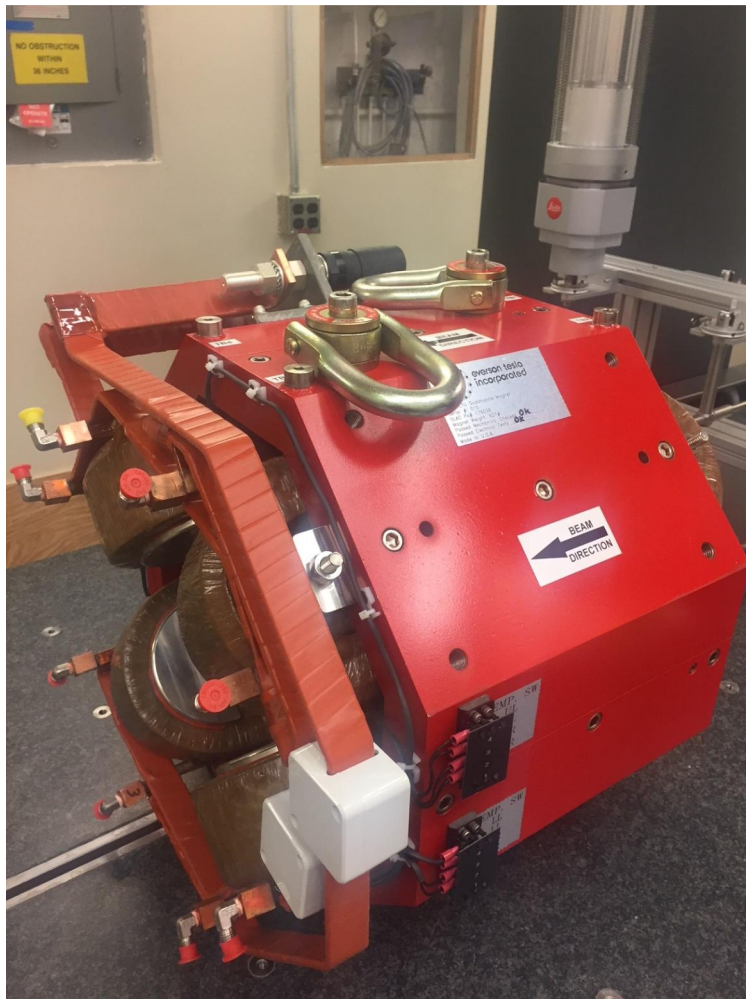


## LCLS II LTU Quad Fiducialization Report

### 1.26Q12 Quadrupole



Inspector : K. Caban  
Engineer : J. Amann  
Drawing No. : SA-380-327-00 R1  
Barcode # : 4058  
Mfg. S/N : 019

## 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.

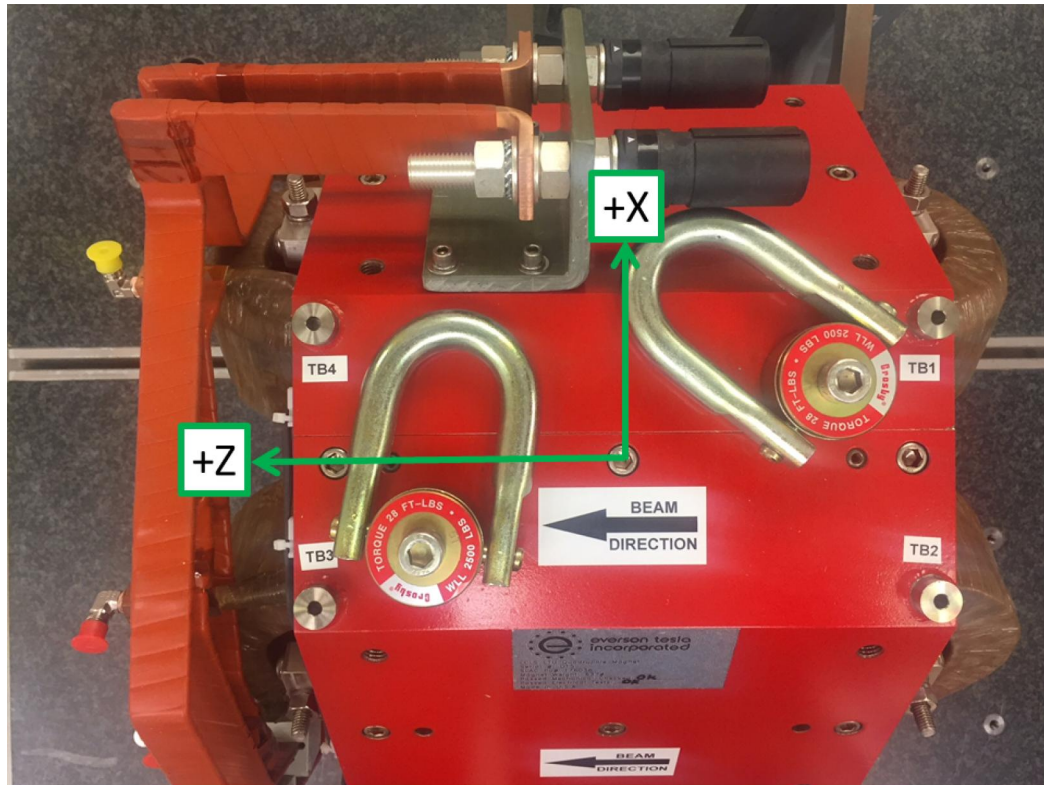
### Coordinate Origins

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	-2.5126	10.2111	-5.4717
TB 2	2.4942	10.2039	-5.4835
TB 3	2.5168	10.2044	5.4783
TB 4	-2.4844	10.2070	5.4897
TB 1*	-2.5092	9.5210	-5.4737
TB 2*	2.4933	9.5159	-5.4841
TB 3*	2.5157	9.5173	5.4791
TB 4*	-2.4832	9.5192	5.4896

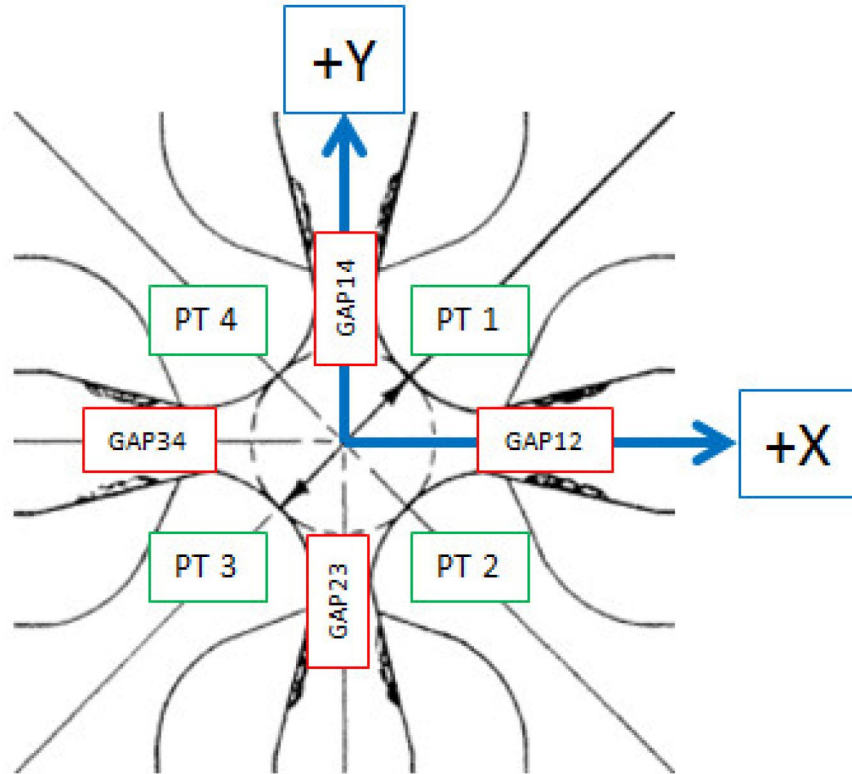
Tooling Ball (TB1-4) Locations are 1 inch above Tooling Ball Adapter Plane  
 Tooling Ball (TB1\*-4\* Locations are 5/16 inch above Tooling Ball Adapter Plane

Dimensions in Inch

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## Pole Tip Gap Measurements



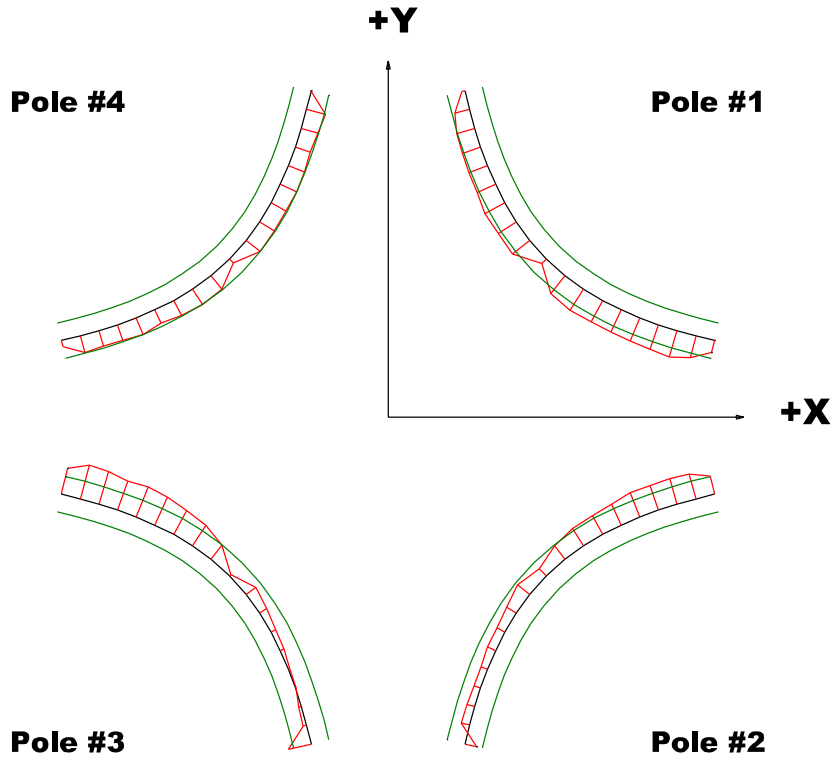
	Nominal Distance	Downstream Pole End	Upstream Pole End
Pole Tip Distance 1-3	1.260	1.2593	1.2593
Pole Tip Distance 2-4	1.260	1.2590	1.2587
Gap 1-2	0.432	0.4300	0.4297
Gap 2-3	0.432	0.4337	0.4321
Gap 3-4	0.432	0.4296	0.4326
Gap 4-1	0.432	0.4313	0.4318

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

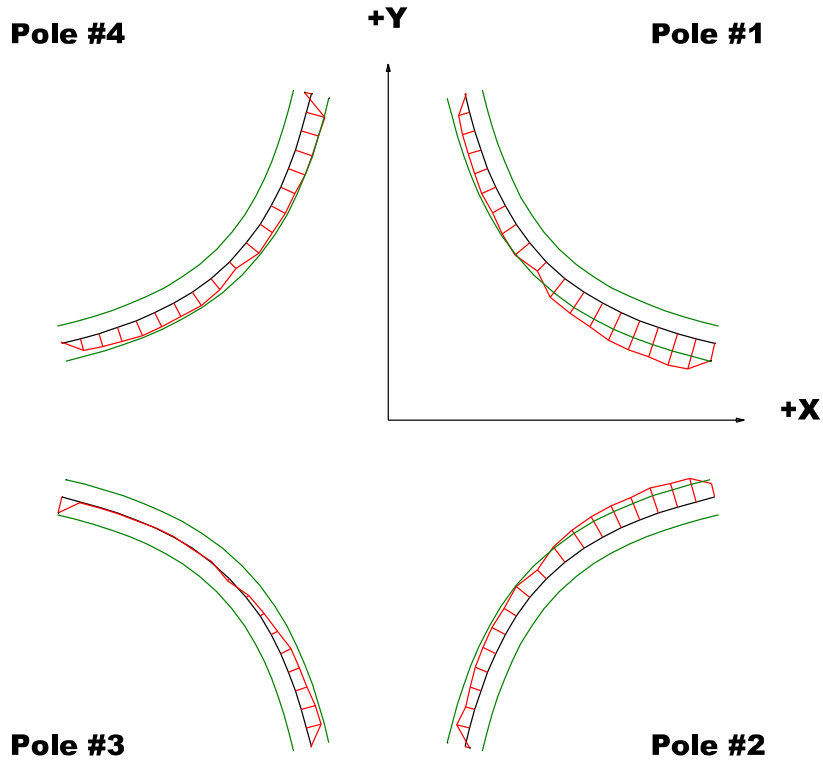
### Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	0.0002	-0.0007	-0.0013	0.0000
Max. Dev.	0.0015	0.0015	0.0019	0.0011

**Barcode # : 4058**

**Mfg. S/N : 019**

## Composite Best-fit of Pole Tips, Upstream



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

Dimensions in Inch

### Pole Tip Deviations

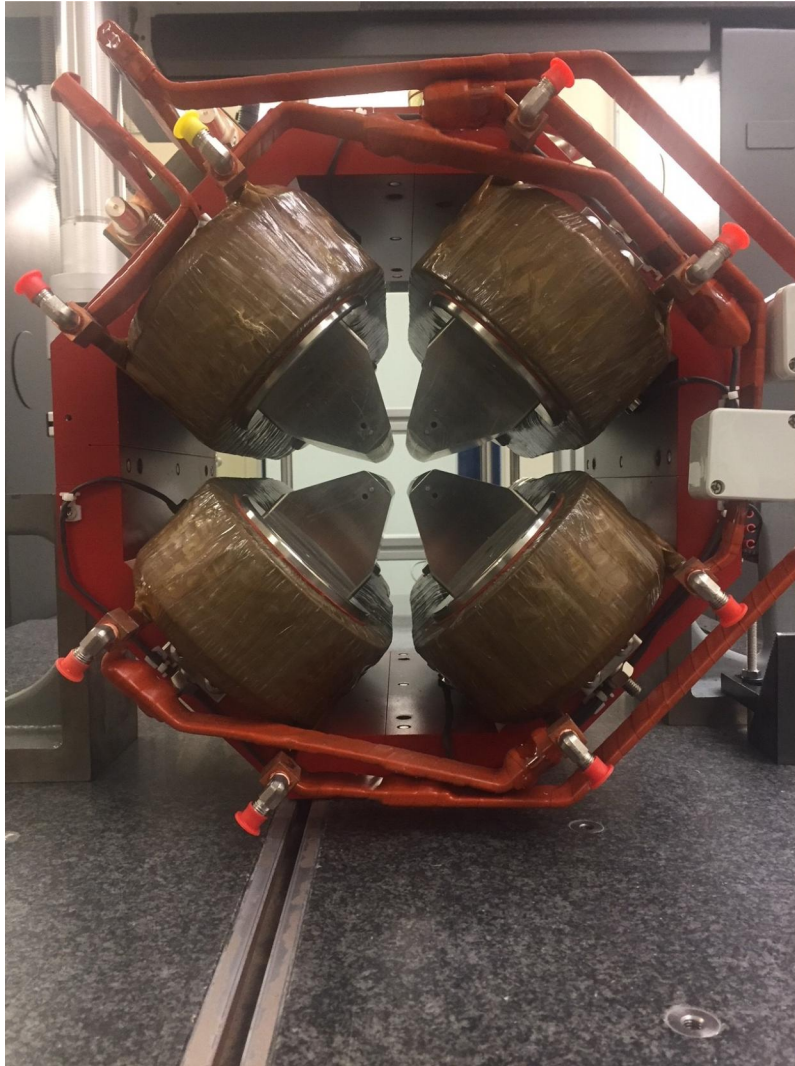
Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.0001	-0.0003	-0.0009	-0.0004
Max. Dev.	0.0018	0.0015	0.0008	0.0010

**Barcode # : 4058**

**Mfg. S/N : 019**



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



Angle in Decimal Degrees ° :0.01417

Angle in Milliradians :0.24728

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