

### FEATURES

- Ranges 0...±25 and 0...±1000 sccm<sup>1</sup>
- Bidirectional sensing
- Actual mass flow sensing
- Ceramic flow tube
- Manifold mount/o-ring sealed

### SERVICE

To be used with dry gases only.  
The AWM42150VH is a special sensor for hydrogen (H<sub>2</sub>) flow.

The AWM series is NOT designed for liquid flow and will be damaged by liquid flow through the sensor.



### SPECIFICATIONS

#### Maximum ratings

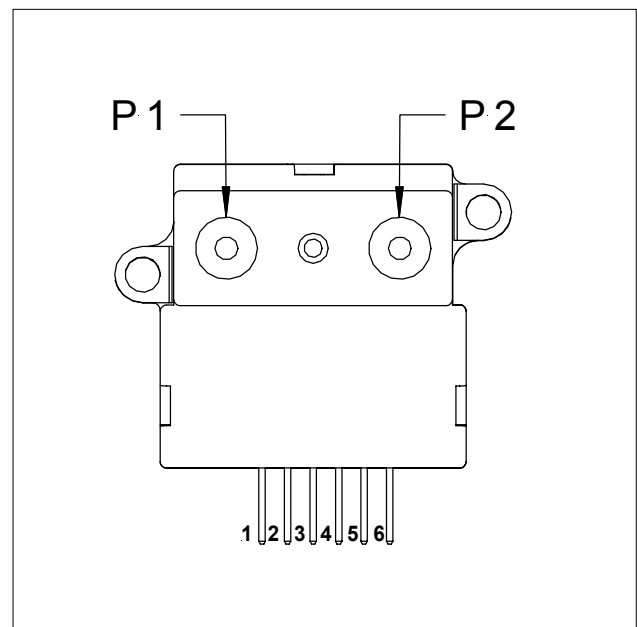
Supply voltage <sup>2</sup>	8 to 15 V typ. 10 ±0.01 V
Power consumption	max. 60 mW
Temperature limits	
Operating	-40 to 125°C
Storage	-40 to 125°C
Mechanical shock	100 g (5 drops, 6 axes)

Note:

<sup>1</sup> sccm denotes standard cubic centimeters per minute

<sup>2</sup> Output voltage is ratiometric to supply voltage

### ELECTRICAL CONNECTION



**FLOW SENSOR CHARACTERISTICS<sup>3</sup>**

$V_s = 10 \pm 0.01 \text{ V}$ ,  $T_A = 25^\circ\text{C}$

Part no.	Flow range (full scale)	Max. flow change <sup>4</sup>	Output voltage @ trim point
AWM42150VH	$\pm 25 \text{ sccm}$	5.0 l/sec	$8.5 \pm 1.5 \text{ mV @ } 25 \text{ sccm}$
AWM42300V	$\pm 1000 \text{ sccm}$	5.0 l/sec	$54.7 \pm 3.7 \text{ mV @ } 1000 \text{ sccm}$

**PERFORMANCE CHARACTERISTICS**

$V_s = 10 \pm 0.01 \text{ V}$ ,  $T_A = 25^\circ\text{C}$

Characteristics			Min.	Typ.	Max.	Unit
Zero offset	AWM42150VH		-1.0	0	1.0	mV
	AWM42300V		-1.5	0	1.5	
Repeatability and hysteresis (combined)	AWM42150VH				$\pm 0.35$	% reading
	AWM42300V				$\pm 0.50$	
Temperature effects <sup>5</sup>	Offset	-25 to 85 °C		$\pm 0.20$		mV
	Span	-25 to 25 °C		2.5		% reading
		25 to 85 °C		-2.5		
Response time				1.0	3.0	ms
Common mode pressure					150	psi

Notes:

<sup>3</sup> A 5 micron filter is recommended for all devices.

<sup>4</sup> Maximum allowable rate of flow change to prevent damage.

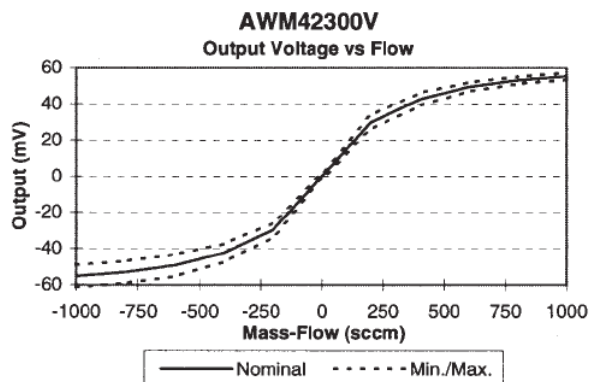
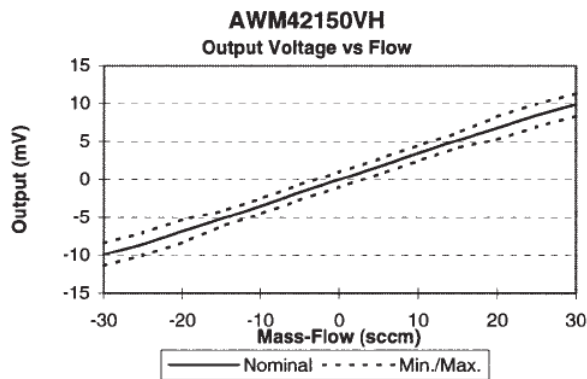
<sup>5</sup> Shift is relative to 25 °C.

### OUTPUT FLOW VS INTERCHANGEABILITY

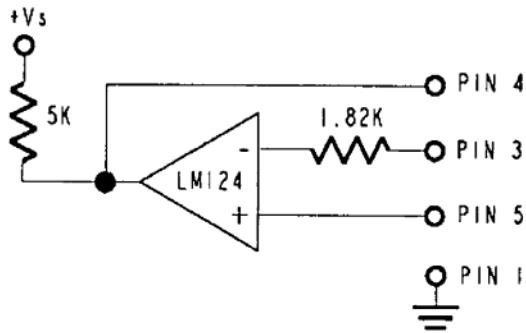
$V_s = 10 \pm 0.01 \text{ V}$ ,  $T_A = 25^\circ\text{C}$

AWM42150VH				AWM42300V			
Press $\mu\text{Bar}$	Flow sccm	Nom. mV	Tol. $\pm \text{mV}$	Press. mBar	Flow sccm	Nom. mV	Tol. $\pm \text{mV}$
20	30	9.9	1.5	2.23	1000	54.7	2.00
17	25	8.5	1.5	1.52	800	53.0	2.0
14	20	6.8	1.5	0.94	600	49.3	2.5
10	15	5.2	1.0	0.49	400	42.5	3.5
7	10	3.5	1.0	0.19	200	29.8	4.0
3	5	1.7	1.0	0.00	0	0.0	1.5
0	0	0.0	1.0	-0.19	-200	-29.8	4.0
				-0.49	-400	-42.5	5.0
				-0.94	-600	-49.3	6.0
				-1.52	-800	-53.0	6.0
				-2.23	-1000	-55.2	6.0

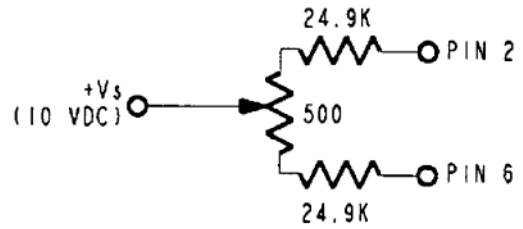
### OUTPUT CURVES



**HEATER CONTROL CIRCUIT**



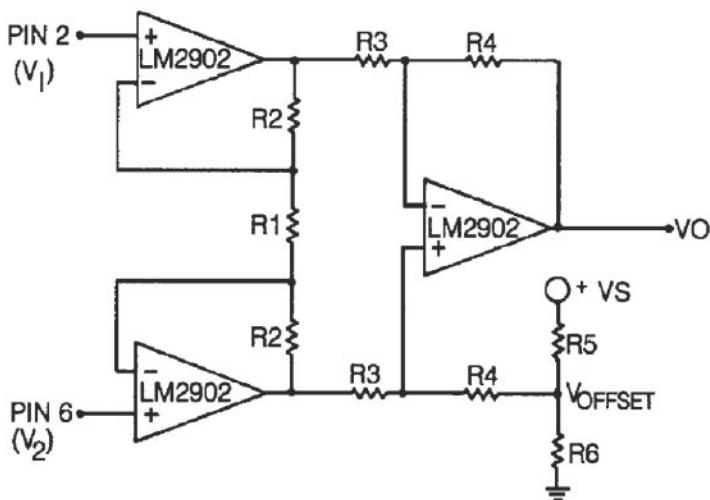
**SENSING BRIDGE SUPPLY CIRCUIT**



**Note:**

**Circuits required for operation per specifications. Circuits are not on board the sensor.**

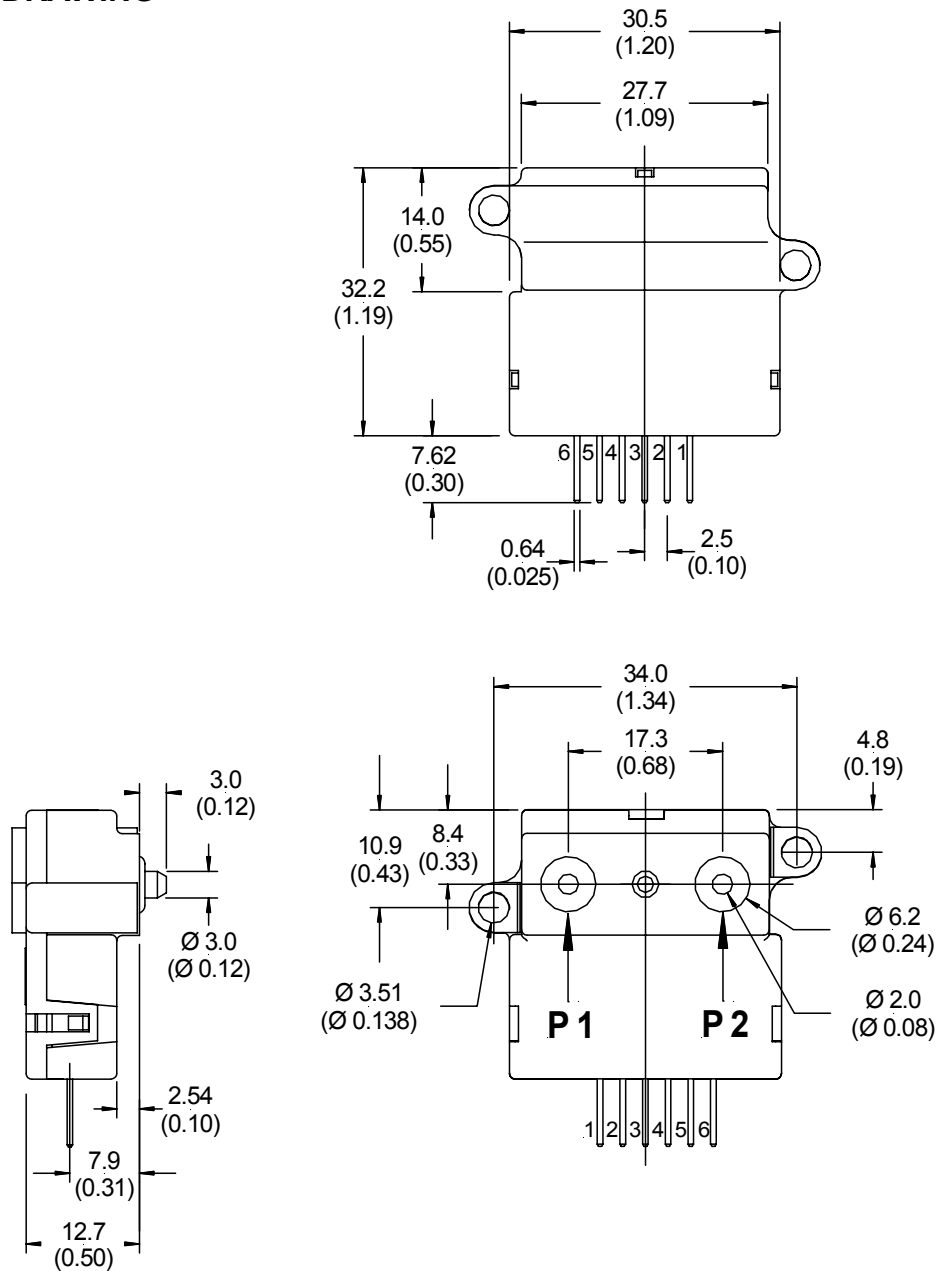
**DIFFERENTIAL INSTRUMENTATION AMPLIFIER CIRCUIT (OPTIONAL)**



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

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

## OUTLINE DRAWING



mass: approx. 14 g

dimensions in mm (inches)

**GAS CORRECTION FACTORS<sup>6</sup>**

Gas type	Correction factor (approx.)
Helium (He)	0.5 <sup>7</sup>
Hydrogen (H <sub>2</sub> )	0.7 <sup>7,8</sup>
Argon (Ar)	0.95
Nitrogen (N <sub>2</sub> )	1.0
Oxygen (O <sub>2</sub> )	1.0
Air	1.0
Nitric oxide (NO)	1.0
Carbon monoxide (CO)	1.0
Methane (CH <sub>4</sub> )	1.1
Ammonia (NH <sub>3</sub> )	1.1
Nitrous oxide (N <sub>2</sub> O)	1.35
Nitrogen dioxide (NO <sub>2</sub> )	1.35
Carbon dioxide (CO <sub>2</sub> )	1.35

Notes:

- <sup>6</sup> Gas correction factors are referenced to nitrogen (N<sub>2</sub>) as calibration gas type. Approximate gas correction factors are provided as guidelines only. Individual gas types may perform differently at temperature extremes and varying flow rates.
- <sup>7</sup> When sensing Hydrogen (H<sub>2</sub>) or Helium (He) it may be necessary to power the mass flow sensor using increased supply voltage: Hydrogen typ. 12 V, Helium typ. 15 V
- <sup>8</sup> Hydrogen (H<sub>2</sub>) flow measurement requires the use of a special sensor. These devices provide normal operation when sensing hydrogen flow and are designated with an "H" at the end of the order number.

**ORDERING INFORMATION**

Flow range	Dry gas	Hydrogen gas <sup>8</sup>
±25 sccm	---	AWM42150VH
±1000 sccm	AWM42300V	---

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