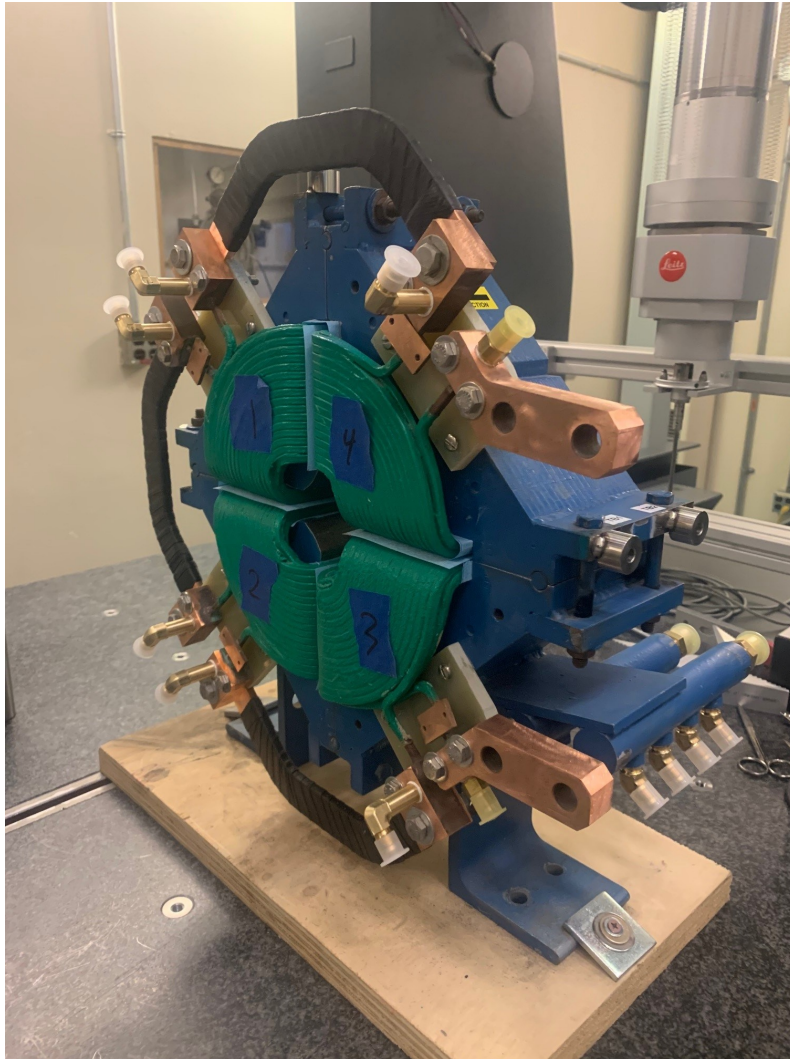


# LCLS II 2Q4W Fiducialization Report

## S30XL Refurb Quadrupole MFD FILE: 40395-5



Inspector : K. Caban  
Engineer : A. Ibrahimov  
Drawing No. : SA-344-112-18 R00  
Barcode # : 4260  
Mfg. S/N : QDAS12

## 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 0.150 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 and +Z points towards Terminal Bus End.

### 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.

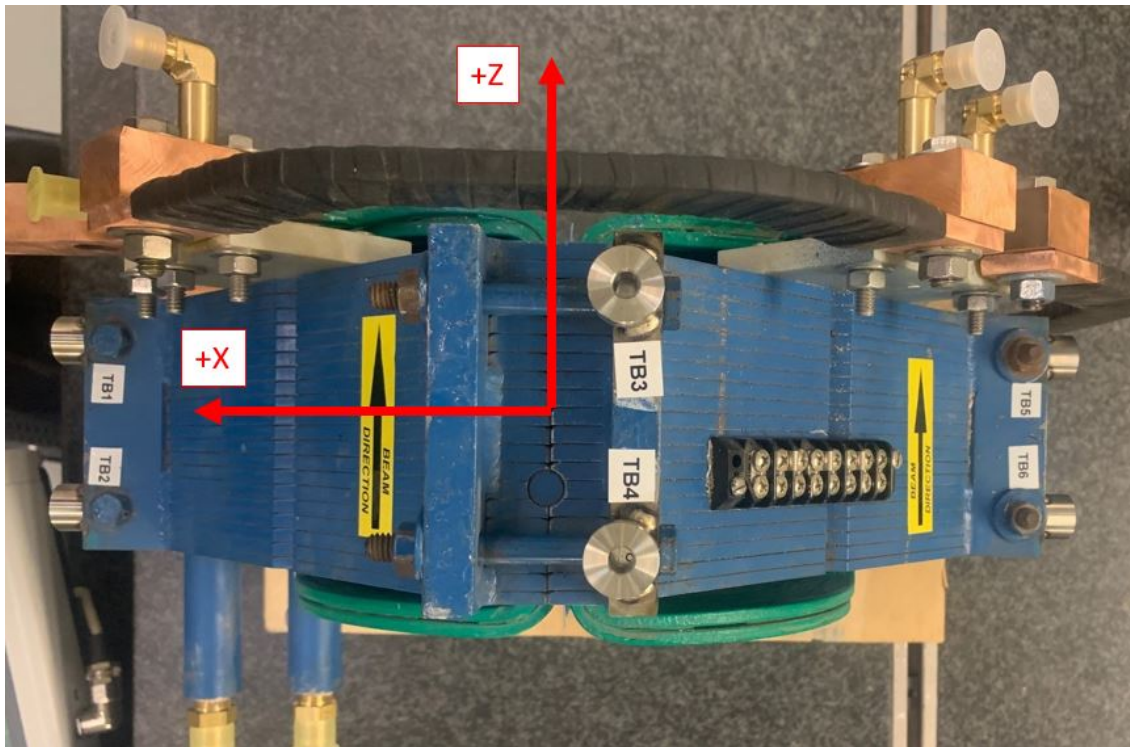
### Coordinate Origins

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. +Z points towards Terminal Bus End.

**Barcode # : 4260**

**Mfg. S/N : QDAS12**

## Tooling Ball Locations



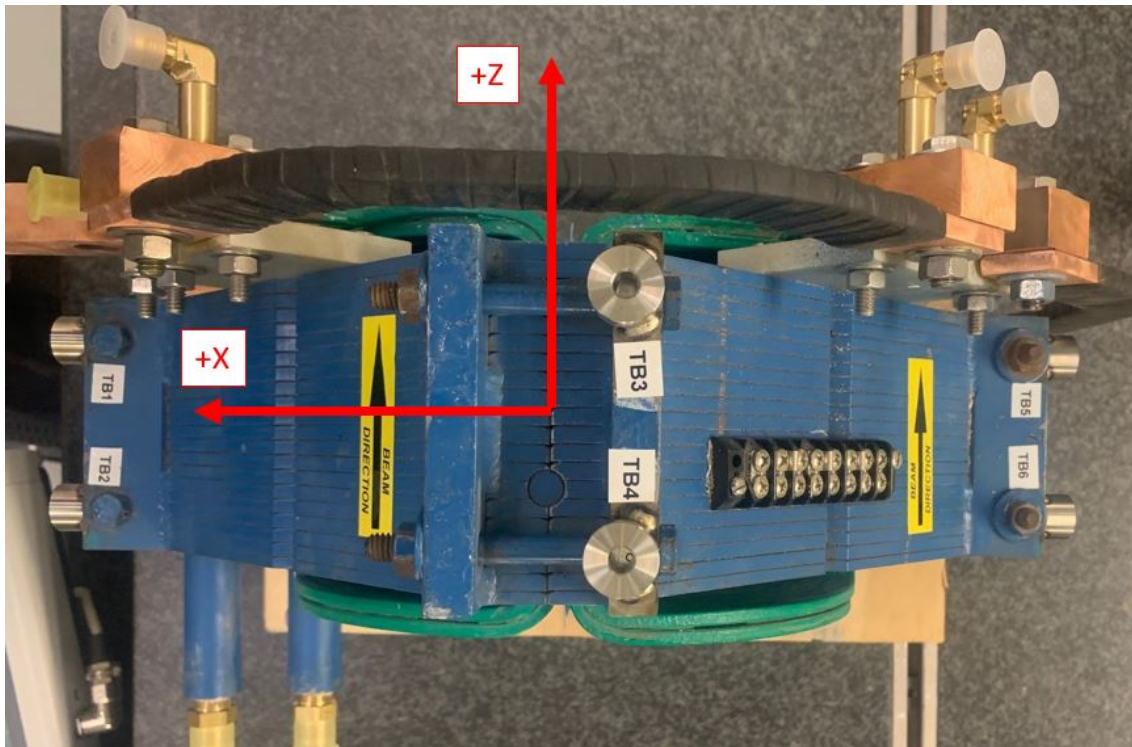
Tooling Ball	X Coord.	Y Coord.	Z Coord.
TB 1	9.0495	0.7975	1.3050
TB 2	9.0493	0.7844	-1.3189
TB 3	-0.8072	9.0471	1.3028
TB 4	-0.7884	9.0461	-1.3011
TB 5	-9.0474	0.7604	1.2986
TB 6	-9.0443	0.7790	-1.3102

Tooling Ball Locations are 1 inch above Tooling Ball Adapter Plane  
Dimensions in Inch

**Barcode # : 4260**

**Mfg. S/N : QDAS12**

## Tooling Ball Locations



Tooling Ball	X Coord.	Y Coord.	Z Coord.
TB 1	8.3619	0.8002	1.3047
TB 2	8.3622	0.7876	-1.3183
TB 3	-0.7980	8.3603	1.3042
TB 4	-0.7853	8.3594	-1.3023
TB 5	-8.3602	0.7636	1.3009
TB 6	-8.3571	0.7858	-1.3094

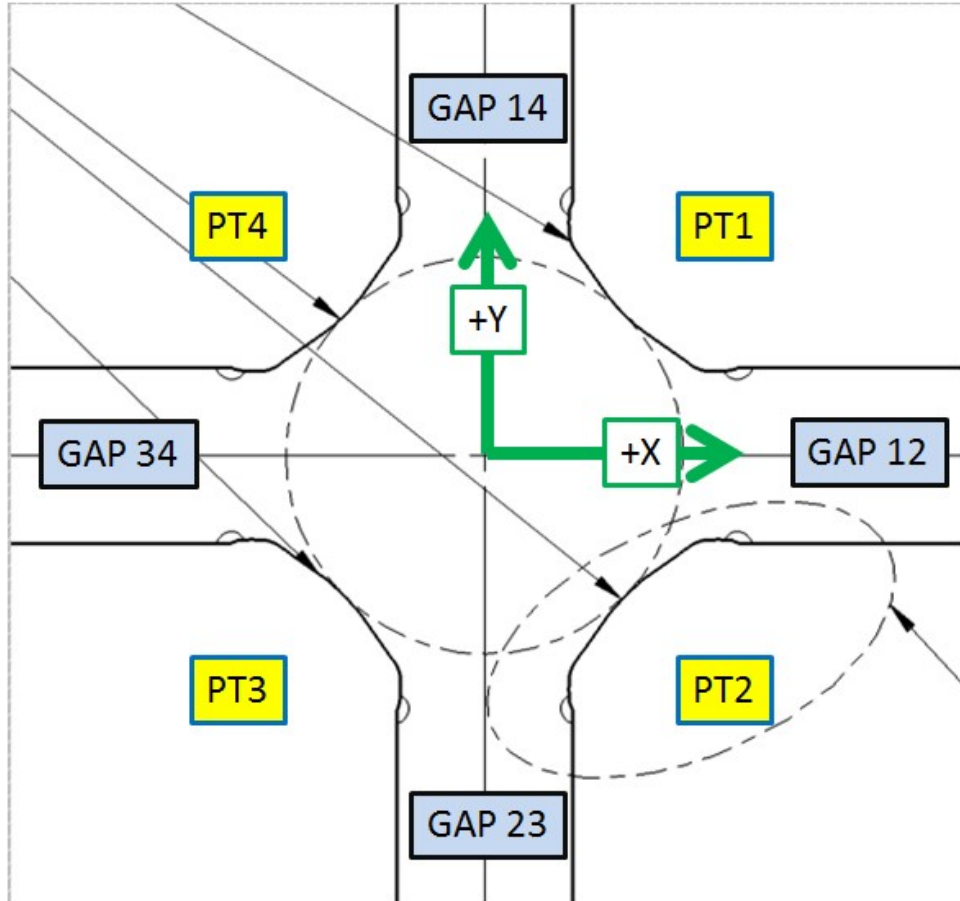
Tooling Ball Locations are 5/16 inch above Tooling Ball Adapter Plane  
Dimensions in Inch

**Barcode # : 4260**

**Mfg. S/N : QDAS12**



## Pole Tip Gap Measurements

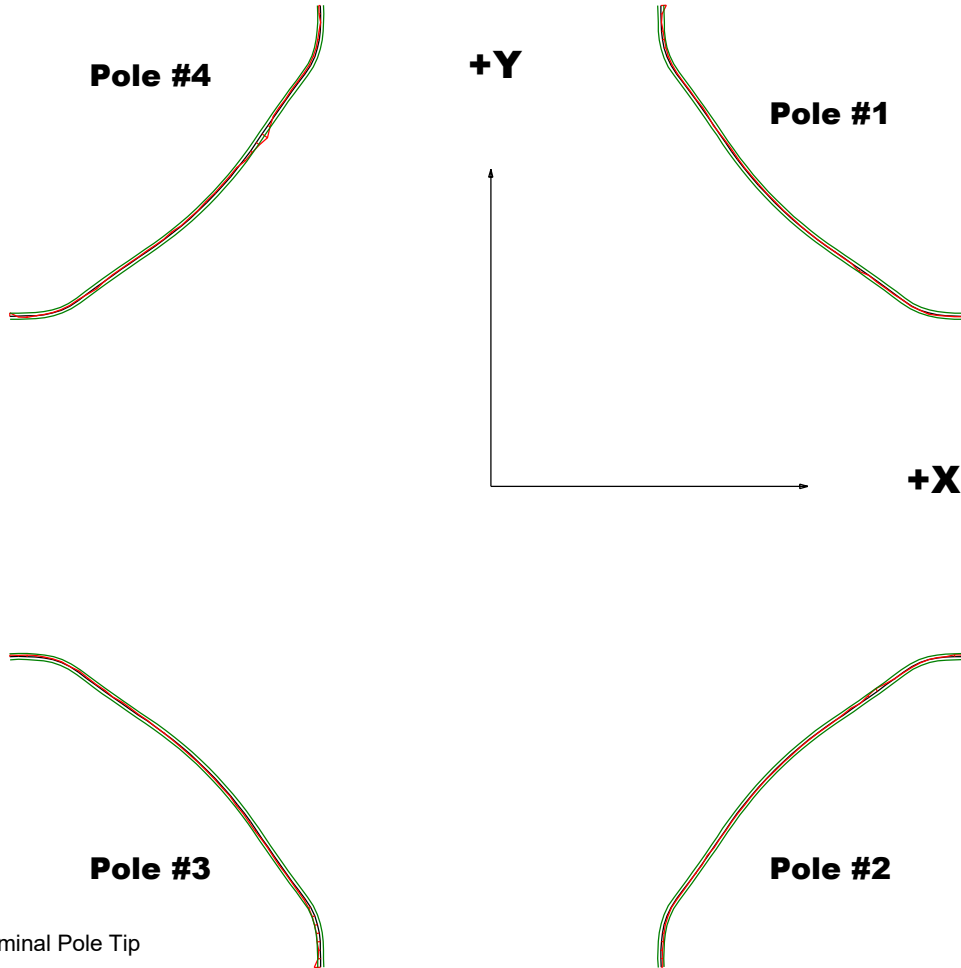


	Nominal Distance	Downstream Pole End	Upstream Pole End
PT Distance 1-3	2.026	2.0265	2.0281
PT Distance 2-4	2.026	2.0266	2.0275
Gap 1-2	0.8602	0.8561	0.8548
Gap 2-3	0.8602	0.8599	0.8627
Gap 3-4	0.8602	0.8578	0.8544
Gap 1-4	0.8602	0.8592	0.8649

Dimensions in Inch

**Barcode # : 4260**  
**Mfg. S/N : QDAS12**

## Composite Best-fit of Pole Tips, Downstream



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

Dimensions in Inch

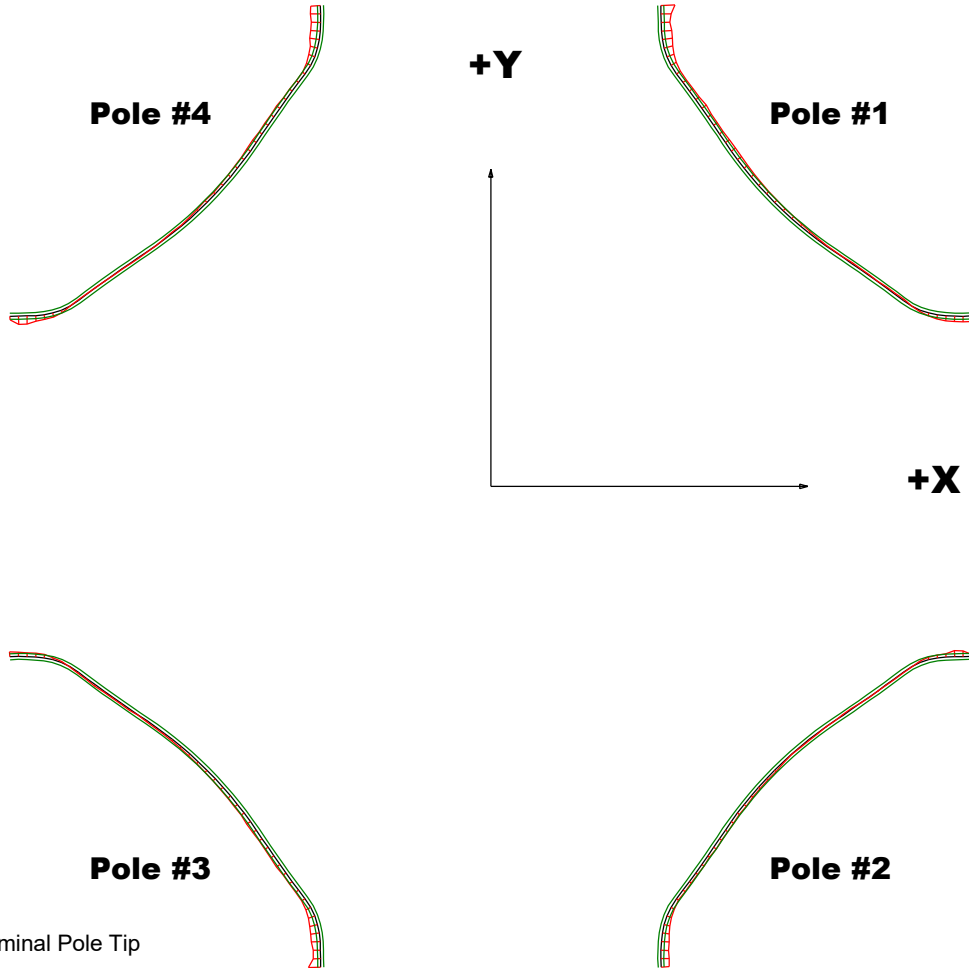
### Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.0018	-0.0009	-0.0022	-0.0011
Max. Dev.	0.0008	0.001	0.0005	0.0022

**Barcode # : 4260**

**Mfg. S/N : QDAS12**

## Composite Best-fit of Pole Tips, Upstream



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

Dimensions in Inch

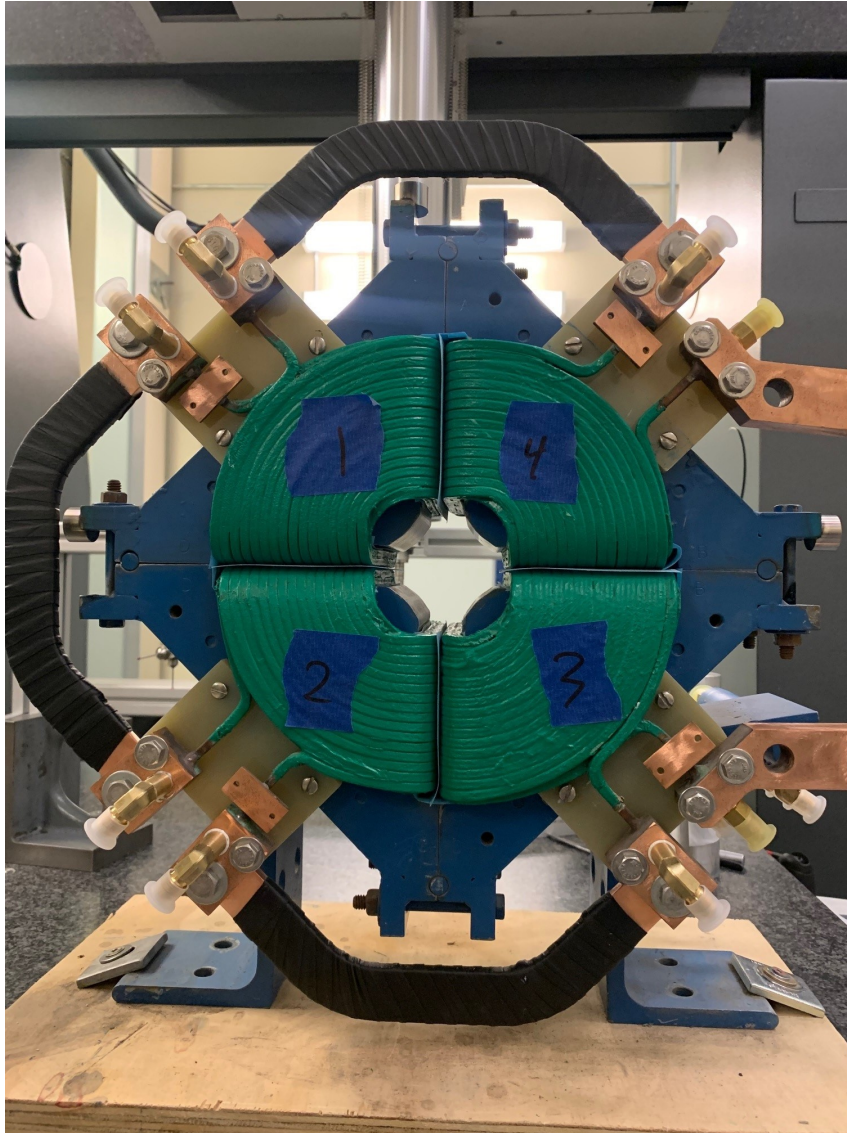
### Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.0046	-0.0028	-0.0041	-0.0034
Max. Dev.	0.0019	0.002	0.0017	0.0028

**Barcode # : 4260**

**Mfg. S/N : QDAS12**

## Angle of the Composite Pole Tip Best-Fit



in Decimal Degrees ° : -0.11377

Angle in Milliradians : -1.98572

**Barcode # : 4260**

**Mfg. S/N : QDAS12**