Simultaneous density and viscosity monitoring in diverse processes
- Repeable measurements in both Newtonian and non-Newtonian, single- and multi-phase fluids
- Hermetically sealed, all 316L stainless steel wetted parts
- Built in fluid temperature measurement

Specifications

Fluid Measurements
- Viscosity Range: 1 to 3,000 cP
- Viscosity Accuracy: 5% of reading (standard)
- Density Range: 0.4 to 4.0 g/cc
- Density Accuracy: 0.01 g/cc
- Reproducibility: Better than 1% of reading
- Temperature: Pt1000 (DIN EN 60751 Class B)
  - Calibrated to NIST traceable viscosity and density standards.

Operational Environment
- Process Fluid Temperature: -40 up to 200 °C
- Ambient Temperature: -40 up to 150 °C
- Pressure Range: up to 5,000 psi

Mechanical
- Material (Wetted parts): 316L Stainless Steel
- Diameter x Length: Ø35 x 140 mm
- Process Connection: 3/4" NPT
- Flange & sanitary connections available
- Ingress Protection: IP68
- Electrical Connection: M12 (8-pin, A-coded)

Electronics & Communication
- Analog output: 4-20 mA (3 channel)
  (Viscosity, Density, Temp.)
- Digital output: Modbus RTU (RS-485)
  Ethernet
  USB
- Wireless output: Bluetooth LE 4.0
- Display (SME-TRD): Multi-line LCD
  (max. 55°C)
  Operational temp.
  Power supply: 24 V DC
  SME-TR(D)
  SME-DRM
  Software: Data acquisition and service control panel
  iOS and Android app

Contact:
rheonics • Switzerland • USA • www.rheonics.com • info@rheonics.com
+41 52 511 32 00 +1 713 364 5427

Protected by US and International patents granted and pending
Operating principle

The rheonics SRD measures viscosity and density by means of a torsional resonator, the finned end of which is immersed in the fluid under test. The more viscous the fluid, the higher the mechanical damping of the resonator, and the denser the fluid, the lower its resonant frequency. From the damping and resonant frequency, the density and viscosity may be calculated by means of rheonics’ proprietary algorithms. Thanks to rheonics’ symmetric resonator design (US patent number 9267872), the transducer is isolated from the fluid in a hermetically sealed capsule, while maintaining excellent mechanical isolation from the sensor’s mounting. Damping and resonant frequency are measured by the rheonics sensing and evaluation electronics (US patent number 8291750). Based on rheonics’ proven gated phase-locked loop technology, the electronics unit offers stable and repeatable, high-accuracy readings over the full range of specified temperatures and fluid properties.

Application

Metering and Interface detection
- Highly accurate and reliable density measurement
- Interface detection to recognize product change

Blending and Batching
- Real-time molar ratio control in chemical reactions through continuous concentration measurement

Biofuels and Petroleum
- In Biofuel production monitor density to distinguish between raw materials and separated products
- In refinery distillation column, differentiate fractions based on density and viscosity - between gasoline, diesel, lubricant and marine fuel
- Continuous measurement - eliminate manual sampling and laboratory time
- Inspect quality of end product at refinery, gas station, in aeroplane and on ship
- Small form factor for direct installation in flow lines

Beverages and Dairy
- Concentration monitoring in soft drink blending
- Continuous sugar concentration read-out in fermentation
- Measure wort density in beer brewing
- Density monitoring across the dairy production process

Other applications:
- Continuous electrolyte density check in battery
- Adapt process to variable raw material quality (eg. due to stratification in tanks) by monitoring density and viscosity of the raw material in real-time
- Measure concentration of lime slurry (calcium hydroxide)
- Ink and coating density and viscosity monitoring for equipment control and QA
- Lubricant density and viscosity monitoring
- Fuel consumption (density) and quality (density, viscosity) monitoring
**Mechanical & Electrical**

**Electronics (select between)**

- **SME-TRD**
  - Transmitter housing (IP66)
  - Onsite and remote installation of electronics head
  - Available with and without rugged display for field use

- **SME-TR**
  - DIN rail mount
  - Extra-small form factor for easy installation
  - Ethernet connection
  - External adapters for wifi

- **SME-DRM**

**Mechanical**

- 316L stainless steel (standard)
- Available with custom coatings
- Long insertion adapters for installation in larger pipes and tanks

**Process connection**

- 3/4” NPT (standard)
- Adapters available for Flange and Tri-clamp
- Sanitary fittings optional

**Mounting**

- **Pipe**
  - Any configuration possible including long insertion adapters

- **Tank**
  - Any configuration possible including long insertion adapters
SRD
INLINE PROCESS DENSITY METER AND VISCOMETER

Electronics installation

Dimensions

SRD-DS-1706
SRD
INLINE PROCESS DENSITY METER AND VISCOMETER

SRD dimensions

Front View

Top View

Perspective View

Software

rheonics Application

PC Data Acquisition & Analysis

Connect using:
- Bluetooth
- Cloud
- Real-time data
- Process view
- Alerts
- Configure
- iOS

Connect over:
- USB
- Ethernet
- Bluetooth
- Cloud
- Configure sensor
- Check calibration
- Firmware upgrade

rheonics • Switzerland • USA • www.rheonics.com • info@rheonics.com  
+41 52 511 32 00  +1 713 364 5427  
SRD-DS-1706
## SRD
INLINE PROCESS DENSITY METER AND VISCOMETER

### Ordering

**Ordering code example**

<table>
<thead>
<tr>
<th>Order code</th>
<th>Name</th>
<th>Short description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRD</td>
<td>V1</td>
<td>Viscosity range 1 - 3000 cP Standard calibrated range</td>
</tr>
<tr>
<td></td>
<td>V2</td>
<td>Viscosity range custom Customer specified calibration range (max. 10,000 cP)</td>
</tr>
<tr>
<td></td>
<td>STD</td>
<td>Viscosity Calibration Standard calibration</td>
</tr>
<tr>
<td></td>
<td>CUS</td>
<td>Viscosity Calibration Custom specific calibrations - specify viscosity range, accuracy required and operational conditions</td>
</tr>
<tr>
<td></td>
<td>D1</td>
<td>Density range 0.4 - 1.5 g/cc Standard range</td>
</tr>
<tr>
<td></td>
<td>D2</td>
<td>Density range custom Customer specified range (max. 4 g/cc)</td>
</tr>
<tr>
<td></td>
<td>DCAL1</td>
<td>Density Calibration Standard calibration accuracy</td>
</tr>
<tr>
<td></td>
<td>DCAL2</td>
<td>Density Calibration Custom specific calibrations - specify density range, accuracy required and operational conditions</td>
</tr>
<tr>
<td></td>
<td>E1</td>
<td>Electronics SME-TRD Transmitter housing with display</td>
</tr>
<tr>
<td></td>
<td>E2</td>
<td>Electronics SME-TR Transmitter housing with solid cover</td>
</tr>
<tr>
<td></td>
<td>E3</td>
<td>Electronics SME-DRM DIN-rail mount housing</td>
</tr>
<tr>
<td></td>
<td>C1</td>
<td>Communication 4-20 mA 3 channels of 4-20 mA analog signal</td>
</tr>
<tr>
<td></td>
<td>C2</td>
<td>Communication Modbus RTU (RS-485) Modbus RTU over RS-485</td>
</tr>
<tr>
<td></td>
<td>C3</td>
<td>Communication USB USB 2.0 compliant service and data acquisition port</td>
</tr>
<tr>
<td></td>
<td>C4</td>
<td>Communication Ethernet Ethernet TCP/IP with RJ45 connector</td>
</tr>
<tr>
<td></td>
<td>C5</td>
<td>Communication Bluetooth LE 4.0 Bluetooth module for short range communication, only available with display module</td>
</tr>
<tr>
<td></td>
<td>T1</td>
<td>Temperature 125 °C Sensor rated for operation in process fluids up to 125 °C (250 °F)</td>
</tr>
<tr>
<td></td>
<td>T2</td>
<td>Temperature 150 °C Sensor rated for operation in process fluids up to 150 °C (300 °F)</td>
</tr>
<tr>
<td></td>
<td>T3</td>
<td>Temperature 200 °C Sensor rated for operation in process fluids up to 200 °C (400 °F)</td>
</tr>
<tr>
<td></td>
<td>T4</td>
<td>Temperature &gt; 200 °C Sensor rated for operation in process fluids above 200 °C (&gt;400 °F)</td>
</tr>
<tr>
<td></td>
<td>P1</td>
<td>Pressure 15 bar (200 psi) Sensor rated for process fluids pressure up to 15 bar (200 psi)</td>
</tr>
<tr>
<td></td>
<td>P2</td>
<td>Pressure 70 bar (1000 psi) Sensor rated for process fluids pressure up to 70 bar (1000 psi)</td>
</tr>
<tr>
<td></td>
<td>P3</td>
<td>Pressure 200 bar (3000 psi) Sensor rated for process fluids pressure up to 200 bar (3000 psi)</td>
</tr>
<tr>
<td></td>
<td>P4</td>
<td>Pressure 350 bar (5000 psi) Sensor rated for process fluids pressure up to 350 bar (5000 psi)</td>
</tr>
<tr>
<td></td>
<td>X1</td>
<td>Process Connection 3/4&quot; NPT Standard</td>
</tr>
<tr>
<td></td>
<td>X2</td>
<td>Process Connection Flange Threaded flange adapter, specify DN/PN</td>
</tr>
<tr>
<td></td>
<td>X3</td>
<td>Process Connection Tri-clamp Threaded TC adapter, specify size</td>
</tr>
</tbody>
</table>

### Accessories

- **Sensor cable**: 5m, 10m, 30m 8 core cable for connecting sensor to transmitter (PUR or PEEK sheaths)
- **Cable gland**: 1/2" NPT Standard and Ex cable glands
- **Transmitter mounting bracket**: Mounting bracket for SME-TR and SME-TRD transmitter housings

### Contact Information

**rheonics GmbH**
Klosterstrasse 19
8406 Winterthur
Switzerland
+41 52 511 32 00

**rheonics Inc.**
3 Sugar Creek Center Blvd, Ste 100
Sugar Land, TX 77478
United States of America
+1 713 364 5427

**www.rheonics.com**
info@rheonics.com

†subject to change without notice
SRD-DS-1706

*Protected by US and International patents granted and pending*