

Component	Quantity	Weight Unit (kg)	Weight SubT							
Arm Structure	1	7.5	7.5							
Motors	0.595248	4	2.380992							
Harmonic Big	1.44403	2	2.88806							
Harmonic Small	1.05822	2	2.11644							
O-Drive	0.11	4	0.44							
			15.325492							
MASTER WEIGHT					MASTER RAD	meters				
Tube A		0.339			Dis A	0.047				
Tube B		0.271			Dis B	0.254				
Module face		0.326			Dis C	0.047				
Module Center		0.112			Dis D	0.2032				
Module Empty		0.263								
Cube Mart Motor		0.270								
Big Harmonic		0.656								
Small Harmonic		0.478								
Odrive		0.03622								
Load		5								
Hand		0.5								
Motor Module 2nd Stage		1.400								
Motor Module 3rd Stage		1.222								
FOS	2									
Worse Case Loading Module					Worse Case Loading Tube					
Y Direction Moment					Y Direction Moment					
	Unit	Weight	Radius	Torque(Nm)		Unit	Weight	Radius	Torque(Nm)	
1	Tube A	0.339	0.301	0.9999822	2	MM 2	1.400	0.301	4.134583618	
2	MM 2	1.400	0.602	8.260737912	3	Module Empty 1	0.263	0.301	0.77658903	
3	Module Empty 1	0.263	0.602	1.5515948	4	Tube B	0.271	0.8522	2.265582222	
4	Tube B	0.271	0.8522	2.26327276	5	MM3	1.222	0.8014	9.608768529	
5	MM3	1.222	1.1024	13.20427821	6	Module Empty 1	0.263	1.1024	2.844225072	
6	Module Empty 1	0.263	1.1024	2.84132576	7	Hand	0.5	0.8014	3.930867	
7	Hand	0.5	1.1024	5.40176	8	Load	5	0.8014	39.30867	
8	Load	5	1.1024	54.0176				Sum:	62.86928547	
			Sum:	88.54055165				Load Condition:	125.7385709	
			Load Condition:	177.0811033						
						Z Direction Shear				

X Direction Moment							Unit	Weight	Radius	Torque(Nm)
	Unit	Weight	Radius	Torque(Nm)						
	1 Tube A	0.339	0	0			1 MM 2	1.400		13.7361582
	2 MM 2	1.400	0	0			2 Module Empty 1	0.263		2.58003
	3 Module Empty 1	0.263	0	0			3 Tube B	0.271		2.65851
	4 Tube B	0.271	0.089225	0.236963755			4 MM3	1.222		11.9899782
	5 MM3	1.222	0.089225	1.068715279			5 Module Empty 1	0.263		2.58003
	6 Module Empty 1	0.263	0	0			6 Hand	0.5		4.905
	7 Hand	0.5	0	0			7 Load	5		49.05
	8 Load	5	0	0					Sum:	87.4997064
			Sum:	1.305679034					Load Condition:	174.9994128
			Load Condition:	2.611358068						
Z Direction Shear										
	Unit	Weight	Radius	Torque(Nm)						
	1 Tube A	0.339	0	3.32559						
	2 MM 2	1.400	0	13.7361582						
	3 Module Empty 1	0.263	0	2.58003						
	4 Tube B	0.271	0	2.65851						
	5 MM3	1.222	0	11.9899782						
	6 Module Empty 1	0.263	0	2.58003						
	7 Hand	0.5	0	4.905						
	8 Load	5	0	49.05						
			Sum:	90.8252964						
			Load Condition:	181.6505928						

[illegible]

