

Operation of TSI® Venturi Valves

Application Note LC-128

Venturi valves can be an important component of critical environments control systems. Understanding how venturi valves operate is key to using them successfully.

At their heart, venturi valves can be considered pressure-independent flowmeters. They are able to mechanically correct for static pressure fluctuations without involving a controller. Instead, a spring-loaded cone responds to duct static pressure changes. As the static pressure inside the duct changes, the spring will compress or expand, moving the cone in or out of the valve body and adjusting the venturi valves resistance to flow. Air volume through the valve is maintained at setpoint, even as static pressure changes.

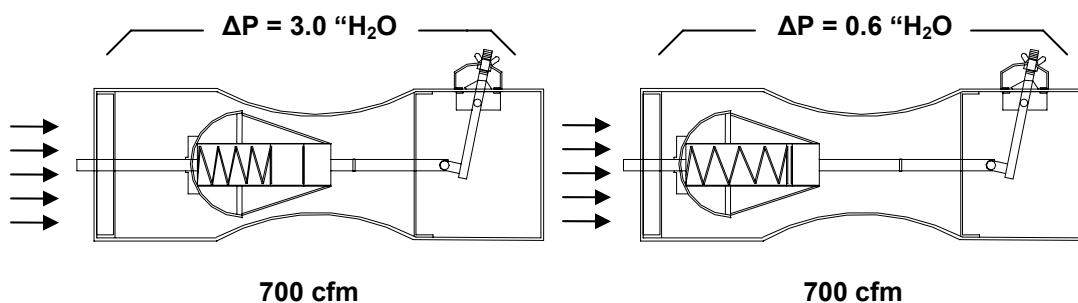


Fig.1: Constant Volume Valve with a spring range of 0.6 - 3.0 "H₂O

When a venturi valve is adjusted to achieve different air flow rates, the valve shaft is repositioned. Moving the shaft also moves the cone inside the valve body, allowing more or less flow through the valve. The cone will ride on its spring in order to maintain pressure-independent operation at any shaft position, meaning that the position of the valve shaft can be used as a flow measurement. TSI uses high-speed electric actuators to control the valve shaft position and flow rate.

To translate valve shaft position into usable flow rate information, the flow curve of the valve is field-programmed into a TSI controller by measuring and entering flow rates at specific valve positions. Field calibration compensates for duct leakage while serving as a check to ensure that the needed pressure drop is present.

In order for the cone and spring of a venturi valve to function as designed, venturi valves require a higher pressure drop than many flow stations, including pitot arrays and flow crosses. The high pressure drop, however, carries with it another advantage: the pressure drop conditions the flow, eliminating requirements for straight duct runs upstream or downstream of the valve. Venturi valves have been installed next to elbows, take-offs and ductwork transitions without compromising their reliability.

TSI Incorporated – 500 Cardigan Road, Shoreview, MN 55126 U.S.A

USA	Tel: +1 800 874 2811	E-mail: answers@tsi.com	Website: www.tsi.com
UK	Tel: +44 149 4 459200	E-mail: tsiuk@tsi.com	Website: www.tsiinc.co.uk
France	Tel: +33 491 11 87 64	E-mail: tsifrance@tsi.com	Website: www.tsiinc.fr
Germany	Tel: +49 241 523030	E-mail: tsigmbh@tsi.com	Website: www.tsiinc.de
India	Tel: +91 80 41132470	E-mail: tsi-india@tsi.com	
China	Tel: +86 10 8260 1595	E-mail: tsibeijing@tsi.com	
Singapore	Tel: +65 6595 6388	E-mail: tsi-singapore@tsi.com	



Contact your local TSI Distributor or visit our website www.tsi.com for more detailed specifications.



TRUST. SCIENCE. INNOVATION.