



INTEGRATED SENSING SYSTEMS

MassSense® Liquid Density Meter

Integrated Sensing Systems (ISS) is a proven leader with over 20 years of experience with MEMS vibrating silicon technology. Our MassSense® Liquid Density Meter or LDM revolutionizes the measurement of liquid density with its small integral packaging and sensitive measuring capabilities. The heart of the LDM is a patented* silicon sensing tube that vibrates at a very high frequency, above 20 kHz, which eliminates the impact of environmental vibrations on density measurement. Silicon sensing tube technology is lighter and stronger than traditional metal sensing technology. A temperature sensor is closely integrated into the sensor for accurate and fast temperature compensation of the density measurement. The result is an instrument that can detect even the slightest changes in density with the industry leading performance specifications.

Installation in a process is normally on a controlled flow bypass (slipstream). An internal orifice in the LDM directs a small portion of the bypass flow through the vibrating detector. Approved for Hazardous Locations & IP67 Sealed. The LDM has ATEX and UL approvals for hazardous environments and is in compliance with ISO/IEC 80079-34 and ISO 9001 Quality Management Systems.

Features

■ In-Line, Real Time

The small internal volume of the silicon sensor and high-speed digital processing results in very fast density detection. This is important in those applications where speed is important.

■ Low Power Consumption

The LDM's, 400 mW, power consumption makes the instrument ideal for portable and remote applications. The instrument can be powered using a small solar panel, external battery, for remote or power adapter.

■ Advanced Measurement Capabilities

The LDM can be programmed to calculate specific gravity, BRIX, °Plato, concentration, as well as other custom measurements.

■ Unmatched Resolution and Sensitivity

The LDM resolves density to 0.000001 g/cc and has an accuracy of 0.0001 g/cc.



Applications

Concentration Measurement

Density and temperature can be used to provide a concentration percentage of binary solutions such as alcohol purity.

Specific Gravity

Used for quality control of water based liquids.

Fuel Quality Monitoring / Quantity

Density can be used to identify and monitor the composition and quality of fuels. Used to convert volumetric fuel flow and total to mass in aviation and ground based vehicles.

Viscosity

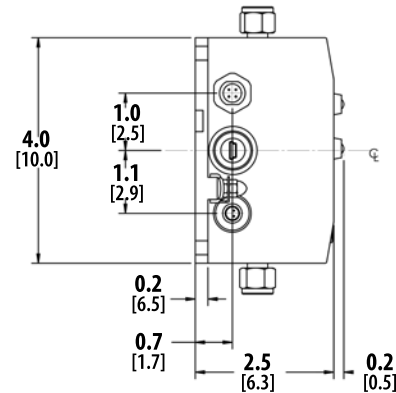
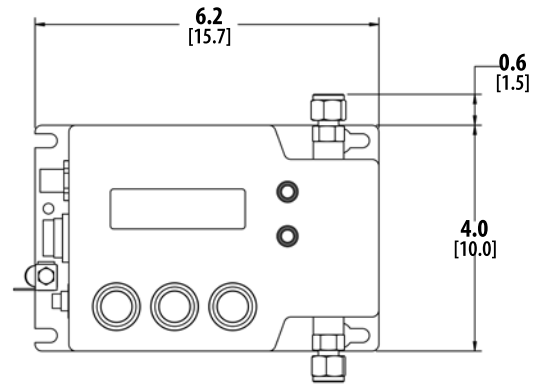
Viscosity measurement is available for inline measurement (<50cP).

High Performing, In-Line Liquid Density Measurement with Unmatched Value

Specifications

GENERAL	
Liquid Density Range	0.6 - 1.3 g/cc
Resolution	0.000001 g/cc
Accuracy	Digital Density: 0.0001 g/cc Analog Density: +/- 0.1% of full scale Temperature: 0.6 F (0.3 C)
Repeatability	0.00003 max g/cc
Pressure	Max: 300 psia (20 bar) DP range: 0.5 – 12 psid (0.8 bar differential)
Flowrate	300 ml/min max 0.027" orifice 1 l/min max 0.050" orifice (water at room temperature)
Operating Temperature	-4 to 140 F (-20 to 60 C)
Sample Rate	100 mS
Fittings	⁵ / ₁₆ straight thread, o-ring seal; standard fitting 1/4" Swagelok® compression
Flowpath Orifice	0.027" (0.07 cm) standard, 0.050" (0.127 cm) optional
Mounting	(4) 1/4" 20 UNC (M6) bolts
Materials	Housing painted aluminum, wetted parts: SS, Silicon, High Performance Epoxy, Glass
Dimensions	6.2" x 2.5" x 4" (15.7 cm x 6.3 cm x 10 cm)
Weight	2.5 lb (1135 g)
POWER	
Supply	8 - 30 VDC, optional USB 5VDC
Consumption	400 mW
OUTPUT	
Digital	RS-232, RS-485, USB
Analog	(2) 4-20 ma, optional
OTHER OPTIONS	
Display	2x16 std. character, adjustable LCD backlit
Environmental	IP67 sealed
Memory	2Gb internal data logger
Flow Indicator	Adjustable flow switch with alarm for low flow condition
Modbus	RTU slave
Cert	Calibration cert NIST
Advanced Density	Allows measuring concentration or reference density calculated to a standard temperature.
APPROVALS	
	CE 0539 Ex II 1G Ex ia IIC T4 -20°C ≤ Ta ≤ +60°C Ex ia IIC T4 Ga -20°C ≤ Ta ≤ +60°C UL CL. I DIV. 1 Group ABCD T4 -20°C ≤ Ta ≤ +60°C Class I, Zone 0, AEx ia IIC T4 20°C ≤ Ta ≤ +60°C EMC EN 61326-1:2006

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 Meter (LDM) includes: ISS Software, 1/4" Swagelok compression fittings (⁵/₁₆ straight thread, viton o-ring).

See HOW TO ORDER guide for complete product selections.

LDM: 0.027" orifice standard, 0.050" optional