AWM42000 Series
Mass flow sensor for gases

FEATURES

- **Ranges 0...±25 and 0...±1000 sccm[1]**
- **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_2) flow.

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

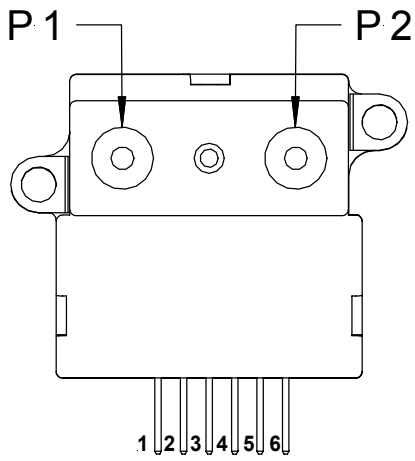
SPECIFICATIONS

Maximum ratings

Supply voltage[2]	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:
[1] sccm denotes standard cubic centimeters per minute
[2] Output voltage is ratiometric to supply voltage

ELECTRICAL CONNECTION



FLOW SENSOR CHARACTERISTICS[3]

V_S = 10 ±0.01 V, T_A = 25°C

Part no.	Flow range (full scale)	Max. flow change[4]	Output voltage @ trim point
AWM42150VH	±25 sccm	5.0 l/sec	8.5 ±1.5 mV @ 25 sccm
AWM42300V	±1000 sccm	5.0 l/sec	54.7 ±3.7 mV @ 1000 sccm

PERFORMANCE CHARACTERISTICS

V_S = 10 ±0.01 V, T_A = 25°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			±0.35	% reading
			AWM42300V			±0.50	
Temperature effects[5]	Offset	-25 to 85 °C			±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

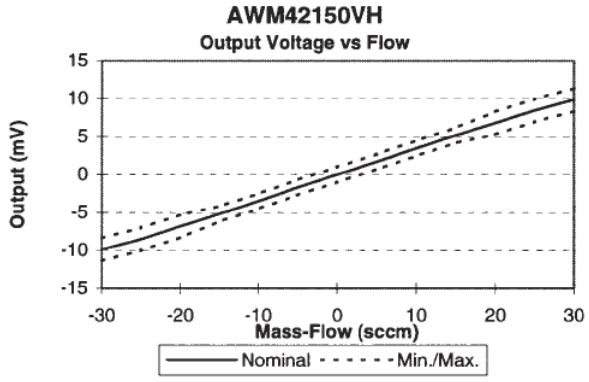
Notes:
[3] A 5 micron filter is recommended for all devices.
[4] Maximum allowable rate of flow change to prevent damage.
[5] Shift is relative to 25 °C.

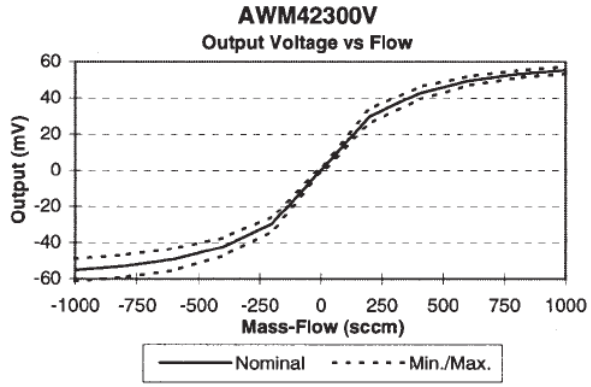
OUTPUT FLOW VS INTERCHANGEABILITY

V_S = 10 ±0.01 V, T_A = 25°C

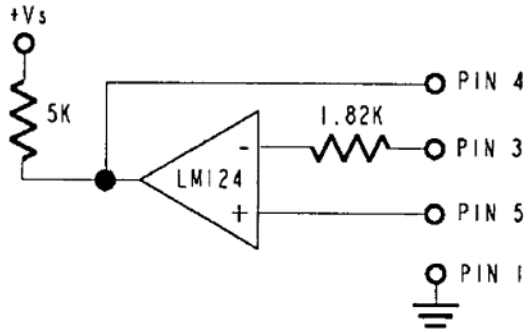
AWM42150VH				AWM42300V			
Press µBar	**Flow sccm**	**Nom. mV**	**Tol. ± mV**	Press. mBar	**Flow sccm**	**Nom. mV**	**Tol. ± mV**
20	**30**	9.9	1.5	2.23	**1000**	54.7	2.00
17	**25**	8.5	1.5	1.52	**800**	53.0	2.0
14	**20**	6.8	1.5	0.94	**600**	49.3	2.5
10	**15**	5.2	1.0	0.49	**400**	42.5	3.5
7	**10**	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

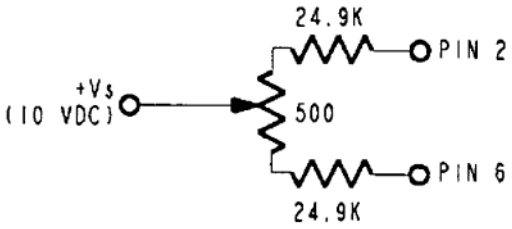




HEATER CONTROL CIRCUIT

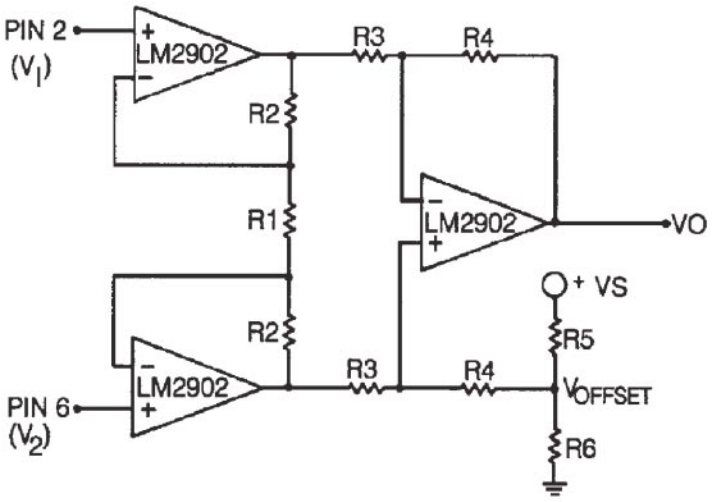


SENSING BRIDGE SUPPLY CIRCUIT



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

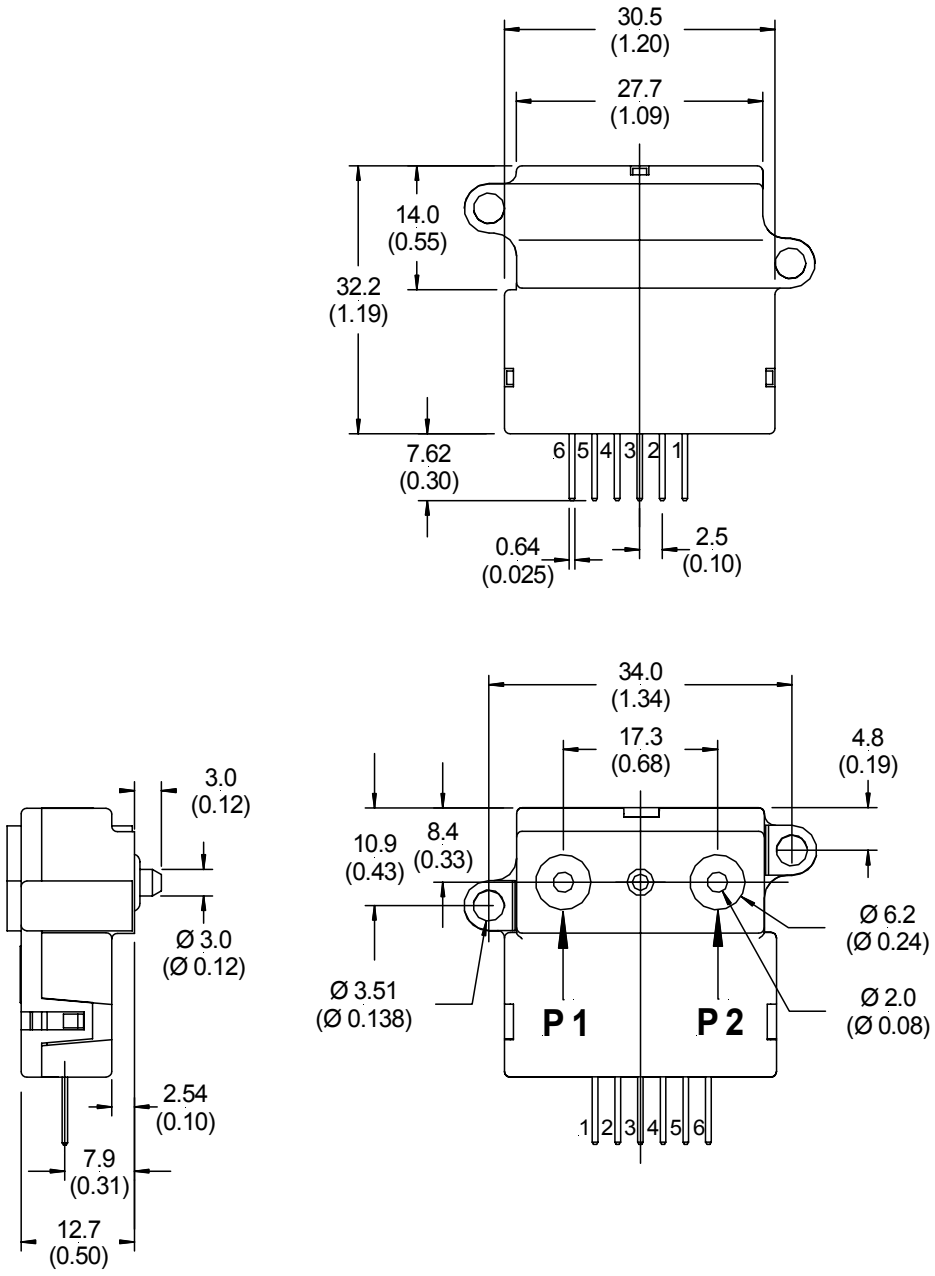
DIFFERENTIAL INSTRUMENTATION AMPLIFIER CIRCUIT (OPTIONAL)



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

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[6]

Gas type	Correction factor (approx.)
Helium (He)	0.5[7]
Hydrogen (H_2)	0.7[7,8]
Argon (Ar)	0.95
Nitrogen (N_2)	1.0
Oxygen (O_2)	1.0
Air	1.0
Nitric oxide (NO)	1.0
Carbon monoxide (CO)	1.0
Methane (CH_4)	1.1
Ammonia (NH_3)	1.1
Nitrous oxide (N_2O)	1.35
Nitrogen dioxide (NO_2)	1.35
Carbon dioxide (CO_2)	1.35

Notes:
[6] Gas correction factors are referenced to nitrogen (N_2) 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.
[7] When sensing Hydrogen (H_2) 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
[8] Hydrogen (H_2) 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[8]
±25 sccm	---	AWM42150VH
±1000 sccm	AWM42300V	---