

## Interactive Catalog Replaces Catalog Pages

Honeywell Sensing and Control has replaced the PDF product catalog with the new **Interactive Catalog**. The **Interactive Catalog** is a power search tool that makes it easier to find product information. It includes more installation, application, and technical information than ever before.

These PDF files are no longer being updated and will be removed by January 2001.



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**Sensing and Control**

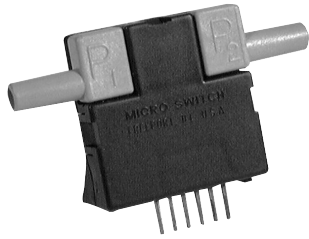
Honeywell Inc.

11 West Spring Street

Freeport, Illinois 61032



## Microbridge Mass Airflow/Unamplified



### FEATURES

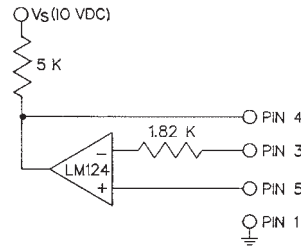
- Cost-effective microbridge technology
- Accurate, repeatable airflow sensing
- Bi-directional sensing capability
- Low differential pressure sensing

Take advantage of microbridge mass flow sensor technology. The AWM1000 series mass flow sensor provides all of the outstanding performance benefits of the standard AWM2000 series in a more cost-effective sensor platform. This device provides accurate, repeatable flow sensing. Sensor to sensor interchangeability specifications are approximately twice as large as compared to the AWM2000 series.

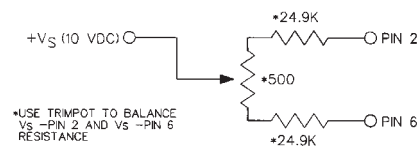
The heater control circuit in Figure 1 and the sensing bridge supply circuit in Figure 2 are both required for operation per specification. These two circuits are **NOT** on board the sensor and must be supplied in the application. The differential amplifier circuitry in Figure 3 may be useful in providing output gain and/or introducing voltage offsets to the sensor output (Ref. Equation 1).

**NOTE:** For applications involving sensing hydrogen (H<sub>2</sub>) gas or helium (He) gas, see Application Note 3, page 131.

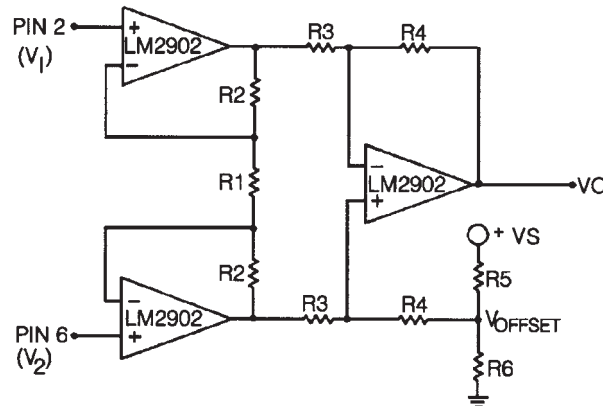
**Figure 1**  
**Heater Control Circuit**



**Figure 2**  
**Sensing Bridge Supply Circuit**



**Figure 3**  
**Differential Instrumentation Amplifier Circuit**



**Equation 1:**

$$V_o = \left( \frac{2R_2 + R_1}{R_1} \right) \left( \frac{R_4}{R_3} \right) (V_2 - V_1) + V_{\text{offset}}$$

$$\text{where } V_{\text{offset}} = V_S \left( \frac{R_6}{R_5 + R_6} \right)$$

# Airflow Sensors

## Microbridge Mass Airflow/Unamplified

AWM1000 Series

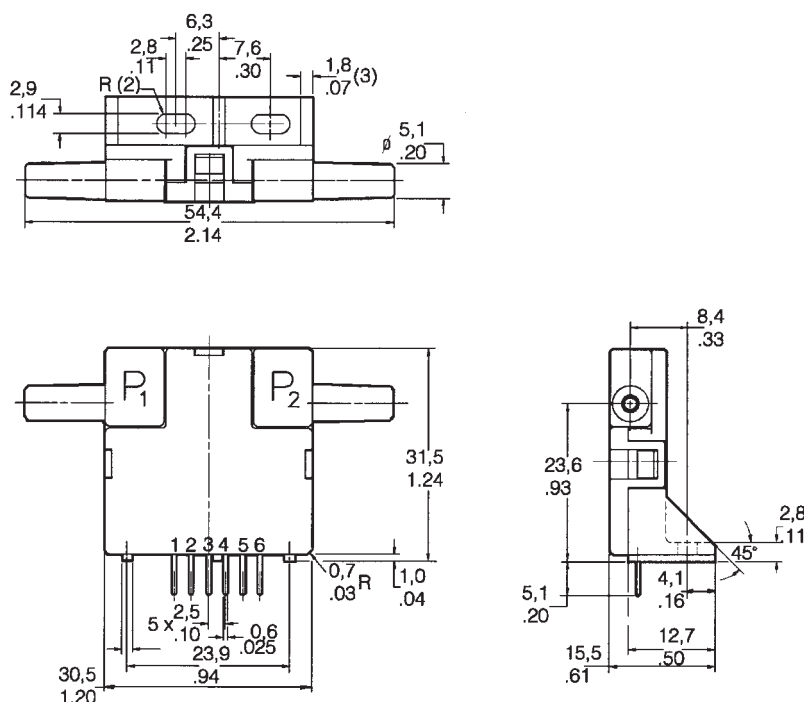
### AWM1000 SERIES ORDER GUIDE (Performance Characteristics @ 10.0 ±0.01 VDC, 25°C)

| Catalog Listings                                           | AWM1100V                                                                           | AWM1200V                              | AWM1300V                         |
|------------------------------------------------------------|------------------------------------------------------------------------------------|---------------------------------------|----------------------------------|
| Flow Range (Full Scale)                                    | ±200 sccm                                                                          |                                       | +1000 sccm to -600 sccm          |
| Pressure Range<br>(See Application Note #1)                |                                                                                    | ±4.0" H <sub>2</sub> O (10 mBar)      |                                  |
| Output Voltage @ Trim Point                                | 30 mV @ 100 sccm                                                                   | 20 mV @ 2.0" H <sub>2</sub> O         | 50 mV @ 650 sccm                 |
| Null Voltage Shift, Typ.<br>+25 to -25°C, +25 to 85°C      | ±0.7 mV (max.)                                                                     | ±0.7 mV (max.)                        | ±0.7 mV (max.)                   |
| Output Voltage Shift, Max.<br>+25 to -25°C<br>+25 to +85°C | ±4% Full Scale<br>±4% Full Scale                                                   | +22% Reading (Note 2)<br>-22% Reading | ±4% Full Scale<br>±4% Full Scale |
| Repeatability & Hysteresis, Max.                           | ±1% Full Scale                                                                     | ±1% Full Scale                        | ±1% Full Scale                   |
|                                                            | <b>Min.</b>                                                                        | <b>Typ.</b>                           | <b>Max.</b>                      |
| Excitation (VDC) (Note 1)                                  | 8.0                                                                                | 10±0.01                               | 15                               |
| Power Consumption (mW)                                     | —                                                                                  | 30                                    | 50                               |
| Null Voltage (mV)                                          | -1.0                                                                               | 0.0                                   | +1.0                             |
| Response Time (msec)                                       | —                                                                                  | 1.0                                   | 3.0                              |
| Common Mode Pressure (psi)                                 | —                                                                                  | —                                     | 25                               |
| Sensor Resistance (kΩ)<br>Pin 2-Pin 1, Pin 6-Pin 1         | —                                                                                  | 5                                     | —                                |
| Sensor Current (mA)<br>Pin 2-Pin 1, Pin 6-Pin 1            | —                                                                                  | 0.3                                   | 0.6                              |
| Temperature Range                                          | Operating: -25° to +85°C (-13° to +185°F); Storage: -40° to +90°C (-40° to +194°F) |                                       |                                  |
| Termination                                                | 2,54 mm (.100") centers, 0,635 mm (0.025") square                                  |                                       |                                  |
| Weight (grams)                                             | 10.8                                                                               |                                       |                                  |
| Shock Rating                                               | 100 g peak (5 drops, 6 axes)                                                       |                                       |                                  |

#### Notes:

- Output Voltage is ratiometric to supply voltage.
- Temperature shifts when sensing differential pressure correlates to the density change of the gas over temperature.  
See Application Note 1.
- Maximum allowable rate of flow change to prevent damage: 5 SLPM/1.0 sec.

#### MOUNTING DIMENSIONS (for reference only)



**NOTE:** Positive flow direction is defined as proceeding from Port 1 (P1) to Port 2 (P2) and results in positive output (Pin 6 > Pin 2). Negative flow direction is defined conversely and results in negative output (Pin 6 < Pin 2). Do not exert a force greater than 4.54 kg (10 lbs.) in any direction.

Airflow Sensors

Microbridge Mass Airflow/Unamplified

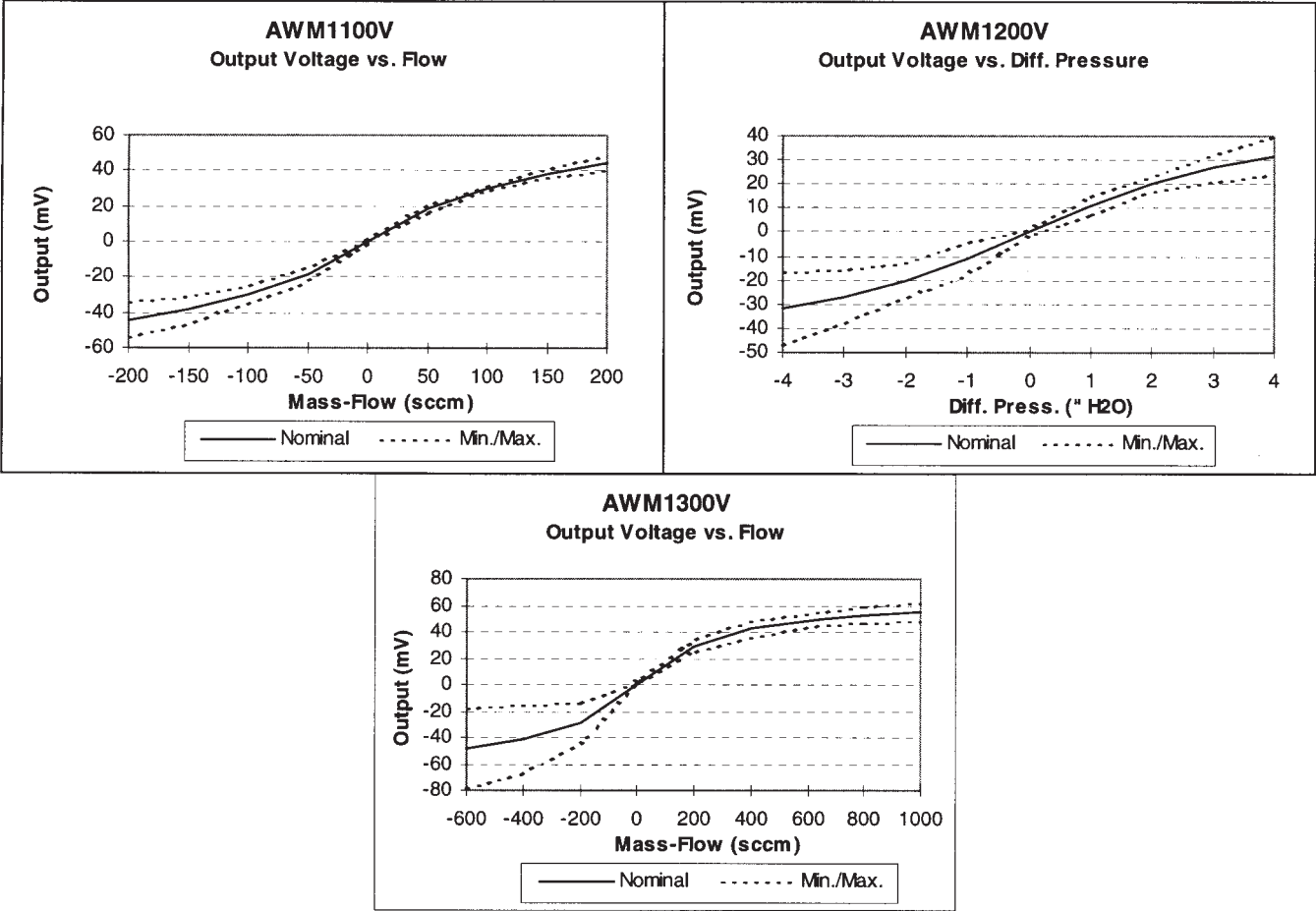
AWM1000 Series

OUTPUT FLOW VS INTERCHANGEABILITY (Note 1)      Performance Characteristics @ 10.0 ±0.01 VDC, 25°C

| AWM1100V      |              |            |             | AWM1200V (Note 2) |                              |            |             | AWM1300V      |              |            |             |
|---------------|--------------|------------|-------------|-------------------|------------------------------|------------|-------------|---------------|--------------|------------|-------------|
| Press<br>mBar | Flow<br>sccm | Nom.<br>mV | Tol.<br>±mV | Flow<br>sccm      | Press.<br>" H <sub>2</sub> O | Nom.<br>mV | Tol.<br>±mV | Press<br>mBar | Flow<br>sccm | Nom.<br>mV | Tol.<br>±mV |
| 0.49          | <b>200</b>   | 44.25      | 4.25        | 120               | <b>4.00</b>                  | 31.75      | 8.0         | 3.4           | <b>1000</b>  | 55.50      | 7.0         |
| 0.35          | <b>150</b>   | 38.75      | 3.00        | 90                | <b>3.00</b>                  | 26.75      | 6.0         | 2.4           | <b>800</b>   | 52.90      | 6.0         |
| 0.21          | <b>100</b>   | 30.00      | 1.00        | 60                | <b>2.00</b>                  | 20.00      | 3.0         | 1.8           | <b>650</b>   | 50.00      | 5.0         |
| 0.09          | <b>50</b>    | 18.40      | 2.00        | 30                | <b>1.00</b>                  | 11.20      | 4.0         | 0.83          | <b>400</b>   | 42.50      | 6.0         |
| 0             | <b>0</b>     | 0.00       | 1.00        | 0                 | <b>0.00</b>                  | 0.00       | 1.0         | 0.31          | <b>200</b>   | 29.20      | 5.0         |
| -0.09         | <b>-50</b>   | -18.40     | 3.90        | -30               | <b>-1.00</b>                 | -11.20     | 7.0         | 0             | <b>0</b>     | 0.00       | 1.5         |
| -0.21         | <b>-100</b>  | -30.00     | 5.00        | -60               | <b>-2.00</b>                 | -20.00     | 7.0         | -0.31         | <b>-200</b>  | -28.90     | 15.0        |
| -0.35         | <b>-150</b>  | -38.75     | 7.65        | -90               | <b>-3.00</b>                 | -26.75     | 11.0        | -0.83         | <b>-400</b>  | -41.20     | 26.0        |
| -0.49         | <b>-200</b>  | -44.25     | 9.75        | -120              | <b>-4.00</b>                 | -31.75     | 15.0        | -1.6          | <b>-600</b>  | -48.20     | 30.0        |

- Notes:
- Numbers in **BOLD** type indicate calibration type, mass flow or differential pressure. Tolerance values apply to calibration type only.
  - Differential pressure calibrated devices are not recommended for flow measurement. Use flow calibrated devices for flow measurement.

OUTPUT CURVES



Airflow