Mechanical Requirements

Item	Description	Quantity/Value	units	Notes
Envelope inner limit		5.4	cm	Inner ladder is at 6 cm. Ladders are tilted
Envelope outer limit		13.5	cm	Outer ladder is at 12 cm. Tilted/Readouts
Axial location relative to IP		50	cm	To HDI cable end
Weight (without external connected services)		TBD		
Envelope precision (axial)		± 2	mm	
Envelope precision (radial)		± 1	mm	
Envelope precision (roll)		± 2	degrees	
Envelope precision (pitch)		± 2	mm	
Envelope precision (yaw)		± 2	mm	
Envelope stability (axial)		± 2	mm	
Envelope stability (radial)		± 1	mm	
Envelope stability (roll)		± 1	mm	
Envelope stability (pitch)		± 1	mm	
Envelope stability (yaw)		± 1	mm	
Envelope repeatability (axial)		± 1	mm	
Envelope repeatability (radial)		± 1	mm	
Envelope repeatability (roll)		± 1	mm	
Envelope repeatability (pitch)		± 1	mm	
Envelope repeatability (yaw)		± 1	mm	

Services (cables/fibers)

Item	Description	Quantity/Value	units	Notes
HV Size/type	Each half ladder needs 1 HV cable	1.5	mm	Connection is at HDI end
HV number	Each half ladder needs 1 HV cable	116 x 2 = 232 cables		116 cables each side
HV length		10	m	from ladder to Local Power/Rack at IR
LV Size/type for the ROC	1 cable with 22 pin connectors	8.8	mm	Each ROC needs one LV cable
LV number for the ROC	1 cable at each ROC	1 cables x 24 ROCs = 24 cables		12 cables each side
LV length for the ROC	From the ROC to local Power Rack Room	10 each	m	Depends on the location of the Local Power ROC at IR
LV Size/type for the ladder at the ROC	4 cables in each ROC	9.5 each cable	mm	
LV number for the ladder at the ROC	4 cables in each ROC	4 cables x 24 ROCs = 96 cables		48 cables in each side
LV length for the Ladder at the ROC	From the ROC to local power Rack Room	10 each		Depends on the location of the Local Power ROC at IR
Data Signal Size/type	4 x 12 fibers optical cables data each ROC	3	mm	Connection is at the ROC
Data Signal number	4 x 12 fibers optical cables data each ROC	4 cables x 24 ROCs = 96 cables		48 cables in each side
Data Signal length	From the ROC to patch panel to rack room	10 + 70 = 80	m	From the ROC to patch panel to rack room
Slow Control Size/type	1 duplex fibers optical cable	1.3 each	mm	
Slow Control number	1 duplex fibers optical cable	1 duples x 24 ROCs = 24	m	12 each side
Slow Control length	From the ROC to patch panel to rack room	70	m	From the ROC to patch panel to rack room
Clock Cable (ROC to clock board): Size/type	Clock cable with 8 pin connector	5	mm	
Clock Cable (ROC to clock board): number	Each ROC has one clock cable	1 cable x 24 ROCs		12 each side

Clock Cable (ROC to clock board): length	From ROC to cloack board	2	m	
Clock Cable (clock board to patch panel): Size/type	1 duplex fiber optical cable	1.3 each	mm	
Clock Cable (clock board to patch panel): number	1 duplex fiber optical cable serve 6 ROCs	24/6 = 4		2 each side
Clock Cable (clock board to patch panel): length	1 duplex fiber: from clock board to patch panel	10	m	
Clock Cable (clock board to patch panel): Size/type	power cable: clock board to patch panel	0.5	mm	
Clock Cable (clock board to patch panel): number	Each cloack board serve 6 ROCs	24/6 = 4		2 each side
Clock Cable (clock board to patch panel): length	power cable: clock board to patch panel	10	m	
Temperature Cable Size/type	One cable from HDI end to readout board at IR	1.5	mm	
Temperature Cable number	One cable from HDI end to readout board at IR	116 x 2 = 232 cables		116 cables each side
Temperature Cable length	One cable from HDI end to readout board at IR	10	m	

Cooling

Item	Description	Quantity/Value	units	Notes
Detector total heat load	390 uW x 128ch x 26 chips x2 x 116 ladders = 301 W	400 W		
Coolant Temperature at ladder		5 to 10 degrees celsius	degrees celsius	
Coolant flow rate		TBD		
Coolant temperature at ROC big wheel		10 degree celsius		
Coolant temperature stability		± 1 degree celsius		

Other

Item	Description	Quantity/Value	units	Notes
Laser requirements	Not applicable (Laser not needed)	NA		
# Racks (on-carriage)	1 Rack for patch pannels: data signal and slow controle			
# Racks (rack room)	2 Racks: Using existing FVTX Racks for FEMS and DCMs			