

# Flow Monitoring Product Guide



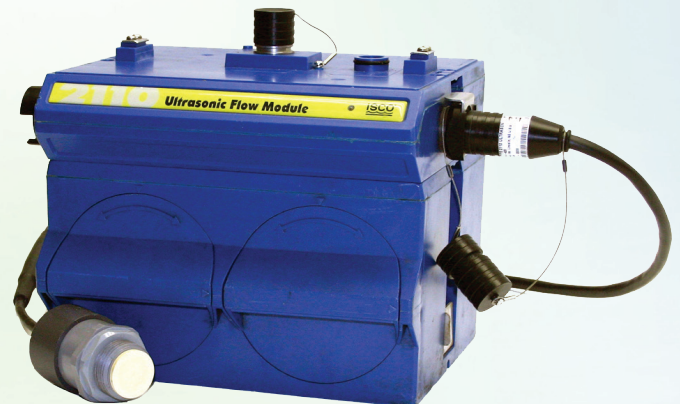
Signature  
Flow Meter



accQpulse  
Flow Profiler



LaserFlow  
Velocity Sensor



2100 Series  
Flow Modules

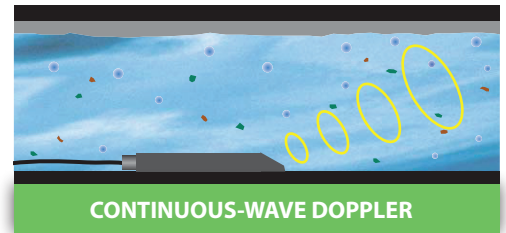
# Flow Monitoring Techniques

## Select the technology best suited for your application

No matter how challenging the application or site conditions, Teledyne Isco offers a proven technology for your needs.

### Continuous-wave Doppler

AV sensors continuously transmit an ultrasonic signal from within the flow stream. Those signals are reflected off bubbles and particles, and return to the sensor where frequency shift is measured to derive an average velocity. A differential pressure transducer in the sensor measures liquid depth to determine the flow area. Flow rate is then calculated by multiplying the area of the flow stream by its average velocity.

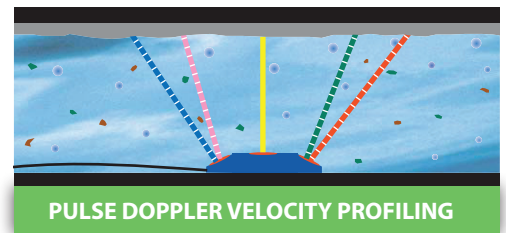


### Pulse Doppler Velocity Profiling

Ceramic crystals transmit acoustic signals (sound pulses) into the flow stream. They are echoed back after contacting bubbles or particles.

By measuring the difference in frequency between the emitted and returned signals (known as Doppler shift), the velocities of particles in the flow stream can be accurately determined.

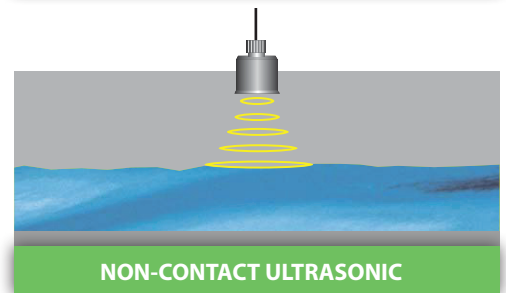
By "range gating" the returned signals, velocity is measured in multiple, distinct cells, called velocity bins. Detailed velocity data in relation to sensor location is then used to calculate a highly-accurate flow profile.



### Non-contact Ultrasonic

With its sensor mounted above the flow stream, transmitted sound pulses are reflected off the liquid surface. The elapsed time between transmitted and returned signals determines liquid level.

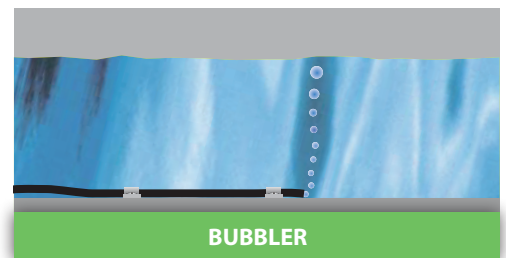
Flow rate is then calculated using one of the meter's built-in flow conversions, or a user-defined level-to-flow relationship.



### Bubbler

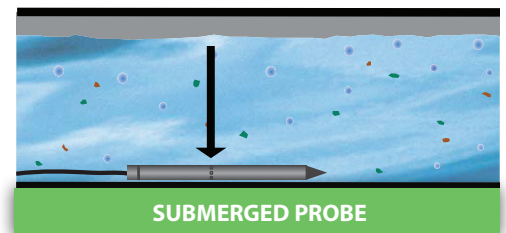
Especially useful in flow streams affected by harsh weather, debris, or corrosive chemicals, bubbler technology forces compressed air from a submerged tube.

The depth of flow is determined by measuring the pressure needed to force the bubbles out of the line. That information is then converted into the flow rate using known parameters.



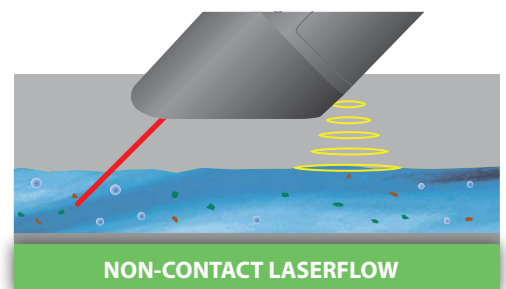
### Submerged Probe

For sites where wind, steam, foam, or turbulence exist, a probe mounted at the bottom of the channel measures the pressure of the liquid above to determine flow stream depth. The level reading is then converted to flow rate using known parameters.



### Non-contact LaserFlow™ Velocity Sensor

The LaserFlow 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 water. A non-contacting ultrasonic transmitter measures the liquid head height to determine the wetted area. Multiplying the wetted area by the average velocity yields the flow rate. Flow during surcharge conditions can be measured with an optional, integrally-mounted continuous-wave Doppler area velocity sensor.



## Collection Systems

- Flow measurement choices with unique benefits for capacity assessment, inflow & infiltration, and sanitary sewer evaluation
- Energy efficient battery-powered flow loggers for portable installation
- Remote telemetry options for flow loggers in permanent installations



## SSOs and CSOs

- Flow monitoring systems with unique technologies for low and high water level applications
- Event notification and remote telemetry options
- NEMA 6P and IP68 protection



## Wastewater Treatment Plants

- Cost-effective alternatives to primary devices at plant inlet, eliminating downstream excavation and construction cost
- Choice of flow technologies to measure flow in chlorine contact or effluent discharge
- SCADA connectivity



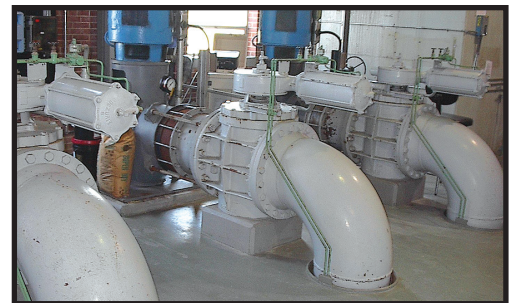
## Stormwater Runoff

- Dry and wet weather flow studies in conjunction with rainfall
- Parameter, rain gauge, automatic sampler interface with flowmeter
- Remote telemetry system



## Lift Stations

- Accurate flow measurement during varying inflow conditions
- Accurate full-pipe flow measurement without lengthy straight runs or bypass
- Remote telemetry system





## Billing/Custody Transfer

- Highly accurate flow measurement with and without primary devices
- Accurate flow measurement for turbulent flow, and zero or near-zero velocities



# Teledyne Isco Instruments

Isco Recommends	2150 Area Velocity Flow Module*  Continuous-wave Doppler	2110 Ultrasonic Flow Module  Ultrasonic	2160 LaserFlow 	accQpulse  Shallow Water	accQpulse  Deep Water	H-A  Pulse
Small Channels/Pipes (<36") <sup>[1]</sup>	✓	✓	✓	✓		
Large Channels/Pipes (>36") <sup>[1]</sup>	✓		✓		✓	
Large Pipes (Low Depth <3") <sup>[1]</sup>	✓		✓	✓		
Concrete-lined Open Channels	✓		✓	✓	✓	✓
Primary Devices (Weirs & Flumes)		✓				
Full Pipes/Force Mains (<18" Dia.)						
Compound Pipes (Surcharge)	✓		✓	✓	✓	
Lift Stations						

[1] Nominal level

## Flowlink® Software

Analyze data, conduct advanced studies, and generate sophisticated reports.

The example on right shows Flowlink's ability to calculate average, minimum, maximum, and total accumulated values. You may also compare data from multiple sites, using both Isco, and non-Isco input. Use series formulas to know the relation between sites or parameters.

Zoom vertically or horizontally, and easily convert graphs to tables.

## Flowlink® Pro

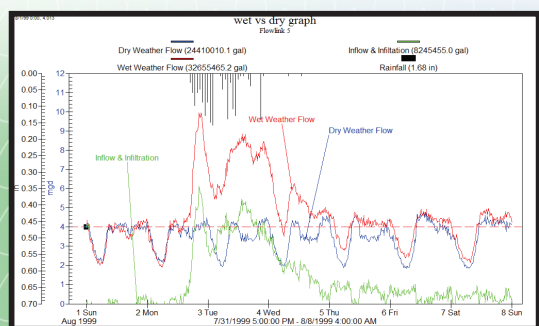
A server/client package providing real-time data, via web interface, for large municipalities and service providers.

Facilitates management of multi-site waste water and flow monitoring networks.


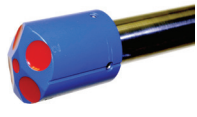





## Flowlink® Global

A Web User Interface (Web UI) to monitor data and site conditions for your flow monitoring programs.

Enables users to view, organize, report, and export data from equipment anywhere. Flowlink Global displays site and device alarms to show you where your attention is needed most. Being web accessible, centralized flow data can be viewed on PCs and mobile devices.



# Instrument Suitability Guide

DFM	HotTap	Signature Ultrasonic Flow Meter	Signature Bubbler Flow Meter	Signature Area Velocity Flow Meter	Signature LaserFlow	3010 Flow Transmitter
						
Doppler	Pulse Doppler	Ultrasonic	Bubbler	Area Velocity		Ultrasonic
		✓	✓	✓	✓	
		✓	✓	✓	✓	
		✓	✓	✓	✓	
✓		✓	✓		✓	
		✓	✓		✓	✓
	✓					
				✓	✓	
	✓**					

\* CSA- and Baseefa- approved versions available for intrinsically safe use.  
 \*\* In full pipes 18" or greater in diameter.

## Communication Options

Isco instruments include a variety of communication methods to facilitate flow monitoring, deliver off-site data and provide alarm.

### Wireless Communication

Gather data while inside your vehicle, with drive-up convenience and safety.

### Cellular and GSM Options

Gather data with CDMA and 1xRTT speed and convenience. Download it remotely via GSM and GPRS. SMS, e-mail, and text alarm also available.

### Interface Module

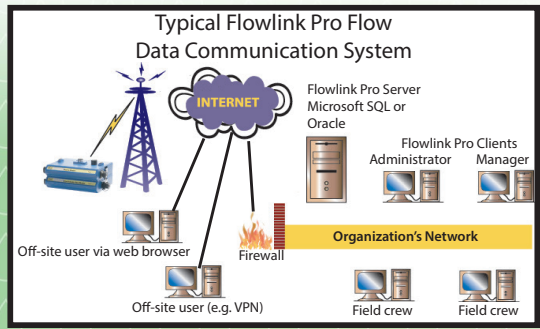
Integrates multiple field instruments and provides a common platform for logging and communications. Optional versions include built-in CDMA or GSM capability and remote or online data access.

### Land-line Modem

Dial up flow data from your desktop. Features include dial-out alarms.

### Analog Output Module

4-20 mA signals for monitoring and control. Easy interface with SCADA/DCS and other secondary systems.





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