



INTEGRATED SENSING SYSTEMS

## Micro Density Sensor

### Embedded Solutions for Density Measurement

Integrated Sensing Systems (ISS) is a proven leader with over 20 years of experience with MEMS vibrating silicon technology. Our Liquid Density Sensor (LDS) and Methanol Concentration Sensor (MCS) are part of the Micro Sensor product line which can be embedded or integrated into system solutions. The LDS is designed to meet the needs of OEM industry as it is easily embedded in other system solutions. This sensor revolutionizes the measurement of density with its small construction and accurate measuring capabilities. The MCS is designed to meet the needs of the Direct Methanol Fuel Cell (DMFC) industry. It measures the methanol concentration in the water used to feed the cell. A temperature sensor is closely integrated into the sensor for accurate and fast temperature compensation of the density measurement.

### Features

#### ■ Integrates in System Solutions

The LDS and MCS are easily embedded for systems integration so that density, temperature, and concentration can be measured as a part of a larger solution.

#### ■ Minimal Calibration Needed

This sensor offers a virtually drift-free solution for density measurement.

#### ■ In Line, Real Time

The sensor provides a stream of measurement data which makes it ideal for automating processes that require either a periodical or continuous self-sampling.

#### ■ Not Impacted by Environmental Vibration

The silicon sensing tube resonates at a very high frequency above 20 kHz which eliminates the impacts of any environmental vibration. The instrument provides an accurate measurement regardless of the environmental conditions.

#### ■ Unmatched Resolution and Sensitivity

With increased resolution at 0.0001 g/cc and 0.0005 g/cc accuracy the instrument can sense the slightest density change in a liquid.



### Applications

#### Concentration Measurement:

Density and temperature can be used to provide a concentration percentage of binary solutions. Standard density measurement can provide the composition and quality of fluids.

#### Specific Gravity: BRIX and °Plato:

These are universal measurements during the brewing and wine making process. It is not affected by bubbles during the fermentation process. Implementing this sensor into the process will allow a whole new level of quality control to help produce a consistent high quality product.

#### Methanol Concentration:

The MCS is specifically tailored for measuring methanol concentrations in alternative fuels. It is primarily used inside a methanol fuel cell to help maintain optimal power output.

#### Fluid Viscosity:

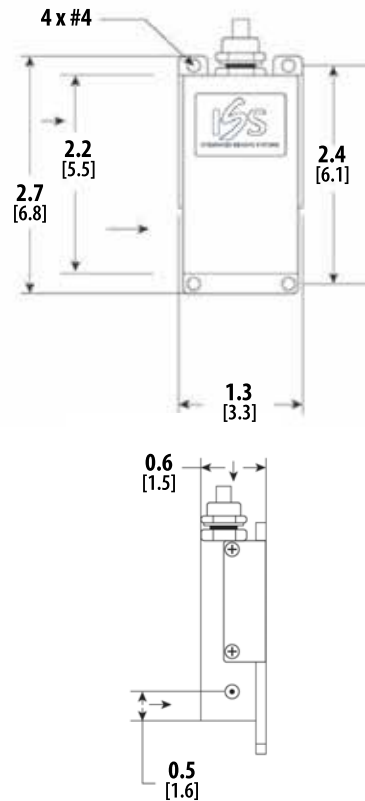
The LDS has the ability to measure viscosity as well as density and temperature. The use of viscosity can indicate the quality of a liquid, and in many cases be used to determine the composition.

*Compact Sensor with the Power to Perform*

## Specifications

GENERAL	
Density Range	0.6 - 1.3 g/cc
Resolution	0.0001 g/cc
Accuracy	Digital Density: 0.0005 g/cc Temperature: +/- 0.6 F (0.3 C)
Pressure	Max: 20 psig (1.4 bar) barbed fitting standard DP Range: 0.5-12 psid water 300 psig (21.7 bar) SS fittings optional
Operating Temperature	41°F to 140°F (5° to 60° C)
Sample Rate	100 mS
Fittings	1/16" plastic barbed standard, 1/8" 316 SS compression fittings optional
Flowpath Orifice	0.028"
Mounting	(4) #4 screws
Materials	Housing: SS Wetted parts: SS, Silicon, High Performance Epoxy, Glass
Dimensions	1.3" x 2.7" x 0.6" (3.3 cm x 6.8 cm x 1.5 cm)
Weight	5.3 oz (150 g)
Chemical Compatibility	Micro Density Sensor can withstand harsh acids and bases
POWER	
Supply	5 to 12 VDC, 5 VDC recommended
Consumption	35 mA
ELECTRICAL	
Outputs	(2) 0.5 to 4.5 VDC analog
Communication	RS-232
OTHER OPTIONS	
	IP 67 Sealed Advanced density is available for LDS models and included with MCS

## Dimensions Inches [cm]



\* US Patents 6,477,901, 6,499,354, 6,637,257, 6,647,778, 6,923,625, 6,932,114, 6,935,010, 7,059,176, 7,228,735, 7,263,882, 7,351,603, 7,381,628, 7,437,912, 7,568,399, 7,581,429, 7,628,082, 7,789,949, 7,823,445, 7,921,737B2, 8,016,798, 8,021,961, Japanese Patent 4,568,763 and more patents pending

## Order Information

The Liquid Density Sensor (LDS) includes: 0.028" flowpath orifice, 1/16" plastic barbed fittings, 20 psig. The Methanol Concentration Sensor (MCS) includes: 0.028" flowpath orifice, 1/16" plastic barbed fittings, advanced density option for concentration measurement, 20 psig. See the HOW TO ORDER guide for complete product selections.

### Models

MCS, LDS

### Available Options

Digital output, Modbus, advanced density for concentration or reference density for LDS models, Viscosity for LDS models only, IP67 Sealed.

