

### FEATURES

- Ranges 0...200 slpm<sup>1</sup>
- 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

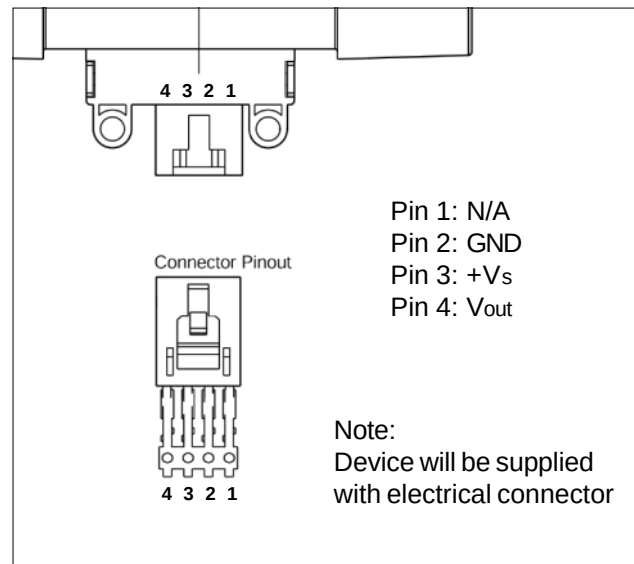


### SPECIFICATIONS

#### Maximum ratings

|                             |                              |
|-----------------------------|------------------------------|
| Supply voltage <sup>2</sup> | 8 to 15 V<br>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:

<sup>1</sup> SLPM denotes standard liters per minute, which is a flow measurement referenced to standard conditions of 0°C, 1 bar, 50% RH.

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

# AWM700 Series

## Mass flow sensor for gases

Honeywell

### 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) | Output voltage @ trim point                    |
|----------|-------------------------|------------------------------------------------|
| AWM720P1 | 200 SLPM <sup>1</sup>   | $5.0 \pm 0.36 \text{ V @ } 200 \text{ SLPM}^1$ |

### PERFORMANCE CHARACTERISTICS

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

| Characteristics                         |                     |              | Min. | Typ.       | Max.      | Unit      |
|-----------------------------------------|---------------------|--------------|------|------------|-----------|-----------|
| Zero offset                             |                     |              | 0.95 | 1.0        | 1.05      | V         |
| Repeatability and hysteresis (combined) |                     |              |      |            | $\pm 0.5$ | % reading |
| Ratiometricity error <sup>2</sup>       |                     |              |      | $\pm 0.30$ |           |           |
| Temperature effects                     | Offset <sup>4</sup> | -20 to 85 °C |      | $\pm 0.25$ |           | 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:

<sup>1</sup> SLPM denotes standard liters per minute, which is a flow measurement referenced to standard conditions of 0°C, 1 bar, 50% RH.

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

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

<sup>4</sup> 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.

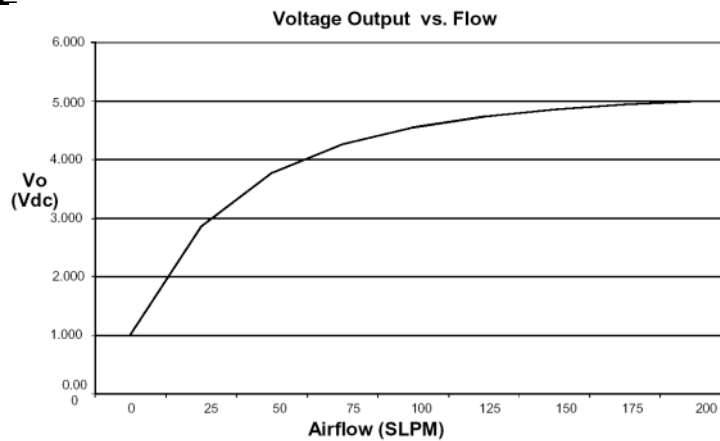
Several techniques for laminarizing the flow include adding hex shaped honeycombs, foam, screen materials or adding constrictors (frits) to the flow stream. There are various commercial laminar flow elements that can be purchased. Unfortunately the greater the efficiency of the laminarizer, the greater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

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

| Flow<br>(SLPM) | Nominal<br>(Vdc) Typical | $\pm$ Tolerance<br>(Vdc) | Pressure Drop           |        |
|----------------|--------------------------|--------------------------|-------------------------|--------|
|                |                          |                          | (inch H <sub>2</sub> O) | (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<sup>5</sup>

| Gas type                            | Correction factor (approx.) |
|-------------------------------------|-----------------------------|
| Helium (He)                         | 0.5 <sup>6</sup>            |
| Hydrogen (H <sub>2</sub> )          | 0.7 <sup>6</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>5</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.

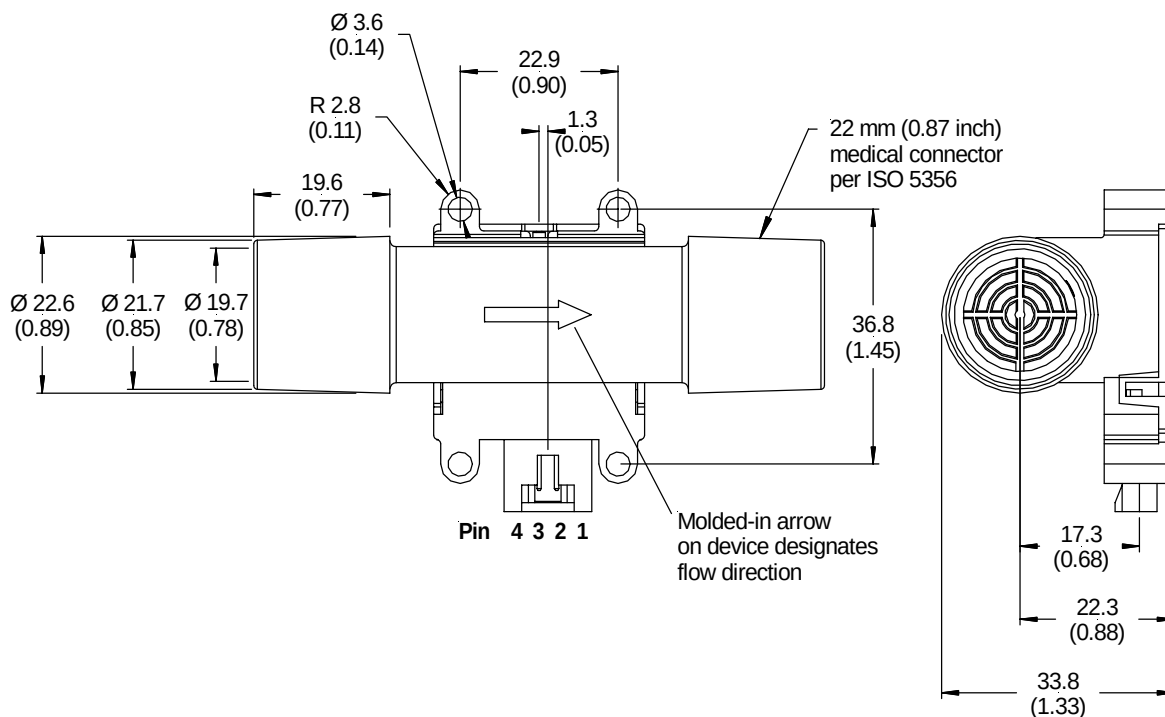
<sup>6</sup> When sensing Hydrogen (H<sub>2</sub>) or Helium (He) it may be necessary to power the mass flow sensor using increased supply voltage: Hydrogen typ. 12 V, Helium typ. 15 V

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### 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)

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