



High-Technology Air Blowers for Fuel Cells



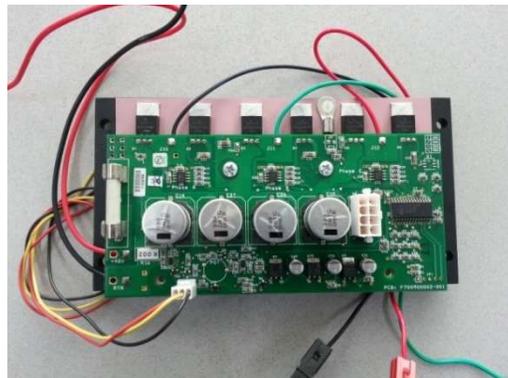
27 September 2016

Company Description



Advanced Air Blower Manufacturer

- **Critical Component**
- **Breakthrough Technology**
- **High Customer Traction**
- **HQ in Boulder, Sales Office in Tokyo**



Global FC Markets, 1-30 kW



>90% of Total Global Fuel Cell Unit Sales

- **Primary Applications**

Telecoms, House Power, Forklifts & Speciality EVs

- **Unit Sales Doubling Annually**

- **Revenues Growing at > 40% per year**



VAIREX Inside

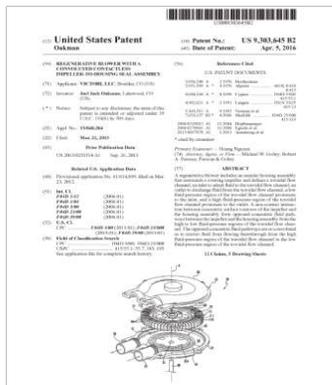
Outside Recognition



We're Getting Noticed



- **State of Colorado**
Office of Economic Development & International Trade
Advanced Industries Grant



- **US Patent 9,303,645 B2**
Regenerative Blower With Convoluted Contactless...
Pending in EU, Japan & Korea

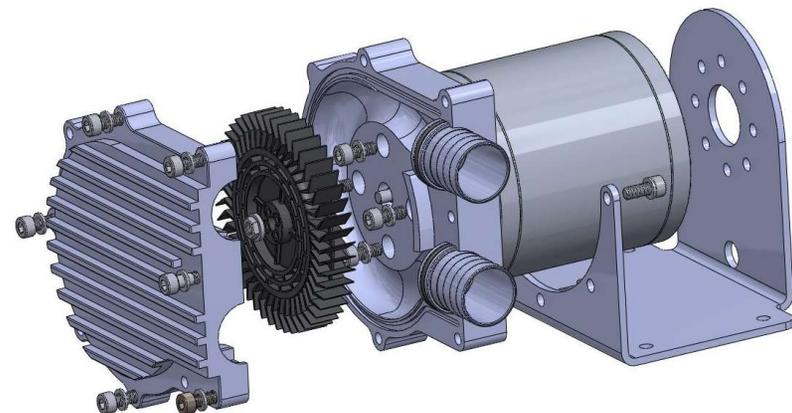


- **President's E-Award**
Presented by Secretary of Commerce Pritzker

Technology

Looks Like a Fan, Acts Like a Compressor

- **10X the Pressure of a Centrifugal Fan**
- **10% of the Parts of a Typical Compressor**
- **Simple & Robust: Only One Moving Part**
- **Lowest Cost, Longest Life, Most Compact**
- **Patents Issued & Pending Globally**

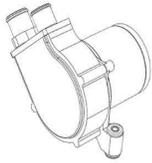
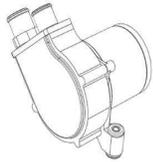
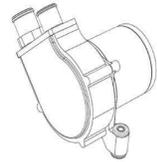


Blower Product Range



Full Range for < 1kW to >30 kW Fuel Cells

- **Range of Blower Heads to Match Flow**
 VRB1 & VRB16 New in 2016
- **Single and Two-Stage to Match Pressure**
- **Range of Motors to Match Voltage & Power**

VRB1 ²	VRB2 ²	VRB4 ²	VRB8 ²	VRB16 ²	VRB32 ²
					
					
VRB1	VRB2	VRB4	VRB8	VRB16	VRB32

Controller Product Range



FC Air Systems Require Motor Controls

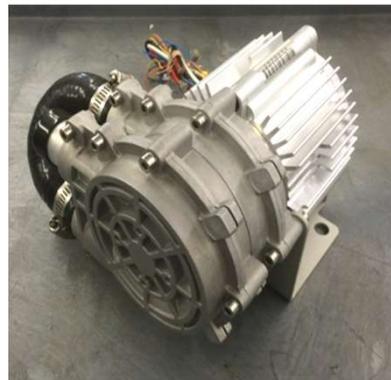
- Responding to Specific FC Requirements
- Product Line Matched to FC Voltage Specs
- Advanced FC-Specific Functions Capable
- Designed to Be Very Cost Effective
- V2 in Fabrication for Customer Evaluation



World Class Manufacturing

Simple Product, Fast Precision Assembly

- **VAIREX Colorado HQ**
- **Capacity >50,000 Units / yr**
- **Lean, Flexible, Paperless**
- **Global Supply Chain**
- **Built to Meet Industry CQD Objectives**



Challenges

Historical Nature of the FC Industry

- Unpredictable Volumes and Schedules
- Ramp Slower than Predicted
- Fits and Starts

Impact on *VAIREX*

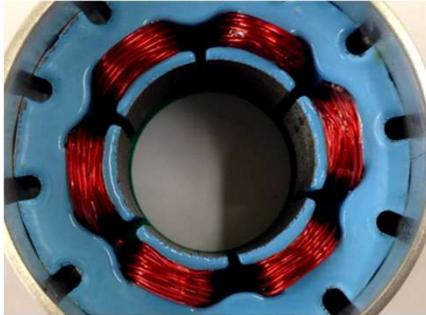
- Increases Costs
- Increases Capital Requirements
- Harder to Attract Capital
- Harder to Attract Supply Chain Support

Suggestions

Shout Out to Survivors

- **Make Fuel Cells a US Energy Plan Priority**
 - Benchmark Against Global Competitors
- **Refocus Towards Industrialization**
- **Non-Dilutive Capital**
 - Grants
 - Customer NRE
 - Banks





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