

VELTRON II

Microprocessor Based
Pressure & Flow “Smart” Transmitter



CE

Accurate airflow measurement for demanding applications

Air Monitor
Precision Airflow Measurement

VELTRON II

with Automatic Zeroing Circuit

The VELTRON II transmitter is furnished with an automatic zeroing circuit capable of electronically adjusting the transmitter zero at predetermined time intervals while simultaneously holding the transmitter output signal.

The automatic zeroing circuit eliminates all output signal drift due to thermal, electronic or mechanical effects, as well as the need for initial or periodic transmitter zeroing. For transmitters operated in temperature controlled spaces (with no thermal effect

upon span), this automatic zeroing function essentially produces a "self-calibrating" transmitter. The automatic zeroing circuit will re-zero the transmitter to within 0.1% of its operating span; for a transmitter with a 0.02 IN w.c. operating span, this represents a zeroing capability within 0.00002 IN w.c.

To permit manual calibration of the VELTRON II, an electronic switch is provided to permit manual positioning of the zeroing valve.

Performance Specification

Ranges.	Natural Spans	Bi-Polar Natural Spans
	0 to 25.00 IN w.c.	
	0 to 10.00 IN w.c.	-10.00 to 10.00 IN w.c.
	0 to 5.00 IN w.c.	- 5.00 to 5.00 IN w.c.
	0 to 2.00 IN w.c.	- 2.00 to 2.00 IN w.c.
	0 to 1.00 IN w.c.	- 1.00 to 3.00 IN w.c.
	0 to 0.50 IN w.c.	- 0.50 to 0.50 IN w.c.
	0 to 0.25 IN w.c.	- 0.25 to 0.25 IN w.c.
	0 to 0.10 IN w.c.	- 0.10 to 0.10 IN w.c.
	0 to 0.05 IN w.c.	- 0.05 to 0.05 IN w.c.

Accuracy. 0.1% of Natural Span, including non-linearity, hysteresis, deadband, and non-repeatability.

Span Rangeability. The calibrated span can be down ranged to 40% of the Natural Span.

Stability. $\pm 0.5\%$ of Natural Span for six months.

Transducer Response Time. 0.5 second to reach 98% of a step change.

Temperature Effect. Zero. None; corrected by AUTO-zero. Span. 0.015% of Full Span/ $^{\circ}$ F.

Mounting Position Effect. None; corrected by AUTO-zero.

Functional Specification

Digital Outputs. Form C dry contacts rated for 3 amps at 24VAC/VDC for optional HI/LO alarm. Dual Form A dry contacts rated for 3 amps at 24VAC/VDC for AUTO-purge activation and acknowledgment.

Digital Inputs. Dry contact for AUTO-purge external start.

Analog Outputs. Dual transmitter outputs are individually configurable via jumper for 0-5VDC, 0-10VDC, or 4-20mADC. Two additional outputs are optionally available.

Analog Inputs. A single input is field configurable via jumper for 0-5VDC, 0-10VDC, or 4-20mADC. For use with optional special function.

Network Communication. Optional ModBus TCP/IP over Ethernet or LonWorks.

Power Supply. Standard 24VAC (20-28VAC) or 24VDC (20-40VDC). Optional 120VAC (100-132VAC), via external transformer.

Power Consumption. Standard: 18VA at 24VAC; 13VA at 24VDC; 36VA at 120VAC. With AUTO-purge Management: 54VA at 24VAC; 48VA at 24VDC; 108VA at 120VAC.

Overpressure and Static Pressure Limit. 25 psig.

Low Pass Filtration. Response time to reach 98% of a step change is adjustable from 2.0 to 250.0 seconds.

Automatic Zeroing. Accuracy. Within 0.1% of calibrated span. Frequency: every 1 to 24 hours on 1 hour interval, user settable.

Circuit Protection. Power input is isolated, fused, and reverse polarity protected.

Span and Zero Adjustment. Electronic adjustment via keypad.

Display. Standard 2 line x 20 characters LCD provides one line of data display. Optional (standard on MASS-tron II) backlit, graphical LCD provides indication of up to four process variables. Triple-size digits for main process variable, standard size characters for the other process variables.

Humidity Limits. 0-95% RH, non-condensing.

Temperature Limits. -20 to 180 $^{\circ}$ F Storage.
+40 to 140 $^{\circ}$ F Operating.

Specifications

Physical Specifications

Signal Connections.

High and low pressure, 1/8" FPT.

Electrical Connections.

External terminal strip with plug-in connectors. Optional terminal strip enclosure with dual 3/4" (.875" actual) conduit connections.

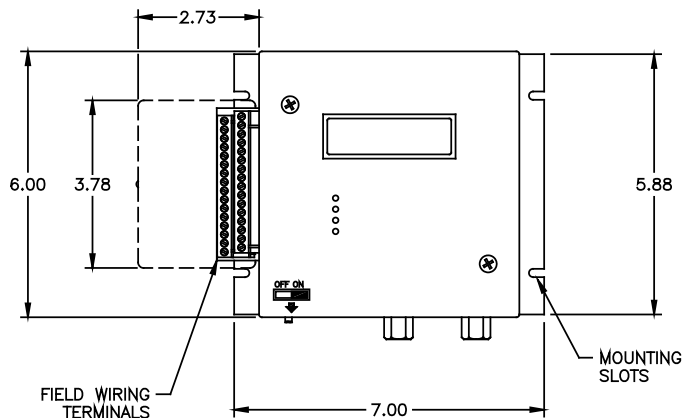
Enclosure.

NEMA 1 aluminum enclosure.

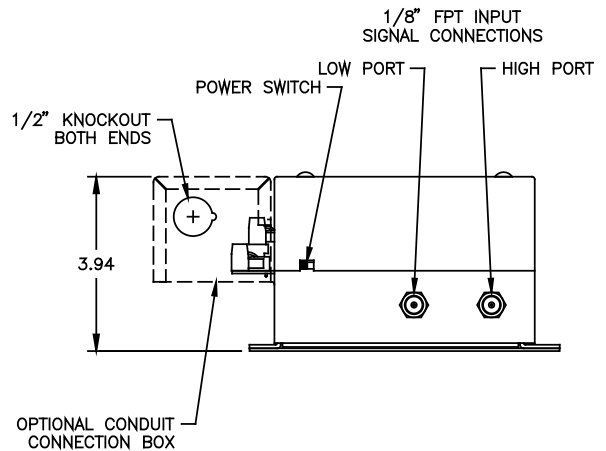
Weight.

4.1 lbs.

Dimensional Specifications



FRONT VIEW



BOTTOM VIEW

Suggested Specification

The transmitter shall be capable of receiving flow signals (total and static pressure) from an airflow station or probe array and produce dual outputs linear and scaled for air volume, velocity, differential pressure, etc.

The transmitter shall contain an integral multi-line digital display for use during the configuration and calibration process, and to display one transmitter output during normal operating mode. All transmitter configuration, parameter setting, zero and span calibration, plus display formatting and scaling will be performed digitally in the on-board microprocessor via input pushbuttons.

The transmitter will be available in multiple natural spans covering the range of 0.05 IN w.c. to 10.0 IN w.c. with an accuracy of 0.1% of natural span. The transmitter shall be furnished with a transducer automatic zeroing circuit and be capable of maintaining linear output signals on applications requiring 10 to 1 velocity (100 to 1 pressure) turndown.

The transmitter shall be capable of having its operating span electronically selected without having to perform recalibration involving an external pressure source.

(Optional) The transmitter shall be capable of receiving an external temperature input, internally perform density correction for the process absolute pressure and temperature, and provide individual analog outputs linear and scaled for standard air volume or mass flow, temperature and absolute pressure.

(Optional) The transmitter shall include an integral P,I,1/D three-mode controller capable of controlling at a user selectable internal or external setpoint, and providing an analog output control signal.

(Optional) The transmitter will provide the means of managing a system for automatic high pressure purge of the airflow station or probe array, with user selectable purge frequency and duration, while maintaining the last transmitter output during the purge cycle.

(Optional) Using a second transmitter as an input, the internal microprocessor can perform a summed flow, flow differential, low signal select, high signal select or percent deviation calculation, with the result being displayed and provided as an analog output signal.

The transmitter shall be the VELTRON II [MASS-tron II or VEL-trol II] as manufactured by Air Monitor Corporation, Santa Rosa, California.

MASS-tron II

Via the addition of both process temperature and pressure compensation, the ultra high accuracy VELTRON II becomes the MASS-tron II multi-variable mass flow transmitter. The process temperature input is an analog signal from a remote 4-wire or loop powered temperature transmitter; with the MASS-tron II having the capability of performing the linearization. The process pressure is measured by means of an internal absolute pressure transducer connected to the transmitter's static pressure signal input.

Performance Specifications

In addition to those available with the VELTRON II, the MASS-tron II includes these performance specifications:

Analog Output. 0-5VDC, 0-10VDC or 4-20mA for process differential pressure, temperature, and absolute pressure.

Analog Input. 0-5VDC, 0-10VDC or 4-20mA for process temperature.

Temperature Compensation Selection. Pushbutton selection of linearized or non-linearized input, thermocouple or 100 ohm platinum RTD temperature sensor type:

Type E	-50 to 1750°F	-50 to 950°C
Type T	-50 to 750°F	-50 to 400°C
Type J	-50 to 2000°F	-50 to 1090°C
Type K	-50 to 2000°F	-50 to 1090°C
RTD	-50 to 1500°F	-50 to 815°C

Pressure Compensation. Absolute pressure (atmospheric or duct static), up to 60 IN Hg.



CE

*Shown with standard 4-line graphic LCD

For optional CE certification, the MASS-tron II is furnished in a NEMA 4 enclosure (not shown).

VEL-trol II



CE

*Shown with optional 4-line graphic LCD

For optional CE certification, the VEL-trol II is furnished in a NEMA 4 enclosure (not shown).

The VEL-trol II incorporates a controller into the ultra high accuracy VELTRON II transmitter, providing the three modes of proportional, integral reset, and inverse derivative to permit the controller to be tuned to the extreme dynamics of critical airflow and pressurization control processes. The selection of the P,I,1/D tuning parameters is accomplished using the password protected membrane switch pushbuttons on the front of the enclosure. By means of a dry contact input, the controller operating set point can be switched from the internal fixed setpoint to an externally provided fixed or variable input.

Performance Specifications

In addition to those available with the VELTRON II, the VEL-trol II includes these performance specifications:

Analog Output. 0-5VDC, 0-10VDC or 4-20mA for controller output.

Analog Input. 0-5VDC, 0-10VDC or 4-20mA for controller external setpoint.

Digital Input. Dry contact for soft start command.

Ultra-Low Differential Pressure & Flow “Smart” Transmitter

Construction Features



Features

Accuracy. The VELTRON II is designed to maintain an accuracy of 0.1% of Natural Span. For a span of 0 to 0.05 IN w.c., this accuracy is equivalent to an output accuracy of ± 0.00005 IN w.c. differential pressure or 0.45 FPM velocity at span.

Continuous Display of Process. All VELTRON II's are equipped with a 2x20 liquid crystal display (LCD) for use during the configuration and calibration process, and to display one transmitter output during normal operating mode. Standard on the MASS-tron and optional for both the VELTRON II and VEL-trol II is a multi-line, backlit, graphical LCD providing up to four lines of data display, with each line individually scalable in user selectable format and units of measure. For high visibility, the main process variable (flow) is displayed with easy-to-read, triple-size digits. Other process variables are displayed with standard size digits.

Analog Communication. Each analog input and output signal can be individually configured for 0-5VDC, 0-10VDC, or 4-20mADC by means of a single jumper.

Electronic Respanning. The VELTRON II operating span can be electronically selected anywhere between the Natural Span and 40% of Natural Span, without having to perform recalibration involving an external pressure source.

Primary Signal Noise Filter. To eliminate background noise and pulsations from the flow signal, the VELTRON II is equipped with a user selectable digital low pass filter.

High Turndown Ratio Operation. The VELTRON II, with its high level of accuracy and automatic zeroing circuitry, can maintain linear output signals on applications requiring velocity turndown of 10 to 1 (equal to a velocity pressure turndown of 100 to 1).

Microprocessor Based Functionality. The VELTRON II's on-board microprocessor performs the functions of operating parameter selection, transmitter configuration, input/output and display signal scaling, and transducer calibration. Imbedded software performs span, flow, and 3-point “K” factor calculations. Input to the micro-processor is via pushbutton.

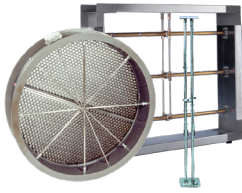
AUTO-purge Management (optional). For “dirty air” applications requiring the use of an Air Monitor AUTO-purge system, the VELTRON II provides the capabilities of establishing purge frequency and duration while giving the user a choice of either internally timed cycle frequency or externally triggered purge initiation. During the purge cycle all transmitter outputs are maintained at their last value prior to the start of the purge cycle.

Special Functions and Alarm Capability. The VELTRON II is capable of performing one of five special application functions using a second transmitter as an input: Summed flow, flow differential, low signal select, high signal select, or percent deviation. The special function output can be both displayed and provided as an analog output signal. Alarms related to the measured process can be configured for one of three modes: Low/Low, High/Low, and High/High.

Multiple Operating Power Selections. Standard input power supplied to the VELTRON II can be either 24VAC or 24VDC via automatic selection. An optional 120VAC external power transformer (UL listed) can be provided.

CE Certification. For optional CE Certification, the VELTRON II is furnished in a NEMA 4 enclosure (not shown).

Air Monitor's Product Families of Flow Measurement and Pressure Products



CA STATION - COMBUSTION AIRFLOW MEASURING STATION

Rugged construction with both integral airflow processing cell and Fechheimer-Pitot measurement technology. Engineered to meet challenging operating conditions of typical industrial applications while providing mass flow measurement within an accuracy of $\pm 2-3\%$ of actual airflow. 316 SS measurement array, carbon steel casing and flow straighteners. Used in conjunction with AUTO-purge III, it provides accurate flow measurement in dirty, particulate laden applications as seen in refineries, chemical plants, pulp & paper, power plants, etc.



VOLU-PROBE / SS - STAINLESS STEEL AIRFLOW TRAVERSE PROBES

Multi-point, self-averaging, Pitot Fechheimer airflow traverse probes and stations with integral airflow direction correcting design ensures accurate measurement. Various mounting configurations to fit every application. All 316 SS welded construction good to 900 F. Alternate materials such as Inconel and Hastelloy available.



LO-FLO - PITOT TRAVERSE STATION

The LO-flo Pitot Traverse Station is a combination air equalizer straightener with self-averaging pitot tube traverse station. The LO-flo is fabricated entirely of Type 316 stainless steel with all welded construction. It is capable of operation up to 900°F and is suitable for application to corrosive gases within the limitation of the 316 stainless steel construction.



ACCU-FLO - AIRFLOW TRAVERSE PROBES

The ACCU-flo/NP is a combination precision nozzle and multipoint self-averaging Fechheimer Pitot airflow measuring station. When combined with an ultra high accuracy transmitter such as Air Monitor's VELTRON II, MASS-tron II or VELTRON DPT-plus, the ACCU-flo/NP provides a high accuracy ($\pm 0.5\%$ of Reading) flow measurement for test measurements used for product testing and development as well as industrial process control applications.



S.A.P. /B, P, S, R STATIC PRESSURE SENSORS

Available in four separate mounting configurations, the S.A.P. family of static pressure sensors generate a steady, non-pulsating output of room, space or plenum pressure.

S.A.P. sensors are available in aluminum or stainless steel construction.



DPT-PLUS - MULTIVARIABLE MASS FLOW TRANSMITTER

The VELTRON DPT-plus is a multivariable mass flow transmitter providing outputs for mass flow, temperature, and differential pressure. Available with URLs as low as 0.05" H₂O with an accuracy of 0.1% of span, this transmitter is uniquely suited for low velocity applications where high accuracy is required. The integral AUTO-zero feature of the transmitter ensures long term stability. FM approved for hazardous area use:

- Explosion Proof: Class 1, Division 1, Groups B, C, D.
- Dust Ignition Proof: Class II, III, Division 1, Groups E, F, G.