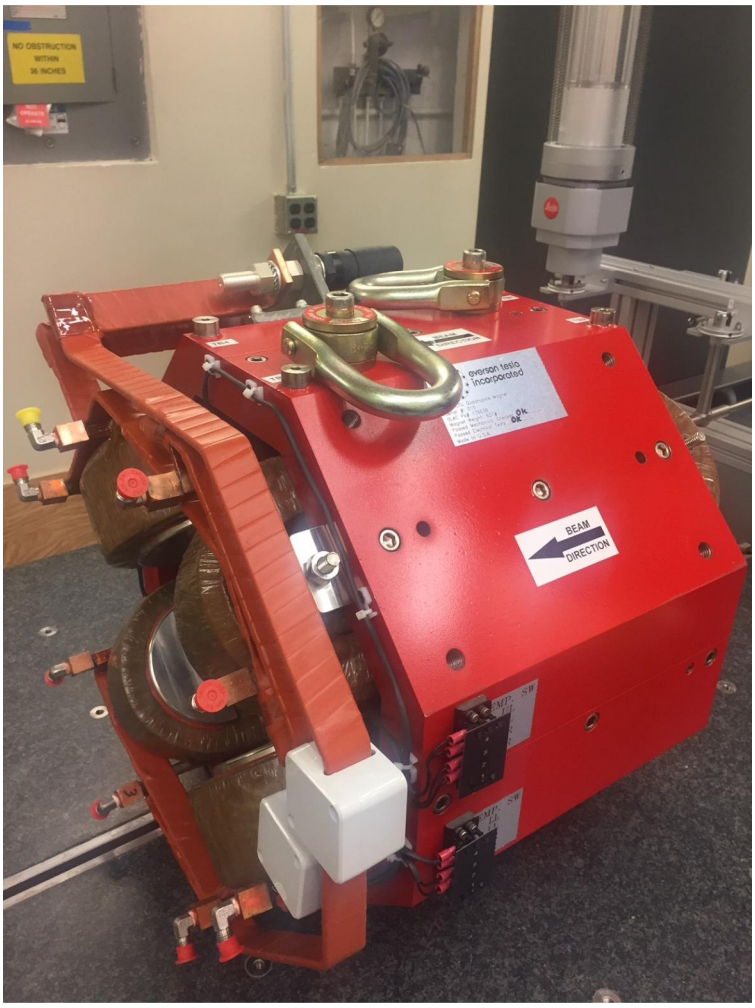
LCLS II LTU Quad Fiducialization Report

1.26Q12 Quadrupole



Inspector : K. Caban

Engineer : J. Amann

Drawing No. : SA-380-327-00 R1

Barcode # : 4057

Mfg. S/N : 018

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 .100 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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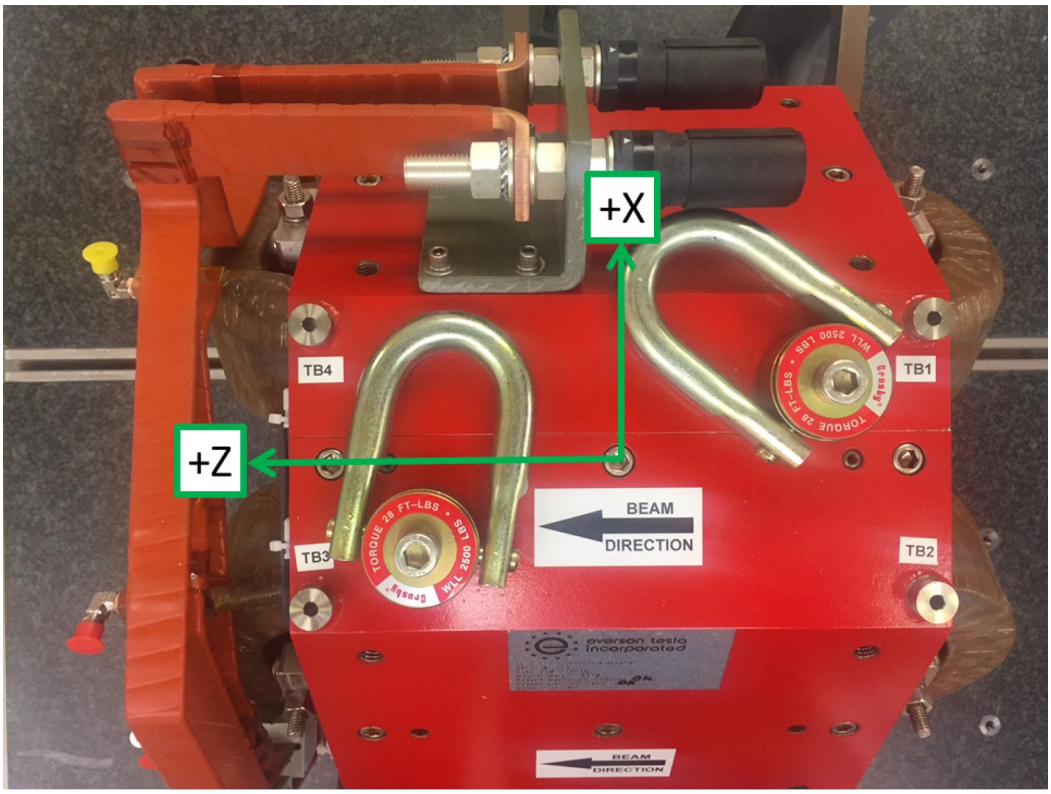
Tooling Ball Locations



Tooling Ball	X Coord.	Y Coord.	Z Coord.
TB 1	-2.5121	10.2008	-5.4788
TB 2	2.4898	10.2048	-5.4906
TB 3	2.5146	10.2085	5.4677
TB 4	-2.4949	10.2004	5.4815
TB 1*	-2.5134	9.5128	-5.4785
TB 2*	2.4907	9.5174	-5.4907
TB 3*	2.5158	9.5217	5.4691
TB 4*	-2.4945	9.5120	5.4839

Tooling Ball (TB1-4) Locations are 1 inch above Tooling Ball Adapter Plane
Tooling Ball (TB1*-4* Locations are 5/16 inch above Tooling Ball Adapter Plane
Dimensions in Inch

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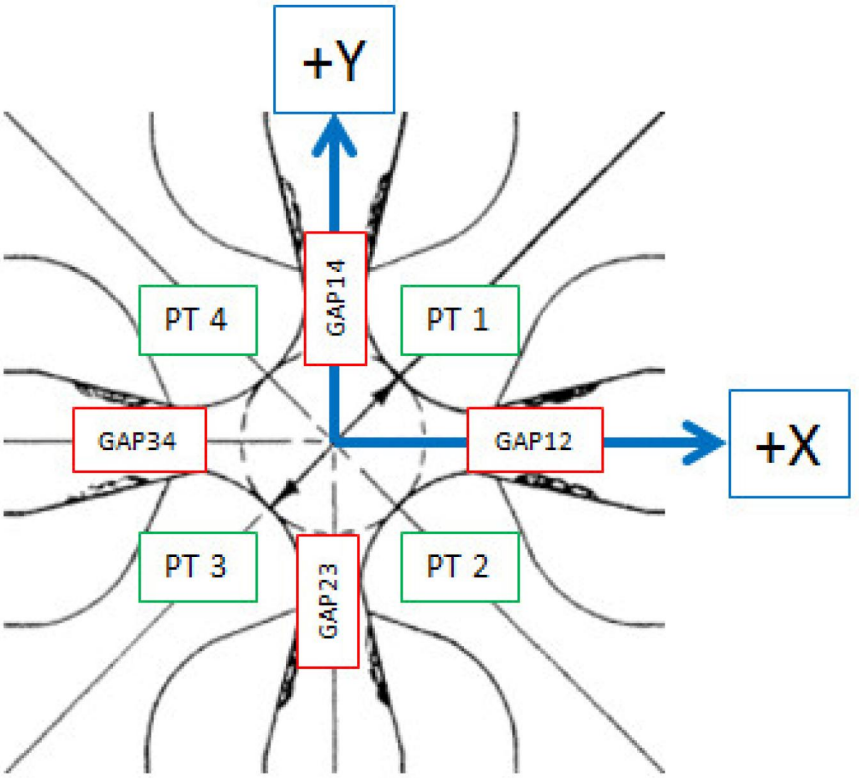
Pole Tip Gap Measurements



	Nominal Distance	Downstream Pole End	Upstream Pole End
Pole Tip Distance 1-3	1.260	1.2589	1.2594
Pole Tip Distance 2-4	1.260	1.2589	1.2592
Gap 1-2	0.432	0.4283	0.4292
Gap 2-3	0.432	0.4338	0.4343
Gap 3-4	0.432	0.4293	0.4289
Gap 4-1	0.432	0.4342	0.4359

Dimensions in Inch

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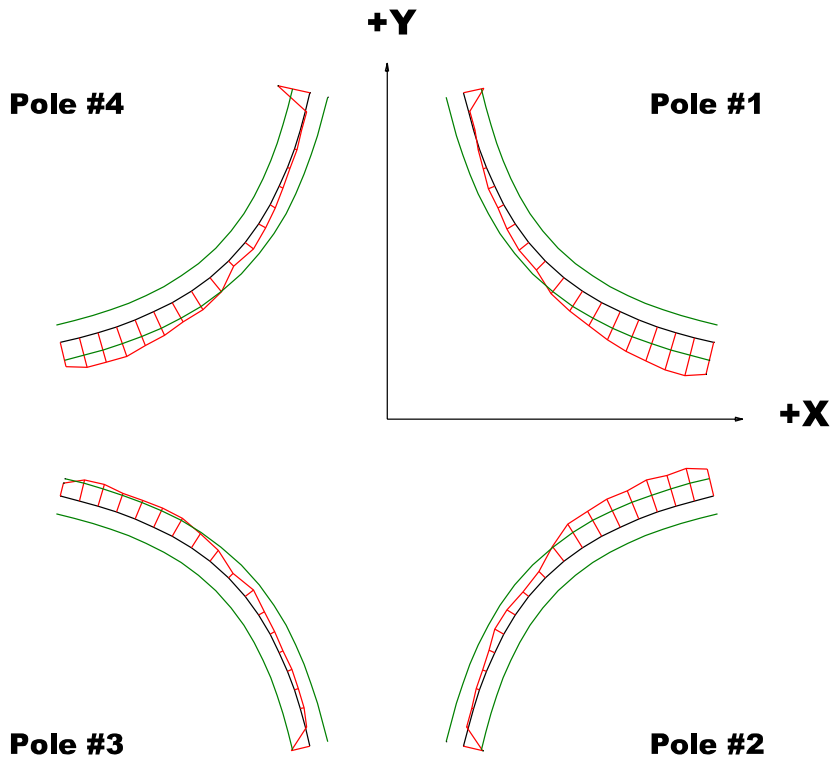
Composite Best-fit of Pole Tips, Downstream



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.	-0.0011	-0.0011	-0.0011	-0.0018
Max. Dev.	0.0022	0.0019	0.0013	0.0017

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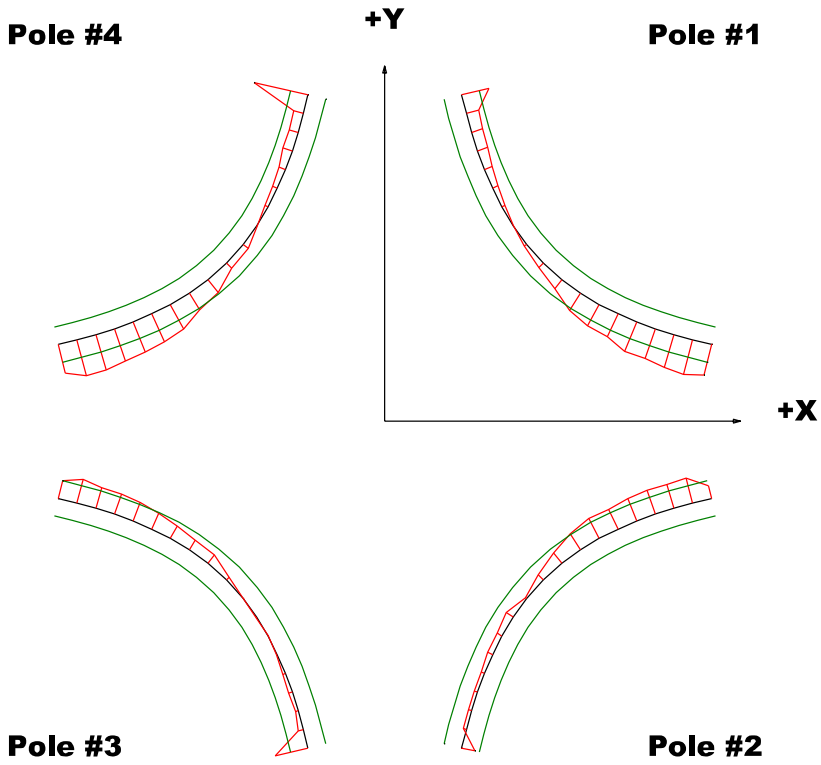
Composite Best-fit of Pole Tips, Upstream



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.	-0.0015	-0.0007	-0.0019	-0.0031
Max. Dev.	0.0020	0.0014	0.0014	0.0021

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Angle of the Composite Pole Tip Best-Fit In Relation to Base/CMM Granite Table

Angle in Decimal Degrees ° :0.01101

Angle in Milliradians :0.19212

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