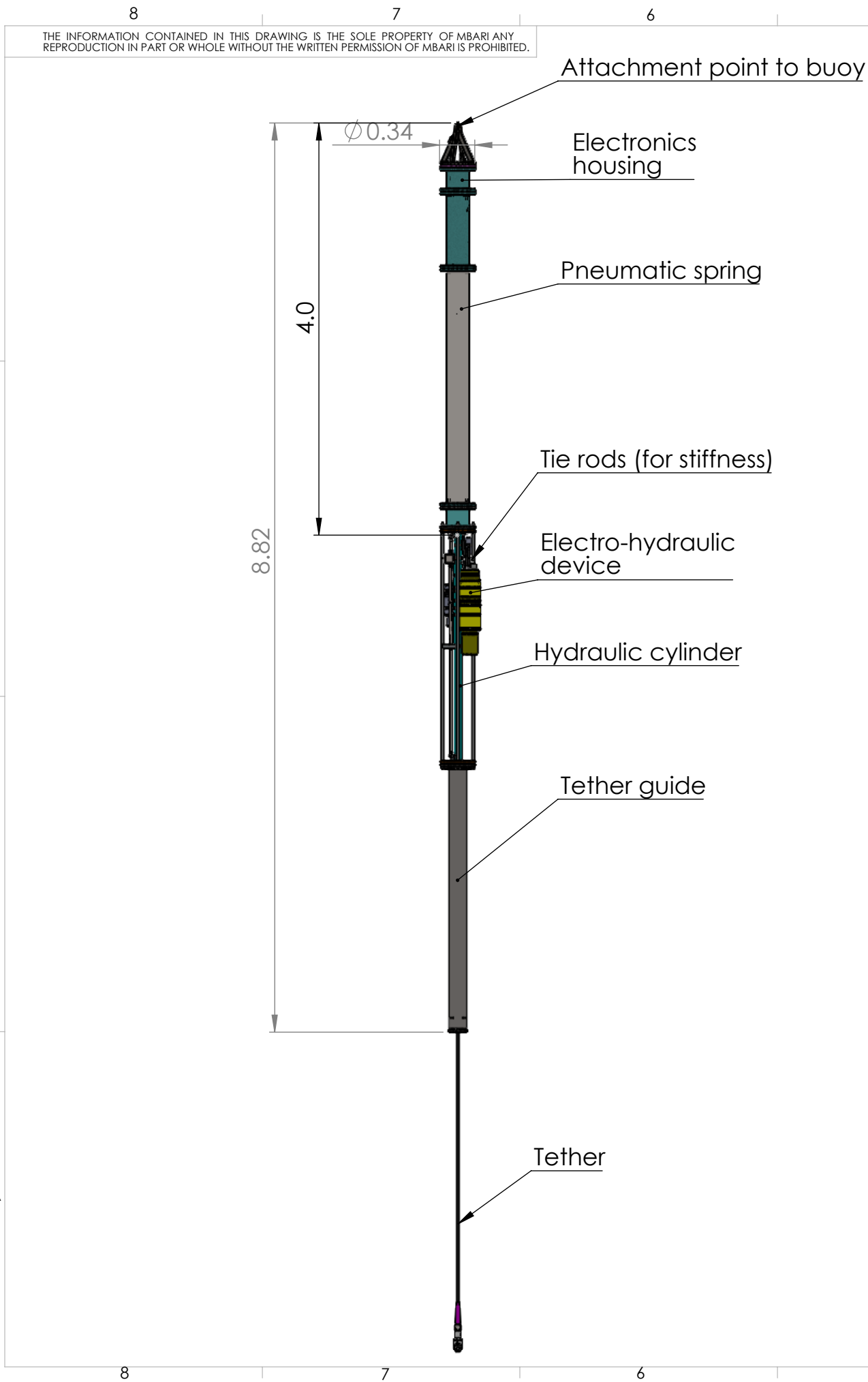




MBARI Wave Energy Converter: Power Take Off Device

Weights and dimensions

Weight = 605 kg (from Solidworks model)
Weight in water = 395 kg (from Solidworks model)
Weight of pneumatic/hydraulic rod and pistons = 48 kg
Center of mass: on central axis, 4.0 m below attachment point.
Stroke length = 203 cm

Moments of inertia: (kg * m²)

Taken at the center of mass and aligned with the output coordinate system. Y is up.
Lxx = 3526 Lxy = -2.289 Lxz = 0.4293
Lyx = -2.289 Lyy = 7.276 Lyz = -3.089
Lzx = 0.4293 Lzy = -3.089 Lzz = 3526

Pneumatic spring:

Volume of upper chamber at midstroke = 39.5 L
Volume of lower chamber at midstroke = 64 L
Pneumatic piston area = 126.7 cm² (115.2 cm² with rod area subtracted)

Hydraulic device:

Oil volume (upper, at midstroke) = 0.90 L (in cylinder) + 0.096 L (in lines)
Oil volume (lower, at midstroke) = 0.90 L (in cylinder) + 0.052 L (in lines)
Hydraulic piston area = 8.87 cm²
Oil line inside diameter = 1.575 cm
Hydraulic motor rotary moment inertia = 0.16 g.m²
Hydraulic motor displacement = 4.9 cm³/revolution
Theoretical torque constant = 0.078 N.m / bar
Volumetric and mechanical efficiencies: see Parker documentation

Generator:

Coupler rotary inertia = 0.34 g.m²
Motor rotary inertia = 2.42 g.m²
Voltage constant = 40.0 Vrms / 10³ rpm
Torque constant = 0.62 N.m / Arms

January 6, 2021

UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:				APPROVALS	DATE	Monterey Bay Aquarium Research Institute		
1 PLACE DIM ±1/16	2 PLACE DIM ±.02	3 PLACE DIM ±.005	ANGLES ±1°	DRAWN				
1. DIMENSIONS ARE IN INCHES				ENGINEER	Francois Cazenave	MBARI 7700 Sandholdt RD. Moss Landing, CA 95039 PH: (831) 775-1700		
2. DIMENSION LIMITS HELD AFTER PLATING.				CHECKED				
3. REMOVE BURRS AND SHARP EDGES .015 MAX.				PROJECT NO.	707976	PTO_Assem-2020		
4. MACHINED FILLET RADII .0150-.030.				PROJECT				
5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005						SIZE	DWG. NO.	REV.
6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .002 PER INCH. MAX .012 INCHES FOR SINGLE SURFACE.						B		
DO NOT SCALE DRAWING				WEIGHT 1337.518 lb.		SCALE	1:200	SHEET 1 OF 1