About Altra Industrial Motion

Altra Industrial Motion (NASDAQ:AMIC) 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, Stieber Clutch, Twiflex Limited, Bibby Transmissions, 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 or call 815-389-3771.

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Ameridrives Couplings

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Wichita® Clutch

An Altra Industrial Motion Company

US (Customer Service)
800-964-3262
www.wichitaclutch.com

Europe
+44 (0) 1234 350311

Asia Pacific
For a list of our AP sales offices:
www.AltraMotion.com/ContactUs

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New mooring winch brakes add strength, security to offshore platforms

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Wichita® Clutch

An Altra Industrial Motion Company

New mooring winch brakes add strength, security to offshore platforms

On a massive offshore oil platform, the brakes that hold the mooring winches don't get a lot of attention — that is until they are called on to provide the demanding tension control for critical operations.

Wichita Clutch says the newly introduced AquaMaKKs series is the most powerful brake in the industry.

Although mooring winch brakes provide the static holding power that keeps the anchor chains and cables in place day after day, they are not critical equipment until a platform moves or anchor chains are repositioned. It is then that the brakes play a critical role. If it is found during this infrequent operation that the corrosive effects of the harsh marine environment have compromised their function, they suddenly get a lot of attention. The other time the brakes are a concern is when platform owners are upgrading to bigger anchoring systems to combat hurricane forces such as have wreaked havoc in the Gulf of Mexico (GoM).

To improve the corrosion resistance of marine-duty winch brakes and to provide the power to control larger anchoring systems being installed today, Wichita Clutch has redesigned its Kopper Kool series of heavy duty clutches and brakes. In 2008 Wichita introduced the new AquaMaKKs series with marine-grade components and engineered designs that have advanced the state-of-the-art in mooring winch brakes.

The most critical components in heavy-duty winch brakes are those that cool the units during operation when friction discs are actuated to provide the tension control to the winch cable. The units transmit torque by applying axial force from the pneumatic, hydraulic or spring-set actuator that provides accurate torque control for constant tensioning.

The friction discs are alternated with copper plate water jackets that absorb heat using a closed-loop water circulation system. Previously constructed from cast iron, the AquaMaKKs water jackets are the first in the industry to be constructed from non-metallic, composite material — an idea borrowed from the aerospace industry — that offers the best corrosion resistance available on a winch brake.

"When you're anchoring an oil platform, you're trying to control a system at the very edge of its design limits," said Rich McConkie, Wichita sales manager. "The platform is letting out the huge, sometimes miles-long anchor chain that's being towed into position; so you need to be able to let the cable out fast — but not too fast — and that's when the real high heat is generated."

According to Richard Mayberry, engineering manager, the AquaMaKKs offers up to 35% more thermal horsepower absorption capacity than the industry's previous leader in that category. The additional capacity is needed to meet the more stringent requirements of the larger anchoring systems being installed in the GoM and other parts of the world.

"The problem that can occur with mooring brakes is that performance is limited if you have poor water flow in the heat absorbing water jackets," Mayberry said. "We invested three years to study and optimize the internal water distribution and to design and patent the new composite water jackets."

Additional thermal horsepower absorption capacity provides greater assurance that the brakes will withstand the extreme stresses required in tension control to anchor an offshore platform.

The design of the new series of clutches and brakes was a collaborative effort among engineers from Wichita Clutch in Wichita Falls, TX, Wichita UK in Bedford, England, and Industrial Clutch, Waukesha, WI. Together with Formsprag Clutch, the three brands comprise the core of the heavy duty clutch/brake division of parent company, Altra Industrial Motion.

Using full 3-D solid modeling and finite element analysis, the engineering team worked to maximize the heat dissipation and torque capacities of the units, provide superior corrosion protection, and reduce the component count as well as the weight of the units.

"We took the time to really understand the customers' requirements throughout the world, not only in the US, but Europe and Asia too," said Mayberry. "This truly was a global design project that took into consideration requirements of the European and Asian customers who might have different concerns than platform operators in the US."

The composite water jacket with built-in corrosion protection is an example, according to McConkie. The corrosion protection is so complete with the composite water jacket material that seawater can be used for cooling.

"On US rigs, you'd probably only use this in an emergency situation, if your cooling system broke down," McConkie said. "It's nice having that redundancy. It adds capability and it's more robust. Globally, others seem to be quite a bit more interested in the capability. It could be a real advantage in the right application."

"Not only do the water jackets provide corrosion resistance, but the design of the entire brake is optimized for marine deck environments. The standard AquaMaKKs design incorporates premium materials and finishes suitable for harsh marine environments so that no additional saltwater corrosion protection is required. Often brakes are designed to offer corrosion protection only as expensive optional marine packages," McConkie said.

Wichita manufactures the units with friction linings in outside diameter sizes from 19 to 36 in. and up to four copper drive plates, offering horsepower ratings up to 3,400 hp, which is an increase of 35% over the heat absorption capacity of the previous top-capacity brakes used on marine decks.

These clutches and brakes can also be used for tension control in traditional style drawworks control systems, for integration into electronic drilling systems, and for heavy-duty applications in mining, metal processing, metal forming, and forestry operations.

"They're designed with a unique mounting pattern that makes them interchangeable with existing units so it's easy to use them in overhaul and field retrofit work," Mayberry said.

"As an engineer, what I like is that they're very simple devices. Of course, they had to be robust and durable enough to handle the rugged duty, the simplicity and reduced part count helps keep costs down and makes them easier to maintain."