

## DC40 series

# LIQUID DENSITY METERS

## for continuous measurement in tanks

**LEMIS Baltic DC40** series of process liquid density meter is ideal for monitoring and control applications within the oil and gas, petrochemical, chemical, food & beverage and other industries.

Use the proven vibrating element technique which is widely accepted as the most accurate method of continuous online density measurement, LEMIS Baltic engineers did new step ahead introducing unique proprietary design of resonant tube sensor which allows the high accuracy of measurement and long term calibration stability even in severe operation conditions. It proves insensitive to plant vibration, high variation of temperatures or liquid viscosity.

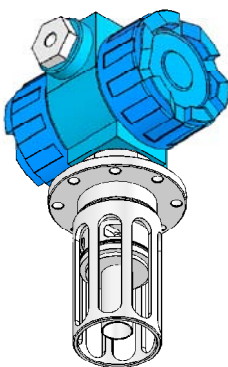
The **DC40** series meters are used in process control where density is the primary control parameter or as an indicator of some other quality control parameter such as % concentration, °Brix, °Baume, specific gravity.

An integral Pt100 temperature sensor provides compensation of the density meter for temperature effect and allows calculation of reference density, API, concentration or specific gravity.

A choice of wetted parts materials : from stainless steel for general industrial use, Ni-SpanC for most demanding applications as fiscal metering, and Hastelloy for applications where ultimate corrosion resistance is required.

### *Product benefits*

- Continuous, online density monitoring at process conditions
- Accurately measures density of liquids with viscosity up to 700cSt
- Rigorous factory calibration and testing of the transducer
- Can operate in pressurized tanks
- Immersion in the tanks up to 30 meters
- No moving parts, virtually maintenance-free system
- Hazardous area approvals
- Large offer of standard product configurations available
- We also can tune system specification for your specific requirements



### *Applications*

- Density monitoring in storage tanks
- Petroleum products and LPG
- Concentrations of acids or corrosive chemical
- Food, Dairy & Beverages
- Product identification and consistency
- Concentration and dilution measurement
- Monitoring of reaction end in reactors

and many others ...





### *Metrology specifications*

|                                  |   |
|----------------------------------|---|
| Density Operating Range          | 0 kg/m <sup>3</sup> to 2000 kg/m <sup>3</sup> (0 to 2 g/cc)                                 |
| Transducer Calibration Accuracy  | Available to $\pm 0.25$ kg/m <sup>3</sup> ( $\pm 0.00025$ g/cc) – see models list           |
| Factory Calibrated Range         | Typical 600 kg/m <sup>3</sup> to 1200 kg/m <sup>3</sup> (0.6 to 1.2 g/cc) – see models list |
| Repeatability                    | 0.1 kg/m <sup>3</sup> ( $\pm 0.0001$ g/cc)  |
| Calibration stability (per year) | < 0.1 kg/m <sup>3</sup> (< $\pm 0.0001$ g/cc)   |
| Viscosity Effect                 | Automatically compensated   |
| Max liquid viscosity, cSt        | Up to 1000 cSt – see models list  |
| Temperature Effect               | automatically compensated   |
| Temperature Measurement          | Built-in high accuracy 4-wire PT100 DIN 43760 Class A                                       |

### *Installation specifications*

|                            |   |
|----------------------------|---|
| Process Temperature Range  | -40°C to +160°C (-40°F to +320°F) – see models list   |
| Installation types         | Direct insertion, Long rigid immersion or flexible - see diagrams                                 |
| Process Connections        | large selection of flanges available<br>ANSI; DIN 50; 1.5" comp; IDF and RJT by installation type |
| Maximum Operating Pressure | 100 bars max or flange rating   |
| Ambient Temperature Range  | -40°C to +85°C (-40°F to +185°F)  |
| Weather Rating             | IP67  |
| Density Meter Dimensions   | See dimensional diagrams  |
| Net Weight                 | 5 kg (11 lb)  |

### *Material Specifications*

|                     |  |
|---------------------|--|
| Sensor              | stainless steel 316L; Ni-Span C; Hastelloy C22 |
| Other Wetted Parts  | stainless steel 316L or Hastelloy C22 (DC408)  |
| Case finish         | stainless steel 316L                           |
| Electronics Housing | aluminum, blue epoxy finish                    |

### *Electrical and Signal Output*

|                         |  |
|-------------------------|--|
| Electrical Connections  | Screw terminals; Cable entry: 2 x 3/4 " NPT                          |
| Sensor Power Supply     | 6 - 12 VDC 30 mA (60 mA pick)  |
| Sensor output           | Line density and temperature digital signals                         |
| Controller Power Supply | 96 - 256 VAC 50/60 Hz  |
| Analog output           | Up to 2 x isolated 4 - 20 mA, direct or reverse-acting, configurable |
| Digital output          | User choice of signals and protocols: RS485; RS232; Modbus; etc...   |

### *Compliance/Certification*

|                       |   |
|-----------------------|---|
| Quality Assurance     | ISO 9001:2000                                 |
| Factory Calibration   | Calibration certificates supplied as standard |
| CE mark               | Compliant EN 61326 ; EN5011 ; EN 50082-2      |
| Hazardous area        | ATEX II 1/2G Ex ia IIB T4                     |
| Material Traceability | Optional certification available              |

## DC40 series

**Products models** To simplify product ordering LEMIS Baltic is offering large choice of standard products with pre-defined configurations that fit most typical industrial applications. If you have specific requirements over the standard list, we can tune system specification for your specific needs.

| Model | Factory calibrated range, g/cc | Accuracy - in all range , g/cc | Max viscosity, cSt | Temperature range, °C | Sensor material |
|-------|--------------------------------|--------------------------------|--------------------|-----------------------|-----------------|
| DC400 | 0.6 to 1.2                     | ±0.0005 g/cc                   | 50 cSt             | -10° to +85°C         | SS 316L         |
| DC401 | 0.6 to 1.2                     | +/-0.001 g/cc                  | 50 cSt             | -10° to +150°C        | SS 316L         |
| DC402 | 0.6 to 1.2                     | ±0.0005 g/cc                   | 200 cSt            | -40° to +85°C         | Ni-Span-C       |
| DC403 | 0.6 to 1.2                     | ±0.0005 g/cc                   | 700 cSt            | -40° to +85°C         | Ni-Span-C       |
| DC404 | 0.6 to 1.2                     | +/-0.001 g/cc                  | 700 cSt            | -10° to +150°C        | Ni-Span-C       |
| DC405 | 0.6 to 1.2                     | +/-0.00025 g/cc                | 50 cSt             | -40° to +85°C         | Ni-Span-C       |
| DC406 | 0.6 to 1.2                     | +/-0.00025 g/cc                | 200 cSt            | -40° to +85°C         | Ni-Span-C       |
| DC407 | 0.4 to 0.7                     | ±0.0005 g/cc                   | 50 cSt             | -40° to +85°C         | Ni-Span-C       |
| DC408 | 0.9 to 1.6                     | ±0.0005 g/cc                   | 50 cSt             | -10° to +85°C         | Hastelloy C22   |
| DC409 | user                           | up to 0.0001 g/cc              | up to 1000 cSt     | -50 to +160 C         | user            |

**Converter DC-series sensors** The optional converter is modern, microprocessor based device made for power supply and signal conversion of the DC series sensors. Equipped with three relay outputs and combined with computer it allows you to automate and control technological process.

### Features



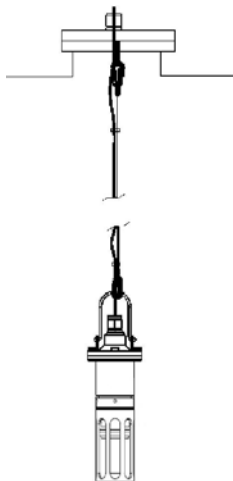
- Automatic temperature compensation
- Digital/graphic display with backlight
- Automatic zero adjustment
- No data loss when switched OFF
- Automates your technological process
- Easy to operate
- RS485, 1 or 2 channels 4-20 mA output



**Calibration and Service** Calibration of LEMIS Baltic density meters is performed in-house according ISO9001:2000 quality assurance program and by using calibration materials that are traceable to national standards. In-house calibration and testing is performed specified dedicated calibration protocol for every standard model of the sensor. For most applications, on-site calibration is generally not required. LEMIS Baltic sensors allows simple, switch-and-go field installation.

## Product installation

Correct installation is a key factor for accurate long-term measurement of density of liquids at process conditions. LEMIS Baltic offers a choice of product configurations to fit different applications.

| Type | Drawing   | Description   |
|------|---|---|
| D    | <p>Direct insertion mounting (D-type)</p>  | <p>The sensor can be installed into a hole in process reservoir or into large diameter pipelines with low flow rate. The sensor installation is possible into pressurized tanks with internal pressure up to 100 bars. Large choice of process connection flanges is available.</p>   |
| R    | <p>Long Rigid mounting (R-type)</p>       | <p>The sensor is installed vertically into a tank with depth up to 6 meters. Large choice of process connection flanges is available. Sensor operating electronic is located into the connection box outside of the tank. Length of the stainless steel connecting stem is customized. Please indicate the stem length when ordering.</p> |
| F    | <p>Long Flexible mounting (F-type)</p>   | <p>The sensor can be immersed into a deep tank up to 30 meters on a flexible cord. The sensor electronics is located into encapsulated chamber and immersed into the tank along with the sensor. Please indicate the cord length when ordering.</p>   |

# DC40 series

## Ordering information

### DC40 series Density meter for continuous measurement in tanks

| Code Model | Factory calibrated range, g/cc | Accuracy - in all range, g/cc      | Max viscosity, cSt              | Temperature range, °C          | Wetted Parts material |
|------------|--------------------------------|------------------------------------|---------------------------------|--------------------------------|-----------------------|
| DC400      | 0.6 to 1.2                     | ±0.0005 g/cc                       | 50 cSt                          | -10° to +85°C                  | SS 316L               |
| DC401      | 0.6 to 1.2                     | +/-0.001 g/cc                      | 50 cSt                          | -10° to +150°C                 | SS 316L               |
| DC402      | 0.6 to 1.2                     | ±0.0005 g/cc                       | 200 cSt                         | -40° to +85°C                  | SS 316L               |
| DC403      | 0.6 to 1.2                     | ±0.0005 g/cc                       | 700 cSt                         | -40° to +85°C                  | SS 316L               |
| DC404      | 0.6 to 1.2                     | +/-0.001 g/cc                      | 700 cSt                         | -10° to +150°C                 | SS 316L               |
| DC405      | 0.6 to 1.2                     | +/-0.00025 g/cc                    | 50 cSt                          | -40° to +85°C                  | SS 316L               |
| DC406      | 0.6 to 1.2                     | +/-0.00025 g/cc                    | 200 cSt                         | -40° to +85°C                  | SS 316L               |
| DC407      | 0.4 to 0.7                     | ±0.0005 g/cc                       | 50 cSt                          | -40° to +85°C                  | SS 316L               |
| DC408      | 0.9 to 1.6                     | ±0.0005 g/cc                       | 50 cSt                          | -10° to +85°C                  | Hastelloy C22         |
| DC409      | user choice                    | user choice<br>(up to 0.0001 g/cc) | user choice<br>(up to 1000 cSt) | user choice<br>(-50 to +160 C) | user choice           |

### Code Installation

|          |                                    |
|----------|------------------------------------|
| <b>D</b> | Direct insertion mounting (D-type) |
| <b>R</b> | Long Rigid mounting (R-type)       |
| <b>F</b> | Long Flexible mounting (F-type)    |

| Code     | Length (for R and F) |          | Diagram |
|----------|----------------------|----------|---------|
|          | (R-type)             | (F-type) |         |
| <b>0</b> | For D                | For D    |         |
| <b>1</b> | 250 cm               | 1 m      |         |
| <b>2</b> | 500 cm               | 3 m      |         |
| <b>3</b> | 1000 cm              | 5 m      |         |
| <b>4</b> | 1500 cm              | 7 m      |         |
| <b>5</b> | 2000 cm              | 10 m     |         |
| <b>6</b> | 3000 cm              | 15 m     |         |
| <b>7</b> | 4000 cm              | 20 m     |         |
| <b>8</b> | 6000 cm              | 30 m     |         |
| <b>9</b> | user                 | user     |         |

### Code Process connections

|            |                                    | Available for : |
|------------|------------------------------------|-----------------|
| <b>A6</b>  | 2" ANSI 150 RF                     | D.or R.         |
| <b>A7</b>  | 2" ANSI 300 RF                     | D.or R.         |
| <b>A8</b>  | 2" ANSI 600 RF                     | D.or R.         |
| <b>A9</b>  | 2" ANSI 900 RF                     | D.or R.         |
| <b>D7</b>  | 50 mm DIN 2527 RF DN 50/PN 10      | D.or R.         |
| <b>D8</b>  | 50 mm DIN 2527 RF DN 50/PN 16      | D.or R.         |
| <b>D9</b>  | 50 mm DIN 2527 RF DN 50/PN 25      | D.or R.         |
| <b>D10</b> | 50 mm DIN 2527 RF DN 50/PN 40      | D.or R.         |
| <b>C6</b>  | COUPLING 2 inch TRI-CLAMP          | D.or R.         |
| <b>C7</b>  | COUPLING 50 mm ISO 2853            | D.or R.         |
| <b>C8</b>  | COUPLING 50 mm DIN 11851           | D.or R.         |
| <b>A11</b> | 3" ANSI 150 RF                     | R               |
| <b>A12</b> | 3" ANSI 300 RF                     | R               |
| <b>A13</b> | 3" ANSI 600 RF                     | R               |
| <b>A16</b> | 4" ANSI 150 RF                     | R               |
| <b>A17</b> | 4" ANSI 300 RF                     | R               |
| <b>A18</b> | 4" ANSI 600 RF                     | R               |
| <b>D15</b> | 80 mm DIN 2527 RF DN 80/PN 40      | R               |
| <b>D19</b> | 100 mm DIN 2527 RF DN 100/PN 25    | R               |
| <b>D20</b> | 100 mm DIN 2527 RF DN 100/PN 40    | R               |
| <b>S</b>   | 1.5" Cone seat compression fitting | D               |
| <b>LB</b>  | 75 mm LB 8                         | D               |
| <b>X</b>   | Special Customized                 | D or R or F     |

### Code Data Output

|           |                                |
|-----------|--------------------------------|
| <b>A1</b> | RS-485                         |
| <b>A2</b> | RS-485 EX                      |
| <b>B1</b> | RS-485 + 4-20 mA - 1 chanel    |
| <b>B2</b> | RS-485 + 4-20 mA - 1 chanel EX |
| <b>B3</b> | RS-485 + 4-20 mA - 2 chanel    |
| <b>B4</b> | RS-485 + 4-20 mA - 2 chanel EX |
| <b>C1</b> | 4-20 mA - 1 chanel             |
| <b>C2</b> | 4-20 mA - 1 chanel EX          |
| <b>C3</b> | 4-20 mA - 2 chanel             |
| <b>C4</b> | 4-20 mA - 3 chanel EX          |
| <b>X</b>  | Special Customized             |

DC401. R3. A6. A1      [Example of ordering part number](#)