



THE RA-47X HIGH SPEED LINEAR ACTUATOR PROVIDES STURDY AND RELIABLE CONTROL IN THE NEW PROPULSION SYSTEM FOR SOUTH AFRICAN MANUFACTURER CAUDWELL MARINE

Caudwell Marine is a Cape Town-based manufacturer of high performance racing and recreational marine engines, with a drive for pushing the boundaries of innovative engineering in everything they do. Leading the industry with award-winning technology and designs, Caudwell Marine outboards provide features and benefits that make boating more enjoyable. Its solutions offer clean technology and fuel efficiency while providing power and low-maintenance in its compact design.

Originating from the English billionaire John Caudwell's partnership with South African entrepreneur Mike Beachy Head, CAUDWELL MARINE (PTY) LTD was founded in 2001 with the aim to develop a marine propulsion system through a revolutionary design that boasted zero power-loss from engine to propeller. Thanks to over seven years of research and testing by their engineering team, they finally reached this goal from its inception to its first production phase. They created an innovative design, which was patented internationally, that maximized power, durability and efficiency for the luxury leisure boating market in the 16 to 40-foot range.

CAUDWELL MARINE launched its new propulsion system at the International Boat Builder's Exhibition and Conference (IBEX) in Miami Florida in October 2007. As a challenger product in the large leisure marine industry, CAUDWELL MARINE partnered with independent boat builders and established intimate and trusting partnerships. After gaining a solid experience and growing steadily over all these years, the company has a global client base.

OPTIMAL ACTUATOR DESIGN FOR A MARINE APPLICATION HIGH IN DEMAND

By analyzing the expected product growth as well as expected market demands, CAUDWELL MARINE realized that there is a growing market for more powerful outboard motors that are called upon to provide class-leading durability, highest torque and power to weight ratio, fuel efficiency, lowest emissions, smooth power and safer handling. That is why they are constantly updating and improving its drive systems by reviewing all engines ECU's, developing modern electronics with NMEA 2000 CAN compliant system, steering by wire solutions and redefining modern electronics for control and display purposes.

So, as more powerful outboards are needed, its components have to meet more demanding technical requirements. It is in this particular roadmap that the South African manufacturer contacted REGNER© in October 2017 to build a sturdy and reliable linear actuator, which had to provide high speed in a very short stroke intended for gear selection applications.

The CAUDWELL's requirements were very clear because they needed reliable electric linear actuators with analog feedback for precise positioning and the first prototypes has to be delivered by February 2018, therefore REGNER© had five months to design, test and produce the complex solution.

The demanding actuator for marine environment had to meet the following technical specifications:

Power supply	12 VDC
Max. thrust	1000 N
Max. speed	Up to 70 mm/s
Stroke length	40 mm
Compact design	240.5 mm
Protection class	IP65
Limit switch	At stroke endpoints
Positioning	Analogue feedback

On average, the development of a new linear solution takes approximately five months minimum from start to the beginning of serial production (SOP). The process of designing and developing a new linear actuator requires research, certified high-performance materials and safety standards compliance.

In this case, we worked virtually, yet closely, with the engineers of CAUDWELL MARINE by defining the different standards that the actuator solution had to meet and establishing a Gantt Chart to get the project under control with its relevant milestones.

After understanding all the requirements, we performed several calculations in order to define the appropriate permanent magnetic motor. Once the motor was chosen and tested, we designed the different components and its connections. We integrated controls, wiring, PCBs transmission and other technical parts. Once that was done, we made assemblies, checked tolerances and performed tests on functionality, load, temperature, EMCs and fatigue.

"I must inform you that myself and the team are very excited regarding the final solution you are providing. We are very impressed"

*Jean Pierre Jacobs
Drive-train Manager at CAUDWELL MARINE*

EXCEEDING CUSTOMER SATISFACTION

Normally each test shows defects or possible improvements that lead to further optimization of the design. After rigorous testing, the design was modified and we entered into a new iteration cycle with an improved prototype that was tested again. When all the testing results were satisfactory, the final prototype took form.

For this demanding application the outcome is a very robust actuator with a high IP degree and special anodized aluminum housing, making it ideal for use in even the harshest of marine environments. The RA-47X offers top quality in every detail and ensures reliable performance with a duty cycle of max. 10% in temperatures ranging from -20°C to +60°C.

With its compact size, the RA-47X is well suited for applications that require short linear movements.



The linear actuator during the IP65 (Degrees of protection) testing.