

Solar Tracker System Helps Overcome Site Topography Challenges

RBI Solar relies on TB Wood's custom jaw couplings to provide long-lasting performance in tough environments.

Edited by Matthew Jaster, Senior Editor

Solar tracking system installations have grown to become the largest market in the solar panel mounting industry. Tracking system popularity has expanded as more customers recognize the advantages compared to fixed solar rack systems for certain applications. The ability of solar tracking system mounted photovoltaic (PV) modules to follow the sun provides substantial improvements in energy yields.

To meet market demand, RBI Solar has introduced the Sunflower Single Axis Tracker that is designed to rotate PV modules on the East/West axis to maximize their energy production. The new system is aptly named since young sunflowers turn to face the sun as they track it across the sky.

"RBI is a well-recognized industry leader in the design, manufacture and installation of solar mounting systems for commercial and utility-scale projects," said Eric Oetjen P.E. at RBI. "We provide single-source responsibility and peace of

mind for EPC (engineering, procurement and construction) customers and project developers throughout the United States. Developing a unique solar tracking system was a natural way for us to expand our product portfolio while providing a solution to an industry need."

Unique Alternative Architecture Provides Many Advantages

Most trackers in the marketplace rely on large motors and heavy steel members to rotate full rows of PV modules at a time. In large scale installations, rows can be up to 400 ft. long, containing as many as 120, 72-cell PV modules. The reason they need heavier steel vertical posts is because, as the large number of modules rotate, they create bending/torque stress. This stress is transferred and increases along the row from post to post.

To accommodate this stress, competitor systems need to



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utilize increasingly larger post sizes as the posts get closer the drive motor. For example, posts at one end of the row, near the drive motor may be size W6x9, while posts at the far end of the row may be size W6x20.

The engineering team at RBI has developed a tabled (sectioned) system design that utilizes gearboxes. A gearbox is positioned at each post to transmit rotational torque into each foundation post instead of the motor shaft. This prevents accumulation of stresses to the motor. The result is a more load-balanced system that can drive long rows in a more cost-effective manner.

“These gearboxes provide two main advantages,” Oetjen said. “The design is non-back-drivable, so rotational stresses are absorbed at each post and not transmitted back to the motor. This allows us to use the same small post size throughout our entire system. This reduces cost and installation time.”

“Secondly, because each row is made up of approx. 35 ft. sections, large arrays can be installed over uneven terrain,” Oetjen added. “Our Sunflower system allows each section of approx. 12 modules to be adjusted at each connection point, to accommodate various topographic conditions. This is a major difference compared to competitor systems that require relatively flat surfaces, since their module rows are made up of one continuous, rigid approx. 300 ft. section.”

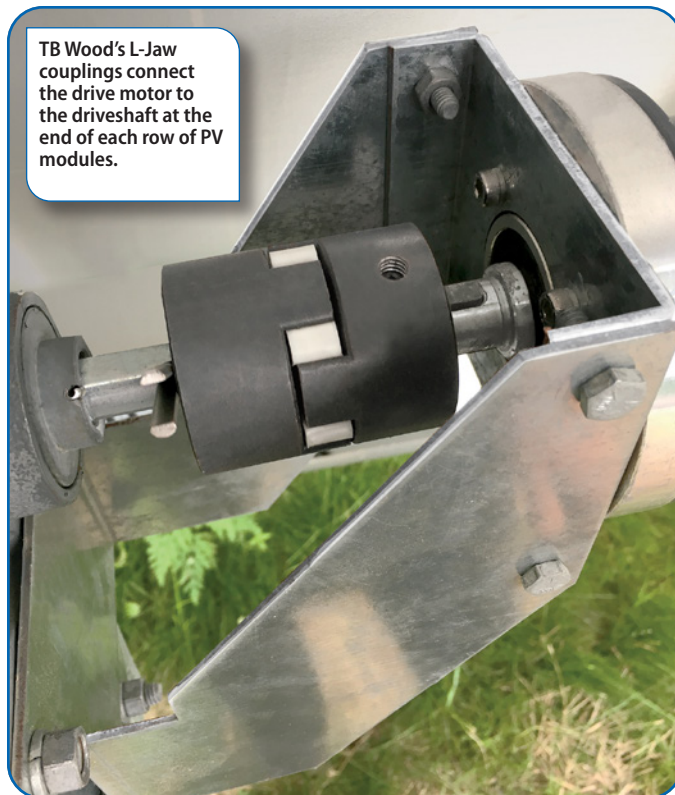
A Small Component with a Large Role

The Sunflower system, designed for commercial/utility grade applications, required a reliable coupling solution to connect the drive motor to the drivetrain at the end of each row of PV modules. The RBI engineering team evaluated options and determined that an L-Jaw coupling was the most economical choice that met the system requirements.

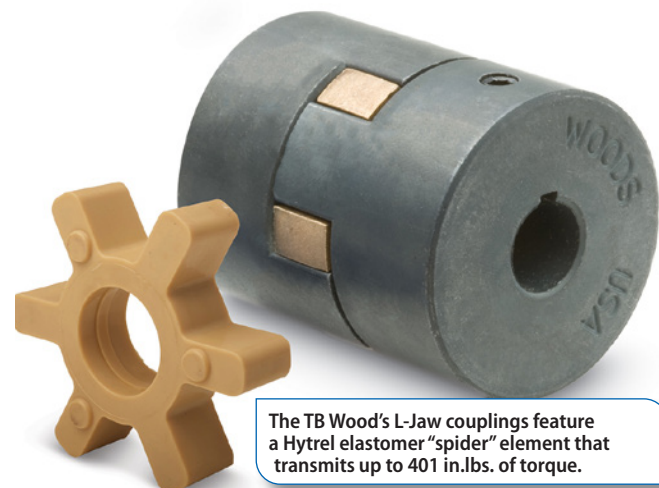
During the tracking system development process, RBI began searching for a coupling source that not only offered the right coupling type and quality level, but also convenient face-to-face support.

“The team at TB Wood’s was willing to work with us to customize the bore geometry of their L-Jaw coupling to provide a better connection to our driveshaft design,” Oetjen said.

“L-Jaw couplings are an excellent solution to connect two shafts and accommodate misalignment when ease of



TB Wood's L-Jaw couplings connect the drive motor to the driveshaft at the end of each row of PV modules.



The TB Wood's L-Jaw couplings feature a Hytrel elastomer “spider” element that transmits up to 401 in.lbs. of torque.

installation and low cost are the primary considerations. These couplings operate with an elastomer element in compression, and they offer a ‘fail safe’ design (to a degree),” said John Smihal, product manager at TB Wood’s. “If the elastomer ‘legs’ of the ‘spider’ fail, the coupling can still transmit torque through the hubs.”

To meet the solar array application specifications and torque requirements, the modified L095 L-Jaw couplings supplied utilize a Hytrel “spider” element with a torque capacity of 401 in. lbs. The couplings feature standard sintered steel hubs (made in the USA).

“We worked closely with RBI to revise our standard L-Jaw coupling bore design to accommodate their unique shaft geometry and provide a more secure hub-to-shaft connection,” Smihal said.

“The TBW L-Jaw couplings provided the most flexibility, durability and consistent quality for our solar track system,” said Oetjen. “However, the overall interactions we had with TBW outweighed all other considerations. We were able to rely, with confidence, on their experienced and knowledgeable team as they provided engineering expertise and exceptional service and support, including fast responses, problem-solving skills and timely delivery.”

Several large Sunflower system installations have been completed and the TB Wood’s couplings continue to provide reliable, trouble-free performance. **PTE**

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RBI Solar
Phone: (513) 242-2051
www.rbisolar.com

TB Wood’s
Phone: (717) 264-7161
www.tbwoods.com

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