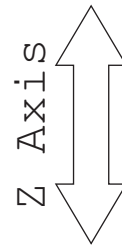
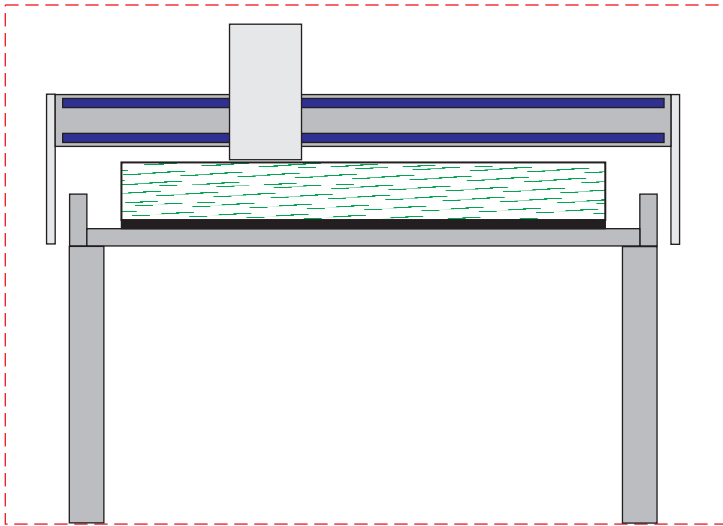


# Carpenter Diagram - Workspace and Footprint

Front View



WorkSpace 

X-Travel: **5' 6"**

Y-Travel: **3' 6"**

Z-Travel: **5"**

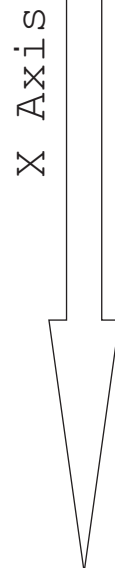
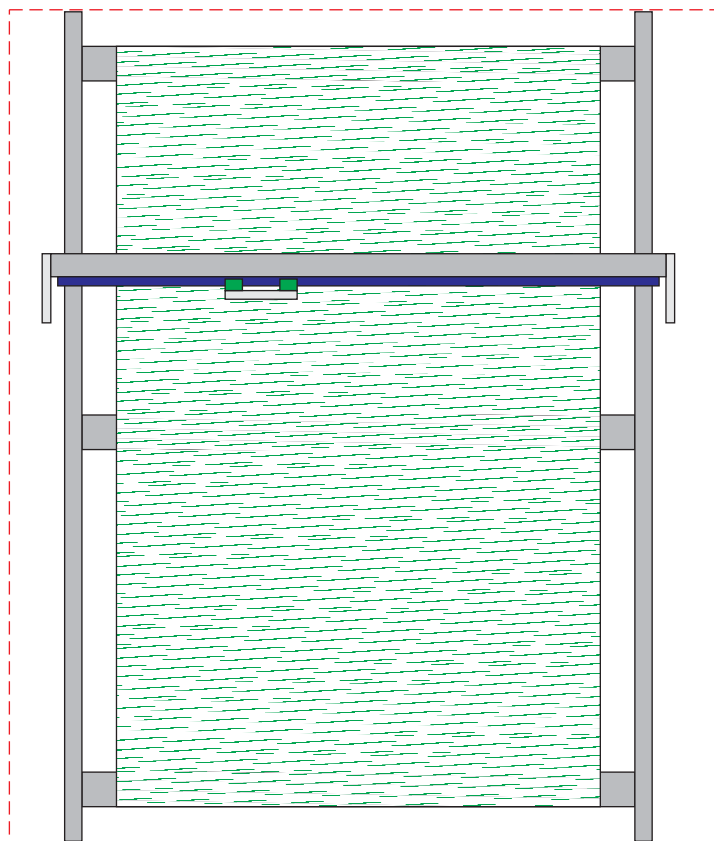
Foot Print 






X: **6'**

Y: **5'**

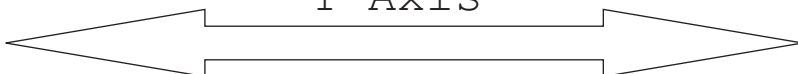
Z: **4'**

Top View



-  -Workspace Volume
-  -3D Foot print
-  -Aluminum Extrusion
-  -Machined Aluminum Component
-  -Profile Linear Rails

Y-Axis

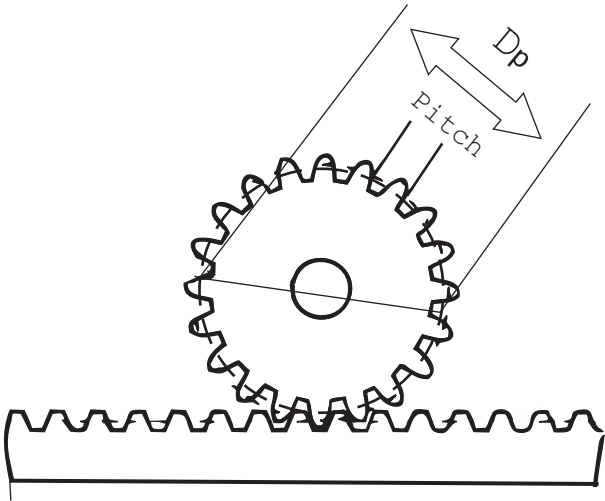
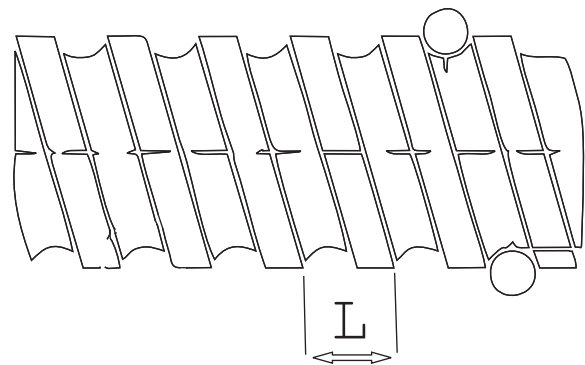


# Linear Drive System Specs

	Driving Force (N)		Step Size (Inches)		Velocity at 300 rpm (inches/min)	
	formula	Value	formula	Value	formula	Value
Rack and Pinion  -Pitch: 20 -Pitch Diameter: 1.25" -Pressure angle: 20°	$\frac{2cos(\alpha)\tau}{D_p}$	112.467 (119.685)	$\frac{D_p}{2} * \frac{\pi}{180}$	0.0196" (51.02 step/Inch)	$\pi D_p(RPM)$	1176.0
Ball Screw  -Diameter: 16 mm -Lead: 5 mm	$\frac{2\pi\tau}{L}$	2387.61	$\frac{L}{360}$	0.000984" (1016.26 step/Inch)	$L * RPM$	59.0

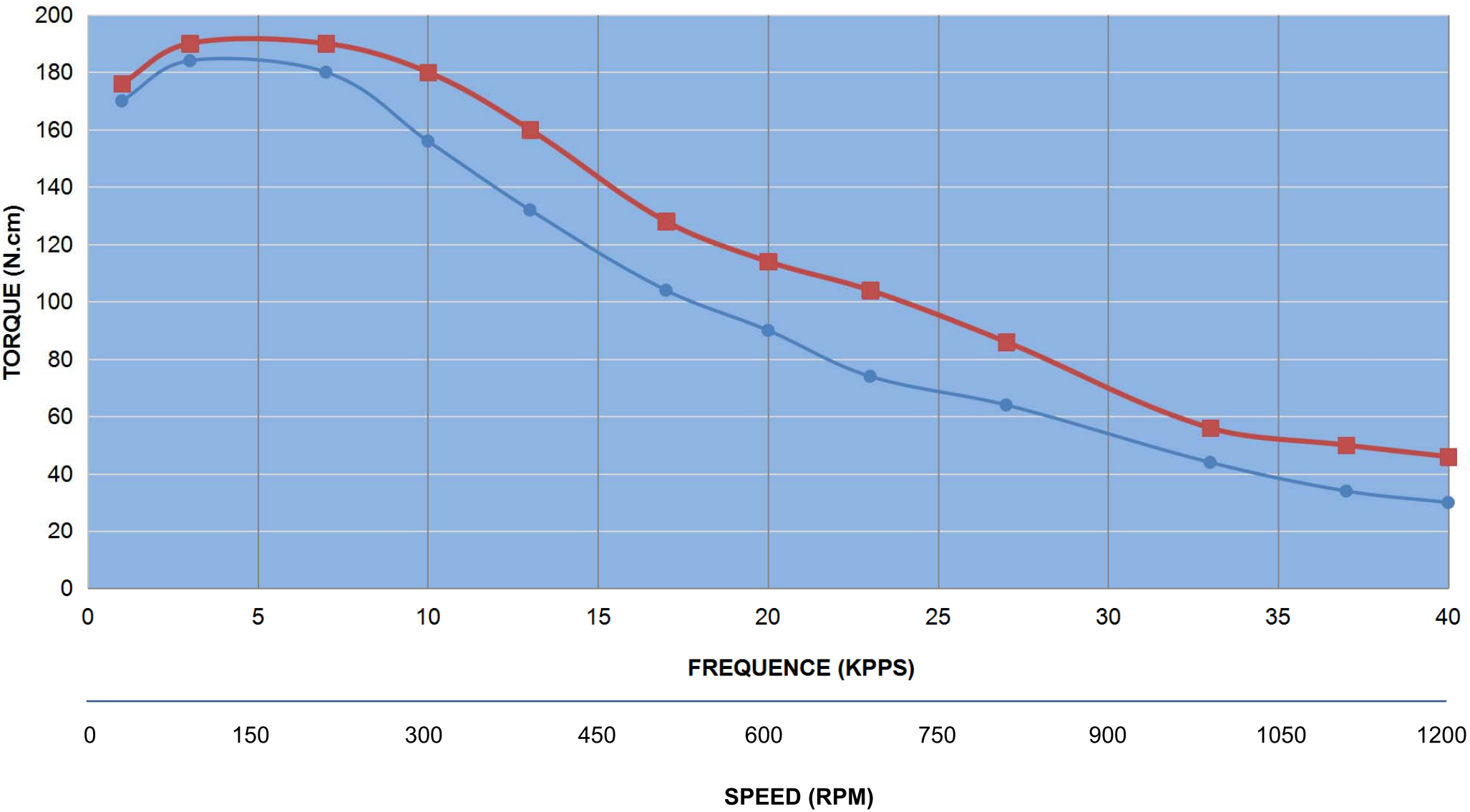
Ball Screw

Rack and Pinion



PULL OUT TORQUE CURVE OF 23HS30-2804S

Driver : DM542T      Voltage:36/48V  
Microstep : 2000      RMS :2.69A



# Construction Components

Components	Specifications	Image
Frame:	15x15 Aluminum Extrusions (6560 Aluminum)	
Linear Rails:	X, Y & Z Axis: Brand: OrangeA Type: HGH 20mm Material: High Quality Steel -Low Noise -Smooth motion	
Linear Drive:	X & Y Axis: Type: Rack & Pinion Pitch: 20 Number of Teeth (Pinion): 25 Pressure Angle: 20° Material: 1018 Carbon Steel Rack 1020 Carbon Steel Pinion	
	Z Axis: Type: Ball Screw SFU-1605 Manufacturing: Precision Rolled C7 Lead: 5mm Diameter: 16mm	
Stepper Motors: *Upgrade-able to Nema 34 at higher torque	Brand: Stepper Online Type: Nema 23 Bipolar Torque: 1.9 Nm Current: 2.8 Amp Resolution: 200 Steps (1.8°)	
Stepper Drivers: *Upgrade-able in accordance with stepper motor	Brand: Stepper Online Model: DM542T v4.0 Micro Steps: 1/128 Current Range: 1 to 4.2 Amps Voltage Range: 20V to 50V DC	
Spindle: *Most personal routers can be used instead with provided custom 3D printed mount	Brand: Tekno Motor Model: Power: 1.1kW (3Hp) Base Speed: 900 rpm Max Speed: 18000 rpm Speed Control: Supplied vfd	
Electrical Box:	Fully Sealed Safety Interlock switch LED Power Display Quick connect plugs for all outputs and Inputs Filtered fans for active cooling	