



**40 SERIES**



# **MULTI-POINT DENSITY METER**

UP TO **16** SENSORS IN ONE DEVICE

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**MDM-40**

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***IN PROCESS TO EXCELLENCE***

# Specifications

## Measuring range:

Density	0... 3 g/cm <sup>3</sup> (0... 3000 kg/m <sup>3</sup> )
Density Standard	0.6... 1.2 g/cm <sup>3</sup> (600... 1200 kg/m <sup>3</sup> )
Temperature	-40... +85°C (-40... +185°F)

## Accuracy:

Density	Up to ±0.00025 g/cm <sup>3</sup> (up to ±0.25 kg/m <sup>3</sup> )
Temperature	±0.2°C (±0.4°F)

## Repeatability:

Density	Up to ±0.000125 g/cm <sup>3</sup> (up to ±0.125 kg/m <sup>3</sup> )
Temperature	±0.1°C (±0.2°F)

## Resolution:

Density	0.0001 g/cm <sup>3</sup> (0.1 kg/m <sup>3</sup> )
Temperature	0.01°C (0.02°F)

## Supported measuring units

Real density: g/cm<sup>3</sup>, kg/m<sup>3</sup>, lb/gal, lb/ft<sup>3</sup>; 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

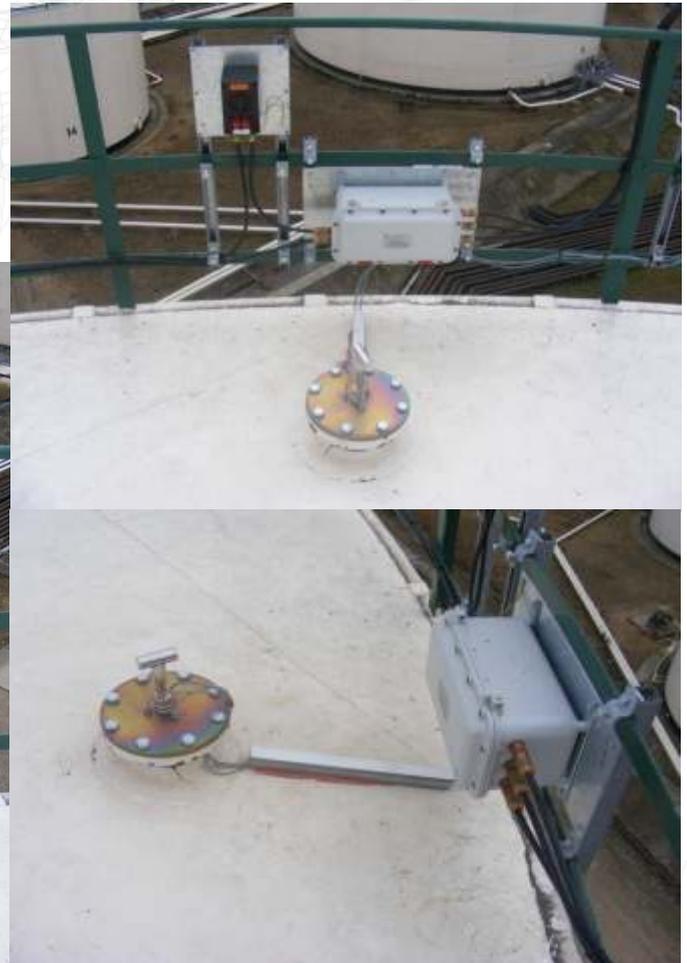
- Density/concentration measurement up to 16 points
- Temperature measurement up to 16 points
- Measurement in tanks up to 35 meters
- Continuous measurements
- High accuracy
- Simple installation
- Suitable for very viscous liquids
- Wide range of applications
- Safe operation, low maintenance
- Easy cleaning
- Rigorous factory testing
- Compact design
- Automatic viscosity/temperature compensation

## Applications

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

## References:

1. **VOPAK TERMINAL, UK (2008)**
2. **PETROCHINA, CHINA (2014)**
3. **HPCL, INDIA (2016)**



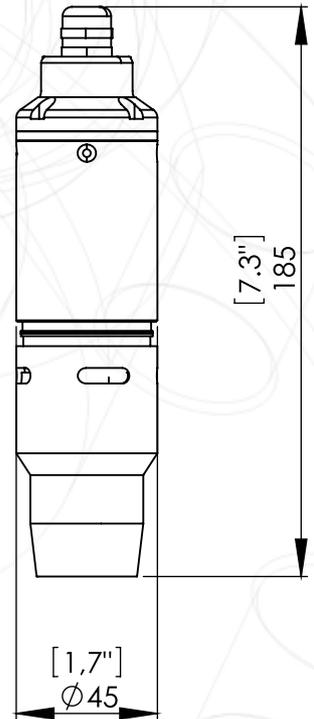
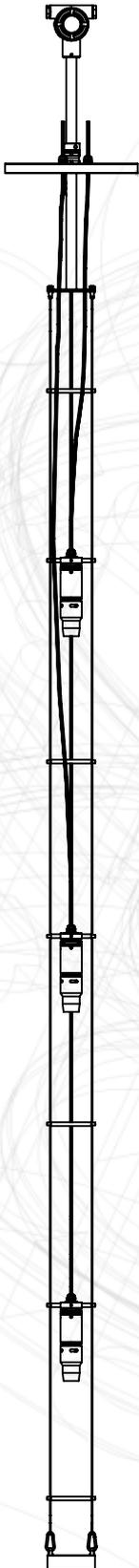
# Sensor

## Principle of operation

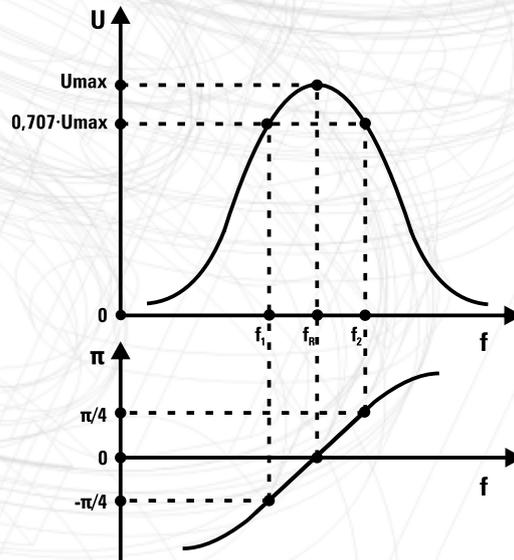
The **MDM-40** measuring principle allows accurate direct measurement liquid density with capability of automatic compensation for liquid's viscosity. This allows **MDM-40** density meter achieving ultimate precision of measurement.

The **MDM-40** 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-40** 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.



## Sensor dimensions



$f = 1 / T$   
 f - resonance phase  
 T - resonator oscillation period

For more information please visit [www.lemis-process.com](http://www.lemis-process.com)



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