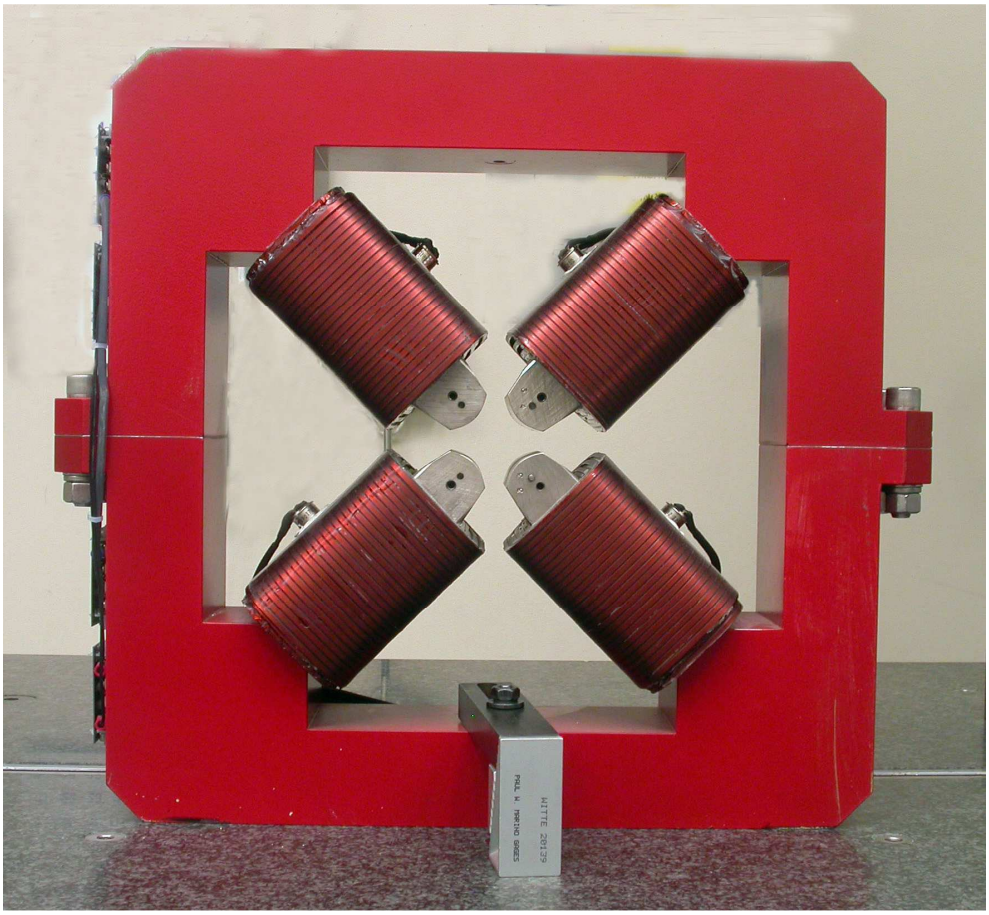
LCLS II Magnet Fiducialization Report
Injector Quadrupole 1.26Q3.5



Inspector : K. Caban

Engineer : J. Amann

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

Barcode No.: 4019

Mfg. S/N : 016

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.

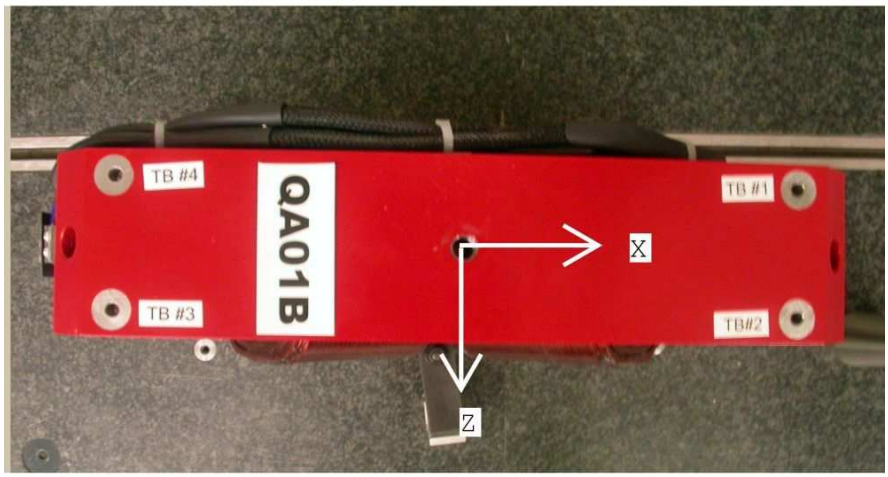
Coordinate Origins

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 # : 4019

Mfg. S/N : 016

Tooling Ball Locations



Tooling Ball	X Coord.	Y Coord.	Z Coord.
TB 1	6.52148	8.86116	-1.23896
TB 2	6.52040	8.86031	1.26063
TB 3	-6.47970	8.89062	1.25970
TB 4	-6.47940	8.89110	-1.24045
TB A	6.51834	8.17316	-1.23947
TB B	6.51851	8.17252	1.26007
TB C	-6.48113	8.20303	1.25941
TB D	-6.48107	8.20359	-1.24030

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

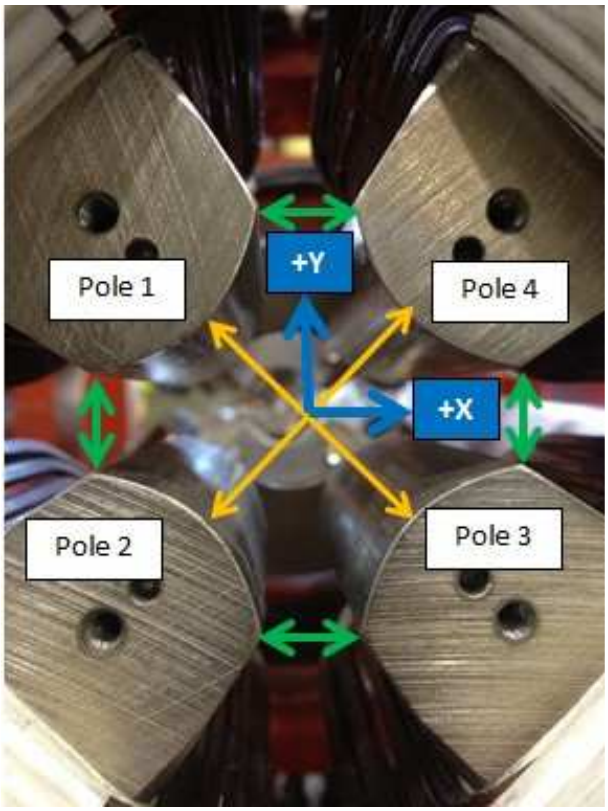
Dimensions in Inch

Barcode # : 4019

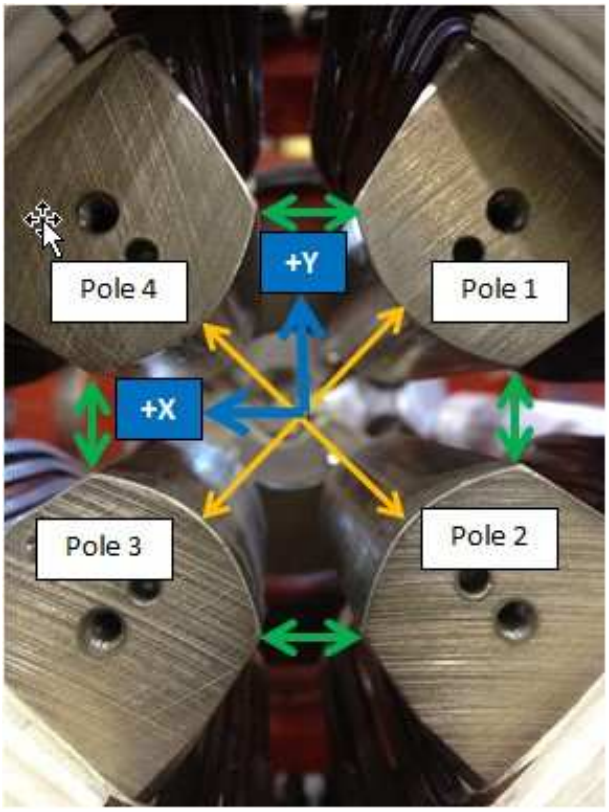
Mfg. S/N : 016

Pole Tip Gap Measurements

Pole Tips View from Downstream



Pole Tips View from Upstream



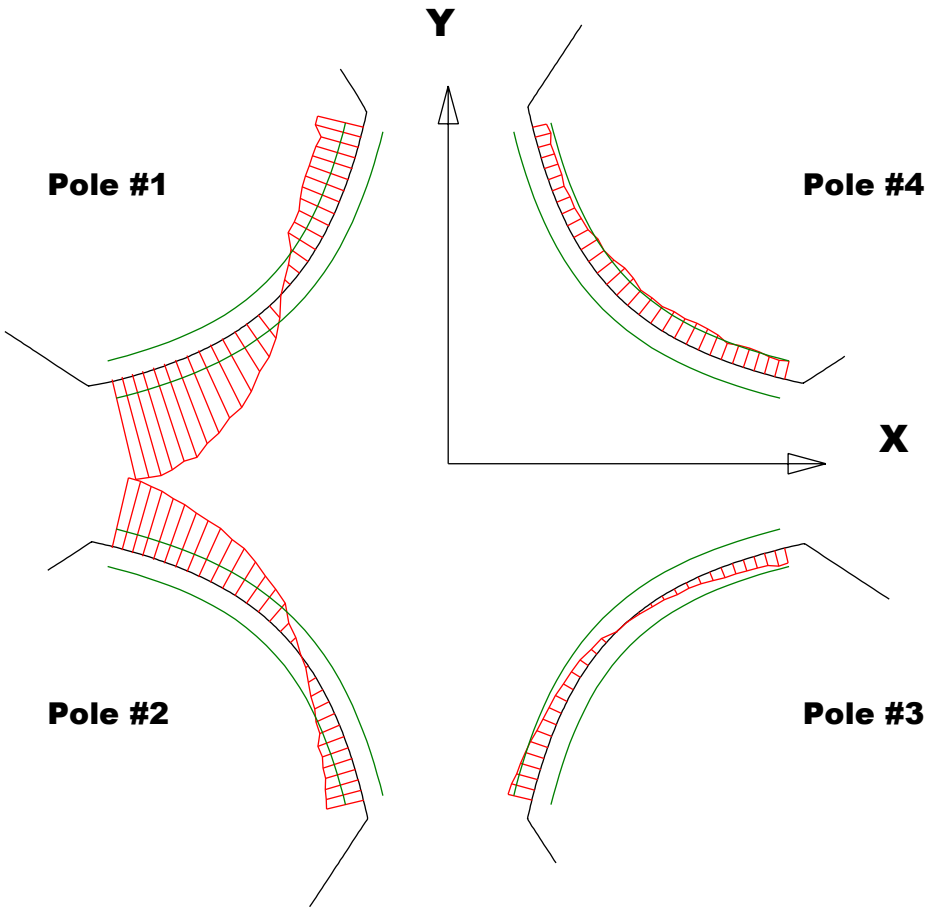
	Nominal Distance	Downstream Pole Ends	Upstream Pole Ends
Pole Tip Distance 1-3	1.260	1.2599	1.26019
Pole Tip Distance 2-4	1.260	1.26057	1.26062
Gap 1-2	.422	0.41245	0.41366
Gap 2-3	.422	0.42383	0.42312
Gap 3-4	.422	0.42525	0.42692
Gap 4-1	.422	0.4274	0.42731

Dimensions in Inch

Barcode # : 4019

Mfg. S/N : 016

Composite Best-fit of Pole Tips, Downstream



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

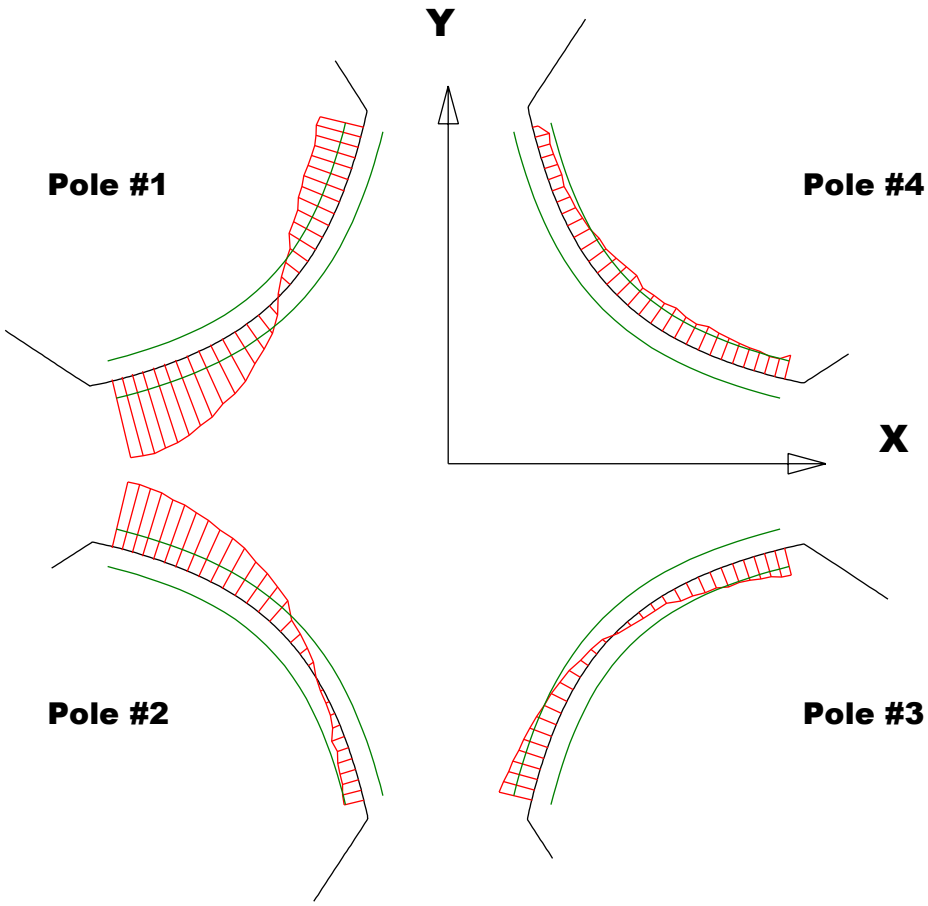
Dimensions in Inch

Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.00251	-0.00201	-0.00085	-0.00129
Max. Dev.	0.0055	0.00374	0.00131	-0.00067

Barcode # : 4019
Mfg. S/N : 016

Composite Best-fit of Pole Tips, Upstream



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

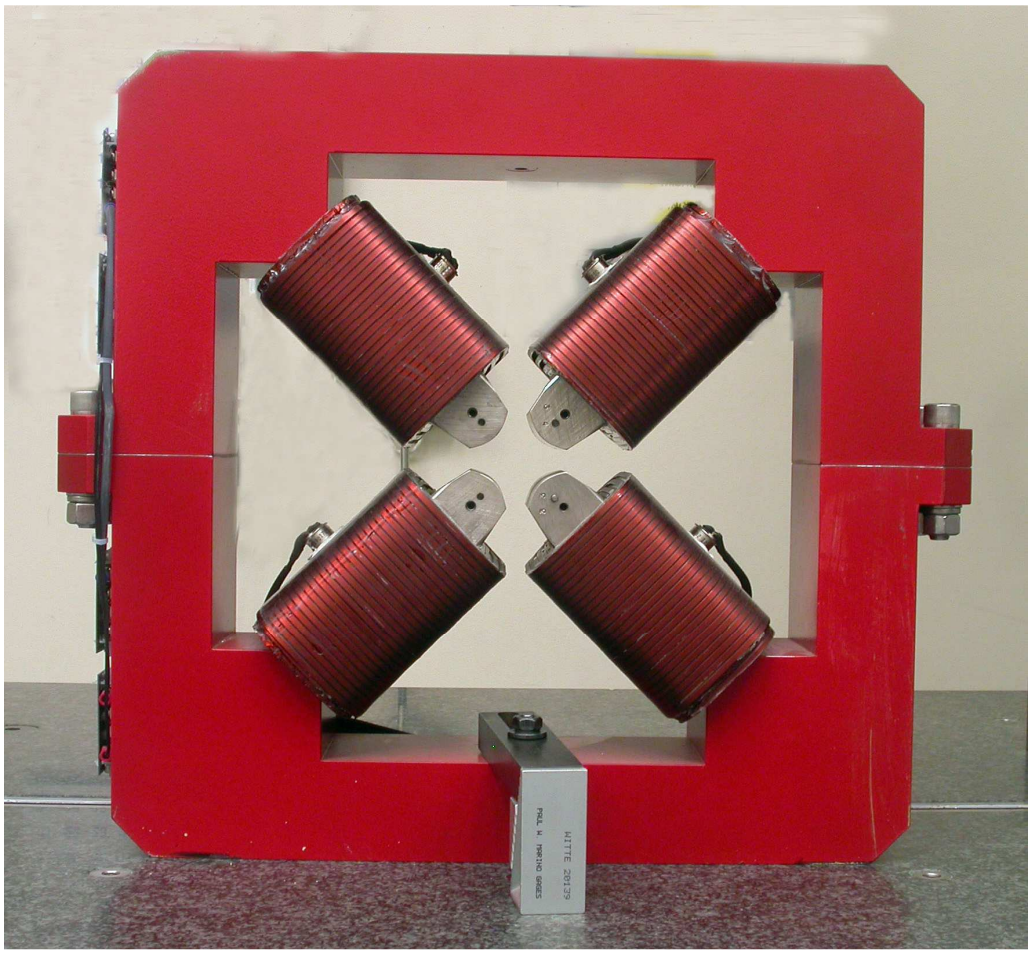
Dimensions in Inch

Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.00245	-0.00107	-0.00147	-0.00149
Max. Dev.	0.00429	0.00355	0.00179	-0.0003

Barcode # : 4019
Mfg. S/N : 016

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



Angle in Decimal Degrees ° = 0.13508

Angle in Milliradians = 2.35766

Barcode # : 4019

Mfg. S/N : 016