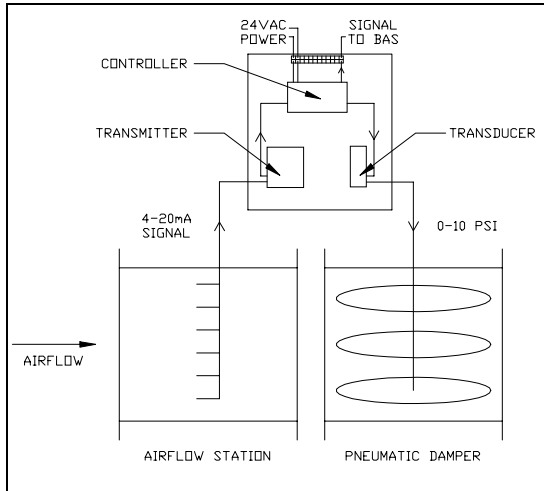


LOCAL CONSTANT VOLUME CONTROL

BULLETIN 881



PRINCIPLES OF DESIGN

This assembly provides very accurate, independent set point control when constant volume airflow to spaces is required.

The assembly includes a linear airfoil damper, an airflow station (differential pressure or thermal mass flow), a transmitter and a controller that uses "Fuzzy Logic". The airflow station senses the flow rate and outputs an analog signal to the controller, which compares this signal to the controller set point. If the set point requires corrective action, the controller outputs an analog signal to the transducer, which either feeds or bleeds instrument air to the flow control damper.

This application provides a constant volume of air where the upstream pressures vary and the space served must have a constant flow rate.

ADVANTAGES

- Time proven components
- Inexpensive local control
- Simple understandable set point control
- Very accurate flow control

The controller uses a field-determined set point to maintain a constant flow into the space. The controller uses a direct (not an inferred) feedback, such as flow through an airflow station, to maintain the airflow to the space. The controller includes a display to provide local monitoring of the flow rate.

Sizes range from a 4" (102mm) diameter to a 16" (406mm) diameter unit.

Flow ranges can vary from 50cfm (0.024 m³/s) to 3000cfm (1.416 m³/s).

Selection of the airflow station technology is based on velocities through the flow station. Differential pressure is provided with higher flow rates and thermal mass flow with both lower and higher flow rates.

Programming for Critical Spaces

BULLETIN 883-b

Waddell Engineering Co. offers the following factory developed & tested fundamental program functions. These functions can be arranged on the controller to meet any application with the only limitation being the hardware specified inputs and outputs.

- 1. Constant Volume (CV)**
The CV Program is used to maintain a constant airflow through the damper unit in spite of changing duct pressure.
- 2. Variable Volume (VAV)**
The VAV Program has been developed to modulate airflow based on a sensor value. An example of this program may be to modulate the airflow through a fume hood based on the value of the sash position sensor.
- 3. Two-Position Constant Volume**
The Two-Position CV Program is used to maintain airflow through the damper unit constant at one of two values. The active set point is selected based on the position of a switch or dry contact sensor. An example is the flow requirements in an occupied or unoccupied space.
- 4. Pressure Independence, Temperature, Humidity**
The Pressure Independence, Temperature control and Humidity Control programs are all controlled using PI, or PID loops depending on which controller type is required. The control schemes are used to maintain a sensor at a constant set point.
- 5. Flow Offset (Limited to One per Control Device)**
The Flow Offset Program is used to maintain a constant offset between the supply air volume and exhaust air volume. The program compares the sum of the flow through the supply valves with the sum of the flow through the exhaust valves and compares the offset with a set point. The supply valves or exhaust valves are then modulated to meet the set point. Each valve will maintain the same proportion of flow to each other as designed.
- 6. Flow offset with Pressure Override**
Space pressures are often determined by the offset between supply and exhaust flow ratings. Actual Space pressure swings can be closely monitored and controlled by selecting a min/max space pressure ranges in the controller.