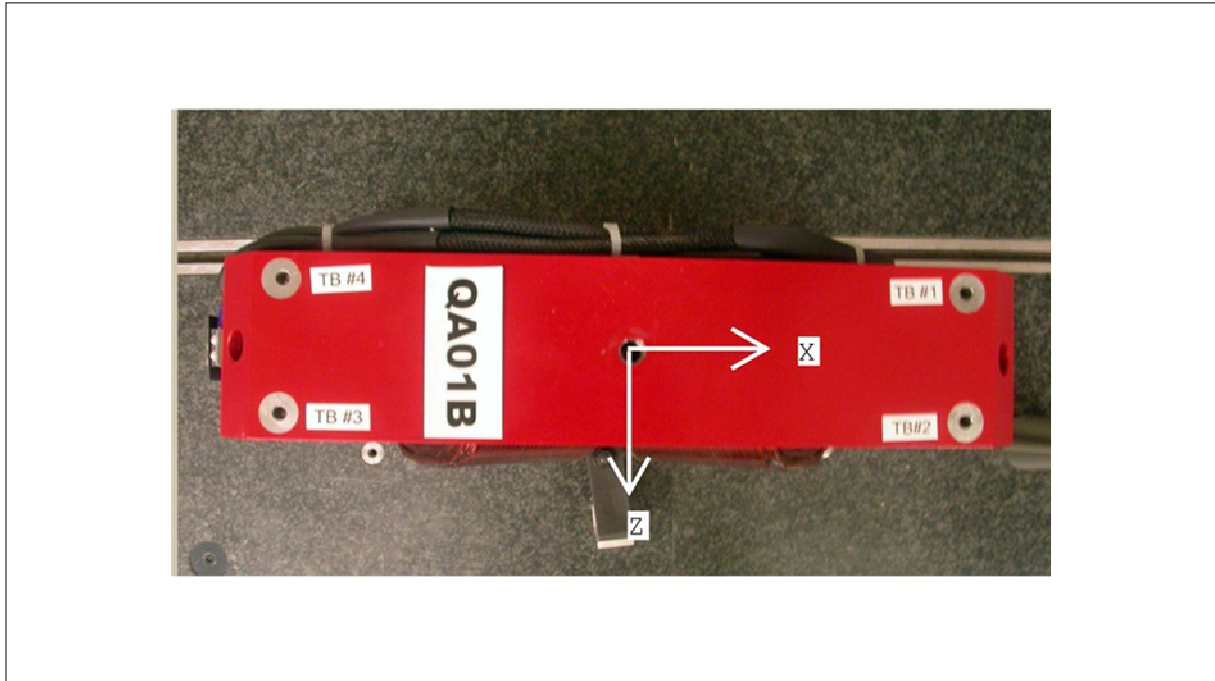
Tooling Ball Locations

Tooling Ball	X Coord.	Y Coord.	Z Coord.
Ball #1	6.48629	8.89099	-1.25259
Ball #2	6.48615	8.89324	1.24803
Ball #3	-6.51318	8.87271	1.24782
Ball #4	-6.51285	8.87129	-1.25226

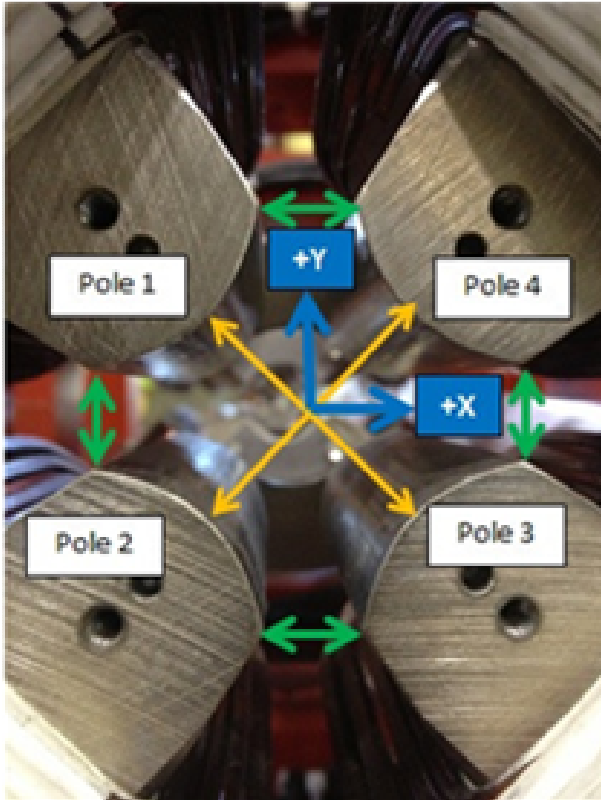Tooling Ball Locations are 1 inch above unpainted surface pads
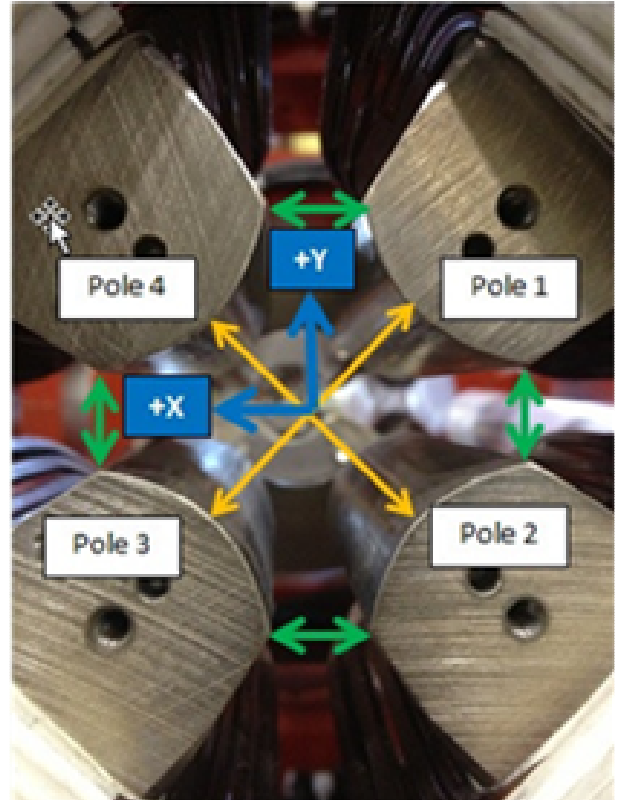
Dimensions in Inch

Barcode # : 002735
Beamline Name: QA01B

Pole Tip Gap Measurements

Pole Tips looking Downstream

Pole Tips looking Upstream

	Nominal Distance	Downstream Pole Ends	Upstream Pole Ends
Pole Tip Distance 1-3	1.260	1.2605	1.26029
Pole Tip Distance 2-4	1.260	1.26151	1.26078
Gap 1-2	.422	0.42459	0.42427
Gap 2-3	.422	0.42473	0.42349
Gap 3-4	.422	0.42331	0.42235
Gap 4-1	.422	0.4219	0.42261

Dimensions in Inch

Barcode # : 002735
Beamline Name: QA01B

Composite Best-fit of Pole Tips, Downstream
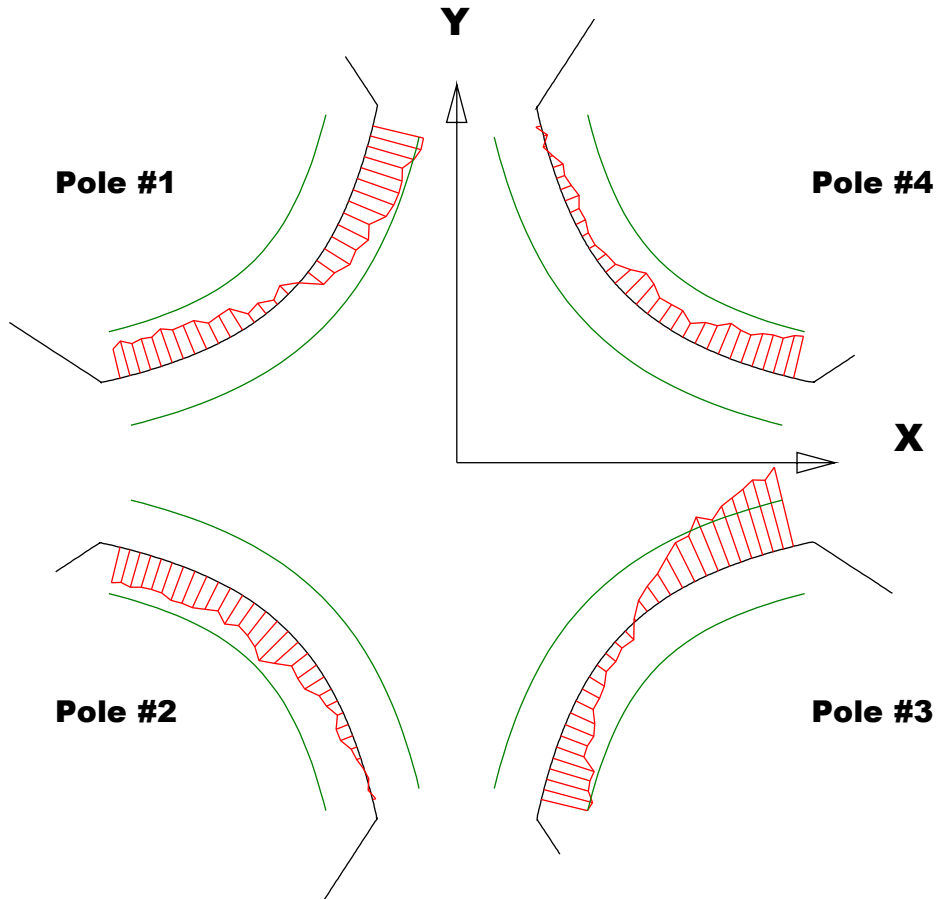
Black = Nominal Pole Tip

Red = Pole Tip Deviations

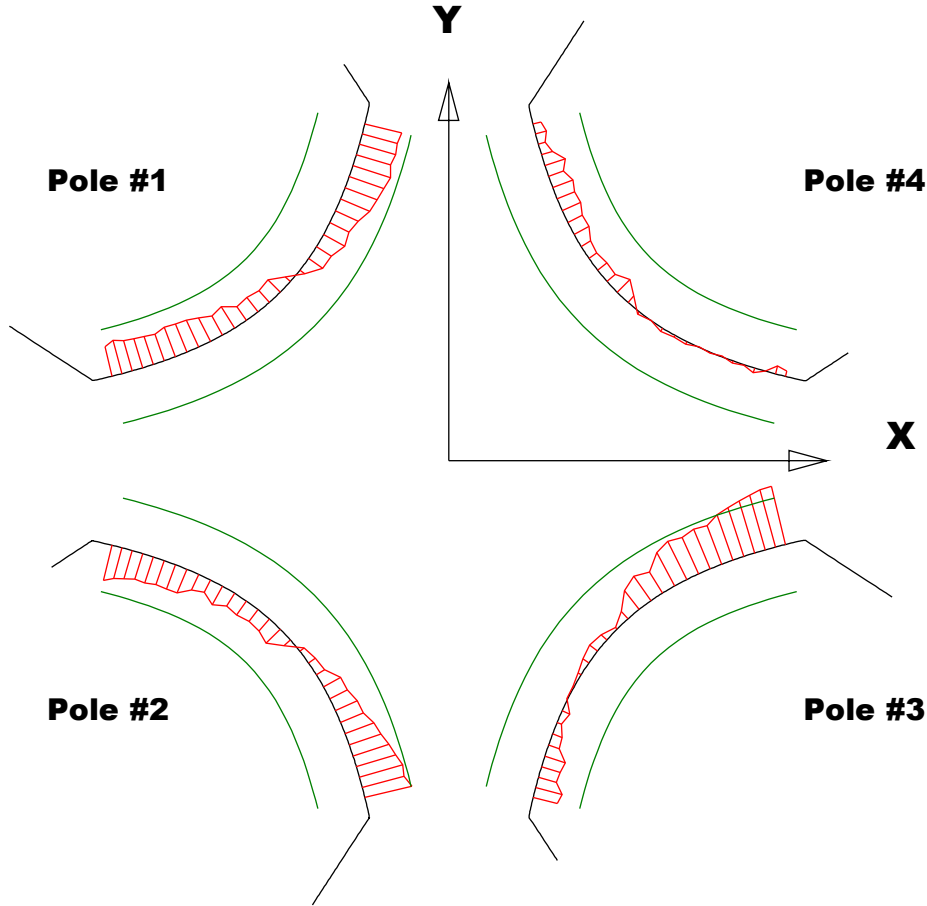Green = +/- .001 Tolerance

Dimensions in Inch

Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.00075	-0.00086	-0.00106	-0.00091
Max. Dev.	0.0011	0.00007	0.00171	0.00011

Barcode # : 002735
Beamline Name: QA01B

Composite Best-fit of Pole Tips, Upstream

Y

Pole #1

Pole #4

X

Pole #2

Pole #3

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.	-0.00072	-0.00076	-0.00057	-0.00045
Max. Dev.	0.00083	0.00102	0.00125	0.0001

Barcode # : 002735

Beamline Name: QA01B