

Product Data Sheet

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April 2013

Micro Motion® 3098 Gas Specific Gravity Meter

Micro Motion density and concentration meters are built to tackle the most demanding process and fiscal applications. For fiscal accuracy of gas specific gravity measurements, the 3098 is the industry standard.



7835 Peak performance density meter

7845 High performance general purpose density meter

7847 High accuracy hygienic density meter

7826/28 Direct insertion density meter

3098 Gas specific gravity meter

7812 Fiscal gas density meter

Best precision gas specific gravity measurement

- Ni-Span-C sensor for a wide-ranging precision measurement
- Installation flexibility through the integral sample conditioning system option

Industry standard for fiscal hydrocarbon measurement

- Market leader with the largest installed base
- Compliant with fiscal measurement standards

Superior reliability and safety

- Optimized design – insensitive to temperature, pressure, and gas compressibility variations



Micro Motion 3098 gas specific gravity meters

The 3098 gas specific gravity meter provides all the benefits of highly accurate, continuous on-line measurements of gas relative density and specific gravity.

About the 3098

The 3098 is the latest development in a product line that is well established as the industry standard for gas specific gravity meters. It is the only product that offers continuous on-line measurements as well as the following benefits:

- highest accuracy and resolution available today
- fast, dynamic response to process conditions
- self compensation for gas compressibility
- custody transfer approval

Because the 3098 is calibrated in the field, it provides the additional benefits of user customization and the flexibility to output multiple parameters to suit your application needs. The 3098 can measure gas specific gravity, gas relative density, and combustion energy content (such as Wobbe Index).

The 3098 is available in the following configurations:

- with ATEX/IECEX or CSA approvals
- installed in a small or large enclosure
- with an integral sample conditioning system

The sample conditioning system preconditions the measurement gas from pipeline pressures and temperatures to those required by the 3098. This option reduces installation complexity and simplifies commissioning.

Advantages

- Better control of product quality
- Faster response to changing conditions
- Reduced waste
- Improved safety
- Greater profitability
- Overcomes the disadvantages of traditional sampling techniques

Typical applications

- Specific gravity measurement
- Relative density measurement
- Calorific value using AGA 5

Contents

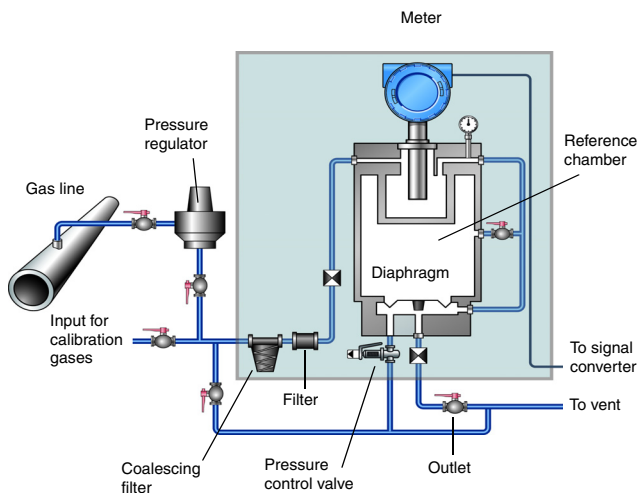
Principle of operation	3	Weight	5
Features	3	Electrical	5
Performance	4	Mechanical	6
Hazardous area classifications	4	Dimensions	6
General classifications	5	3098 Ordering information	8
Materials of construction	5		

Principle of operation

To measure the specific gravity of a gas, the 3098 utilizes a resonating element gas density meter that is surrounded by a constant volume reference chamber (V) filled with a fixed quantity of gas. A separator diaphragm inside the reference chamber ensures that the pressure (P) of the sample gas in the density meter is equal to that of the reference gas, with the whole measuring system being at temperature equilibrium.

The specific gravity of a gas is the ratio of its molecular weight (M) to the molecular weight of standard dry air. However, considering the equalized temperature (T) and pressure of the gas, and taking into account super compressibility effects (Z), the specific gravity and relative density will be equivalent.

The following diagram illustrates a typical 3098 specific gravity measuring system.



Features

The 3098 gives a frequency output that is proportional to the gas specific gravity. The frequency output is sent to a 7950/51 signal converter in which all the relevant calculations are performed. Additionally, you can alter the signal converter configuration using the Micro Motion PC_Config software. The software supports configuration and data logging from 7950/7951 via Modbus, including double precision data handling.

In addition to measuring the gas specific gravity, the 3098 can measure gas relative density and combustion energy content. When configured to output energy using AGA 5, the 3098 (with the associated signal converter) can directly output calorific value, gas specific gravity, and Wobbe Index. Using the measurements of calorific value and gas specific gravity, the Wobbe Index indicates the energy output available from a particular gas mixture.

7950/7951 Signal Converter features

The 7950/7951 signal converters enable you to create a highly flexible measurement system that is accurate, easy to set up and use, and interfaces simply with your process and plant systems.



A comprehensive range of calculations are available as standard on the 7950/7951. Typical 7950/7951 signal converter calculations are:

- Specific gravity
- Relative density
- Calorific value (AGA 5)
- Wobbe Index

Typical signal converter outputs are:

- Status
- mA
- RS232C/485.

Performance

Specific gravity range	0.1 to 3 typical
Process gas	Dry, clean, non-corrosive gases
Accuracy ⁽¹⁾	Up to $\pm 0.1\%$ of reading
Repeatability ⁽¹⁾	$\pm 0.02\%$ of reading
Temperature range	$-22\text{ }^{\circ}\text{F}$ to $+122\text{ }^{\circ}\text{F}$ ($-30\text{ }^{\circ}\text{C}$ to $+50\text{ }^{\circ}\text{C}$) or as limited by the dewpoint of the gas
Temperature coefficient	0.005% / $^{\circ}\text{F}$ (0.01% / $^{\circ}\text{C}$)
Reference chamber pressure	17 to 101 psi (1.2 to 7.0 bar) absolute at $68\text{ }^{\circ}\text{F}$ ($20\text{ }^{\circ}\text{C}$)
Supply pressure	Minimum reference pressure: +15% Maximum reference pressure: +100% up to a maximum of 174 psi (12 bar) absolute
Gas flow rate	0.012 to 3.66 in ³ /s (0.2 to 60 normal cc/s)
Response time	Less than 5 s upon entry into enclosure
Calibration ⁽²⁾	Using gas samples with known specific gravity

(1) *These figures apply to the measurement of a typical natural gas at a reference pressure of about 6 bars. Two gases of known specific gravity are required for calibration (typically nitrogen and methane). In practice, the accuracy achieved will depend on the care taken in calibration. An accuracy of 0.1% of reading can readily be obtained.*

(2) *Contact your nearest Micro Motion sales office for more information on the startup procedure for the 3098.*

Hazardous area classifications

ATEX

ATEX-approved: Certification for use in Europe

ATEX II 1 G Ex ia IIC T5 Ga

CSA

CSA-approved: Certification for use in Canada and USA

Class I, Division I, Groups A, B, C & D T4

IECEX

IECEX-approved: International Certification

Ex ia IIC T5 Ga

General classifications

Electromagnetic compatibility

All versions conform to the latest international standards for EMC, and are certified compliant with:

- Emissions: IEC/EN 61326-1:2006

Environment

- Weather rating: IP65

Materials of construction

Wetted parts	Ni Span C902, Aluminum alloy, Stainless steel AISI 316L, Viton, Stycast catalyst 11, and Permendur iron
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Weight

Weight	<ul style="list-style-type: none">• Without enclosure: 15.4 lbs (7 kg) approximately• Small enclosure: 44 lbs (20 kg) approximately• Large enclosure: 68 lbs (31 kg) approximately
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Electrical

Power supply	+15.5 to 33 VDC, 20 to 30 mA
Output signal	Frequency <ul style="list-style-type: none">• 6 V peak-to-peak for 3-wire• 2 to 3 V peak-to-peak for 2-wire
Electrical connections	System outlet to suit M20 cable gland

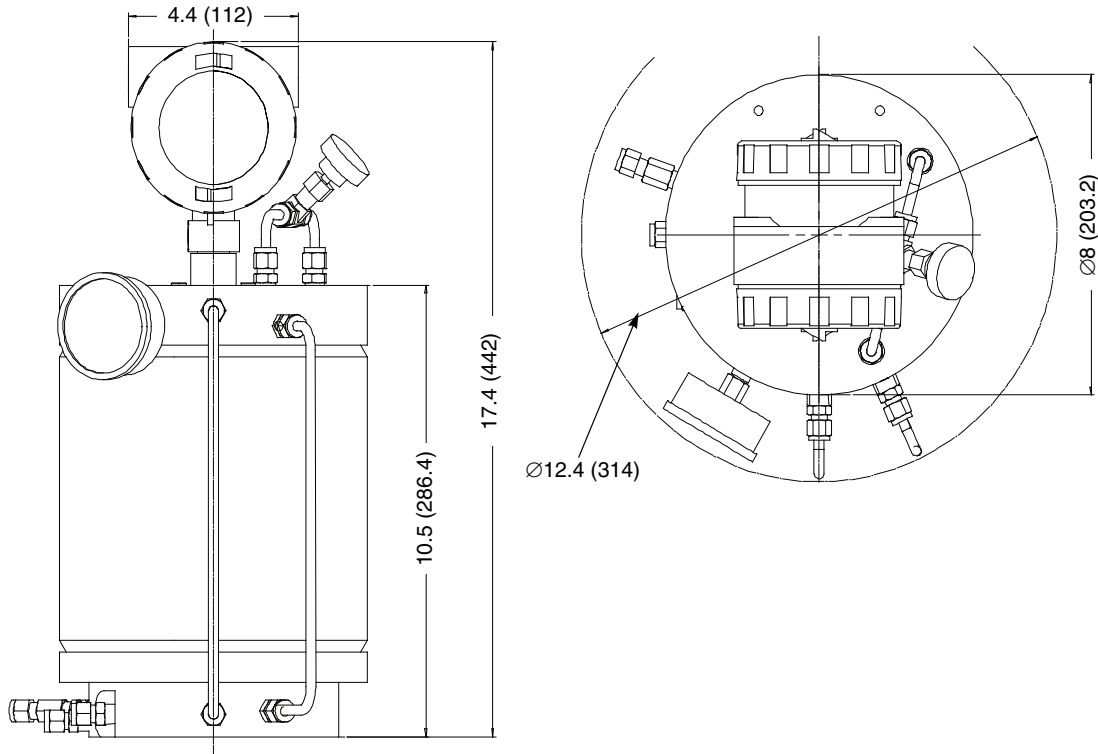
Mechanical

Gas connectors	Swagelok fitting for 0.25 in (6.35 mm)
Built-in filter	7 micron
Maximum dimensions	<ul style="list-style-type: none">• Without enclosure: 17.4 in x 12.4 in (442 mm x 314 mm)• Small enclosure: 19.7 in x 19.7 in x 11.8 in (500 mm x 500 mm x 300 mm)• Large enclosure: 23.6 in x 31.5 in x 11.8 in (600 mm x 800 mm x 300 mm)

Dimensions

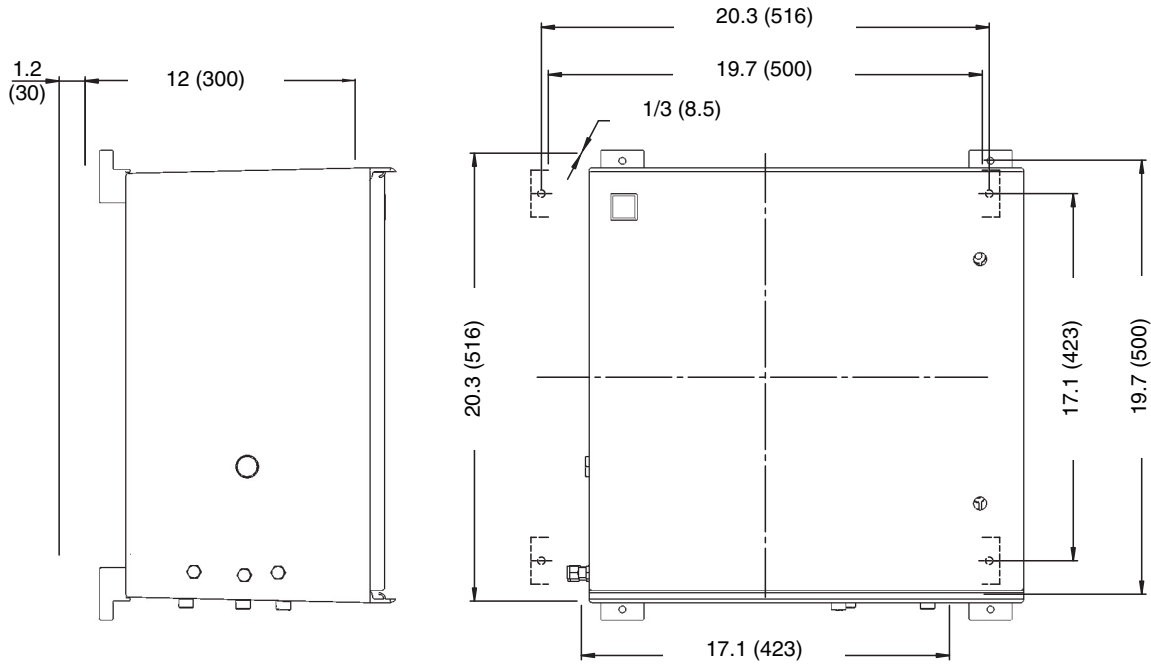
3098 without enclosure (Option F or J)

Dimensions in inches (mm)



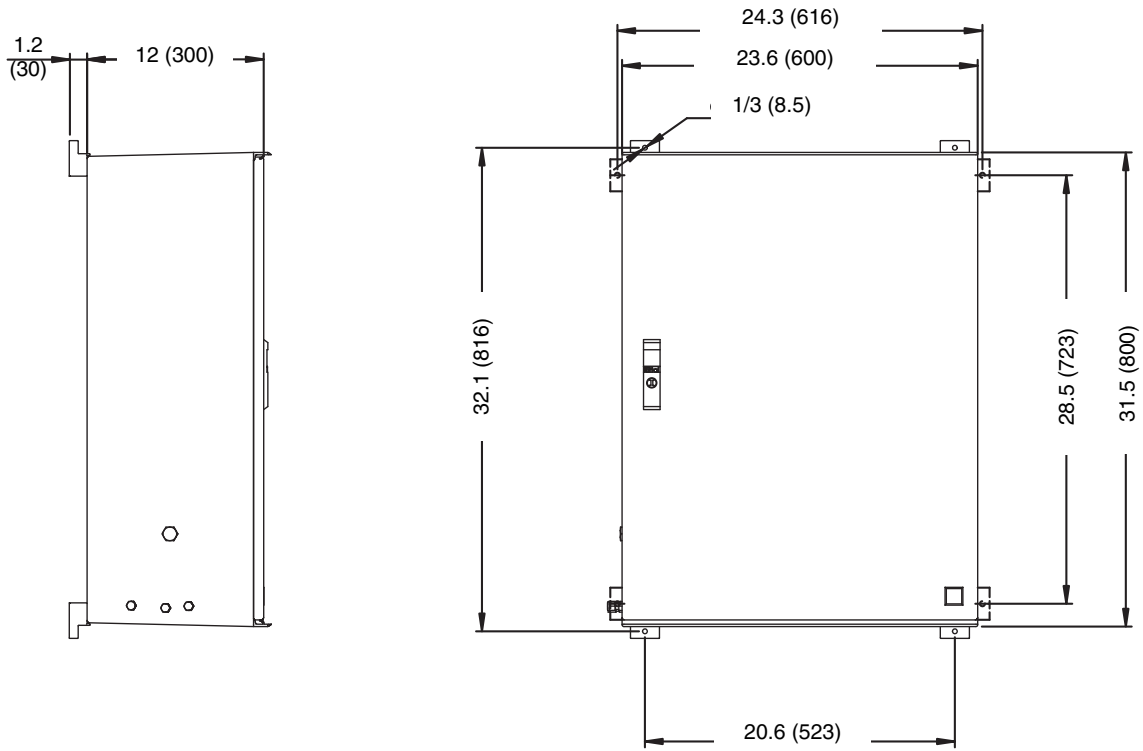
3098 with a small enclosure (Option E or H)

Dimensions in inches (mm)



3098 with a large enclosure (Option G or K)

Dimensions in inches (mm)



3098 Ordering information

Model	Product description
3098	Gas specific gravity meter
Code ⁽¹⁾	Installation kit
E	ATEX/IECEx mounted in an insulating enclosure (500 x 500 x 300 mm)
F ⁽²⁾	ATEX/IECEx without enclosure
G	ATEX/IECEx mounted in an insulating enclosure (600 x 800 x 300 mm)
H	CSA (US and Canada) insulating enclosure (500 x 500 x 300 mm)
J ⁽²⁾	CSA (US and Canada) without enclosure
K	CSA (US and Canada) insulating enclosure (600 x 800 x 300 mm)

(1) For information on ordering the 3098 with the integral sample conditioning system, contact your nearest sales office.

(2) Please note the published performance specification is with the instrument fitted inside an approved enclosure.

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Micro Motion introduced the first reliable Coriolis meter in 1977. Since that time, our ongoing product development has enabled us to provide the highest performing measurement devices available.

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Emerson Process Management

Micro Motion Americas

Worldwide Headquarters
7070 Winchester Circle
Boulder, Colorado USA 80301
T: +1 800 522 6277
T: +1 (303) 527 5200
F: +1 (303) 530 8459
Mexico T: 52 55 5809 5300
Argentina T: 54 11 4837 7000
Brazil T: 55 15 3413 8147
Venezuela T: 58 26 1792 1858

Emerson Process Management

Micro Motion Europe/Middle East

Central & Eastern Europe T: +41 41 7686 111
Dubai T: +971 4 811 8100
Abu Dhabi T: +971 2 697 2000
France T: 0800 917 901
Germany T: 0800 182 5347
Italy T: 8008 77334
The Netherlands T: +31 318 495 555
Belgium T: +32 2 716 77 11
Spain T: +34 913 586 000
U.K. T: 0870 240 1978
Russia/CIS T: +7 495 981 9811

Emerson Process Management

Micro Motion Asia Pacific

Australia T: (61) 3 9721 0200
China T: (86) 21 2892 9000
India T: (91) 22 6662 0566
Japan T: (81) 3 5769 6803
South Korea T: (82) 2 3438 4600
Singapore T: (65) 6 777 8211

For a complete list of contact information and websites, please visit: www.emersonprocess.com/home/contacts/global.

