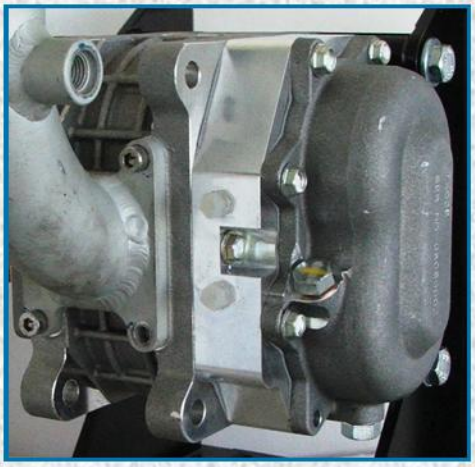
NEW HYDROGEN PUMP GOES THE DISTANCE

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®-HD6, 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.

Hydrogen Bus

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 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.



TX Hydrogen Pump mounted in frame

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. •