RealShear™ M-Series Wall Shear Stress Sensor

Lenterra’s RealShear™ M-series Wall Shear Stress Sensors enable direct measurement of wall shear stress induced by fluids in mixers and pipes. With a housing shaft diameter of 0.135” (3.4 mm) they are half the diameter of our F-series sensors, enabling them to be installed in locations which require a more miniaturized form factor. The sensor is mounted flush with a pipe or vessel wall, or rotor/stator workhead, to provide in-line real-time measurement with no disruption of process flow. When paired with an LOI Optical Interrogator, the RealShear™ sensor provides fast and continuous measurements for a wide range of applications.

### Probe features

- Stainless steel construction, sterilizable and chemically resistant
- Fiber optic sensing – no electromagnetic interference and no ignition hazard
- High measurement rate (500 per second)
- Simultaneous measurements of wall shear stress and temperature
- Directional measurement
- Turn-key operation when coupled with Lenterra Optical Interrogator (LOI)
- Wide range of sensitivities (model dependent)

### Models

<table>
<thead>
<tr>
<th>Model number</th>
<th>Measurement range $^1$, Pa</th>
<th>Resolution $^2,3$, Pa</th>
<th>Nominal Resonance Frequency, Hz</th>
<th>Housing shaft length, mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-200</td>
<td>±200</td>
<td>0.4</td>
<td>70</td>
<td>40.6</td>
</tr>
<tr>
<td>M-600</td>
<td>±600</td>
<td>1.6</td>
<td>80</td>
<td>40.6</td>
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<tr>
<td>M-2K</td>
<td>±2,000</td>
<td>5</td>
<td>150</td>
<td>40.6</td>
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<tr>
<td>M-5K</td>
<td>±5,000</td>
<td>11</td>
<td>220</td>
<td>40.6</td>
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<tr>
<td>M-25K</td>
<td>±25,000</td>
<td>40</td>
<td>440</td>
<td>40.6</td>
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<tr>
<td>M-100K</td>
<td>±100,000</td>
<td>80</td>
<td>900</td>
<td>30.6</td>
</tr>
</tbody>
</table>

$^1$ Custom measurement ranges available

$^2$ When used with a Lenterra LOI interrogator

$^3$ Corresponds to standard deviation of the zero wall shear stress noise

### Threaded housing shaft

6-80 thread, 0.135” [3.4mm] major dia

### Optical wavelength

1556.5 nm

### Operating temperature $^4$

-10°C to 120°C (14°F to 248°F)

### Storage temperature

-10°C to 60°C (-14°F to 140°F)

$^4$ Operating temperature is for the pin thermally insulated from the instrument cable
Specifications

**Probe construction**

**Housing**
Hollow stainless steel (316L) threaded (6-80 thread) shaft with 5/8" hexagon head. Fiber Bragg gratings adhered to the stainless steel (316L) lever inside housing.

**Floating element**
Material: SS 316L

**Instrument cable**
- **PVC tube**
- **Furcation tube**
- **Stainless steel squarelock tube**
- **Optical fibers**
Material: SS squarelock tube covered with PVC tube
Outside diameter: 0.24" (6.1mm)
Length: 6.5 ft (2m)
Operating temperature: -10°C to 60°C (14°F to 140°F)

**Fiber optic connector**
Type: Duplex LC/PC fiber connector
Ingress Protection: IP67 - Dust Tight, Waterproof
Operating temperature: -40°C to 85°C (-40°F to 180°F)

**Base**
Material: SS 316L

**Strain relief boot**
Material: Polyolefin Plastic

**Directional response**

*Sensitivity vs. flow direction*

Specifications are subject to change without notice