

## Mass Airflow Sensors

### AWM90000 Airflow

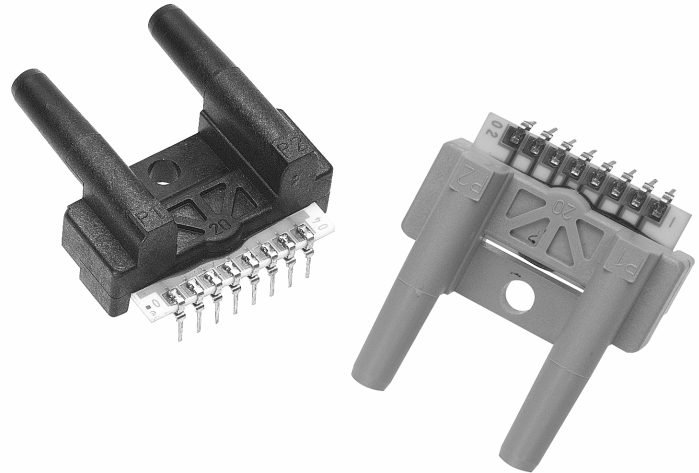
### *AWM90000 Series*

#### FEATURES

- Mass flow and differential pressure versions
- Bi-directional sensing capability
- Highly stable null and full-scale
- Extremely low pressure drop
- Compact package design
- Extremely low hysteresis and repeatability errors, less than 0.35% of reading
- Fast response time, 1 ms typical
- Low power consumption, 50 mW max.

#### TYPICAL APPLICATIONS

- Continuous Positive Airway Pressure (CPAP) equipment
- Sleep apnea monitors
- Respirators and ventilators
- Oxygen conservers
- Oxygen concentrators
- Nebulizers
- Spirometers
- Anesthesia delivery
- Variable Air Volume (VAV) – damper control
- Clogged filter detection
- Fuel to air ratio sensing
- Leak detection equipment
- Spectroscopy equipment



AWM90000 Series microbridge mass airflow sensors are available in two versions, Mass Flow and Differential Pressure. The AWM92100V has a flow range of +/- 200 sccm with a pressure drop of only 0.49 mBar, typically. The AWM92200V is a differential pressure version that has a range of +/- 2" H<sub>2</sub>O.

The AWM90000 Series sensors have a 1 millisecond response time, operate with a supply voltage from 8.0 Vdc to 15.0 Vdc, while consuming only 50 mW of power. The compact plastic package will withstand a maximum overpressure of 25 psi without compromising performance. The sensor is well suited for use in portable devices and battery-powered applications.

The AWM90000 Series provides customers with a combination of time proven reliability, repeatable flow sensing, and the ability to customize the sensor functions to meet their specific application needs.

#### **▲WARNING**

##### **PERSONAL INJURY**

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

**Failure to comply with these instructions could result in death or serious injury.**

#### **▲WARNING**

##### **MISUSE OF DOCUMENTATION**

- The information presented in this product sheet is for reference only. Do not use this document as product installation information.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

**Failure to comply with these instructions could result in death or serious injury.**

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## PERFORMANCE SPECIFICATIONS

Catalog Listings	AWM92100V	AWM92200V
Flow Range (Full Scale)	+/- 200 sccm	
Pressure Range		+/- 2.0 H <sub>2</sub> O (5 mBar)
Null Voltage Shift, Typ. -25 °C to 25 °C [-13 °F to 77 °F] 25 °C to 85 °C [77 °F to 185 °F]	+/- 2.0 mV <sup>(1)</sup> +/- 2.0 mV <sup>(1)</sup>	+/- 2.0 mV <sup>(1)</sup> +/- 2.0 mV <sup>(1)</sup>
Output Voltage Shift, Typ. -25 °C to 25 °C [-13 °F to 77 °F] 25 °C to 85 °C [77 °F to 185 °F]	-3.0% FSO <sup>(2)</sup> +/-1% FSO <sup>(2)</sup>	25% Reading -30% Reading

1. Assumes low TCR Bridge resistance used (pins 2 and 8)
2. Requires recommended RC value of 1K Ohm is used (pins 3 to 7) and typ. Heater control circuit. Maximum current RH.

Specifications	Min.	Typ.	Max.
Excitation <sup>(1)</sup>	8.0 Vdc	10 ±0.01 Vdc	15.0 Vdc
Power Consumption			50 mW
Calibration Gas	Air		
Ratiometricity Error <sup>(1)</sup>	± 0.30 typ. % Reading		
Repeatability and Hysteresis <sup>(2)</sup>	± 0.35% Reading		
Response Time	1 ms typ.		
Pressure Drop @ Full Scale (200 sccm)	0.49 typ. mBar		
Overpressure	25 psi max.		
Operating Temperature Range	-25 °C to 85 °C [-13 °F to 185 °F]		
Storage Temperature Range	-40 °C to 90 °C [-40 °F to 194 °F]		
Vibration	20 g's, 10 Hz to 2000 Hz		
Shock	100 g, 6 ms		
Weight	5.6 grams		

1. Output voltage is ratiometric to supply voltage.
2. Repeatability and Hysteresis tolerances reflect inherent inaccuracies of the measurement equipment.

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## AWM92100V FLOW SPECIFICATIONS

Flow (sccm)	Nominal (mV Typical)	± Tolerance (mV Typical)
200	77	32
150	68	29
100	56	25
50	36	17
0	0	20
-50	-37	18
-100	-57	26
-150	-69	30
-200	-78	33

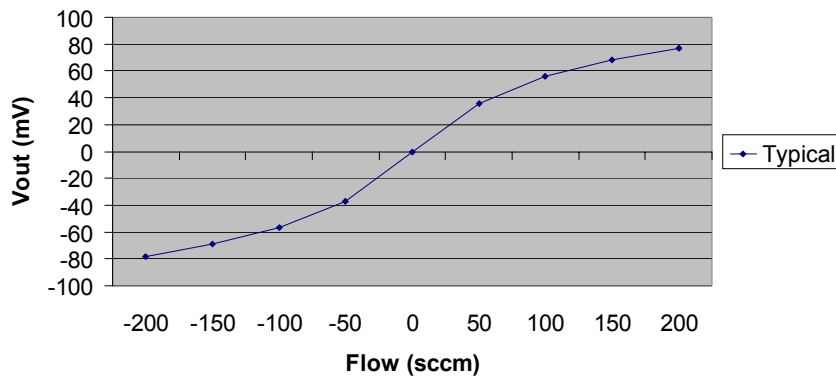
## AWM92200V FLOW SPECIFICATIONS

Pressure (inch H2O)	Nominal (mV) Typical	Typical Min. (mV)	Typical Max. (mV)
2.0	38	22	77
1.5	32	18	66
1.0	23	12	49
.5	12	7	29
0	0	-20	20
-.5	-12	-7	-30
-1.0	-23	-12	-51
-1.5	-32	-18	-68
-2.0	-39	-22	-79

## AWM92100V VOLTAGE OUTPUT VS. FLOW CURVE

Depicts performance characteristics for the AWM92100V sensor at 10.0 ±0.01 Vdc at 25 °C [77 °F].

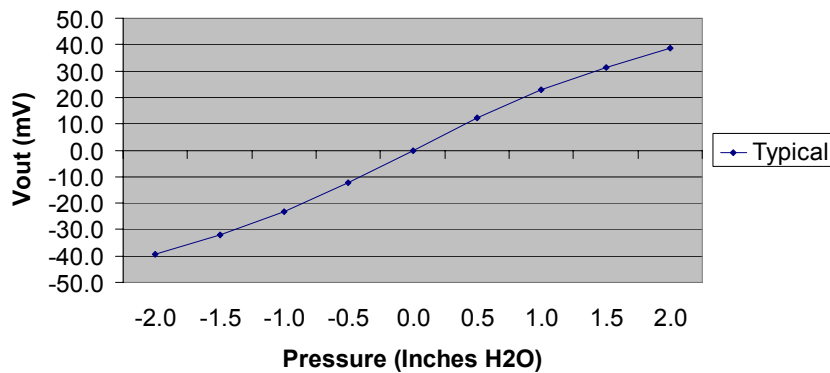
AWM92100V Output vs. Flow



## AWM92200V OUTPUT VOLTAGE VS. PRESSURE CURVE

Depicts performance characteristics for the AWM92200V sensor at 10.0 ±0.01 Vdc at 25 °C [77 °F].

AWM92200V Output vs. Pressure

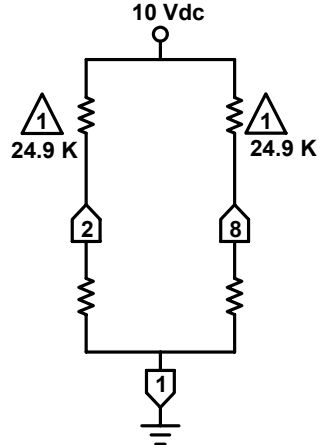
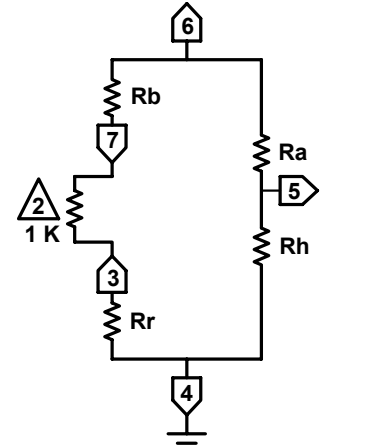
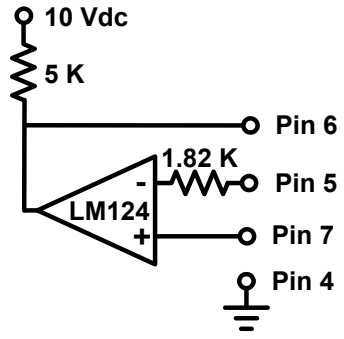




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## WIRING DIAGRAMS

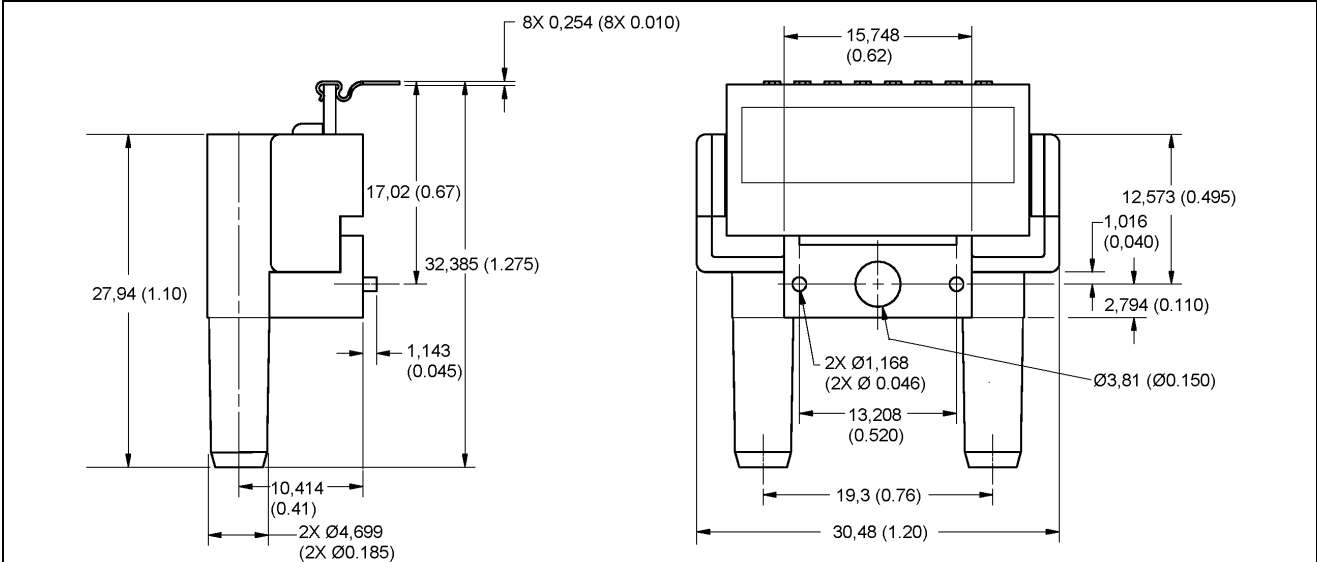
Sensor Bridge Circuit	Used With Heater Control Circuit	Heater Control Circuitry (Suggested)
		
	<p>Customer supplied 24.9 K<math>\Omega</math> matched bridge circuit resistors (affects null output voltage). Output is measured differentially from pins 8 to 2.</p>	
	<p>Customer supplied 1 K<math>\Omega</math> resistor (affects temperature compensation and span voltage).</p>	

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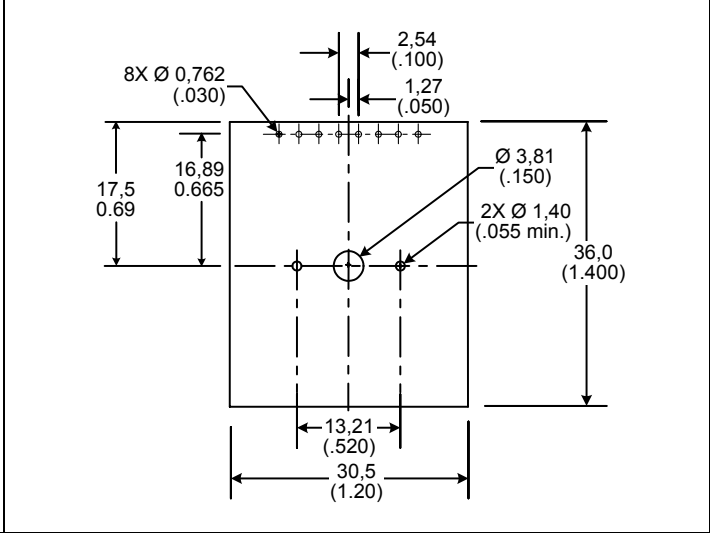
**MOUNTING DIMENSIONS** (for reference only) mm(in)



**Sensor Pinout**



**PC Board Mounting Dimensions** (outer dimensions equal the minimum circuit board space required.)



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## NOTICE

### LAMINAR FLOW

Due to the fast response time of the sensor, these specifications were generated using laminar flow. Airflow instability or "turbulence" present in the airstream will result in an increase in measurement uncertainty.

The turbulent flow problem can be corrected by either straightening the airflow using flow laminarizing or by slowing the response of the sensor using a simple RC time constant on the output of the sensor. This, of course, slows down the sensor response time. The values needed depend on the amount of turbulence present in the application.

Several techniques for laminarizing the flow include adding hex shaped honeycombs, foam, screen materials or adding constrictors (frits) to the flow stream. There are various commercial laminar flow elements that can be purchased. Unfortunately the greater the efficiency of the laminarizer, the greater the increase in pressure drop in order to establish a given flow rate. Plastic honeycomb material probably gives the most improvement for the least pressure drop. In any test fixture, the avoidance of sharp radii is an absolute requirement.

## WARRANTY/REMEDY

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While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

For application assistance, current specifications, or name of the nearest Authorized Distributor, check the Honeywell web site or call:  
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**Honeywell**

## Sensing and Control

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