UNIVERSITY OF MINNESOTA
Driven to Discover℠

High performance, highly efficient valves for controlling gas flows

A disruptive pneumatic proportional valve technology has been developed that replaces traditional solenoid actuators with piezoelectric actuators. The valves offer two order of magnitude reductions in power consumption, making them ideal for portable applications. They match the flow capacity of most miniature pneumatic valves. They offer highly linear control regardless of operating pressure. They are the fastest of any available pneumatic valves.

Technology ID

2019-320-2022-120

Category

Engineering & Physical Sciences/Design Specifications
Engineering & Physical Sciences/Instrumentation, Sensors & Controls

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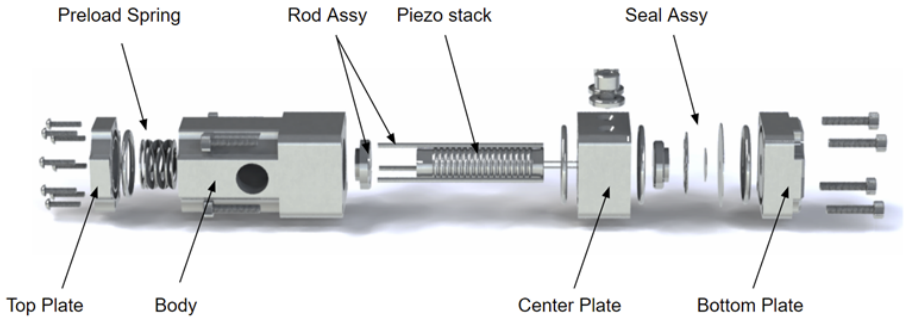

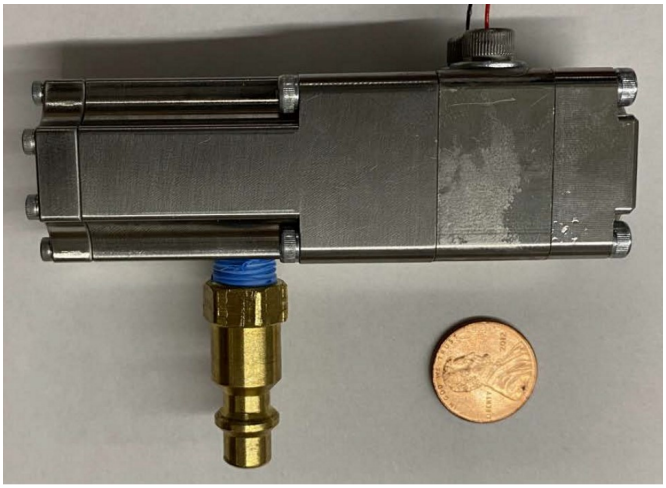

IP Status: US Patents Issued; Patent No.10,330,212 , Patent No. 11,067,187 , Patent No.12,228,222; US Patent Pending; Application No.19/001,797

Applications

- Mass flow controllers
- Portable medical ventilators
- Aerospace control valves
- Soft robotics
- Remote field applications
- Service in strong magnetic fields
- Generic control valves

Technology Overview

Piezoelectric actuators require near-zero power to hold them at any static position. In contrast, conventional solenoid actuators constantly consume power to hold them at non-equilibrium positions. Piezoelectric pneumatic valves are superior for portable applications, as batteries can be downsized. However, to date, piezoelectric pneumatic valves have gained little commercial acceptance due to low flow capacity, low pressure capacity, or both. The revolutionary UMN valves achieve flow and pressure capacities comparable to common miniature pneumatic valves by combining unique seal or orifice plates with piezoelectric stack actuators. Their control characteristics are superior to solenoid valves, making them ideal for high precision applications such as mass flow controllers.

Phase of Development

TRL: 4-5
Proof of concept prototype available.

Desired Partnerships

This technology is now available for:

- License
- Sponsored research
- Co-development

Please contact our office to share your business' needs and learn more.

Researchers

- **Thomas Chase, PhD** Professor, Mechanical Engineering Department

Licensing Terms

MN-IP Try and Buy

Center for Compact and Efficient Fluid Power (CCEFP) Try and Buy – Available to CCEFP member companies

Try

- Trial period is up to 12 months
- Trial fee is $0; In place of Try fee, a business plan for the Try period is required
- No US patent fees during Try period[1]

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