# VORTEK®

# VTFA Series

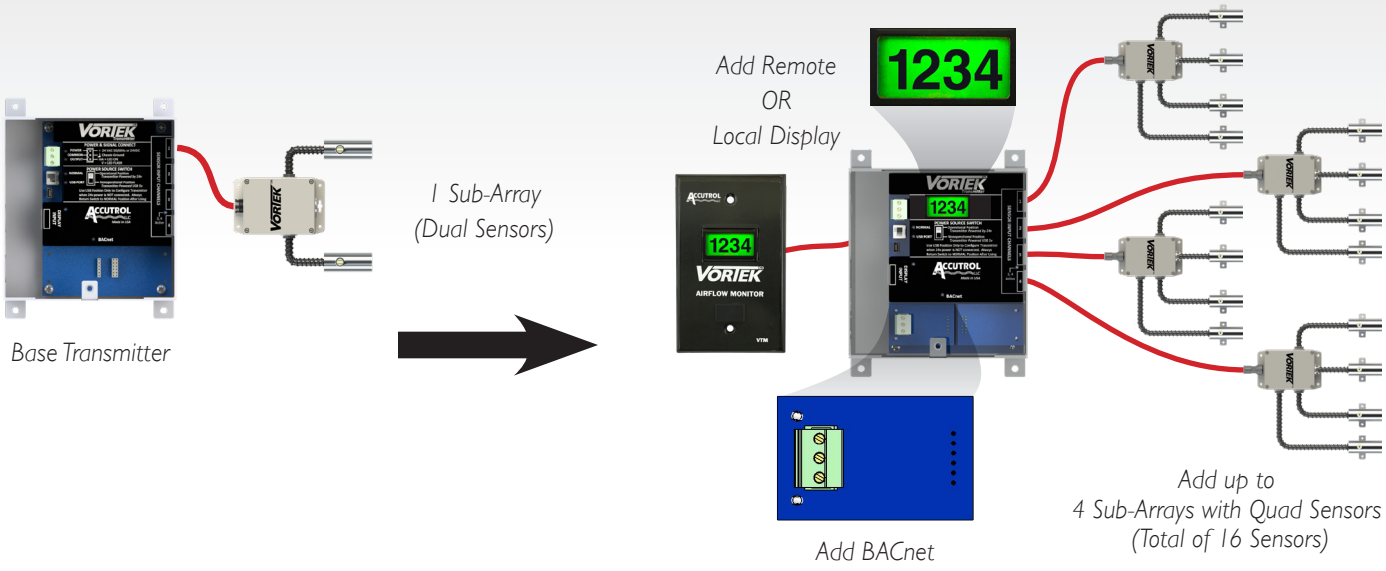
## *Digital Airflow Measurement for Fan Arrays*


- Digital Airflow Sensing
- Modular Design
- Intuitive User Interface
- Stable – Drift Free
- Resistant to Contamination
- Not Affected by Humidity
- Not Affected by Temperature
- Not Affected by Altitude
- Linear Over Entire Range
- Low Power Requirements
- Universal Voltage and Current Output
- Native BACnet MS/TP Optional

Accutrol, LLC • 21 Commerce Drive, Danbury, CT 06810 • 203-445-9991 • www.accutrolllc.com

## Modular Design Concept

**The VorTek incorporates a unique, modular design concept.** This enables you to order only the functions that are required for a specific application, thereby eliminating the need to pay for features that are not required. Instead of multiple electronics platforms for different applications or "series" of models, the VorTek simplifies user selection by utilizing a single electronics platform that can be used from a base of two sensing points up to sixteen sensing points. Any unit can be easily changed in the field to add sensors or reconfigure the range using the free Accutrol Insight graphical software.



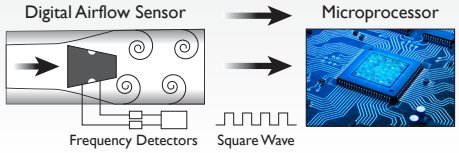

## Insight User Interface

**The innovative design of the VorTek** incorporates the use of the free Accutrol Insight graphical software, the same award-winning software used for the Accutrol AVC Fume Hood Control System. Gone is the frustration of older style alphanumeric displays and pushbuttons with a large decision tree user manual. The Insight software provides simple intuitive access to the configuration of the transmitter for different applications. The software connects to the VorTek through a standard USB connection providing quick and easy access for the following:

- **BAS –** Allows simple field changes to the transmitter range.
- **Commissioning –** Allows simple adjustment for unusual airflow profiles.
- **Owner –** Can make changes to ranges, number of sensors, etc. as the system requirements change.

## Digital Airflow Sensing

The VorTek airflow measuring device is the ***only*** digital airflow sensing device on the HVAC market. By utilizing vortex shedding technology, the shedder mounted in the air stream creates pressure pulses, which are converted to an electronic frequency. This electronic frequency is related to airflow velocity in a linear manner. That is why the VorTek is able to maintain high accuracy over a very large range.




*Pressure Pulses Converted to Electronic Frequency*

## Stable – Drift Free

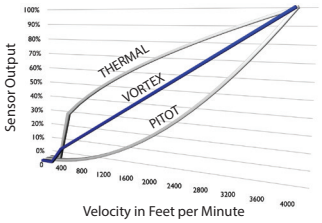
One of the many advantages of vortex shedding is that the sensing is not amplitude based and cannot drift over time. Therefore, no recalibration is required – ever.


*Vortex Shedding Cannot Drift Over Time*

Other airflow sensors rely on an amplitude measurement device, which is susceptible to inaccuracies and drift.

- Pitot and orifice sensors rely on differential pressure transmitters, which require periodic calibration.
- Thermal airflow sensors use thermistors, which will drift over time and must be matched to the electronics.

## Linear Airflow Measurement




*Vortex Shedding Is Linear*

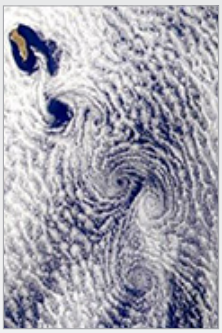
The VorTek is the ***only*** airflow measurement technology that is linear. The inherent physics of vortex shedding is a linear relationship between frequency and air velocity. That means that as air velocity changes, the frequency of the pulses changes in a linear manner. This eliminates the need for complicated curve matching associated with thermal devices.

## Contamination Resistant

Vortex sensors are contamination resistant. Other airflow measurement technologies, such as thermal dispersion, are severely affected by contaminants in the air stream. As a thermistor gets coated with dust or dirt, the thermal transfer is impacted, seriously affecting the accuracy of the device.

## Unaffected by Humidity, Temperature, Altitude

Vortex shedding is also unaffected by changes in air density and humidity, which do affect thermal airflow measurement systems.

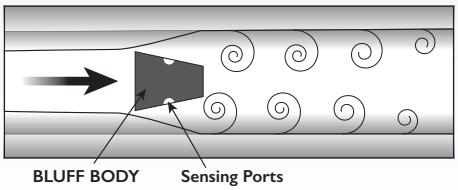


*Vortex Shedding Around a Volcanic Island*

### How Vortex Sensing Works

The vortex shedding phenomena can be seen all around us in everyday life. Swirling vortices, or eddy currents, are generated whenever air flows around an obstruction in its path. Common examples are the eddy currents that develop behind rocks in a stream or the fluttering of a flag behind a flagpole. The satellite photo (left) shows clouds flowing around a volcanic island. As clouds pass the mountains, the vortices are created on a grand scale.

VorTek sensors simply utilize this same vortex shedding phenomena to measure the velocity of the air on a smaller scale. As airflow passes around the trapezoidal shedder, it creates alternating low pressure vortices. Sensing ports on opposite sides of the shedder relay these pressure pulses to frequency detectors, which then output a digital signal to the electronics. The electronics subsequently convert these digital pulses to analog output signals.




*Vortex Shedding on a Smaller Scale*

# Specifications

## PERFORMANCE

| | |
|---|---|
| **Individual Sensor Accuracy** | ±2% of reading |
| **Sensor FS Range** | Factory Default - 12,000 FPM (3658 MPM) (software configurable) |
| **Installed System Accuracy*** | Fan inlet ±5% of reading per fan |

## ENVIRONMENTAL

| | |
|---|---|
| **Operating Temperature** | |
| Sensor | -20° to 140° F (-29° to 60° C) |
| Sensor Electronics | -20° to 150° F (-29° to 66° C) |
| Transmitter | -20° to 150° F (-29° to 66° C) |
| Display (optional) | -4° to 158° F (-20° to 70° C) |
| **Storage Temperature** | |
| Sensor and Transmitter | -40° to 150° F (-40° to 66° C) |
| Display (optional) | -22° to 176° F (-30° to 80° C) |
| **Humidity** | |
| Sensors | Non-condensing |
| Transmitter | 0% to 90% non-condensing |

## MATERIALS OF CONSTRUCTION

| | |
|---|---|
| **Sensor** | Polycarbonate Plastic UL94 V-0 |
| **Mounting Hardware** | |
| Sensor Rivet Nuts | Neoprene rubber-coated brass with zinc plated steel screws |
| Conduit Clamp | Zinc-plated steel over EPDM rubber with stainless steel Tek-screw |
| **Sensor Tubing** | Ether-based polyurethane |
| **Flexible Conduit** | UV resistant flexible PVC, VW-1 Flammability Rating |
| **Conduit Fittings** | Nylon 6/6, UL94 V-2 |
| **Enclosures** | Transmitter: Aluminum Alloy 5052-H32,16 Gauge<br><br>Sensor Electronics: NEMA 4X (IP66) Polycarbonate Plastic UL94 V-0<br><br>Optional Transmitter: NEMA 4X (IPX6) Polycarbonate Plastic UL94 V-0 |

* Installed Airflow accuracy is the actual system accuracy expected when installation meets or exceeds placement guidelines

## ELECTRONICS

| | |
|---|---|
| **Input Power** | 24VAC ±20% 50-60Hz<br>2.4 VA (no options)<br>4.8 VA (includes display & BACnet options<br><br>24VDC ±10%<br>1 W (no options)<br>3 W (includes display & BACnet options |
| **Input** | Up to 16 sensors |
| **Output** | 0-20mA, 4-20mA, 0-10v, 2-10v, 0-5v or 1-5v (software configurable)*<br>*Notes:*<br>*Analog Output is for Total Flow;*<br>*Individual Fan Flow is available when connected through BACnet.* |
| **Configuration Port** | USB 2.0, Isolated, **USB C Connector** |
| **USB Power Switch** | Selects alternate power source for configuration when main power is not available. Draws 5v power from USB configuration port. |
| **Status Indicators** | LED Status Indicators for: Power, Output, Configuration Port, Power Source Switch, Sensor Input Ch 3 and 4, Display and BACnet Communications |
| **I/O Terminal Block** | 3 position vertical pluggable screw terminal block |
| **Network Com Port (optional)** | **BACnet MS/TP** EIA 485 2-wire<br>Galvanically isolated<br>Data rates: 9600, 19200, 38400, 57600, 76800 and 115200<br>1/8 Unit load receiver input impedance<br>Network bias and EOL termination not provided within the transmitter |
| **Display (optional)** | Remote mount or transmitter mount<br>Liquid Crystal Display, 2 lines x 8 characters with white LED backlight includes USB configuration port |

## VorTek VTFA Fan Array Airflow Sensor Ordering Guide

**VTFA** ☐ - ☐☐☐☐ - ☐☐ - ☐☐

**No. of Sub-Arrays**
**1** = 1 Sub-Array
**2** = 2 Sub-Arrays
**3** = 3 Sub-Arrays
**4** = 4 Sub-Arrays

**Sub-Array 1**
**1** = Single Sensor
**2** = Dual Sensors
**3** = Triple Sensors
**4** = Quad Sensors

**Sub-Array 2**
**0** = Not Used
**1** = Single Sensor
**2** = Dual Sensors
**3** = Triple Sensors
**4** = Quad Sensors

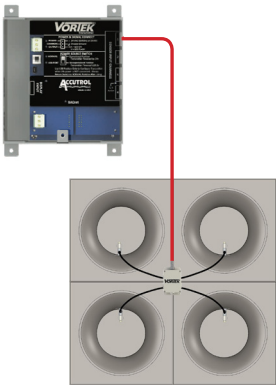
**Sub-Array 3**
**0** = Not Used
**1** = Single Sensor
**2** = Dual Sensors
**3** = Triple Sensors
**4** = Quad Sensors

**Sub-Array 4**
**0** = Not Used
**1** = Single Sensor
**2** = Dual Sensors
**3** = Triple Sensors
**4** = Quad Sensors

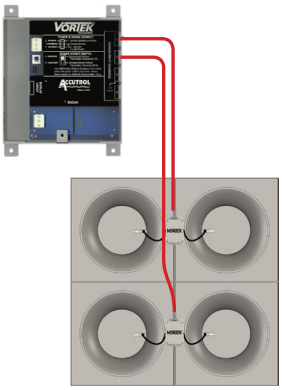
**Options**
**BLANK** = No Options
**B** = BACnet MS/TP
**D** = Internal Transmitter Display
*Note: Cannot be used with remote display.*

**Enclosures**
**0** = Standard Xmtr
**1** = NEMA 4X Xmtr

**Cable Length**
**1** = Standard 25' (7.6m)
**2** = 50' (15.2m)
**3** = 75' (22.9m)
**4** = 100' (30.5m)



*Example:* **VTFA1-4000-X0-B**



*Example:* **VTFA2-2200-X0-B**

## VorTek VTM Optional Remote Airflow Monitor*


The VTFA is available with an optional airflow monitor that can be mounted remotely from the transmitter. The monitor is connected to the VTFA with factory cable and can be located up to 100' away. The VTM includes a mini USB connection to enable the operator to use the Insight User Interface without accessing the transmitter.

* Cannot be used with internal display.

## VorTek VTM Remote Airflow Monitor* Ordering Guide

**VTM** ☐☐☐ - ☐

**Cable Length**
**000** = No cable
**025** = 25' (7.6m) Plenum Rated Cable
**050** = 50' (15.2m) Plenum Rated Cable
**075** = 75' (22.9m) Plenum Rated Cable
**100** = 100' (30.5m) Plenum Rated Cable

**Cable Type**
**BLANK** = Standard Plenum Rated Cable
**N** = NEMA 4X Watertight Cable

Your representative is: