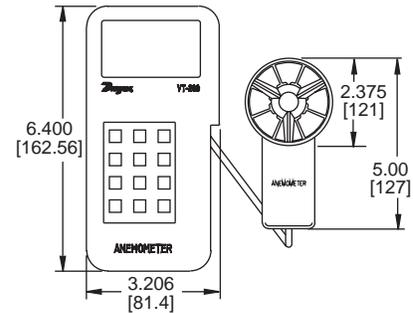




Model VT-200 Vane Thermo-Anemometer



Specifications- Installation and Operating Instructions



DESCRIPTION

Model VT-200 Vane Thermo-Anemometer is ideal for balancing air conditioning and heating ducts or checking the operation of fans and blowers. Model VT-200 measures air volume in cubic feet per minute and cubic meters per minute. Air velocity measurements can be viewed in ft/min, m/s, knots, km/hr, and mph with $\pm 3\%$ accuracy. The multifunction LCD can simultaneously display air velocity and temperature in selectable units or air flow and air area. Built-in datalogger can store up to 1000 measurements or transfer the data to a PC via RS-232 communication. Additional features include data hold and record/recall minimum, maximum and average readings. Model VT-200 includes RS-232 interface, PC Windows software, cable, 9V battery, carrying case, and instruction manual.

DISPLAY DESCRIPTIONS

AVE:	When selected from the OPTION menu, this indicates method of average.
MAX:	This symbol will appear when MIN/MAX button is pressed once. This will indicate maximum value of measured air velocity or air flow.
MIN:	When MIN/MAX button is pressed twice, this symbol will appear. It indicates the minimum value of measured air velocity or air flow.
2/3V:	When selected by the OPTION button, this will be displayed with MAX symbol.
VEL:	When VEL/FLOW button is pressed once, this symbol will appear indicating unit is measuring air velocity.
FLOW:	When VEL/FLOW button is pressed twice, this symbol will appear indicating the unit is measuring air flow.
READ:	This symbol will appear when READ function is enabled. This allows user to read recorded data.
REC:	When unit is recording data, this symbol will appear.
RS-232:	When the RS-232 function is enabled, this symbol will appear.
ft ² :	This will appear in the FLOW function indicating the unit is measuring in square feet.
m ² :	This will appear in the FLOW function indicating the unit is measuring in square meters.
CFM:	This symbol indicates units measured in cubic feet per minute.
CMM:	This symbol indicates units measured in cubic meters per minute.
m/s:	This symbol indicates units are measured in meters per second.
ft/min:	This indicates units are measured in feet per minute.
Km/h:	This units are measured in kilometers per hour.
x100:	This indicates the actual value is multiplied by 100.
x10:	This indicates the actual value is multiplied by 10.

PHYSICAL DATA

Air Velocity Ranges: 80 to 4925 ft/m, 1.4 to 90.0 kph, 0.9 to 55.9 mph, 0.4 to 25.0 m/s, 1.9 to 38.8 knots.

Temperature Range: 32 to 140°F (0 to 60°C).

Resolution: 10 ft/m, 0.1 kph, 0.1 mph, 0.1 m/s, 0.1 knots, 0.1°F, 0.1°C.

Accuracy: Air Velocity: $\pm 2\%$ + 1 digit, Temperature: 1.5°F

(0.8°C).

Temp. Sensor: Thermistor.
Operating Temperature: 32 to 122°F (0 to 50°C) max 80% RH.

Output: RS232 serial interface via 3.5 mm terminal.

Power Supply: One 9 V battery.

Power Current: Approx. 8.3 mA.

Housing: ABS plastic.

Weight: 0.84 lb (381 g).

HOW TO MEASURE WIND/ AIR VELOCITY

1. Press the ON/OFF button to turn on the anemometer.
2. To select anemometer function, press the VEL/FLOW button (Number 4).
3. Choose which option is needed, either VEL (Air Velocity) or FLOW (air flow) The VEL or the FLOW symbol will appear in the upper left corner of the LCD.
4. Press the UNIT button (Number 3) to select desired unit of measurement. The selected unit of measure will be displayed at the top of the LCD.
5. Determine the approximate wind direction.
6. Hold the anemometer vane so that the air flow will pass through from the back to the front. (**NOTE: The back of the vane has a place for a mounting screw and the front has "ANEMOMETER" engraved on the handle.**) Make sure the air is flowing in the direction of the arrows on the inside of the vane.
7. Wait for two seconds in order to obtain a stabilized reading.

HOW TO MEASURE WIND/AIR TEMPERATURE

(**NOTE: Temperature and wind velocity are measured simultaneously.**)

1. Select either °C or °F by pressing °C/°F button (Number 6).
2. Let wind pass through center of vane. (A thermocouple is built into the center of the vane.)
3. Obtain temperature reading on LCD.

HOW TO MEASURE WIND/AIR FLOW

1. Press the ON/OFF button to turn on anemometer.
2. Press the VEL/FLOW button (Number 4) to select FLOW function. The FLOW symbol will appear in the upper left corner of the LCD.
3. Press the UNIT button (Number 3) to select desired unit of measurement. (CFM or CMM)

- The previously stored free area will be displayed in the upper corner of the LCD. To enter the new free area, press the AREA button (Number 0). The lower four digits will become blank, and the anemometer will wait for new entry.
- Enter new free area by using the numerical keypad and then press to end. The meter will automatically exit when all four digits are entered.
- Press the OPTION button several times until neither the AVE nor the 2/3VMAX is showing on the LCD.
- Determine approximate wind direction.
- Hold vane so that wind passes through back to front. (See arrows on inside of vane).
- Wait two seconds in order to obtain stabilized output.

NOTE: The flow value equals velocity multiplied by free area.

$$FLOW = VELOCITY \times (FREE AREA)$$

HOW TO MEASURE WIND/AIR FLOW WITH 2/3VMAX OPTION

- Press the ON/OFF to turn on the anemometer.
- Select desired function by pressing the VEL/FLOW button (Number 4). FLOW symbol should appear on the left of the LCD.
- Select desired units of measurement (CFM or CMM) by pressing the UNIT button (Number 3).
- Any previously stored free area data will be displayed in the upper LCD. To enter new free area data, press AREA button (Number 0). The lower four digits will become blank. The meter will wait for new entry. Enter free area by using numerical key pad and then press ENTER when finished. The meter will automatically exit entering mode if all four digits are entered.
- Once the free area is updated, press the OPTION button to select the 2/3Vmax mode. the 2/3Vmax symbol will be displayed in the upper LCD.
- Determine approximate wind direction.
- Hold vane so that wind passes through from the back to the front.
- Measure maximum velocity by moving around center of the free area. The meter will record the maximum value and use it to calculate the wind flow by the following equation:

$$FLOW = 2/3 \times \max(VELOCITY) \times (FREE AREA)$$

HOW TO OBTAIN AVERAGE WIND/AIR FLOW

- Press the ON/OFF button to turn on the anemometer.
- Select desired function by pressing the VEL/FLOW button (Number 4). The FLOW symbol will appear in left corner of the LCD.
- Select the desired unit of measurement by pressing the UNIT button (Number 3).
- Any previously stored free area data will be displayed in the upper LCD. To enter new data, press AREA button (Number 0). The lower four digits will become blank. To enter free area by using numerical keypad and then press ENTER to accept. The meter will automatically exit entering mode when all four digits are entered.
- Once the new free area is updated, press the OPTION button to select the AVE function. The AVE symbol is appear at the top of the LCD.
- Press the START button to clear the upper LCD.
- Determine the approximate wind direction.
- For the most accurate reading, keep the axis of the vane within 20° of the wind direction.
- Select a measuring point within free area. Once a point is selected, press the NEXT button to average the wind flow. The value is the four digit upper LCD will increment by one to indicate how many points have been averaged. The maximum number of points is 12. The averaged reading will be appear on the larger 4 digit display on the LCD. The meter will calculate the average wind flow by using the following equation:

$$FLOW = 1/N \sum (VELOCITY) \times (FREE AREA)$$

HOW TO RECORD A SINGLE DATA SAMPLING

- Select the (VEL) Velocity mode to measure wind velocity. Set the sampling time by selecting the SAMPLE button (Number 0) the previously stored sampling time will be displayed in the upper LCD.
- Enter '0' as the sampling value for single data sampling. Zero will be displayed on the LCD. Press the ENTER button to accept '0' as the sampling time.
- Press the REC (Number 9) button to store the data displayed on the LCD. Every time the REC button is pressed, a single data point will be stored in memory. The data is maintained in the memory even when battery is replaced. (**NOTE:** Single point data sampling can also be done in the FLOW mode. Follow above instructions for VELOCITY sampling but be sure to put into FLOW mode.)

HOW TO CONTINUOUSLY RECORD DATA SAMPLING

- Select the VEL (VELOCITY) mode (The FLOW mode can not be continuously stored).
- Press the SAMPLE button (Number 0) to change the sampling time. The previously stored sampling time will be displayed on the upper LCD.
- Continuous sampling time can be set from 1 to 240 seconds with a maximum number of 2000 records stored in memory. Enter the desired time via the numeric keypad (1-240) and press enter to accept new sampling time.
- Press the REC button (Number 9) to begin data storage at the specified sampling time. The REC symbol will be displayed at the top of the LCD when the RECORD function is actuated. Data will maintained in the memory even after the battery has been replaced.
- To end recording, press the REC button (Number 9) again. The REC symbol should not be displayed at this time. (**NOTE:** Data will be lost if the REC button is not disabled before turning off unit.)

HOW TO READ SEQUENTIALLY STORED DATA

- Press the read button (Number 7) to read stored data in memory. The READ symbol will be displayed in the upper LCD.
- The RECORD NUMBER will be indicated in the upper LCD prior to displaying the data. Scroll through the data records by pressing the READ button. The data will roll over to the first record if the last record has been read.
- To exit the READ mode, press the RESET button (Number 8).

HOW TO READ RANDOMLY STORED DATA

- Access the READ mode by pressing the READ button (Number 7). The READ symbol will appear at the top of the LCD.
- Press the SAMPLE button and enter the sample number to be viewed. The record number will be displayed in the upper LCD.
- Press ENTER to select the displayed record number. The data corresponding to that number will be displayed.
- Press the RESET button (Number 8) to exit the READ mode.

HOW TO DOWNLOAD SOFTWARE TO PC

FOR WINDOWS 3.1™

- Start **Microsoft™ Windows™** on PC.
- Insert disk into drive A (or B)
- From **PROGRAM MANAGER**, select **File** menu and choose **Run**.
- Type a:\setup (or b:\setup) then press **ENTER**.

FOR WINDOWS 95™ OR WINDOWS 98™

- Start **WINDOWS 95™ OR WINDOWS 98™**.
- Insert disk in drive A (or B).
- Click **Start** button and select **Run**.
- Type in a:\setup (or b:\setup) and then press **Enter**.

HOW TO DOWNLOAD CURRENT DATA FROM THE ANEMOMETER TO THE PC USING THE RS-232C FUNCTION.

NOTE: The RS-232 function when downloading current data to a PC will be automatically disabled if the REC function (storing data internally) is continuously recording data.

- To enable RS-232 function, press the RS-232 button (Number 1) and the ON/OFF button at the same time.
- Attach 9 pin male plug to anemometer and tighten down using a standard screwdriver.
- Attach opposite 9 pin female to COM 1 port on back of PC. (Adapter is enclosed to accommodate 25 pin port if needed.) Tighten plug to back of PC with a standard screwdriver.
- Data will be sent to RS-232C port at the rate of 15 bytes of live data per second.

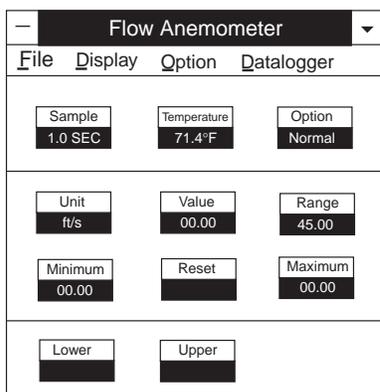
HOW TO DOWNLOAD STORED DATA TO PC USING RS-232C FUNCTION

- Make sure cable is attached to the meter and the PC. (See above instructions on "Downloading current data..." if cable is not attached.)
- Press the DLOAD button (Number 5) to send all stored data from memory to RS-232 port.

USING VT-200 SOFTWARE

Main Window

When the program is executed, it will automatically search for the connected anemometer or the available serial port. If no serial port is available, then a message of "NO COM" (No Communication) will be displayed. Once the communication port is setup, the main window will be displayed on the screen.



DESCRIPTION OF WINDOWS APPLICATION PROGRAM

Main Window

When the program is executed, it will automatically search for the connected anemometer or available serial port. If no serial port is available, then a message of "NO COMMUNICATION" (NO COM) will be displayed. Once communication port is setup, a main window will be displayed on the screen.

WINDOW DESCRIPTIONS

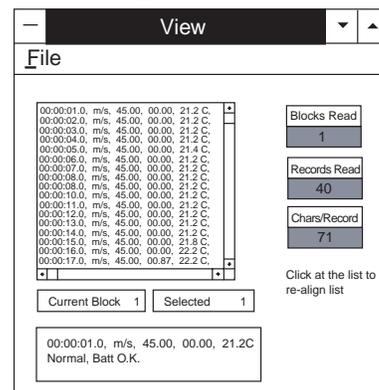
- Sample:** The value under SAMPLE is the sampling time.
- Temperature:** Temperature of wind or air in °C or °F.
- Option:** Display option of anemometer. MAX, MIN, AVE, 2/3Vmax.
- Unit:** Displays units of air velocity or air flow (m/s, ft/min, knots, MPH, kmh, CFM, CMM.)
- Value:** Displays the actual reading from the anemometer.
- Range:** Displays the range of the selected unit of measure.
- Minimum:** Displays the minimum value recorded by PC.
- Maximum:** Displays the maximum value recorded by PC.
- Reset:** Clears both the minimum and maximum values recorded.
- Lower:** The minimum value recorded in the specified range.
- Upper:** The Maximum value recorded in the specified range.

FILE

When **FILE** is selected from the **MAIN MENU**, a pull down menu will show six options: Name, Start Recording, End Recording, View, Plot Data from File, and Exit.

- Name:** Enter file name to store data displayed in the LCD at a specified interval.
- Start Recording:** Starts recording when selected.
- End Recording:** Ends recording when selected.
- View:** When **VIEW** is selected from the **FILE** menu, a view file window will be show as below. This allows users to review ASCII data file. If a printer is connected to the PC, users can print content selectively.

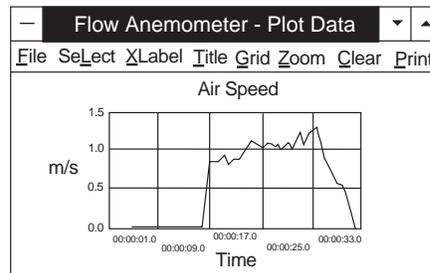
VIEW WINDOW:



- File:** This option allows user to open data file. User will be asked to enter file name. After file name is entered, the program will read one block of data. The number of records in one block depends on the memory size of the PC. The more memory the PC has, the more records in on block.
- Blocks Read:** Indicates how many blocks of records have been read.
- Records Read:** Indicates how many records have been read.
- Chars./Record:** Indicate how many characters in one record.
- Current Block:** Indicates the current block number being reviewed.
- Selected:** Indicates the current record number being selected.

Plotting Data from File:

When the **Plot Data from File** option is selected from the **FILE** menu, a plot window will be displayed. The user can plot the curve of the data file. In the window, there are nine options to choose from:



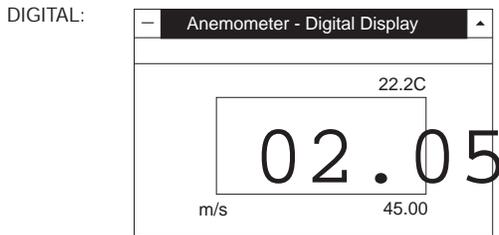
- File:** Opens the file to enable user to plot data.
- Select:** Allows user to select Velocity, Temperature, Flow or Area to be plotted.
- Scale:** Allows user to set scale at Y-axis.
- X Label:** User can select sequence number (1,2,3,4,...) or time (12:00:01, 12:00:05,...) as X-axis label.
- Title:** Allows user to enter a title for X-axis, Y-axis or graph.
- Grid:** Allows user to draw horizontal and vertical grids.

- Zoom:** Allows user to zoom into graph up to 3,600 points.
- Stat:** Statistics. This allows user to plot average value or standard deviation over the curve. This function is only valid when STATIS is less than 3600 data. If there is more than 3600 data, STATIS will be disabled.
- Clear:** This clears the graphic screen.
- Print:** If a printer is connected to the PC, this allows user to print out the curve.
- Exit:** Closes the menu.

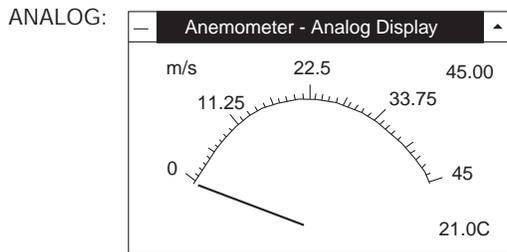
DISPLAY

When **DISPLAY** is chosen from the **MAIN MENU**, a pull down menu will show four options, DIGITAL, ANALOG, LIST, and GRAPHIC.

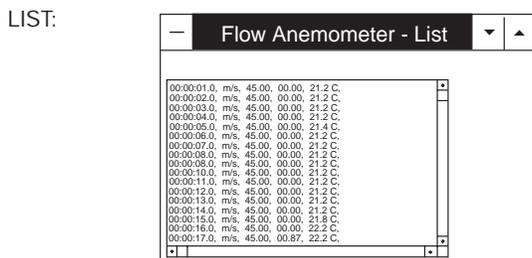
When the DIGITAL option is selected, a window is displayed emulating a digital meter. Use CTRL +D for a shortcut for the DIGITAL option.



When ANALOG option is selected, a window is displayed emulating an analog meter.



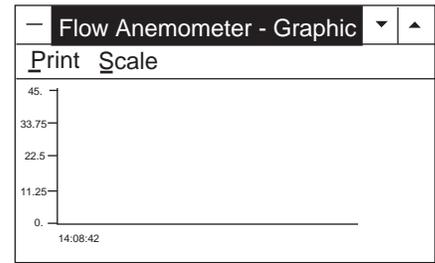
When the LIST is selected, a window is opened which lists the date, function, range and value of every sampling.



When the GRAPHIC option is selected, a window is displayed which emulates a strip chart recorder opens. This window has two menus, **PRINT** and **SCALE**.

- PRINT:** Allows user to print through any printer connected to the PC.
- SCALE:** Allows user to set the minimum and maximum value for the Y-axis.

GRAPHIC:

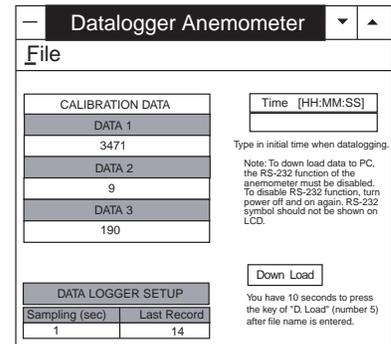


OPTION

When **OPTION** is chosen from the main menu, a pull down menu will show five options: UPPER LIMIT, LOWER LIMIT, GRAPHIC MODE, SAMPLE RATE, and BAUD RATE.

- Upper Limit:** Enter upper limit. If this limit is exceeded, a message reading "OVER" will be displayed on the screen.
- Lower Limit:** Enter lower limit. If the displayed value is less than lower limit, a message reading "UNDER" will be shown on the screen.
- Graphic Mode:** This allows user to select display of graphic windows. Choose either DOT or BAR.
- Sample Rate:** This allows user to enter PC sampling time, or click SAMPLE to enter sampling time.
- Baud Rate:** 9600

DATALOGGER:



- Calibration Data:** This is any calibration data stored in memory of the anemometer. This function is used when the meter is returned for repair or calibration.
- Datalogger Setup:** This is the sampling time and total number of records stored in the anemometer.
- Time:** This value is entered by the user. Enter the initial time when converting data.
- Download:** When this option is selected, the program will ask the user to enter the FILE name. After it is entered, the user had 10 seconds to press the DLOAD button (Number 5) on the keypad. When this button is pressed, all of the data stored in the memory of the anemometer will be sent to the PC. The program will convert all of the coded data to a ASCII file under the name entered by the user.

HOW TO REPLACE BATTERY

- When LOW BATTERY is displayed on the LCD:
1. Turn off the anemometer by pressing the ON/OFF button.
 2. Remove the screw from the battery compartment cover.
 3. Slide compartment cover off, and disconnect existing 9V battery.
 4. Replace with new 9V battery.
 5. Replace compartment cover and fasten screw.