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# Wichita Clutch AquaMakks Dual-Actuator Brakes Offer Economical Two-for-One Simplicity



As seen in  
**Exploration & Production**  
April, 2012



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In spite of its demand as a global commodity, the price of oil can be wildly unpredictable. A jumble of geopolitical forces, environmental factors and seasonally fluctuating demand combine to make oil's future prices anything but certain. But the cost of drilling for that oil – that's a different story.

Whether oil prices are up or down, the costs of getting to that oil can be reliably predicted to become ever more expensive. And a significant component cost of oilfield exploration is the specialized equipment that's required. In many situations, engineering innovation helps to contain costs rather than contributing to the incessant upward spiral.

That's the case with the new dual actuator AquaMakks drawworks brake developed by Wichita Clutch, headquartered in Wichita Falls, Texas. The dual actuator option adds another layer of versatility and cost-effectiveness to Wichita's popular line of AquaMakks brakes.

## Looking For a Better Solution

Tri-Service Oilfield Manufacturing (TSM) is a leading manufacturer of drawworks for the drilling and service rig industry. For more than a half century, TSM has been supplying the global oil industry with a complete line of drilling and service equipment. Along the way, they've built a worldwide reputation for quality, reliability and customer satisfaction.

Searching for a way to control equipment costs, TSM contacted Wichita Clutch and inquired about the possibility of developing a single brake solution that would be more cost-effective and more readily available than the dual-action brakes they were previously using on their drawworks. "TSM wanted a more economical single-unit assembly that would provide both tension braking and spring-set failsafe parking," said George Nemecek, Wichita Clutch Area Sales Manager.

Responsible for controlling the process of lowering and retrieving tons of equipment thousands of feet into and back out of the earth, the braking system of a drawworks assembly is obviously a critical component. And though they are subject to nearly unimaginable stresses, extended downtime for repair or replacement of drawworks brakes can be costly. TSM has used Wichita's brakes in their drawworks assemblies for a number of years, and Wichita had earned a reputation for quality products and reliable customer support. So there was a comfort factor for TSM in turning to Wichita Clutch with their request.

TSM engineers collaborated with Wichita Clutch in the design of the new braking solution. "Wichita was given our performance parameters such as static and dynamic stopping and retarding conditions," according to a representative of the TSM engineering team. "Wichita then sized the brake as required to meet our desired service factor. The physical size was also reviewed to ensure that our drawworks and the brake were a good match." Speed of delivery was also critically important, and Wichita was able to beat the closest competitor's lead time by 50 percent.



The Dual-Actuator AquaMakks water-cooled brake from Wichita Clutch provides both failsafe parking and precision tension braking capability in one unitized assembly.

### Two Brakes in One – But the Innovation Doesn't Stop There

The resulting solution was Wichita Clutch's dual actuator AquaMakks brake. According to Richard Mayberry, Engineering Manager at Wichita Clutch, "TSM wanted to be able to use the brake as the primary static holding or parking brake, along with being used as a dynamic brake." The goal was achieved. In dynamic tensioning mode, the AquaMakks dual-actuator brake can absorb up to 3,400 HP – 35 percent more than the closest competitor. And for static parking, the unit provides a torque rating sufficient to hold 750,000 lbs. on 12 lines.

But the AquaMakks incorporates a number of innovative features; perhaps the most pioneering is the composite water jacket.

### Use of High-Tech Composites at an All-Time High

The use of metal is losing its iron grip on the world of manufacturing. Advanced composite materials offering dramatic improvements in strength-to-weight ratios and superior corrosion resistance are replacing metal in many applications. Consider Boeing's new 787 Dreamliner – half of its primary structure is built of composite materials. And yet the Dreamliner is setting new performance standards unmatched by aircraft of traditional all-metal construction. But the benefits of modern composites are applicable to many industries outside the field of aerospace. So Wichita Clutch took a cue from the aerospace industry in solving a problem that's plagued the operators of heavy-duty industrial brakes for decades.

"In the oilfield, sometimes the water used in brake cooling systems is not of a high quality," Wichita's Mayberry explained, "and over a short period of time can severely corrode the working internals of a water jacket. But the composite material water jacket of the AquaMakks is impervious to widely ranging quality issues."

The superior corrosion resistance of the AquaMakks is a boon to offshore operators using saltwater as a coolant. But water quality is an issue in many locales. Some Texas oilfields, for instance, must deal with highly acidic water with a very low pH value – very corrosive to water jackets of traditional iron construction.

A side benefit of the AquaMakks composite water jacket is significant weight savings, with a weight reduction of 50 percent or more compared to brakes utilizing iron water jackets. This can result in weight savings of thousands of pounds in the largest units – a great benefit for mobile applications such as truck-mounted units. And the advantages of composite construction come without any sacrifice in strength. In stress testing, engineers were unable to induce a



Tri-Service Oilfield Manufacturing (TSM) incorporates the Wichita Clutch Dual-Actuator AquaMaKks on their drawworks.

structural failure even when stressing the unit to more than four times its maximum design load.

### Easy Maintenance, Easy Retrofit

The dual-actuator AquaMakks also helps operators hold down costs by making maintenance a faster, less labor-intensive task. When the copper alloy wear plates need to be adjusted for wear, the process is as simple as removing some shims; disassembly of the unit is not required. Inspection and maintenance is also simplified with the open case design, providing easy access to key components. To help speed the process of repair and replacement, the AquaMakks design uses fewer mounting bolts than competing units.

And the design of the AquaMakks provides for quick and easy replacement of older single-actuator brakes. Richard Mayberry of Wichita Clutch said that the main design challenge was "To make the dual actuator assembly such that it can be retro-fitted onto existing brakes without impact to the rest of the brake unit. Simply remove the normal air tube holding plate, install the dual-actuator head assembly and go back to work."

There's even an option that allows for easy interchangeability with competing models by matching the mounting bolt pattern and tooth profile. In fact, making the unit interchangeable with other models was a unique TSM requirement. According to the TSM representative, "No significant changes need to be made to the drawworks to drop in this brake in place of competitor units."

## About Altra Industrial Motion

Altra Industrial Motion (NASDAQ:AIMC) is a leading multi-national designer, producer and marketer of a wide range of electromechanical power transmission products. The company brings together strong brands covering over 40 product lines with production facilities in nine countries.

Altra's leading brands include Boston Gear, Warner Electric, TB Wood's, Formsprag Clutch, Wichita Clutch, Industrial Clutch, Ameridrives Couplings, Kilian Manufacturing, Marland Clutch, Nuttall Gear, Bauer Gear Motor, Stieber Clutch, Twiflex Limited, Bibby Turboflex, Matrix International, Inertia Dynamics, Huco Dynatork, Ameridrives Power Transmission, Delroyd Worm Gear and Warner Linear. For information on any of these technology leaders, visit [www.AltraMotion.com](http://www.AltraMotion.com) or call 815-389-3771.



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### **US (Customer Service)**

800-964-3262

[www.wichitaclutch.com](http://www.wichitaclutch.com)

### **Europe**

+44 (0) 1234 350311

### **Asia Pacific**

For a list of our AP sales offices:

[www.AltraMotion.com/ContactUs](http://www.AltraMotion.com/ContactUs)