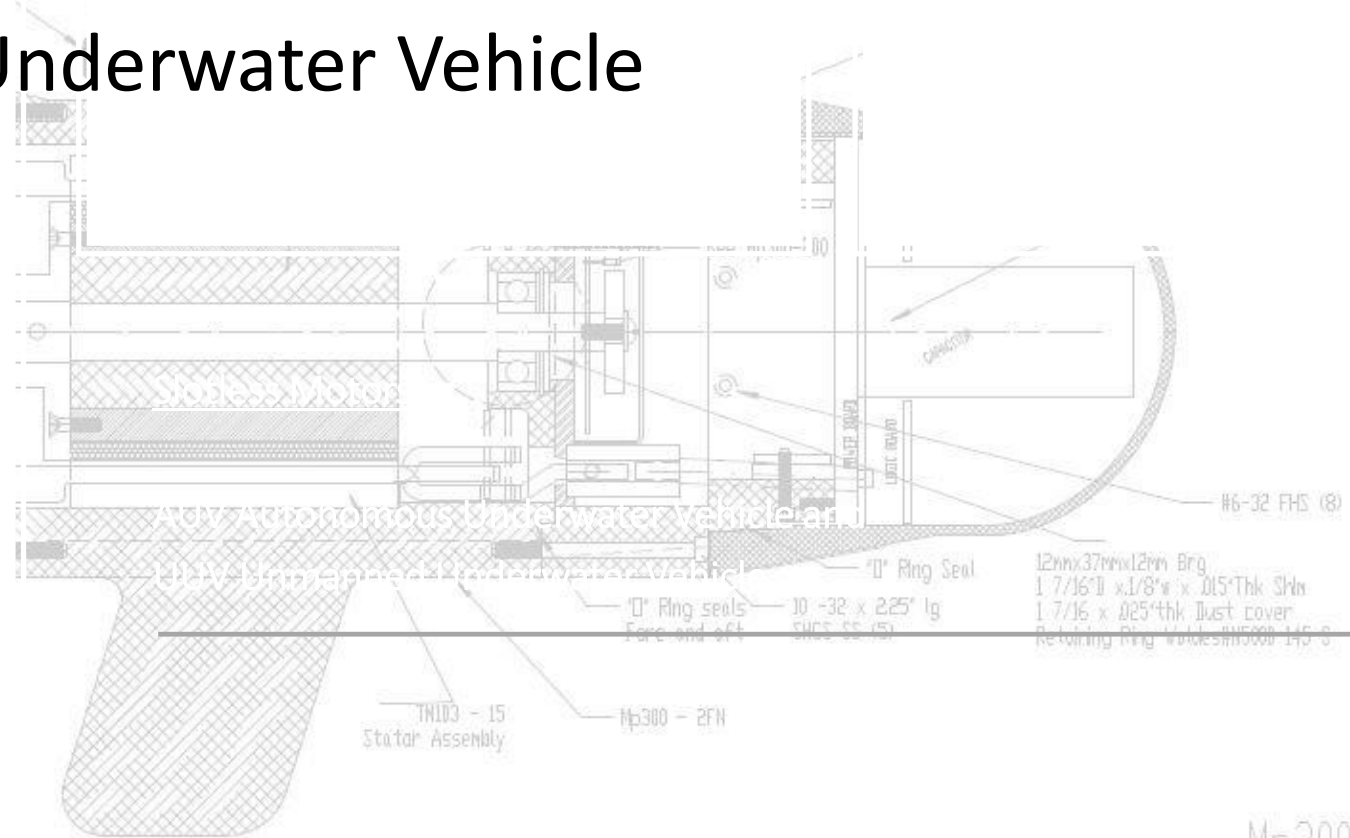


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Precision Rotating Components

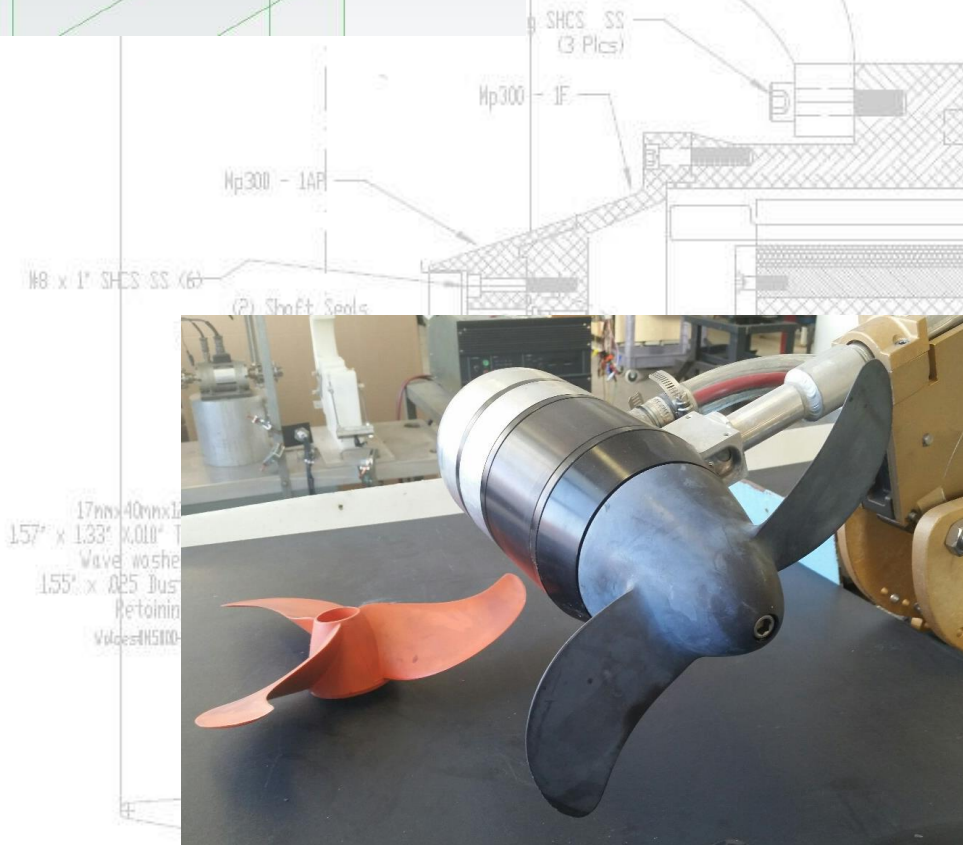
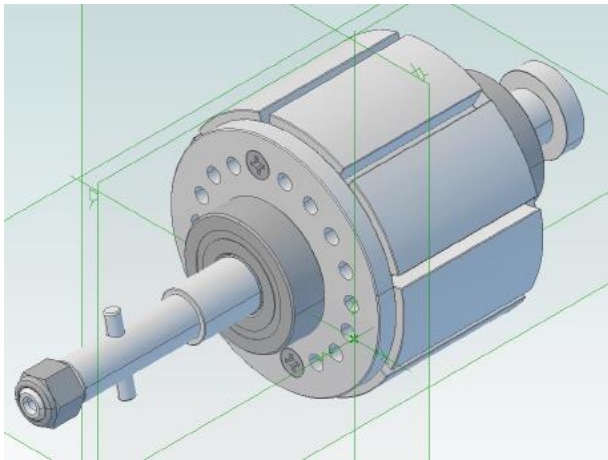
AUV Autonomous Underwater Vehicle and UUV Unmanned Underwater Vehicle



Mp300-02

Elinco Slotless Benefits

- Experienced, Responsive Design Staff
- Design Flexibility:
 - From components to complete motor assemblies
 - Magnetic circuit optimization
 - Specialized sealing technology for submersibles
 - Wide variety of features
- Global manufacturing footprint



Mp300 - 15
Stator Assembly

Mp300 - 2FN

Elinco Slotless Motor Benefits

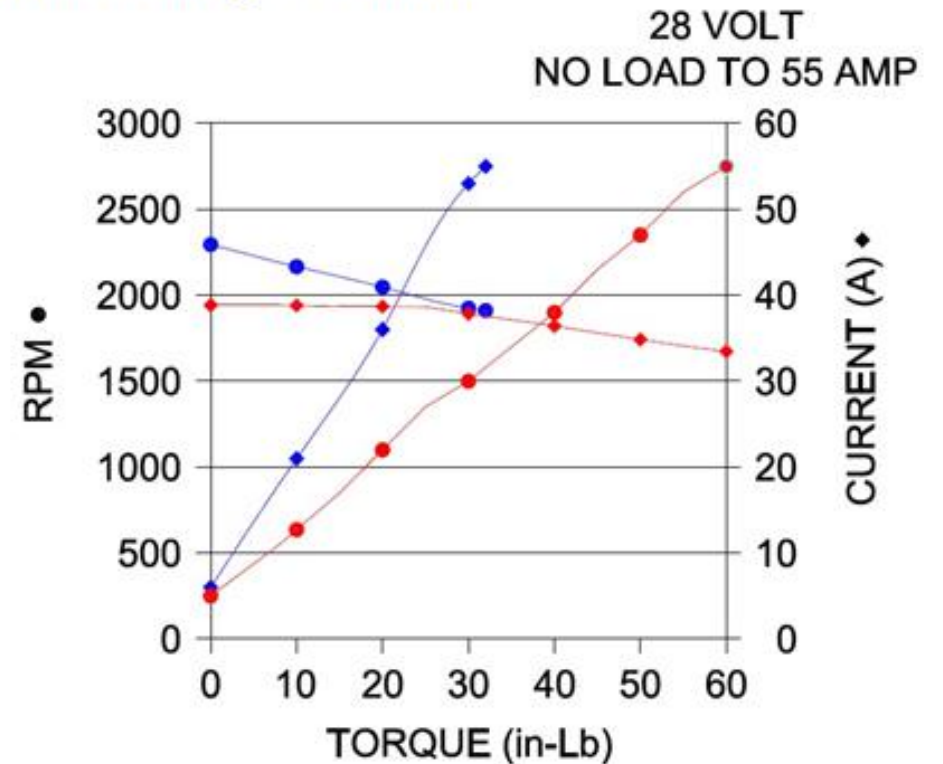
- Simplified stator design
- Good copper fill due to lack of teeth
- Lower investment cost for new or revised designs



Speed-Torque-Current

- Slotless Motor Benefits
 - Elimination of cogging and ripple torque
 - Low Noise
 - Higher efficiency, more work per battery charge means greater range

- Elinco Slotless BLDC
- Typical Trolling DC Motor



WHY "SLOTLESS" BRUSHLESS DC MOTORS?



TWP-e-jpc

09/25/2017

Slotless Motor

Why "SLOTLESS" brushless DC motors?

The "Slotless" brushless DC motor technology has been, and continues to be, pioneered by Elinco. It has been proven in production and field operation. This patented design consists, basically, of a stator winding positioned inside a laminated stator ring (without conventional teeth) and at permanent magnet rotor. This design provides several advantages over conventional Brushless DC motor construction.



1. **Zero cogging torque:** In the conventional permanent magnet motor the magnets take a preferred angular position with respect to the stator teeth. If no power is applied to the motor and the shaft is rotated by hand the magnetic positioning effect can be felt. The amount of force required to move the rotor from this position is known as cogging torque. As motor designers have changed their designs to high energy magnets the cogging torques have become larger and thus increased the number of application problems, particularly where smooth operation is required at low speeds. By eliminating the stator teeth the slotless motors have no preferred rotor position and the shafts rotate smoothly at any speed. In addition, shaft position can be more finitely controlled.
2. **Smooth torque:** Motors have a variation of torque during the 360 degrees of angular motion known as torque ripple. This is normally the result of the combined motor and

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