

"The Future of Flow!"

ISCO[®]

**2100 Series
Flow Modules**



Isco 2100 Series Flow Modules

For decades...

water and wastewater flow monitoring has required storing, handling, and maintaining cumbersome, single-purpose equipment. Gathering all but the most basic data meant having to coordinate instruments from different manufacturers, each with varying design and technology. Once collected, comprehensive analysis and reporting was often difficult, if not impossible — except through time-consuming manual editing that seldom provided concise results that could be reported using easy-to-understand graphics.

Isco has developed...

the industry's first and only line of flow monitoring instruments that eliminate all the inherent drawbacks of previous designs, while delivering a new level of data collecting and reporting capability that is literally changing the face of flow monitoring around the globe.

"The Future of Flow!"

If your work involves any or all of the applications below, our 2100 Series Flow Modules will give you unmatched power and versatility - along with data handling and reporting features that are unmatched in the industry.

- ▶ Capacity Assessment
- ▶ Inflow and Infiltration Studies
- ▶ Sewer Overflow Studies
- ▶ Sanitary Sewer Evaluation
- ▶ Open channel flow measurement, with or without a primary device

Contents

Choosing the right technology

Area velocity and ultrasonic methods - How they work Pg. 2

Isco 2100 Series Features

A breakthrough in flow meter technology..... Pg. 3

Isco 2100 Series Flow Modules

2110 Ultrasonic Flow Module Pg. 5

2150 Area Velocity System Pg. 5

2150EX Area Velocity System Pg. 6

2151 and 2151P Intrinsically Safe Area Velocity Module Pg. 6

Remote Communication Choices

2103 Land-line Phone Modem Module Pg. 7

2103c Cellular Phone Modem Pg. 7

2108 Analog Output Module Pg. 8

Modbus Pg. 8

Internet Pg. 8

On-site Data Retrieval

Isco Flowlink® Software Pg. 9

Isco Field Wizard™ Pg. 9

2102 Communication Module Pg. 9

Choosing the right technology

To provide you with the most appropriate method to monitor flow in differing applications, Isco has developed outstanding instruments based on separate technologies. Both our 2150 Area Velocity Module and our 2110 Ultrasonic Flow Module are compatible with auxiliary 2100 Series accessories, as well as our exclusive Flowlink® software.

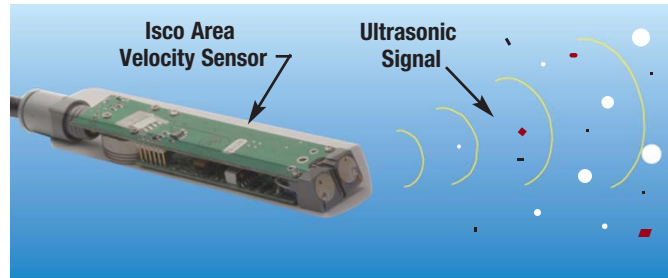
Whichever you choose, industry-leading quality, superior performance, and lasting durability are assured.

Area Velocity Method

The area velocity method is best suited where weirs and flumes are not practical, and where submerged, full-pipe, surcharged, and reverse-flow conditions may occur.

Isco Area Velocity Flow Modules use continuous-wave Doppler technology to measure mean velocity. The sensor continuously transmits an ultrasonic signal, and measures the frequency shift of the returned signal reflected by air bubbles and particles in the flow.

A differential pressure transducer in the sensor measures liquid depth to determine flow area. Flow rate is then calculated by multiplying the area of the flow stream by its average velocity.

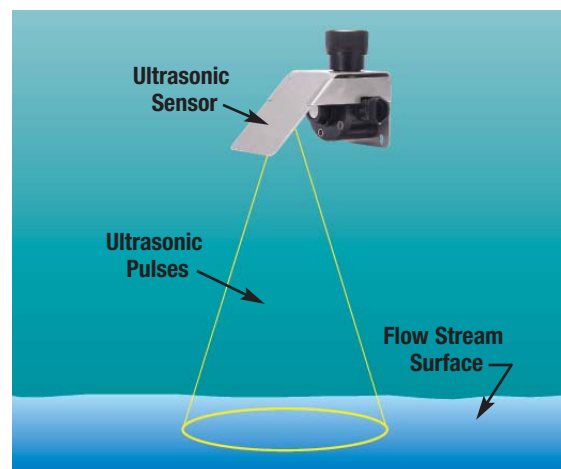


Ultrasonic Method

The ultrasonic method is preferred for non-contact flow measurement in streams containing harsh chemicals, grease, or suspended solids.

The sensor, mounted above the flow stream, transmits sound pulses that reflect 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.



Isco 2100 Series Features

A breakthrough in flow meter technology

- ▶ NEMA 4X, 6P, (IP68) enclosure
- ▶ No wire harness
- ▶ Power-efficient digital electronics allow up to 15 months of battery life
- ▶ 38.4-baud communication

Superior sensor design

- ▶ Microprocessor-based digital Area Velocity and Ultrasonic sensors
- ▶ Field interchangeable
- ▶ Built-in temperature compensation
- ▶ Digital communication between sensor and module eliminates RF interference
- ▶ Chemical-resistant outer coverings

Powerful extras

- ▶ Secured, roll-over data storage in non-volatile “flash memory”
- ▶ Variable-rate data storage can automatically switch when conditions vary
- ▶ Record and store input voltage information
- ▶ Built-in flow conversion for the specified primary device or natural stream boundary

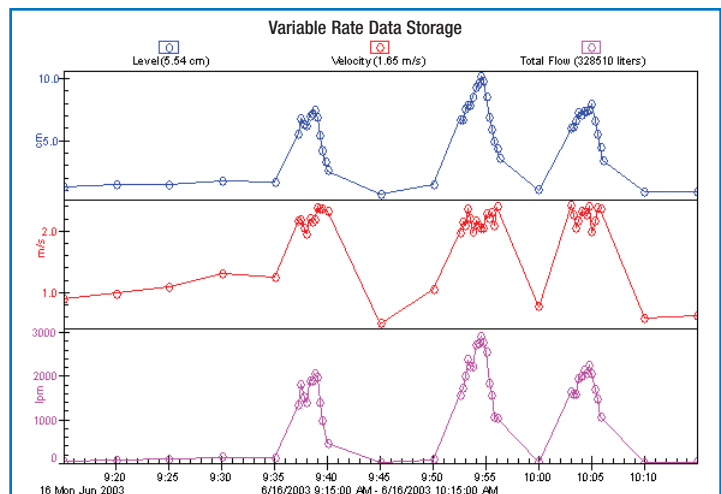
2100 Series Flow Modules use all-digital electronics for maximum performance and durability.



The angled reflection plate on the 2100 Series Ultrasonic Level Sensor enables “zero deadband” installation, and protects against moisture accumulation on the sensor face.



Isco’s low-profile Area Velocity Sensor is only 5/8-inch high and measures velocity in as little as one inch of water.



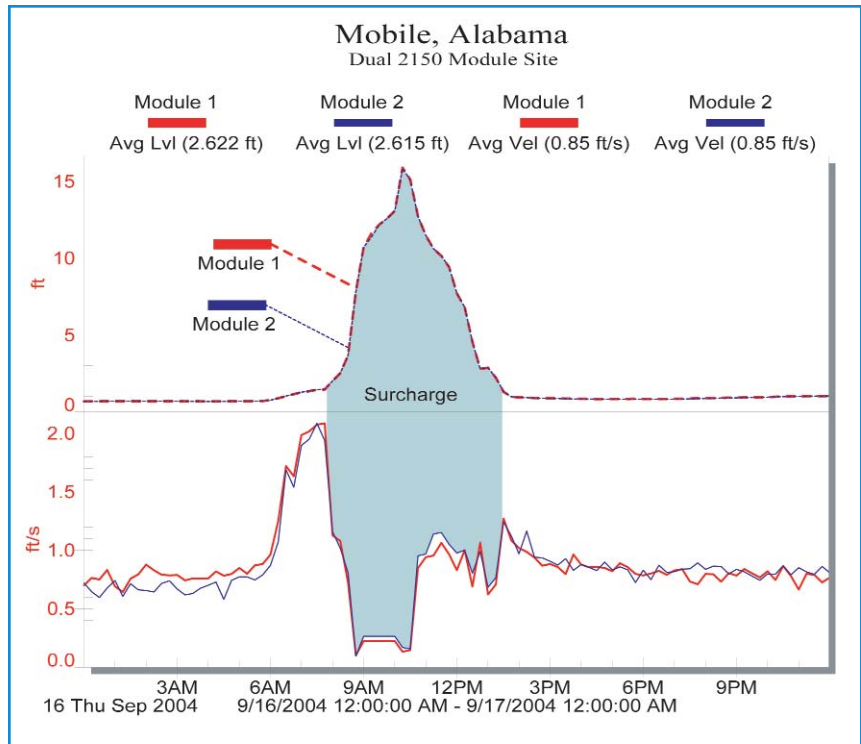
Variable-rate data storage can automatically switch when conditions vary, providing maximum information while saving power and memory. In the example above, the 5-minute storage rate changes to 30 seconds when the level rises to 1.5 inches, capturing important information that would have been missed without this unique feature.

Field-proven Performance



Sustained performance under the most demanding conditions.

Under surcharge, conventional meters often become useless until they are cleaned and recalibrated. Actual data taken during Hurricane Ivan shows that two 2150 AV modules stacked together delivered accurate readings during surcharge. And — they stayed on the job afterward without needing time-consuming service.

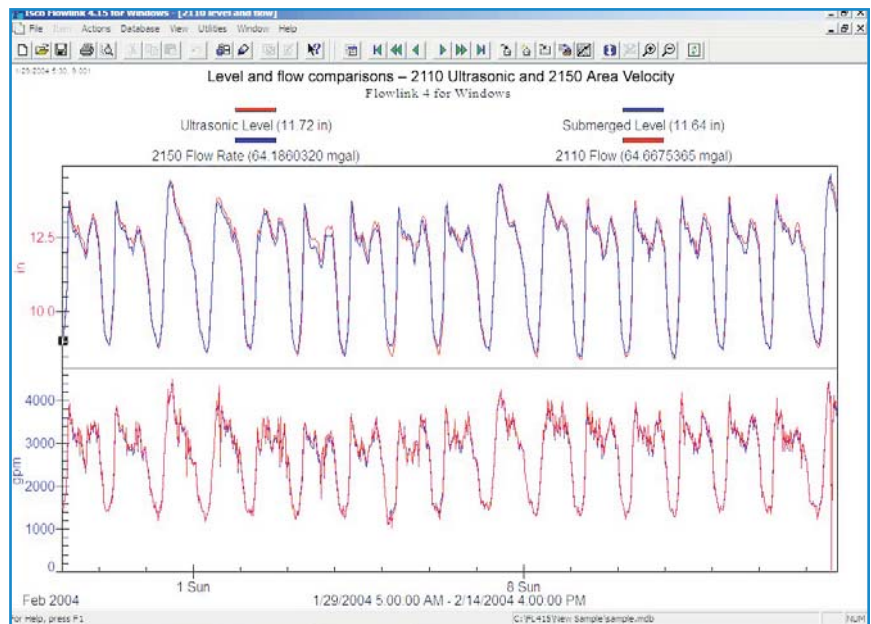


Innovative and Versatile



The perfect pair for redundant level measurement.

Redundant measurements may be necessary to fulfill project requirements, or simply a desirable way to reinforce confidence in data accuracy. Combining the unique assets of our AV and Ultrasonic modules provides solid confirmation of flow data from one source.



Above, the top panel shows how closely the 2110's ultrasonic level reading (red) tracked with the level reading of an Isco 2150 area velocity sensor (blue), indicating both instruments were providing accurate readings. The lower panel shows the same degree of proximity with flow readings.

Isco 2100 Series Flow Modules



Compact, Modular Design

Stack up the flow monitoring power

— with as many as four 2100 Series Flow Modules on a single battery module! Mix and match modules to build a compact, integrated flow system.

- ▶ Monitor multiple flow streams from just one stack
- ▶ Set up and retrieve data from all modules on the same stack, or networked together with a single connection
- ▶ Use multiple batteries in one stack for extended service life

2110 Ultrasonic Flow Module

- ▶ Rugged sensor with digital electronics
- ▶ Deflector-style sensor eliminates deadband
- ▶ Unique sensor design prevents condensation on sensor face
- ▶ Self-tuned power control device determines optimum transmitting power for application
- ▶ Stationary mounts available for floor, wall, or in-pipe use

Note: For complete 2110 operating specifications, request Isco Product Data Sheet L-2125.



2150 Area Velocity System

- ▶ Microprocessor-based digital probe ensures calibration stability (preventing level drift)
- ▶ No need for span calibration
- ▶ One-point calibration in the field
- ▶ No temperature drift
- ▶ Low-profile probe measures velocity in as little as one inch of flow depth
- ▶ Automatic correction for silt level
- ▶ Automatic gain control for varying flow conditions
- ▶ Sensor is unaffected by the “draw-down effect”


Note: For complete 2150 operating specifications, request Isco Product Data Sheet L-2115.



2150EX Area Velocity System

ATEX Category 1G Area Velocity Module

All the outstanding features found in our 2150 area velocity module, in an intrinsically safe package.

- ▶  1G EEx ia 11B T4 (-40°C to +60°C)
- ▶ Non-conductive ABS enclosures with stainless steel connections
- ▶ Meets U.S., Canadian, and European intrinsic safety standards
- ▶ Expandable system with intrinsically safe isolators
- ▶ Rechargeable or single-use battery options

Note: For complete 2150EX information, request Isco Product Data Sheet L-2204.



2151 and 2151P Area Velocity Modules

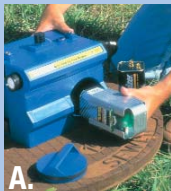
CSA Class 1, Div.1, Groups C&D Intrinsically Safe

- ▶ Meets U.S. and Canadian intrinsic safety standards
- ▶ Expandable system with intrinsically safe isolators
- ▶ Standard or wall-mount styles

Note: For complete information, request Isco Product Data Sheet L-2109 (2151) or L-2117 (2151P).



The 2151P versions, shown at right, are designed for convenient upright installation, either within a manhole, or wall-mounted in a safe location away from the flow stream.



Simple to set up — Easy to use!

- A. Two alkaline lantern batteries deliver up to 15 months of power.
- B. High-capacity desiccant cartridge prevents moisture build-up.
- C. Quick-disconnect input makes setup or sensor changes a snap.

Remote Communication Choices

Two-way communication with down-hole flow modules from the comfort of your office.

Realize substantial savings in time and manpower with your choice of the following systems.

Isco 2103 Land-line Phone Modem Module

Dial up flow data with your desktop phone.

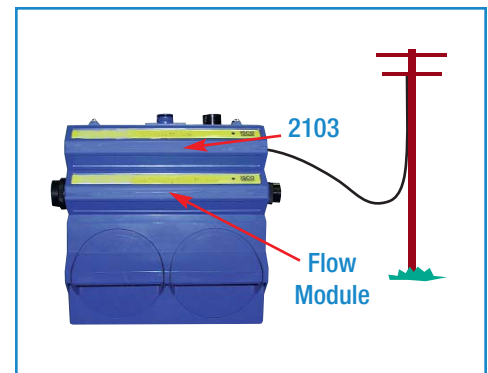
Minimize the need for expensive on-site visits and confined space entry.

The 2103 Modem Module provides reliable, two-way dial-up communication between down-hole 2100 Series Flow Modules and your desktop computer, equipped with Isco Flowlink software.

A dial-out feature enables the system to transmit a text message alarm to your digital cell phone or pager.

- ▶ System configuration and data retrieval
- ▶ Schedule automatic downloading using Isco Flowlink
- ▶ Error correction protocols compensate for excessive line noise
- ▶ Automatic dial-out alarms

Note: For complete 2103 Modem Module information, request Isco Product Data Sheet L-2110.



Isco 2103c Cellular Phone Modem

Gather data with cell phone speed and convenience.

All the features of the 2103 Modem with the convenience of cell phone access.

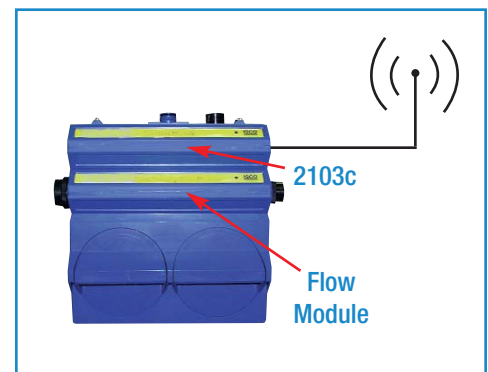
The 2103c Modem Module allows remote two-way dial-up communication with 2100 Series instruments via cell phone modem and your desktop computer, equipped with Isco Flowlink software.

Send packaged data from the field to your server, via internet, at set intervals with cost-effective 1X RTT service.

A dial-out feature enables the system to transmit a text message alarm to your digital cell phone or pager.

- ▶ CDMA cellular technology
- ▶ External, in-street (buriable), and other antenna options
- ▶ Automatic wake-up schedule for efficient power management

Note: For complete 2103c Modem Module information, request Isco Product Data Sheet L-2128.



Isco 2108 Analog Output Module

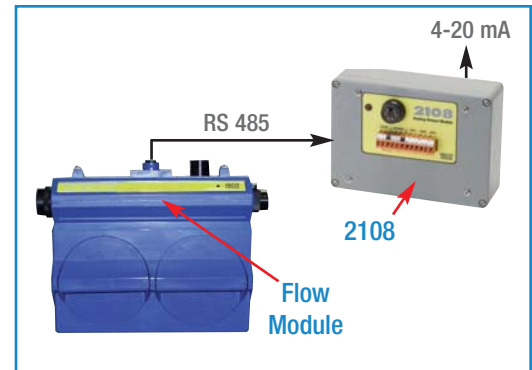
4-20 mA signals for monitoring and control.

The 2108 Analog Output Module provides current outputs for use with any Isco 2100 Series Area Velocity Module, and for Ultrasonic Flow Modules.

This allows easy interface with SCADA/DCS or other secondary instrument systems.

- ▶ As with any 2100 Series Module, the 2108 may be cable-connected up to 3,000 feet from other modules
- ▶ DIN rail mountable
- ▶ Three independent, isolated 4-20 mA outputs per module
- ▶ Outputs are freely programmable for any parameter measured by Isco flow modules
- ▶ Retrieve data from instruments using Flowlink software

Note: For complete 2108 Module information, request Isco Product Data Sheet L-2118.

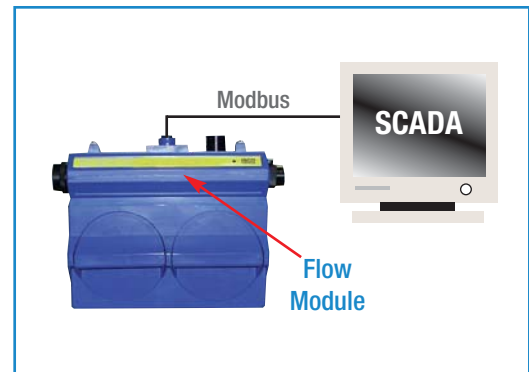


Modbus

Serial Output

The 2100 Series provides digital RS-232 modbus output. It can be used to interface with external communication modules, SCADA systems, or other devices.

- ▶ ASCII protocol
- ▶ Polling via direct-connect or modem
- ▶ Modified serial output for user-supplied data collection platform
- ▶ Process control

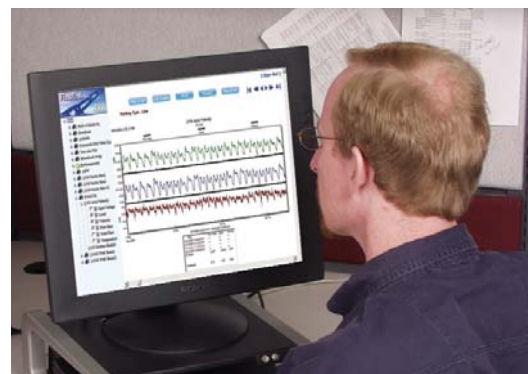


Internet

“Real-time” data from the field.

Access data online whenever you want — and from wherever you are.

- ▶ View data in line graph or scatter plot form
- ▶ Export data directly from the web page to your desktop
- ▶ Site or parameter selection, timescale, and zooming — each with just a single click.



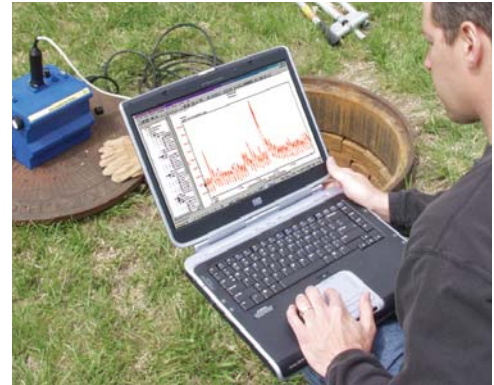
On-site Data Retrieval

Isco Flowlink® Software

The industry's premier flow data management software.

- ▶ Download and process data on site
- ▶ Unmatched data management capability
- ▶ Variety of data downloading and handling options
- ▶ Advanced data editing and analysis capability
- ▶ Powerful reporting and presentation choices

Note: For complete Flowlink information, request Isco Product Data Sheet L-2127.



Isco Field Wizard™

A durable, weatherproof module for on-site data retrieval.

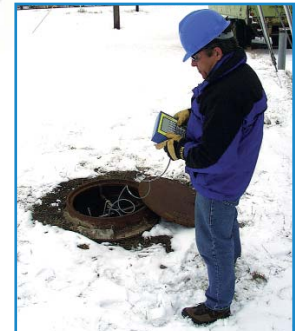
Don't risk damage to your fragile notebook PC.

This robust module provides on-site display of current readings, information about stored data, diagnostics, and more.

Interrogate all 2100 Series Flow Modules in the stack at one time, and store more than 14 days' data from up to 20 modules!

- ▶ Rugged NEMA 4X, 6P (IP 68) enclosure
- ▶ Large easy-to-read keypad
- ▶ Efficient data retrieval, system configuration, and level calibration
- ▶ Quickly transfer data to a PC running Isco Flowlink Software

Note: For complete Field Wizard information, request Isco Product Data Sheet L-2103.



Isco 2102 Communication Module

Eliminate constant manhole entry with safe, convenient drive-up data retrieval.

Connect with your Isco 2100 Series Flow Modules from the safety and convenience of your vehicle.

- ▶ Robust digital spread-spectrum radio signal
- ▶ "Plug and Play" setup - no interfacing needed
- ▶ Low power consumption
- ▶ Data retrieval, system configuration, and level calibration

Note: For complete 2102 Module information, request Isco Product Data Sheet L-2102.



2100 Series Accessories

Antennas



*Spread-spectrum
Directional*



*Spread-spectrum
Omni-directional*



Cellular External



Cellular In-street (buried)

Isco Power Products



*Rechargeable Batteries
(lead-acid)*



*Charger for Isco
lead-acid batteries*



*120 VAC / 12VDC
Power Converter*



*Special batteries and chargers are used with
the 2150EX. Contact the factory for details.*

Sensor Mounts

Area Velocity



*Auger Bracket
(for stream beds)*



*Isco Scissor (shown)
or Spring Ring*

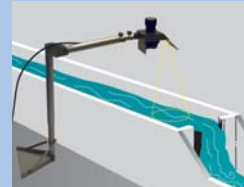
Ultrasonic



Wall-mount Bracket



*In-pipe Assembly
(requires Isco Scissor Ring assy.)*

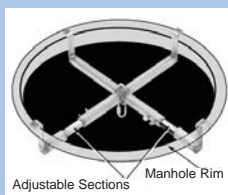


Floor Stand

Related Isco Products



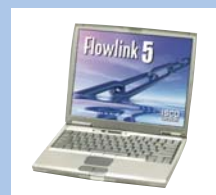
*Isco Street Level
Installation Tool*



*Isco ProHanger
(instrument suspension device)*



*Isco 4501
Pump Station Monitor*



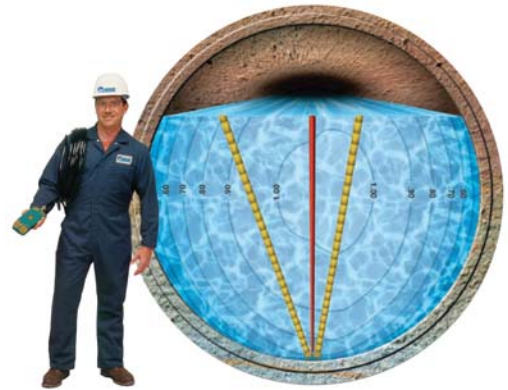
*Isco Flowlink® Data
Management Software*

Now Available - Teledyne MGD flow technology for large pipes!

MGD Technologies, Inc. has become part of Teledyne Isco, bringing you the benefits of Isco's 2100 Series and MGD's ADFM™ Pulse Doppler technology — from a single source!

Pulse Doppler technology is ideal for accurate flow measurement in large pipes/channels, complex hydraulics, or other difficult applications.

Ask for our *Selection Guide* to help choose the flow technology that best suits your needs.



Open Channel Flow Measurement Handbook

Isco's practical and comprehensive reference book has become an essential resource for thousands of professionals who deal with the realities of flow measurement in wastewater collection and treatment, irrigation, water resources, and other open channel applications.

Along with standard discharge tables for a wide variety of primary devices, this new edition includes weir and flume data extrapolated for lower head heights - useful for checking a meter's on-site low-flow readout. Expanded and updated discussions of area velocity measurement help you understand the advantages and limitations of available technologies.



Product Data Sheets

Individual Product Data Sheets containing further information and detailed specifications are available for 2100 Series Modules and most other Isco products.



Visit us online at: www.isco.com



Teledyne Isco, Inc.

4700 Superior St.
Lincoln, NE 68504 USA
Phone: (402) 464-0231
USA & Canada: (800) 228-4373
Fax: (402) 465-3022
e-mail: iscoinfo@teledyne.com
Internet: www.isco.com

