

Diagram illustrating the components of a 5-DOF leg mechanism:

- Leg Actuator 1
- Link 1
- Leg Actuator 2
- Link 2
- Leg Actuator 3
- Link 3
- Leg Actuator 4
- Link 4
- Leg Actuator 5
- Link 5
- Foot and Ankle

				0.7853981634							
Component Type	Mass (kg)	Vertical Length [m]	Notes	Longitudinal Len (m)	Required Rated Torque [Nm]	Spec'd Motors	Rated Torque	Cost	Mass [Kg]		
Leg Actuator 1 (Hip to Leg): Leg Raise Qty		Units	Notes			Leg Actuator 2	Qty	Units	Notes		
Mass: Link Leg 1,2,3,4,5, Foot	5.529381259	Kg				Mass: Link Leg 2,3,4,5, Foot	5.113437059	Kg			
Length: 1,2,3,4,5, Foot	1.0918952	Meter				Length: 2,3,4,5, Foot	0.9960102	Meter			
Center of Mass: Link 1,2,3,4,5, Foot	0.5459476	Meter				Center of Mass: Link 2,3,4,5, Foot	0.4980051	Meter			
Weight of Beam	54.24323015	N				Weight of Beam	50.16281755	N			
Length: Actuator 1 to 2	0.095885	Meter				Length: Actuator 2 to 3	0	Meter			
Weight: Actuator 2	2.4525	N				Weight: Acuatorator 3	2.4525	N			
Length: Actuator 1 to 3	0.095885	Meter				Length: Actuator 2 to 4	0.5348986	Meter			
Weight: Actuator 3	2.4525	N				Weight: Actuator 4 + Belt Assem	22.7039697	N			
Length: Actuator 1 to 4	0.6307836	Meter				Length: Acuatorator 2 to 5	0.9198102	Meter			
Weight: Actuator 4 + Belt Assem	22.7039697	N				Weight: Actuator 5	4.905	N			
Length: Actuator 1 to 5	1.0156952	Meter				Moment: Beam (Link Leg 2,3,4,5, Foot)	24.98133897	Nm			
Weight: Actuator 5	4.905	N				Moment: Actuator 3	0	Nm			
Moment: Beam (Link leg 1,2,3,4,5, foot)	29.61396132	Nm				Moment: Actuator 4 + Belt Assem	12.14432161	Nm			
Moment: Actuator 2	0.2351579625	Nm				Moment: Actuator 5	4.511669031	Nm			
Moment: Actuator 3	0.2351579625	Nm				Moment on Joint 2: Sum of Moments	41.63732961	Nm			
Moment: Acuatorator 4 and Belt Assem	14.32129174	Nm									
Moment: Acuatorator 5	4.981984956	Nm									
Moment on Joint 1: Sum of Moments	49.38755394	Nm									

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Component Type	Mass (kg)	Vertical Length [m]	Notes	Longitudinal Len (m)	Required Rated Torque [Nm]
Leg Actuator 3	Qty	Units	Notes		
Mass: Link Leg 5 and Foot	3.0163892	Kg			
Length: Leg 5 and Foot	0.4611116	Meter			
Center of Mass: Leg 5 and Foot	0.2305558	Meter			
Weight of Beam	29.59077805	N			
Length: Knee to Actuator 5	0.3849116	Meter			
Weight: Actuator 5	4.905	N			
Moment: Beam (Leg 5 and Foot)	6.822325506	Nm			
Moment: Actuator 5	1.887991398	Nm			
Moment on Joint 3: Sum of Moments	8.710316904	Nm			
Leg Actuator 4: Knee Raise	Qty	Units	Notes		
Mass: Link Leg 5 and Foot	3.0163892	Kg			
Length: Leg 5 and Foot	0.4611116	Meter			
Center of Mass: Leg 5 and Foot	0.2305558	Meter			
Weight of Beam	29.59077805	N			
Length: Knee to Actuator 5	0.3849116	Meter			
Weight: Actuator 5	4.905	N			
Moment: Beam (Leg 5 and Foot)	6.822325506	Nm			
Moment: Actuator 5	1.887991398	Nm			
Moment on Joint 4: Sum of Moments	8.710316904	Nm	Lower bound torque		
Leg Actuator 4: Squat	Qty	Units	Notes		
Mass: Upper Body + hip	53	Kg			
Length: Link 1,2,3,4	0.6307836	Meter			
Length: Upper Body Moment Arm	0.1291769404	Meter	Account for Squat Angle [ADJUST LENGTH for REDUCING LENGTH MOMENT ARM]		
Center of Mass: Link, 1,2,3,4,	0.2583538808	Meter	Account for Squat Angle		
Angle Of Squat from horizontal Plane	0.610865	Radians	35 degrees		
Weight Upper Body	519.93	N			
Mass: Link Leg 1,2,3,4	2.512992059	Kg			
Weight of Beam	24.6524521	N			
Length: Knee to Actuator 4	0.2190816774	Meter	Account for Squat Angle		
Weight: Acutator 4	4.905	N			
Length: Knee to Actuator 3	0.4381633548	Meter	Account for Squat Angle		
Weight: Actuator 3	2.4525	N			
Length: Knee to Actuator 2	0.4381633548	Meter	Account for Squat Angle		
Weight: Actuator 2	2.4525	N			
Length: Knee to Actuator 1	0.5167077616	Meter	Account for Squat Angle		
Weight: Acutator 1	13.2435	N			
Weight: Hip Acutator 1	4.905	N			
Moment: Upper Body + Hip	67.16296663	Nm			
Moment: Beam (Leg Link 1,2,3,4)	6.369056672	Nm			
Moment: Actuator 4	1.074595628	Nm			
Moment: Acutator 3	1.074595628	Nm			
Moment: Actuator 2	1.074595628	Nm			
Moment: Actuator 1	6.843019241	Nm			
Moment: Hip Actuator 1	0.6336128927	Nm			
Moment on Joint 4: Sum of Moments	84.23244231	Nm	Upper Bound Rated Torque		