Air Velocity/Temperature Measurement Unit Provides All-in-One Toolbox

If you are involved in HVAC installation or maintenance, or if you work with air flow in an industrial process, lab, or research facility, then you will want to know about the new FMA1000 Air Velocity/Temperature Transmitter-Indicator from Omega Engineering. This compact, full-featured unit provides air velocity and temperature measurements in visual, analog, and digital formats. It includes a display panel, analog outputs, and a USB computer interface (software included). All of this is neatly packaged in a 3.5 x 4.5" NEMA 4, IP65-rated case.

The air velocity sensor is the hot wire type using two RTDs. Measurements are based on the rate of heat loss caused by the air flow. The temperature sensor uses another RTD for a direct measurement. The air velocity and temperature ranges covered are 0 to 10,000 FPM and -40 to 121°C (-40 to 250°F), respectively. To ensure maximum accuracy, each FMA1000 is individually calibrated in a NIST traceable wind tunnel.

FMA1000 Features

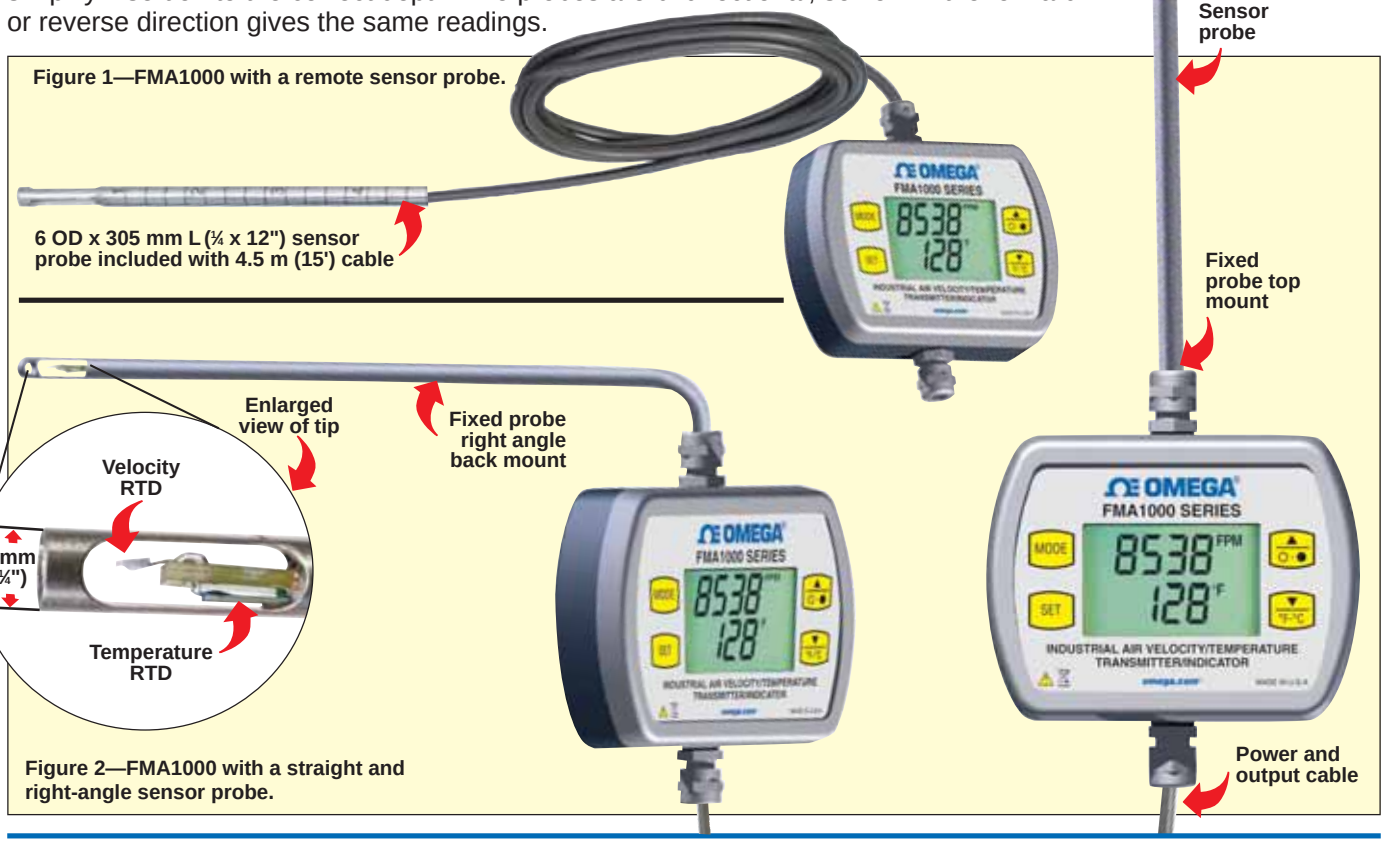
The design of the FMA1000 is well thought out and offers enough features to accommodate most air velocity measurement and data needs. In fact, this instrument is so loaded with features, it is a challenge to present them in an organized way.

Power Input

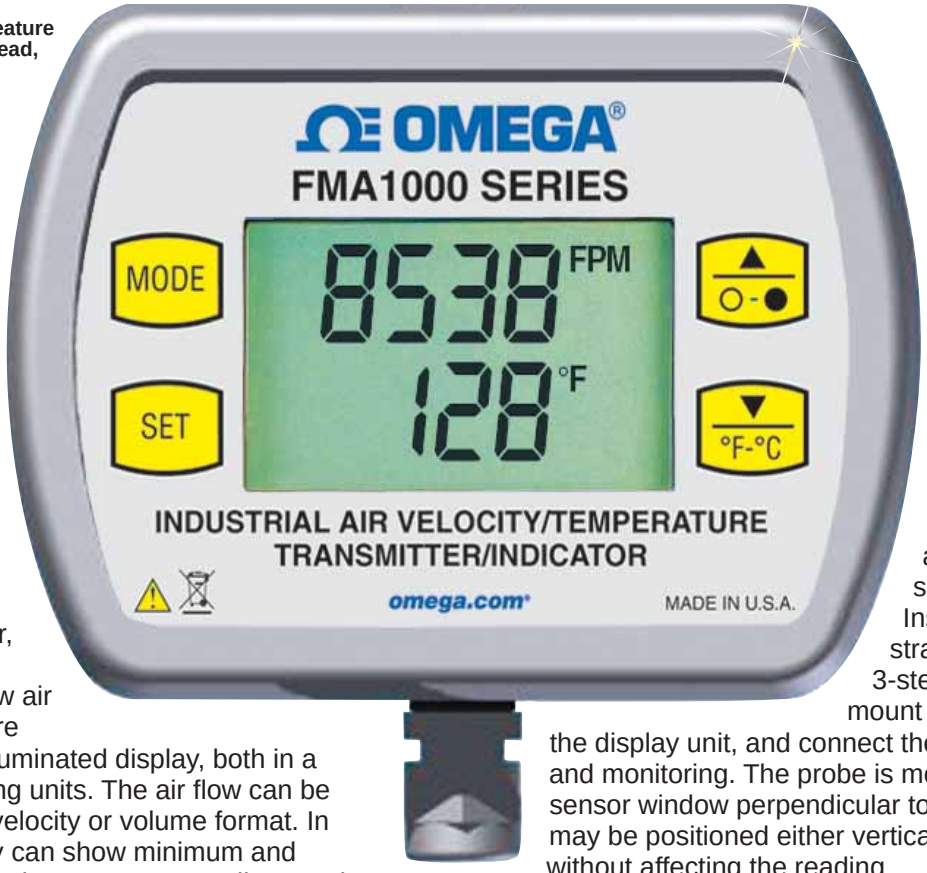
Consistent with its flexible design philosophy, the FMA1000 can be powered with either a 15 to 24 Vdc power supply, or through the included USB cable connected to a PC.

Probes

Stainless steel sensor probes are available in three configurations: straight, right angle, and remote with a 4.6 m (15') cable (shown in Figures 1 and 2). Marks at 1" intervals simplify insertion to the correct depth. The probes are bi-directional, so flow in the forward or reverse direction gives the same readings.



FMA1000 units feature a large, easy to read, backlit LCD.



Display Panel

Functioning as a standalone indicator, the FMA1000 can simultaneously show air flow and temperature information on its illuminated display, both in a choice of engineering units. The air flow can be displayed in either velocity or volume format. In addition, the display can show minimum and maximum air flow and temperature readings and includes indicators for high and low alarm conditions.

Analog Outputs

For analog control and monitoring functions, a 4.6 m (15') power/output cable is provided. Signals are provided for air velocity, temperature, high alarm condition, and low alarm condition. The air velocity output is available in all of the common configurations: 0 to 5 Vdc, 0 to 10 Vdc, and 4 to 20 mA current loop. The temperature output is 0 to 5 Vdc. Input power connections are also made through the same cable.

Digital Outputs

For logging data to a pc, an alternate cable with a USB serial connector is included. In this mode, power for the FMA1000 is derived from the computer through its USB connection. This cable also has analog output leads for air flow and temperature which can be used for monitoring and control functions while data logging. The software which is supplied for the pc application is described in detail below.

Installation

Most commonly, permanent installations of the FMA1000 will use the remote probe configuration. The fixed probes models are typically used for on-the-spot measurements and trouble-shooting. Installation is a straight-forward 3-step process: mount the probe, mount the display unit, and connect the cable for power and monitoring. The probe is mounted with the sensor window perpendicular to the air flow and may be positioned either vertically or horizontally without affecting the reading.

Keep in mind that the FMA1000 is calibrated for use with clean air or nitrogen. Other gases, having different thermal conductivities, will produce un-calibrated and non-linear measurements. Also, the dusty or oil-laden air found in some blower or compressor systems can cause coating of the sensor and lead to inaccurate readings.

Setup and Operation

The FMA1000 is setup using the LCD display and keypad on the front panel. Since no calibration is required, it is only necessary to set the parameters that are relevant to your application. First choose the engineering units for air flow and temperature. Air flow can be shown in feet per minute (FPM), meter per second (m/s), miles per hour (MPH), kilometer per hour (Km/h), or cubic feet per minute (CPM). Temperature units are °F or °C. Next, set high and low air velocity alarm points, the sampling rate from 250 msec to 2 seconds, and if air flow volume readings are needed, set the cross-sectional area. Atmospheric pressure may also be set if the application requires it. (The default value is 760 mmHg.) These parameters are stored in non-volatile memory and, consequently, are not affected by loss of power to the unit. Once the setup is complete, start taking readings.

Data Logging Software

The FMA1000 comes with Windows-based application software that can be used for real time monitoring, while logging and charting the measurement data. After installing the software, connect the unit to the computer with the included USB cable and use the Settings screen, shown in Figure 3 below, to configure the program for your application. Here you can set the following parameters:

Engineering units for air flow and temperature. Choices are the same as on the unit's display panel.

Time base for the charting function. A full screen can cover 1 minute, 10 minutes or one hour.

Chart scaling. Options are auto, manual, or logarithmic. In manual mode the Y scale for the air velocity and temperature can be set to any value within the probes range.

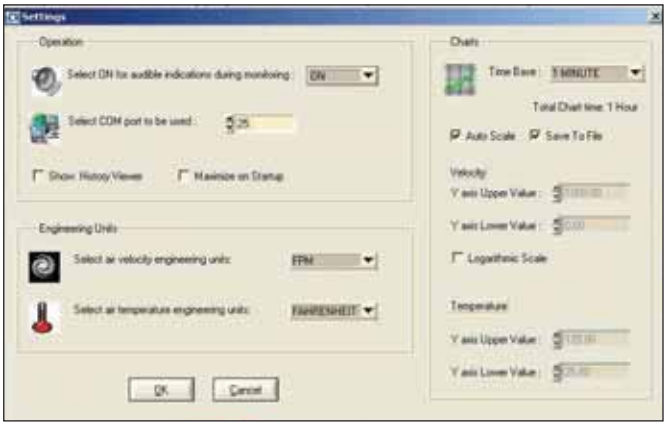


Figure 3—Settings menu.

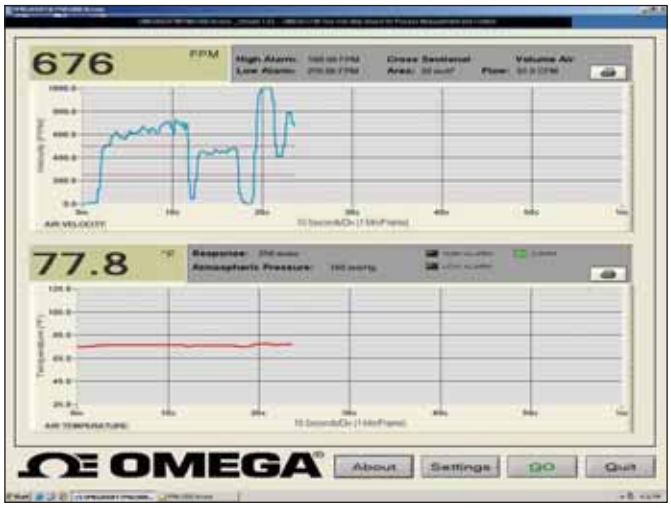


Figure 4—Main window.

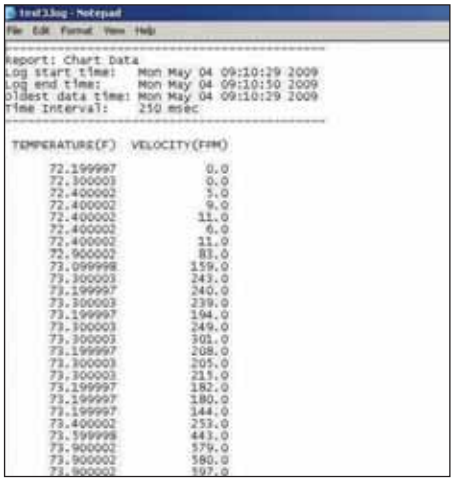


Figure 5—Typical data file.

A single display screen is used to display the data from the FMA1000. This is shown in Figure 4. The upper graph plots the air velocity over time, while the information bar above gives a digital display of the last reading. This bar also shows the volume air flow, the high and low alarm settings, and the cross-sectional area setting.

The lower graph plots the corresponding temperature readings, while its information bar shows the last reading in digital format, the response time between readings, the atmospheric pressure setting, and high and low alarm LED indicators.

Both graphs can be sent to a printer and the corresponding data saved to a text file which can be imported into an Excel spreadsheet. An example of the data file is shown in Figure 5.

As you can see from the description of the FMA1000, it is a multi-purpose workhorse in a small package. Not only can it function as a standalone air velocity and temperature meter, but, with its analog outputs, can serve as a controller interface, and, with the USB computer interface, adds charting and data logging capability. And here is the most amazing part; the FMA1000 costs 25% less than earlier products that offer only a fraction of its capability. So, if the FMA1000 offers the type of measurement capability you need in your work, what are you waiting for?

Coming Soon!

Handheld Air Velocity/Temperature Meter with Wireless Sensing Probe