## accQpulse™ Deep Water Sensor

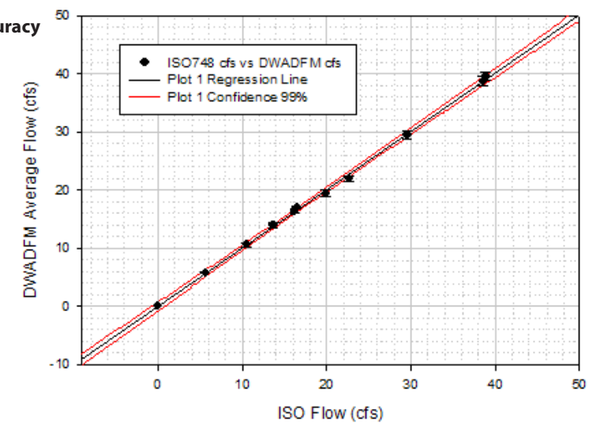
| Measurement Performance | |
|---|---|
| Flow Accuracy | 2.0% of reading* |
| Velocity (maximum) | ±20 ft/s (±6 m/s) at depths less than 30 in (0.8 m), ±7 ft/s (±2.2 m/s) in depths from 30 in (0.8 m) to 33 ft (10 m) |
| Velocity Bin Size | 1 to 4 inches (25 to 100 mm) |
| Vertical Profiling Range | 6 inches to 16 feet (150 mm to 4.9 m)<br>Reduce by 20% when using the QBADFM Intrinsic Safety Barrier Module |
| **Water Level** | |
| Measurement Range | 3 in to 32 ft (76 mm to 9.8 m) |
| Level Accuracy | ±1% of range (actual measurement) or ±3 mm (whichever is greater) |
| **Acoustic Frequency** | |
| Frequency (Velocity Measurement) | 2.4 MHz |
| Frequency (Level Measurement) | 600 kHz |
| **Physical Specifications** | |
| Operating Temperature | 23 to 113º F (-5 to 45º C) |
| Housing Material | Polyurethane |
| Size (H x W x D) | 8 x 3.6 x 1.5 in (203 x 91 x 38 mm) |
| Weight | 1.3 lb (0.6 kg) |
| **Sensor Signal Cable** | |
| Material | Polyethylene jacket |
| Length | 49 ft (15 m) or 147 ft length (45 m) |

## accQpulse™ Shallow Water Sensor

| Measurement Performance | |
|---|---|
| Flow Accuracy | 2.0% of reading* |
| Velocity (maximum) | ±30 ft/s (±9 m/s) at depths less than 30 in (0.8m), ±10 ft/s (±3 m/s) in depths from 30 in (0.8 m) to 48 in (1.2 m) |
| Velocity Bin Size | 0.4 in (10 mm) |
| Vertical Profiling Range | 3 to 40 in (75 to 1 m)<br>Reduce by 20% when using the QBADFM Intrinsic Safety Barrier Module |
| **Water Level** | |
| Measurement Range | 3 to 48 in (75 to 1219.2 mm) |
| Level Accuracy | ±1% of range (actual measurement) or ±3 mm (whichever is greater) |
| **Acoustic Frequency** | |
| Frequency (Velocity Measurement) | 2.4 MHz |
| Frequency (Level Measurement) | 600 kHz |
| **Physical Specifications** | |
| Operating Temperature | 23 to 104º F (-5 to 40º C) |
| Housing Material | Polyurethane |
| Size (H x W x D) | 10.5 x 2.3 x 0.6 in (267 x 57 x 16 mm) |
| Weight | 0.4 lbs (0.2 kg) |
| **Sensor Signal Cable** | |
| Material | Polyethylene jacket |
| Length | 49 ft (15 m) or 147 ft length (45 m) |

* Typical at normal flow conditions. Results of verification in an external lab are presented in the following graph.

**Flow Accuracy**

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*Teledyne Isco is continually improving its products and reserves the right to change specifications without notice.*



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# accQpulse™ Velocity Profiler

*Accurate flow measurement in shallow and deep water applications*


The accQpulse™ Velocity Profiler brings unparalleled precision and accuracy to flow rate measurement in many sizes of pipes and open channels. Its unique ability to measure velocity at multiple points makes it suitable for most applications including sites with non-uniform, rapidly changing, near zero, zero, or reverse flow conditions. These applications include: waste water collection systems, billing, combined sewer systems and outfalls, wastewater treatment facilities, irrigation canals, industrial discharges, and stormwater conveyance and outfalls.

With sensor options for both shallow and deep water, the accQpulse™ Velocity Profiler is the only flexible pulse-doppler flow meter available. The shallow water sensor is used to measure flow in depths up to 40 inches (1m). The deep water sensor is used to measure flow in depths up to 16 feet (4.9 m).

- **Achieve accurate measurement**
  By measuring velocity at multiple points, you can record accurate flow measurement.
- **Eliminate on-site calibration**
  With detailed information on velocity at multiple points and advanced flow algorithms, there is no need for on-site calibration.
- **Rely on quality data information**
  Verify that your data is accurate with diagnostic information and Flowlink software's data quality analysis.

## Standard Features

- Pulse Doppler velocity profiling technology
- Tri-redundant velocity sensors and a depth sensor combined in a single, compact housing
- Data quality verification information (signal strength and correlation)
- Chemically resistant polyurethane encapsulated sensor withstands abuse, resists oil and grease fouling, and eliminates the need for frequent cleaning
- Rugged, submersible enclosure meets IP 68 protection rating

## Options

- Secondary pressure sensor for redundant level measurement
- Flow conditioning platform for shallow water sensor
- Sensor fairing for deep water channels where sediment or debris are present
- accQcomm digital/analog interface module for 4-20 mA, RS-232/422, MODBUS, and Ethernet interface
- Remote cell phone communication options
- QBADFM intrinsic safety barrier for hazardous area installation classified as Class I, Div 1, Group C & D
- Flowlink data management software

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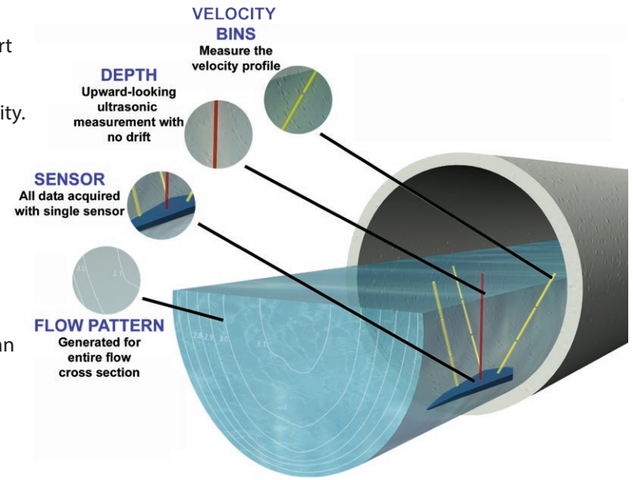
## Principles of Operation

Three piezoelectric ceramic devices in the sensor emit short acoustic pulses along narrow beams into the flow stream. Each beam points in a different direction to measure velocity. A fourth ceramic device is mounted in the center of the sensor and aimed vertically to measure the depth.




The acoustic signals 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 velocity in the flow stream can be accurately determined. By "range gating" the returned signals, velocity is measured in multiple, distinct cells called "velocity bins".

As a result, the accQpulse™ provides detailed velocity data in relation to sensor location at multiple points in three different directions within the flow channel. This is used to calculate a true, highly accurate flow.

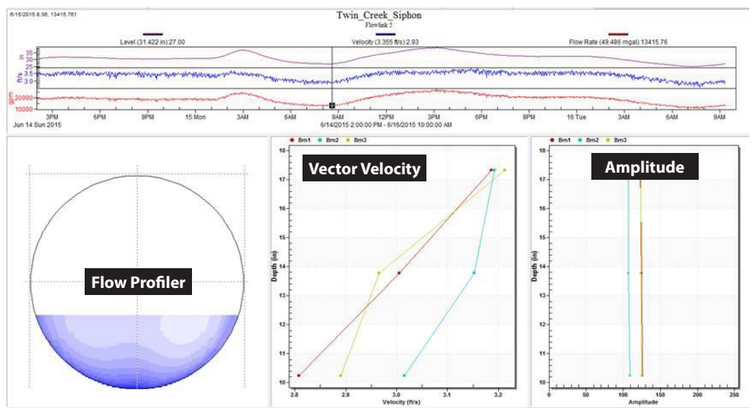
The velocity profiling information reduces the need for in-situ calibration and ensures accurate flow rate measurement over a host of different measurement environments and hydraulic conditions.

## Flowlink

Teledyne Isco designed Flowlink software packages to assist technicians in the field with instrument configuration, installation diagnostics, equipment maintenance, and data collection.

The multi-panel user interface allows accQpulse™ users to verify proper operation of the instrument for accurate flow measurement. Back at the office, Flowlink 5.1 software aggregates the flow data for reports, analysis, and archiving.

When on-site instrumentation is equipped with communication modules, Flowlink software can eliminate costly site visits by remotely monitoring site information and displaying alarm conditions.




**Flowlink Software Packages Available:**

Flowlink — Desktop or Notebook Stand-alone package

Flowlink Pro — Server based software for maximum efficiency

Flowlink Global — Web User Interface for any data, anywhere, at any time

## accQpulse™ Velocity Profiler

| | |
|---|---|
| **Physical** | |
| **Electronics Unit** | |
| Operating Temperature | 23° F to 104° F (-5° C to 40° C) |
| Storage Temperature | -13° F to 140° F (-25° C to 60° C) |
| Packaging | IP 68 |
| Dimensions (HxWxD) | 15.6 x 9.4 x 5.9 in. (397 x 240 x 150 mm) |
| Weight (with batteries) | 16.4 lb (7.4 kg) |
| **Data Management** | |
| **Data Types** | |
| Q, V, D | Flow, average velocity, depth |
| Velocity | Velocity profile data (relative to acoustic beam directions) per beam and bin |
| Amplitude | Amplitude intensity data (relative backscatter intensity) per beam and bin |
| Data Quality | Profile data quality indicators per beam and bin |
| Temperature | Transducer temperature output, range 20 to 125º F (-7 to 52º C) |
| **Data Storage and I/O** | |
| Data Storage Capacity | 4 MB std. (15,360 measurements with a typical configuration), slate or wrap |
| Data I/O Interface | RS-232 standard. Multiple industry-standard protocols optional |
| Data Transfer Rate | Configurable to 115,200 bps |
| **Power** | |
| Internal Battery Voltage | 18 VDC nominal |
| Internal Battery Capacity | 26 Ah at 75º F (24º C) - Alkaline battery life 30 weeks at 15 minute sampling interval |
| External DC | 12 - 24 VDC; 10 VDC absolute minimum; 28 VDC absolute maximum |
| **Software** | |
| Flowlink or WinADFM software for setup, operation, data review, and data management. | |
| **QBADFM Intrinsic Safety Barrier and Hazardous Location Sensors** | |
| Classification | Barrier: Class I, Division 1, Groups C and D<br>Sensors: Temperature class T3 |
| Housing | Polycarbonate |
| Dimensions (HxWxD) | 12.7 x 9.4 x 3.5 in (322 x 238 x 88 mm) |
| Weight | 4 lbs 9.4 oz |
| Operating and Storage Temperature | -65 to 160° F (-54 to 71° C) |
| Humidity | 90% to none |

## Options

### Digital/Analog Interface Module accQcomm™

The accQcomm™ digital/analog interface module accepts data from up to three accQpulse™ flow meters and provides interfaces such as MODBUS, Ethernet, or analog signal (4-20mA). The module is wall or console mountable and is powered with 12 to 24 VDC.


accQcomm™

### Hazardous Area Installation

When the accQpulse™ is used with intrinsic safety barrier model QBADFM, it is suitable for the hazardous areas classified as Class I, Div 1, Group C & D.

QBADFM Intrinsic Safety Barrier Module