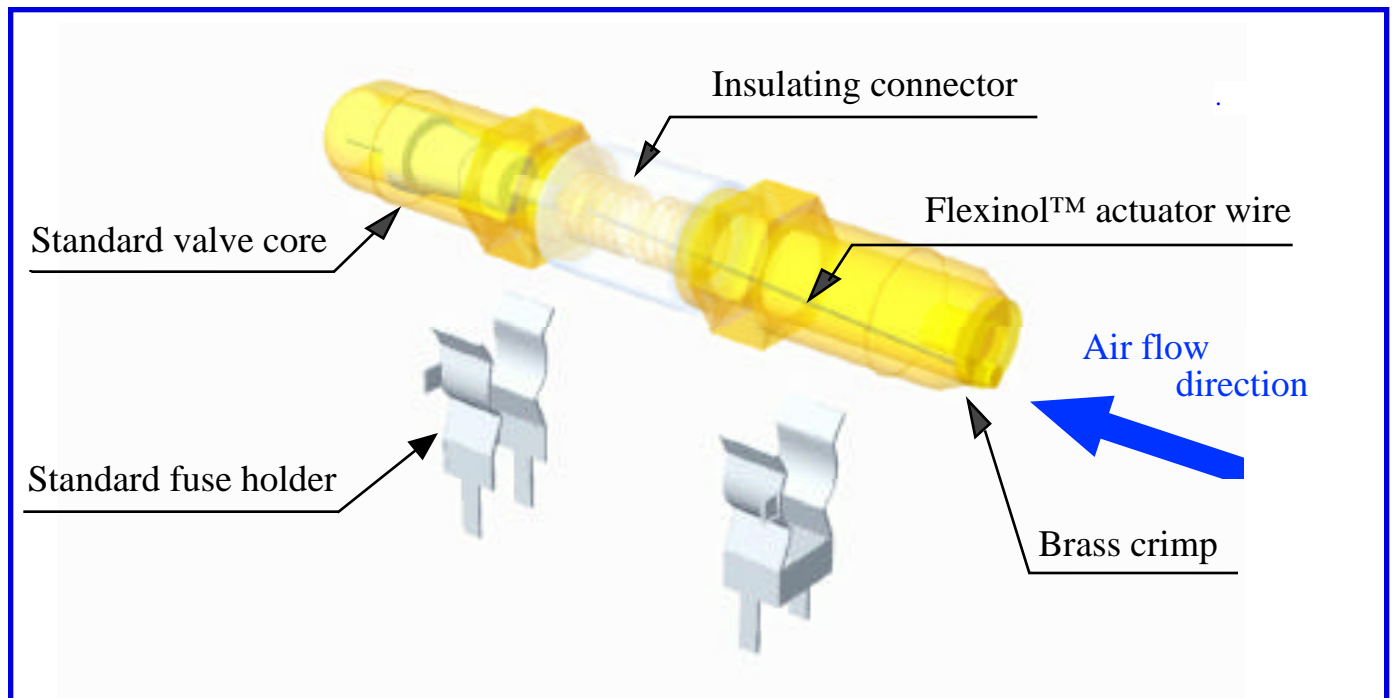


## Electrostem™ Valve

A Proportional Control Valve with exciting features:  
Small Size  
Light Weight  
Low Voltage - less than 1.0 Volt  
and  
Surprisingly Low Cost



**Pressure\*:** 75 PSI

**Voltage (Standard Operation)\*\*:** .8 to .975 Volt

**Current (Standard Operation)\*\*:** 750 mA

**Resistance:** 1.3

**Ambient:** 22°C

**Size:** 0.36"Ø x 1.75" Long

**Connecting electrically:** The brass ends of this valve are the electrical contacts. They are non polarized. Current can run either direction.

\*The valve can be custom manufactured for higher psi if the application requires it.

\*The valve can also be operated manually but should not be manually operated while being used electrically.

\*Wire is exposed internally. A wire break could cause a spark internally.

\*\*Flexinol™ (the "valve motor") is based primarily on a thermal reaction. Therefore, the cycle rate, and power to the valve can vary greatly depending on the goal of each different application.

### Electrostem™ Valve:

This valve is designed to show how Flexinol™ can be used to proportionally control air flow. It uses a standard valve core or stem like those found in automobile tires. Generally, these stems are on or off depending on whether the internal stem cap is open or closed. Nevertheless, Flexinol™ actuator wires can very gradually open or close these caps to produce proportionally controlled air flow. While heated with internal resistance (like a light bulb) the Flexinol™ contracts and opens the cap; however, as it opens air begins to flow through and cool the same wire. The equilibrium between the electrical input and the mass of air entering the valve determines the aperture size and air flow. Consider the following test results showing how higher density of the pressurized input air restricts the output volume. :

While passing 750mA current through the valve:

20psi	1.28gpm
40psi	1.11gpm
60psi	.95gpm
80psi	.78gpm
100psi	.61gpm

Further testing also shows that with constant input pressure the output varies directly with current:

At:	<u>1000mA</u>	<u>1120mA</u>	<u>1150mA</u>
50psi	3.33gpm	3.75gpm	4.64gpm
100psi	2.51gpm	4.64gpm	5.23gpm

Air flow is controlled naturally. If airflow is restricted, a given current such as the 750mA above will automatically open the valve further to maintain its equilibrium of energy input and air convection output. For example, if being used to fill some sort of chamber (perhaps a car tire) a constant 750mA will open the valve more and permit more air flow as the pressures equalize, until it is completely open. **This allows a kind of bleed on action but also lets the valve reach the fully open position and apply the full potential of the pressure available. Thus promoting a constant air flow.**

**Although tests with air flow** show maximum flow rates and the current required to fully open the valve at a different input pressures, one must remember that at these amperages any decrease in air flow will overheat and destroy the valve itself.

20psi	@	1000mA	3.53gpm
40psi	@	1500mA	6.67gpm
60psi	@	1750mA	8.57gpm
80psi	@	1850mA	12.00gpm
100psi	@	2000mA	15.00gpm

**Note: Higher currents not only permit more air flow, they require it. Should air flow stop for any reason the equilibrium becomes lopsided and above 750mA will severely damage the Electrostem™ valve.**

Interesting as this valve is, it is only one demonstration of the many new possibilities that Flexinol™ actuator wire brings to the valve industry.

There are many other needs and preferences that can now be filled with this exciting material. Please contact us if you have any other valve requests that you would like to explore with us.