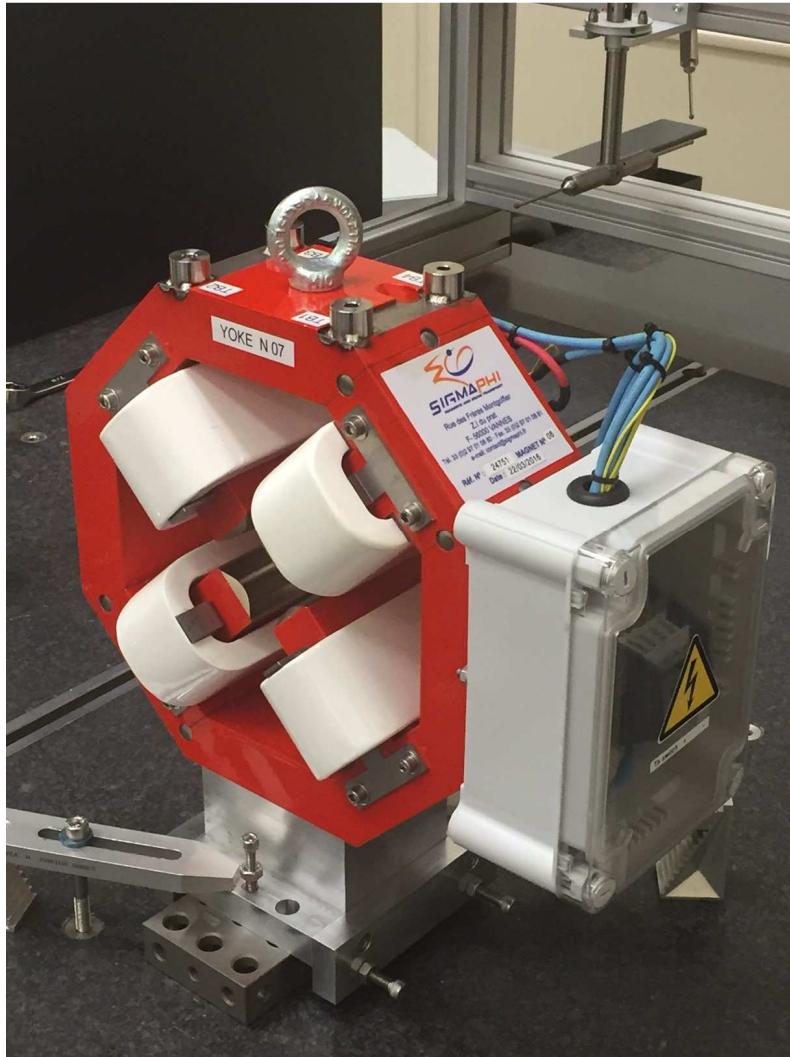


## LCLS II Tweaker Quadrupole Fiducialization Report



Inspector : K. Caban  
Engineer : J. Amann  
Drawing No. : SA-380-702-28  
Barcode # : 4100  
Mfg. S/N : 07

## **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 .300 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 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.

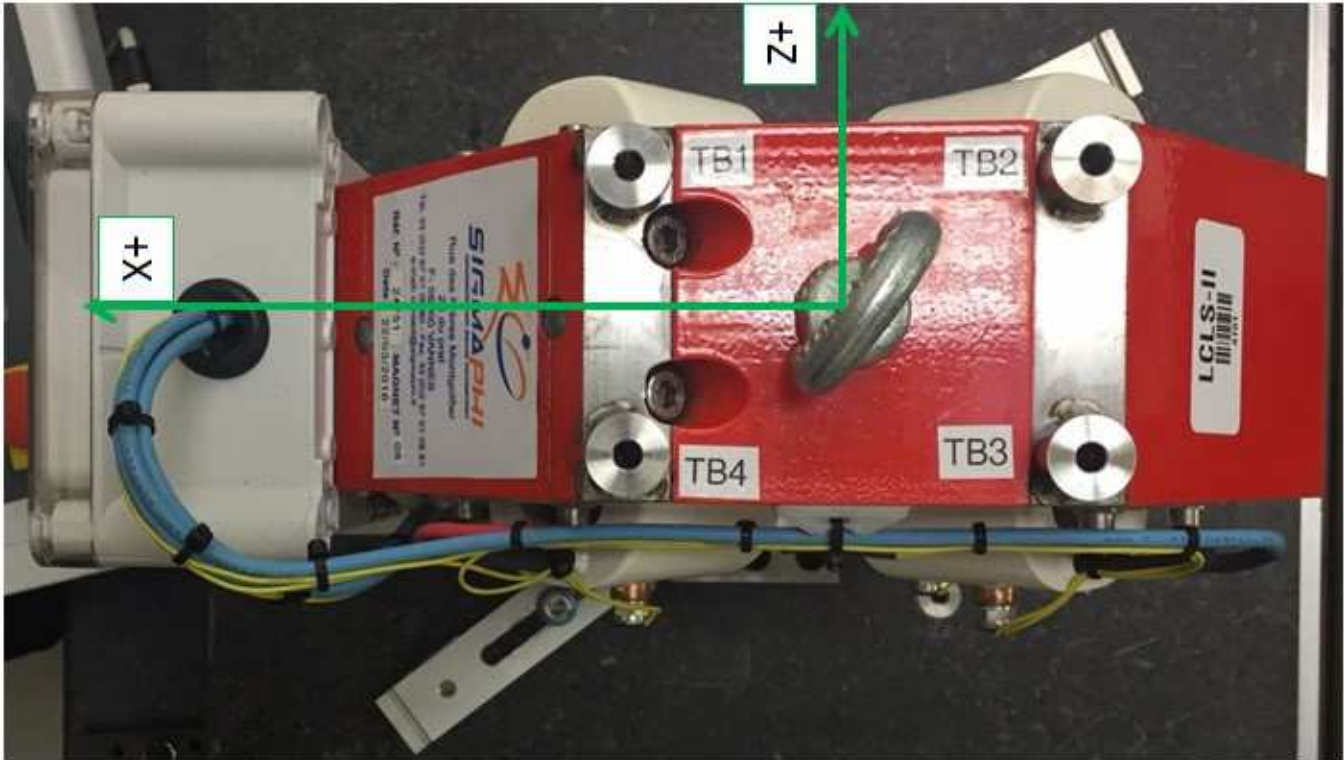
### **Coordinate Origins**

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



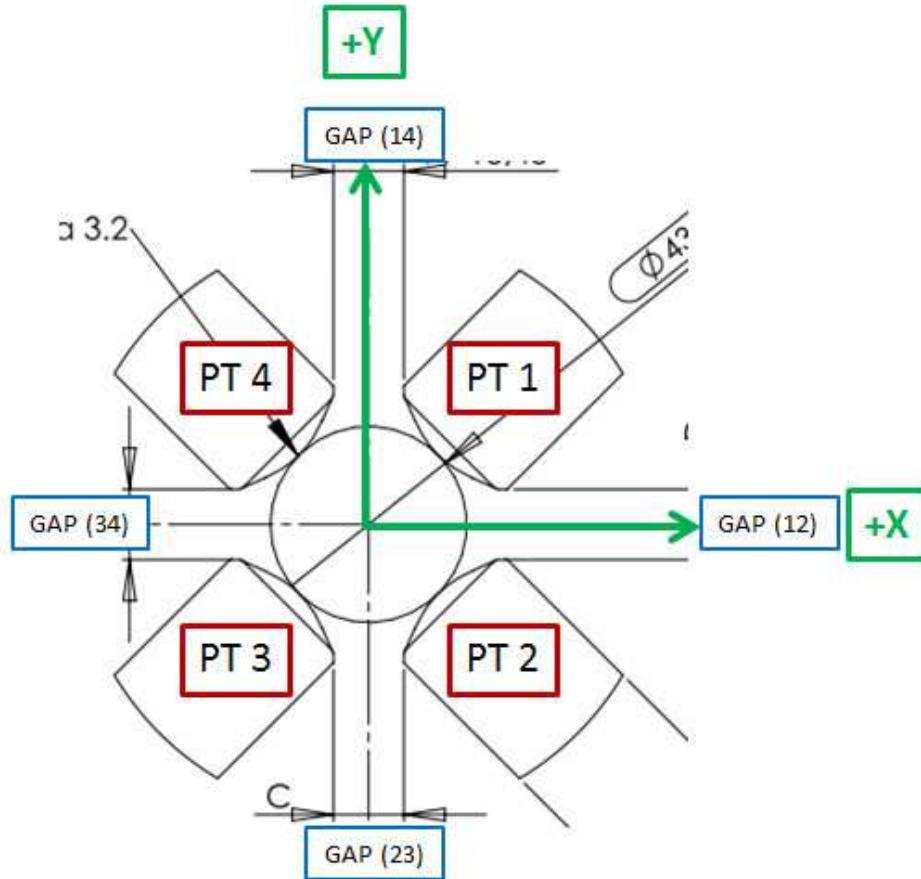
Tooling Ball	X Coord.	Y Coord.	Z Coord.
TB 1	1.97129	6.73707	1.25966
TB 2	-1.96954	6.73854	1.26245
TB 3	-1.97179	6.74035	-1.25766
TB 4	1.97162	6.73710	-1.25994
TB A	1.97073	6.04853	1.25998
TB B	-1.96972	6.04967	1.26213
TB C	-1.97142	6.05012	-1.25767
TB D	1.97109	6.04816	-1.26028

Tooling Ball Locations (1-5) are 1 inch above Tooling Ball Adapter Plane  
 Tooling Ball Locations (A-E) 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	1.693	1.69474	1.69368
Pole Tip Distance 2-4	1.693	1.69185	1.69183
Gap 1-2	0.6075	0.60664	0.60608
Gap 2-3	0.6075	0.60632	0.60597
Gap 3-4	0.6075	0.60661	0.60587
Gap 4-1	0.6075	0.60671	0.60585

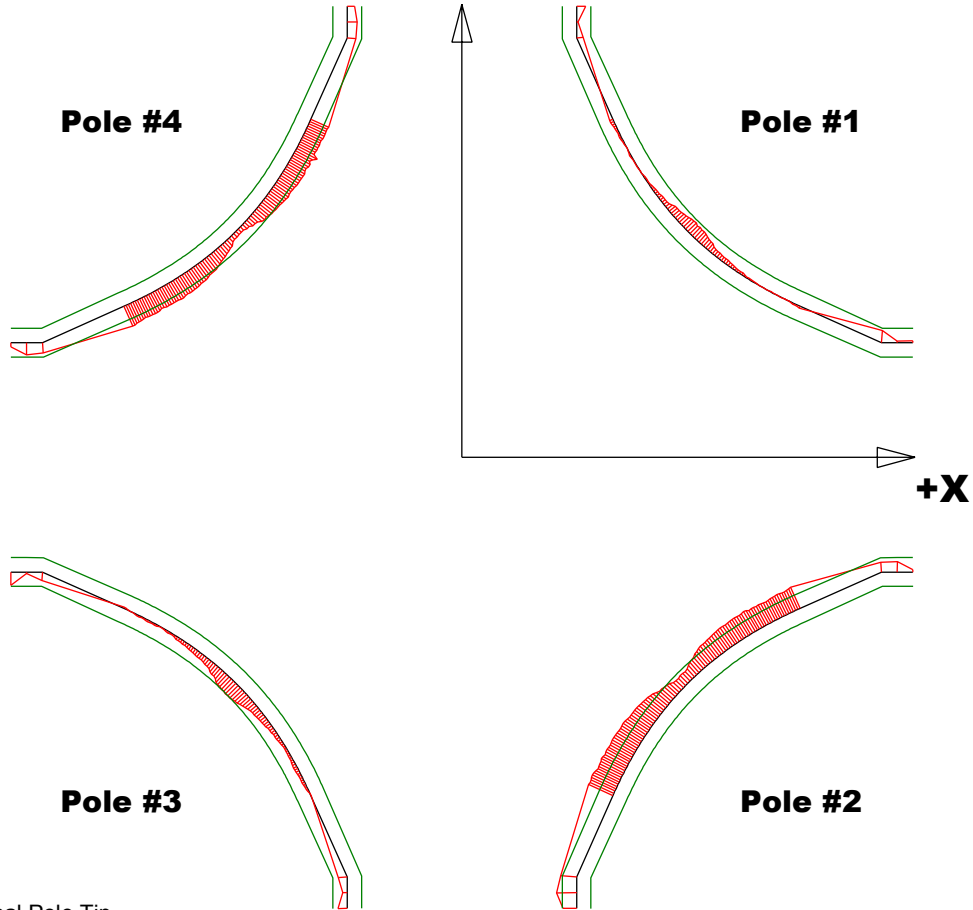
Dimensions in Inch

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# Composite Best-fit of Pole Tips, Downstream

+Y



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

Dimensions in Inch

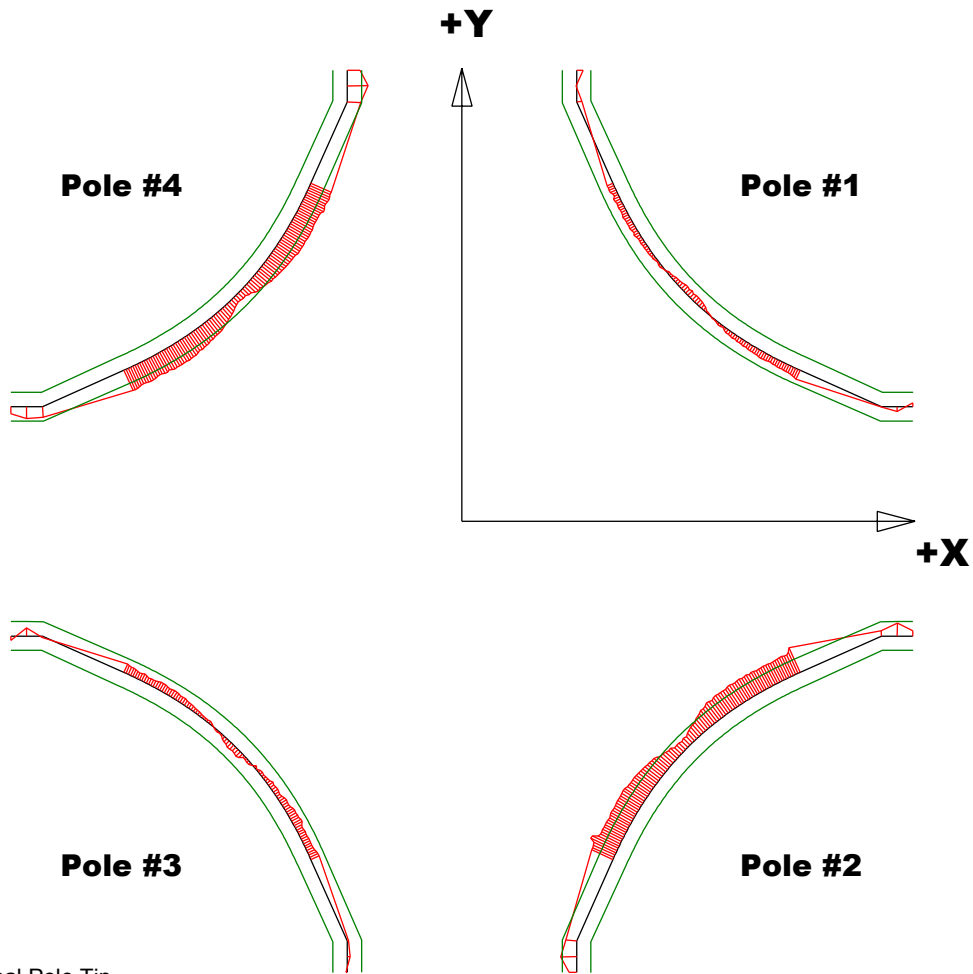
## Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.00025	-0.0019	-0.00009	-0.00162
Max. Dev.	0.00085	-0.00017	0.00103	-0.00029

**Barcode # : 4100**

**Mfg. S/N : 07**

## Composite Best-fit of Pole Tips, Upstream



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

Dimensions in Inch

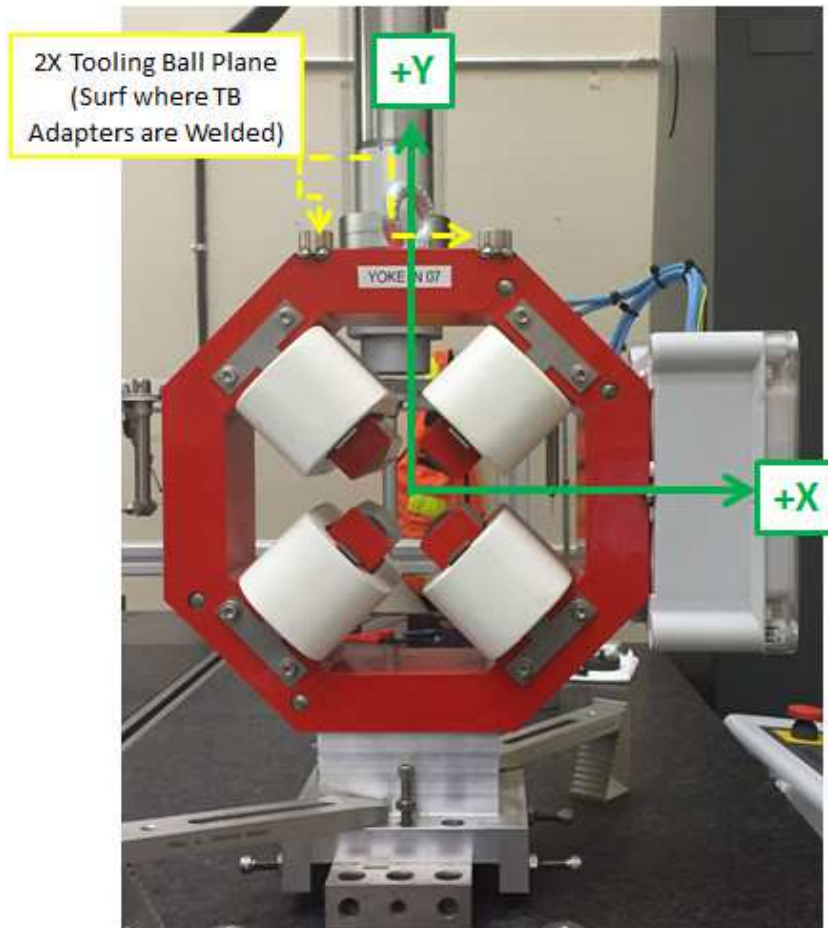
### Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.00068	-0.00201	-0.00064	-0.00164
Max. Dev.	0.00045	-0.00035	0.00043	-0.00044

**Barcode # : 4100**

**Mfg. S/N : 07**

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



Angle in Decimal Degrees ° :0.01293

Angle in Milliradians :0.22559

**Barcode # : 4100**

**Mfg. S/N : 07**