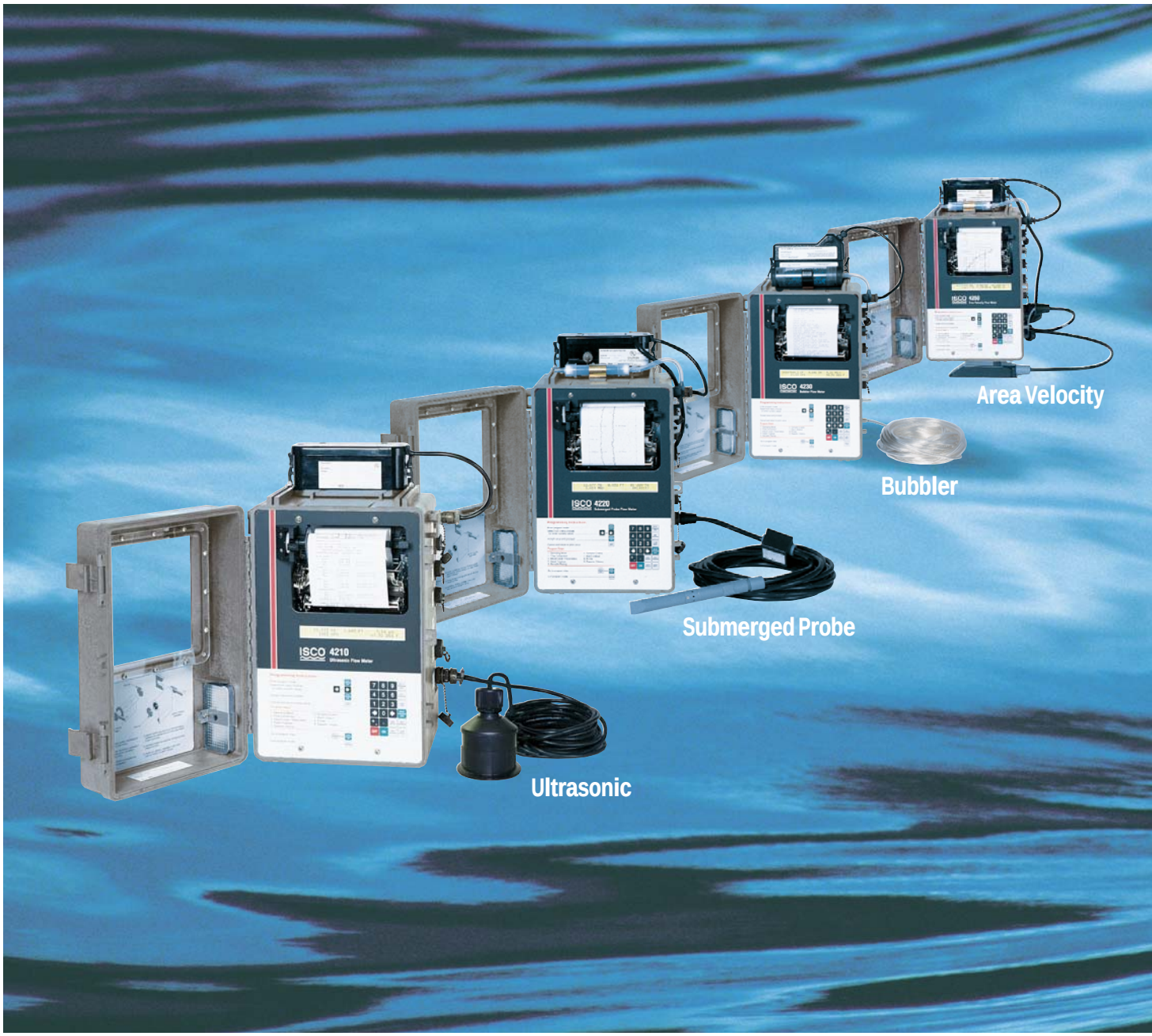
4200 Series Flow Meters

Accurate flow measurement that's versatile and easy to use



ISCO®

4200 Series Open Channel Flow Meters

When you need a monitoring system that's accurate, versatile, and easy to use, turn to open channel flow meters from Isco. Our 4200 Series is backed by 30 years of experience in flow measurement. You can depend on Isco technology to meet your needs in an increasingly complex monitoring environment.

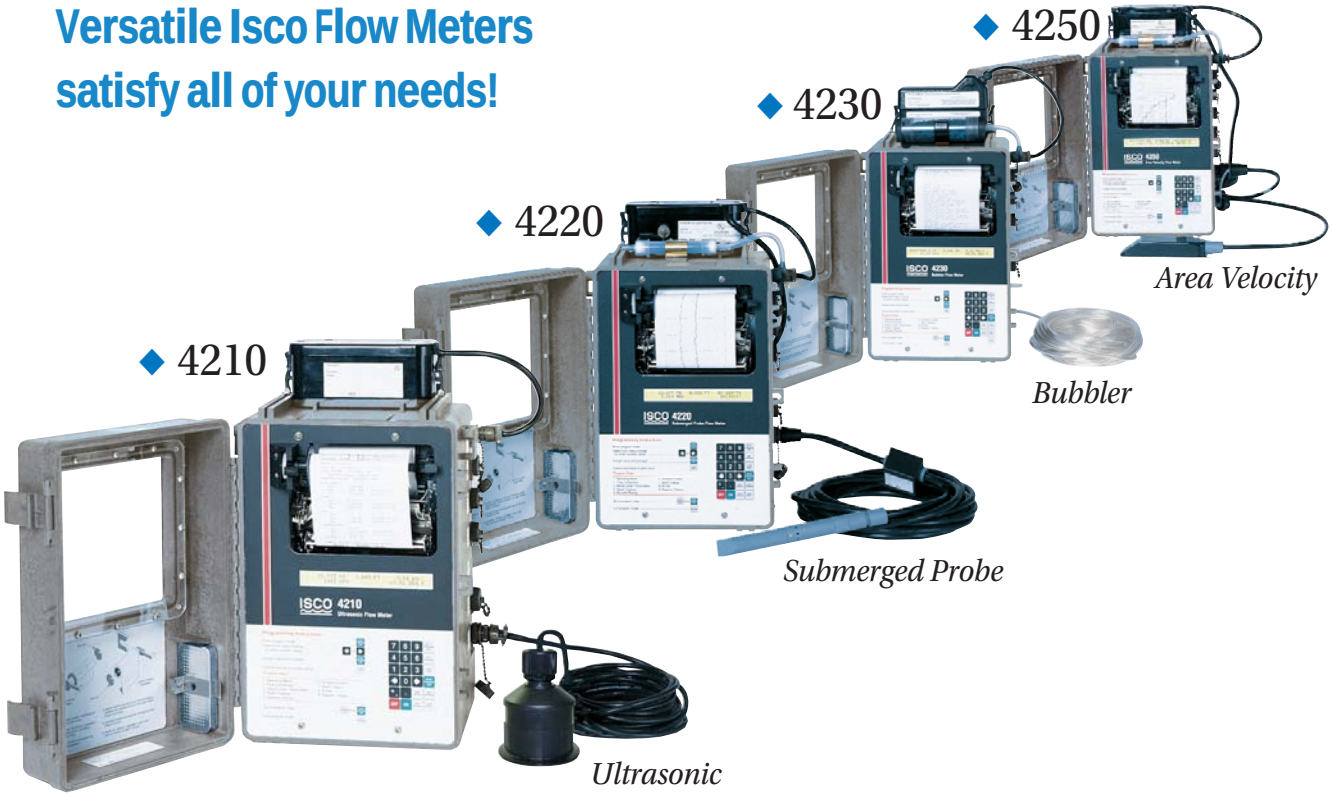
Maximum Accuracy

Nothing else matters if your flow meter can't measure flow accurately. But inaccuracies result when a single measurement technology is used in a variety of applications. The 4200 Series offers you a choice of four measurement technologies, so you can select the flow meter best suited for your site conditions.

Maximum Versatility

Today, you need a monitoring system with the versatility to perform in a variety of situations. For example, you may be required to collect flow-proportioned samples. Or you may be required to monitor parameters such as pH, conductivity, or temperature. In storm water monitoring, you need to measure rainfall. You may need to be notified when an alarm condition occurs. And, in many applications, you need to control a process, such as chlorination and pH neutralization.

Versatile Isco Flow Meters satisfy all of your needs!



Convenient options customize the 4200 Series for your specific portable and fixed-site applications including:

- Pretreatment Compliance
- Storm Water Runoff Monitoring
- Permit Enforcement
- Sewer Flow Monitoring
- Combined Sewer Overflow Studies
- Wastewater Treatment Plant Operations
- Inflow And Infiltration Studies
- River And Stream Gauging

User-friendly Programming and Data Collection

Fast and Easy Programming

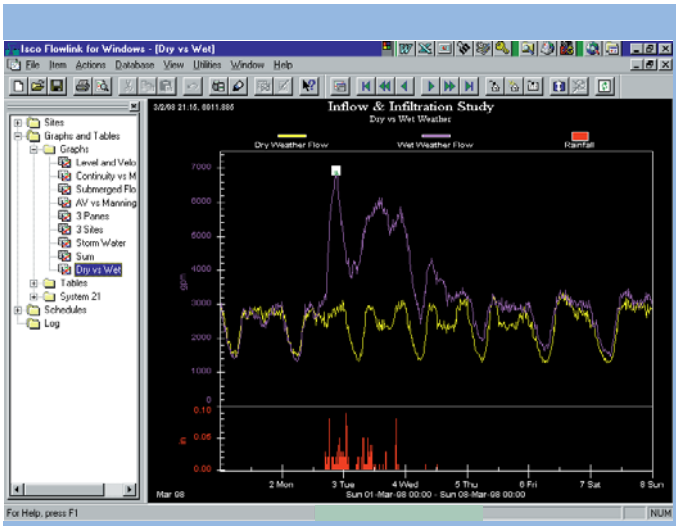
The 4200s are so easy to program, you'll rarely need the instruction manual. Just use the tactile keypad to respond to simple questions on the two-line, 80-character LCD. For added convenience, the LCD is backlit, so it's easy to read – even in the darkest manholes.

The 4200 Series contains built-in flow conversions for most applications, or you can enter data points or an equation for special situations. When programming is complete, data is displayed in selectable units of measure.

Exclusive Built-in Printer

Our 4200 Series Flow Meters give you a choice of technologies for collecting data. A built-in dot matrix printer gives you an accurate, on-site printout of monitoring data. The printer plots up to three lines of data, plus rainfall and samples. Simple, easy-to-read summary reports are printed on command or at selected time intervals. You can also print the flow meter program on command.

The exclusive built-in printer provides easy-to-read charts and summary reports.



Isco's Flowlink Software produces a variety of informative graphs and reports from your stored data.

Powerful Data Storage

The 4200 Series also features internal memory to store over 2 months of flow, rainfall, parameter and sample data at 15 minute intervals. You can retrieve stored data on-site with a laptop PC, an Isco 581 Rapid Transfer Device, or remotely – via telephone modem and our 2102 Wireless Module. Isco Flowlink® software uses stored data to generate informative graphs and reports.

Convenient Alarm Messages

In addition to transferring stored data over telephone lines, our telephone modems have voice messaging capabilities. Now your flow meter can notify you when programmed alarm conditions occur, eliminating the need for a separate dialer.

Up to three lines of data are accurately plotted at one of four chart speeds.

Rainfall data from a rain gauge is recorded as a bar graph.

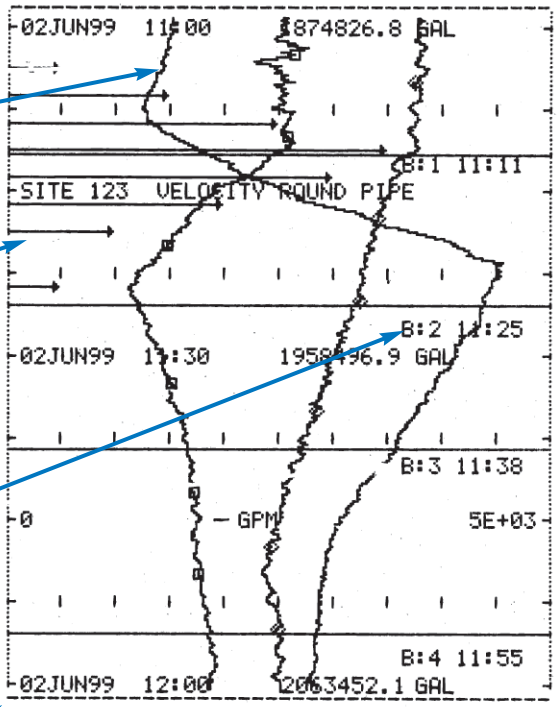
When used with a sampler, the printer records event marks, time, and bottle numbers.

Date, time, total flow, site number, and flow conversion are printed for easy reference.

Two summary reports can be printed, each with its own time interval and contents.

Sampler history reports list the date and time of each sample event.

Flow meter history reports include the date and time of important monitoring events.

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REPORT A SITE 123
INTERVAL: 01JUN99 12:00 TO 02JUN99 12:00
TOTAL VOLUME   2063452.1 GAL
    Sampler Volume 170102.1 GAL
INTERVAL VOLUME   2063452.1 GAL
Fwd 2063452.1 GAL Rev        0.0 GAL
FLOW RATE:
    Ave        1703 GPM
    Max        4542 GPM     02JUN99 11:22
    Min        1224 GPM     02JUN99 11:08
LEVEL:
    Ave       0.751 FT
    Max       1.234 FT      02JUN99 11:23
    Min       0.635 FT      02JUN99 11:07
VELOCITY:
    Ave       2.787 FT/S
    Max       3.677 FT/S    02JUN99 11:20
    Min       2.510 FT/S    02JUN99 11:10
pH:
    Ave       7.1
    Max       7.25 pH       02JUN99 05:15
    Min       5.89 pH       02JUN99 11:24
TEMPERATURE:
    Ave       65.4
    Max       67.1 DEG F    01JUN99 14:31
    Min       59.3 DEG F    02JUN99 11:50
RAINFALL:     0.28 IN
----------------------------------------
SAMPLE HISTORY starting 12:00 01JUN99
    BOTTLE 1      02JUN99   11:11
    BOTTLE 2      02JUN99   11:25
    BOTTLE 3      02JUN99   11:38
    BOTTLE 4      02JUN99   11:55
----------------------------------------
HISTORY starting 12:00 01JUN99
  01JUN99 13:44 FLOW CONVERSION CHANGED
  01JUN99 13:47 LEVEL ADJUSTED
  01JUN99 13:48 pH ADJUSTED
  01JUN99 13:55 TOTALIZER RESET
  02JUN99 07:12 SAMPLER ENABLED
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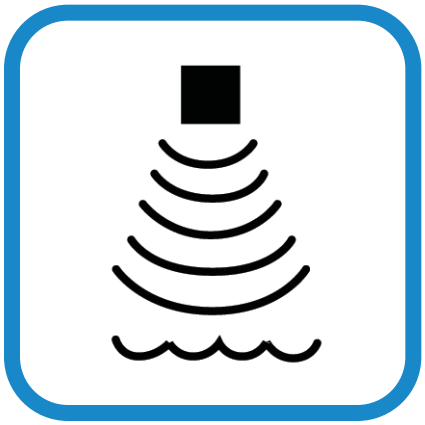
NOTE: Printout shown 85% of actual size.

Choose the Best Technology For Your Applications

No single technology is suitable for all open channel flow measurement applications. Isco offers you a choice of ultrasonic, submerged probe, bubbler, and area velocity flow meters.

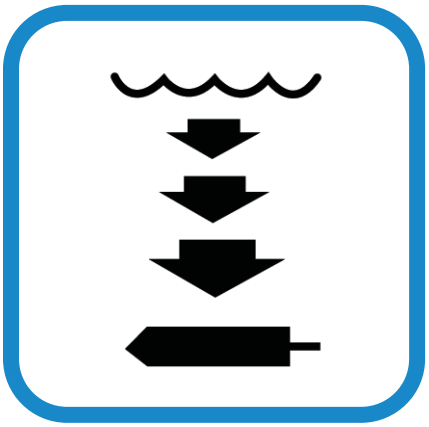
The 4200 Series includes the 4210 Ultrasonic, 4220 Submerged Probe, 4230 Bubbler, and 4250 Area Velocity Flow Meters. Now you can choose the most accurate technology for each of your monitoring sites.

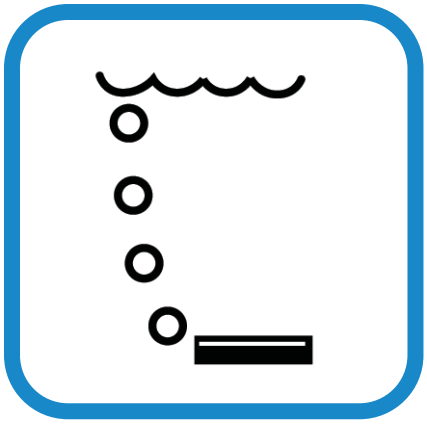
Please refer to the Flow Measurement Technology Selection Guide on the back cover for more information.



4210 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 4210 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.

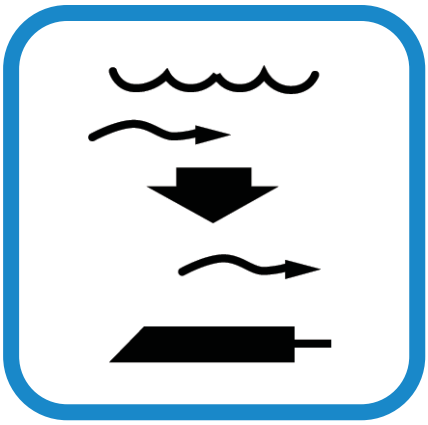
4220 Submerged Probe—ideal for sites where wind, steam, foam, or turbulence exist. The probe is mounted at the bottom of the channel and measures the pressure of the liquid above the probe to determine the depth of the flow stream. The 4220 converts the level reading into flow rate.





4230 Bubbler—resists damage by lightning, debris, and corrosive flow stream chemicals. The 4230 uses an internal air compressor to force air from a bubble tube submerged in the flow stream. The depth of the flow is determined by measuring the pressure needed to force bubbles out of the line. The 4230 then converts this depth into flow rate.

4250 Area Velocity—for sites where submerged, surcharged, full pipe, or reverse flow conditions may occur. The 4250 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 depth to determine flow area. The 4250 calculates flow rate by multiplying the area of the flow stream by the average velocity.



More Than a Flow Meter

201 pH/Temperature Module

Water Quality Monitoring

In addition to measuring flow rate, Isco 4200 Series Flow Meters can continuously monitor important water quality parameters. Simply connect an Isco 201 pH/Temperature Module to your 4200 Series Flow Meter.

Parameter Module Specifications

201 Parameter Module		
Size (L x W x D)	8.5 in x 4.75 in x 3.5 in	21.6 cm x 12.1 cm x 8.9 cm
Weight	2.5 lbs	1.1 kg
Material	Structural foam molded polystyrene	
Enclosure	NEMA 4X	IP65
Power	10 to 14V DC, 10 mA Maximum (supplied by 4200 Series Flow Meter)	
Cable Length (module to flow meter)	15 ft (4.6 m) standard, 1000 ft (305 m) maximum	
Operating Temperature	32 to 158°F	0 to 70°C
Storage Temperature	-4 to 158°F	-20 to 70°C
pH Probe		
Submersible, vertical or horizontal-mounting probe with combination type electrodes; single or double porous Teflon® liquid junction to resist fouling and coating. Steam-sterilized glass hemi-bulb for long-term stability. Built-in amplifier and internal exposed temperature probe for stability and fast temperature response.		
Size (L x D)	6 in x 1.12 in	15.2 cm x 2.8 cm
Cable Length	25 ft	7.6 m
Range	0 to 14 pH	
Accuracy	±0.1%	
Operating Temperature	32 to 230°F	0 to 110°C
Storage Temperature	32 to 230°F	0 to 110°C
Materials		
Probe	316 Stainless Steel	
Cable	Polyvinyl chloride (PVC)	

Temperature Probe		
Precision linear thermistor enclosed in stainless steel housing.		
Size (L x D)	2.5 in x 0.55 in	6.35 cm x 1.4 cm
Cable Length	25 ft	7.6 m
Range	32 to 176°F	0 to 80°C
Accuracy	±1.8°F	±1°C
Materials		
Probe	Type 316 stainless steel	
Cable	Polyvinyl chloride (PVC)	

Flexible Control and Communication

The 4200 Series offers up to 3 internal analog outputs, allowing you to control processes and drive external equipment. Each output can be scaled based on any flow or parameter measurement, and can also be manually controlled to test the operation of connected equipment.

The 4200s also feature a serial output to communicate with computers, SCADA networks, and similar systems. Current status and readings are transmitted in response to a command, or automatically at selected time intervals.

Easy to Upgrade

Nonvolatile flash memory makes it easy to use the latest software in your flow meters. You can easily reprogram this memory using a PC, without opening the flow meter or returning it to the factory.

Variety of Power Sources

Isco offers a variety of power sources to meet your specific needs. Select from nickel-cadmium or lead-acid batteries for portable flow monitoring. Solar panels are also available to maintain the charge on a lead-acid battery.

Connect a sampler for flow proportioned sampling, or a rain gauge for stormwater runoff monitoring. The flow meter can activate the sampler based on flow, parameters, and/or rainfall.

Isco power packs are used in applications where AC power is available. The Battery-backed Power Pack features a built-in battery to power your flow meter when AC power is lost.

Rugged Enclosure

Isco 4200 Series Flow Meters are engineered for portable or fixed-site flow monitoring. Their enclosures meet NEMA 4X and IP65 requirements for watertight, dust-tight, and corrosion resistant operation. This ensures dependable operation in the harshest environments.

YSI 600® Specifications

YSI 600		
Length	14 in	35.6 cm
Diameter	1.6 in	4.1 cm
Weight (with bulkhead connector and stainless steel nose weight)	1.4 lbs	0.63 kg
Power (supplied by 4200 Series Flow Meter or 6700 Series Sampler)	12V DC	
Cable		
Integral	25, 50, 100, or 200 ft	7.6, 15.2, 30.5, or 61.0 m
Field Cable (for use with YSI 600 with bulkhead connector)	8, 25, 50, or 100 ft standard, 1000 ft maximum	2.4, 7.6, 15.2, or 30.5 m standard, 305 m maximum
Media	Freshwater, seawater, and wastewater; not designed for raw sewage	
pH Measurement (optional)		
Range	0 to 14 pH	
Resolution	0.1 pH	
Accuracy	±0.2 pH	
Reference Electrode	Field-replaceable, screw-in module	
Dissolved Oxygen Measurement (optional)		
Probe Type	Rapid-Pulse	
Range	0 to 20 mg/l	
Resolution	0.1 mg/l	
Accuracy	±0.2 mg/l	

Conductivity Parameter	Conductivity, specific conductance, salinity, or total dissolved solids*	
Conductivity Measurement		
Range	0 to 100 mS/cm	
Resolution	0.002 mS/cm	
Accuracy	±0.5% of reading or ±0.001 mS/cm, whichever is greater	
Salinity Measurement		
Range	0 to 70 ppt	
Resolution	0.1 ppt	
Accuracy	±0.2 ppt	
Temperature Measurement		
Range	23° to 113°F	-5° to 45°C
Resolution	0.18° F	0.1°C
Accuracy	±0.27° F	±0.15°C
Operating Temperature	23° to 113°F	-5° to 45°C
Storage Temperature		
With pH Probe	14° to 140°F	-10° to 60°C
Without pH Probe	-40° to 140°F	-40° to 60°C
Materials		
Sonde	Polyvinyl chloride (PVC), Type 316 stainless steel	
Cable	Polyurethane	
Bulkhead Connector (optional)	Type 316 stainless steel	

* Specific conductance [conductivity corrected to 77°F (25°C)] and total dissolved solids are automatically calculated from conductivity according to algorithms found in Standard Methods for the Examination of Water and Wastewater.

YSI 600 Multi-Parameter Water Quality Monitor

4210 Ultrasonic Flow Meter

The 4210 Ultrasonic provides non-contact sensing of the flow over a weir.

The sensor on the 4210 Ultrasonic Flow Meter is mounted above the flow stream. It transmits a sound pulse that is reflected by the surface of the flow. The elapsed time between sending a pulse and receiving an echo determines the level in the channel. A built-in temperature sensor automatically compensates for changes in air temperature to ensure measurement accuracy.

Non-contacting Sensor

Because its sensor does not contact the liquid, the 4210 provides long-term dependability with no scheduled maintenance. The Isco 4210 is not affected by chemicals or high concentrations of grease, suspended solids, or silt in the flow.

Accurate Under Tough Conditions

The 4210 automatically adjusts amplifier gain in response to echo strength. This patented* technology maximizes performance in the presence of steam, foam, and turbulence. Our Variable Blanking Distance feature eliminates false echo problems caused by obstructions such as manhole rungs or the top of a flume.

*US Patent No. 5,319,974

Isco 4210 Specifications

Flow Meter

Size (H x W x D) (without power source)	15.5 in x 11.5 in x 10.5 in	439.4 cm x 29.2 cm x 26.7 cm
Weight (without power source)	17.3 lbs	7.8 kg
Material	High-impact molded polystyrene structural foam	
Enclosure (self-certified)	NEMA 4X	IP65
Power	12 to 14V DC, 24 mA average at 12.5V DC (printer set at 1 in/hr (2.5 cm/hr) and 1 minute level reading interval)	
Typical Battery Life	(printer set at 1 in/hr (2.5 cm/hr) and 1 minute level reading interval)	
934 Nickel-Cadmium Battery	7 to 8 days	
946 Lead-Acid Battery	10 to 12 days	
948 Lead-Acid Battery	60 to 75 days	
Program Memory	Non-volatile, programmable flash; can be updated via interrogator port without opening the enclosure	
Display	Backlit LCD, 2-line, 80-character (5.5 mm high x 3.2 mm wide)	
Level-to-Flow Rate Conversions		
Weirs	V-notch, rectangular with and without end contractions, Cipolletti	
Flumes	Parshall, Palmer-Bowlus, Leopold-Lagco,Trapezoidal, H, HS, HL	
Manning Formula	Round, U-channel, rectangular, trapezoidal	
Data Points	Four sets of 50 level-flow rate points	
Equation	Two-term polynomial	
Totalizers		
LCD	9-digit, floating decimal point, resettable	
Mechanical (optional)	7-digit, non-resettable	
Rain Gauge Input	Contact closure, normally open	
Resolution	0.01 or 0.004 in.	0.25 or 0.1 mm
Parameter Inputs	pH, dissolved oxygen, conductivity, and temperature (with optional YSI 600 Multi-Parameter Water Quality Monitor); pH and temperature (with optional Isco 201 Parameter Module)	
Sampler Activation Conditions	Enabled, disabled, AND and OR combinations of any two of level, flow rate, rainfall, pH, DO, conductivity, and temperature	
Sampler Pacing Output	12V pulse	
Sampler Input	Event mark, bottle number	
Printer		
Recording Modes	Up to 3 graphs of level, flow rate, pH, DO, conductivity, and temperature vs time; includes totalized flow. Rainfall and sampler events (time and bottle number) are also recorded	
Speed	Off, 0.5, 1, 2, 4 in/hr	Off, 1.25, 2.5, 5, 10 cm/hr
Recording Span	User selectable with multiple over-ranges	
Resolution	1/240 of recording span	
Reports Printed	Flow meter program, 2 independent time interval reports, flow meter history, sampler history	
Interval Report Contents	Site number; time interval; total flow; minimum, maximum, and average flow rate, level, pH, DO, conductivity, and temperature, and time of occurrence; interval flow; total rainfall; number of samples, flow meter history and sampler history	
Character Size	0.09 in high x 0.07 in wide (2.4 mm x 1.7 mm), 12 pitch	
Paper	4.5 in wide x 58 ft (11.4 cm x 17.7 m) plain white paper, replaceable roll	
Ribbon	19.7 ft (6.0 m) black nylon, replaceable	

Data Storage Memory		
Capacity	80,000 bytes (approximately 40,000 readings) divided into a maximum of 12 memory partitions; equal to 100 days of level, rainfall, pH, DO, conductivity, and temperature readings at 15 minute intervals, plus 3,000 sample events.	
Setup and Data Retrieval	Isco Flowlink® software	
Communication	Direct connection, optional internal 2400 bps telephone modem with voice messaging; or optional spread-spectrum wireless module	
Data Retrieval (optional)	Isco 581 Rapid Transfer Device (RTD)	
Voice Messaging (with optional internal telephone modem)	Calls up to 5 telephone numbers with programmable delay between calls, activated based on AND and OR combinations of any two of level, flow rate, rainfall, pH, DO, conductivity, and temperature	
Analog Outputs (optional)	Up to 3 isolated internal outputs, 0 to 20 mA or 4 to 20 mA, scaleable based on level, flow rate, pH, DO, conductivity, or temperature, into a maximum of 750 ohms each	
Relay Outputs	2 form C relays with field selectable trip points based on flow rate (with optional High/Low Alarm Relays)	
Serial Output	Current status and readings, in response to command or automatically at selectable time intervals, ASCII comma separated values at 1200, 2400, 4800, or 9600 bps	
Operating Temperature	0° to 140°F	-18° to 60°C
Storage Temperature	-40° to 140°F	-40° to 60°C

Ultrasonic Sensor

Length	4.0 in	10.2 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)	2.2 lbs	1.0 kg
Enclosure (self-certified)	NEMA 4X, 6P	IP68
Frequency	40 kHz	
Range (distance from sensor to liquid)		
Minimum	1 ft	0.3 m
Maximum	11 ft	3.3 m
Span	0 to 10 ft	0 to 3 m
Blanking Distance	1 to 11 ft	0.3 to 3.3 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 11 ft ±0.03 ft	0.31 to 3.3 m ±0.009 m
Temperature Coefficient	±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.	
Operating Temperature	-22° to 140°F	-30° to 60°C
Compensated Temperature	-22° to 140°F	-30° to 60°C
Materials		
Acoustic Window	Glass-reinforced epoxy	
Sensor Housing	Glass-filled polyester	
Cable	Polyvinyl chloride (PVC) jacket	

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

4220 Submerged Probe Flow Meter

The probe on the Isco 4220 uses a differential pressure transducer to measure the depth of the liquid. The probe's venting system automatically compensates for changes in atmospheric pressure to maintain accuracy.

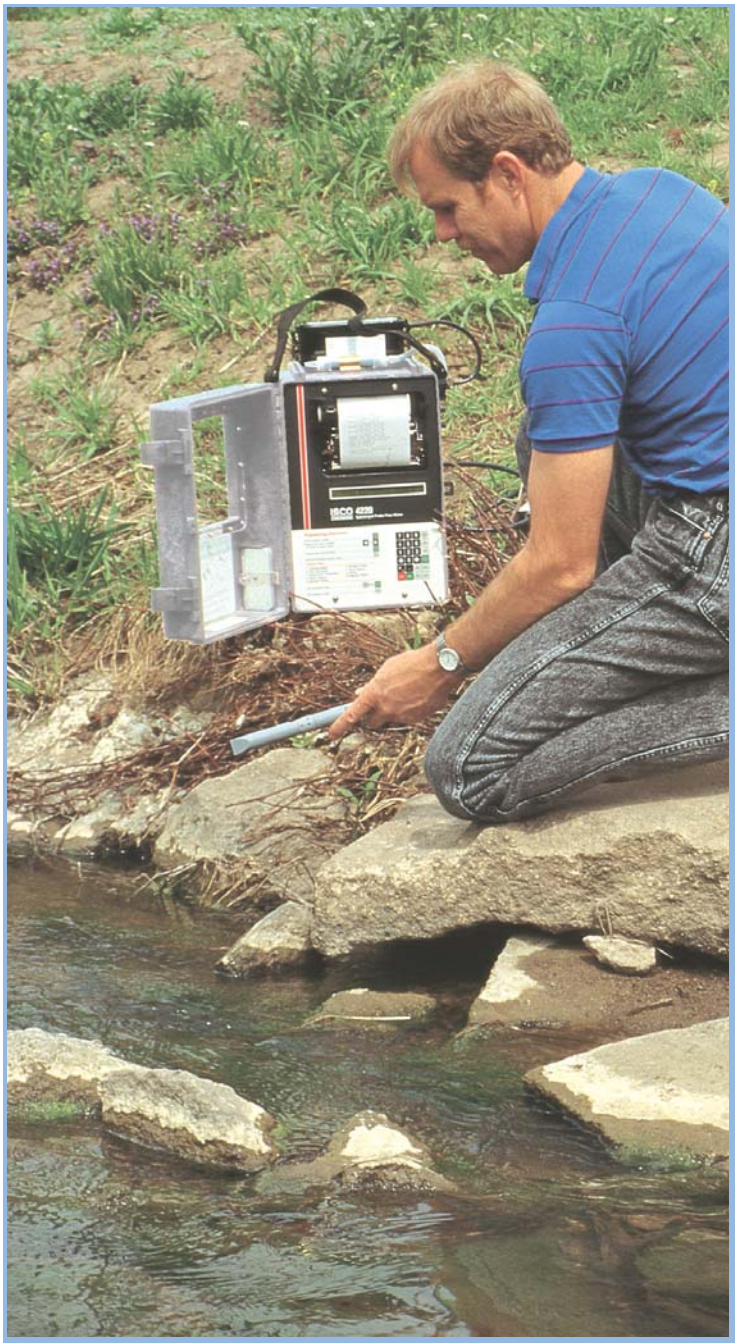
Accurate Under Tough Conditions

The 4220 provides accurate measurement at sites where wind, steam, foam, turbulence, or air temperature fluctuations exist. The probe can accurately sense pressure even when covered with silt and sand.

Fast and Easy Installation

Isco mounting rings make it easy to install the probe in round pipes, manhole inverts, and other open channels. And with the Isco Street Level Installation Tool, you can install your monitoring system from ground level, eliminating the costs and hazards of entering manholes.

In addition, most flumes are available with an integral recess for mounting an Isco Submerged Probe.



The 4220 Submerged Probe accurately measures depth, even when covered with silt and sand.

Isco 4220 Specifications

Flow Meter

Size (H x W x D) (without power source)	15.5 in x 11.5 in x 10.5 in	39.4 cm x 29.2 cm x 26.7 cm
Weight (without power source)	17.3 lbs	7.81 kg
Material	High-impact molded polystyrene structural foam	
Enclosure (self-certified)	NEMA 4X	IP65
Power	12 to 14V DC, 15 mA average at 12.5V DC (printer set at 1 in/hr (2.5 cm/hr) and continuous level reading interval)	
Typical Battery Life	(printer set at 1 in/hr (2.5 cm/hr) and continuous level reading interval)	
934 Nickel-Cadmium Battery	8 to 11 days	
946 Lead-Acid Battery	12 to 16 days	
948 Lead-Acid Battery	75 to 90 days	
Program Memory	Non-volatile, programmable flash; can be updated via interrogator port without opening the enclosure.	
Display	Backlit LCD, 2-line, 80-character	
Level-to-Flow Rate Conversions		
Weirs	V-notch, rectangular with and without end contractions, Cipolletti	
Flumes	Parshall, Palmer-Bowlus, Leopold-Lagco,Trapezoidal, H, HS, HL	
Manning formula	Round, U-channel, rectangular, trapezoidal	
Data Points	Four sets of 50 level-flow rate points	
Equation	Two-term polynomial	
Totalizers		
LCD	9-digit, floating decimal point, resettable	
Mechanical	7-digit, non-resettable (optional)	
Rain Gauge Input	Contact closure, normally open	
Resolution	0.01 or 0.004 in	0.25 or 0.1 mm
Parameter Inputs	pH, dissolved oxygen, conductivity, and temperature (with optional YSI 600 Multi-Parameter Water Quality Monitor); pH and temperature (with optional Isco 201 Parameter Module)	
Sampler Activation Conditions	Enabled, disabled, AND and OR combinations of any two of level, flow rate, rainfall, pH, DO, conductivity, and temperature	
Sampler Pacing Output	12V pulse	
Sampler Input	Event mark, bottle number	
Printer		
Recording Modes	Up to 3 graphs of level, flow rate, pH, DO, conductivity, and temperature vs time; includes totalized flow. Rainfall and sampler events (time and bottle number) are also recorded	
Speed	Off, 0.5, 1, 2, 4 in/hr	Off, 1.25, 2.5, 5, 10 cm/hr
Recording Span	User selectable with multiple over-ranges	
Resolution	1/240 of recording span	
Reports Printed	Flow meter program, 2 independent time interval reports, flow meter history, sampler history	
Interval Report Contents	Site number; time interval; total flow; minimum, maximum, and average flow rate, level, pH, DO, conductivity, and temperature, and time of occurrence; interval flow; total rainfall; number of samples, flow meter history and sampler history	
Character Size	0.09 in high x 0.07 in wide (2.4 mm x 1.7 mm), 12 pitch	
Paper	4.5 in wide x 58 ft (11.4 cm x 17.7 m) plain white paper, replaceable roll	
Ribbon	19.7 ft (6.0 m) black nylon, replaceable	
Data Storage Memory		
Capacity	80,000 bytes (approximately 40,000 readings) divided into a maximum of 12 memory partitions; equal to 100 days of level, rainfall, pH, DO, conductivity, and temperature readings at 15 minute intervals, plus 3,000 sample events.	
Setup and Data Retrieval	Isco Flowlink® software	
Communication	Direct connection, optional internal 2400 bps telephone modem with voice messaging, or optional spread spectrum wireless module	
Data Retrieval (optional)	Isco 581 Rapid Transfer Device (RTD)	

Voice Messaging (with optional internal telephone modem)	Calls up to 5 telephone numbers with programmable delay between calls, activated based on AND and OR combination of any two of level, flow rate, rainfall, pH, DO, conductivity, and temperature	
Analog Outputs (optional)	Up to 3 isolated internal outputs, 0 to 20 mA or 4 to 20 mA, scaleable based on level, flow rate, pH, DO, conductivity, or temperature, into a maximum of 750 ohms each	
Relay Outputs	2 form C relays with field selectable trip points based on flow rate (with optional High/Low Alarm Relays)	
Serial Output	Current status and readings, in response to command or automatically at selectable time intervals, ASCII comma separated values at 1200, 2400, 4800, or 9600 bps	
Operating Temperature	0° to 140°F	-18° to 60°C
Storage Temperature	-40° to 140°F	-40° to 60°C

Submerged Probe

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	25 ft		7.6 m	
Cable Diameter	0.3 in		0.8 cm	
Weight (including cable)	3 lbs		1.4 kg	
Level Measurement Method	Submerged pressure transducer mounted in the flow stream			
Transducer Type	Differential linear integrated circuit pressure transducer			
Level Measurement Range	0.1 to 10 ft		0.03 to 3.05 m	
Maximum Allowable Depth	20 ft		6.1 m	
Level Measurement Accuracy	Level*	Error	Level*	Error
Non-linearity, repeatability, and hysteresis at 25°C (77°F) (does not include temperature coefficient)	0.033 to 5.0 ft >5.0 ft	±0.008 ft/ft ±0.012 ft/ft	0.01 to 1.52 m >1.52 m	±0.008 m/m ±0.012 m/m)
Temperature Coefficient	Level*	Error	Level*	Error
Maximum error over compensated temperature range (per degree of temperature change)	0.1 to 4.0 ft 4.0 to 10 ft	±0.005 ft/°F ±0.007 ft/°F	0.03 to 1.22 m 1.22 to 3.05 m	±0.0027 m/°C ±0.0038 m/°C
Operating Temperature	32° to 160°F		0° to 71°C	
Compensated Temperature	32° to 122°F		0° to 50°C	
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*

4230 Bubbler Flow Meter

Isco 4230 Bubbler Flow Meters use an internal air compressor to force a metered amount of air through a bubble line submerged in the flow channel. By measuring the pressure needed to force air bubbles out of the line, the level of the water is accurately determined.

Versatile and Accurate

The 4230 provides accurate measurement in a variety of conditions. It is not affected by wind, steam, foam, or turbulence. And, because only the bubble tube contacts the flow, corrosive chemicals are not a problem. The 4230 also resists damage by lightning and debris, making it ideal for storm water applications.

Automatic Drift Compensation allows the 4230 to compensate for transducer drift. This makes our bubbler flow meters the most accurate level measurement technology. In standby applications, such as storm water runoff monitoring, Automatic Drift Compensation also allows the 4230 to maintain its level calibration indefinitely.

Dependable Operation

The 4230 is not affected by suspended solids and rapidly changing head heights that can cause problems for some bubbler flow meters. Automatic bubble line purging prevents clogging. And,built-in software senses rapidly rising heads and increases the bubble rate to maintain maximum accuracy.

A 4230 Bubbler paces an Isco 3700 Sampler to collect flow proportioned samples.

Isco 4230 Specifications

Flow Meter

Size (H x W x D) (without power source)	15.5 in x 11.5 in x 10.5 in	39.4 cm x 29.2 cm x 26.7 cm
Weight (without power source)	19.1 lbs	8.6 kg
Material	High-impact molded polystyrene structural foam	
Enclosure (self-certified)	NEMA 4X	IP65
Power	12 to 14V DC, 16 mA average at 12.5V DC (printer set at 1 in/hr (2.5 cm/hr), 1 bubble per second, 15 minute purge, and continuous level reading interval)	
Typical Battery Life	(printer set at 1 in/hr (2.5 cm/hr), 1 bubble per second, 15 minute purge, and continuous level reading interval)	
934 Nickel-Cadmium Battery	7 to 10 days	
946 Lead-Acid Battery	10 to 15 days	
948 Lead-Acid Battery	60 to 90 days	
Program Memory	Non-volatile, programmable flash; can be updated via interrogator port without opening the enclosure	
Display	Backlit LCD, 2-line, 80-character	
Level-to-Flow Rate Conversions		
Weirs	V-notch, rectangular with and without end contractions, Cipolletti, Isco Flow Metering Inserts	
Flumes	Parshall, Palmer-Bowlus, Leopold-Lagco,Trapezoidal, H, HS, HL	
Manning formula	Round, U-channel, rectangular, trapezoidal	
Data Points	Four sets of 50 level-flow rate points	
Equation	Two-term polynomial	
Totalizers		
LCD	9-digit, floating decimal point, resettable	
Mechanical	7-digit, non-resettable (optional)	
Rain Gauge Input	Contact closure, normally open	
Resolution	0.01 or 0.004 in	0.25 or 0.1 mm
Parameter Inputs	pH, dissolved oxygen, conductivity, and temperature (with optional YSI 600 Multi-Parameter Water Quality Monitor); pH and temperature (with optional Isco 201 Parameter Module); or dissolved oxygen and temperature (with optional Isco 270 Parameter Module)	
Sampler Activation Conditions	Enabled, disabled, AND and OR combinations of any two of level, flow rate, rainfall, pH, DO, conductivity, and temperature	
Sampler Pacing Output	12V pulse	
Sampler Input	Event mark, bottle number	
Printer		
Recording Modes	Up to 3 graphs of level, flow rate, pH, DO, conductivity, and temperature vs time; includes totalized flow. Rainfall and sampler events (time and bottle number) are also recorded	
Speed	Off, 0.5, 1, 2, 4 in/per hour	Off, 1.25, 2.5, 5, 10 cm/per hour
Recording Span	User selectable with multiple over-ranges	
Resolution	1/240 of recording span	
Reports Printed	Flow meter program, 2 independent time interval reports, flow meter history, sampler history	
Interval Report Contents	Site number; time interval; total flow; minimum, maximum, and average flow rate, level, pH, DO, conductivity, and temperature, and time of occurrence; interval flow; total rainfall; number of samples, flow meter history and sampler history	
Character Size	0.09 in high x 0.07 in wide (2.4 mm x 1.7 mm), 12 pitch	
Paper	4.5 in wide x 58 ft. (11.4 cm x 17.7 m) plain white paper, replaceable roll	
Ribbon	19.7 ft (6.0 m) black nylon, replaceable	

Data Storage Memory Capacity	80,000 bytes (approximately 40,000 readings) divided into a maximum of 12 memory partitions; equal to 100 days of level, rainfall, pH, DO, conductivity, and temperature readings at 15 minute intervals, plus 3,000 sample events.	
Setup and Data Retrieval	Isco Flowlink® software	
Communication	Direct connection, optional internal 2400 bps telephone modem with voice messaging, or optional spread spectrum wireless module	
Data Retrieval (optional)	Isco 581 Rapid Transfer Device (RTD)	
Voice Messaging (with optional internal telephone modem)	Calls up to 5 telephone numbers with programmable delay between calls, activated based on AND and OR combinations of any two of level, flow rate, rainfall, pH, DO, conductivity, and temperature	
Analog Outputs (optional)	Up to 3 isolated internal outputs, 0 to 20 mA or 4 to 20 mA, scaleable based on level, flow rate, pH, DO, conductivity, or temperature, into a maximum of 750 ohms each	
Relay Outputs	2 form C relays with field selectable trip points based on flow rate (with optional High/Low Alarm Relays)	
Serial Output	Current status and readings, in response to command or automatically at selectable time intervals, ASCII comma separated values at 1200, 2400, 4800, or 9600 bps	
Operating Temperature	0° to 140°F	-18° to 60°C
Storage Temperature	-40° to 140°F	-40° to 60°C

Bubbler

Range	0.01 to 10 ft		0.003 to 3.05 m	
Level Measurement Accuracy Linearity, Repeatability, and Hysteresis at 72°F (22°C)	Level*	Error	Level*	Error
	0.01 to 1.0 ft	±0.005 ft	0.003 to 0.31m	±0.002 m
	0.1 to 5.0 ft	±0.010 ft	0.03 to 1.52 m	±0.003 m
	0.1 to 10 ft	±0.035 ft	0.03 to 3.05 m	±0.011 m
Temperature Coefficient Maximum error within compensated temperature range (per degree of temperature change)	±0.0003 x level x temperature change from 72°F where level is measured in feet		±0.0009 x level x temperature change from 22°C where level is measured in meters	
Automatic Drift Correction	After a 5 minute warm-up period, zero level is corrected to ±0.002 ft (±0.0006 m) at intervals between 2 and 15 minutes			
Long-Term Level Calibration Change	Typically 0.5% of reading per year			
Ambient Operating Temperature Range	0° to 140°F		-18° to 60°C	
Compensated Temperature Range	32° to 140°F		0° to 60°C	

** Actual vertical distance between the end of the bubble line and the liquid surface*

4250 Area Velocity Flow Meter

The sensor on the Isco 4250 uses patented* Doppler technology to directly measure average velocity in the flow stream. An integral pressure transducer measures liquid depth to determine flow area. The 4250 then calculates flow rate by multiplying the area of the flow stream by its average velocity.

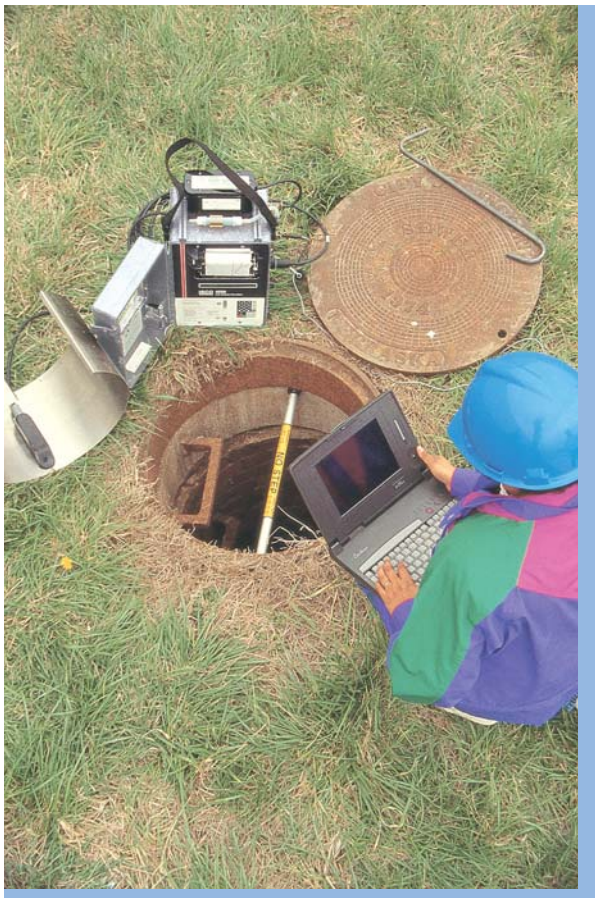
The 4250 gives you greater accuracy in applications where weirs or flumes are not practical, or where submerged, full pipe, surcharged, and reverse flow conditions may occur. And you don't have to estimate the slope and roughness of the channel.

Easy Setup

The 4250's Doppler system continuously profiles the flow stream. This saves you time by eliminating profiling and calibration required by electromagnetic systems.

Maintenance-free

The streamlined 4250 sensor sheds debris and withstands corrosive flow stream chemicals. And, unlike electromagnetic probes, the sealed Isco sensor resists fouling by oil and grease, so you're not bothered with frequent cleanings. You can count on the Isco 4250 for long-term, dependable operation.



The 4250 Area Velocity Flow Meter is ideal for sites where submerged, full pipe, surcharged, or reverse flows may occur.

*US Patent Nos. 5,371,686 and 5,557,536

Isco offers both Standard and Low Profile Area Velocity Sensors to meet your specific needs. The Standard Sensor (right) is more suitable for use in larger pipes and in turbid flows with high concentrations of suspended solids and entrained air, and may be less susceptible to silting.

The Low Profile Sensor senses velocity in flows typically down to 1" (25 mm) in depth, while its streamlined design minimizes flow stream obstruction. In addition, encapsulation in epoxy provides improved chemical compatibility.

Please refer to literature on the Low Profile Area Velocity Sensor for specifications.

Isco 4250 Specifications

Size (H x W x D) (without power source)	15.5 in x 11.5 in x 10.5 in	39.4 cm x 29.2 cm x 26.7 cm
Weight (without power source)	17.3 lbs	7.81 kg
Material	High-impact molded polystyrene structural foam	
Enclosure (self-certified)	NEMA 4X	IP65
Power	12 to 14V DC, 14 mA average at 12.5V DC (printer set at 1 in/hr (2.5 cm/hr), 1 minute level reading interval, and 5 minute velocity reading interval)	
Typical Battery Life	(printer set at 1 in./hr (2.5 cm/hr), 1 minute level reading, interval, 5 minute velocity reading interval)	
934 Nickel-Cadmium Battery	8 to 11 days	
946 Lead-Acid Battery	12 to 16 days	
948 Lead-Acid Battery	75 to 90 days	
Program Memory	Non-volatile, programmable flash; can be updated via interrogator port without opening the enclosure	
Display	Backlit LCD, 2-line, 80-character	
Level-to-Area Conversions		
Channel shapes	Round, U-shaped, rectangular, trapezoidal	
Data points	Four sets of 50 level-area points	
Level-to-Flow Rate Conversions		
Weirs	V-notch, rectangular, and Cipolletti	
Flumes	Parshall, Palmer-Bowlus, Leopold-Lagco,Trapezoidal, H, HS, HL	
Manning formula	Round, U-channel, rectangular, trapezoidal	
Data Points	Four sets of 50 level-flow rate points	
Equation	Two-term polynomial	
Totalizers		
LCD	Total, forward, and reverse flow; 9 digits each, floating decimal point, resettable	
Mechanical (optional)	Total flow, 7 digits, non-resettable	
Rain Gauge Input	Contact closure, normally open	
Resolution	0.01 or 0.004 in	0.25 or 0.1 mm
Parameter Inputs	pH, dissolved oxygen, conductivity, and temperature (with optional YSI 600 Multi-Parameter Water Quality Monitor); pH and temperature (with optional Isco 201 Parameter Module)	
Sampler Activation Conditions	Enabled, disabled, AND and OR combinations of any two of level, velocity, flow rate, rainfall, pH, DO, conductivity, and temperature	
Sampler Pacing Output	12V pulse	
Sampler Input	Event mark, bottle number	
Printer		
Recording Modes	Up to 3 graphs of level, velocity, flow rate, pH, DO, conductivity, and temperature vs time; includes totalized flow. Rainfall and sampler events (time and bottle number) are also recorded	
Speed	Off, 0.5, 1, 2, 4 in/per hour	Off, 1.25, 2.5, 5, 10 cm/per hour
Recording Span	User selectable with multiple over- and under-ranges	
Resolution	1/240 of recording span	
Reports Printed	Flow meter program, 2 independent time interval reports, flow meter history, sampler history	
Interval Report Contents	Site number; time interval; total, forward and reverse flow; minimum, maximum, and average flow rate, level, velocity, pH, DO, conductivity, and temperature, and time of occurrence; interval flow; total rainfall; number of samples, flow meter history and sampler history	
Character Size	0.09 in high x 0.07 in wide (2.4 mm x 1.7 mm), 12 pitch	
Paper	4.5 in wide x 58 ft (11.4 cm x 17.7 m) plain white paper, replaceable roll	
Ribbon	19.7 ft (6.0 m) black nylon, replaceable	
Data Storage Memory Capacity	80,000 bytes (approximately 40,000 readings) divided into a maximum of 12 memory partitions; equal to 60 days of level, velocity, rainfall, pH, DO, conductivity, and temperature readings at 15 minute intervals, plus 3,000 sample events.	
Setup and Data Retrieval	Isco Flowlink® software	
Communication	Direct connection, optional internal 2400 bps telephone modem with voice messaging, or optional spread spectrum wireless module	
Data Retrieval (optional)	Isco 581 Rapid Transfer Device (RTD)	

Voice Messaging (with optional internal telephone modem)	Calls up to 5 telephone numbers with programmable delay between calls, activated based on AND and OR combinations of any two of level, velocity, flow rate, rainfall, pH, DO, conductivity, and temperature	
Analog Outputs (optional)	Up to 3 isolated internal outputs, 0 to 20 mA or 4 to 20 mA, scaleable based on level, velocity, flow rate, pH, DO, conductivity, or temperature, into a maximum of 750 ohms each	
Relay Outputs	2 form C relays with field selectable trip points based on flow rate (with optional High/Low Alarm Relays)	
Serial Output	Current status and readings, in response to command or automatically at selectable time intervals, ASCII comma separated values at 1200, 2400, 4800, or 9600 bps	
Operating Temperature	0° to 140°F	-18° to 60°C
Storage Temperature	-40° to 140°F	-40° to 60°C

Area Velocity Sensor (see separate data sheet for low-profile 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 transducer			
Range				
Standard range probe	0.05 to 10 ft		0.015 to 3.05 m	
Extended range probe	0.05 to 30 ft		0.015 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 at 25°C (77°F) (does not include temperature coefficient)			
	Level*	Error	Level*	Error
Standard range probe	0.033 to 5.0 ft	±0.008 ft/ft	0.01 to 1.52 m	±0.008 m/m
	> 5.0 ft	±0.012 ft/ft	> 1.52 m	±0.012 m/m
Extended range probe	0.05 to 15 ft	±0.03 ft	0.015 to 4.57 m	±0.009 m
	0.05 to 21 ft	±0.09 ft	0.015 to 6.40 m	±0.027 m
	0.05 to 30 ft	±0.30 ft	0.015 to 9.14 m	±0.09 m
Temperature Coefficient	Maximum error within compensated temperature range (per degree of temperature change)			
	Level*	Error	Level*	Error
Standard range probe	0.05 to 4.0 ft	±0.005ft/°F	0.015 to 1.22 m	±0.0027 m/°C
	4.0 to 10 ft	±0.007ft/°F	1.22 to 3.05 m	±0.0038 m/°C
Extended range probe	0.05 to 30 ft	±0.008ft/°F	0.015 to 9.14 m	±0.0044 m/°C
Velocity Measurement				
Method	Doppler ultrasonic			
Frequency	500 kHz			
Typical minimum depth for velocity measurement	0.25 ft		75 mm	
Range	-5 to +20 ft/s		-1.5 to +6.1 m/s	
Accuracy	Velocity	Error	Velocity	Error
(Uniform velocity profile)	-5 to +5 ft/s	±0.1 ft/s	-1.5 to +1.5 m/s	±0.03 m/s
	5 to 20 ft/s	±2% of reading	1.5 to 6.1 m/s	±2% of reading
Resolution	±0.024 ft/s		±0.0073 m/s	
Operating Temperature	32° to 160°F		0° to 71°C	
Compensated Temperature	32° to 100°F		0° to 38°C	
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*

4200 Series Flow Meter Accessories

674 Rain Gauge

Tipping bucket design accurately measures on-site rainfall.

2102 Wireless Module

Reduces the need for confined space entry by providing remote data retrieval from monitoring instruments.

581 Rapid Transfer Device (RTD)

Transfers data from flow meters to PC for analysis with Isco Flowlink®software.

ProHanger

The sure way to suspend a flow meter or sampler inside a manhole.

All-stainless construction.

Ultrasonic Sensor Cable Clamp

Securely suspends the sensor by its own cable.

Ultrasonic Sensor Cable Straightener

Straightens the end portion of the sensor cable.

Ultrasonic Sensor Mounting Bracket

Allows the sensor to be secured to a vertical surface.

Ultrasonic Sensor Sunshade

Assures accurate temperature compensation.

Ultrasonic Sensor Floor Mount

For convenient placement of the sensor onto a horizontal surface.

Ultrasonic Calibration Target

Allows calibration of the sensor without manhole entrance.

Quick Disconnect Box

Extends distance between submerged probe and flow meter.

Flow Metering Inserts

Specially-designed bubbler flow meter measures flow in sewer pipes without manhole entry.

Spring Rings

To install flow and parameter sensors in small round pipes.

Scissors Rings

For sensor installation in large round pipes and manhole inverts.

Street Level Installation Tool

Allows installation of flow and parameter sensors into sewers without manhole entry.

Power Choices

Nickel-cadmium and Lead-acid Batteries

Sealed, rechargeable batteries for portable applications.

45 Amp-hour Lead-acid Battery

Long-life automotive style battery with carrying case and connect cable.

High-capacity Power Packs

Convert AC power to 12 VDC. Includes charging capability.

Battery-backed Power Packs

AC power packs with a built-in battery for back-up power.

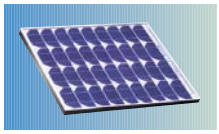
Chargers

Five-station Battery Charger

Handles up to five Isco 934 Nickel-Cadmium or 946 Lead-acid batteries at once.

Wall-mount Chargers

Economical and efficient charging for single batteries.



Solar Panel Battery Chargers

For Isco lead-acid batteries where AC line power is not available. Several sizes offered.

General Purpose 12V Charger

6-Amp portable for lead-acid batteries.

NOTE: For additional battery or charger information, request our Power Products Catalog No. L-0104

Ordering Information

Model	Part Number
4210 Ultrasonic Flow Meter	68-4210-001
4210 Accessories	
Sensor Cable Clamp	60-3004-129
Sensor Cable Straightener	60-3213-061
Sensor Mounting Bracket	60-2443-092
Sensor Sunshade	60-3004-142
Sensor Floor Mount	60-3004-117
Calibration Target	60-3004-143
4220 Submerged Probe Flow Meter	
with 10 ft (3.05 m) level measurement range	68-4220-001
4220 Accessories	
Quick Disconnect Box	60-3224-003
4230 Bubbler Flow Meter	
with 1/16 in x 25 ft (1.6 mm x 7.62 m) Teflon bubble line	68-4230-001
with 1/8 in x 50 ft (3.2 mm x 15.2 m) vinyl bubble line	68-4230-002
4230 Accessories	
Flow Metering Inserts	
6" (150 mm) Insert	68-3230-005
8" (200 mm) Insert	68-3230-006
10" (250 mm) Insert	68-3230-007
12" (300 mm) Insert	68-3230-008
SST bubble tube extension, 1/16" ID	60-1704-018
SST bubble tube extension, 1/8" ID	60-1873-043
4250 Area Velocity Flow Meter	
with Low Profile Area Velocity Sensor with 10 ft (3.05 m) level measurement range	68-4250-006
with Standard Area Velocity Sensor with 10 ft (3.05 m) level measurement range	68-4250-001
with Standard Area Velocity Sensor with 30 ft (9.14 m) level measurement range	68-4250-002
4250 Accessories	
Quick Disconnect Box	60-3254-004

Model	Part Number
4200 Series Options	
Telephone modem with voice messaging	68-4200-004
2102 Wireless Module	68-2000-002
Analog outputs	
1 output	60-3214-146
2 outputs	60-3214-148
3 outputs	60-3214-149
Mechanical totalizer	60-3214-134
4200 Series Accessories	
201 pH/Temperature Module w/double junction pH probe	68-4200-002
674 Rain Gauge	
0.01"	60-3284-001
0.1 mm	68-3280-001
High/Low Alarm Relays	60-3404-028
Chart Roller	60-3004-156
Isco Flowlink® Software	Ask about options
581 Rapid Transfer Device (RTD) with transfer cable	68-6700-056
ProHanger (for 18" - 24" manholes)	209-9006-04
Power Products	
934 Nickel-Cadmium battery, 4 A-H	60-1684-040
946 Lead-acid battery, 6.5 A-H	60-3004-106
948 Lead-acid battery, 45 A-H	68-3000-948
High-capacity Power Packs	
Model 913 (120V AC)	60-1684-088
Model 923 (240V AC)	60-3004-190
Battery-backed Power Packs	
Model 914 120V AC	60-3004-130
Model 924 240V AC	60-3004-160
AC-powered chargers	
Model 961 120 VAC (for ni-cad only)	60-3004-059
Model 963 120 VAC (for lead-acid only)	60-3004-198
965 Five-station battery charger	68-3000-965
General purpose 12V charger	341-0118-12
Solar panel battery chargers	Custom Order

Flow Measurement Technology Selection Guide

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

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