

Case Master Boat Builders and Gulf Coast Air & Hydraulics Drive enabled electronic thrusters





Electronic thrusters offer many benefits over their hydraulic counterparts.



Dynamic Positioning (DP) systems have become a requirement for the boats supplying offshore oil rigs.

Drive enabled electronic thrusters improve performance on offshore supply boats

Main benefits of ABB drives and motors for thrusters	
Smooth interface with Dynamic Positioning systems	Consistent torque throughout the speed range with extremely fast reaction time
Stepless speed and torque operation	Low thruster noise level
Environmentally friendly	Electrical control systems do not require the hydraulic fluids nor the additional pumping and piping

Master Boat Builders Inc. of Bayou La Batre, Alabama cultivated its niche building highly sophisticated offshore supply vessels, in large part, by being one of the first builders to transition to thrusters powered by electric motors and variable speed drives.

The electronic thrusters provide numerous benefits over their hydraulic predecessors, and are highly compatible with the Dynamic Positioning (DP) systems that automatically maintain a vessel's position while it is serving an offshore oil platform.

Baldor motors and ABB drives have been integral components of Master Boat thrusters since the early stages of the transition because both components are uniquely able to withstand the harsh marine environment and the tremendous demands of the DP system.

Gulf Coast Air & Hydraulics Inc, in Mobile, Alabama, has been a valued supplier and partner to Master Boat in transitioning to the more efficient electric thrusters.

Dynamic Positioning systems and the orchestra of control

In addition to the environmental safety benefits, electronic thruster systems are far safer to operate and service, easier to install, cheaper to operate, and more efficient than hydraulic systems.

The biggest benefit of the electric thrusters, however, is how smoothly they interface and respond to the sophisticated Dynamic Positioning (DP) systems that are required by the American Bureau of Shipping (ABS), and the oil companies that contract the boats to supply their offshore oil rigs.

A DP system is an automatic operational mode that triangulates between GPS satellites to maintain a vessel's position within a 1 to 3 meter radius. When engaged, the DP System simultaneously and continuously controls the bow thrusters, main propulsion system and rudders to hold the ship in place, no matter the wind, current or wave action. The orchestra of control is essential in the supply process to keep a boat from hitting the floating oil rig.

"DP systems became a requirement on almost every offshore supply vessel operating in the Gulf," said Andre Dubroc, the general manager of Master Boat.

The motor and drive package – especially suited for intense demands of the DP system

When the vessel is on station or in a positioning mode, depending on wave height, current and wind, there can be quite a demand put on the thrusters depending on the position of the boat. The benefit of the ABB ACS800 drive



ABB's industrial drives interface smoothly with the Dynamic Positioning systems.



Drive controlled electric motors help reduce the thruster noise level.

and the Baldor RPM AC motor pairing is their ability to smoothly and rapidly execute the cycling speeds required in the positioning process.

"In the DP application, the VFD will typically be ramping from 1,000 rpm in one direction to 1,000 rpm in the other direction in less than 10 seconds - a full reversal in less than 10 seconds. You can't do that consistently with a standard induction motor and a standard scaler type VFD, they just can't take the abuse," said Mike Mitchell, the ABB application manager who has worked with Master Boat on the electrical systems.

The direct torque control (DTC) technology in the ABB drive, and the low inertia aspects of the AC motor, provide excellent control throughout the entire speed range, from 2 rpm to 1,800 rpm. They allow highly efficient acceleration, deceleration, and full reversals, reducing generator load and increasing the overall performance of the system.

A custom drive cabinet for a tight fit

Master Boat's new class of 220 foot vessels contain the fourth iteration of drive enabled design at 800 hp. This move increased the width of the drives beyond the tight space allotments of the boat, where every inch of space is a premium. Working together Master

Boat, Gulf Coast and ABB created a custom design that reduced 30 inches of width on each drive cabinet, saving five feet of space with the two cabinets mounted side by side.

Preparing for bigger boats and bigger challenges

At the close of 2015 there are at least 60 Master Boat built vessels floating around the Gulf of Mexico with a Baldor/ABB drive systems controlling their thrusters, the vast majority of them integrated by Gulf Coast Air & Hydraulics.

Gulf Coast sees challenges and opportunities ahead and understands that the boats, along with their electronic motor and drive packages, will need to evolve

"Our big challenge moving forward is that the boats are going to get bigger and the thrusters are going to get bigger. The drives will need to get bigger in power, and we will need to further custom-size them so they fit within the limited space in the boat," said Chuck Moorehead, Gulf Coast president and co-founder. **"Those challenges are where great partnerships excel."**



Andrei Dubroc, General Manager at Master Boat Builders

Master Boat Builders, founded in 1978 and based in Bayou La Batre, Alabama, specializes in offshore supply, fishing and dive support vessels for quality minded customers.



Chuck Moorehead, CEO at Gulf Coast Air and Hydraulics

Gulf Coast Air and Hydraulics, since 1985 based in Mobile, Alabama, is a marine and industrial solutions company specializing in variable speed driven components.

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