AWM700 Series

Mass flow sensor for gases

FEATURES

- **Ranges 0...200 slpm[1]**
- **Actual mass flow sensing**
- **1...5 V output**

SERVICE

To be used with dry gases only

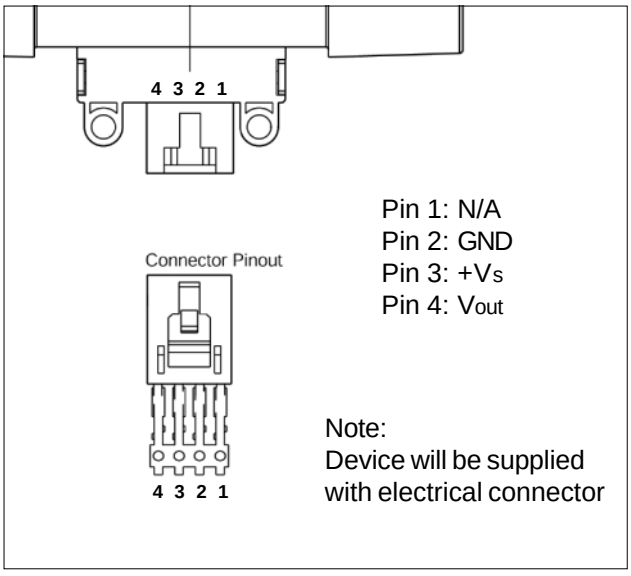
The AWM series is NOT designed for liquid flow and will be damaged by liquid flow through the sensor

SPECIFICATIONS

Maximum ratings

Supply voltage[2]	8 to 15 V typ. 10 ±0.01 V
Power consumption	60 mW
Output load	
NPN (Sinking)	10 mA
PNP (Sourcing)	20 mA
Temperature limits	
Operating	-25 to 85°C
Storage	-40 to 90°C
Mechanical shock	100 g (3 drops, 3 axes)

ELECTRICAL CONNECTION



Note:
[1] SLPM denotes standard liters per minute, which is a flow measurement referenced to standard conditions of 0°C, 1 bar, 50% RH.
[2] Output voltage is ratiometric to supply voltage

FLOW SENSOR CHARACTERISTICS[3]

V_S = 10 ±0.01 V, T_A = 25°C

Part no.	Flow range (full scale)	Output voltage @ trim point
AWM720P1	200 SLPM[1]	5.0 ±0.36 V @ 200 SLPM[1]

PERFORMANCE CHARACTERISTICS

V_S = 10 ±0.01 V, T_A = 25°C

Characteristics			Min.	Typ.	Max.	Unit
Zero offset			0.95	1.0	1.05	V
Repeatability and hysteresis (combined)					±0.5	% reading
Ratiometricity error[2]				±0.30		
Temperature effects	Offset[4]	-20 to 85 °C		±0.25		V
	Span	25 to 10 °C		-2.0		% reading
		25 to 40 °C		2.0		
Response time				6.0		ms
Common mode pressure					25	psi

Notes:
[1] SLPM denotes standard liters per minute, which is a flow measurement referenced to standard conditions of 0°C, 1 bar, 50% RH.
[2] Output voltage is ratiometric to supply voltage
[3] A 5 micron filter is recommended for all devices.
[4] Shift is relative to 25 °C.

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.

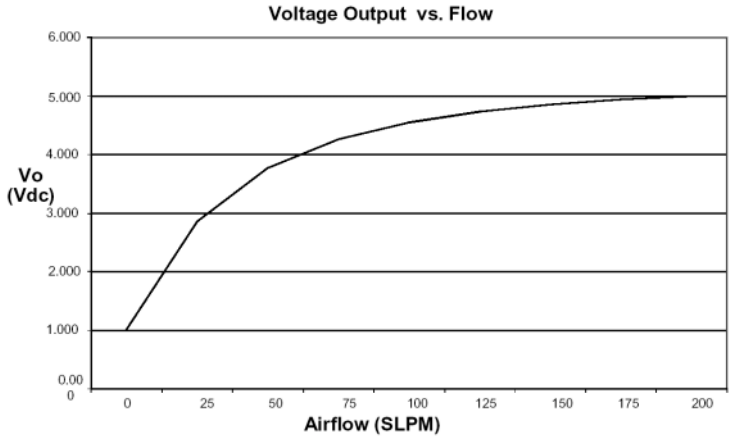
Several techniques for laminarizing the flow include adding hex shaped honeycombs, foam, screen materials or adding constrictors (frits) to the flow stream. There are various commercial laminar flow elements that can be purchased. Unfortunately the greater the efficiency of the laminarizer, the greater 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.

FLOW SPECIFICATIONS

V_S = 10 ±0.01 V, T_A = 25°C

Flow (SLPM)	Nominal (Vdc) Typical	±Tolerance (Vdc)	Pressure Drop (inch H_2O)	(mBar)
0	1.00	0.05	0	0
25	2.99	—	0.04	0.10
50	3.82	0.18	0.13	0.33
75	4.30	—	0.21	0.53
100	4.58	—	0.34	0.85
150	4.86	—	0.65	1.64
200	5.00	0.36	1.09	2.74

OUTPUT CURVE



GAS CORRECTION FACTORS[5]

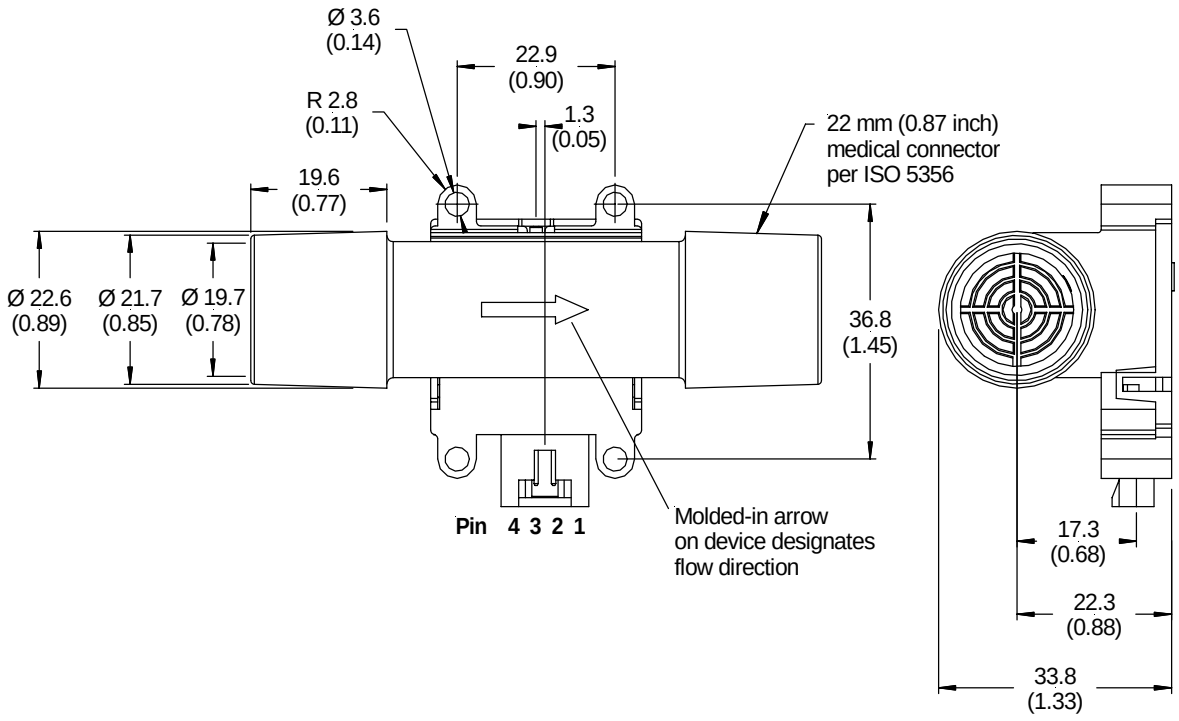
Gas type	Correction factor (approx.)
Helium (He)	0.5[6]
Hydrogen (H_2)	0.7[6]
Argon (Ar)	0.95
Nitrogen (N_2)	1.0
Oxygen (O_2)	1.0
Air	1.0
Nitric oxide (NO)	1.0
Carbon monoxide (CO)	1.0
Methane (CH_4)	1.1
Ammonia (NH_3)	1.1
Nitrous oxide (N_2O)	1.35
Nitrogen dioxide (NO_2)	1.35
Carbon dioxide (CO_2)	1.35

Notes:

[5] 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.

[6] 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

OUTLINE DRAWING



mass: approx. 34 g

dimensions in mm (inches)

ORDERING INFORMATION

Flow range	Dry gas
200 SLPM	AWM720P1

Note: Device will be supplied with 4 pin receptacle connector (see Electrical Connection info)