

VORIEK™

Fan Array Airflow Monitors



Manufactured by:



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USA

Accutrol Representative:



VTFA MANUAL REV D ECN 2870

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SECTION 1 - INTRODUCTION

The VorTek (VT) airflow measurement system is the only true digital airflow velocity sensing system on the HVAC market. Unlike pressure-based and temperature-based airflow measurement sensors, the vortex shedding airflow sensor provides a direct measurement of the airflow velocity rate. The measurement provided by the vortex shedding sensor is immune to the effects of temperature, pressure and humidity. Also, the measurement signal is not amplitude-based and cannot drift over time, therefore recalibration is never required.

1.1 Theory of Operation

The vortex shedding digital airflow sensor contains a small shedder bar which generates vortex shedding pressure pulses as air flows through the sensor. The pressure pulses are converted to electronic pulses by detectors located at the end of each sensor. Because the vortex shedding frequency is directly proportional to the airflow velocity; regardless of temperature, pressure, or humidity, the VT sensor is capable of providing an extremely accurate and repeatable signal over a wide operating range. Figure 1 illustrates the sensor signal path.

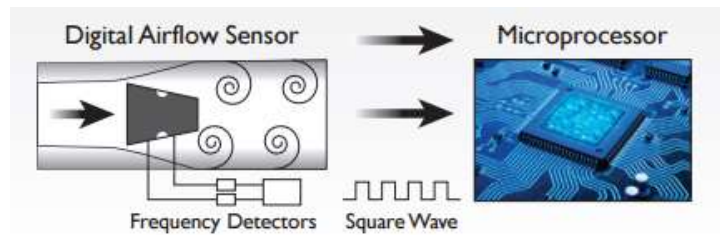


Figure 1

Each VTF sensor is mounted on a small airfoil shaped pedestal which is designed to not impede fan performance while providing an accurate and repeatable measurement of the airflow velocity at the fan inlet. The individual signals are sent from each sensor to the VTF transmitter where they are processed to provide an average airflow velocity rate for the fan inlet. The transmitter calculates the average airflow volume rate based on the fan inlet size, and provides an analog output signal for connectivity to any BAS control device. For network communications an optional EIA-485 port supporting BACnet MS/TP is provided.

1.2 Operating Range

The full-scale range of the VTFA Fan Array Airflow Transmitter is factory-configured for 12000 FPM (60.9m/s), which is appropriate for the majority of fan inlet measurement applications. If a different full-scale range is required, it can be configured using the VT Insight configuration software. The full-scale airflow volume range for the transmitter analog output can be configured to any value using the VT Insight software.

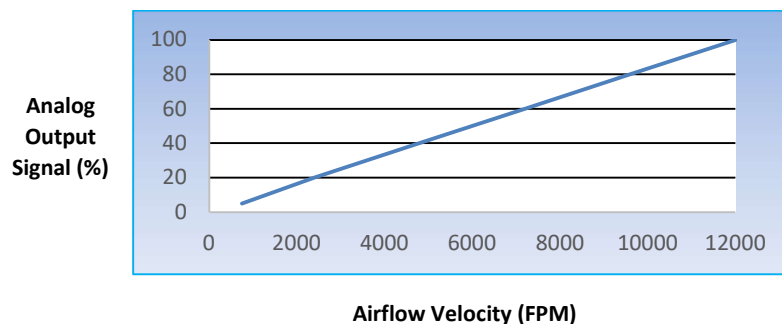
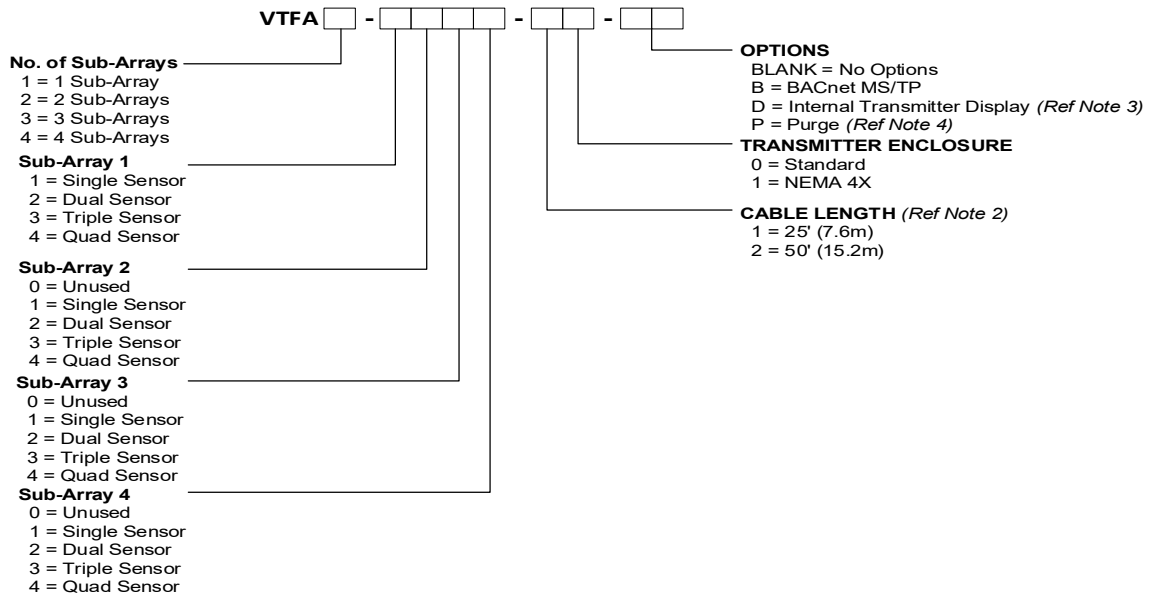


Figure 2

1.3 Model Code



1.4 Model Code Notes:

- The following information should be provided with order so the Transmitter can be factory-configured:
 Device Tag Number
 Analog Output Full Scale Range
 Analog Output Signal Type
 Fan Inlet Size (measured at the smallest diameter of the inlet)
- One cable is provided with each probe. Max length of Outdoor Rated cable is 50'. Contact factory if cables longer than 50' are required. Cable terminations are based on the Transmitter Enclosure Type per table below.

Transmitter Enclosure Type	Cable Terminations	
	Transmitter End	Sensor Electronics End
0	Standard RJ45	Waterproof RJ45
1	Waterproof RJ45	Waterproof RJ45

- When Option D (Internal Transmitter Display) is selected, the Remote Display cannot be used.
- Purge option requires a connection to a clean and dry instrument air supply 20psi ± 2psi.

Model Code Example:

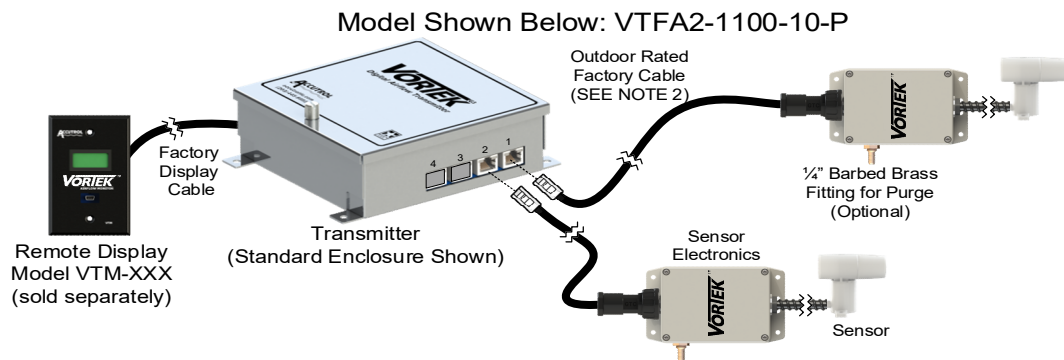


Figure 3

SECTION 2 - SPECIFICATIONS

PERFORMANCE

Accuracy	
Individual Sensors	+/-2% of reading
System Accuracy	+/-5% of reading (installed accuracy expected when installation meets guidelines)
Repeatability	+/- 0.1% of reading
Sensor FS Range	Factory Default is 12,000 FPM (60.69 m/s) (software configurable)

ENVIRONMENTAL

Operating Temperature	
Sensor	-40° to 165° F (-40° to 74° C)
Transmitter	-20° to 150° F (-29° to 66° C)
Display (optional)	-4° to 158° F (-20° to 70° C)
Storage Temperature	-22° to 165° F (-30° to 74° C)
Humidity	0 to 95% (non-condensing)

ELECTRICAL

Input Power	24VAC +/- 20% 50-60Hz, 2.4 VA with no options, 4.8 VA with display & BACnet options 24VDC +/-10%, 1 W with no options, 3 W with display & BACnet options
Inputs	4 Sensor Input Channels with up to 4 Sensors per Input (16 Sensors Max)
Output	0-20mA, 4-20mA, 0-10v, 2-10v, 0-5v or 1-5v (software configurable) 12-bit Resolution, Capable of driving 1K ohm load
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 Channel 3 and 4, Display and BACnet Communications
I/O Terminal Block	3 position vertical pluggable screw terminal block, screw access on top, 12-30 AWG
Cables	
Standard	Outdoor rated shielded cables with watertight plug on sensor end
Optional	NEMA 4X Transmitter; IP67 Outdoor rated shielded cables with watertight plug on both ends
Network Com Port	EIA 485 2-wire BACnet MS/TP
(Optional)	Galvanically Isolated Data Rates 9600, 19200, 38400, 76800 and 115200 1/8 Unit Load Receiver Input Impedance Network bias and EOL Termination not provided within the Transmitter
Display	Remote mount or transmitter mount
(Optional)	Liquid Crystal Display, 2 lines x 8 characters with white LED backlight Includes USB Configuration Port

MATERIALS OF CONSTRUCTION

Sensor	Polycarbonate Plastic UL94 V-0
Mounting Hardware	
Sensor Rivet Nuts	Neoprene rubber-coated brass with 304ss 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 Sensor Electronics: NEMA 4X (IP66) Polycarbonate Plastic UL94 V-0 Optional Transmitter: NEMA 4X (IPX6) Polycarbonate Plastic UL94 V-0

EMC AND SAFETY

Emissions	EN 55011:2009+A1:2010, FCC Part 15:2017, ICES-003 Issue 6, EN61000-3-2:2014, EN61000-3-3:2013
Immunity	EN61326-1:2013, EN61000-4-2:2009, EN61000-4-3:2006+A1:2008+A2:2010 EN61000-4-4:2012, EN61000-4-5:2006, EN61000-4-6:2009, EN61000-4-8:2010 EN61000-4-11:2004
Safety	EN61010-1:2010

2.1 Materials Installed in the Fan Inlet(s)

Item	Description	Material
1	VorTek Sensor	Polycarbonate
2	Flexible Conduit	PVC
3	Mounting Hardware	Plated Steel
4	Gasket	Neoprene/EPDM
5	Well-Nuts	Neoprene Rubber-Coated Brass

Table 1

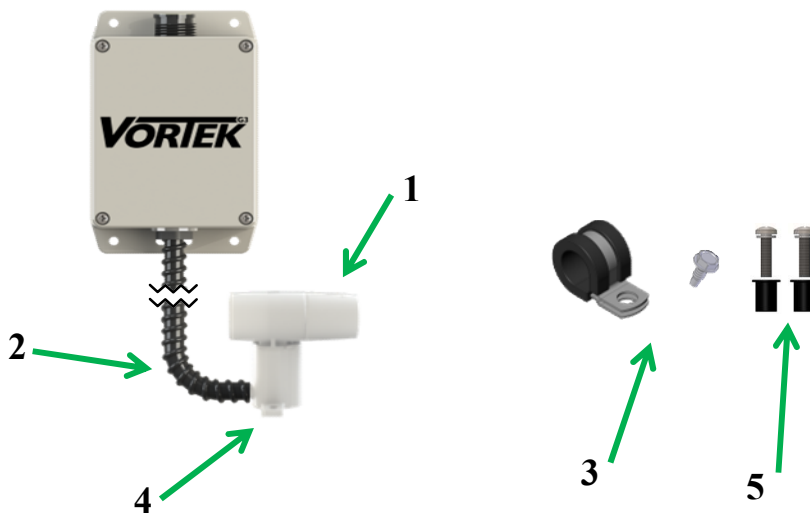


Figure 4

SECTION 3 – VT INSIGHT - USER INTERFACE SOFTWARE & CONFIGURATION

Using a PC, you can communicate directly with the transmitter using the VT Insight Configuration Software. All that's required is a Windows PC or Tablet with a USB Port, a USB Cable and the VT Insight Software.

3.1 Minimum Requirements for PC

- PC or Tablet with Windows Version 10 or greater
- USB 2.0 Port
- Screen Resolution 1280 x 768 or greater suggested
- USB to USB-Type C Cable

3.2 Installing the VT Insight Software

Before starting the installation process, close any programs running on the computer.

1. Download the **Accutrol Software Manager (ASM)** from <https://www.accutrollc.com/accuvalve-software-downloads/>. If the **ASM** is already installed, skip to step 3.
2. Go to the downloads folder in the File Explorer app of your PC and Extract All contents from the folder. Once done, install the **ASM** by executing the Setup File within the extracted **AccutrolSoftwareSuite.zip** file. A desktop icon will appear.
3. Once installed, launch the **ASM** using the Desktop Icon.
4. Click on the **VT Insight Software** Icon to download the install folder to your PC. This will launch the user's Default Browser.
5. Extract All contents from the install folder. Once done, execute the Setup File to install the program.
6. When the **VT Insight Software** is installed, start **VT Insight** from inside the **ASM** to run the application. A registration window will open, select "Click to Go to Website" to complete the Product Registration Form, then select "submit".



Fill in all fields required on the blank form.



Note: When selecting the Register Product Key button, the information provided will be copied to the clipboard and Insight will attempt to generate an email using your default Email Program. If a default Email program has not been configured, you will need to manually generate an email addressed to requestsoftwarekey@accutrollc.com and paste the clipboard information into the body of the email. The Installation Serial Number is unique to the computer which it was installed on. Therefore, the Registration Key will only function on this one computer. If you require the software to be installed on more than one computer, a request for each computer must be generated separately.

3.3 Insight Software Product Registration

Once you have received the Product Key from Accutrol, you will need to do the following to activate the software.

1. Open the VT Insight application by opening the Accutrol Software Manager and clicking on the VT Insight Icon or go to the Start Menu -> All Apps -> Accutrol LLC -> VT Insight.
2. Copy the Product Key provided on the email from Accutrol, paste it into the “Product Key” field provided at the bottom of the form, then click on the “Register Product Key” button that appears. You must be connected to internet during first launch of VT Insight after a valid Product Key has been submitted.



Please Register Your Copy of VT Insight

VT™ Insight Product Registration

Insight has been installed. Your Insight serial number is:

To request a product key, please register your serial number at |

[Click to Go to Website](#)

Please allow 1 business day to receive an email reply with your product key.
To activate your software, copy and paste your product key into the box below and select activate.

Enter Product Key:

[Click to Activate](#)

IMPORTANT-READ CAREFULLY: The End-User License Agreement ("EULA") which can be found within the Software Help About Dialog box, is a legal agreement between you (either an individual or a single entity) and Accutrol, LLC for the software, which includes associated media and Internet-based services ("Software"). You agree to be bound by the terms of the EULA by installing, copying, or using the software. If you do not agree, do not install, copy, or use the software.

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Paste
Product
Key Here

3. You will now be able to use the VT Insight Software on your computer. If you have any problems, contact Accutrol LLC at 203-445-9991.




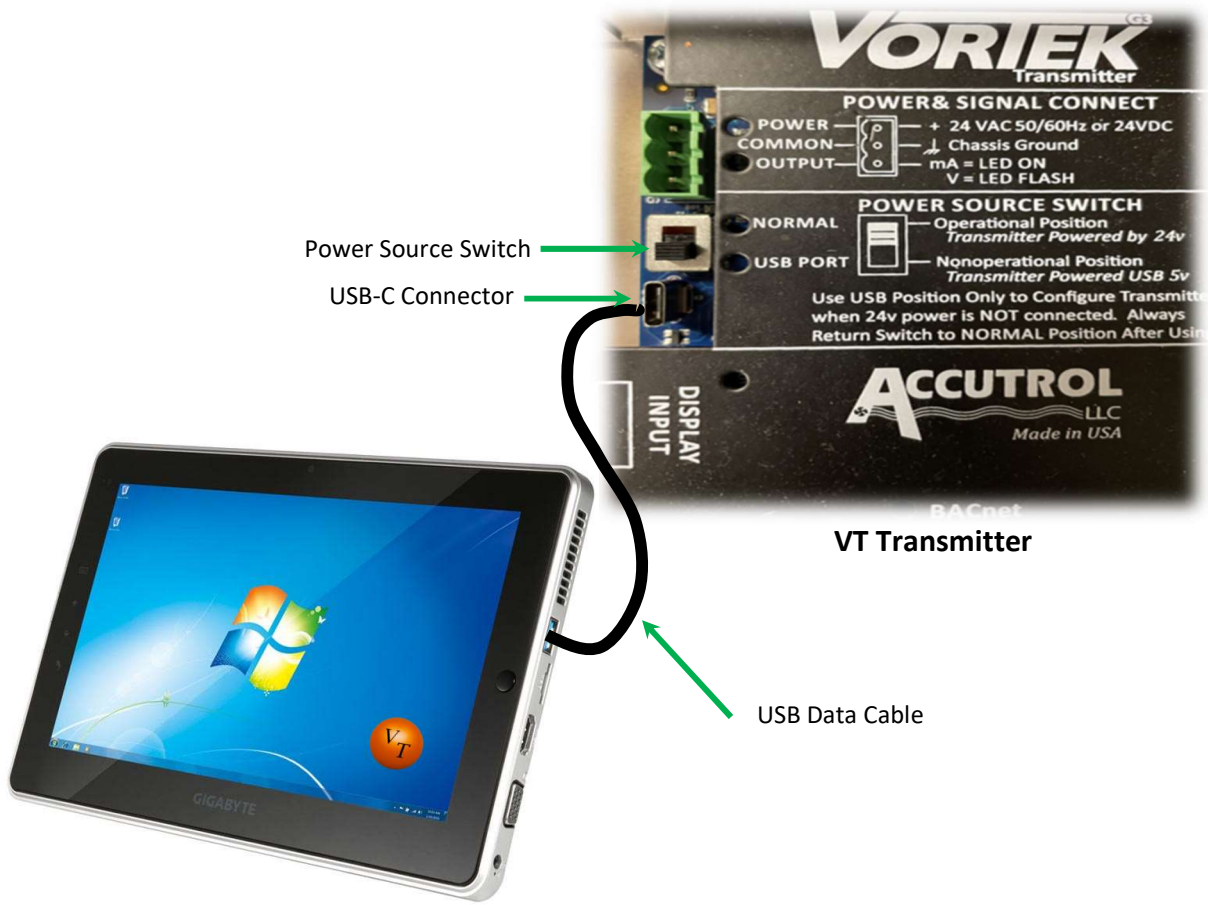
Note: *VT Insight will attempt to update itself with the latest released version of software each time it is initiated when the computer is connected to the internet. If you do not wish to update, you will be given a choice to not update each time.*

3.5 Connecting the PC to the Transmitter

If the transmitter is wired and powered by an external 24v power source, simply connect the USB cable from the computer to the transmitter USB port.

If the transmitter is not yet powered by the external 24v power source, the transmitter can be temporarily powered by the 5 VDC supplied from the USB port of the computer. This is a convenient feature for configuring the VT BACnet parameters or checking the transmitter configuration prior to having the 24v power source connected. To power the transmitter from the 5v USB supply, move the Power Source Switch to the “USB Port” position and attach the USB cable from the computer to the transmitter USB port. The “USB Port” LED should be illuminated to indicate the transmitter is being powered from the 5 VDC USB port. Open the VT Insight Program and you will have access to view the configuration and make any changes required. After completing the configuration, save any changes that have been made and then close Insight. Now disconnect the USB cable from the transmitter then return the Power Source Switch to the “Normal” position.

 **Note:** If the Power Source Switch is left in the “USB Port” position, the transmitter will not operate properly when power is supplied by the BMS 24v input power connection. Therefore, it is important to return the Power Source Switch to the “NORMAL” position.



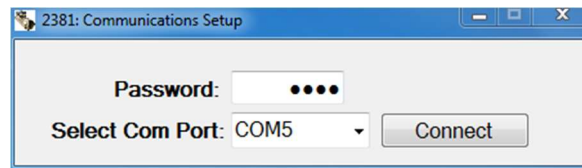
**Windows PC or Tablet with
VT Insight Software**

3.6 Using VT Insight Software

To open the VT Insight application, double click on the VT Insight Icon from within the Accutrol Software Manager or select VT Insight from the Start Menu.



Select the appropriate COM port for the transmitter then select Connect.



Note: If you're not sure which COM port your computer is using for the VT transmitter, then disconnect the USB cable and view the drop-down list noting the COM ports that are included in the list. Now reconnect the USB cable and view the drop-down list. The new COM port added to the bottom of the list is the correct COM port.

3.6.1 VT Insight Dashboard

The VT Insight Dashboard is the primary screen for accessing the parameters and viewing the real-time performance of the VT airflow transmitter. The Dashboard provides an intuitive graphical user interface that is easy to understand and provides access to the majority of field-configurable parameters with one click. The diagram below identifies the different objects of the dashboard followed by brief descriptions of each provided on the following pages.

Drop Down Menus → SYSTEM TOOLS WINDOW HELP

Airflow Volume Gauge → VOLUME 1563 CFM

Airflow Volume Calculation → Total Volume x Offset = Adjusted Volume

Com Status → S/N: 44 | VT TAG: Tag Number abcd | MAC: (DEC= 44 HEX= 2C)

Close Program → X

Analog Output Gauge → ANALOG OUTPUT 1563 CFM Airflow 0.63 VDC

Transmitter Configuration → Fan Array - Total 4 Fans Selected

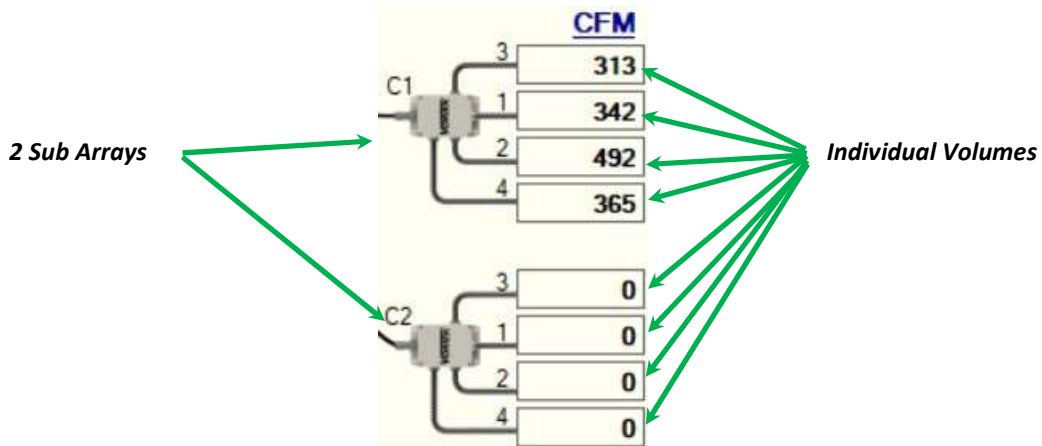
Average Volumes for each monitored fan inlet

Fan Inlet	Average Volume (CFM)
C1-1	312
C1-2	372
C1-3	465
C1-4	414
C2-1	0
C2-2	0
C2-3	0
C2-4	0
C3-1	0
C3-2	0
C3-3	0
C3-4	0
C4-1	0
C4-2	0
C4-3	0
C4-4	0

3.6.2 Sensor Volume Measurements

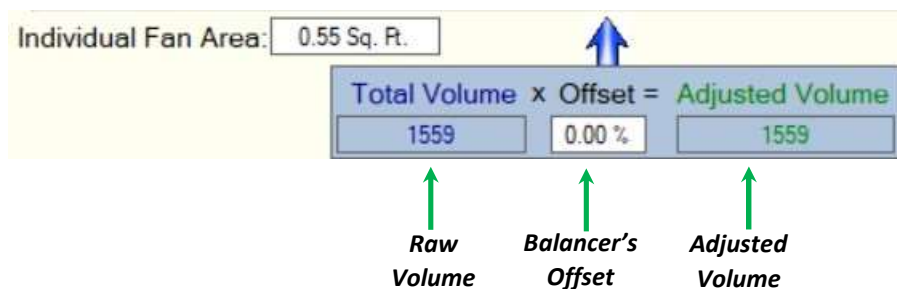
This area of the dashboard displays the real-time sensor volume measurement of each fan inlet. The example shown below is an application with 1 sub array with 4 sensors, which is a VTFA1-4000 configuration.

Note: The diagram below always shows 4 boxes per sub array, even if all 4 sensor ports are not being used. In operation, if the number of boxes with active values does not match the number of sensors connected, the fans may be off.



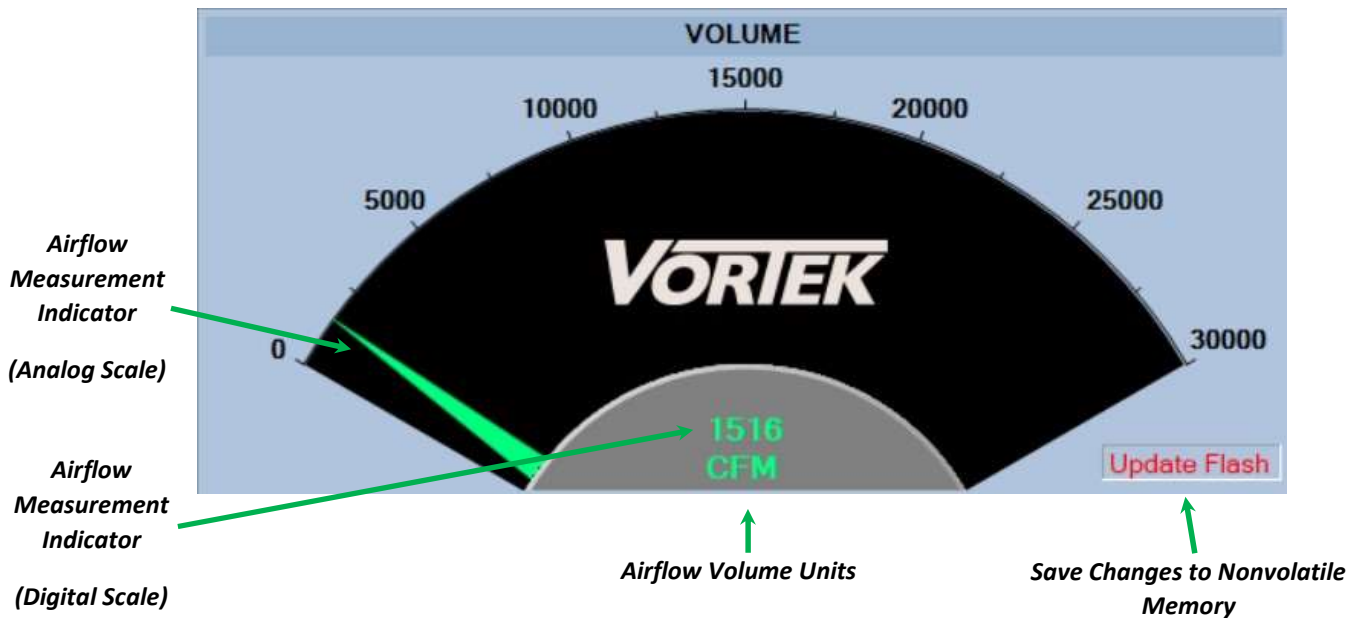
3.6.3 Volume Calculation Block

The Volume Calculation Block shows the real-time Airflow Volume measurement. The “Balancer Volume Offset” window can be accessed by double-clicking on the “Offset” box. The Individual Fan Area value can be adjusted by double-clicking on the Fan Array diagram and adjusting the individual fan diameter.



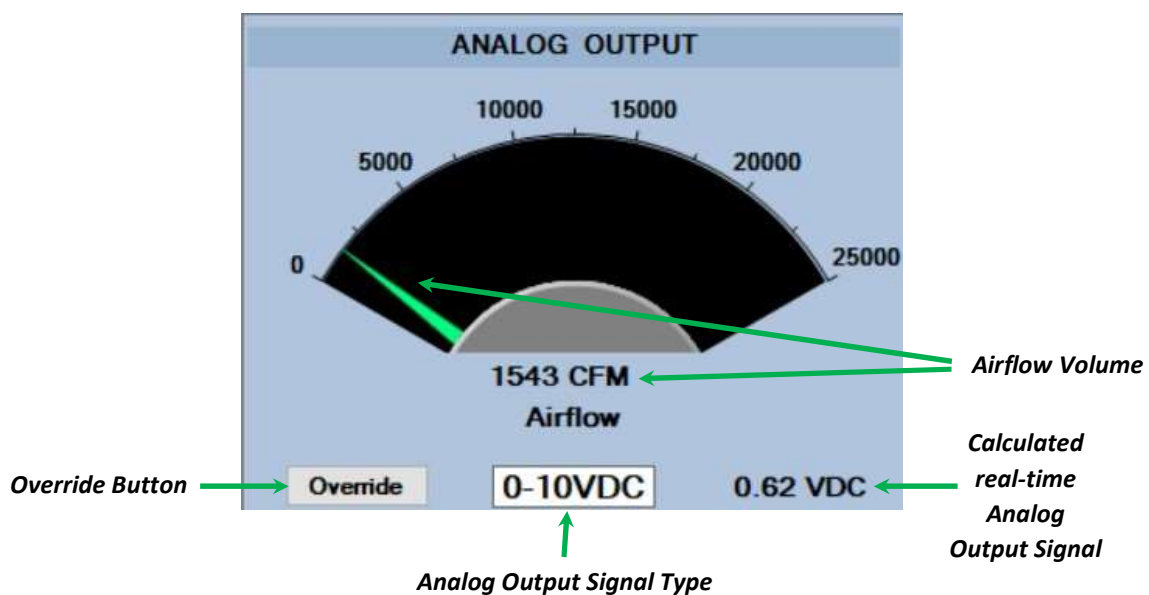
3.6.5 Airflow Volume Gauge

The Airflow Volume Gauge provides an indication of the real-time total airflow volume measurement for the fan array. This reading is derived from summing all of the monitored fans and multiplying it by the Balancer offset adjustment just below this Airflow Volume Gauge.



3.6.6 Analog Output Gauge

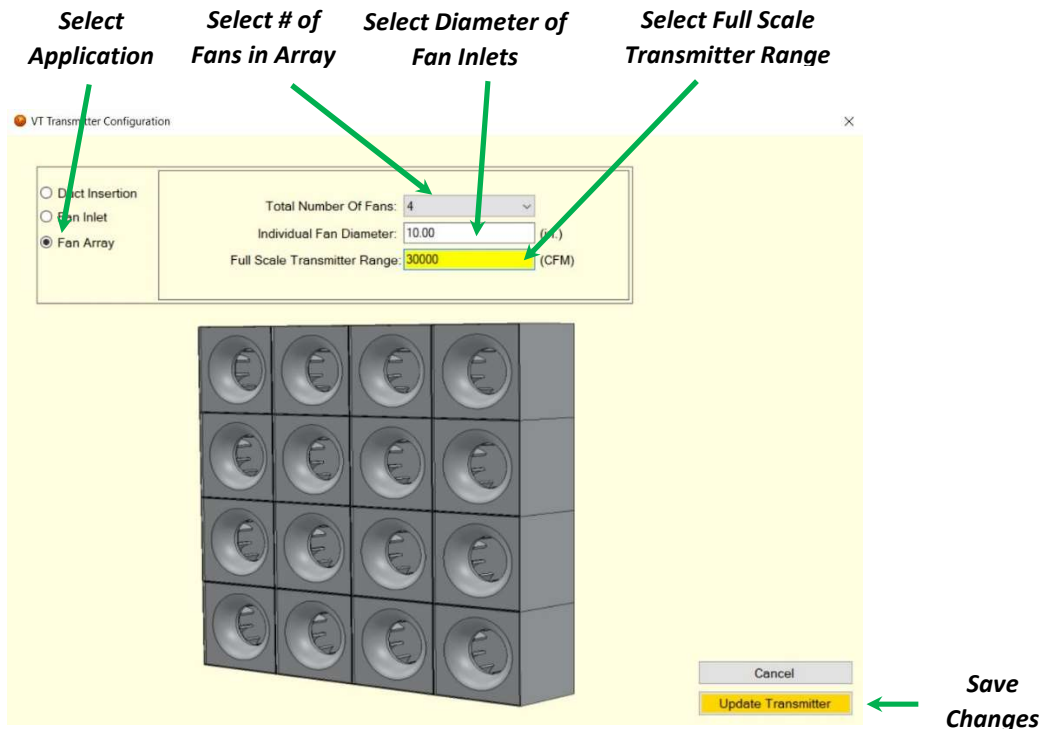
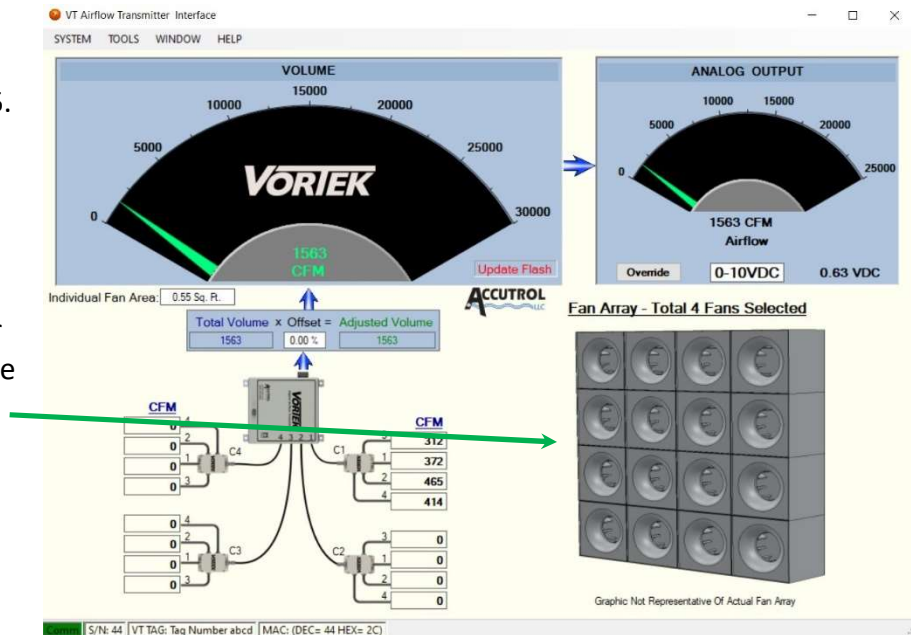
The Analog Output Gauge displays the airflow volume on a gauge that has the same full scale range as the Analog Output Signal. In addition to displaying the airflow volume, this gauge also shows the signal type and the calculated real-time output signal that corresponds to the airflow volume. Double-clicking on the gauge will open the Analog Output Configuration window.



3.6.7 Configuration Window

Each transmitter is factory-configured; therefore, field configuration should not be required. However, if for some reason the transmitter configuration needs to be modified, it can be done using the VT Insight Configuration Window.

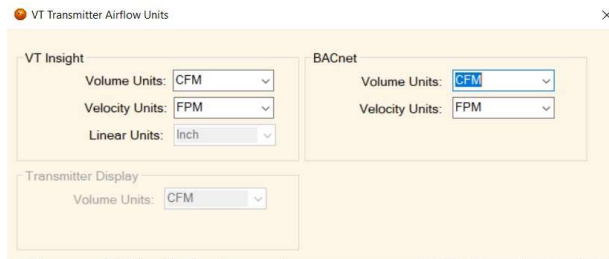
1. Apply power and connect the USB cable per Section 3.5.
2. Select the Com port.
3. If the transmitter configuration shown on the dashboard does not match your application, move the cursor to this area and double click to select.



4. After saving changes, close the window and verify your changes appear on the Dashboard.
5. When the fans are turned on, one should see the sensors reporting volumes.

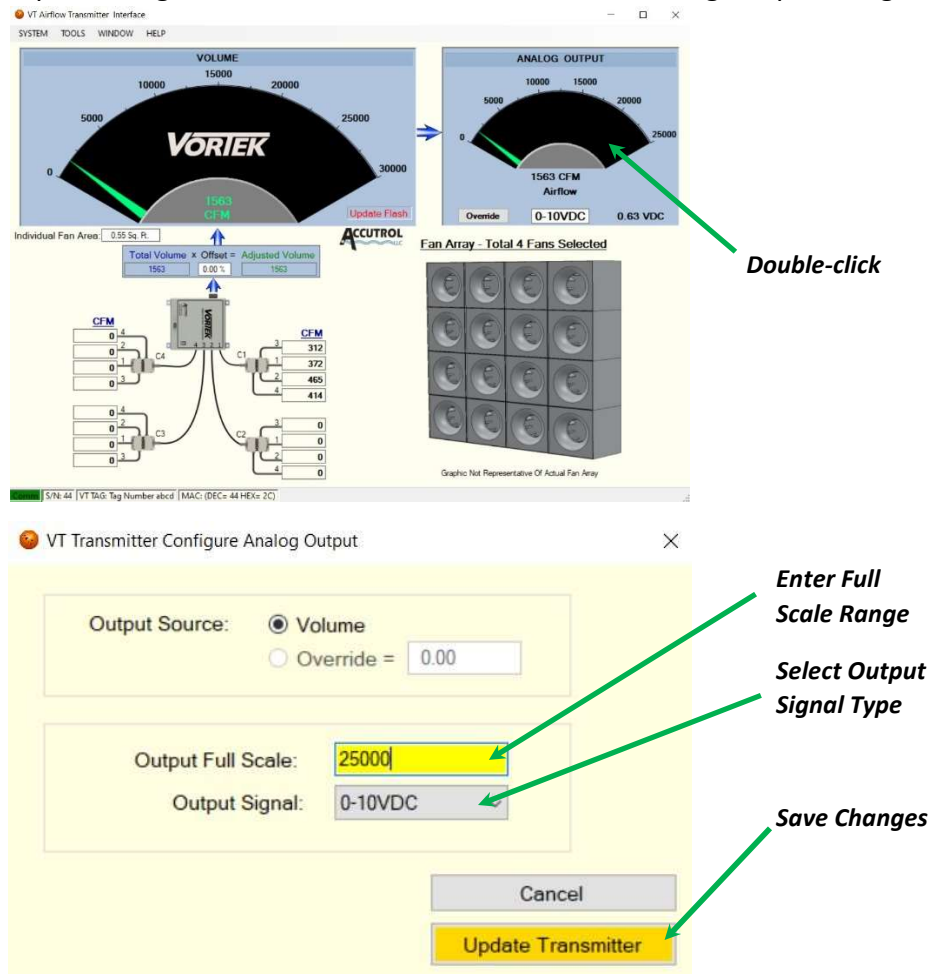
3.6.8 Units of Measurement

To change the Units of Measurement, double-click on the bottom of the Airflow Volume Gauge to open the window shown below. Select the appropriate units for the application and save changes before closing the window.



3.6.9 Analog Output Configuration

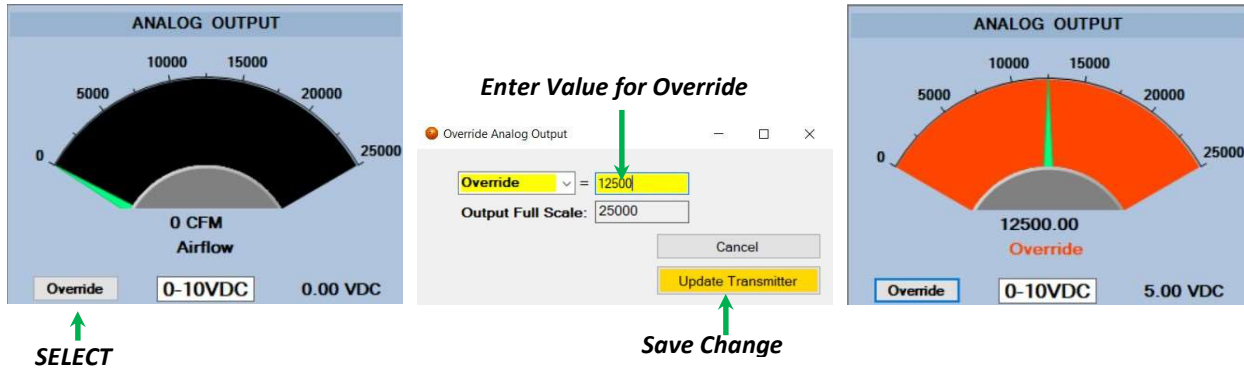
To open the Analog Output Configuration Screen, double-click on the bottom of the Analog Output Gauge.



Enter the appropriate Full Scale and Output Signal Type required for the application, then save changes when complete.

3.6.10 Analog Output Override

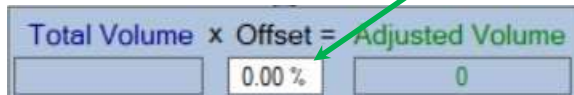
The transmitter's Analog Output can be overridden, which is a useful feature to verify the analog output signal is reaching the receiving device (BMS controller) at the expected signal level. To open the Override window, select the "Override" button located at the lower left of the Analog Output Gauge. Enter the value you would like the analog output signal to be driven to. Select Update Transmitter to save change.



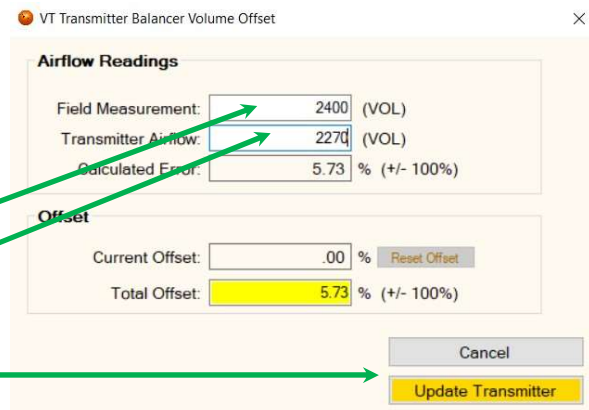
The example shown above will result in the Analog Output Signal reading 5.00 VDC which is 50% of the full scale output signal, as indicated on the Analog Output Gauge above on the right. Note that the gauge face is orange to indicate that the analog output signal is being overridden. Be sure to release the Analog Output to "Normal" before disconnecting from the transmitter.

3.6.11 Balancer Volume Offset

Adjustments can be made when working with the Balancing contractor to correlate the measured airflow volume with an external field measurement device. To open the Balancer Offset Window, double-click on the "Offset" box located in the Volume Calculation Block on the Dashboard.



Enter the field measurement and the transmitter airflow volume measurements in the appropriate boxes. To commit the offset to memory, select "Update Transmitter".



SECTION 4 – BACNET OPTION

BACnet® is a standard data communication protocol designed specifically for building automation and control networks. The Accutrol VT Transmitter uses the BACnet MS/TP (Master-Slave/Token Passing) protocol which is a type of MAC layer implemented using the EIA-485 signaling standard. The performance of the MS/TP network is heavily influenced by the network traffic load, the assignment of MS/TP node addresses and the network configuration parameter *Nmax_info_frames*. Additionally, it is imperative the physical network layer is properly configured (cabling, EOL terminations, bias, etc...) and is verified to be reliable otherwise the network performance can be compromised.

4.1 BACnet Objects

The Accutrol VT Transmitter product family supports a collection of BACnet-visible objects. The table on the following page defines the visible objects for each model of the VT Transmitter Product Family which includes models; VTD for Duct Applications, VTF for Fan Inlet Applications, and VTFA for Fan Array Applications.



All objects discovered may not be active in every application.

			Parameter By Model Type		
Point	Object Description	Present Value Type	VTD	VTF	VTFA
DE ###	Device Instance	Write	###	###	###
AI1	Airflow Volume	Read	Volume	Volume	Volume
AI2	Airflow Velocity	Read	Velocity	Velocity	N/A
AI3	Flash Writes Remaining	Read	Note 1	Note 1	Note 1
AI4	Airflow Channel 1 – Sensor 1	Read	Velocity	Velocity	Volume
AI5	Airflow Channel 1 – Sensor 2	Read	Velocity	Velocity	Volume
AI6	Airflow Channel 1 – Sensor 3	Read	Velocity	Velocity	Volume
AI7	Airflow Channel 1 – Sensor 4	Read	Velocity	Velocity	Volume
AI8	Airflow Channel 2 – Sensor 1	Read	Velocity	Velocity	Volume
AI9	Airflow Channel 2 – Sensor 2	Read	Velocity	Velocity	Volume
AI10	Airflow Channel 2 – Sensor 3	Read	Velocity	Velocity	Volume
AI11	Airflow Channel 2 – Sensor 4	Read	Velocity	Velocity	Volume
AI12	Airflow Channel 3 – Sensor 1	Read	Velocity	Velocity	Volume
AI13	Airflow Channel 3 – Sensor 2	Read	Velocity	Velocity	Volume
AI14	Airflow Channel 3 – Sensor 3	Read	Velocity	Velocity	Volume
AI15	Airflow Channel 3 – Sensor 4	Read	Velocity	Velocity	Volume
AI16	Airflow Channel 4 – Sensor 1	Read	Velocity	Velocity	Volume
AI17	Airflow Channel 4 – Sensor 2	Read	Velocity	Velocity	Volume
AI18	Airflow Channel 4 – Sensor 3	Read	Velocity	Velocity	Volume
AI19	Airflow Channel 4 – Sensor 4	Read	Velocity	Velocity	Volume
AI20	Number of Fans	Read	N/A	N/A	Value
AV1	Unsubscribed COV Interval	Write	Sec	Sec	Sec
AV2	Airflow Volume Measurement Adjust	Write	%	%	%
BV1	Write to Flash	Write	Note 1	Note 1	Note 1
MSI1	Airflow Volume Units	Write	1=CFM 2=CMS 3=CMM 4=CMH 5=LPS 6=LPM	1=CFM 2=CMS 3=CMM 4=CMH 5=LPS 6=LPM	1=CFM 2=CMS 3=CMM 4=CMH 5=LPS 6=LPM
MSI2	Airflow Velocity Units:	Write	1=FPM 2=MPM 3=MPS	1=FPM 2=MPM 3=MPS	N/A

Notes:

1: Writing a value of (1) to the BACnet Object BV1 will cause the transmitter to copy the active configuration stored in volatile memory (RAM) and write it to nonvolatile memory (FLASH). Reference Section 4.1.1 for a detailed description.

⚠ CAUTION: Nonvolatile Flash memory has a limited number of Lifetime Write Cycles, therefore writing to Flash memory should be used only when necessary.

In general the standard AI, AV, BV and MSI objects support required properties for those object types. Object_Name is writable with provision for 64-character maximum length names. BV Inactive_Text and Active_Text, and MSI State_Text are writable.

Standard object property values other than Present_Value shall respond as follows:

- Object_Identifier: generated automatically from request
- Object_Type: generated automatically from request
- Object_Name: writable
- Polarity: always NORMAL
- Units: Reference Table above, MSI1 and MSI2
- State_Text, Inactive_Text, Active_Text: writable
- Status_Flags: always {FALSE,FALSE,FALSE,FALSE}
- Event_State: always NORMAL
- Out_Of_Service: always FALSE

Objects; AI and AV shall support the COV_INCREMENT property which shall also be writable.

4.1.1 Save Active Configuration to Nonvolatile Flash Memory

The Accutrol VT Transmitter has both volatile (RAM) and nonvolatile (Flash) memory. RAM memory does not have a limitation on the number of times it can be written, whereas Flash memory does. RAM memory is used by the transmitter to store and retrieve active values which are not retained when the power to the transmitter is lost. Values stored in Flash memory are copied to RAM memory during the power up sequence of the transmitter.

Writing a value of one (1) to the BACnet Object BV1 will cause the transmitter to copy the active configuration stored in volatile memory (RAM) into nonvolatile memory (Flash). Once values have been saved to nonvolatile memory they will retain their value through power cycles. Nonvolatile Flash memory has a limited lifetime number of write cycles which can be monitored via the BACnet Object AI3.

4.2 Unsubscribed COV

The AV1 object Present_Value shall specify an interval in whole seconds at which the transmitter shall periodically issue Unsubscribed COV Notifications as local segment broadcasts. An AV1 value of zero shall disable this behavior. When non-zero, the Unsubscribed COV shall also be issued if the Present_Value of any AI object changes by more than the COV_INCREMENT for the corresponding object. If COV_INCREMENT is zero for a given object, it shall also disable Unsubscribed COV for that object, even if AV1 is non-zero.



The VT Transmitter includes a USB port which provides local connectivity for programming the Transmitter using the PC based software tool “VT Insight” described in Section 3. For BACnet operation, the PC must be disconnected from the local USB port to avoid conflicts.

SECTION 5 – MAINTENANCE AND TROUBLESHOOTING

There is no recommended scheduled maintenance required for this product. Below are some useful notes and troubleshooting tools.



Notes:

- *If you have more than one application operating on your PC along with Insight, the Insight Dashboard will appear to freeze until your cursor is within the frame of the dashboard and something is selected within the Insight frame.*
- *If some of the sensors don't show flow when the Insight window is active, it may be because the velocity is too low, too many sensors were chosen in the configuration window for what is installed, or you may have a sensor that is not functioning due to a blockage or erratic flow pattern. If everything is configured correctly, extract the Sensor from the fan inlet and inspect.*



Note: *When all desired changes are made, it is good practice to select “Update Flash” as this will save all changes to the transmitter.*

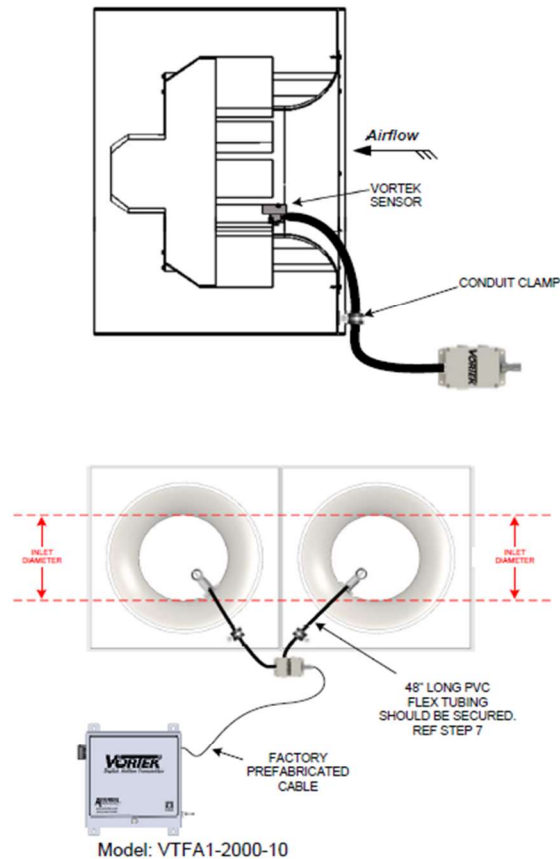
APPENDIX A: DOCUMENT REVISION HISTORY

Revision History		
ECN #	New Rev.	New Filename
2272	A	VTFA Installation and Operation Manual
Section	Description of Change	
Entire Document	First release	
2312	B	VTF Installation and Operation Manual
Section	Description of Change	
Appendix B-C	UPDATED TO MATCH SUBMITTAL DOC	
2602	C	VTF Installation and Operation Manual
Section	Description of Change	
Cover	Updated revision letter	
Page iii	Updated table of contents to include appendix	
Page 2	Added section note on purge from submittal	
Page 3	Added section from submittal on EMC and safety	
Appendix D	Added appendix d from submittal to include product options	
2870	D	VTFA Installation and Operation Manual
Section	Description of Change	
Cover	Updated version up from C to D.	
Throughout IOM	Removed all mention of 'G3'. Renamed VTG3 Insight to VT Insight. Updated images of VT Insight.	
Page ii	Added TM to VorTek.	
Pages 2 & 3	Updated Submittal Documentation.	
Page 4	Updated List of Materials and VTFA Probe Image.	
Pages 5 & 6	Updated download and registration process for VT Insight. Includes VT Insight Icon and Images.	
Appendix B-D	Updated Submittal Documentation.	

APPENDIX B: SENSOR INSTALLATION INSTRUCTIONS

SENSOR INSTALLATION

CROSS SECTION VIEW



⚠ CAUTION: Only use the mounting hardware provided with the sensors and follow the instructions below, otherwise damage to the fan may result. If hardware is missing contact the factory.

⚠ WARNING: Use safety glasses and cut-resistant gloves when installing sensors. Verify the circuit providing power to the fan is turned off and there is no power at the fan motor.

MOUNTING HARDWARE PROVIDED WITH EACH SENSOR:

- (2) #10-32 Well-Nuts with Threaded Inserts
- (2) #10-32 x 3/4" Long Phillips Screws
- (2) #10 Split Lock Washers
- (1) Drilling Template Label
- (1) Conduit Clamp
- (1) Screw, #10x1/2", SS, TEK

TOOLS REQUIRED:

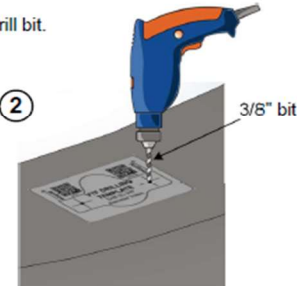
- Drill with a 3/8" Drill Bit
- #2 Phillips Screwdriver with Torque Indicator

1. Position the drilling template label into the throat of the fan inlet bell (smallest diameter) with airflow direction indicator facing towards the fan blades. Verify the fan blades will not come in close contact with the sensor and there are no obstructions in front of the sensor.
2. Drill a hole at each location using a 3/8" diameter drill bit.

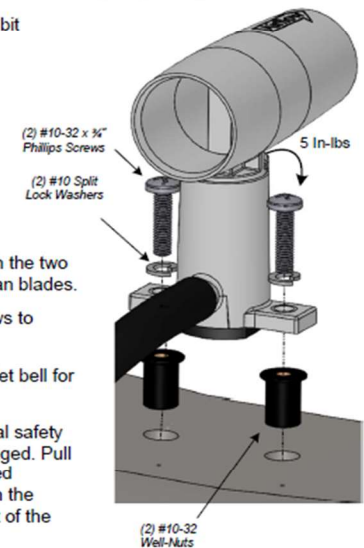
①



②



③ ④ ⑤



3. Insert the 2 well-nuts into the 3/8" diameter holes.
4. Place the sensor into the fan inlet bell and align the two holes in mounting bracket with the two well-nuts. Verify the airflow direction indicator on the sensor is pointing towards the fan blades.
5. Secure the sensor in place using mounting hardware supplied. Tighten the two screws to 5 inch-pounds.
6. For applications with two sensors, select mounting location on the opposite side of inlet bell for the second sensor and repeat above steps.
7. In addition to serving as a signal conduit, the flexible tubing also provides a mechanical safety connection to prevent the sensor from getting pulled into the fan if it becomes disengaged. Pull the flexible conduit away from the fan inlet and secure it to a surface using the provided Conduit Clamp so it is not in the air stream and there is no slack in the tubing between the sensor and mounting hardware. Secure the Sensor Electronics Enclosure in place out of the airstream.
8. For dual inlet applications, repeat above steps for other inlet side.

APPENDIX C: TRANSMITTER INSTALLATION INSTRUCTIONS

TRANSMITTER INSTALLATION

1. Select an easily accessible location to install the transmitter within the range of the sensor cables that have been provided. Provide clearance to remove the cover and easily access the connectors and field connections.
2. Using the four 0.20" diameter holes located on the transmitter enclosure, secure the transmitter to mounting surface using (4) #8 or #10 Pan Head Screws. For sheet metal mounting surface, use sheet metal or tek screws, for plywood surface use coarse thread wood screws, for drywall surface, use drywall anchors with the appropriate screws.
3. Connect each sensor to the corresponding sensor input channel on the transmitter using the cables provided (Reference Figure 1)

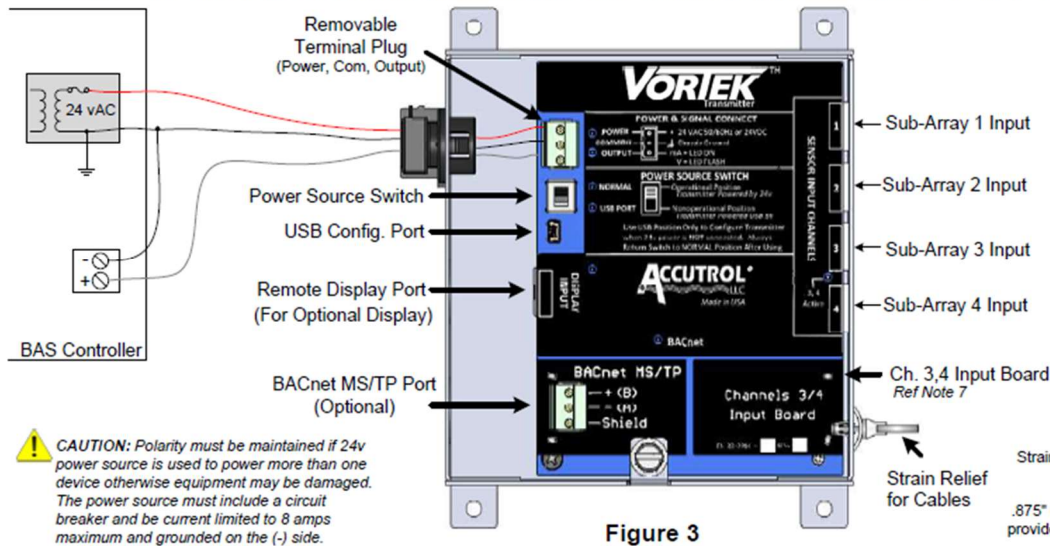
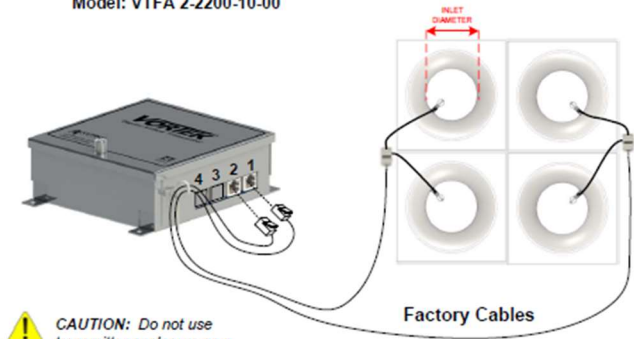


Figure 3

TRANSMITTER WIRING

1. Loosen the thumb screw located on the transmitter enclosure cover and remove cover.
2. Run 3-conductor cable from the field controller to the transmitter through the strain relief fitting.
3. Remove the terminal block from the power & signal header, loosen the three screws and terminate the power, common and output signal wires in the terminal block per markings.
4. Tighten the terminal block screws, verify wires are secure and reconnect to the header.
5. If BACnet is required; run BACnet MS/TP cable into enclosure, remove terminal block from BACnet header and terminate the BACnet wires in the appropriate terminals. Tighten the terminal block screws, verify wires are secure and reconnect to header.
6. If Remote Display is required; remove knock-out located directly in line with the Display Port, install strain relief fitting into .875" dia. hole, run the factory cable provided with the Remote Display into the enclosure and plug cable into the Display Input Port.
7. The channel 3,4 input board is required for applications that have 3 or 4 sub-arrays. Applications with 1 or 2 sub-arrays do not require this board.

Figure 1
Model: VTFA 2-2200-10-00



CAUTION: Do not use transmitter enclosure as a junction box. Only wires terminating on the transmitter board should enter the enclosure.

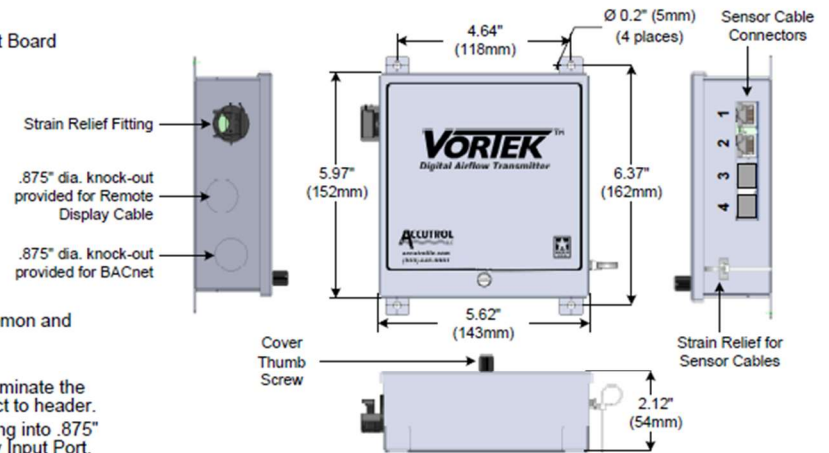
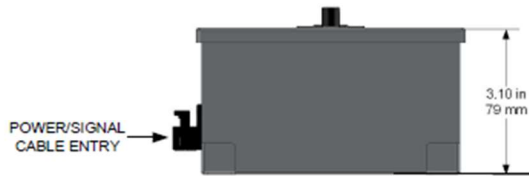
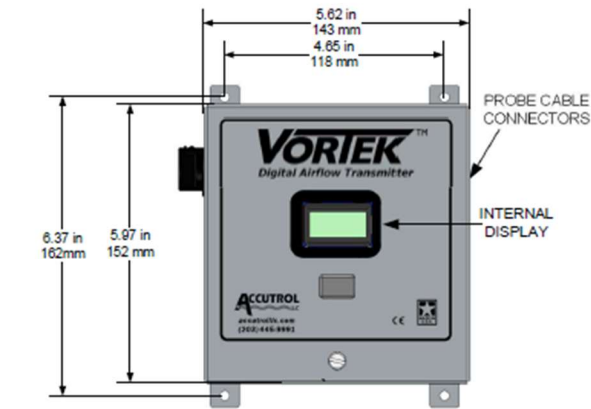


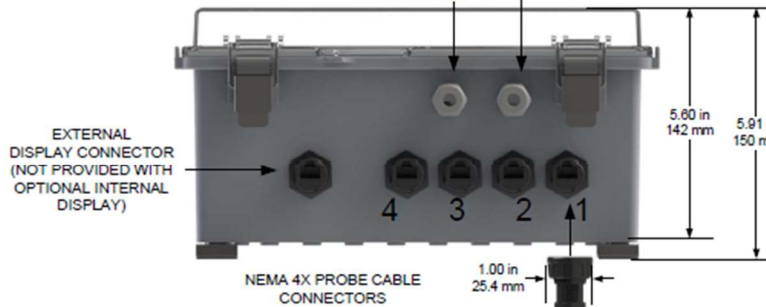
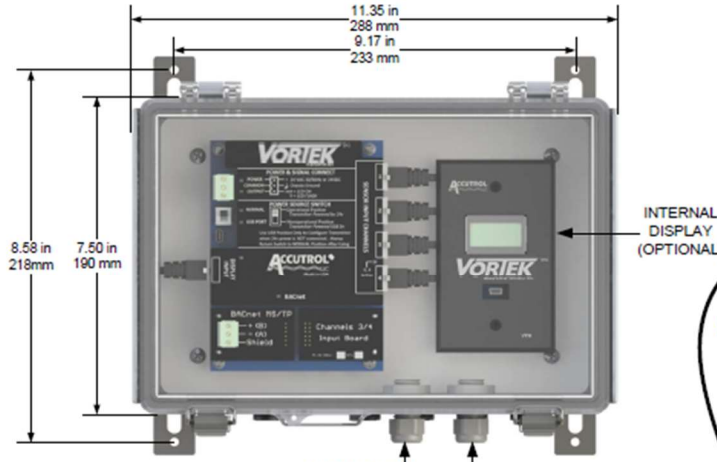
Figure 2

APPENDIX D: OPTIONS

TRANSMITTER WITH OPTIONAL DISPLAY



NEMA 4X TRANSMITTER WITH OPTIONAL DISPLAY



NEMA 4X SENSOR WITH OPTIONAL PURGE

