



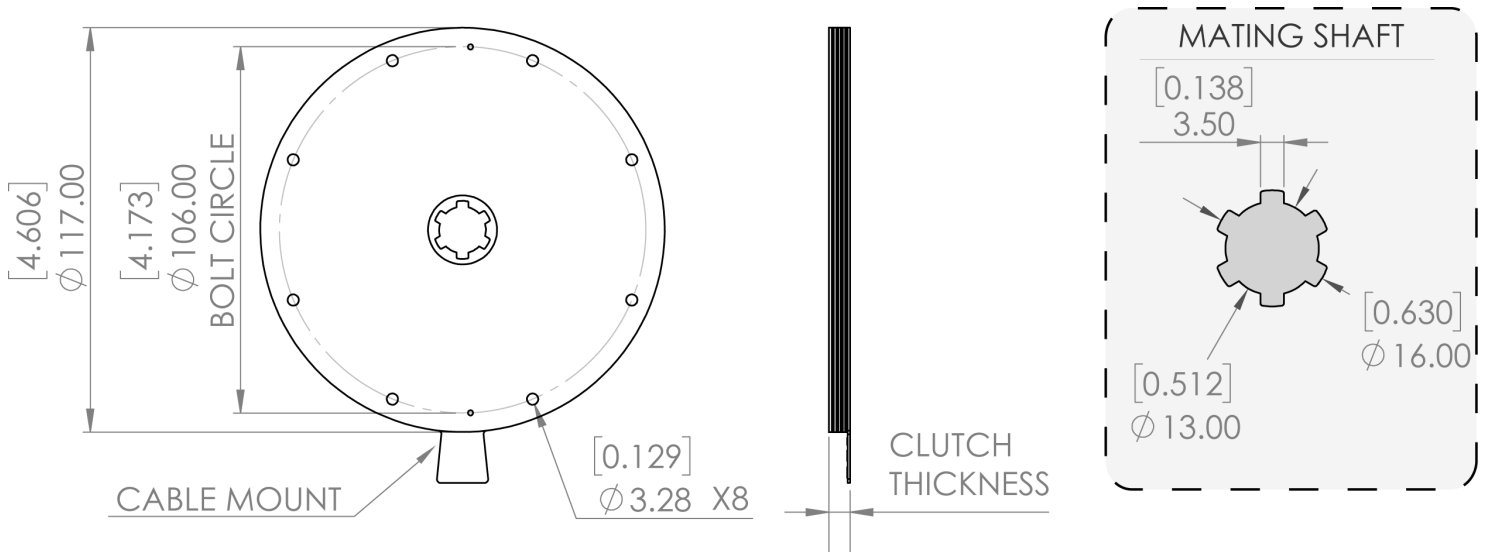
ESTAT ACTUATION

Compact motion starts—and stops—with us

UltraSlim Rotary Evaluation Unit

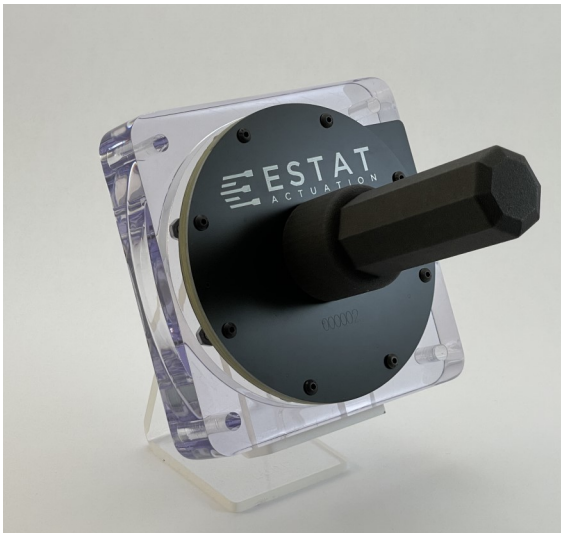
Nested Disc Clutch

UltraSlim units provide the same holding torque as conventional options with 10x less mass, 10x less volume and 1000x less power consumption. The UltraSlim Evaluation Unit is available in a number of thicknesses to achieve different target-holding torques. All of the evaluation units are composed of clutch modules. Each clutch module adds 4 Nm of holding capacity for an additional 1.2 mm of thickness. The US-4 module is a demo unit that represents a single clutch module without any additional components. The US-12, US-24, and US-36 are full clutch units composed of multiple clutch modules and other components. Clutch units ship with a base and handle for instant evaluation after unboxing.



Technical Specifications	Model			
	US-4 module	ESTAT US-12	ESTAT US-24	ESTAT US-36
Clutch thickness—mm (inch)	0.8 (0.032)	6.2 (0.244)	9.4 (0.370)	12.8 (0.504)
Weight: clutch only—g (lb)	22 (0.049)	160 (0.35)	271 (0.60)	382 (0.842)
Rotational inertia—kg m ² (lbm ft ²)	7.0 x 10 ⁻⁶ (1.6x10 ⁻⁴)	7.5 x 10 ⁻⁵ (1.8x 10 ⁻³)	1.5 x10 ⁻⁴ (3.6 x 10 ⁻³)	2.2 x 10 ⁻⁴ (5.3 x 10 ⁻³)
Max rated torque—Nm (in-lb)	4 (35.4)	12 (106.2)	24 (212.4)	36 (318.6)
Off-state friction—Nm (in-lb)	< 0.05 (0.44)	< 0.05 (0.44)	< 0.06 (0.53)	< 0.09 (0.80)
Response— msec	< 20	< 20	< 20	< 20
Power consumption (1 Hz cycling)* — W	< 0.002	< 0.006	< 0.012	< 0.018
Activated maintenance power — mW @ 400V	< 0.06	< 0.16	< 0.32	< 0.48

*Power consumption at one Hz cycling is the average power consumption experienced by the clutch when it is activated for 0.5 seconds and deactivated for 0.5 seconds in a repeating cycle.



Device overview:

The **UltraSlim Evaluation Unit** allows users to experience our electrostatic rotary clutch within seconds of unboxing. The handle and base accessories provide simple grips for a tactile experience. Just click “engage” on the voltage driver (sold separately) to operate.

The clutch itself is extremely compact. ESTAT clutches are formed of multiple clutch modules (below) each measuring only 0.8 mm thick. Stacking multiple modules increases the torque capacity of the clutch. The quantity and diameter of these modules can be selected to fit any application.

Our clutches are 10 times lighter and 1000 times more efficient than conventional electromagnetic options.

Device operation:

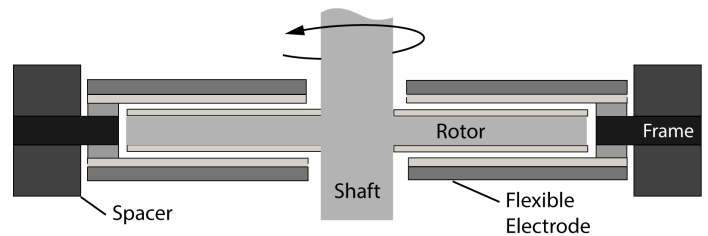
ESTAT clutches are load-bearing capacitors. Applying voltage across the clutch electrodes causes accumulation of positive charges on one side of the clutch and negative charges on the other. This results in adhesion between the rotor and the flexible electrodes, which locks the clutch. As capacitors, ESTAT clutches require minimal maintenance current to remain engaged (< 10 μ A). The clutch disengages when the voltage potential is removed.

The inner clutch rotor interacts with a spline shaft. The outer clutch electrodes are connected to the clutch housing. Clutches can be customized to fit spline shafts, keyed shafts or other transmission elements.

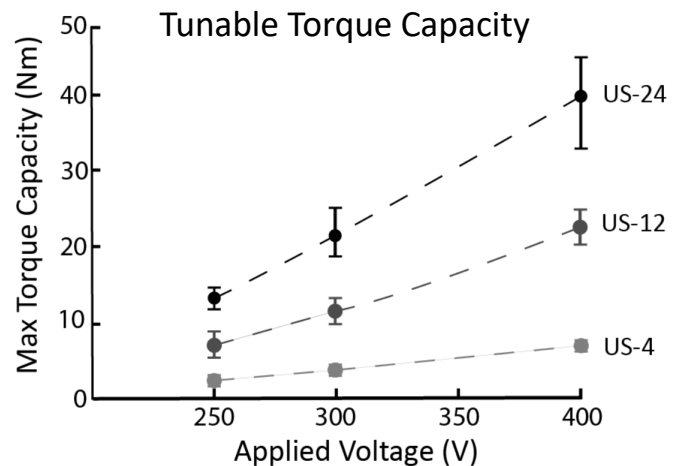
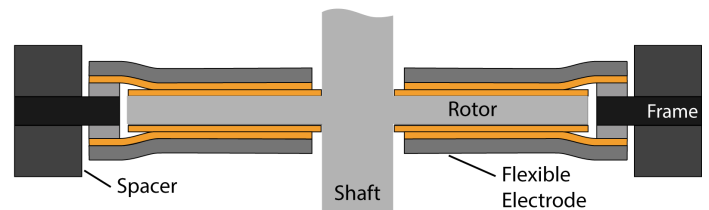
Adjusting max load:

Maximum torque can be adjusted by modulating applied voltage (right bottom). This behavior can be used as a mechanical fuse to provide gear train protection or for other torque-limiting applications. If applied torque exceeds the maximum holding torque, the clutch will slip. This slip is accompanied by a drop in torque as the clutch transitions from static to kinetic friction. Try the low, medium and high voltage settings on the included voltage driver to experience this feature.

Disengaged - Power Off
Shaft and rotor are free spinning



Engaged - Power On
Shaft and rotor are coupled to outer frame



*Markers denote low, medium and high voltage driver settings

Email info@estat.tech for availability, questions, or to place an order.

ESTAT Actuation Inc. • www.ESTAT.tech • 91 43rd St. Pittsburgh, PA 15201

Note: specifications subject to change without notice.