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Reaching New Levels of Take-Up Efficiency



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Reaching New Levels of Take-Up Efficiency

Reel Power relies on advanced PMSM technology from Bauer Gear Motor



The new RD10 rim drive shaftless take-up utilizes a new economical roller drive system that fits in a smaller footprint while providing superior efficiency. (Shown without guarding for clarity.)



A Bauer BK Series geared motor drives a roller which rotates the large cable reel as it coils. The output shaft of the geared motor is coupled, via chain and sprocket, to the drive roller.

As demand for copper wire and other cable products grows, distributors continue to look for ways to improve efficiencies, reduce costs and maximize space in their facilities.

In response to industry trends, Reel Power Industrial, a leading manufacturer of reel and coiling solutions, recently added a new rim drive shaftless take-up to its popular RD line. The units are typically used by wire and cable distribution facilities where large spools of copper wire are transferred down to smaller reels for contractor use.

RD10 reels are “rim driven” allowing for quick change out and loading of large wire and cable spools. The machine uses a geared motor to drive a roller which rotates the cable reel as it coils. The output shaft of the geared motor is coupled, via chain and sprocket, to the drive roller. A smaller motor/gearbox drives two threaded rods which, in turn, move the ejection roller up and down the frame. Maintaining a consistent winding torque through all speed ranges is critical to ensure proper spooling.

“Manufactured over 30 years, the RD line has been periodically updated to take advantage of innovative technology as it became available,” said Joe Crosley, Sr. Electrical Engineer at Reel Power Industrial. “Initially, RD Series take-offs were offered with a 20 hp mechanical variable drive system that provided high-torque but was cumbersome and expensive to maintain. Then, as VFD motors and controls became available, we upgraded but had to increase horsepower to maintain low-end torque.”

The goal was to design a new roller drive system that would fit in a smaller footprint while providing superior efficiency. The only way to meet the reduced size requirement was to utilize a more power-dense, right-angle geared motor vs. the in-line drive used on previous versions of the machine.

After testing geared motors from different manufacturers, Reel Power selected the Bauer BK Series geared motor featuring a permanent magnet synchronous motor (PMSM) for the main reel roller drivetrain. The PMSM technology maintains consistent torque from 0 hz to 120 hz and does not overheat at lower power as some other competitor models.

The RD unit requires a variable speed control to allow the operators to control the rewind process. “Older RD models accomplished this via mechanical variable speed drives with adjustable pulleys. Newer models utilized VFD drive controls with inverter-duty induction motors,” Crosley said. “However, switching to permanent magnet (PM) motors is not always a simple adjustment. After thoroughly testing many VFD controls, we found some drive manufacturers do not have adequate algorithms for PM motor control.”

Once a VFD and a Bauer BK unit was selected that met the initial performance criteria, the RD10 was loaded with a 10,000 lb. reel and run for several hours, including stops and starts, to verify that the new geared motor could handle the load. Bauer engineers worked closely with the Reel Power engineering team to fine tune the motor to meet performance expectations.

The compact Model BK40 supplied features PMSM technology that reduces heat losses from the rotor by 100% and total losses by approximately 25%, while increasing total efficiency by 10% or more. This improved performance translates into lower total cost of ownership, a reduction in CO² emissions, and ongoing savings that buffer against future increases in energy costs.

Along with being an economical choice, the size-to-power ratio of the Bauer solution was a key factor. “Aside from the inherent superior efficiency provided by the Bauer PMSM technology, due to its power-dense design, we were able to move from a 20 hp motor to a 15 hp motor which saved on initial cost as well as operating costs,” Crosley explained. “The implementation of the Bauer BK right angle, helical bevel geared motor package also allowed us to reduce the width of the machine from 137” to 101-3/4” – which is a huge win for our customers.”

The new RD10 units provide smoother acceleration and deceleration with no “cable popping”, reducing the risk of damaging strands. A footswitch and central operator controls with handheld speed pendant allow the operator to wind material onto a reel or onto a coiling head. The footswitch can be “jogged” without tripping the drive – allowing for easy packaging of the spooled material. Dynamic reel braking reduces “over spin”. RD10 units generate lower ambient noise compared to mechanically driven units.

A Boston Gear 700 Series speed reducer is utilized on the machine’s smaller ejection drive. The 700 Series is the industry standard for modular worm gear construction. Units feature a rugged fine-grained cast-iron housing for maximum strength and durability.

“The Bauer gear motor performed well in both our in-house testing and testing at our customer’s facility. Bauer is a great company to team with. They were very supportive and worked well with our staff,” according to Crosley. “We are looking at other applications that may maximize the inherent features of the Bauer PMSM geared motors.”



The compact BK right angle, bevel geared motor supplied featured permanent magnet synchronous motor (PMSM) technology that reduces heat losses from the rotor by 100% and total losses by approximately 25%, while increasing total efficiency by 10% or more.



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About Altra Motion

Altra is a leading global designer and producer of a wide range of electromechanical power transmission and motion control components and systems. Providing the essential control of equipment speed, torque, positioning, and other functions, Altra products can be used in nearly any machine, process or application involving motion. From engine braking systems for heavy duty trucks to precision motors embedded in medical robots to brakes used on offshore wind turbines, Altra has been serving customers around the world for decades.

Altra's leading brands include Ameridrives, Bauer Gear Motor, Bibby Turboflex, Boston Gear, Delevan, Delroyd Worm Gear, Formsprag Clutch, Guardian Couplings, Huco, Jacobs Vehicle Systems, Industrial, Kilian, Kollmorgen, Lamiflex Couplings, Marland Clutch, Matrix, Nuttall Gear, Portescap, Stieber, Stromag, Svendborg Brakes, TB Wood's, Thomson, Twiflex, Warner Electric, and Wichita Clutch.



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