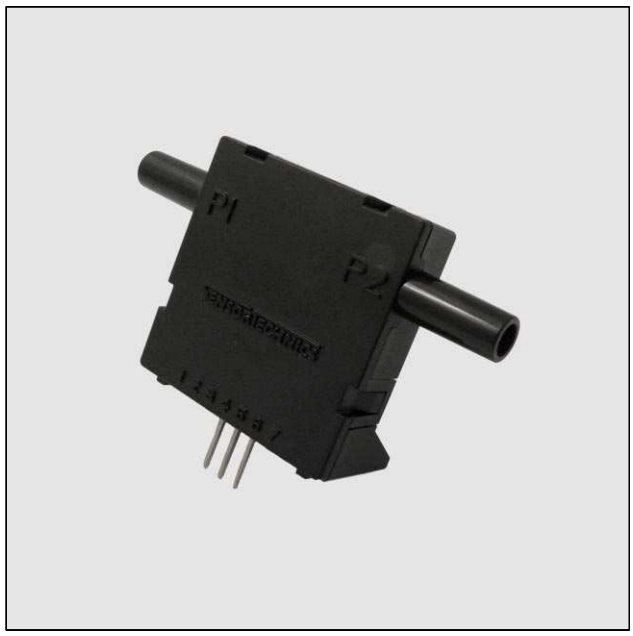
WBA Series
Mass flow sensors for gases

FEATURES

- **Flow ranges 0...200 sccm, 0...±200 sccm, 0...1 slpm, 0...±1 slpm**
- **Thermal mass flow sensing**
- **1...5 V linear output**
- **RoHS and REACH compliant**
- **Quality Management System according to ISO 13485:2003 and ISO 9001:2008**



MEDIA COMPATIBILITY[6]

To be used with dry gases only.

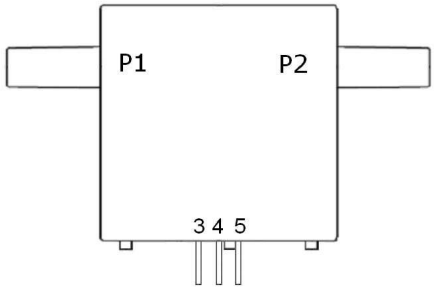
The WBA series is NOT designed for liquid flow and will be damaged by liquid flow through the sensor.

SPECIFICATIONS

Maximum ratings

Supply voltage	8 ... 15 V
Temperature limits	
Compensated	-25 ... 85 °C
Operating	-25 ... 85 °C
Storage	-40 ... 125 °C
Humidity limits (non-condensing)	0 ... 95 %RH
Vibration[1]	20 g
Mechanical shock[2]	30 g

ELECTRICAL CONNECTION



Pin	Connection
3	+Vout
4	+Vs
5	GND

FLOW SENSOR CHARACTERISTICS[6]

(V_S = 10 ±0.01 V, T_A = 20 °C, P_{Abs}= 101.325 kPa)

Part no.	Flow range	Max. flow change	Pressure drop	Max. Common mode pressure
WBAM200DU...	0...200 sccm	5.0 slpm/sec	0.1 mbar @ 200 sccm 0.5 mbar @ 1 slpm	25 psi
WBAM200DB...	0...±200 sccm			
WBAL001DU...	0...1 slpm			
WBAL001DB...	0...±1 slpm			

Note:
sccm denotes standard cubic centimeters per minute.
slpm denotes standard liter per minute.

PERFORMANCE CHARACTERISTICS

(V_S = 10 ±0.01 V, T_A = 20 °C, P_{Abs}= 101.325 kPa, output signal is ratiometric to V_S, media = air)

Characteristics			Min.	Typ.	Max.	Unit
Accuracy[3]					±(2.0 % of reading + 0.25 %FSO)	
Temperature effects (-25...85 °C)[5]	Offset			±0.625		%FSS
	Span	WBAM200...			±4	% of reading
		WBAL001...			±5	
Repeatability (incl. hysteresis)					0.25	
Offset long term stability (1 year)				±0.05		%FSS
Noise level					0.1	
Current consumption (no load)				10	12	mA
Response time (t_{90})					5	ms
Warm-up time[7]					70	

Unidirectional devices

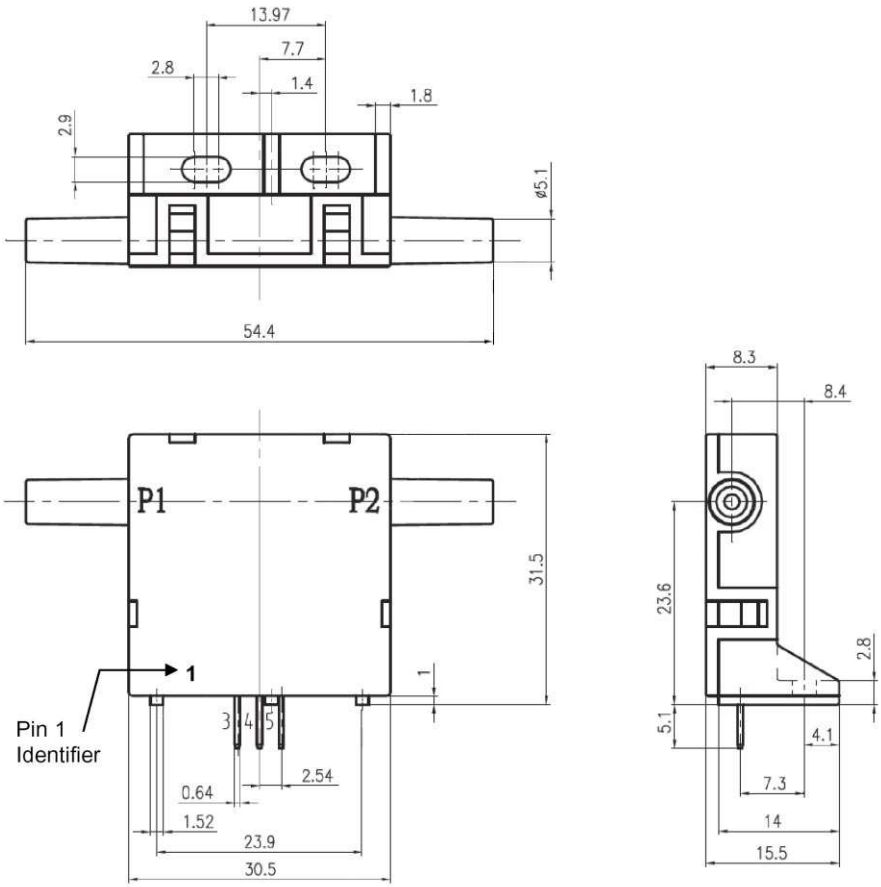
Characteristics	Min.	Typ.	Max.	Unit
Zero offset	0.99	1.00	1.01	V
Full scale span[4]	3.91	4.00	4.09	
Full scale output		5.00		

Bidirectional devices

Characteristics		Min.	Typ.	Max.	Unit
Zero offset		2.99	3.00	3.01	V
Full scale span[4]		3.91	4.00	4.09	
Output	at max. specified flow		5.00		
	at min. specified flow		1.00		

Note:
The sensor's performance is determined by intake flow conditions which depend on mounting and environmental effects. To ensure laminar flow through the sensor, it should be considered to insert a straight tube with a length 10 times the inner diameter of the pneumatic connector or a laminar flow element upstream of the sensor. Additionally, the WBA has to be mounted with both ports horizontally and pins downwards.

OUTLINE DRAWING



Note:
Positive flow direction is defined as proceeding from P1 to P2 and results in positive output.

third angle projection

dimensions in mm

GAS CORRECTION FACTORS[8]

Gas type	Gas correction factor
Air	1.0
Oxygen (O_2)	1.0
Nitrogen (N_2)	1.0
Argon (Ar)	1.18
Hydrogen (H_2)	*
Carbon dioxide (CO_2)	0.67

* For Hydrogen applications, the actual H_2 calibration is performed whenever possible.

Specification notes:

1. Sweep 20 to 2000 Hz, 8 min, 4 cycles per axis, MIL-STD-883E, Method 2007.2.
2. 5 shocks, 3 axes, MIL-STD-883E, Method 2002.3.
3. Accuracy is the combined error from offset and span calibration, linearity, hysteresis and repeatability.
4. Full Scale Span (FSS) is the algebraic difference between the output signal for the highest and lowest specified flow.
5. Shift is relative to 25°C.
6. A 5 µm filter is recommended to protect the sensing element from dust particles which may be present in some applications.
7. Warm-up time is the time from power on to the first stable reading.
8. To obtain the real flow rates in a specific gas, multiply the readings from the sensor by the gas correction factor in the table. The factors are approximate and should be used as guidelines only. Sensor performance strongly depends on gas dynamics and has to be evaluated in the respective application.

ORDERING INFORMATION

Options	Series	Flow range		Gas		Flow direction		Grade		Calibration	
	WBA	M200	200 sccm	D*	Dry air	B	Bidirectional	H	High	0	10 V (V_S=8...15 V)
		L001	1 slpm			U	Unidirectional				
				* other calibration gases on request							
Example:	**WBA**	**M200**		**D**		**U**		**H**		**0**	