LEMIS®
process

40 SERIES

MULTI-POINT DENSITY METER

UP TO 6 SENSORS IN ONE DEVICE

MDM-46

IN PROCESS TO EXCELLENCE

Specifications

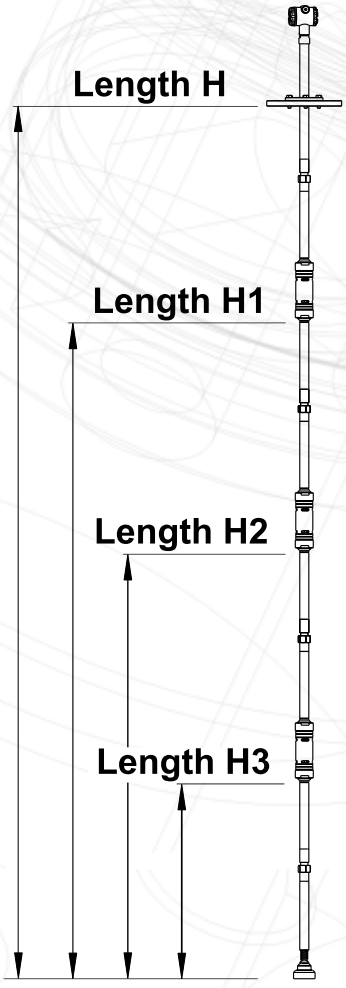
Measuring range:	
Density	0… 3 g/cm³ (0… 3000 kg/m³)
Density Standard	0.6… 1.2 g/cm³ (600… 1200 kg/m³)
Temperature	-40… +85°C (-40... +185°F)
Accuracy:	
Density	Up to ±0.00025 g/cm³ (up to ±0.25 kg/m³)
Temperature	±0.2°C (±0.4°F)
Repeatability:	
Density	Up to ±0.000125 g/cm³ (up to ±0.125 kg/m³)
Temperature	±0.1°C (±0.2°F)
Resolution:	
Density	0.0001 g/cm³ (0.1 kg/m³)
Temperature	0.01°C (0.02°F)
Supported measuring units	Real density: g/cm³, kg/m³, lb/gal, lb/ft³; API; SG Referred density: at 15°C, 20°C, 60°F; API60; SG60 Tables ASTM D1250 Alcohol tables Temperature in °C or °F
Ambient temperature	-40… +85°C (-40... +185°F)
Weather rating	IP68 for sensor and IP65 for other parts
Power voltage:	
Device	110-230V AC (50-60 Hz)
Sensor	6-14V DC (30 mA)
Implosion protection marking	**ATEX** II 1/2G Ex ia IIB T4; **IECEx** Ex ia IIB T4 Ga /Gb; CCE
Digital output	Standard: RS485, Modbus; user choice of signals and protocols
Temperature compensation	Automatic
Viscosity compensation	Automatic
Factory calibration	Calibration certificates supplied as standard

Advantages

- Spot density/concentration up to 6 points
- Spot Temperature up to 6 points
- Continuous measurements
- High accuracy
- Simple installation
- Suitable for very viscous liquids
- Wide range of applications
- Safe operation, low maintenance
- Easy cleaning
- Rigorous factory testing
- Compact design
- Automatic viscosity/temperature compensation

Applications

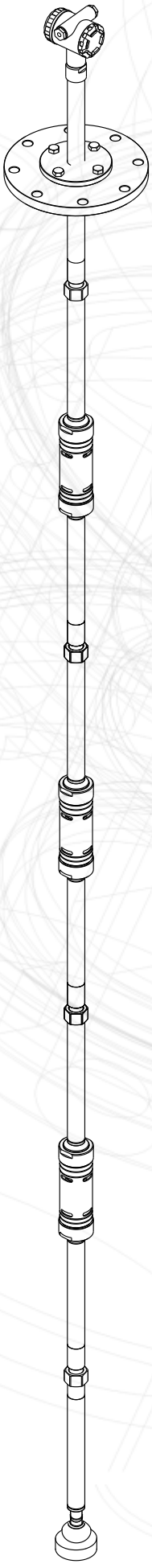
- Petroleum industry
- Ethanol production
- Food & Beverages
- Chemical industry
- Cosmetic industries
- Pharmaceutical industry



Configuration

The **MDM-46** assembly includes multiple pipe sections with 1 to 6 Sensor Modules (each sensor has 2,8 kg weight). These sections consist of 1.3" (1m has 2,5 kg weight) outside diameter Stainless Steel Pipe threaded at both ends and fitted either with a special threaded sleeve or with a Sensor Module. The Probe Assembly is delivered to the job site in sections of varying length (usually 5' to 8' long) depending on tank height and number of sections included. Each Sensor Module is factory pre-assembled with a section of stainless steel pipe along with sensor cables. All pipe section lengths and Sensor Module dimensions are precision manufactured and are re-measured at the factory. The above design provides smooth pipe surface all over the Probe Assembly and makes it easily applicable in tanks with cone and floating roofs (seals). The wires are all terminated in an Explosion Proof, Aluminum housing on top of the probe.

Sensor

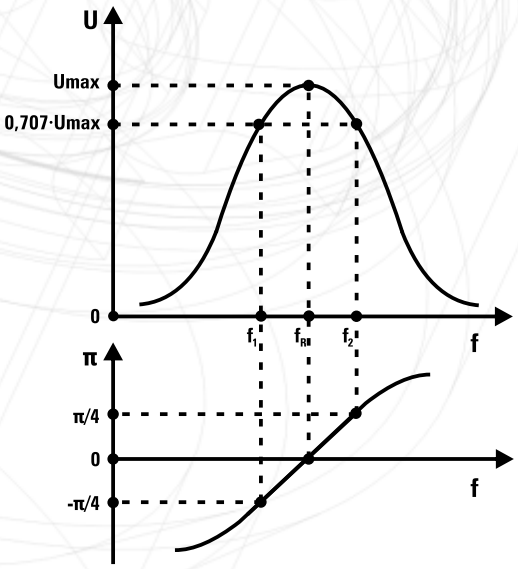


Principle of operation

The **MDM-46** measuring principle allows accurate direct measurement liquid density with capability of automatic compensation for liquid's viscosity. This allows **MDM-46** density meter achieving ultimate precision of measurement.

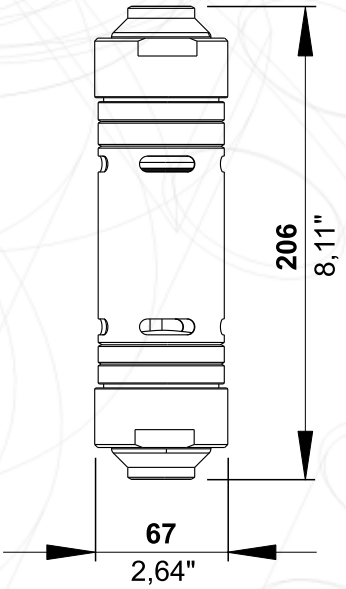
The **MDM-46** sensing element is a specially designed streamlined resonant tube, which is washed on either side by measured liquid. The tube is excited and oscillated at resonant frequency. The oscillation period of the vibrating tube and its frequency characteristics depend on parameters of the measured liquid as its density and viscosity. An integral high accuracy Pt-1000 temperature sensor provides continuous liquid temperature that allows temperature compensation and future calculation of reference density. Calibration constants of the sensor are determined in results of rigorous factory calibration by means of the standard liquids and stored in the EEPROM.

The **MDM-46** series sensor made from stainless steel for general industrial use or from Ni-SpanC for most demanding applications asking for ultimate accuracy in wide temperature range or from Hastelloy for applications where ultimate corrosion resistance is required.



f = 1 / T

f - resonance phase
T - resonator oscillation period



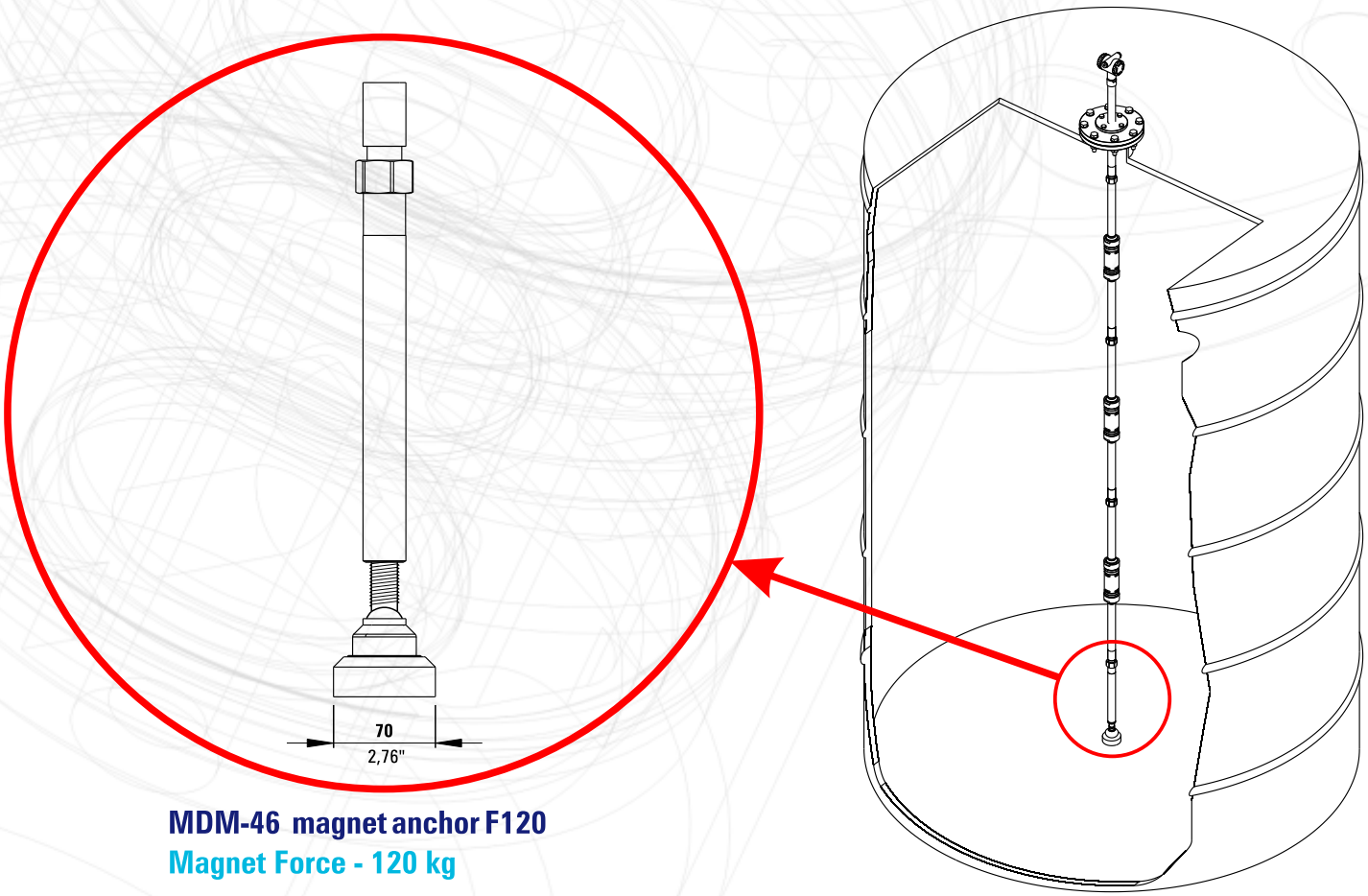
Sensor dimensions, mm

Installation

MDM
Installation Kit

Physically, the **MDM-46** is a 2" pipe (assembled by sections) that is lowered into the tank to the bottom, through a 3" or larger flange opening. The **MDM-46** does not require a stilling well or stand pipe, it can be installed free standing in a cone roof tank. It is a single instrument, thus it requires only one electrical connection (Not multiple tank openings and electrical connections as with other level or level hybrid systems). Spool section for mounting the **MDM-46** on the other half of a 3" or 4" flange face. You do not need to pivot the gauge or lift it out of the gauge pipe temporarily to take a manual gauge or sample.

Installation of the **MDM-46** takes roughly 3-4 hours by a two man crew for a tank height of 50 feet. That includes the time involved in manually carrying the **MDM-46** and **MDM Installation Kit** to the top of the tank. If a cherry picker or hoist is used for moving the equipment to the top of the tank, the installation time can be cut in half.



MDM-46 magnet anchor F120
Magnet Force - 120 kg

For more information please visit www.lemis-process.com

ISO 9001
DNV
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