

1 YEAR
WARRANTY

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FMA900A SERIES **Air Velocity Transmitter With One** **SPST Relay Contact Closure**



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FMA900A SERIES Air Velocity Transmitter With One SPST Relay Contact Closure

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Section 1 - Introduction

The FMA900A series measures air velocities up to 12,000 FPM (60.9 m/sec). It provides either a 0 to 5 Vdc or 4/20 mA analog output corresponding to the air flow range and one SPST relay contact closure corresponding to high alarm set point. The alarm set point is adjustable from 0 to 100% of the air flow range. This unit can be used in HVAC applications, R&D labs, exhaust/ ventilation hoods and other manufacturing processes.

The sensor is designed based on RTD elements. The air velocity is measured by the heat loss from the RTD sensor as it cools down by the air flow. The sensor is housed in a 1/4" OD x 12" long 304 Stainless Steel tube with inch marks for ease of insertion depths. The sensor probe comes in three configurations:

- Fixed mount probe
- 12" long remote probe connected via 15 feet of shielded cable
- 3.75" Short Probe

The following table shows all the models of this product.

Model No.	Range FPM (m/sec)	Description
FMA901A-*-**	0 to 500 (0 to 2.54)	Air velocity transmitter, relay output, fixed probe
FMA901R-*-**	0 to 500 (0 to 2.54)	Air velocity transmitter, relay output, remote probe
FMA902A-*-**	0 to 1000 (0 to 5.08)	Air velocity transmitter, relay output, fixed probe
FMA902R-*-**	0 to 1000 (0 to 5.08)	Air velocity transmitter, relay output, remote probe
FMA903A-*-**	0 to 2000 (0 to 10.16)	Air velocity transmitter, relay output, fixed probe
FMA903R-*-**	0 to 2000 (0 to 10.16)	Air velocity transmitter, relay output, remote probe
FMA904A-*-**	0 to 5000 (0 to 25.4)	Air velocity transmitter, relay output, fixed probe
FMA904R-*-**	0 to 5000 (0 to 25.4)	Air velocity transmitter, relay output, remote probe
FMA905A-*-**	0 to 10,000 (0 to 50.8)	Air velocity transmitter, relay output, fixed probe
FMA905R-*-**	0 to 10,000 (0 to 50.8)	Air velocity transmitter, relay output, remote probe
FMA906A-*-**	0 to 12,000 (0 to 60.9)	Air velocity transmitter, relay output, fixed probe
FMA906R-*-**	0 to 12,000 (0 to 60.9)	Air velocity transmitter, relay output, remote probe

Where,

*- Specify output type, add suffix "V1" for 0 to 5 Vdc, "MA" for 4 to 20 mA

** - Add suffix "S" for 95mm (3.75") short probe

NOTE:

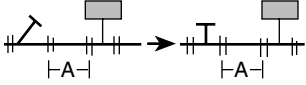
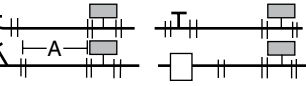
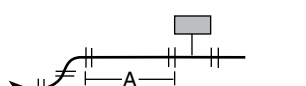
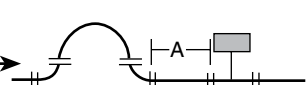
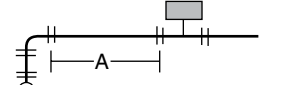
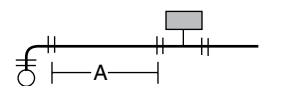
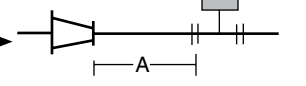
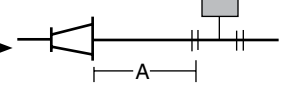
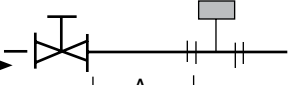
The FMA900A air velocity transmitter is not explosion proof, nor is it intrinsically safe. Do not use for flammable or hazardous gases, or in Hazardous areas.

The FMA900A series air velocity switch is intended for use with clean air or Nitrogen ONLY. Do not use with other gases, as it will produce an error in measurement. In addition, air carrying dust or oil (such as found in blower/compressor systems that utilize oil) can lead to coating of the sensor and thus inaccurate readings.

Refer to the Maintenance section for information on cleaning the sensor. The FMA900A is a bi-directional device, meaning the air flow in the forward or reverse direction provides the same readings. The FMA900A can be mounted vertically or horizontally without shift in calibration.

Section 2 - Installation

1. Remove the protective cap from the sensor tip.
2. Run a length of straight pipe before and after the flow sensor probe.
The amount of upstream straight pipe required depends on the type of obstruction which is immediately upstream of the flow sensor. See Table 1 for specific requirements. Downstream of the flow sensor, in all situations, run 5 diameters of straight pipe regardless of the downstream obstruction.
3. Align the sensor probe with the air flow. Make sure the air flow is perpendicular to the sensor window. The score line on the sensor tubing is another way of aligning the sensor to the flow stream. The score line starts from the center of the sensor window and as a result it can be aligned properly.
4. One way of installing the sensor probe into a flow stream is to utilize a compression fitting such as Omega's SSLK-14-14 stainless steel compression fitting with PTFE ferrule, which allows adjustment of the insertion depth of the probe.
5. Connect your wirings to the terminal block in the back of the unit. Figure 1 shows the back plate. The back plate has the terminal block for wiring connections, and one potentiometer adjustment for high alarm set point. It also has one red LED alarm indication, and the green LED for power indication. Figure 2 shows a typical wiring diagram.

	Typical Piping	Recommended Straight Pipe Length "A"		Remarks
		Without Vanes	With Vanes	
All Fittings in Same Plane		15D	15D	Closed Branch
		20D	15D	Elbow, Tee, Branch Pipe
		25D	15D	Elbow, 2 planes
		25D	15D	Long-radius bends
Fittings in Two Planes		30D 25D	15D 15D	Elbow Long-radius bends
		40D 35D	15D 15D	Elbow Long-radius bends
Varied Section		20D	15D	Contracting Pipe
		40D	20D	Expanding Pipe
Valves		Recommend Meter Be Installed Upstream		Regulating, reducing valves Ball, check valves Shut-off valves

Note: Straight pipe length on the downstream side to be 5 pipe diameters minimum.
Note: D – Pipe internal diameter

Table 1. Piping Requirements

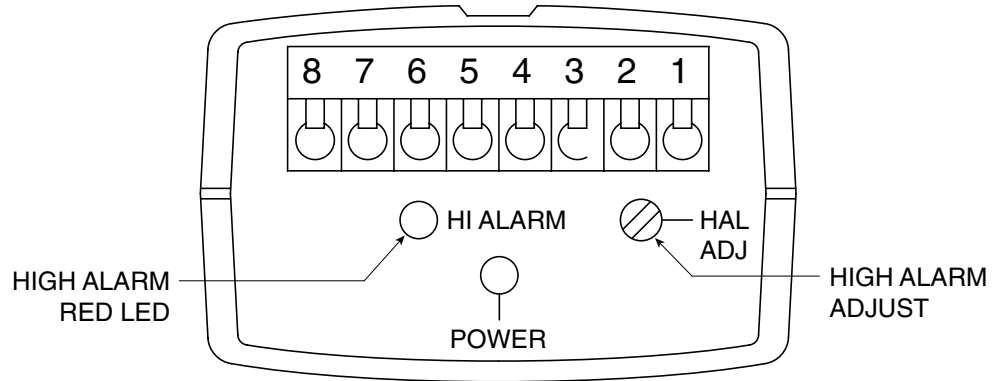


Figure 2-1. FMA900A Back Plate View

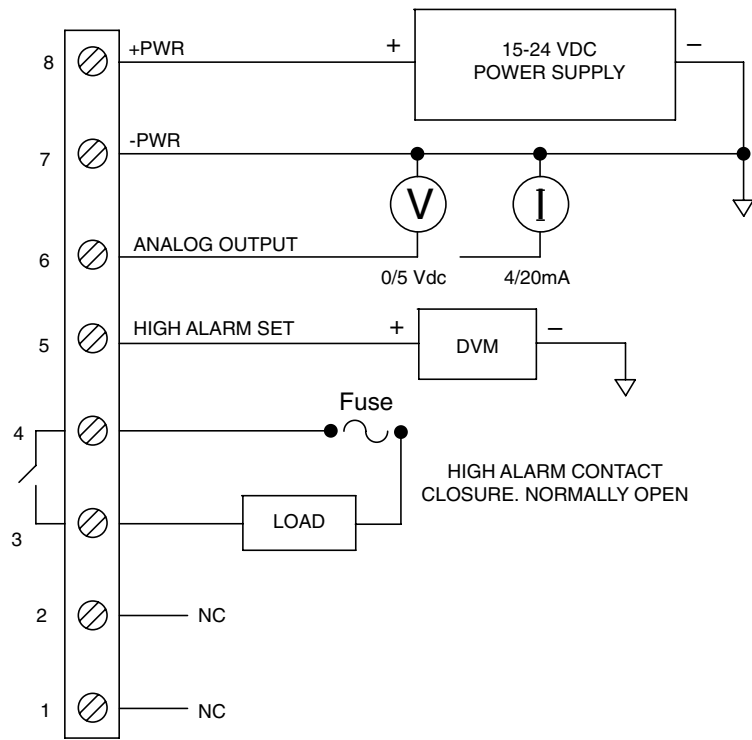


Figure 2-2. Typical Wiring Diagram

Figure 2-3 shows the FMA900A general dimensions with the fixed mount probe. Figure 2-4 shows the FMA900A with remote probe.

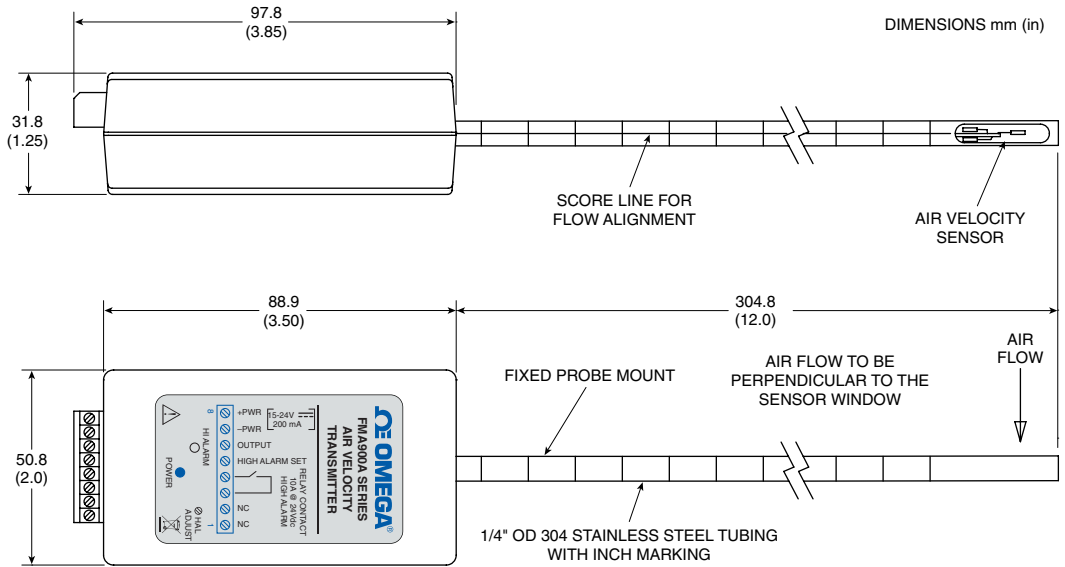


Figure 2-3. FMA900A Fixed Mount Probe, General Dimensions

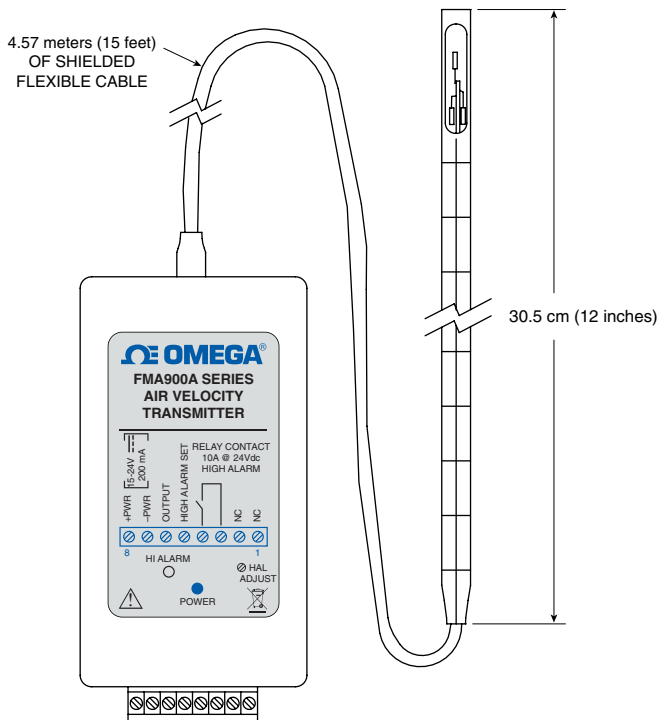


Figure 2-4. FMA900A With Remote Probe

Section 3 - Operations

CAUTION:

Connection to the power supply, analog output, and the relay output should be made by qualified personnel only. When the relay connection is made to voltages greater than 40 Vac, extreme care must be taken to avoid injury, and the transmitter should be operated in an enclosure as provided by your local BOCA code. The relay load should be resistive (eg. Not a torque motor).

The FMA900A measures the air velocity and provides either a 0 to 5 Vdc or 4 to 20 mA analog output. It has a built-in SPST NO relay for high alarm operation. Here is the procedure to operate this unit:

- After completing the wiring connections, use a regulated DC power supply (15 to 24 Vdc) to power the device.
- Measure the high alarm set point voltage using a DVM (Digital Volt-meter). This voltage is measured from terminal block # 5 to # 7. The air flow range is based on 0 to 5 Vdc. For example, if you have a 0 to 5000 FPM range unit, and want to adjust the high alarm set point to 3500 FPM, you will adjust the high alarm potentiometer on the back plate (HAL ADJ) so that the DVM measures 3.5 volts.
- Now you are ready to operate the unit. The analog output is measured between terminal block # 6 & # 7. When the air flow goes above 3500 FPM, the relay will energize and will provide a contact closure. The red LED alarm indicator will also turn on.

Maintenance

Except for intermittent removal of the sensor from the line for cleaning, there is no routine maintenance. If the sensor probe becomes coated with dust, blow the dust away with clean air. If the sensor probe is coated with sticky material, clean it with water or alcohol (Ethanol) using an artist's brush.

Calibration

Each FMA900A is individually calibrated in a NIST traceable wind tunnel. For calibration certification or calibrating to a new air flow range, the unit must be returned back to the factory.

Section 4 - Specifications

Air Velocity Range:	0 to 500 (0 to 2.54), 0 to 1000 (0 to 5.08), 0 to 2000 (0 to 10.16), 0 to 5000 (0 to 25.4), 0 to 10,000 (0 to 50.8), 0 to 12,000 (0 to 60.9) FPM (m/sec)
Accuracy:	2% of Full Scale
Sensor Probe	
Standard:	6.3 OD x 305 mm (1/4 OD x 12") – 304 Stainless Steel
Remote:	Standard probe connected via 15' of shielded cable
-S (Short Probe):	6.3 OD x 95 mm (1/4 OD x 3.75") – 304 Stainless Steel
Velocity Sensor:	One 100 ohms RTD, Two 1000 ohms RTD
Response Time:	250 msec, 0 to 90% of final value
Analog Output	
Voltage:	0 to 5 Vdc, 1K min. Load
Current:	4 to 20 mA, 400 Ohms Load Max.
High Alarm Set Point:	0 to 100% adjustable, 0 to 5 Vdc
Alarm Indication:	Red LED
Alarm Deadband:	5% of FS
Built-in Relay:	One 12V SPST NO relays
Contact Rating:	10A @ 24 Vdc, 10A @ 250 Vac (Resistive)
Operating Ambient Temperature	
Sensor Probe:	-40 to 93°C (-40 to 199°F)
Electronic Case:	0 to 50°C (32 to 122°F)
Power:	15 to 24 Vdc @ 200 mA
Power Indicator:	Green LED
Dimensions:	89 H x 51 W x 32 mm D (3.5 x 2 x 1.25")
Weight:	160 g (5.6 oz)



NOTES:



NOTES:

WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by the company will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive, and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY/DISCLAIMER language, and, additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

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