

INDUSTRIAL APPLICATION

VARIABLE AIR VOLUME CONTROLLER

What is a Variable Air Volume (VAV) Controller?

The Variable Air Volume (VAV) controller is an electronic device for digital control of single duct, dual duct, fan powered, and supply/exhaust VAV terminal configurations.

Along with the control capability of the VAV box, the controller can also integrate the control of the room or zone baseboard heat and lighting logic.

How does it work?

A VAV system maintains the air supply at a constant temperature while individual zone thermostats vary the flow of air to each space maintaining the desired zone temperature. This is unlike a constant volume system that maintains a constant volume of airflow to the space, but varies the temperature of the air stream in response to space temperature changes. VAV systems are predominantly single duct, but about 15% are dual duct designs.

Air Handling System

The air handling system typically maintains about 1 inch W.C. static pressure inside the longest run of duct work away from the supply fan.

This ensures that each VAV terminal unit has enough pressure at its inlet to deliver the maximum required flow of air into the space.

As each VAV box opens and closes in response to the temperature changes in the space, the static pressure in the air handling system changes. It is the job of the controller at the air handler to modulate the supply fan providing the needed amount of airflow to each VAV box by maintaining the static pressure setpoint.

Temperatures

VAV systems are most easily understood by first considering them as cooling applications. As the zone temperature increases and if the Air Handling Unit is supplying cool air, the VAV controller opens the VAV box damper to allow more cool air to reach the space.

The specific amount of air volume required to maintain a particular zone temperature setpoint is dictated by the size of the space and the internal and external heat loads.

In addition, since the size of the VAV box dictates its maximum cooling capacity, a VAV box's performance is dependent upon the mechanical engineer's correct box sizing for each zone.

If the installed unit is too small, insufficient cooling results and at high flow rates audible noise may be emitted. If the installed unit is too large, proper control may be difficult to attain since a small change in damper position causes an excessive change in airflow.

Where are pressure sensors used on a VAV Controller?

The above mentioned setpoint is used by the airflow loop, which samples airflow via a Differential Pressure Sensor (DPS) in the box inlet and modulates the damper to control the flow. Thus, the VAV box flow is independent of duct static pressure. The sensor is self is located outside of the duct in close proximity to the other electronics controls. Tubing is ran from the DPS to the manifolds on the high side which face upstream and the low side ports which face downstream.

Differential Pressure Sensor In most applications the sensor is mounted on the panel wall for ease of replacement (see product P992, P993), but can also be installed on the printed circuit board (products P1J, P1K).



Tubing running from the Differential Pressure Sensor to the Upstream (High) and Downstream (Low) Manifolds



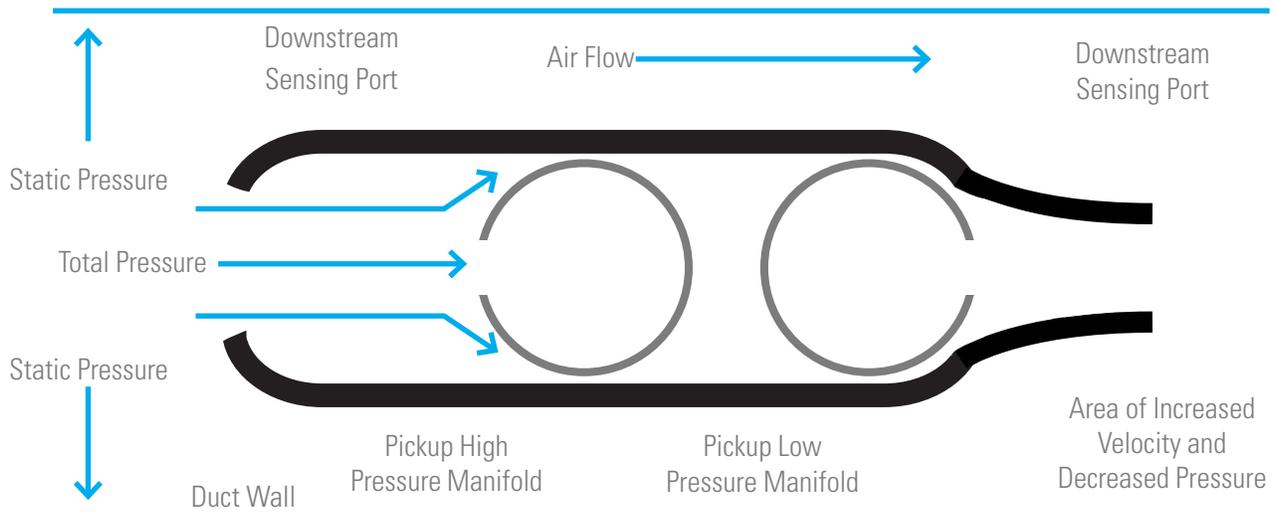
RECOMMENDED PRODUCTS

Product Series	Type	Features	Function	Brand
 P992	External Mount	<ul style="list-style-type: none"> • 5V input • Ratiometric output • 0-2" to 0-10" H₂O range 	Differential Low Pressure Sensor	Kavlico
 P993	PCB Mount (Rugged)	<ul style="list-style-type: none"> • 5V input • Ratiometric output • 0-2" to 0-10" H₂O range 	Differential Low Pressure Sensor	Kavlico
 P1K*	PCB Mount	<ul style="list-style-type: none"> • 5V input • Ratiometric output • 0-2" to 0-10" H₂O range 	Differential Low Pressure Sensor	Kavlico
 P1J*	PCB Mount	<ul style="list-style-type: none"> • 2.7-5.5V input • Digital output (I²C or SPI) • 0-2" to 0-10" H₂O range • Low power (<2.5mA) 	Differential Low Pressure Sensor	Kavlico

*For breathing pressure sensor (typically 0-2" to 0-10") see standard P1J and P1K options. For tank pressure sensor (typically >15psi) contact Sensata or higher pressure options



WHAT THE AIR FLOW PICKUP MEASURES?



Sensata Technologies, Inc. ("Sensata") data sheets are solely intended to assist designers ("Buyers") who are developing systems that incorporate Sensata products (also referred to herein as "components"). Buyer understands and agrees that Buyer remains responsible for using its independent analysis, evaluation and judgment in designing Buyer's systems and products. Sensata data sheets have been created using standard laboratory conditions and engineering practices. Sensata has not conducted any testing other than that specifically described in the published documentation for a particular data sheet. Sensata may make corrections, enhancements, improvements and other changes to its data sheets or components without notice.

Buyers are authorized to use Sensata data sheets with the Sensata component(s) identified in each particular data sheet. HOWEVER, NO OTHER LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE TO ANY OTHER SENSATA INTELLECTUAL PROPERTY RIGHT, AND NO LICENSE TO ANY THIRD PARTY TECHNOLOGY OR INTELLECTUAL PROPERTY RIGHT, IS GRANTED HEREIN. SENSATA DATA SHEETS ARE PROVIDED "AS IS". SENSATA MAKES NO WARRANTIES OR REPRESENTATIONS WITH REGARD TO THE DATA SHEETS OR USE OF THE DATA SHEETS, EXPRESS, IMPLIED OR STATUTORY, INCLUDING ACCURACY OR COMPLETENESS. SENSATA DISCLAIMS ANY WARRANTY OF TITLE AND ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, QUIET ENJOYMENT, QUIET POSSESSION, AND NON-INFRINGEMENT OF ANY THIRD PARTY INTELLECTUAL PROPERTY RIGHTS WITH REGARD TO SENSATA DATA SHEETS OR USE THEREOF.

All products are sold subject to Sensata's terms and conditions of sale supplied at www.sensata.com SENSATA ASSUMES NO LIABILITY FOR APPLICATIONS ASSISTANCE OR THE DESIGN OF BUYERS' PRODUCTS. BUYER ACKNOWLEDGES AND AGREES THAT IT IS SOLELY RESPONSIBLE FOR COMPLIANCE WITH ALL LEGAL, REGULATORY AND SAFETY-RELATED REQUIREMENTS CONCERNING ITS PRODUCTS, AND ANY USE OF SENSATA COMPONENTS IN ITS APPLICATIONS, NOTWITHSTANDING ANY APPLICATIONS-RELATED INFORMATION OR SUPPORT THAT MAY BE PROVIDED BY SENSATA.

Mailing Address: Sensata Technologies, Inc., 529 Pleasant Street, Attleboro, MA 02703, USA.

CONTACT US

Americas

+1 (800) 350 2727
sensors@sensata.com
switches@sensata.com

Europe, Middle East & Africa

+359 (2) 809 1826
pressure-info.eu@sensata.com

Asia Pacific

sales.isasia@list.sensata.com
China +86 (21) 2306 1500
Japan +81 (45) 277 7117
Korea +82-10-9218-1179
India +91 (80) 67920890
Rest of Asia +886 (2) 27602006
ext 2808