Honeywell

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: ★ = competitive differentiator ★ High accuracy • Full calibration and temperature compensation ★ Customizable ★ High sensitivity at very low flows ★ High stability ★ Low pressure ★ Linear output • Fast response time • High 11-bit (analog) or 12-bit (digital) resolution • Low 3.3 Vdc operating voltage • Analog or ASIC-based I²C digital output • Bidirectional flow • Insensitive to mounting orientation and altitude • Small size • RoHS compliant

Benefits: High ±2.5% accuracy allows for very precise airflow measurement, often ideal for demanding applications with high accuracy requirements. Full calibration and temperature compensation typically allow 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 sensitivity at very low flows allows a customer's application to detect presence or absence of airflow. High stability reduces errors due to thermal effects and null shift to provide accurate readings over time, often eliminating the 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 a customer's application to respond quickly to airflow change, important in critical medical (i.e., anesthesia) and industrial (i.e., fume hood) applications. High 11-bit (analog) or 12-bit (digital) 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. Analog output provides an interface for reading airflow over the specified full scale flow span and temperature. ASIC-based I²C digital output compatibility eases integration to microprocessors or microcontrollers, reducing PCB complexity and component count. Bidirectional flow sensing capability eliminates 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 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. Potential medical applications include anesthesia delivery machines, ventricular assisted devices (heart pumps), hospital diagnostics (spectrometry, gas chromatography), nebulizers, oxygen

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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 (0.1 SCCM to 200 SLPM); accurate low pressure sensing 0.003 mbar to 10 mbar (0.0001 in H_20 to 4.0 in H_20); analog or digital output; flow range offering ±30 SCCM to 200 SLPM.

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
Technology	silicon die with thermally isolated heater
Flow/pressure range	200 SCCM
Output	analog (Vdc), digital (I^2C)
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
Operating temperature range	-20 °C to 70 °C [-4 °F to 158 °F]

Airflow Sensors	AWM1000 Series	AWM2000 Series
Signal conditioning	unamplified	unamplified
Technology	silicon die	silicon die
Flow/pressure range	±200 SCCM, 1000 SCCM to -600 SCCM, ±5,0 mbar [2.0 in H_20], ±10,0 mbar [4.0 in H_20]	±30 SCCM, ±1000 SCCM, ±10,0 mbar [4.0 in H_20]
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_20 to 0.5 in H_20], 0 mbar to 5,0 mbar [0 in H_20 to 2 in H_20], 5,0 mbar [2.0 in H_20]
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	200 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 or amplified	unamplified
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_20]
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]

concentrators, patient monitoring systems (respiratory monitoring), sleep apnea machines, spirometers and ventilators. Potential industrial applications include air-to-fuel ratio, analytical instrumentation (spectrometry, chromatography), fuel cells, gas leak detection, gas meters, HVAC filters and VAV system on HVAC systems, and meteorology.

AIRFLOW SENSORS

AWM1000 Series.

Features: Precision silicon micromachining • Sensitivity to low flows (0.1 SCCM to 200 SLPM) • 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 (0.1 SCCM to 200 SLPM) • 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 (0.1 SCCM to 200 SLPM) • 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 (0.1 SCCM to 200 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 (0.1 SCCM to 200 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 (0.1 SCCM to 200 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 (0.1 SCCM to 200 SLPM) • Low power consumption • Analog output • Cost-effective • Bi-directional sensing capability • Low differential pressure sensing • Actual mass airflow sensing • Enhanced response time • Unamplified • 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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