

# LaserFlow<sup>®</sup>

## Non-Contact Subsurface Velocity Sensor

The LaserFlow<sup>®</sup> velocity sensor remotely measures flow in open channels with non-contact Laser Doppler Velocity technology and non-contact Ultrasonic Level technology. The sensor uses advanced technology to measure velocity with a laser beam at single or multiple points below the surface of the wastewater stream.

*The only non-contact flow measurement device to read below the surface.*

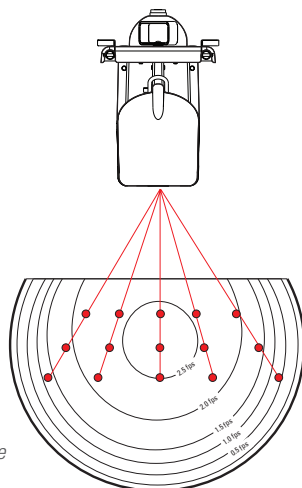
The sensor uses an ultrasonic level sensor to measure the level and determines a sub-surface point to measure velocity. The sensor then focuses its laser beam at this point and measures the frequency shift of the returned light.

The LaserFlow is ideal for a broad range of wastewater monitoring applications. It is compatible with both the Teledyne ISCO Signature<sup>®</sup> Flow Meter and the 2160 LaserFlow Module, depending on the type of installation.

During submerged conditions, flow measurement continues without interruption with optional continuous wave Doppler Ultrasonic Area Velocity technology.

With its specially designed mounting bracket in place, the LaserFlow can be deployed and removed from street level. This avoids the risk and expense of confined space entry. A variety of communication options enable programming and data retrieval from a remote location. Information about data quality can be recorded and transmitted with the flow data.

Additionally, built-in diagnostic tools simplify installation, maintenance, and advanced communication options reduce site visits.



*The LaserFlow device can be programmed to take velocity measurements at single or multiple points below the water's surface.*



## LaserFlow<sup>®</sup>

### Applications:

- Permanent and portable flow measurement for CSO, SSO, I&I, SSEs, CMOM, and other sewer monitoring programs
- Wastewater treatment plant influent, process, and effluent flow measurement
- Industrial process and discharge flow measurement
- Stormwater conveyance and outfall
- Irrigation canals and channels
- Shallow flow measurement in varying pipe sizes

### Standard Features:

- Non-contact velocity and level measurement
- Single or multiple point measurement below the liquid surface
- Rugged, submersible enclosure with IP68 ingress protection
- Zero deadband from measurement point in non-contact level and velocity measurements
- Quality readings without manual profiling
- Bidirectional velocity measurement

## LaserFlow® Sensor

Size (H x W x D):	14.96 x 10.3 x 22.32 in (38.01 x 26.21 x 56.7 cm)
Weight :	8.7 kg (19.2 lbs)
Materials:	Conductive Carbon Filled ABS, SST, Conductive Kynar® <sup>a</sup> , Anodized Aluminum, UV Rated PVC
Cable Lengths:	32.8 or 75.5 ft (10 or 23 m) <sup>b</sup>
Enclosure:	IP68
Certifications:	CE EN61326; FDA CDRH 21CFR1040; IEC 60825-1
Laser Class:	Class 3R
Temperature Range:	Operating: -4 to 140 °F (-20 to 60 °C) Storage: -40 to 140 °F (-40 to 60 °C)
Power Required:	Input voltage: 8 to 26 VDC 12 VDC Nominal
Flow Accuracy:	±4% of reading <sup>c</sup>
Communication Protocol:	TIENet™

## Velocity

Technology:	Non-Contact, Subsurface Laser Doppler Velocity (patented)
Measurement Range:	-15 ft/s to 15 ft/s (-4.6 m/s to 4.6 m/s)
Maximum distance from liquid surface to bottom of sensor:	10 ft (3 m)
Minimum depth:	0.5 in (0.01 m) <sup>c</sup>
Direction:	Selectable Bidirectional Measurement <sup>d</sup>
Accuracy:	±0.5% of reading 0.1 ft/s (±0.03 m/s)
Minimum Velocity:	0.5 ft/s (0.15 m/s)

## Level

Technology:	Non-Contact Ultrasonic
Measurement Range:	0 to 10 ft (0 to 3 m) from measurement point
Accuracy @ 72 °F (22 °C)	0.02 ft (±0.006 m) at <1 ft level change 0.04 ft (±0.012 m) at <1 ft level change
Temperature Coefficient within compensated range:	± 0.0002 x D (m) per degree C ± 0.00011 x D (ft) per degree F (D = Distance from transducer to liquid surface)
Beam Angle:	10° (5° from center line)
Ultrasonic Signal:	50 KHz
Deadband:	Zero deadband from bottom of LaserFlow sensor <sup>e</sup>

## Optional Surcharge Measurement:

### TIENet™ 350 Area Velocity Sensor

Probe Size (H x W x L):	0.75 x 1.3 x 6.0 in (19 x 33 x 152 mm)
Materials:	Sensor: Epoxy, chlorinated CPVC, SST Cable: UV-Rated PVC
Certifications:	CE EN61326
Temperature Range:	32 to 158 °F (0 to 70 °C)

## Velocity

Technology:	Submerged Continuous Wave Doppler
Ultrasonic:	Measurement
Range:	-5 to 20 ft/s (-1.5 to 6.1 m/s)
Velocity Measurement:	Bidirectional
Accuracy:	±0.1 ft/s (±0.03 m/s) from -5 to 5 ft/s ±2% of reading from 5 to 20 ft/s, Uniform velocity profile
Minimum Depth:	0.08 ft (25 mm)
Frequency:	500 kHz

## Level

Technology:	Submerged Differential Linear Pressure Transducer
Measurement Range:	0.033 to 10 ft (0.01 to 3.05 m)
Accuracy:	± 0.10% of full scale
Maximum Depth:	34 ft (10.5 m)
Stability:	±0.023 ft/yr (±0.007 m/yr)

## Options and Accessories

- Flow measurement during submerged conditions via Ultrasonic Doppler technology
- Redundant flow measurement with simultaneous Continuous Wave Doppler or Ultrasonic Level Sensing
- Permanent and temporary mounting hardware
- Sensor retrieval arm enables installation and removal without confined space entry
- Remote ultrasonic level sensor options for drop manhole and outfall applications

<sup>a</sup> Kynar® is a registered trademark of Arkema, Inc.

<sup>b</sup> Custom cable lengths also available.

<sup>c</sup> Under normal flow conditions.

<sup>d</sup> Turbidity > 20 NTU. Distance < 48 inches.

<sup>e</sup> Deadband for remote TIENet™ 310 ultrasonic level sensor varies, depending on the type of mounting hardware.

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