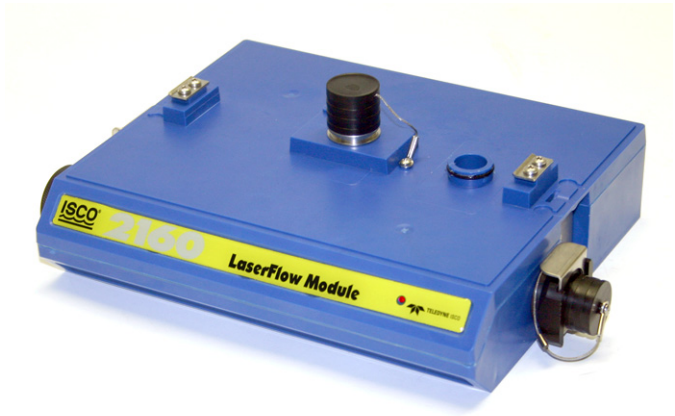
Teledyne Isco 2160 LaserFlow™ Module

The 2160 LaserFlow™ Module uses non-contact Laser Doppler Velocity technology and non-contact Ultrasonic Level technology to remotely measure open channel flow. The sensor has advanced technology to measure velocity with a laser beam at single or multiple points below the surface of the wastewater stream.

The LaserFlow is ideal for a broad range of wastewater monitoring applications.

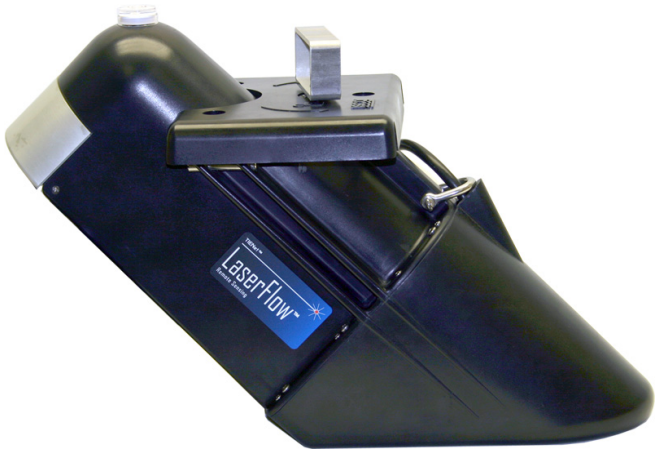
During submerged conditions, flow measurement continues without interruption with optional Doppler Ultrasonic Area Velocity technology.

In field use, the 2160 is typically powered either by two alkaline, or Isco Rechargeable Lead-acid batteries, within a 2191 Battery Module. Other power options (including solar) are available.



Applications

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



The LaserFlow™ velocity sensor transmits level and velocity data back to the 2160 module.

Standard Features

- Rugged, submersible enclosure fulfills IP68 enclosure requirements
- The quick-connect sensor can be easily removed and interchanged in the field without requiring recalibration
- Up to four 2100 Series flow modules can be networked by stacking and/or extension cables
- Modbus output interface

Options and Accessories

- Flow measurement during submerged conditions via Ultrasonic Doppler technology
- Redundant flow measurement w/ simultaneous Continuous Wave Doppler and/or Ultrasonic Level Sensing
- Remote cell phone communication options
- Analog output module

Flowlink® Data Analysis

Isco Flowlink® Software is a powerful tool for analyzing flow and water quality data. It provides site setup, data retrieval, and comprehensive data analysis, as well as advanced reporting and graphing. See separate data sheets for details on Flowlink and Flowlink Pro software.

Specifications – 2160 LaserFlow™ Module	
Size (H×W×D)	2.9 × 11.3 × 7.5 in. 7.4 × 28.7 × 19.1 cm
Weight Alone Weight w/ 2191 Battery Module	2.0 lbs 0.9 kg 6.0 lbs 2.7 kg
Material	High-impact polystyrene, Stainless steel
Enclosure (self-certified)	IP 68
Power	7.0 to 16.6 VDC, Typical operating current 25 mA at 12 VDC Nominal, 1.0mA standby.
Typical Battery Life[a] (2160 module w/ 2191 Battery Module & LaserFlow Sensor)	Data Storage Interval Alkaline Batteries[a] 15 minutes 12 weeks
Program Memory	Non-volatile, programmable flash; can be updated using PC without opening enclosure; retains user program after updating
Number of Modules	Up to 4, field interchangeable
Maximum Distance between Remote Modules	3300 ft 1000 m
Wiring between Modules	Twisted pair for communication, pair for power, gauge dependent on distance
Total Flow Calculations	Up to 2 independent level-to-area and/or level-to-flow rate conversions, net, positive or negative, based on either flow rate conversion
Level-to-Area Conversions	
Channel Shapes	Round, U-shaped, rectangular, trapezoidal, elliptical, with silt correction
Data Points	Up to 50 level-area pairs
Level-to-Flow Rate Conversions	
Weirs	V-notch, rectangular, Cipolletti, Isco Flow Metering Inserts, Thel-Mar
Flumes	Parshall, Palmer-Bowlus, Leopold-Lagco, trapezoidal, H, HS, HL
Manning Formula	Round, U-shaped, rectangular, trapezoidal
Data Points	Up to 50 level-flow rate pairs
Equation	2-term polynomial
Data Storage Memory	Non-volatile flash; retains stored data during program updates
Capacity	798,000 bytes (up to 158,000 readings, equal to over 270 days of level, velocity, flow rate, ultrasonic signal, Doppler frequency, and input voltage readings at 15 minute intervals).
Data Types	Combined Flow, Flow Rate, Flow Rate 2, Total Flow, Input Voltage LaserFlow: Level, Distance, Velocity, Case Temperature, Laser Temperature, X-Axis, Y-Axis, Laser Diode Current, Ultrasonic Signal, Sense Voltage, Air Temperature, Doppler Power, Window Temperature Optional 350 AV Sensor: Level, Temperature, Velocity, Signal, Spectrum, Spectrum Ratio
Storage Mode	Rollover with variable rate data storage
Storage Interval	15 or 30 seconds; 1, 2, 5, 15, or 30 minutes; or 1, 2, 4, 12, or 24 hours
Bytes per reading	5
Setup and Data Retrieval	Serial connection to IBM PC or compatible computer with Isco Flowlink software
Baud Rate	38,400
Temperature range	-40° to 140°F -40° to 60°C Operating and Storage

a. Specification for Eveready Energizer® alkaline lantern batteries, model #529, Isco part #340-2006-02. Eveready Energizer® is a registered trademark of Union Carbide Corporation.

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