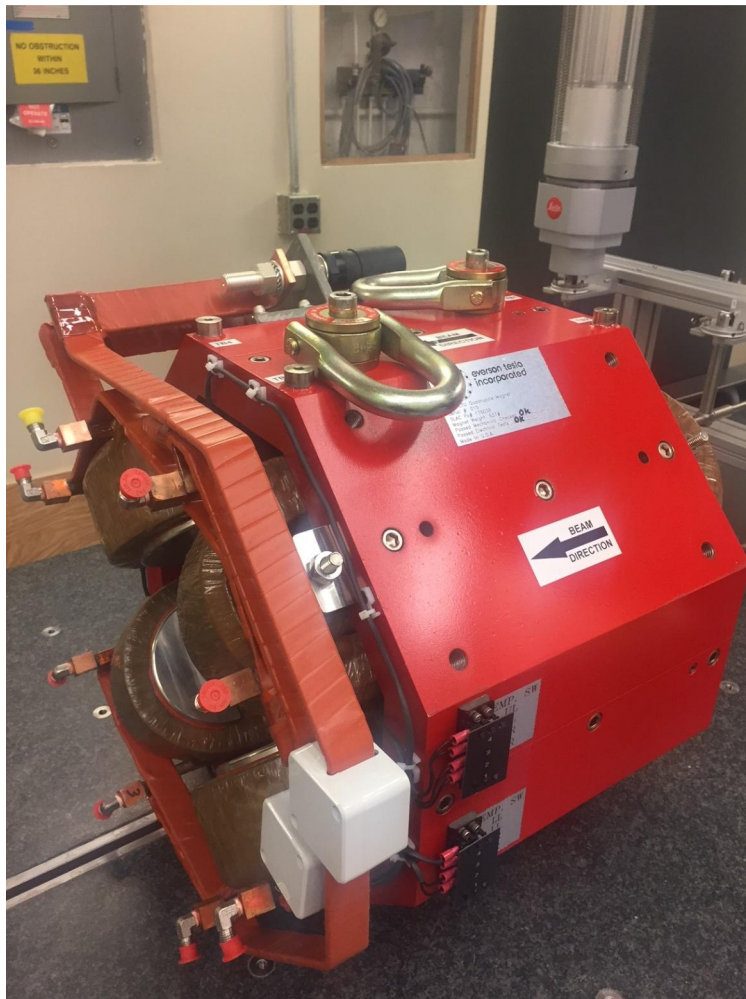


## LCLS II LTU Quad Fiducialization Report

### 1.26Q12 Quadrupole



Inspector : K. Caban  
Engineer : J. Amann  
Drawing No. : SA-380-327-00 R1  
Barcode # : 4062  
Mfg. S/N : 023

## 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.

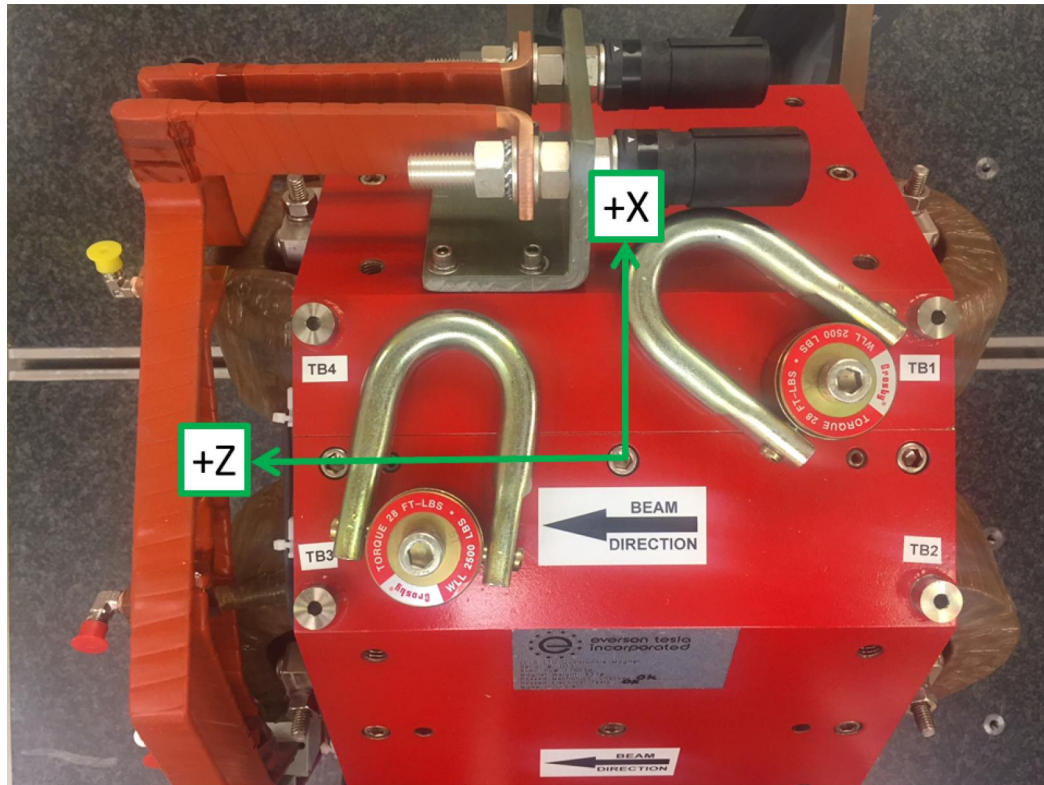
### Coordinate Origins

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	-2.5132	10.1979	-5.4840
TB 2	2.4870	10.2002	-5.4868
TB 3	2.4906	10.2020	5.4723
TB 4	-2.5174	10.1989	5.4792
TB 1*	-2.5135	9.5096	-5.4842
TB 2*	2.4891	9.5128	-5.4880
TB 3*	2.4934	9.5147	5.4740
TB 4*	-2.5175	9.5104	5.4791

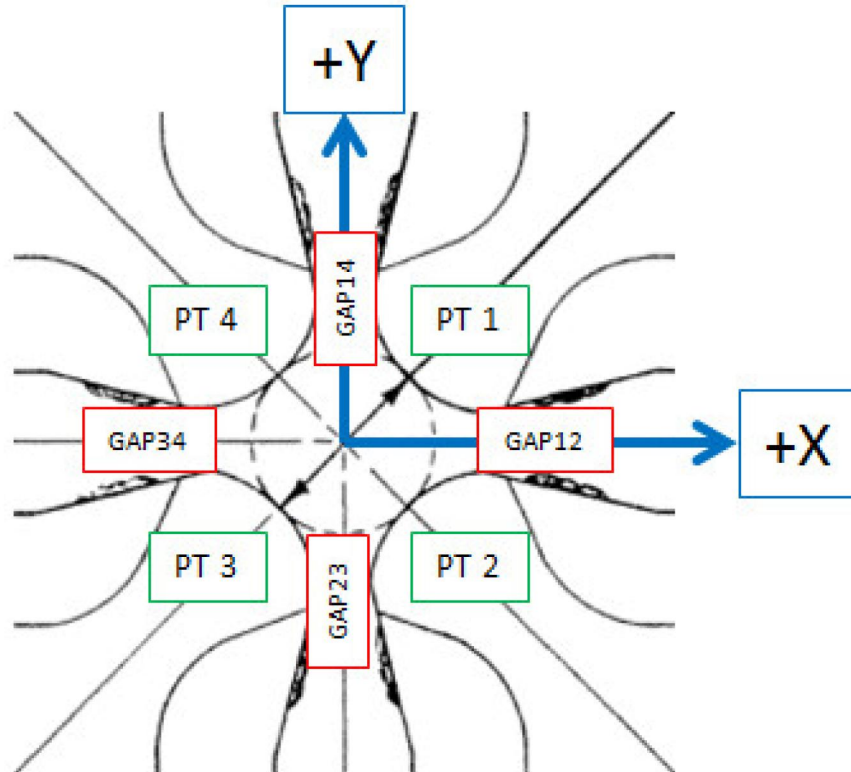
Tooling Ball (TB1-4) Locations are 1 inch above Tooling Ball Adapter Plane  
 Tooling Ball (TB1\*-4\* Locations are 5/16 inch above Tooling Ball Adapter Plane

Dimensions in Inch

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## Pole Tip Gap Measurements



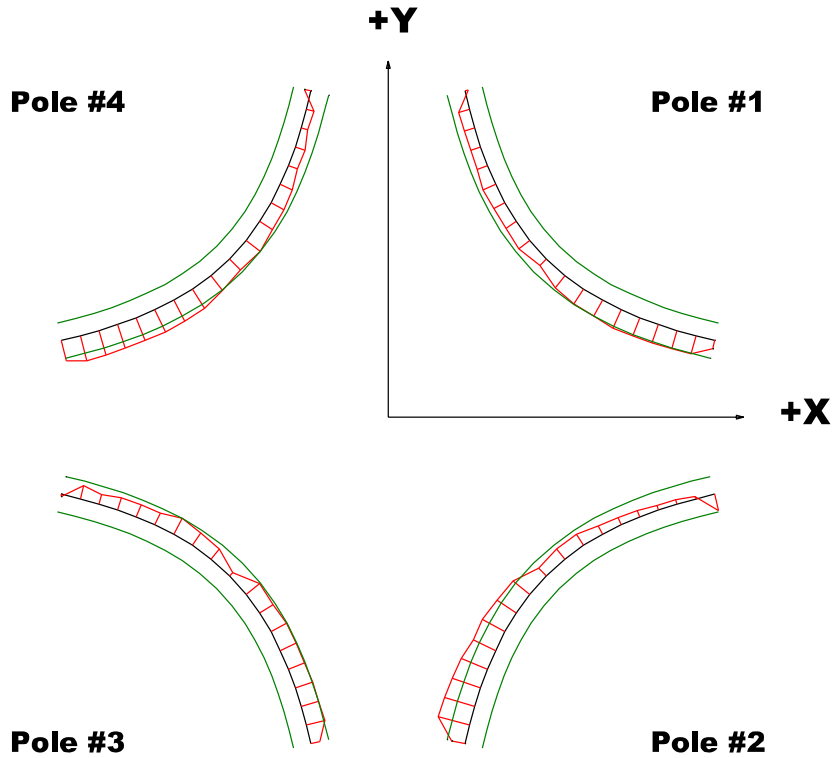
	Nominal Distance	Downstream Pole End	Upstream Pole End
Pole Tip Distance 1-3	1.260	1.2591	1.2586
Pole Tip Distance 2-4	1.260	1.2585	1.2580
Gap 1-2	0.432	0.4321	0.4283
Gap 2-3	0.432	0.4305	0.4352
Gap 3-4	0.432	0.4305	0.4287
Gap 4-1	0.432	0.4324	0.4326

Dimensions in Inch

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**Mfg. S/N : 023**

## Composite Best-fit of Pole Tips, Downstream



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

Dimensions in Inch

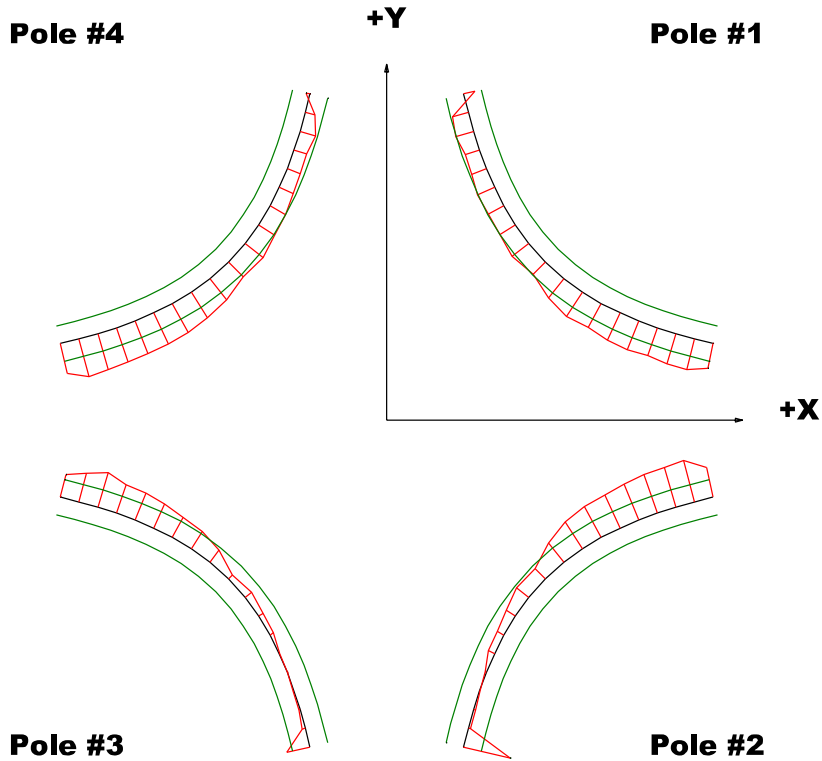
### Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.0002	-0.0009	-0.0001	-0.0004
Max. Dev.	0.0011	0.0018	0.0010	0.0014

**Barcode # : 4062**

**Mfg. S/N : 023**

## 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.	-0.0006	-0.0026	-0.0013	-0.0002
Max. Dev.	0.0018	0.0024	0.0020	0.0022

**Barcode # : 4062**

**Mfg. S/N : 023**



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



Angle in Decimal Degrees ° :-0.05399

Angle in Milliradians :-0.94224

**Barcode # : 4062**

**Mfg. S/N : 023**