

OGURA

“What you need in a clutch”®

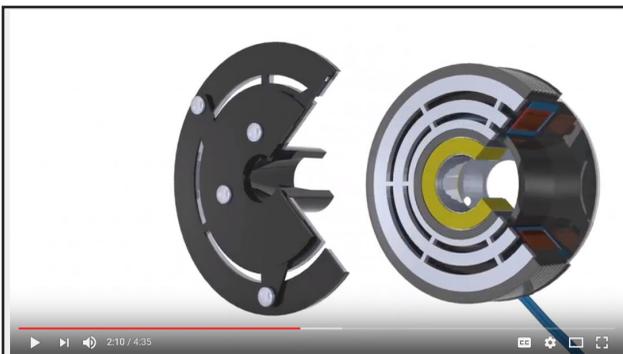


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MOBILE CLUTCH ANIMATION CREATED

Somerset, NJ

Mobile clutches are one of the highest volume electromagnetic clutches produced in the world. The largest mobile clutch application is on A/C compressors for cars. Mobile clutches are driven by the fan belt and when switched on, engage the A/C compressor to generate cooling. Besides A/C compressors, mobile clutches are used on a variety of pumps and other engine driven accessories. The animation shows how a multiple pole clutch is constructed and how multiple flux paths within the clutch increases a clutch's torque. •



New Ogura mobile clutch animation video

ISO/TS FOLLOW-UP AUDIT

Kiryu, Japan

Last quarter, 21 departments in all plants were audited for a week for ISO 9001 and ISO/TS 16949. The audit was done by personnel from Lloyd's Register Quality Assurance (LRQA). There were a few incidents of minor nonconformance, but Ogura has counter measures in place. The conclusion from the Lloyd's team is that “all counter measures were adequate and effective and all incidents of non-conformance were closed.” All activities that were audited were found to continuously utilize Ogura's management system, QMS, effectively.



ISO/TS follow up audit

At the next audit, the plants are going to shift to ISO 9001:2015 and IATF 16949. •

Ogura Industrial and our sponsored lawnmower racers, Chuck Miller and Bobby Cleveland will be at the GIE Expo in Louisville, KY October 18-20, Booth 2104 - Stop by and visit!



Ogura Sales Rep Profile

Bruce Richards, JT Chapman Co.

Bruce Richards has recently joined the JT Chapman organization as an Outside Sales Associate where he will service the Missouri territory for Ogura.

He has over 17 years of power transmission experience with Motion Industries, Tricom Services, and Grainger. He has spent the majority of his career with Motion Industries at the Riverside, MO and Topeka, KS branches.

His experience includes: Warehouse Manager, Inside Sales Associate, Outside Sales Associate and most recently Storeroom Manager at Unilever – Independence, MO. He spent 3 years in Motion Industries corporate accounts as the Strategic Account Manager for Nestle Foods. He was also at Delphi Energy Management – Olathe, KS as a storeroom manager for Tricom Services.

Bruce grew up in Texarkana, TX. He has a Bachelor of Science degree from Texas A&M University – Texarkana. He currently resides in Shawnee, KS with his wife Tyffani and two sons, Reed and Jack. They are active at Sacred Heart Catholic Church volunteering for altar servers, ushers and school of religion. They love animals and have an extended fur and feather family that includes dogs, cats, chickens and geese. Bruce loves to hunt, fish, garden and cook. He can often be found around his smoker cooking ribs or over a jelly pot stirring crabapples.

Bruce loves to travel and meet new people. He enjoys assisting others in finding viable solutions particularly when it includes researching anything mechanical. He is excited about joining the JT Chapman family and Ogura sales force and is looking forward to meeting all their valued customers. ●



Bruce Richards

PURDUE TAKES SECOND PLACE

Rockville, Indiana

Ogura helped sponsor the Purdue agBOT challenge team by providing product and technical assistance to the team. Purdue's overall performance was very successful and earned them a 2nd place finish in the weed and feed challenge at Gerrish Farms in Rockville, Indiana.

Teams in this competition were required to build a machine that could autonomously maneuver over two to

four 1,000 foot crop rows at a time while observing growing plants and applying fertilizer with pin point precision as needed. In addition, the vehicle was required to identify and kill three common weeds, either chemically or mechanically while providing real-time data and observations back to the base station.

For the mechanical eradication of the weeds, a Multivator is towed behind the ATV with a separate gas engine. The clutch is used so that the engine can be started and run at full engine horsepower when the Multivator needs to be engaged.

Ogura is proud to continue to assist college and university engineering student design teams with projects like this. ●



The Purdue agBOT Challenge Team

NEW ISO STANDARDS

Kiryu, Japan

Last quarter, 100 managers and production supervisors attended the ISO 14001:2015 kickoff. Mr. Kawauchi (Ogura's quality manager) said that the 2015 version is a dramatic revision of the previous version and he said that a careful approach is needed to make sure Ogura maintains consistency while the changes are implemented.

This is important because they need to be in conformance with ISO 9001 which will be implemented after the new ISO 14001 is in place ●



ISO 14001:2015 kickoff

Application Story

Don't Trust Atoms... They Make Up Everything

The following article is a "success and reliability update" to the application story "New Hydrogen Pump goes the Distance" originally posted in Ogura's 2010 fourth quarterly newsletter, "On The Move."

In early 2005, Ogura received a question: "What would happen if we pumped hydrogen (H₂) with the Ogura air pumps?" an engineer at Ballard asked Ogura over the phone.

Ballard's engineer wanted to try his idea. They bought a standard model made to pump air and were able to run them with H₂ for enough time to test and quantify their efficiency. They learned quickly that the Ogura Wankel based pump technology was going to be the most efficient H₂ pump they had ever tested. Lifetime was another issue. Life of our stock unit with H₂ was very short lived at about 50 hours before it began to leak hydrogen due to seal wear.

The technical challenge was to reach the 5,000 hours minimum continuous life. The technical side progressed quickly with next generations lasting hundreds of hours, then thousands. 5,000 hours became the production life targets. With Ballard's help and knowledge of the H₂ environment, the Ogura hydrogen pump surpassed the 5,000 hours in test without leaks and went into full production.

With more than ten million kilometers logged with these buses, these unique blowers have exceeded 5,000 hours on average by more than 100%, with some machines lasting 17,500 hours before a slow leak of hydrogen begins (from physical wear of the specially developed H₂ seals).

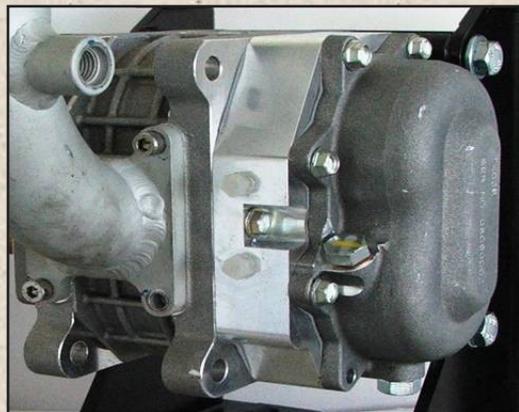
Due to the blower's success at Ballard for their 75 and 150 kW machines, Ogura has provided scale models made to pump wet H₂ for smaller and larger (up to one megawatt) fuel cell applications.

Ogura has even received Ballard's coveted vendor of the year award, for zero defects and on time deliveries for nearly 12 years running. According to Ballard's purchasing team, Ogura's blower is the next most robust product on the bus module next to their fuel cell stack which is rated for 20,000 hours.

With nearly a decade of custom production under our belt, Ogura TX04U-M for hydrogen recirculation at Ballard has exceeded all of the customer's expectations.

Ballard Power Systems Inc. is a leading manufacturer of fuel cells and is working to improve the efficiency and range of their FCveloCity® bus modules. Recent joint projects in China are working to produce many smaller fuel cell modules to help the Chinese transport bus market reduce the pollution they face today.

Ballard and Ogura continue to work together to improve life and reduce the costs associated with these unique products.●



Ogura TX series

Application Story

NEW HYDROGEN PUMP GOES THE DISTANCE

Since the 2010 Olympic and Paralympics Winter Games, the BC Transit's fleet of fuel cell buses has been operating in the Resort Municipality of Whistler, British Columbia. To date, the fleet has accumulated in excess of half a million kilometers.

Ballard's heavy duty fuel cell module, the FCveloCity®-HDC, delivers enhanced fuel cell durability and improved efficiency at a reduced cost, while offering an industry leading 12,000 hours/five year warranty. To achieve this warranty all components in the fuel cell module have to demonstrate high performance and reliability during the warranty period. The two crucial pieces of the system are the Fuel Cell Stack and the Hydrogen Recirculation Device. The durability and performance of the Fuel Cell Stack depends on the durability and performance of the Hydrogen Recirculation Device.

performance and durability of traditional gas moving devices. In 2006 Ogura and Ballard started to cooperate in the area of Hydrogen Recirculation Device development. The Ogura TX series Air Blower was selected as the platform for the hydrogen blower. Having a fully operational and efficient motorized H₂ recirculation device is critical to enable the longest range, highest durability and most efficient fuel cell buses ever produced.

The Ogura pump is a positive displacement blower that operates by pulling gas through a pair of smoothly meshing rotors. These rotors are connected to each other by gears and are set 90 degrees from each other. As the rotors turn in opposite directions, gas is trapped in the pockets formed between the rotors and the housing. For every revolution of the rotor, a volume of gas (depending on the device's size), gets pumped from one side to the other.

In this cooperative endeavorment Ballard contributed the hydrogen infrastructure and knowledge of the hydrogen environment, while Ogura provided the hardware and incorporated all necessary material and design changes resulting from the iterative development process. Throughout this joint development activity, a number of brainstorming and design sessions took place, in which engineering teams from both companies met directly in the USA, in Japan and in Canada. The outcome of this cooperation is the TX04U-MA Hydrogen Recirculation Blower, which demonstrates superior performance and exceptional durability even in the presence of water in the hydrogen gas stream.



The Fuel Cell environment creates new challenges to components and materials and understanding the difference between "traditional" industries and the "fuel cell" industry is important to the success of new designs and applications. In the past 10 years there have been many attempts to develop a Hydrogen Recirculation Device based on existing air compressor designs. However, the presence of chemically aggressive hydrogen and water vapor along with water droplets was found to have very negative effects on the

Original 2010 application story



CHUCK MILLER WINS THE STABIL BP NATIONALS

Carlisle, IA

Going into the weekend of the 25th Anniversary of the Stabil 360 Finals, the Ogura Clutch BP mower, driven by Chuck Miller, was in first place in points. With 5 wins, a 2nd and 3rd place finish for the season. Chuck was only 50 points ahead of the 2nd place driver. It was going to be a tough race with the championship on the line. Chuck needed to finish ahead of the 2nd place driver or he would not win the championship. Chuck started on the pole position and had a great start. He led out in 1st place and stayed there. Although he could not see the driver behind him, he could hear him inch closer and closer as the race continued. Chuck could not afford to slow down at all and had to drive as hard as he could to the finish. In the end, Chuck won the race and won the 25th Anniversary Overall National Points Championship.

This year was also a special occasion for Chuck because it marks exactly 25 years since he has been racing in the Stabil series. He won the inaugural Stabil race BP class in 1992. He also won the 20th BP National Championship and now the 25th anniversary race. Ogura is very proud to sponsor Chuck and all employees congratulate him on his dedication to continue as a champion. ●



Chuck Miller holding the checkered flag for the BP class win

AIR CONDITIONING SHOW IN CHINA

Guangzhou, China

Last quarter, Ogura participated in the 14th Guangzhou International Automotive Air Conditioning and Cold Chain Technology Exhibition. This is Ogura's 8th year of participating in the show. 182 companies exhibited.

The show is a chance for automotive air conditioning component makers to get together and exchange information about new products and new technologies. Ogura's booth was near the entrance, so it had good exposure.

Besides air conditioning clutches, Ogura also showed industrial clutches and racing clutches as well as videos showing the race cars that Ogura supports. This helped set the booth apart from other companies at the show. ●



Ogura booth at the Guangzhou International Automotive Air Conditioning and Cold Chain Technology Exhibition



Ogura products on display in the booth