CMOSens® EM1

Mass Flow Meter for Gases

SENSIRION
THE SENSOR COMPANY

- CMOSens® technology
- Unbeatable price/performance ratio
- High output data speed (up to 200 Hz)
- Wide dynamic range (1:100 with 3% m.v. accuracy)
- Various maximum flow ranges: up to 200 ln/min (FS)
- Digitally calibrated & temperature compensated
- RS232 and SPI digital interface

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CMOSens® EM1 Product Summary

The CMOSens® EM1 Mass Flow Meter (MFM) enables fast and economical measurement of gas flows over a very wide dynamic range. Its leading price/performance ratio is based on Sensirion's unsurpassed CMOSens® sensor technology which combines a sensor element with the amplification and A/D converter circuit on one single CMOS chip. This results in good performance, fast response time and large dynamic range at very attractive cost.
All measurement data is fully calibrated and temperature compensated by means of an internal micro controller.

Mounted in rugged, chemically inert housing the CMOSens® EM1 Mass Flow Meter is suitable for a wide range of applications. Such include mass flow metering for process control, medical applications and fuel cells.
The sensor housing provides two inlets for measuring the gas flow and withstands overpressures of 8 bar (116 psi).
The CMOSens® EM1 Mass Flow Meter requires a supply voltage of 7…18 Vdc and provides an RS232 and SPI compliant electrical interface.

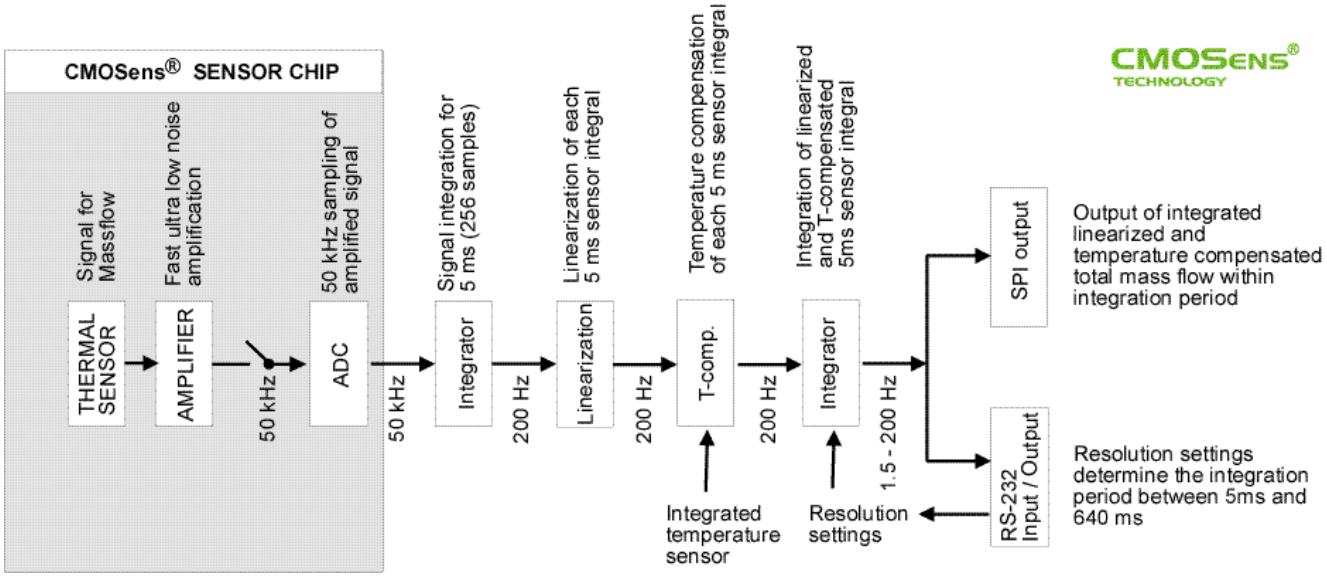

Figure 1: Block Diagram CMOSens® EM1 Mass Flow Meter.

Introductory Description

The heart of the CMOSens® Mass Flow Meter is powered by Sensirion's unsurpassed CMOSens® sensor technology. The CMOSens® EM1 Mass Flow Meter therefore provides unbeatable performance at very attractive system cost. One single device covers a range of 0.05 ln/min up to 200 ln/min .

The CMOSens® EM1 runs with an internal flow integration time of 5ms. This allows correct measurement and display of fast changing signals. But very often a precise total flow over a longer period is of higher interest than a fast single measurement. For this purpose the CMOSens® EM1 Mass Flow Meter can be set to slower read out times (see Table 4). The sensor internally still integrates in 5 ms slices and recognizes fast signal changes but for the read out the total flow over the whole period is calculated. The CMOSens® Mass Flow Meter therefore is exceptionally well suited for difficult measurement conditions when fast changing gas flows must be monitored and summed up precisely.

The CMOSens® EM1 Mass Flow Meter measures true mass flow independent of the ambient temperature and pressure changes. You simply connect the gas to be measured to the CMOSens® EM1 device to get an instantaneous gas mass flow integral with a selectable integration time between 5 ms and 640 ms. Depending on the type a flow range between 0.1 ln/min and up to 200 ln/min can directly be measured by connecting the CMOSens® EM1 Mass Flow Meter.

In addition to mass flow, the CMOSens® EM1 device provides information about the temperature on the CMOSens® sensor element. Both mass flow and temperature data are accessed through an RS232 or SPI interface. The RS232 interface allows you to directly connect the CMOSens® EM1 Mass Flow Meter to a PC. The serial peripheral interface (SPI) also enables the CMOSens® EM1 Mass Flow Meter to be used in smaller micro controller systems. If a special interface such as 4-20 mA current output or other or another flow range is required, contact Sensirion for a customer specific solution.

Please contact Sensirion before using any corrosive, toxic or explosive gas types (see also section 1.5 and 1.7). However, the standard calibration gas is nitrogen. Please contact Sensirion, if you would like to use the sensor for applications with other gases.

A free PC software to read out the CMOSens® EM1 Mass Flow Meter can be downloaded from www.sensirion.com.

CMOSens® sensor technology

CMOSens® is the base technology for all Sensirion multi sensor modules and sensor systems. The unification of semiconductor chip and sensor technology serves as a platform for highly integrated system solutions with excellent sensor precision and reliability. With CMOSens®, the on-chip sensor element forms an integrated whole with a high-end amplification and A/D converter circuit. Due to the compact single-chip design, CMOSens® based sensors are very resistant to electromagnetic disturbances (EMC), another important technical advantage of this state of the art sensor technology. As a result, CMOSens® based multi sensor modules offer excellent sensor precision, fast response time and a very large dynamic measurement range. In addition, the digital intelligence of the CMOSens® sensor technology enables digital interfaces that permit an easy link with the system of the customer, a real advantage and benefit that results in ready-to-use problem solutions.