SRV
WIDE VISCOSITY RANGE INLINE PROCESS VISCOMETER

• Repeatable measurements in both newtonian and non-newtonian
• Hermetically sealed, available in 316L stainless steel and Hastelloy C22 wetted parts
• Built in fluid temperature measurement

Specifications

Fluid Measurements

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viscosity Range</td>
<td>3 to 10,000 cP (0.5 to 50,000 cP available)</td>
</tr>
<tr>
<td>Viscosity Accuracy</td>
<td>5% of reading (standard)</td>
</tr>
<tr>
<td></td>
<td>1% &amp; higher accuracy available</td>
</tr>
<tr>
<td>Reproducibility</td>
<td>Better than 0.1% of reading</td>
</tr>
<tr>
<td>Temperature</td>
<td>Pt1000 (DIN/EN 60751 class B)</td>
</tr>
</tbody>
</table>

Calibrated to NIST traceable viscosity standards.

Operational Environment

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process Fluid Temperature</td>
<td>-40 up to 285 °C</td>
</tr>
<tr>
<td></td>
<td>-40 up to 545 °F</td>
</tr>
<tr>
<td>Pressure Range</td>
<td>up to 10,000 psi</td>
</tr>
<tr>
<td></td>
<td>up to 690 bar</td>
</tr>
</tbody>
</table>

Mechanical

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material (Wetted parts)</td>
<td>Stainless steel 316L</td>
</tr>
<tr>
<td></td>
<td>Hastelloy C22</td>
</tr>
<tr>
<td>Variant</td>
<td>Flush, Short, Long insertion</td>
</tr>
<tr>
<td>Process Connection</td>
<td>Threaded, Flange, Sanitary</td>
</tr>
<tr>
<td></td>
<td>EHEDG certified hygienic available</td>
</tr>
<tr>
<td>Ingress Protection</td>
<td>IP69K</td>
</tr>
<tr>
<td>Electrical Connection</td>
<td>M12 (8-pin, A-coded)</td>
</tr>
<tr>
<td></td>
<td>Limited by the M12 connector Prating</td>
</tr>
</tbody>
</table>

Electronics & Communication

Analog output

4-20 mA (3 channel) (Viscosity, Density, Temp.)

Digital output

- Modbus RTU (RS-485)
- Ethernet (Ethernet/IP, Modbus TCP, Profinet)
- USB
- HART

Wireless output

Bluetooth LE 4.0

Display

- Multi-line LCD (SME-TRD)
- Operational temp. -20 to 65 °C
- Power supply 24 V DC
- SME-TR(D) IP65/66
- SME-DRM IP40/50

Software

- Data acquisition and service control panel
- iOS and Android app

Protected by US and International patents granted and pending
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SRV-DS-2212
Operating principle

The rheonics SRV measures viscosity by means of a balanced torsional resonator, one end of which is immersed in the fluid under test. The more viscous the fluid, the higher the mechanical damping of the resonator. By measuring the damping, the product of viscosity x density may be calculated by rheonics' proprietary algorithms. The resonator is both excited and sensed by means of an electromagnetic transducer mounted in the sensor’s body. Thanks to rheonics’ patented symmetric resonator design, the transducer is isolated from the fluid in a hermetically sealed capsule, while maintaining excellent mechanical isolation from the sensor’s mounting. Damping is measured by the rheonics patented sensing and evaluation electronics. 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

Painting and coating
- Optimize solvents and lacquer use in the process
- Control the coating process regardless of temperature
- Eliminates the need for costly destructive testing
- Ensure uniform film thickness and adhesion
- Eliminate manual sampling and laboratory time
- Reduce wastage & ensure quality of end product
- Small form factor for direct installation in printing presses and painting nozzles

Polymers and Slurries
- Monitor the viscosity change through the complete polymerization process
- End-point detection and real-time monitoring
- Avoid blockage through instantaneous and early detection of viscosity build-up
- Check incoming raw material quality and ensure outgoing product quality
- Ensure process control and stability
- Scale from pilot plants to production rapidly without further application engineering

Other applications:
- Pump efficiency optimization and pipeline leak monitoring
- HFO/MDO viscosity monitoring in fuel conditioning units on-board ships
- SAGD heavy oil viscosity control for transport through heating and slurry formation
- Viscosity monitoring and control in multiple food manufacturing processes for making dough, chocolate, cream, cheese, jams, mayonnaise, etc
- Ink viscosity monitoring and control for printing
- Lubricants viscosity monitoring and control

Response of the same resonator immersed in two fluids of different viscosities

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WIDE VISCOSITY RANGE INLINE PROCESS VISCOMETER

Mechanical & Electrical

Electronics (select between)

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

- SME-TR
  - DIN rail mount
  - Extra-small form factor for easy installation
  - Ethernet connection

- SME-DRM
  - Available with and without display for field use

Process fluid wetted materials available
- 316L stainless steel (standard)
- Available with custom coatings, Hastelloy C22

Process connection
- Flush, Short and Long insertion probes
- Threaded, Flange, Tri-clamp, Varinline, Ingold, API, 6A
- EHEDG certified hygienic version

Mounting

Pipe
- NPT thread
- Flanged
- Tri-clamp
- Long insertion probe

Tank
- Any configuration possible including long insertion adapters

Cable Gland
- Standard
- Ex Rated

Sensor Cable
- Up to 1,500m (4,921 ft.)

M12 connector
- IP67 | IP68 | IP69K

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Electronics installation

Industrial high-contrast LCD
Bluetooth LE 4.0
Status LED

Dimensions

The sizes provided are approximate and may not be exact.
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WIDE VISCOSITY RANGE INLINE PROCESS VISCOMETER

SRV dimensions

Front View
Perspective View

The sizes provided are approximate and may not be exact.

Software

rheonics Application

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

PC Data Acquisition & Analysis

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

We recommend using the online RFQ form: https://rheonics.com/request-for-quotation/
For sensor accessories visit: https://rheonics.com/product-accessories/

Ordering code example

<table>
<thead>
<tr>
<th>SRV</th>
<th>V1</th>
<th>V2</th>
<th>V3</th>
<th>V4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viscosity range</td>
<td>Calibration</td>
<td>Electronics</td>
<td>Communication</td>
<td>Temperature</td>
</tr>
<tr>
<td>V1</td>
<td>3 - 3000 cP</td>
<td>STD</td>
<td>E1</td>
<td>C1, C2</td>
</tr>
<tr>
<td>V2</td>
<td>3 - 50,000 cP</td>
<td>STD</td>
<td>E1</td>
<td>C1, C2</td>
</tr>
<tr>
<td>V3</td>
<td>0.5 - 3000 cP</td>
<td>STD</td>
<td>E1</td>
<td>C1, C2</td>
</tr>
<tr>
<td>V4</td>
<td>custom</td>
<td>STD</td>
<td>E1</td>
<td>C1, C2</td>
</tr>
</tbody>
</table>

Viscosity range (select all)

V1 3-3000 cP Standard calibrated range
V2 3 - 50,000 cP Extended calibrated range
V3 0.5 - 3000 cP Extended lower calibrated range
V4 custom Customer specified calibrated range within 0.5 - 50,000 cP

Calibration (select all)

STD Standard calibration
CUS Customer specific calibrations - specify viscosity range, accuracy required and operational conditions

Electronics (select one)

E1 SME-TRD Transmitter housing with display
E2 SME-1R Transmitter housing with solid cover
E3 SME-DRM DIN-rail mount housing

Communication (select all)

C1 4-20 mA 3 channels of 4-20 mA analog signal
C2 Modbus RTU (RS-485) Modbus RTU over RS-485
C3 USB USB 2.0 compliant service and data acquisition port
C4 Ethernet Ethernet over RJ-45 connector
C5 Bluetooth LE 4.0 Bluetooth module for short range wireless communication (only for E1)
C6 Modbus TCP Modbus TCP over Ethernet
C7 Ethernet/IP Ethernet/IP protocol
C8 HART HART over analog channels
C9 Profinet Profinet protocol

Temperature (select one)

T1 125 °C (250 °F) Sensor rated for operation in process fluids up to 125 °C (250 °F)
T2 150 °C (300 °F) Sensor rated for operation in process fluids up to 150 °C (300 °F)
T3 200 °C (400 °F) Sensor rated for operation in process fluids up to 200 °C (400 °F)
T4 Max. operating temp. Specify your required maximum temperature

Pressure (select one)

P1 15 bar (200 psi) Sensor rated for process fluids pressure up to 15 bar (200 psi)
P2 70 bar (1000 psi) Sensor rated for process fluids pressure up to 70 bar (1000 psi)
P3 200 bar (3000 psi) Sensor rated for process fluids pressure up to 200 bar (3000 psi)
P4 500 bar (7500 psi) Sensor rated for process fluids pressure up to 500 bar (7500 psi)
P5 750 bar (11240 psi) Sensor rated for process fluids pressure up to 750 bar (11240 psi)

Process Connection (select one)

X1 Threaded Threaded process connection - 3/4" NPT or G1/2"x
X2 Flange Flange adapter, specify DN/PN - Hygienic EHEDG certified version available
X3 Tri-clamp Tri-clamp flange, specify size - Hygienic EHEDG certified version available
X4 Hygienic Specify Hygienic connection required
X5 FPC version Long insertion probe, specify insertion length and flange - Hygienic EHEDG certified version available

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