ISCO 4100 SERIES FLOW LOGGERS

The Ultimate System for Multi-Site Flow Monitoring and Analysis

- Multiple Measurement Technologies
- Large, Versatile Memory
- Advanced Data Analysis
- Up to One Year Battery Life
- Rugged, Submersible Enclosure

ISCO®

ISCO 4100 SERIES FLOW LOGGERS

Isco Flow Loggers provide dependable long-term performance in tough sewer environments.

The new 4100 Series Flow Loggers are battery-powered, open channel flow meters sealed in rugged, submersible enclosures. They store flow, rainfall and sample data in their large, versatile memory. With Isco Flowlink® Software on your PC, you can set up your Flow Loggers, retrieve and analyze stored data, and generate informative graphs and reports.

Isco Flow Loggers are the ultimate system for collecting and analyzing data from multiple sites.

Applications of the 4100 Series include:

Treatment capacity analysis

Peak flows and long-term flow patterns must be measured to guide the expansion of wastewater treatment plants and sewer systems. Monitoring your collection system with Isco Flow Loggers provides the accurate data you need to determine the timing of treatment capacity expansion.

Inflow and infiltration studies

I&I studies determine the amount of surface water and groundwater entering the sanitary sewer system. Isco Flow Loggers help you pinpoint locations of excessive inflow and infiltration. They can also determine the effectiveness of maintenance programs.

Combined sewer overflow studies

An accurate model of a combined sewer system is needed to assist in the selection of cost-effective overflow controls. The 4100 Series collects flow and rainfall data, and activates a sampler. Data and sample analysis are used to calibrate sewer models, and develop proper overflow control strategies.

Automated customer billing

To receive efficient treatment of wastewater, industries and surrounding communities often discharge to a central treatment plant. A system of strategically located Flow Loggers precisely measures flow from each discharger. This ensures that dischargers pay their fair share of treatment costs.

Long-term river and stream gauging

Flows in rivers and streams are measured to predict levels in downstream reservoirs. Long-term monitoring is often required at remote locations under challenging weather conditions. The rugged design and long battery life of the Isco 4100 Series Flow Loggers ensure that your system operates properly throughout the duration of your monitoring projects.

Superior features and performance

The new Isco 4100 Series Flow Loggers have all the features you need to handle the most demanding projects.

The Isco Flow Logger signals a sampler to collect flow proportioned samples.

Large, Versatile Memory

The large memory and long battery life of the Flow Loggers substantially reduce the need to visit flow monitoring sites to replace batteries and retrieve data. Internal memory stores over 100,000 readings of flow, rainfall and sample data. Stored data is retrieved and analyzed using Isco Flowlink Software on your PC.

For more information on data storage and Flowlink Software, see page 11.

Up to One Year Battery Life

The highly efficient power management system in the 4100 Series provides battery life of up to one year. Isco Flow Loggers can be powered by standard alkaline lantern batteries or a rechargeable Isco lead acid battery. A solar panel is also available to maintain the charge on a lead acid battery.

Easy to Upgrade

Nonvolatile "flash" memory makes it easy to upgrade the 4100 Series with new software. You can easily reprogram this memory using a PC, without opening the Flow Logger enclosure.

Rugged, Submersible Enclosure

The Isco 4100 Series enclosures meet NEMA 4X, 6 and IP67 requirements for submersible, watertight, dust-tight and corrosion resistant operation. This ensures dependable operation in the harshest environments.

Rainfall Monitoring

Connect an Isco Rain Gauge for automatic rainfall measurement. Rainfall data is useful in storm water runoff and combined sewer overflow (CSO) monitoring, and inflow and infiltration studies.

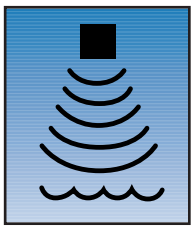
Sampler Pacing and Activation

The Isco Flow Logger signals a sampler to collect flow proportioned samples. For standby applications such as CSO monitoring, the Flow Logger can also activate the sampler based on flow, rainfall and/or time.

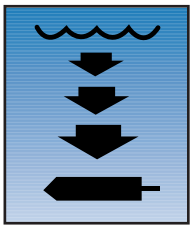
Choose the best technology for your applications

No single measurement technology is suitable for all open channel flow monitoring applications. Only Isco offers you a choice of ultrasonic, submerged probe, bubbler, variable gate and area velocity flow meters. The 4100 Series includes the 4110 Ultrasonic, 4120 Submerged Probe and 4150 Area Velocity Flow Loggers. Now you can choose the most accurate technology for each of your monitoring sites.

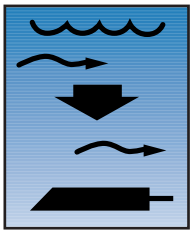
- **4110 Ultrasonic** — for flow measurement in streams containing harsh chemicals, grease or suspended solids. The ultrasonic sensor is mounted above the flow stream and requires no scheduled maintenance. The 4110 measures the level in the channel by transmitting a sound pulse from the sensor and measuring the time for the echo to return from the flow stream surface. The level is then converted into flow rate.

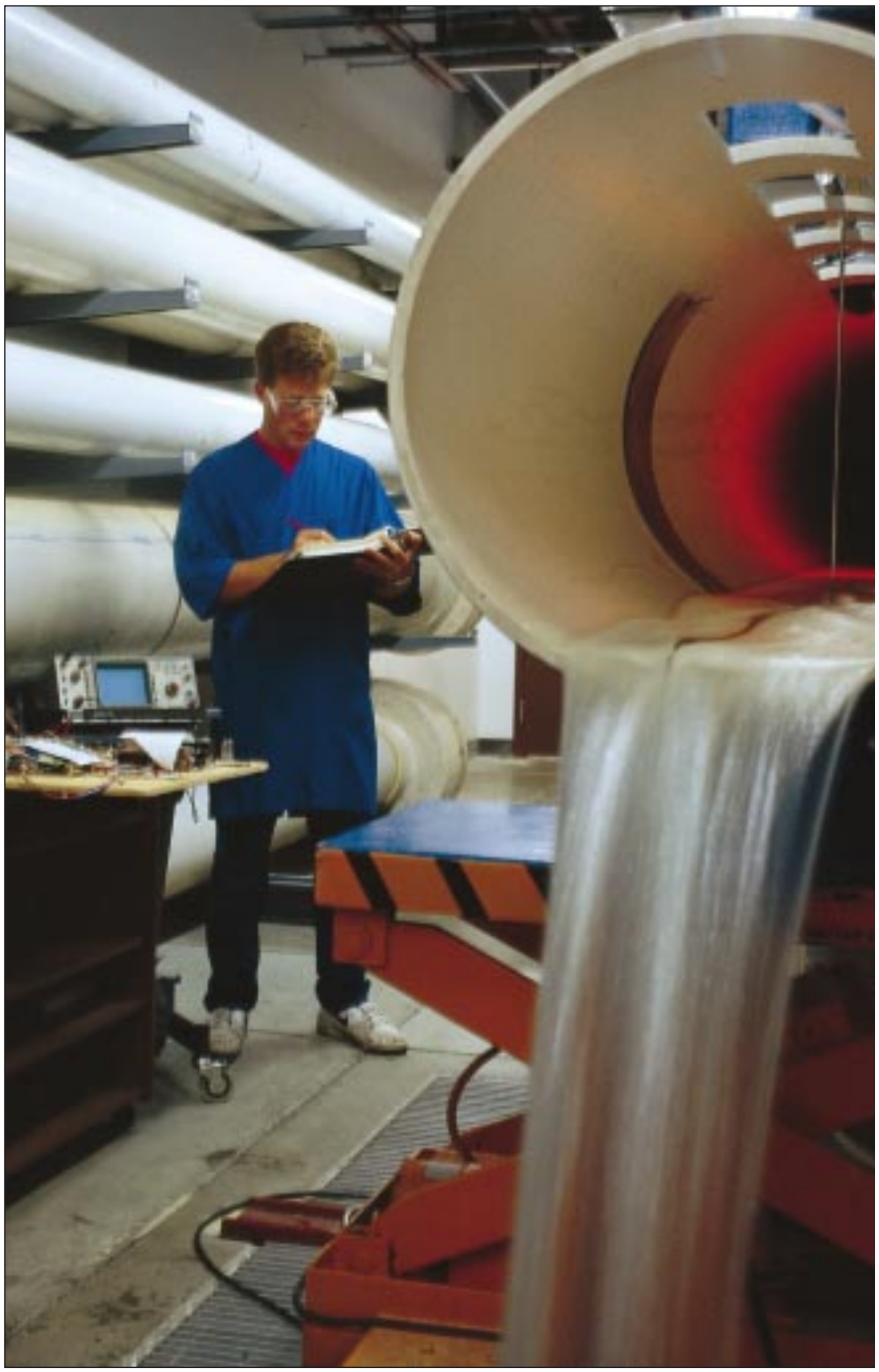


- **4120 Submerged Probe** — ideal for sites where wind, steam, foam or turbulence exist. The probe is mounted at the bottom of the channel, and measures the pressure of the liquid above the probe to determine the depth of the flow stream. The 4120 converts the level reading into flow rate.



- **4150 Area Velocity** — for sites where submerged, surcharged, full pipe or reverse flow conditions may occur. The 4150 sensor is mounted at the bottom of the channel, and uses Doppler technology to directly measure average velocity throughout the flow stream. An integral pressure transducer measures liquid level to determine flow area. The 4150 calculates flow rate by multiplying the area of the flow stream by the average velocity.





The 4100 Series was designed and tested under true open channel conditions in the Isco Flow Measurement Laboratory. This ensures you accurate and dependable performance.

For more information, please see the Flow Measurement Technology Selection Guide on the back cover.

4110 Ultrasonic Flow Logger

The Isco 4110 Ultrasonic Flow Logger features a non-contacting sensor that quickly and easily installs above the flow stream. The 4110 sensor is not affected by flow stream chemicals or high concentrations of grease, suspended solids or silt. This gives you long-term dependability with no need for scheduled maintenance.

The non-contacting 4110 Ultrasonic Flow Logger accurately measures flow through a Parshall Flume.

Rugged, Dependable Sensor

The 4110 uses a single-head sensor sealed in a rugged, corrosion resistant enclosure. The sensor transmits a sound pulse which is reflected from the surface of the flow stream. The elapsed time between sending a pulse and receiving an echo determines the level in the channel.

Accurate Under Tough Conditions

To ensure maximum accuracy, a built-in sensor automatically compensates for changes in air temperature. To improve performance in the presence of turbulence and foam, the 4110 automatically adjusts amplifier gain in response to echo strength. And, Isco's Variable Blanking Distance feature eliminates false echo problems caused by obstructions such as manhole rungs or the top of a flume.

Isco 4110 Flow Logger Specifications

Flow Logger

Size	10.5 x 9.0 x 6.0 in.	26.7 x 22.9 x 15.2 cm
Weight *(without batteries)*	8.0 lbs.	3.6 kg
Material		
Body and battery end	Structural foam molded polystyrene	
Connector end	Ryton® *(polyphenylene sulfide)*	
Type *(self-certified)*	NEMA 4X, 6	IP67
Power	Two 6 volt lantern batteries *(alkaline recommended)* or one rechargeable 12 volt Isco 947 Lead Acid Battery	
Typical Battery Life *(event inputs will shorten battery life)*		
	Minimum data storage interval	
	1 hour	**15 minutes**
Alkaline lantern batteries	1 year	3 months
Isco 947 Lead Acid Battery *(time between recharges)*	4 months	1 month
Program Memory	Non-volatile, programmable flash; can be updated via Interrogator port without opening the enclosure	
Time Base Accuracy	±1 second per day	
Level-to-Flow Rate Conversions		
Weirs	V-notch, rectangular with and without end contractions, Cipolletti	
Flumes	Parshall, Palmer-Bowlus, Leopold-Lagco, trapezoidal, H	
Manning formula	Round, U-channel, rectangular, trapezoidal	
Equation	Of the form $K_1H^{N1} \pm K_2H^{N2}$	
Data points	50 level-flow rate points	
Sampler Activation Conditions	Enabled, disabled, level, flow rate, rainfall and time; AND and OR combinations of any two of level, flow rate, rainfall and time; values may be above or below a set-point, inside or outside a range, or a rate of change	
Sampler Pacing Output	12 volt pulse	
Data Storage Memory		
Capacity	230,000 bytes; equal to over 700 days of level and rainfall readings at 15 minute intervals, plus 5000 sample events	
Partitions	Maximum of 6	
Data types	Level, flow rate, rainfall or sample data	
Storage modes	Rollover, slate or triggered slate	
Storage interval	1, 2, 5, 10, 15, 30, 60 or 120 minutes	
Resolution		
Level	0.000328 ft. (0.00394 in.)	0.0001 m
Flow rate	Stored as a floating point number in CFS	
Rainfall	0.01 or 0.004 in.	0.25 or 0.1 mm
Samples	Includes time or bottle number	
Bytes per reading		
Level	2	
Flow rate	4	
Rainfall	1	
Samples	4	
Communication	Serial connection to an IBM PC® or compatible computer with Isco Flowlink Software Version 3	
Baud rate	300, 1200, 2400, 4800 or 9600	
Operating Temperature	0° to 140°F	-18° to 60°C
Storage Temperature	-40° to 140°F	-40° to 60°C

Ultrasonic Sensor

Length	6.9 in.	17.5 cm
Diameter	3.6 in.	9.1 cm
Cable Length	25 ft.	7.6 m
Cable Diameter	0.3 in.	0.8 cm
Weight *(including cable)*	2.6 lbs.	1.2 kg
Range *(distance from sensor to liquid)*		
Minimum	2 ft.	0.6 m
Maximum	12 ft.	3.7 m
Span	0 to 10 ft.	0 to 3 m

Level Measurement Accuracy

At 22°C (72°F), still air, and 40 to 70% relative humidity

Head Change*	**Maximum Error**	**Head Change***	**Maximum Error**
1.0 ft. or less	±0.02 ft.	0.31 m or less	±0.006 m
1.0 to 10 ft.	±0.03 ft.	0.31 to 3.05m	±0.009 m

Operating Temperature	-22° to 140°F	-30° to 60°C
Compensated Temperature	-22° to 140°F	-30° to 60°C
Temperature Error	±0.000047 x D per °F	±0.000085 x D per °C
Maximum error over compensated temperature range (per degree of temperature change)	*Where D is the distance from the transducer to the liquid surface*	
Materials		
Sensor housing	Xenoy® 6120	
Cable	Polyvinyl chloride (PVC) jacket with an integral stainless steel mounting cable	

** Actual vertical distance between the ultrasonic sensor and the liquid surface*

® Ryton is a registered trademark of Phillips Petroleum Company
® IBM PC is a registered trademark of International Business Machines
® Xenoy is a registered trademark of General Electric

4120 Submerged Probe Flow Logger

The 4120 provides accurate measurement, even where wind, steam, foam, turbulence or air temperature fluctuations exist.

Isco mounting rings make it easy to install the Submerged Probe in round pipes.

Accurate Under Tough Conditions

The Isco 4120 probe uses an integral differential pressure transducer to measure the depth of the liquid. The probe features a streamlined, low-profile design to minimize flow stream obstruction. Its venting system automatically compensates for changes in atmospheric pressure to maintain measurement accuracy. The probe accurately senses pressure even when covered with silt and sand.

Safe for Hazardous Locations

Isco Submerged Probes are UL Classified for use in Class I, Division 1, Groups A, B, C, & D hazardous locations when installed using the new Intrinsically Safe Barrier and Quick Disconnect Box. This makes the 4120 safe to use in locations where flammable gases or vapors may be present.

Fast and Easy Installation

Isco mounting rings and straps make it easy to install the probe in round pipes, manhole inverts, and other open channels. In addition, most flumes are available with an integral recess for mounting an Isco Submerged Probe.

Isco 4120 Flow Logger Specifications

Flow Logger

Size	10.5 x 9.0 x 6.0 in.	26.7 x 22.9 x 15.2 cm
Weight *(without batteries)*	8.0 lbs.	3.6 kg
Material		
Body and battery end	Structural foam molded polystyrene	
Connector end	Ryton *(polyphenylene sulfide)*	
Type *(self-certified)*	NEMA 4X, 6	IP67
Power	Two 6 volt lantern batteries *(alkaline recommended)* or one rechargeable 12 volt Isco 947 Lead Acid Battery	
Typical Battery Life (*event inputs will shorten battery life)*		
	Minimum data storage interval	
	1 hour	**15 minutes**
Alkaline lantern batteries	2 years	6 months
Isco 947 Lead Acid Battery *(time between recharges)*	8 months	2 months
Program Memory	Non-volatile, programmable flash; can be updated via Interrogator port without opening the enclosure	
Time Base Accuracy	±1 second per day	
Level-to-Flow Rate Conversions		
Weirs	V-notch, rectangular with and without end contractions, Cipolletti	
Flumes	Parshall, Palmer-Bowlus, Leopold-Lagco, trapezoidal, H	
Manning formula	Round, U-channel, rectangular, trapezoidal	
Equation	Of the form $K_1H^{N1} \pm K_2H^{N2}$	
Data points	50 level-flow rate points	
Sampler Activation Conditions	Enabled, disabled, level, flow rate, rainfall and time; AND and OR combinations of any two of level, flow rate, rainfall and time; values may be above or below a set-point, inside or outside a range, or a rate of change	
Sampler Pacing Output	12 volt pulse	
Data Storage Memory		
Capacity	230,000 bytes; equal to over 700 days of level and rainfall readings at 15 minute intervals, plus 5000 sample events	
Partitions	Maximum of 6	
Data types	Level, flow rate, rainfall or sample data	
Storage modes	Rollover, slate or triggered slate	
Storage interval	1, 2, 5, 10, 15, 30, 60 or 120 minutes	
Resolution		
Level	0.000328 ft. (0.00394 in.)	0.0001 m
Flow rate	Stored as a floating point number in CFS	
Rainfall	0.01 or 0.004 in.	0.25 or 0.1 mm
Samples	Includes time and bottle number	
Bytes per reading		
Level	2	
Flow rate	4	
Rainfall	1	
Samples	4	
Communication	Serial connection to an IBM PC or compatible computer with Isco Flowlink Software Version 3	
Baud rate	300, 1200, 2400, 4800 or 9600	
Operating Temperature	0° to 140°F	-18° to 60°C
Storage Temperature	-40° to 140°F	-40° to 60°C

Submerged Probe

Hazardous Location Rating	UL Classified for use in Class I, Division 1, Groups A, B, C, & D hazardous locations as defined by Article 500 of the National Electrical Code when installed with Isco Intrinsically Safe Barrier and Quick Disconnect Box per control drawing 60-3403-131	
Length	9.5 in.	24.1 cm
Diameter	0.875 in.	2.2 cm
Frontal Area	0.765 $in.^2$	4.93 cm^2
Cable Length		
Standard range probe	25 ft.	7.6 m
Extended range probe	50 ft.	15.2 m
Cable Diameter	0.3 in.	0.8 cm
Weight *(including cable)*		
Standard range probe	3 lbs.	1.4 kg
Extended range probe	7 lbs.	3.2 kg
Level Measurement Method	Submerged pressure transducer mounted in the flow stream	
Transducer Type	Differential linear integrated circuit pressure transducer	
Level Measurement Range		
Standard range probe	0.1 to 10 ft.	0.03 to 3.05 m
Extended range probe	0.1 to 30 ft.	0.03 to 9.14 m
Maximum Allowable Level		
Standard range probe	20 ft.	6.1 m
Extended range probe	40 ft.	12.2 m

Level Measurement Accuracy

Non-linearity, repeatability, and hysteresis (does not include temperature error)

	Level*	**Error**	**Level***	**Error**
Standard range probe	0.1 to 5.0 ft.	±0.01 ft.	0.03 to 1.52 m	±0.003 m
	0.1 to 7.0 ft.	±0.03 ft.	0.03 to 2.13 m	±0.009 m
	0.1 to 10 ft.	±0.10 ft.	0.03 to 3.05 m	±0.03 m
Extended range probe	0.1 to 15 ft.	±0.03 ft.	0.03 to 4.57 m	±0.009 m
	0.1 to 21 ft.	±0.09 ft.	0.03 to 6.40 m	±0.027 m
	0.1 to 30 ft.	±0.30 ft.	0.03 to 9.14 m	±0.09 m

Operating Temperature	32° to 160°F	0° to 71°C
Compensated Temperature	32° to 100°F	0° to 38°C

Temperature Error

Maximum error over compensated temperature range (per degree of temperature change)

	Level*	**Error**	**Level***	**Error**
Standard range probe	0.1 to 4.0 ft.	±0.005ft./°F	0.03 to 1.22 m	±0.0027m/°
	4.0 to 10 ft.	±0.007ft./°F	1.22 to 3.05 m	±0.0038m/°
Extended range probe	0.1 to 12 ft.	±0.015ft./°F	0.03 to 3.66 m	±0.0082m/°
	12 to 30 ft.	±0.021ft./°F	3.66 to 9.14 m	±0.012 m/°

Materials	
Submerged probe	Type 316 stainless steel, chlorinated polyvinyl chloride (CPVC)
Cable	Polyvinyl chloride (PVC)

** Actual vertical distance between the submerged probe and the liquid surface*

4150 Area Velocity Flow Logger

The Isco 4150 Flow Logger features a patent-pending Doppler system that eliminates the problems of electromagnetic probes. The 4150 gives you greater accuracy under tough open channel conditions, including submerged, full pipe, surcharged and reverse flow. And, you don't need a weir or flume.

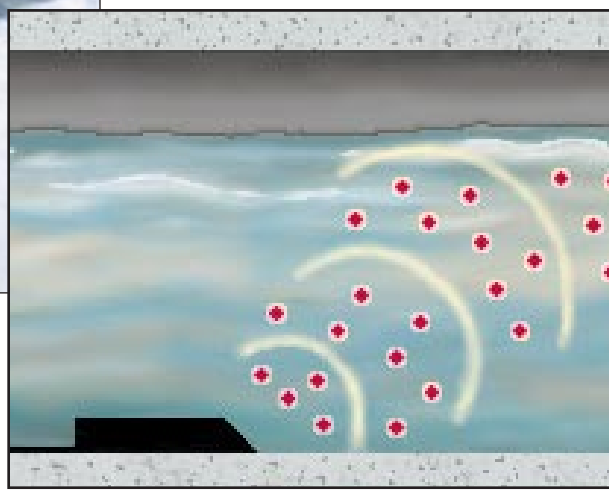
The Isco Doppler sensor directly measures average velocity throughout the flow stream.

Maximum Accuracy

The 4150 calculates flow rate by multiplying the area of the flow stream by its average velocity. The Isco Doppler sensor directly measures average velocity throughout the flow stream, while an integral pressure transducer measures liquid depth to determine flow area.This new technology gives you maximum accuracy, and eliminates profiling and calibration required by electromagnetic probes.

Maintenance-free

The streamlined, low-profile 4150 sensor sheds debris and withstands corrosive flow stream chemicals. And, unlike electromagnetic probes, the sealed Isco sensor does not have exposed electrical contacts. These contacts are easily fouled by oil and grease, and require frequent cleaning. You can count on the Isco 4150 for long-term, dependable operation.



Isco 4150 Flow Logger Specifications

Flow Logger

Size	10.5 x 9.0 x 6.0 in.	26.7 x 22.9 x 15.2 cm
Weight *(without batteries)*	8.0 lbs.	3.6 kg
Material		
Body and battery end	Structural foam molded polystyrene	
Connector end	Ryton *(polyphenylene sulfide)*	
Type *(self-certified)*	NEMA 4X, 6	IP67
Power	Two 6 volt lantern batteries *(alkaline recommended)* or one rechargeable 12 volt Isco 947 Lead Acid Battery	
Typical Battery Life *(event inputs will shorten battery life)*		
	Minimum data storage interval	
	1 hour	**15 minutes**
Alkaline lantern batteries	1 year	3 months
Isco 947 Lead Acid Battery *(time between recharges)*	4 months	1 month
Program Memory	Non-volatile, programmable flash; can be updated via Interrogator port without opening the enclosure	
Time Base Accuracy	±1 second per day	
Level-to-Flow Rate Conversions		
Weirs	V-notch, rectangular with and without end contractions, Cipolletti	
Flumes	Parshall, Palmer-Bowlus, Leopold-Lagco, trapezoidal, H	
Manning formula	Round, U-channel, rectangular, trapezoidal	
Equation	Of the form $K_1H^{N1} \pm K_2H^{N2}$	
Data points	50 level-flow rate points	
Level-to-Area Conversions		
Channel geometries	Round, U-channel, rectangular, trapezoidal	
Data points	50 level-area points	
Sampler Activation Conditions	Enabled, disabled, level, velocity, flow rate, rainfall and time; AND and OR combinations of any two of level, velocity, flow rate, rainfall and time; values may be above or below a set-point, inside or outside a range, or a rate of change	
Sampler Pacing Output	12 volt pulse	
Data Storage Memory		
Capacity	230,000 bytes; equal to over 400 days of level, velocity and rainfall readings at 15 minute intervals, plus 5000 sample events	
Partitions	Maximum of 6	
Data types	Level, velocity, flow rate, rainfall or sample data	
Storage modes	Rollover, slate or triggered slate	
Storage interval	1, 2, 5, 10, 15, 30, 60 or 120 minutes	
Resolution		
Level	0.000328 ft. (0.00394 in.)	0.0001 m
Velocity	0.001 ft./s	0.0003 m/s
Flow rate	Stored as a floating point number in CFS	
Rainfall	0.01 or 0.004 in.	0.25 or 0.1 mm
Samples	Includes time and bottle number	
Bytes per reading		
Level	2	
Velocity	2	
Flow rate	4	
Rainfall	1	
Samples	4	
Communication	Serial connection to an IBM PC or compatible computer with Isco Flowlink Software Version 3	
Baud rate	300, 1200, 2400, 4800 or 9600	
Operating Temperature	0° to 140°F	-18° to 60°C
Storage Temperature	-40° to 140°F	-40° to 60°C

Area Velocity Sensor

Length	6.6 in.	16.8 cm
Width	1.6 in.	4.1 cm
Height	1.2 in.	3.0 cm
Nose Angle	35° from horizontal	
Cable Length		
Standard range probe	25 ft.	7.6 m
Extended range probe	50 ft.	15.2 m
Cable Diameter	0.37 in.	0.9 cm
Weight *(including cable)*		
Standard range probe	2.1 lbs.	0.96 kg
Extended range probe	3.9 lbs.	1.8 kg
Level Measurement		
Method	Submerged pressure transducer mounted in the flow stream	
Transducer type	Differential linear integrated circuit pressure transduc	
Range		
Standard range probe	0.1 to 10 ft.	0.03 to 3.05 m
Extended range probe	0.1 to 30 ft.	0.03 to 9.14 m
Maximum Allowable Level		
Standard range probe	20 ft.	6.1 m
Extended range probe	40 ft.	12.2 m

Accuracy

Non-linearity, repeatability, and hysteresis (Does not include temperature error)

	Level*	**Error**	**Level***	**Error**
Standard range probe	0.1 to 5.0 ft.	±0.01 ft.	0.03 to 1.52 m	±0.003
	0.1 to 7.0 ft.	±0.03 ft.	0.03 to 2.13 m	±0.009
	0.1 to 10.0 ft.	±0.10 ft.	0.03 to 3.05 m	±0.03
Extended range probe	0.1 to 15 ft.	±0.03 ft.	0.03 to 4.57 m	±0.009
	0.1 to 21 ft.	±0.09 ft.	0.03 to 6.40 m	±0.027
	0.1 to 30 ft.	±0.30 ft.	0.03 to 9.14 m	±0.09

Velocity Measurement		
Method	Doppler ultrasonic	
Transducer type	Twin 500 kHz piezoelectric crystals	
Typical minimum depth for velocity measurement	0.25 ft.	7.6 cm
Range	-5 to +20 ft./s	-1.5 to +6.1 m/s

	Velocity	**Error**	**Velocity**	**Error**
Accuracy	-5 to +5 ft./s	±0.1 ft./s	-1.5 to +1.5 m/s	±0.03 m
	5 to 20 ft./s	±2% of reading	1.5 to 6.1 m/s	±2% of readin

Resolution	±0.024 ft./s	±0.0073 m/s
Operating Temperature	32° to 160°F	0° to 71°C
Compensated Temperature	32° to 122°F	0° to 50°C

Level Measurement Temperature Error

Maximum error within compensated temperature range (per degree of temperature change)

	Level*	**Error**	**Level***	**Error**
Standard range probe	0.1 to 4.0 ft	±0.005ft./°F	0.03 to 1.22 m	±0.0027 m/
	4.0 to 10 ft.	±0.007ft./°F	1.22 to 3.05 m	±0.0038 m/
Extended range probe	0.1 to 12 ft.	±0.015ft./°F	0.03 to 3.66 m	±0.0082 m/
	12 to 30 ft.	±0.021ft./°F	3.66 to 9.14 m	±0.012 m/

Materials	
Sensor	Polybutadiene based polyurethane, stainless steel
Cable	Polyvinyl chloride (PVC), chlorinated polyvinyl chloride (CPVC)

** Actual vertical distance between the area velocity sensor and the liquid surface.*

Isco Flowlink Software

Isco Flowlink Software is a new generation of flow data analysis software for your PC.

Flowlink Version 3 quickly and easily collects and analyzes data from Isco 4100 Series Flow Loggers.

User-Friendly

Flowlink is easy for beginners to use, yet provides all the power you need for advanced flow studies. Pull-down menus and pop-up windows allow you to quickly make selections. On-line help screens provide specific guidance for each step of the program.

Quick and Easy Setup

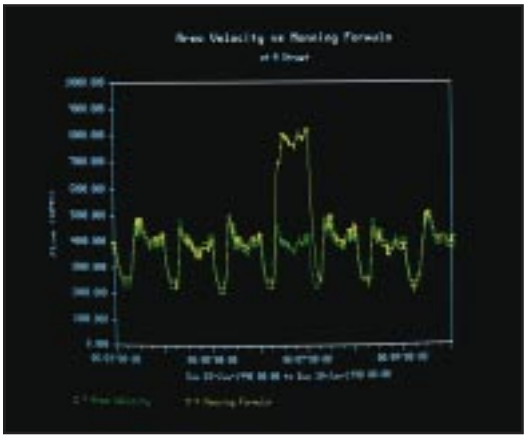
Flowlink sets up the data storage, flow conversion and sampler activation, and calibrates each Flow Logger in your monitoring system.

Versatile Data Storage

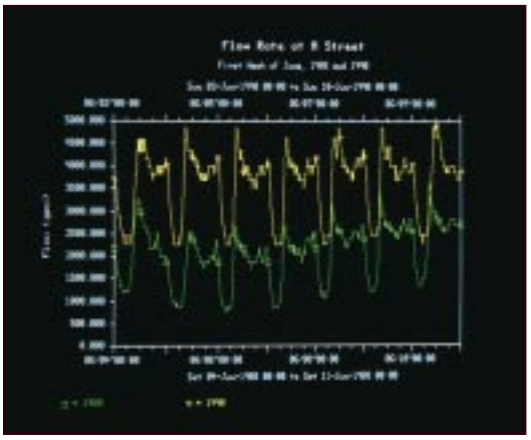
Each Flow Logger stores level, velocity, flow rate, rainfall and sample data. The memory can hold over 100,000 readings stored at intervals from one minute to two hours.

You can select the data storage method you need. When the memory is full, it can either roll over to keep recording, or it can stop storing new data. A fixed amount of data can also be stored following a triggering event, such as a flow stream level or velocity, or a rainfall amount.

Flowlink collects and analyzes data from Isco 4100 Series Flow Loggers.



Flow rates determined by level and velocity can be compared to flow rates based on level only.

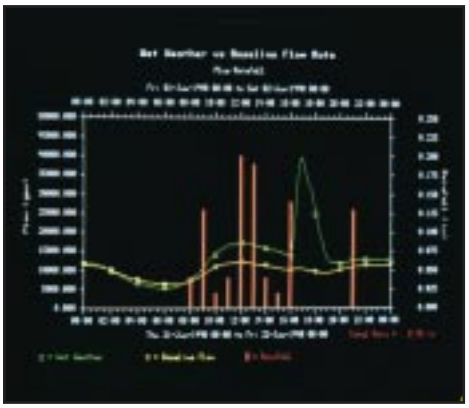


Data from two time periods can be displayed together to analyze long-term trends.

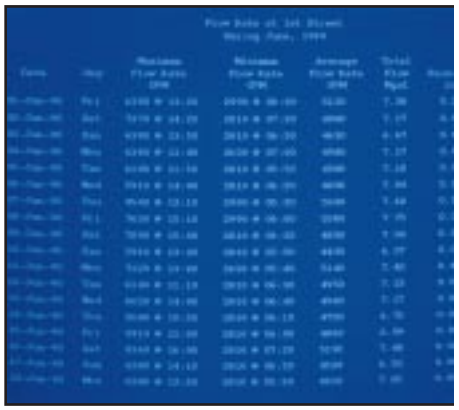
Flowlink 3 generates useful graphs, reports and summaries from stored data. Data can also be analyzed from a variety of Isco monitoring instruments, including:

- 4200 Series Flow Meters
- 3700 Series Samplers
- PAL 1101 Parameter Actuator/Logger
- 2500 Series Level Data Acquisition System

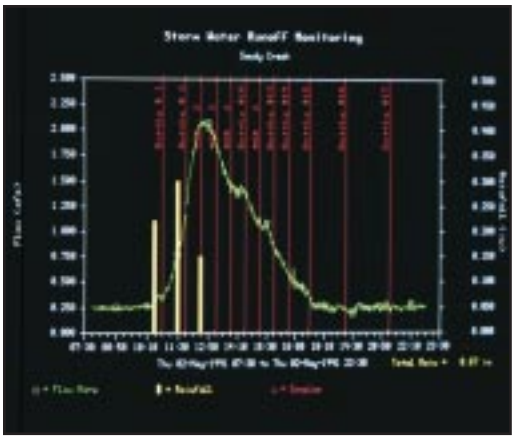
If you have monitoring data from other sources, you can import it into Flowlink 3 for analysis. Data can also be exported in ASCII format for analysis in Lotus 1-2-3®, Microsoft Excel® and other programs.



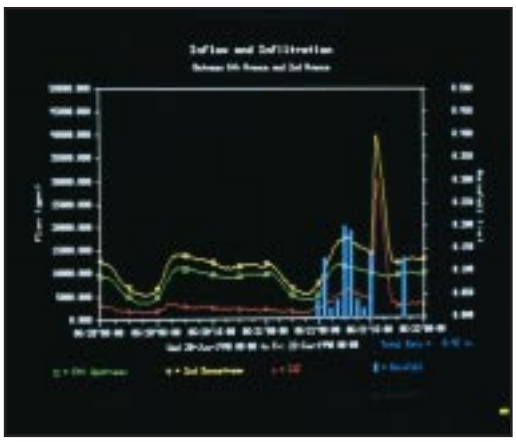
For continuous sewer flow monitoring, data can be averaged to determine a baseline flow curve.



Monthly summaries report both daily values and monthly totals.



Rainfall, flow rate and sample data can be analyzed together for storm water runoff monitoring.



Addition and subtraction of data is useful for inflow and infiltration studies.

Flowlink is so easy, anyone can use it.

® Lotus is a registered trademark of Lotus Development Corporation

4100 Series Flow Logger Accessories

Alkaline Battery

Part #340-2006-02

6V lantern battery for Flow Loggers. Two required.

947 Lead Acid Battery

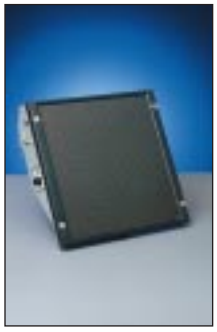
Part #60-3114-011

Rechargeable 12V battery for Flow Loggers.

965 Five Station Battery Charger

Part #68-3000-965

Charges up to five Isco Lead Acid or Nickel Cadmium Batteries at one time. Powered by 120 or 240V AC.



Solar Panel Battery Charger

Part #68-3000-032

Charges Isco Lead Acid Batteries in locations where AC line power is not available.

674 Rain Gauge

0.01" Part #60-3284-001
0.1 mm Part #68-3280-001

Tipping bucket rain gauge accurately measures on-site rainfall.

Spreader Bar

Part #60-3004-110

For suspending Flow Logger in a manhole.

Spring Rings

(Call for part numbers)

To install flow and parameter sensors in small round pipes.

Scissors Rings

To install sensors in large round pipes and manhole inverts.

Ultrasonic Sensor Cable Clamp

Part #60-3004-129

Suspends sensor by its cable from Spreader Bar.

Ultrasonic Sensor Cable Straightener

Part #60-3213-061

Straightens ultrasonic sensor when suspended by cable.

Ultrasonic Sensor Mounting Bracket

Part #60-2443-092

Allows sensor to be secured to a vertical surface.

Ultrasonic Sensor Floor Mount

Part #60-3004-117

For convenient mounting of the ultrasonic sensor to a horizontal surface.

Ultrasonic Calibration Target

Part #60-3004-143

For calibration of an ultrasonic sensor without entering the manhole.

Quick Disconnect Box

Part #60-3224-003

Intrinsically Safe Barrier

Part #60-3404-060

Allows submerged probe to be installed in hazardous locations.

Flow Data Handbook

Part # 60-3003-041

Includes information on weir and flume applications, open channel flow meters, the Manning formula, and discharge tables for a variety of primary devices.

Ordering Information

Model	Part Number
4110 Ultrasonic Flow Logger	68-4110-001
4120 Submerged Probe Flow Logger	
with 10 ft. level measurement range	68-4120-001
with 30 ft. level measurement range	68-4120-002
4150 Area Velocity Flow Logger	
with 10 ft. level measurement range	68-4150-001
with 30 ft. level measurement range	68-4150-002

Isco accessories make installation of the 4100 Flow Loggers fast and easy.

Flow Measurement Technology Selection Guide

Isco offers open channel flow meters with ultrasonic, submerged probe, bubbler, and area velocity measurement technologies. The 4100 Series includes the 4110 Ultrasonic, 4120 Submerged Probe and 4150 Area Velocity Flow Loggers. Choose the most accurate technology for each of your monitoring sites.

Suitability for Different Applications	Ultrasonic Sensor	Submerged Probe	Area Velocity Sensor
Weirs and flumes	Excellent [1]	Excellent	Excellent
Channels less than 6 in. (150 mm)	Not Recommended	Excellent	Not Recommended
Small round pipes, 6 to 8 in. (150 to 200 mm)	Good [2]	Excellent	Excellent
Medium round pipes, 10 to 15 in. (250 to 375 mm)	Good [2]	Excellent	Excellent
Large round pipes, 15 to 96 in. (375 to 2500 mm)	Excellent [2]	Good	Excellent
Irrigation channels and small streams	Excellent [2]	Good	Good
Rivers and large streams	Excellent [2]	Good	Good
Chemical Compatibility of Sensor			
Organic solvents	Compatible	Not Recommended	Not Recommended
Organic acids	Compatible	Not Recommended	Not Recommended
Alcohols	Compatible	Compatible	Compatible
Esters	Compatible	Not Recommended	Not Recommended
Inorganic acids	Compatible	Not Recommended	Not Recommended
Inorganic bases	Compatible	Not Recommended	Not Recommended
Inorganic salts	Compatible	Compatible	Compatible
Performance Under Adverse Conditions			
Strong wind	Not Recommended	Excellent	Excellent
Air temperature fluctuations	Very Good [3]	Excellent	Excellent
Steam above liquid	Not Recommended	Excellent	Excellent
Foam on liquid	Not Recommended	Excellent	Excellent
Flow stream turbulence	Not Recommended	Excellent	Excellent
Floating debris	Not Recommended	Excellent	Excellent
Floating oil or grease	Not Recommended	Excellent	Excellent
Suspended solids	Excellent	Very Good	Very Good
Suspended grease	Excellent	Very Good	Very Good
Silting in	Excellent	Very Good	Very Good
Liquid temperature fluctuations	Very Good [4]	Good [4]	Good [4]
Submerged flow	Not Recommended	Not Recommended	Excellent
Full pipe flow	Not Recommended	Not Recommended	Excellent
Surcharged flow	Not Recommended	Not Recommended	Excellent
Reverse flow	Not Recommended	Not Recommended	Excellent
Maintenance Requirements Caused by Adverse Conditions			
Silting in	None	Occasional	Occasional
Suspended solids	None	Occasional	Occasional
High grease concentration	None	Occasional	Occasional

1. Use with caution in small flumes
2. There must be adequate space above for mounting sensor
3. Large air temperature fluctuations will affect accuracy
4. Large water temperature fluctuations will affect accuracy

Isco, Inc. • P.O. Box 82531 • Lincoln, NE 68501-2531, USA
Phone: (402) 464-0231 • Toll free: (800) 228-4373
Fax: (402) 465-3022 • E-Mail: info.ed@isco.com • Website: www.isco.com

Isco Europe AG • Heckenweg 3 • CH-8704 Herrliberg, Switzerland
Phone:(41-1) 915 37 54 • Fax: (41-1) 915 41 31