

Airflow Sensors Line Guide



Go with the flow of engineering leadership. All airflow sensors operate on heat transfer — flow and differential pressure. But Honeywell Sensing and Control (S&C) offers advanced chip design, manufacturing techniques and microstructure technology, allowing our microbridge to be notably faster, smaller and more sensitive. Our silicon chip design is created from a thin-film, thermally isolated bridge structure, containing both heater

and temperature sensing elements. This provides rapid response to the air or gas flow and amount and direction, delivering a proportional output voltage. Amplified versions provide an enhanced output signal and less external circuitry, while unamplified versions allow additional external circuit options. What's more, a variety of port styles provides greater application flexibility.

FEATURES

HONEYWELL ZEPHYR™ ANALOG OR DIGITAL AIRFLOW SENSORS HAF Series-High Accuracy.

Features: Total error band as low as ± 2.25 %FSS • Wide range of airflows from ± 50 SCCM to ± 750 SCCM • Full calibration and temperature compensation

- Customizable for specific end-user needs
- High stability
- Low pressure drop
- Linear output
- Fast response time
- 11-bit (analog version) or 12-bit (digital version) resolution
- Low 3.3 Vdc operating voltage option and low power consumption
- ASIC-based I²C digital output (digital version)
- Bidirectional flow sensing capability
- Insensitivity to mounting orientation
- Insensitivity to altitude
- Small size occupies less space on PCB
- RoHS-compliant materials meet Directive 2002/95/EC

Benefits: Provide an analog or digital interface for reading airflow over the specified full-scale flow span and temperature range. Thermally isolated heater and temperature sensing elements help provide a fast response to air or gas flow. Total error band as low as ± 2.25 %FSS allows for very

precise airflow measurement, often ideal for demanding applications with high accuracy requirements. Detects presence or absence of airflow from ± 50 SCCM to ± 750 SCCM, increasing the options for integrating the sensor into the application; also has high sensitivity at very low flows. Full calibration and temperature compensation typically allow the customer to remove additional components associated with signal conditioning from the PCB, reducing PCB size as well as costs often associated with those components (e.g., acquisition, inventory, assembly). Customizable for specific end-user needs. High stability reduces errors due to thermal effects and null shift to provide accurate readings over time, often eliminating need for system calibration after PCB mount and periodically over time. Low pressure drop typically improves patient comfort in medical applications, and reduces noise and system wear on other components such as motors and pumps. Linear output provides more intuitive sensor signal than the raw output of basic airflow sensors, which can help reduce production costs,

design, and implementation time. Fast response time allows the customer's application to respond quickly to airflow change, important in critical medical and industrial applications. 11-bit (analog version) or 12-bit (digital version) resolution increases ability to sense small airflow changes, allowing customers to more precisely control their application. Low 3.3 Vdc operating voltage option and low power consumption allow for use in battery-driven and other portable applications. ASIC-based I²C digital output (digital version) compatibility eases integration to microprocessors or microcontrollers, reducing PCB complexity and component count. Bidirectional flow sensing capability eliminates the need for two airflow sensors, helping to reduce production costs and implementation time. Insensitivity to mounting orientation allows customer to position sensor in most optimal point in the system, eliminating concern for positional effects. Insensitivity to altitude eliminates customer-implemented altitude adjustments in the system, easing integration and reducing production costs

Airflow Sensors Line Guide

Our technology is most sensitive to your needs.

Honeywell S&C offers specially crafted airflow sensor housings to precisely direct and control the airflow across the element. The mechanical package design allows easy mounting to circuit boards, plus other advantages: amplified or un-amplified microbridge airflow; state-of-the-art silicon micromachining; sensitivity to low flows (30 SCCM to 300 SLPM); accurate low pressure sensing 0.003 mbar to 10 mbar (0.0001 in H₂O to 4.0 in H₂O); analog or digital output.

Honeywell S&C airflow sensors offer enhanced performance in multiple potential applications, including HVAC system damper control, gas analysis, leak detection equipment, gas metering and chromatography, process control, and vent hoods. In the medical industry, potential applications range from respiratory equipment such as respirators, spirometers, anesthesia and oxygen delivery to sleep apnea equipment.



Honeywell Zephyr™ Analog or Digital Airflow Sensors

HAF Series-High Accuracy

Signal conditioning	amplified, digital
Technology	silicon die with thermally isolated heater
Flow/pressure range	±50 SCCM to ±750 SCCM
Total error band	as low as ±2.25 %FSS
Output	analog (Vdc), digital (I ² C)
Power consumption	3.3 Vdc: 40 mW typ. (no load) (analog) 23 mW typ. (no load) (digital) 5.0 Vdc: 55 mW typ. (no load) (analog) 38 mW typ. (no load) (digital)
Port style	long port, short port
Media capability	non-corrosive dry gases
Compensated temperature range	0 °C to 50 °C [32 °F to 122 °F]
Operating temperature range	-20 °C to 70 °C [-4 °F to 158 °F]

Airflow Sensors



AWM1000 Series

AWM2000 Series

Signal conditioning	unamplified, compensated	unamplified, compensated
Technology	silicon die	silicon die
Flow/pressure range	±200 SCCM, 1000 SCCM to -600 SCCM, ±5,0 mbar [2.0 in H ₂ O], ±10,0 mbar [4.0 in H ₂ O]	±30 SCCM, ±1000 SCCM, ±10,0 mbar [4.0 in H ₂ O]
Output	analog	analog
Power consumption	30 mW typ.	30 mW typ.
Port style	straight	straight
Media capability	dry gas only	dry gas only
Operating temperature range	-25 °C to 85 °C [-13 °F to 185 °F]	-25 °C to 85 °C [-13 °F to 185 °F]



Airflow Sensors

AWM3000 Series

Signal conditioning	amplified
Technology	silicon die
Flow/pressure range	30 SCCM, 200 SCCM, 1000 SCCM, 0 mbar to 1,25 mbar [0 in H ₂ O to 0.5 in H ₂ O], 0 mbar to 5,0 mbar [0 in H ₂ O to 2 in H ₂ O], 5,0 mbar [2.0 in H ₂ O]
Output	analog
Power consumption	50 mW or 100 mW typ.
Port style	straight
Media capability	dry gas only
Operating temperature range	-25 °C to 85 °C [-13 °F to 185 °F]



Airflow Sensors

AWM5000 Series

AWM700 Series

Signal conditioning	amplified	amplified
Technology	silicon die	silicon die
Flow/pressure range	0 SLPM to 5,0 SLPM, 0 SLPM to 10,0 SLPM, 0 SLPM to 15,0 SLPM, 0 SLPM to 20,0 SLPM	300 SLPM
Output	analog	analog
Power consumption	100 mW max.	60 mW max.
Port style	1/4 in-18 NPT	22 mm tapered
Media capability	dry gas only	dry gas only
Operating temperature range	-20 °C to 70 °C [-4 °F to 158 °F]	-25 °C to 85 °C [-13 °F to 185 °F]

Airflow Sensors Line Guide



Airflow Sensors

AWM40000 Series

AWM90000 Series

Signal conditioning	unamplified (compensated) or amplified	uncompensated
Technology	silicon die	silicon die
Flow/pressure range	±25,0 SCCM, 1,0 SLPM, 6,0 SLPM	±200 SCCM, ±5,0 mbar [2.0 in H ₂ O]
Output	analog	analog
Power consumption	60 mW max., 75 mW max.	50 mW typ.
Port style	manifold	parallel
Media capability	dry gas only	dry gas only
Operating temperature range	-40 °C to 125 °C [-40 °F to 251 °F] (inclusive)	-25 °C to 85 °C [-13 °F to 185 °F]

by not having to purchase additional sensors for altitude adjustments. Small size occupies less space on PCB, allowing easier fit and potentially reducing production costs; PCB size may also be reduced for easier fit into space-constrained applications. RoHS-compliant materials meet Directive 2002/95/EC. Designed for use in medical equipment such as anesthesia delivery machines, ventricular assist devices (heart pumps), hospital diagnostics (spectrometry, gas chromatography), nebulizers, oxygen concentrators, patient monitoring systems (respiratory monitoring), sleep apnea machines, as well as industrial analytical instrumentation, gas meters/leak detection, HVAC filters, and meteorological equipment.

AIRFLOW SENSORS

AWM1000 Series.

Features: Precision silicon micromachining • Sensitivity to low flows (200 SCCM to 1000 SCCM) • Enhanced response time • Low power consumption • Analog output • Cost-effective • Bi-directional sensing capability • Low differential pressure sensing • Sensor to sensor interchangeability • Unamplified • Laser trimmed • Mass flow and differential pressure sensing

Benefits: Cost-effective microbridge technology for potential applications including HVAC damper control, process control, respirators, oxygen concentrators, gas metering, and chromatography. Differential amplifier circuitry provides output gain and/or introduces voltage offsets to sensor output.

AWM2000 Series.

Features: Precision silicon micromachining • Sensitivity to low flows (30 SCCM to 1000 SCCM) • Enhanced response time • Low power consumption • Analog output • Cost-effective • Bi-directional sensing capability • Low differential pressure sensing • Actual mass airflow sensing • Unamplified • Laser trimmed • Sensor to sensor interchangeability • Mass flow and differential pressure sensing

Benefits: Cost-effective microbridge technology for potential applications including process control, respirators, ventilators, oxygen concentrators, and leak detection equipment. Differential amplifier circuitry provides output gain and/or introduces voltage offsets to sensor output.

AWM3000 Series.

Features: Precision silicon micromachining • Sensitivity to low flows (30 SCCM to 1000 SCCM) • Enhanced response time • Low power consumption • Analog output • Cost-effective • Low differential pressure sensing • Laser trimmed • Amplified • Actual mass airflow sensing • Mass flow and differential pressure sensing • Sensor to sensor interchangeability

Benefits: Amplified signal conditioning increases gain and introduces voltage offsets to sensor output. On board heater control circuit. Laser trimmed for improved sensor interchangeability. Potential applications include HVAC damper control, process control, respirators, leak detection equipment, gas metering, and chromatography.

AWM5000 Series.

Features: Precision silicon micromachining • Sensitivity to low flows (5 SLPM to 20 SLPM) • Enhanced response time • Low power consumption • Analog output • Cost-effective • On-board signal conditioning • Venturi type flow housing • Remote mounting capability • Laser trimmed • “AMP” compatible connector • Rugged plastic package • Amplified • Mass flow pressure sensing • Sensor to sensor interchangeability

Benefits: Performs amplification, linearization, temperature compensation, and gas calibration. Separate gas calibration types (nitrogen, carbon dioxide, nitrous oxide or argon). Microbridge chip in direct contact with flow stream reduces error due to orifice or bypass channel clogging. In-line flow measurement potential applications

including HVAC damper control, oxygen concentrators, leak detection equipment, gas metering, and chromatography. 1 Vdc to 5 Vdc linear output possible regardless of flow range or calibration gas. Active laser trimming improves interchangeability. AMP-compatible connector often provides reliable connection in demanding applications.

AWM700 Series.

Features: Precision silicon micromachining • Sensitivity to low flows (200 SLPM to 300 SLPM) • Enhanced response time • Low power consumption • Analog output • Cost-effective • High flow range capability in a small package • Highly stable null and full-scale • Compact package design • Extremely low hysteresis and repeatability errors • AMP-compatible connector • Amplified • Mass flow and differential pressure sensing • Sensor to sensor interchangeability

Benefits: Performs amplification and temperature compensation. Specially designed bypass flow housing provides in-line flow measurement. Provides combination of enhanced reliability, accuracy, and precision operating characteristics for use in potential medical ventilation equipment and medical and analytical instrumentation applications. Low power consumption for portable devices and battery-powered applications. Enhanced accuracy over life reduces need for recalibration. Snap-in AMP-compatible connector provides reliable connection.

AWM40000 Series.

Features: Precision silicon micromachining • Sensitivity to low flows (25 SCCM to 6 SLPM) • Enhanced response time • Low power consumption • Analog output • Cost-effective • Repeatable response • Laser trimmed • Standard mounting centers • Amplified and unamplified • Mass flow pressure sensing • Sensor to sensor interchangeability

Benefits: Sensitive to low flows, adaptable for use with higher flows for

potential applications including process control, respirators, ventilators, oxygen concentrators, gas metering, and chromatography. Low power consumption for portable devices and battery-powered applications. Laser-trimmed thick-film and thin-film resistors designed to provide consistent interchangeability from one device to the next.

AWM90000 Series.

Features: Precision silicon micromachining • Sensitivity to low flows (200 SCCM) • Low power consumption • Analog output • Cost-effective • Bi-directional sensing capability • Low differential pressure sensing • Actual mass airflow sensing • Enhanced response time • Uncompensated • Mass flow and differential pressure sensing

Benefits: Proven thermal bridge technology. Two versions available, mass flow and differential pressure. Provides ability to customize sensor function for potential applications including HVAC damper control, process control, respirators, ventilators, oxygen concentrators, leak detection equipment, gas metering, and chromatography. Low power consumption for portable devices and battery-powered applications.

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Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

For more information about Sensing and Control products, visit www.honeywell.com/sensing or call +1-815-235-6847. Email inquiries to info.sc@honeywell.com

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008150-5-EN IL50 GLO
February 2012
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