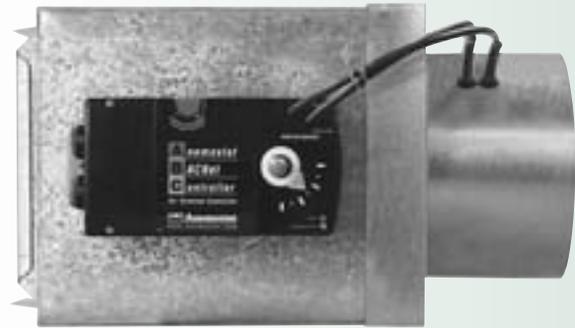


## Go Digital with Anemostat BACnet Controllers . . . . . Simple as ABC!!

### APPLICATION

When designing your HVAC system with digital control automation, consider specifying Anemostat air terminals ("VAV boxes") with Anemostat's BACnet Controllers (ABCs) – a turnkey solution that is easily implemented. Or if you intend to install a stand-alone DDC system today that can provide a network solution tomorrow, ABCs should be considered.

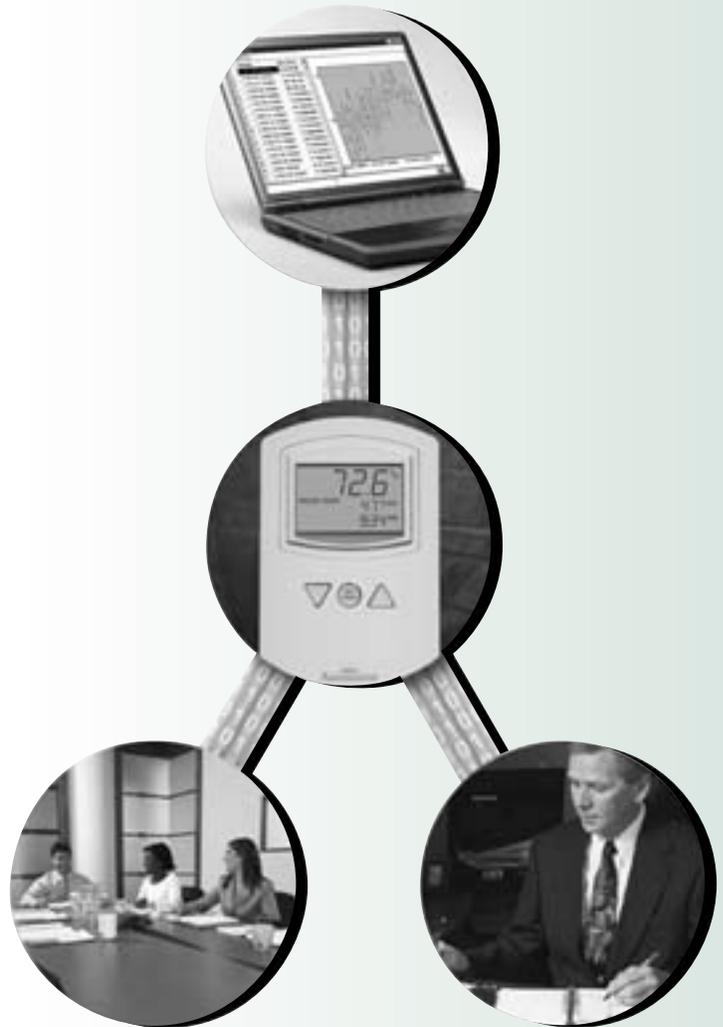


### WHAT IS BACNET?

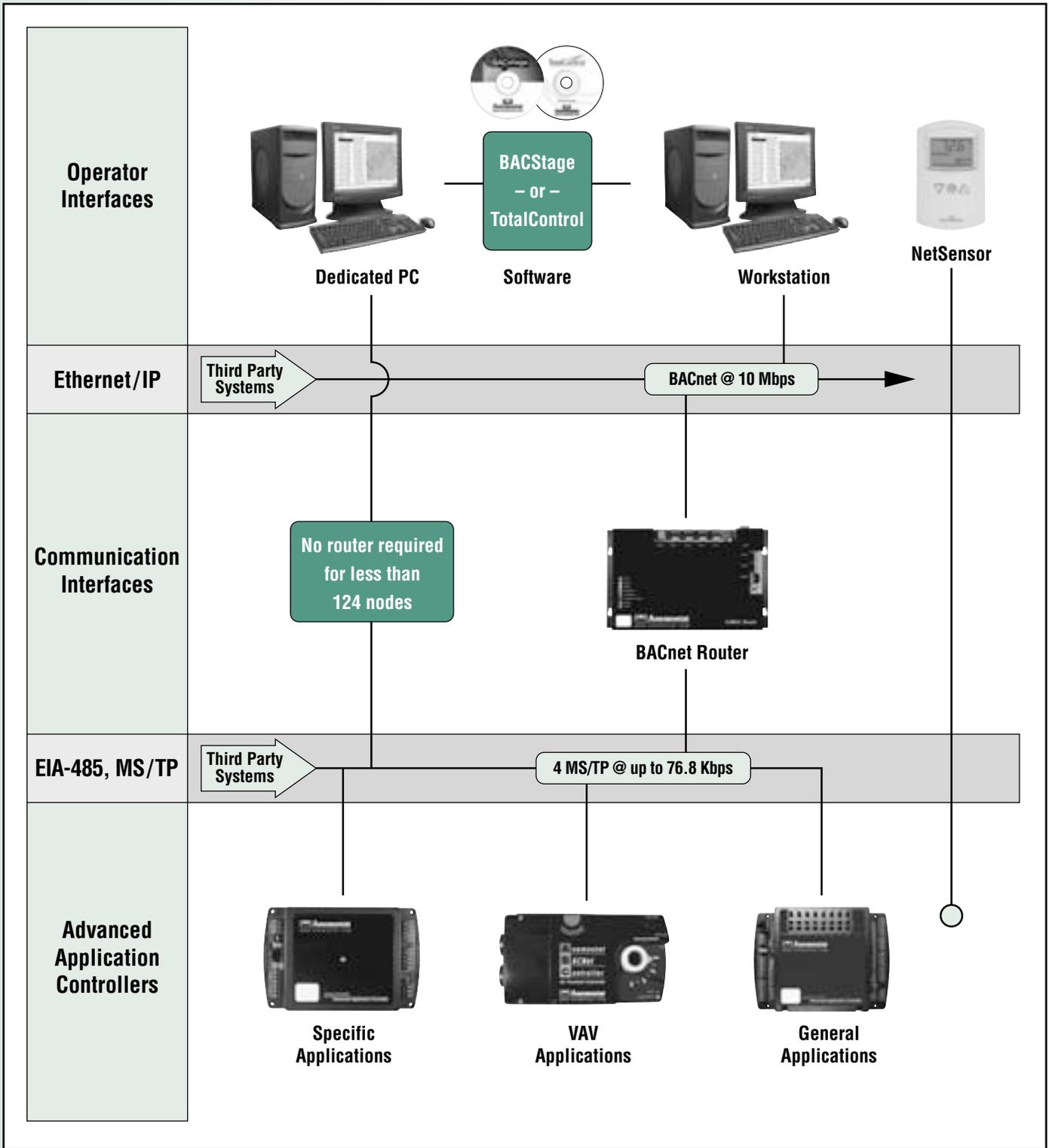
- Based on ANSI/ASHRAE Standard 135 **Building Automation and Control Networking** protocol. Building management, users, and manufacturers collaborative effort!
- A non-proprietary, open data communications protocol using an agreed-upon set of rules for creating interoperable networks of building systems. It was developed by the American Society of Heating, Refrigerating, and Air-conditioning Engineers (ASHRAE) but has become a worldwide standard (ISO-16484-5).
- The protocol encompasses all building systems from HVAC and building automation to lighting, security, fire and life safety, etc. It defines the messages that various devices exchange and how those messages are delivered.
- BACnet controllers do NOT use proprietary chipsets
- Interoperability of all BACnet control devices on a system – eliminates "owner lock-in" issues with proprietary systems, increases competitiveness, and provides significant hardware and software choices

### BENEFITS OF FACTORY-SUPPLIED DDC HARDWARE

- In-Stock digital controls and wall sensors for all VAV air terminals – no more delays due to consignment controls that arrive late or never
- Eliminates coordination delays and integration "finger pointing"
- Single source responsibility:
  - "Turnkey" means our engineering group integrates the controller with the air terminal for a complete, functioning assembly as specified and ready to install
  - Controls are factory programmed and tested "right on the air terminal" – not possible with consignment controls provided to the factory by other control manufacturers
  - Entire assembly factory warranted including wiring, relays, controls, sensors, and other miscellaneous hardware required to meet your specifications
- Economic alternative to field installed controls
- Controls using the industry standard BACnet protocol eliminates integration difficulties with other "networked" devices



## Anemostat BACnet Architecture



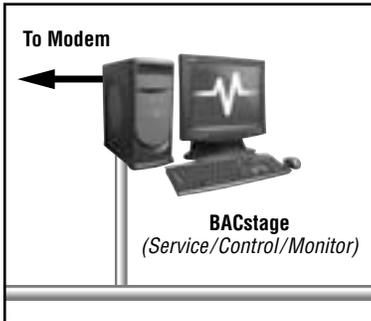
**Notes:**

1. ABC-5050 routers supports four MS/TP networks, four BACnet IP subnetworks and one BACnet 8802-3 network.
2. MS/TP units can operate standalone or may be networked (up to 124 units).

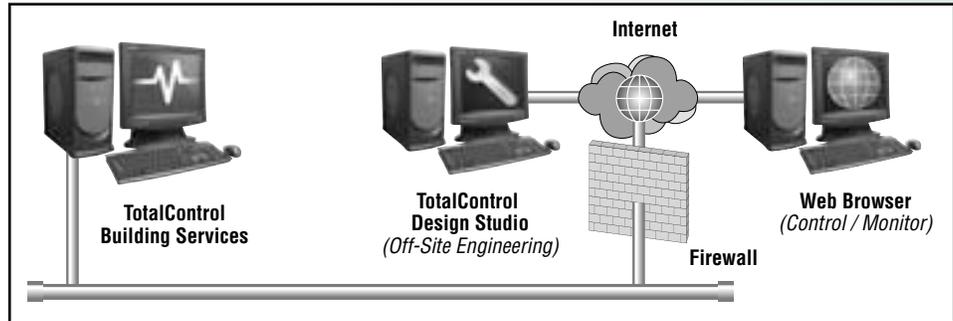
## OPERATOR WORKSTATION SOFTWARE

Connect to your network and/or access BACnet control devices using PC software. Anemostat offers 2 software solutions based on your requirements:

- BACstage – essential tool to configure ABCs and our other BACnet controllers and create an operator workstation for your BACnet system
- TotalControl – a powerful, leading edge, building automation software using a web interface to communicate and manage remote or local networks in multiple locations



*BACstage*

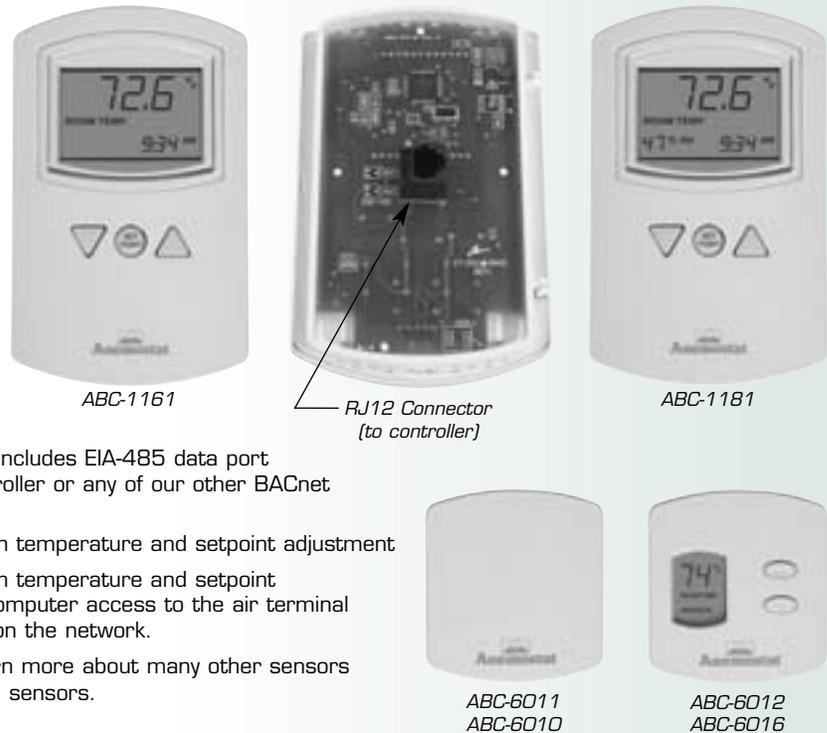


*TotalControl*

## WALL / NETSENSORS

Anemostat offers various wall/space sensors that connect directly to the air terminal ABC controller:

- ABC-1161 – NetSensor monitors space temperature. Large, 4-character LCD display. Includes EIA-485 data port to allow computer access to the air terminal controller or any of our other BACnet controllers on the network.
- ABC-1181 – NetSensor monitors space temperature AND humidity. Large, 4-character LCD display. Includes EIA-485 data port to allow computer access to the air terminal controller or any of our other BACnet controllers on the network.
- ABC-6011 – Wall sensor with 10k  $\Omega$  Thermistor.
- ABC-6010 – Wall sensor with 10k  $\Omega$  Thermistor. Includes EIA-485 data port to allow computer access to the air terminal controller or any of our other BACnet controllers on the network.
- ABC-6012 - Wall sensor with LCD display for room temperature and setpoint adjustment
- ABC-6016 - Wall sensor with LCD display for room temperature and setpoint adjustment. Includes EIA-485 data port to allow computer access to the air terminal controller or any of our other BACnet controllers on the network.



Contact your local Anemostat Representative to learn more about many other sensors available for your specific applications, including CO2 sensors.

## ADVANCED APPLICATION BACNET CONTROLLERS

Native BACnet controllers are available for: air terminals, specific applications and general use. They are installed in stand-alone environments or networked with other BACnet devices.

## ABC-7001 / 7003 AIR TERMINAL CONTROLLERS

The 2 available models of ABCs are distinguished by their different output configurations used for various single duct, dual duct, and fan-powered air terminal applications:

### DESCRIPTION

The ABC-7001 and ABC-7003 are native BACnet, direct digital controllers designed for VAV air terminal units. An integrated actuator and the supplied programs make this an ideal controller for adding temperature setback, overrides, and other HVAC sequences. Install this versatile controller in stand-alone environments or networked to other BACnet devices. As part of a complete facilities management system, the ABC-7001 & ABC-7003 controllers provide precise monitoring and control of connected points.



- BACnet MS/TP compliant
- VAV control sequences are incorporated to provide pressure independent control of single duct, dual duct, and fan-powered units. Programmed sequences are stored in the controller.
- Controller includes a platinum-ceramic flow-through, on-board sensor. When coupled with the patented Velocity Wing inlet air flow sensor, expect a high degree of primary flow control accuracy even with significant turn-down rates.
- Highly programmable sequencing using control basic – virtually unlimited control strategies to meet comfort needs while maintaining a high level of energy efficiency. Cooling, heating, proportional or step heat, setback, temperature limiting control loops are all easily configured.

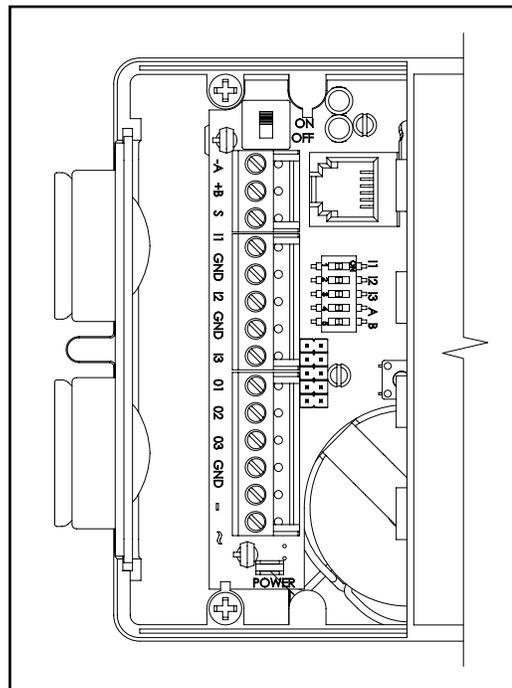
## SPECIFICATIONS

### ABC-7001/7003 Inputs

- 3 universal inputs each of which is programmable as an analog, binary or accumulator objects. A fourth input is dedicated to the airflow sensor.
- Standard units of measure
- Pull-up resistors for switch contacts and other un-powered equipment. Switch select none or 10k  $\Omega$ .
- Removable screw terminal block, wire size 14–22 AWG
- 10-bit analog-to-digital conversion
- Pulse counting to 16 Hz
- 0–5 volts DC analog input range
- Over-voltage input protection
- Compatible with ABC-1161/81 and ABC-6000 Series Wall / NetSensors

### ABC-7001 OUTPUTS

- 3 universal outputs each of which is programmable as an analog or binary object.
- 1 output dedicated to the actuator
- Standard and custom units of measure
- Removable screw terminal block, wire size 14–22 AWG
- 0–10 volts DC for analog objects
- 0–12 volts DC for binary objects
- Output current limited to 100mA per output.



ABC-7001 Terminal Strip

## ABC-7003 OUTPUTS

### Universal

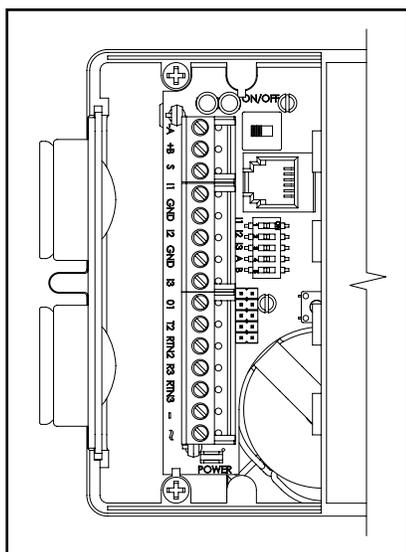
- 1 universal output that is programmable as an analog or binary object.
- 1 output dedicated to the actuator
- Standard and custom units of measure
- Removable screw terminal block, wire size 14–22 AWG
- 0–10 volts DC for analog objects
- 0–12 volts DC for binary objects
- Output current limited to 100mA per output.

### Triac Output

- 1 optically isolated triac output. Programmable as a binary object.
- Maximum switching 30 volts AC at 1 ampere
- Removable screw terminal block, wire size 14–22 AWG

### Relay Output

- 1 normally open relay contact
- Maximum switching 30 VAC/VDC, 2A Max
- Removable screw terminal block, wire size 14–22 AWG



ABC-7003 Terminal Strip

## PROGRAMMABLE FEATURES

- 10 Control Basic program areas
- 4 PID loop objects
- 40 analog and 40 binary value objects
- See Pic statement for supported BACnet objects

### Schedules

- 8 Schedule objects
- 3 Calendar objects

### Alarms and events

- Supports intrinsic reporting
- 8 Notification class objects

### Trends

- 8 Trend objects

### Memory

- Programs and program parameters are stored in nonvolatile memory.
- Auto restart on power failure

## COMMUNICATIONS

- EIA-485 operating up to 76.8 kilobaud
- NetSensor Models ABC-1161/81 are compatible through RJ-12 connector

## ACTUATOR FEATURES

### Torque

- 50 in-lb. minimum
- 70 in-lb. maximum

### Motor Timing

- 18°/minute at 60 Hz.

## SPECIFIC APPLICATION CONTROLLERS

Native BACnet job-specific controllers are fully programmable and designed for a variety of applications. As part of a complete facilities management system, these controllers provide precise monitoring and control for roof top units, air handlers, and heat pump applications.

## GENERAL USE CONTROLLERS

Native BACnet general use controllers are fully programmable and designed for general applications. Programmable inputs / outputs and user defined Control Basic programs allow for unlimited applications as part of a complete facilities management system.



## FULLBAC ROUTER

Use this multi-port BACnet router to manage BACnet building automation data between BACnet/IP, BACnet Ethernet, and MS/TP networks. This router conforms to ANSI/ASHRAE Standard 135.

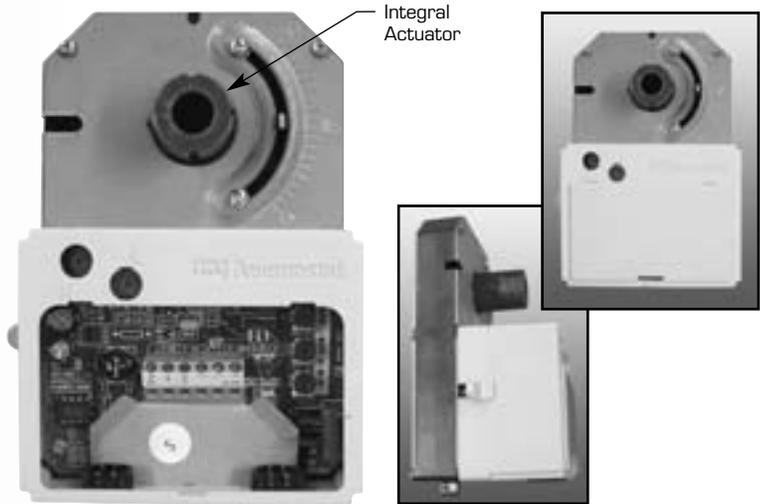


## ANALOG ELECTRONIC CONTROLS

### General

Anemostat's Model C51 analog controller is used in air flow strategies to provide pressure independent control with analog voltage signals that provide closed loop control of air flow and auxiliary heating devices such as hot water or electric coils. Air flow adjustments are made at the space thermostat, reducing the time required for flow trimming. Anemostat includes the space thermostat (factory calibrated for design flow) where applicable when analog controls are provided.

The Model C51 controller requires a 24vac power source. Typically, a step down transformer is used at each terminal. Electronic input signals such as air velocity and room temperature are processed by the controller. The Velocity Wing inlet sensor provides the controller with signals representing actual flow rate. The integral reversible damper actuator responds as commanded by the controller for flow regulation. The included wall thermostat provides feedback to the terminal controls, signaling requests to meet temperature setpoint.



Model C51 Analog Controller  
(Cover Removed)



Cooling Only Wall Thermostat  
(Included When Applicable)



Heating & Cooling Wall Thermostat  
(Included When Applicable)



Cooling Only Wall Thermostat  
(Cover Removed)

Flow Adjustments



Flow Adjustments

Direct Readout

Heating & Cooling Wall Thermostat  
(Cover Removed)

## PNEUMATIC CONTROLS

These controls require a clean, dry source of compressed air, 20 psi being typically used. Since pneumatic controls are air consuming devices, compressor sizing should include the terminal controls. Control devices may include a velocity controller, air velocity sensor, pneumatic actuator, and volume damper. The pneumatic velocity controller is the brain which monitors pneumatic input signals from the thermostat and velocity sensor, and outputs a signal to the damper actuator resulting in air flow regulation. The pneumatic velocity sensor is mounted in the inlet of the terminal in the air stream, and provides the velocity controller with a signal proportional to actual air velocity pressure. The pneumatic damper actuator receives a pressure signal from the velocity controller in response to actual flow vs. desired flow.

## THE VELOCITY CONTROLLER

The pneumatic velocity controller is a "pneumatic computer", monitoring inputs and directing outputs to maintain space temperature by controlling the flow rate of conditioned air into the space. The controller receives a pressure (psi) input signal from the thermostat (for variable air volume control), indicative of what air flow rate the thermostat requires to meet or maintain room temperature set point. As this input pressure varies, the controller is reset to a new required flow rate. The reset span or reset range is the input pressure range over which flow can be varied. The reset start point is the pressure at which reset begins. The flow rates at the beginning and end of the reset span are the upper and lower limits of air

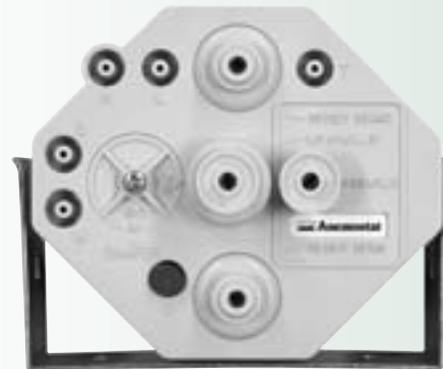
flow, commonly called maximum and minimum set points. Velocity controllers have dials which allow for adjustment of both the maximum and minimum flow rates. Anemostat pre-calibrates all controllers to their specified maximum and minimum flow rates, but remain adjustable in the field for flow trimming. The velocity controller constantly monitors two input pressure signals (inches w.c.) from the pneumatic air velocity sensor, located in the supply air stream. These signals are proportional to total pressure (high) and duct static pressure (low). The velocity controller automatically calculates velocity pressure through subtraction of total pressure minus static pressure ( $\text{High-Low}=\Delta P$ ). This differential signal then represents the controlled variable, air velocity pressure. By comparison of desired flow and actual flow, the controller responds with an output pressure (psi) to the pneumatic damper actuator for volume damper positioning. The main air source is used by the controller for this output pressure. Any flow rate change, due to duct static pressure changes or damper positioning changes, are automatically interpreted by the controller.

## CONTROLLER C31

Anemostat's best controller provides exceptional performance for precise air flow control. The C31 is a flexible, multi-function controller that maintains a full reset span regardless of the maximum and minimum sensor differential pressure signals, see diagram 1. Note that although the controller is configurable for normally open or normally closed volume control dampers, the damper linkage must be physically configured as normally open or normally closed.

## C31 SPECIFICATIONS

- Multi-function reset controller featuring factory set reset start point and span
- Configurable for direct or reverse acting reset
- Configurable for normally open or normally closed dampers
- 0 to 10 psi field adjustable reset start point
- 0 to 10 psi field adjustable reset span
- Main Air Consumption: 1.0 scfh @ 20 psi
- Recommended Main Air Pressure: 15 to 30 psi, 20 psi optimum



Model C31 Multi-Function Controller

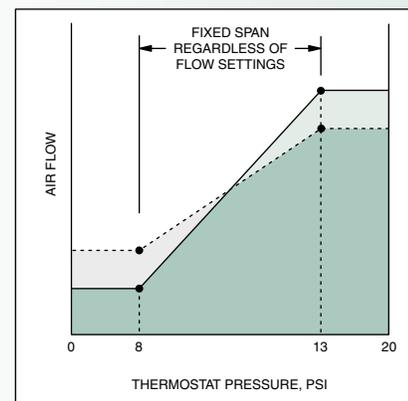


Diagram 1: Model C31 Controller; Fixed Span