FEATURES

- **Ranges 0...30 to 0...±1000 sccm[1] or 0...0.5 to 0...2 "H_2O (0...1.25 to 0...5 mbar)**
- **1...5 V, 1...3.75 V, 4...20 mA output**
- **Actual mass flow sensing**
- **Low differential pressure sensing**

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

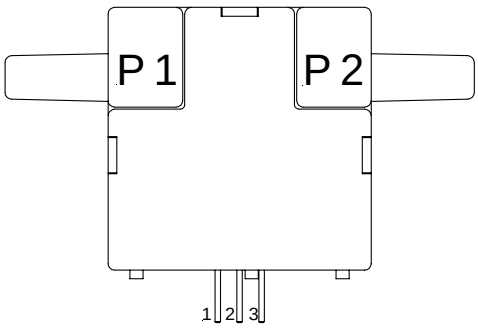
SPECIFICATIONS

Maximum ratings

Supply voltage[2]	8 to 15 V typ. 10 ±0.01 V
Power consumption	
AWM3303V	typ. 100 mW
AWM3...CR	typ. 50 mW
all others	typ. 50 mW, max. 60 mW
Temperature limits	
Operating	-25 to 85°C
Storage	-40 to 90°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



Pin 1: V_{out}
Pin 2: $+V_S$
Pin 3: GND

FLOW SENSOR CHARACTERISTICS[3]
V_S = 10 ±0.01 V, T_A = 25°C

Part no.	Flow range (full scale)	Pressure range	Max. flow change[4]	Output voltage @ trim point
AWM3100V	200 sccm		5.0 l/sec	5 V @ 200 sccm
AWM3150V	30 sccm		5.0 l/sec	3.4 V @ 25 sccm
AWM3200V		2 "H_2O	5.0 l/sec	5 V @ 2 "H_2O
AWM3300V	1000 sccm		5.0 l/sec	5 V @ 1000 sccm
AWM3303V	±1000 sccm		5.0 l/sec	5 ±0.15 V
AWM3200CR		2 "H_2O	5.0 l/sec	20 ±1 mA @ 2 "H_2O
AWM3201CR		0.5 "H_2O	5.0 l/sec	20 ±1 mA @ 0.5 "H_2O

PERFORMANCE CHARACTERISTICS
VOLTAGE OUTPUT VERSIONS (V_S = 10 ±0.01 V, T_A = 25°C)

Characteristics				Min.	Typ.	Max.	Unit
Zero offset			AWM3100V	0.95	1.0	1.05	V
			AWM3150V	0.90	1.0	1.10	
			AWM3200V	0.92	1.0	1.08	
			AWM3300V	0.90	1.0	1.10	
			AWM3303V	2.95	3.0	3.05	
Repeatability and hysteresis			AWM3100V, AWM3200V			±0.5	% reading
(combined)			all others			±1.0	
Temperature effects[5]	Offset	-25 to 85 °C[6]	AWM3150V		±100		mV
			AWM3303V		±50		
			all others		±25		
	Span	-25 to 25 °C	AWM3100V			-4.0	% reading
			AWM3150V			±5.0	
			AWM3200V			24.0[5]	
			AWM33...			-5.0	
		25 to 85 °C	AWM3100V			4.0	
			AWM3150V			±5.0	
			AWM3200V			-24.0[5]	
			AWM33...			5.0	
Response time[7]					1.0	3.0	ms
Common mode pressure						25	psi

PERFORMANCE CHARACTERISTICS

CURRENT OUTPUT VERSIONS (V_S = 10 ±0.01 V, T_A = 25°C)

Characteristics				Min.	Typ.	Max.	Unit
Zero offset			AWM3200CR	3.7	4.0	4.3	mA
			AWM3201CR	3.6	4.0	4.4	
Repeatability and hysteresis (combined)						±0.5	% reading
Non-linearity					5		
Temperature effects[5]	Offset	-25 to 85 °C[6]				±2.0	mA
	Span	-25 to 25 °C	AWM3200CR			24[5]	% reading
			AWM3201CR			32[5]	
		25 to 85 °C	AWM3200CR			-31[5]	
			AWM3201CR			-32[5]	
Response time[7]						60	ms
External output load[8]				100 to 300			Ohm

GAS CORRECTION FACTORS[9]

Gas type	Correction factor (approx.)
Helium (He)	0.5[10]
Hydrogen (H_2)	0.7[10,11]
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:
[3] A 5 micron filter is recommended for all devices.
[4] Maximum allowable rate of flow change to prevent damage.
[5] Temperature shifts in differential pressure devices are mostly due to the density change of the gas over temperature.
[6] Shift is relative to 25 °C.
[7] Initial warm-up time for signal conditioned circuitry is 1 minute max.
[8] Output load connected from V_{out} to GND (current sinking).
[9] 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.
[10] 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
[11] 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.

OUTPUT FLOW VS INTERCHANGEABILITY

V_S = 10 ±0.01 V, T_A = 25°C

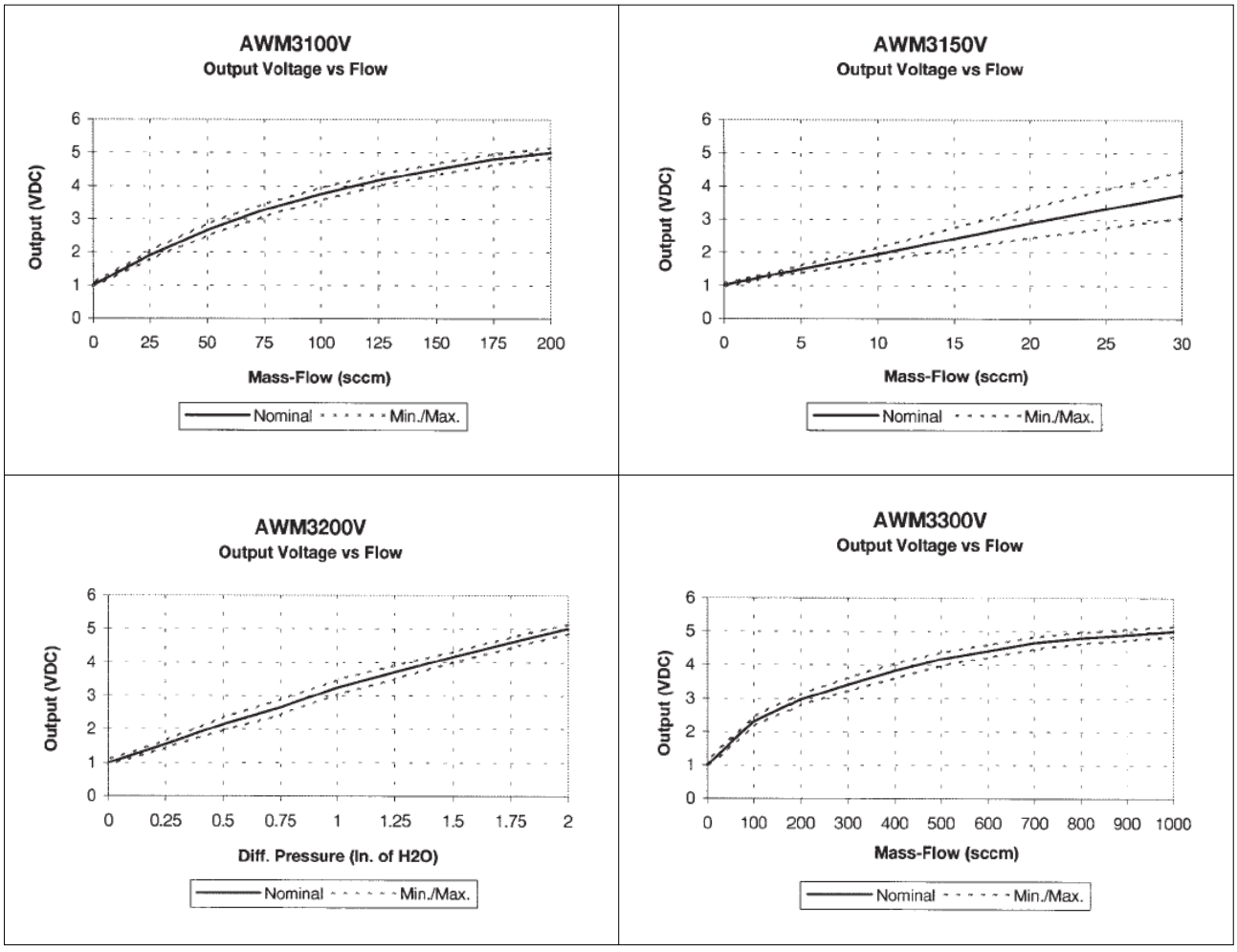
AWM3100V				AWM3150V				AWM3200V[13]				AWM3300V			
Press. mBar	**Flow sccm**	**Nom. VDC**	**Tol. ± VDC**	Press mBar	**Flow sccm**	**Nom. VDC**	**Tol. ± VDC**	Flow sccm	**Press ″ H_2O**	**Nom. VDC**	**Tol. ± VDC**	Press. mBar	**Flow sccm**	**Nom. VDC**	**Tol. ± VDC**
0.49	**200**	5.00	0.15	2.50	**30**	3.75	0.70	60.0	**2.00**	5.00	0.15	3.40	**1000**	5.00	0.15
0.42	**175**	4.80	0.16	1.70	**20**	2.90	0.45	53.0	**1.75**	4.59	0.15	2.90	**900**	4.90	0.16
0.35	**150**	4.50	0.17	0.84	**10**	1.95	0.20	46.0	**1.50**	4.16	0.16	2.40	**800**	4.80	0.17
0.28	**125**	4.17	0.18	0.42	**5**	1.50	0.10	38.0	**1.25**	3.70	0.20	2.00	**700**	4.66	0.18
0.21	**100**	3.75	0.19	0.34	**4**	1.40	0.08	30.0	**1.00**	3.25	0.22	1.60	**600**	4.42	0.19
0.14	**75**	3.27	0.19	0.26	**3**	1.30	0.08	23.0	**0.75**	2.65	0.22	1.20	**500**	4.18	0.20
0.09	**50**	2.67	0.17	0.17	**2**	1.20	0.07	16.0	**0.50**	2.15	0.19	0.80	**400**	3.82	0.21
0.04	**25**	1.90	0.13	0.08	**1**	1.10	0.06	8.0	**0.25**	1.55	0.11	0.54	**300**	3.41	0.19
0.00	**0**	1.00	0.05	0.00	**0**	1.00	0.05	0.0	**0.00**	1.00	0.08	0.31	**200**	2.96	0.17
												0.12	**100**	2.30	0.14
												0.00	**0**	1.00	0.10

Notes:

12 Numbers in **BOLD** type indicate calibration type, mass flow or differential pressure. Tolerance values apply to calibration type only.

13 Differential pressure calibrated devices are not recommended for flow measurement. Use flow calibrated devices for flow measurement.

OUTPUT CURVES



OUTPUT FLOW VS INTERCHANGEABILITY

V_S = 10 ±0.01 V, T_A = 25°C

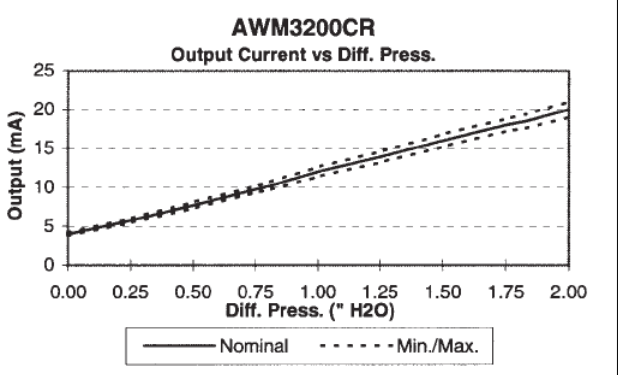
AWM3200CR [13]				AWM3201CR [13]				AWM3303V			
Flow sccm	Press. ″ H_2O	Nom. mA DC	Tol. ± mA DC	Flow sccm	Press. ″ H_2O	Nom. mA DC	Tol. ± mA DC	Press mBar	Flow sccm	Nom. VDC	Tol. ± VDC
0	**0.00**	4.00	0.3	0	**0.00**	4.0	0.4	3.49	**1000**	5.00	0.15
7	**0.25**	5.75	0.3	35	**0.10**	7.2	0.4	2.42	**800**	4.82	0.18
15	**0.50**	7.70	0.4	42	**0.13**	8.0	0.4	1.59	**650**	4.67	0.20
22	**0.75**	9.75	0.4	53	**0.17**	9.4	0.5	0.83	**400**	4.42	0.20
25	**0.81**	10.21	0.5	61	**0.20**	10.4	0.5	0.31	**200**	3.96	0.15
30	**1.00**	12.00	0.6	71	**0.25**	12.0	0.6	0.00	**0**	3.00	0.05
37	**1.25**	13.90	0.7	81	**0.30**	13.6	0.7	-0.31	**-200**	2.03	0.18
45	**1.50**	16.00	0.8	87	**0.35**	15.2	0.8	-0.83	**-400**	1.62	0.20
52	**1.75**	18.00	0.8	97	**0.40**	16.8	0.9	-1.59	**-600**	1.35	0.25
55	**1.83**	18.50	0.9	105	**0.45**	18.4	1.0	-2.42	**-800**	1.15	0.30
60	**2.00**	20.00	1.0	113	**0.50**	20.0	1.0	-3.44	**-1000**	1.00	0.35

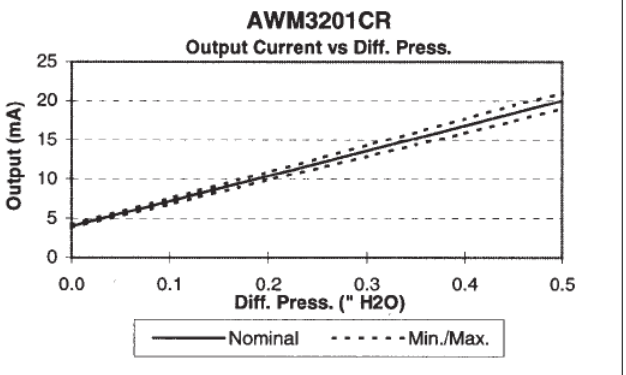
Notes:

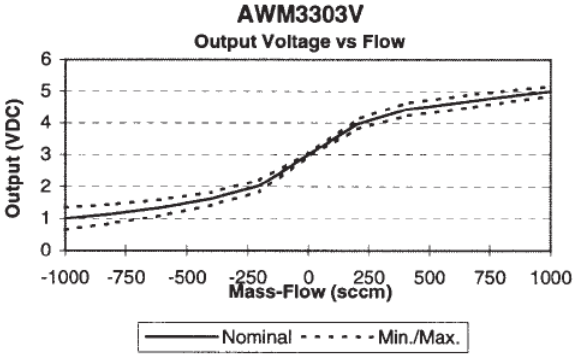
12 Numbers in **BOLD** type indicate calibration type, mass flow or differential pressure. Tolerance values apply to calibration type only.

13 Differential pressure calibrated devices are not recommended for flow measurement. Use flow calibrated devices for flow measurement.

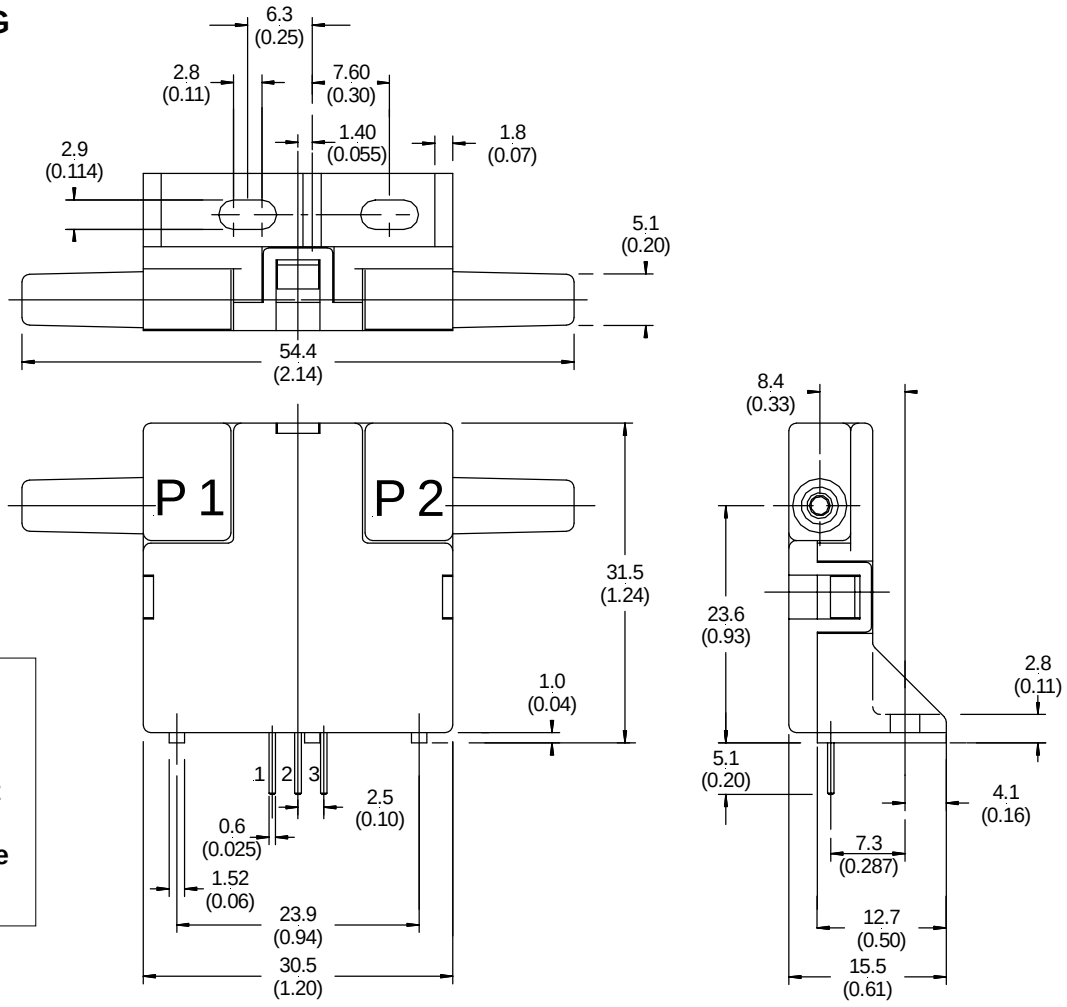
OUTPUT CURVES







OUTLINE DRAWING



Note:
Positiv flow direction is defined as proceeding from port 1 (P1) to port 2 (P2) and results in positive output.

mass: approx. 10.8 g

dimensions in mm (inches)

ORDERING INFORMATION

Flow range	Dry gas
0...30 sccm	AWM3150V
0...200 sccm	AWM3100V
0...1000 sccm	AWM3300V
0...±1000 sccm	AWM3303V

Pressure range	Dry gas	
	Voltage output	Current output
0...0.5 "H_2O (0...1.25 mbar)	---	AWM3201CR
0...2 "H_2O (0...5 mbar)	AWM3200V	AWM3200CR