

Flow Products

See Inside!

- **Flow experts ready to answer your questions! See page 474.**
- **Data Delivery Services (DDS) for “hands-off” sewer flow monitoring! See page 476.**
- **Flow meter selection guide helps you select the best product for your needs! See pages 478-479.**
- **Flow meter packages contain all you need in one product number: meter, sensor(s), and accessories! See page 490.**

**MARSH
McBIRNEY**

SIGMA



Be Right™

Your Flow Monitoring Professionals

Flow Products



- **Experienced flow professionals**
- **Accessible—talk to a flow expert, not voicemail**
- **Product recommendations based on your application**
- **Focused on excellent customer service**
- **Friendly and personable**

Our Customer Support Center located in Frederick, Maryland will provide you with the exceptional sales, technical, and field support that you have come to expect from Hach. Count on our experts for your next open channel flow monitoring application.

We invite you to take a look at our latest innovations that were designed with you in mind. Be sure to visit our website at www.hachflow.com and sign up for our informative newsletter, Focus on Flow, published for flow professionals like yourself. We look forward to hearing from you.

Contact information for ordering and tech support:

Hach Company
4539 Metropolitan Ct.
Frederick, Maryland 21704
Telephone: U.S. and Canada 1-800-368-2723
Outside the U.S. 1-301-874-5599
Fax: 1-301-874-8459



MARSH
McBIRNEY **SIGMA**



Your Flow Monitoring Professionals

What our customers have to say...

***“The meters have been working great!
We picked the sites they should be in and
they work perfect there.”***

Brian Stapleton, Assistant Manager
Sewer System Maintenance and Operations Department (SSMO)
NEORSD (Northeast Ohio Regional Sewer District)

***“We've appreciated the Customer Service Group.
The access that we have to technical support has
been great. We can always pick up the phone and
talk to somebody if we need to. I have never had
any problems getting anything answered. I'm sure
it's the same with our field crews. We have more than
75 meters all over the County's service area and
having that open access to technical support
and advice is very helpful.”***

Abraham Araya
Water Quality Planner and Flow Monitoring Data Analyst
King County, Washington

***“The fact that you don't have to touch anything
in the sewer is 'perfect.' I have been doing this
for 18 years so I've seen it all. It is easily understood
why anyone working in the sewer environment
would prefer the 'hands-off' approach and
freedom from entering monitoring sites that the
Flo-Dar meter affords. These meters are nice.
I also like the battery system.”***

Gus Belmont
Sewer Department Superintendent
Whitpain Township



Data Delivery Service (DDS)

The ultimate "Hands-Off" approach to sewer flow monitoring.



Access your flow data from anywhere, anytime!

Imagine...

a reliable sewer flow monitoring network that doesn't require manhole visits.

Imagine...

accessing your sewer flow data anytime, anywhere—transmitted directly to your PC, laptop, or a secure website.

Imagine...

receiving this unedited, accurate data at a fixed monthly price.

Imagine...

having all the benefits of superior data quality from a Hach web-enabled flow meter—without the upfront capital expense associated with a flow meter purchase.

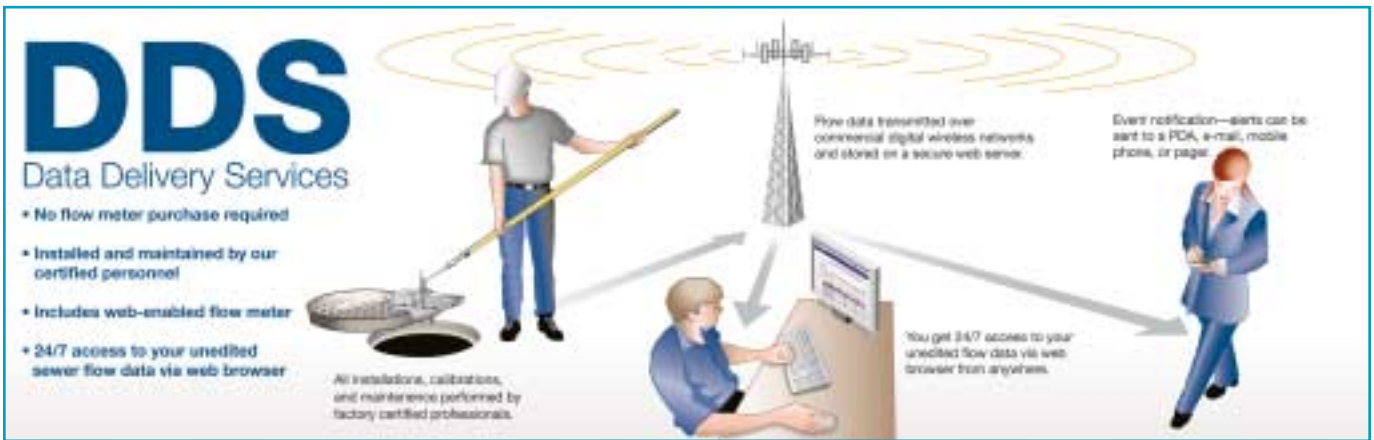
This new approach to sewer flow metering utilizes Hach's award-winning and highly accurate flow meters without the capital expense of meter purchase. Whether you need data from one monitoring site or many more, DDS will change the way you think about sewer flow metering.

With DDS (Data Delivery Services) you pay only for sewer flow data and you don't have to leave your office to get it. For a fixed monthly fee, Hach Company will furnish you with a web-enabled sewer flow meter and all of the following:

- 24/7 access to your unedited sewer flow data via web browser
- 95% data uptime guarantee or it's FREE
- Secure password protected access
- Unlimited secure data transfers
- Daily data back-ups
- Live customer support



Whether you need data from one monitoring site or many more, DDS will change the way you think about sewer flow metering.



What our DDS customers are saying...

"With DDS, I can spot a potential problem from my desk. Cost savings have been phenomenal! Don't turn off DDS!"
Brown & Caldwell

"The system has helped us provide quality data while saving us time in the field."
O'Brien & Gere

"This is far better than purchasing a bunch of meters that we may or may not use in the future. This is the way to go!"
Gould Engineering

"It did not make sense to invest a large sum of money into capital expenditures that were only needed for two years. With a fixed price per meter, per month, DDS was perfect for us."
City of Carmel, Indiana

"Now we just go to the website and look at the flows. It's quite a time saver. Everything is taken care of for us with DDS."
US Steel

"It's great because we don't have to buy the meters, pay for maintenance or labor. With DDS our savings will be big!"
City of Lawrence, Kansas

"It was a no-brainer! When we get another flow study we plan on using DDS. Hach made the whole process very easy."
LJB Engineering

For more information, call to request Literature #2602, or visit www.hachflow.com



Web-Enabled Sewer Flow Meters

Now you can get 24/7 access to your flow meter data via the web! We make it easy!

Flow Products



Let Hach host your data and effortlessly manage your flow meters from anywhere.

Get complete support of your flow meter, data hosting and transmission system from one company—Hach.

Hach's Web-Enabled Flow Meters provide highly accurate flow measurements under a wide range of flow and site conditions.

Ideal Applications:

- Inflow/Infiltration Studies
- Billing/Custody Transfer
- Combined Sewer Overflow Monitoring
- Sewer System Evaluations and more.



Professional flow data reporting is easily accomplished via the graphical web-based user interface.

Find it here... and on www.hachflow.com



Flow Meter Guide

	Sigma Sub AV Sensor		Sigma Sub AV, Low Profile Velocity, and Ultrasonic Sensors				Sigma Sub AV Sensor
	Sigma Model 910	Sigma Model 920	Sigma Model 930	Sigma Model 930T	Sigma Model 940	Sigma Model 911	
PRODUCT FEATURES							
Portable/Field	■	■	■	■	■	■	
Permanent		■	■	■			
Interface via PC	■	■	■	■	■	■	
User Interface: key pad + LCD							
Analog Outputs							
Digital Outputs (ModBus ASCII)		■	■	■	■		
Optional Sampler Output		■	■	■	■ (Included)	■ (US & Canada)	
Optional Rain Gauge Input		■	■	■			
Web enabled (Integral wireless modem)				■			
Optional External Power (AC, Solar, marine battery)		■	■	■			
Number of Sensor Inputs (Velocity or Depth)	1	2	3	3	2	1	
Water Quality Parameters							
Data Storage Capacity*	90	240	175	175	175	300	
Battery Life (days)**	60	90	365	250	365	240	
Velocity Technology							
Ultrasonic Doppler	■	■	■	■	■	■	
Radar Doppler							
Electromagnetic							
Depth Technology							
Ultrasonic***				Optional			
Pressure Transducer				Integral to Velocity Sensor			
Bubbler							
INSTALLATION							
Manhole Installation	■	■	■	■	■	■	
Open Channels/Pipes <6 in. (150mm)	■	■	■	■	■	■	
Open Channels/Pipes 6 to 60 in. (150 to 1500mm)	■	■	■	■	■	■	
Open Channels/Pipes 6 to 96 in. (150 to 2400mm)							Contact Factory
Open Channels/Pipes 6 to 224 in. (150 to 5600mm)							Contact Factory
Weirs and Flumes							
Hazardous Area Installation					■	■	
Wastewater plant effluent (Primary Device)							
Natural Streams							
APPLICATIONS							
Low Velocity 0.2 to 0.8 ft/s (0.06 to 0.24 m/s)	■	■	■	■	■	■	
High Velocity 0.8 to 20 ft/s (0.24 to 6.1 m/s)	■	■	■	■	■	■	
Full Pipe, surcharge flow	■	■	■	■	■	■	
Reverse Flow							
Low Depth, <2 in (50mm)				X Using Low Profile Sensor			
Low Suspended Solids (0.1 to 20ppm)							Contact Factory
Corrosive effluents (pH <4, > 10)							Contact Factory
Silty sites							Good when using Submerged Area Velocity Sensor Oil Filled
Persistent Foam							Use Submerged Area Velocity Sensor - Contact Factory

* Typical with 15 minute recording interval

** Typical with 15 minute recording interval, 1 level and 1 velocity, data download once per week, at 10°C (50°F), can vary depending upon site conditions.

*** In-pipe and extended range sensors available. Contact factory for compatibility.



Flow Meter Guide

Sigma Sub AV, Low Profile Velocity Submerged Depth, Bubbler, and Ultrasonic Sensors	Ultrasonic Sensor	Marsh-McBirney Flo-Dar Sensor	Marsh-McBirney Flo-Tote 3	Marsh-McBirney Flo-Dar Sensor	Marsh-McBirney Flo-Tote 3	Marsh-McBirney Velocity Only Sensor
Sigma Model 950	GLI Model U53	Marsh-McBirney Flo-Logger		Marsh-McBirney Flo-Station		Marsh-McBirney Flo-Mate
■		■	■			■
■	■			■	■	
■		■	■			
■	■			LCD DISPLAY ONLY		■
■ (Optional)	■			■	■	
■	■					
■ (Included)	■ (Included)	■	■	■	■	
■			■	■	■	
■			■	■	■	
■	N/A	■	■	■	■	N/A
4 (Contact Factory for details)	1	2 (Optional Surcharge Velocity)	1	2 (Optional Surcharge Velocity)	1	1
pH, ORP, DO, Conductivity, Contact Factory	N/A	60	120	120	120	30 hours
		120	120			
■		■		■		
			■		■	■
Optional	■	■		■		
Optional		Used with Surcharge Velocity Option	Integral to sensor	Used with Surcharge Velocity Option	Integral to sensor	
Bubbler only or Bubbler with velocity sensor						
■		■	■	■	■	Profiling
■		■	■	■	■	Profiling
■		■	■	■	■	Profiling
		Excellent		Excellent		Profiling
		Excellent		Excellent		Profiling
■	■					Profiling
		Sensor Only Use Safety Barrier		Sensor Only Use Safety Barrier		
	■	■				■
■						
■			Excellent		Excellent	Excellent
■		Excellent	■	Excellent	■	■
■		Using Optional Surcharge Velocity Sensor	■	Using Optional Surcharge Velocity Sensor	■	
■			■		■	
X Using Low Profile Sensor		■		■		2 in (50mm) Possible at Low Velocities Only
	Excellent	Excellent	Excellent	Excellent	Excellent	
	In Primary Devices	Excellent		Excellent		
		Excellent		Excellent		

Contact Factory

Sigma Model 910 Area Velocity Flow Meter

The Sigma Model 910 Flow Meter's compact design and weight makes it one of the best choices for harsh environments.



The Hach Sigma 910 is the most popular meter for economical, short-term, single-channel collection system monitoring. (Sensor sold separately.)

The compact and lightweight 910 Flow Meter measures average velocity directly, without the need for time-consuming and costly flow profiling.

Ideal for Harsh Environments

The Model 910 Flow Meter is NEMA 6P sealed to withstand submergence and prolonged surcharge conditions. Its compact size makes it easily portable and provides for easy storage and fit in a variety of applications such as sewer and storm monitoring.

Advanced Technology for Accuracy

- Automatically corrects for temperature effects
- Uses patented "drawdown correction" to correct the effects of velocity on accurate depth measurement
- Advanced Doppler technology avoids signal dropouts and ensures accuracy in low-flow, full-pipe, or reversed-flow conditions

Easy Installation and Maintenance

The 4.5 inch diameter means it can be installed almost anywhere. The sensor is detachable and interchangeable for flexibility. Single point calibration (atmospheric) makes calibration quick and accurate.

Note: Hach Data Management software is required to program this Flow Meter. See page 491 for details.

Ideal for:

- Short Term Flow Studies
- Sanitary Sewer Evaluation Studies

Specifications*

Units of Measurement

Depth: m, cm, ft., in.
Flow: gps, gpm, gph, lps, lpm, lph, mgd, afd, cfs, cfm, cfh, cfd, m³s, m³m, m³h, m³d
Totalized Flow: L, m³, ft.³, gal., acre-ft.

Monitoring Intervals

1, 2, 3, 5, 6, 10, 12, 15, 20, 30, and 60 minutes

Operating Temperature

-18 to 60°C (0 to 140°F)

Storage Temperature

-40 to 60°C (-40 to 140°F)

Time Based Accuracy

±1 second per day

User Interface

IBM-compatible PC

Program Memory

Non-volatile programmable flash, can be updated via RS-232 port

Data Storage

Capacity: 90 days of 1 depth and 1 velocity reading at 15-minute recording intervals

Data Types: Depth and velocity

Storage Mode: Wrap or slate

RAM Memory: 128 K

Communications

Serial connection to IBM-compatible computer with Hach Data Management Software

Enclosure Material

PVC

Enclosure Rating

NEMA 6P (IP67)

Power Source

One Energizer EN-529 alkaline 6 Vdc battery or EN-529-CAN

Battery Life

60 days typical (with 15-minute recording interval, 1 depth and 1 velocity, data download once per week, at 10°C (50°F), also affected by site conditions).

Dimensions

11.4 cm diameter x 44.8 cm (4.5 in. diameter x 17.625 in.)

Weight

3.54 kg (7.8 lbs.) with battery

**Subject to change without notice. Specifications will vary depending on channel size, channel. See page 482 and 484 for sensor specs.*

Prod. No. Description

4900 Sigma 910 Flow Meter with 6-volt battery

This is for a Flow Meter Only. For a complete system, refer to packages on page 490.

For more information, call to request Literature #2545, or visit www.hachflow.com

Sigma Model 920 Area Velocity Flow Meter

Provides the robust qualities of the 910 but with a longer battery life and up to two independent depth/velocity channels.

Made for Submergence and Prolonged Surge Conditions

The rugged housing of the 920 Flow Meter is NEMA 6P sealed to withstand submergence and prolonged surge conditions. A low power draw creates an extended 90-day battery life.

Versatile Features and Options

The optional rainfall logging feature records and characterizes rain events—a true innovation in water monitoring. Use the optional internal modem to automate data retrieval, paging, and reporting. With multiple sensor options, this meter can be used for redundancy, averaging, and multiple pipe monitoring.

Advanced Technology for Accuracy

- Automatically corrects for temperature effects
- Uses patented “drawdown correction” to correct the effects of velocity on accurate depth measurement
- Advanced Doppler technology avoids signal dropouts and ensures accuracy in low-flow, full-pipe, or reversed-flow conditions
- The only true In-Pipe ultrasonic sensor with zero dead band. Use our In-pipe sensor in combination with a Low Profile Area velocity sensor to monitor flow in pipes or channels with depths less than 2 in. Also combine an Ultrasonic In-Pipe sensor with a regular Submerged Area Velocity sensor for depth measurement redundancy to avoid depth data gaps.

Easy Installation and Maintenance

Installs quickly and easily with no velocity calibration required.

Note: Hach Data Management software is required to program this Flow Meter. See page 491 for details.

Ideal for:

- Short Term Flow Studies
- Sanitary Sewer Evaluation Studies
- CSO Studies and Monitoring
- NPDES Stormwater Compliance

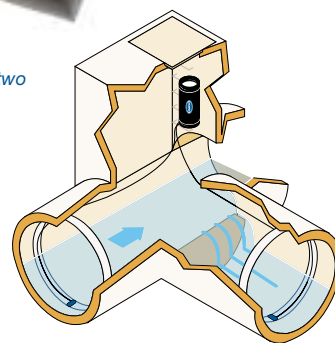
Prod. No.	Description
4850	Sigma Model 920 Flow Meter Includes two 3667 lantern batteries. The Sigma Model 920 Flow Meter can accommodate 1 additional AV sensor (1 submerged AV sensor OR 1 low profile velocity sensor) or 1 ultrasonic sensor.
4883	Input for additional submerged AV or low profile velocity sensor. Will give the Sigma Model 920 two AVs total. Requires AV sensor or low profile velocity sensor.
4869	Input for 75 kHz ultrasonic sensor. Will give the Sigma Model 920 one AV and one ultrasonic sensor. Requires ultrasonic sensor.

This is for a Flow Meter Only. For a complete system, refer to packages on page 490.

For more information, call to request Literature #2541, or visit www.hachflow.com



Measure depth and velocity in two channels or velocity in one and level in another. (Sensors sold separately.)



Specifications*

Units of Measurement

Depth: m, cm, ft., in.
Flow: gps, gpm, gph, lps, lpm, lph, mgd, afd, cfs, cfm, cfd, m³s, m³m, m³h, m³d
Totalized Flow: L, m³, ft.³, gal., acre-ft.

Monitoring Intervals
1,2,3,5,6,10,12,15,20,30 and 60

Operating Temperature
-18 to 60°C (0 to 140°F)

Storage Temperature
-40 to 60°C (-40 to 140°F)

Time Based Accuracy
±1 second per day

User Interface
IBM-compatible PC

Program Memory
Non-volatile programmable flash, can be updated via RS-232 port

Data Storage (optional)
Capacity: 240 days of 2 depth, 2 velocity readings, and rainfall at 15-minute recording intervals
Data Types: Depth, velocity, and rainfall
Storage Mode: Wrap or slate

Sampler Output Conditions (optional)
Set point on depth, velocity, flow or flow rate of change

Sampler Output (optional)
6 to 12 Vdc pulse, 100 mA maximum at 500 ms duration flow proportional

Communications

RS-232 serial connection to IBM-compatible computer with Hach Data Management Software
Optional Modem: Bell 212
Baud: 14400
Transfer Protocol: Binary or 14400, V.32 bis, V.42, MNP2-4 error correction V.42 bis, MNP5 data compression
MNP10EC Cellular Protocol
Local terminal: RS-232 at 19.2 k-baud

Enclosure Material
PVC

Enclosure Rating
NEMA 6P (IP67)

Power Source
Two Energizer 529 or EN-529-CAN batteries or external AC power source.

Battery Life
90 days typical (with 15-minute recording interval, 1 depth and 1 velocity, data download once per week, at 10°C (50°F), also affected by site conditions).

Dimensions
16.8 cm diameter x 44.7 cm (6.625 in. diameter x 17.625 in.)

Weight
7.5 kg (16.5 lbs.) with battery

*Subject to change without notice. Specifications will vary depending on channel size, channel. See pages 486 and 489 for sensor specs.

Area Velocity Flow Meters

Sigma Model 930T Remote Communications Flow Meter



The Hach Sigma 930T Remote Communications Flow Meter is the most advanced flow meter of its kind. It provides a single supplier solution for the collection and integration of information throughout wastewater and collection system. Get continuous, real-time access to data in remote locations. (Sensors sold separately.)

The Hach Sigma 930T Remote Communications Flow Meter provides a reliable, cost-effective wireless flow monitoring solution. It is ideal for long-term/permanent flow studies or temporary installations in inaccessible locations.

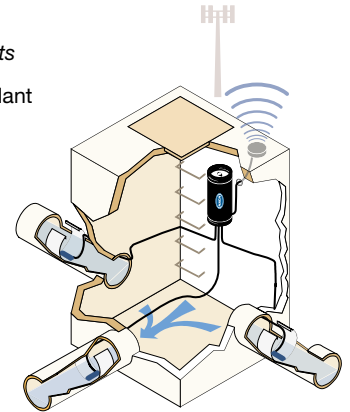
Advanced Technology for Accuracy

- Automatically corrects for temperature effects
- Uses patented "drawdown correction" to correct the effects of velocity on accurate depth measurement
- Advanced Doppler technology avoids signal dropouts and ensures accuracy in low-flow, full-pipe, or reversed-flow conditions

See and Download Your Data from Anywhere, Anytime, Using the Internet

- Continuously monitor data in real time or retrieve data automatically for later analysis
- Alarm notification and secure data transmission
- Schedule events
- Share information with associates, consultants and clients

Use a single 930T flow meter for multi-point and/or redundant monitoring. Up to three depth and velocity sensors can be used with a single meter. Optional rainfall-logging and sampler pacing capabilities are ideal for CSO and stormwater monitoring.



Ideal for:

- Permanent Collection System Monitoring
- Long-term Flow Monitoring
- Sanitary Sewer Evaluation Studies
- CSO and SSO Studies and Monitoring

Contact factory for pricing.

Sigma Model 930 Long-Term Area Velocity Flow Meter



Hach's most advanced Sigma flow meter—supports three interchangeable sensors, long battery life, increased data storage and offers optional interfaces with samplers, and modem capability. (Sensors sold separately.)

The Hach Sigma 930 is designed for long-term/permanent flow studies with approximately 365-day battery life and a strong NEMA 6P PVC enclosure. Permanent collection system monitoring can now be done confidently, within an affordable budget.

Advanced Technology for Accuracy

- Automatically corrects for temperature effects
- Uses patented "drawdown correction" to correct the effects of velocity on accurate depth measurement
- Advanced Doppler technology avoids signal dropouts and ensures accuracy in low-flow, full-pipe, or reversed-flow conditions
- Multiple sensors for redundancy and multiple pipe monitoring
- Up to three depth and velocity sensors
- Low power draw creates an extended year-long battery life
- Optional rainfall logging feature records and characterizes rain events, a true innovation in water monitoring
- Multiple communications options
- Optional sampler pacing capabilities, ideal for CSO and stormwater
- NEMA 6P sealed to withstand submergence and prolonged surcharge conditions

Ideal for:

- Long-Term Flow Monitoring
- Sanitary Sewer Evaluation Studies
- CSO Studies and Monitoring
- NPDES Stormwater Compliance
- Permanent Collection System Monitoring

Contact factory for pricing.

For more information, call to request Literature #2540, or visit www.hachflow.com

Intrinsically Safe AV Flow Meters

Sigma Model 940 Intrinsically Safe Area Velocity Flow Meter

Its rugged design, low-profile probes, and one-year battery life significantly reduce site visits. Choose up to two area velocity sensors, or one area velocity and one depth backup. Whether you require redundancy in a single pipe or depth and velocity in separate pipes, you'll profit from new performance levels in a single meter.

Industry standard MODBUS ASCII protocol has been incorporated into the American Sigma 940 Flow Meter. The implementation of the MODBUS protocol allows your SCADA or DCS system to directly communicate with the 940 Flow Meter without the use (or additional cost) of a PLC.

Advanced Technology for Accuracy

- Automatically corrects for temperature effects
- Uses patented "drawdown correction" to correct the effects of velocity on accurate depth measurement
- Advanced Doppler technology avoids signal dropouts and ensures accuracy in low-flow, full-pipe, or reversed-flow conditions
- CSA-NRTL/C certified for operation in Class I, Division I, Groups C and D hazardous locations
- Multiple communications options
- NEMA 6P sealed to withstand submergence and prolonged surcharge conditions
- Sampler pacing capabilities, to document the extent of overflow problems

Ideal for:

- Long Term Flow Monitoring in Hazardous or Potentially Hazardous Areas
- Sanitary Sewer Evaluation Studies
- CSO Studies and Monitoring

Contact factory for pricing.



The Hach Sigma 940 intrinsically-safe flow meter supports dual sensors, interfaces with samplers, has a long battery life, and offers increased data storage and optional modem capability. (Sensors sold separately.)

For more information, call to request Literature #2579, or visit www.hachflow.com

Sigma Model 911 Intrinsically Safe Portable Area Velocity Flow Meter

With quick installation and minimum maintenance, the 911 is ideal for short-term flow studies in hazardous or potentially hazardous environments. Profiling to establish accurate average velocity is not needed.

Advanced Technology for Accuracy

- Automatically corrects for temperature effects
- Uses patented "drawdown correction" to correct the effects of velocity on accurate depth measurement
- Advanced Doppler technology avoids signal dropouts and ensures accuracy in low-flow, full-pipe, or reversed-flow conditions
- CSA-NRTL/C certified for operation in Class I, Division I, Groups C and D hazardous locations
- Low profile, non-fouling probe reduces maintenance and is detachable/interchangeable for ultimate flexibility
- Easy installation with a slender 6.5 in. diameter, no profiling required
- NEMA 6P sealed to withstand submergence and prolonged surcharge conditions
- Sampler pacing capabilities, to document the extent of overflow problems

Ideal for:

- Short Term Flow Studies in Hazardous or Potentially Hazardous Areas
- Sanitary Sewer Evaluation Studies
- CSO Studies and Monitoring
- Industrial Discharge Monitoring

Contact factory for pricing.



Are there hazardous gasses at your monitoring site? Be sure you're safe with an affordable Sigma 911 intrinsically safe flow meter. (Sensors sold separately.)

For more information, call to request Literature #2578, or visit www.hachflow.com

Sigma Model 950 Series Area Velocity Flow Meter

The Sigma Model 950 Series Flow Meter offers maximum flexibility for multiple applications.



The Sigma Model 950 Series Permanent/Portable Open Channel Flow Meters provide portable and/or permanent single-channel monitoring plus water quality testing, process control interface, and digital display. (Sensors sold separately.)

Versatility and Customization

The Sigma 950 series are the meters of choice by flow professionals, consultants, and municipalities. Choose from any of the following technologies to fit your application.

- Use the Submerged Area/Velocity flow meter to measure flow in collections systems for periods up to 40 days using our 6 amp-hr gel electrolyte battery
- Use any of our depth technologies when primary devices (Weirs and Flumes) are available to measure depth and calculate flow
- The bubbler depth technology is ideal for applications with high winds, high temperature or when foam is present
- The combination of bubbler depth technology and doppler velocity is the favorite of storm water professionals
- The ultrasonic depth technology is ideal to monitor industrial dischargers for your pre-treatment program in combination of any of our Automatic Wastewater samplers



The 950 Flow and Quality Meter logs flow, depth, pH, temperature, dissolved oxygen, and conductivity.

Sampler Pacing and Equipment Control

The 950 Flow Meter is the perfect choice to do flow pacing sampling with portable samplers. Control samplers, pumps, or other equipment based on monitored flow or selected parameter(s). Sampler pacing provides the ability to document overflow problems.

Note: Hach Data Management software is required to program this Flow Meter. See page 491 for details.

Ideal for:

- Long Term or Permanent Flow Studies
- Sanitary Sewer Evaluation Studies
- CSO Studies and Monitoring
- NPDES Stormwater Compliance
- Industrial Compliance Monitoring

Battery life for our depth technologies greatly depend on logging intervals and environmental conditions Contact us to determine the battery life for your application. Other power options are available, such as AC power converters and Solar Panels.

Hach Sigma 950 Factory Installed Options:

- Integral pH-Temperature/ORP Meter
- Integral Dissolved Oxygen/Temperature Meter
- Integral Conductivity/Temperature Meter
- Rain Gauge Input
- Analog Input Data-logging Channels
- 4 – 20 mA Outputs
- Mechanical Totalizer
- Alarm Relays
- Modem
- Expanded Memory
- AC Power Backup



With solar power and radio communications, these 950AVs monitor three billing sites.



The 950AV provides maximum versatility with the choice of three depth measurement technologies and velocity. OptiFlo-AV offers all three in one meter.

Sigma Model 950 Series Area Velocity Flow Meter

Model 950 Flow Meters Provide Maximum Versatility		
Model	Choice of Depth Technology	Features
950 — Depth Only*	Bubbler Submerged Pressure Ultrasonic (50 kHz downlook) Ultrasonic (75 kHz downlook) Ultrasonic (75 kHz In-pipe)	Each 950 meter contains electronics for only one sensing technology.
950 — AV (Area Velocity)	Bubbler Submerged Pressure Ultrasonic (50 kHz downlook) Ultrasonic (75 kHz downlook) Ultrasonic (75 kHz In-pipe)	Measures velocity as well as depth. No need for primary device.
950 OptiFlow — Depth Only*	Up to three depth sensors in <u>one</u> meter.	
	Bubbler Submerged Pressure Ultrasonic (50 kHz)	950 Optiflow meters have electronics for measuring depth with three different technologies. Only one can be used at a time.
950 OptiFlow — AV	Up to three depth sensors in <u>one</u> meter.	
	Bubbler Submerged Pressure Ultrasonic (75 kHz)	950 Optiflow meters have electronics for measuring depth with three different technologies. In addition to measuring velocity. No need for primary device. Only one can be used at a time.

*To measure flow, depth only meters also require a primary device such as a weir or flume.

Solar Power System for Flow Meters and Samplers

- Uninterrupted operation; no recharging of power supply
- Accommodates varying size modules
- Handles wide range of battery options



Sigma Smart Chargers

- Compatible with Sigma Battery Pack Models 913US, 913EU, 913UK and 914US, 914EU, 914UK (12 Vdc, Gel Electrolyte and NiCad, 4 - 6 amp/hr)
- Fast Recharging time-typically less than one hour
- Two-Stage charging for Optimal Battery Life
- NiCad Charger for US Charger
Prod. No. 6427500,
Cord Prod. No. 1801000
- Gel-Electrolyte for US Charger
Prod. No. 6247400,
Cord Prod. No. 1801000



Prod. No.	Description
2672	950 Bubbler Flow Meter with Graphics Display
2680	950 Submerged Pressure Flow Meter with Graphics Display
3286	950 75 kHz Ultrasonic Flow Meter with Graphics Display
3412	950 OptiFlo Flow Meter with Graphics Display
3248	950 AV Bubbler Flow Meter with Graphics Display
3522	950 AV Submerged Flow Meter with Graphics Display
3959	950 AV 75 kHz Ultrasonic Flow Meter with Graphics Display
3773	950 AV OptiFlo Flow Meter with Graphics Display

950 Flow Meters only—must order sensors and options separately. For a complete system refer to packages on page 490. Also available: Solar modules with 40 W, 50 W, 60 W, and 75 W panels; batteries and accessories.

For more information, call to request Literature #2547, or visit www.hachflow.com

Specifications*

Units of Measurement

Flow: gps, gpm, gph, lps, lpm, lph, mgd, afd, cfs, cfm, cfh, cfd, m³s, m³m, m³h, m³d
Totalized Flow: L, m³, ft.³, gal., acre-ft.

Primary Devices

Flumes: Parshall, Palmer, Bowlus, Leopold-Lagco, H, HL, HS, trapezoidal
Weirs: N-notch (15 to 120°) contracted/non-contracted rectangular, Thelmar, compound Cipolletti
Manning Equation: Round, U and rectangular trapezoidal channels
Flow Nozzles: Kennison, parabolic, California pipe
Head vs. Flow: Custom programmable curve (up to 99 points)

Operating Temperature

-10 to 65.5°C (14 to 150°F)

Storage Temperature

-40 to 80°C (-40 to 176°F)

Humidity

0 to 100%, condensing

Time Based Accuracy

±6 seconds (±0.007%) per day

Totalizers

8-digit resettable and 8-digit non-resettable LCD software totalizer
Optional 6-digit non-resettable mechanical totalizer

Graphics Display

Back lit LCD; Auto-off when not in use
SCII Mode: 8 line x 40 character
Graphics Mode: 60 x 240 dot
Dimensions: 3.8 x 12.7 cm (1.5 x 5 in.)
Displays: depth vs. time, flow vs. time
Optional Displays: rainfall, pH, ORP, temp., DO, conductivity, vs. time, sampler events, and alarm events

Keypad

21 position sealed membrane switch with blinking green LED to indicate power on. Four "soft keys", function defined by display

*Subject to change without notice. Specifications will vary depending on channel size, channel. See pages 486 and 489 for sensor specs.

Data Logging

"Smart" Dynamic memory allocation automatically partitions memory to provide the maximum logging time. No manual memory partitioning required.

Memory Mode: Either slate or wraparound may be selected
Data Points: Approximately 20,000 standard. Expandable up to 116,000 data points.

Daily Statistics: Available for up to 32 days
Recording Intervals: 1, 2, 3, 5, 6, 10, 12, 15, 20, 30, or 60-minute intervals

Program Memory

Non-volatile programmable flash, can be updated via RS-232 port

Sampler Output

12 to 17 Vdc pulse, 100 mA maximum at 500 ms duration

Communications

RS-232: Up to 19,200 baud
SCADA MODBUS communication protocol via RS-232 or optional modem
Modem (optional): 14,400 baud
Cellular Communications (optional): 14,400 bps, MNP 10-EC Cellular Protocol
Pager Alarms

Enclosure Material

ABS, UV resistant

Enclosure Rating

NEMA 4X, 6

Power Source

12 Vdc

Power Options

6 amp-hr. gel electrolyte rechargeable battery
4 amp-hr. Ni-Cad rechargeable battery
Lantern battery pack with two 6-Volt lantern batteries
115 Vac, 230 Vac or 100 Vac power converter with battery charger

Dimensions

34.3 x 25.4 x 24.1 cm (13.5 x 10.0 x 9.5 in.)

Weight

5 kg (11 lbs.) not including battery source

Sigma Area Velocity Flow Sensors

The Sigma AV Flow Sensor provides reliable, accurate data with minimal maintenance and greater life expectancy.



The Hach Sigma AV Flow Sensor is a robust sensor specially developed to withstand harsh environments typical of collection systems. It provides reliable, accurate data with minimal maintenance and greater life expectancy.

Specifications*

AV SENSORS VELOCITY MEASUREMENT

Method

Doppler ultrasound; twin 1 MHz piezoelectric crystals

Operating Depth

2 cm (0.8 in.) minimum, typical
Recommended Range
-1.52 to 6.10 m/s (-5 to 20 ft./s)

For velocity performance specifications, please refer to individual Hach Sigma Flow Meter specifications.

AV SENSORS DEPTH MEASUREMENT

Method

Pressure transducer with stainless steel diaphragm

Accuracy

±0.16% full scale ±1.5% of reading at constant temp ±2.5°C (±36.5°F)
±0.20% full scale ±1.75% of reading from 0 to 30°C (32 to 86°F)
±0.25% full scale ±2.1% of reading from 0 to 70°C (32 to 160°F)

Velocity-Induced Depth Error

Compensated based on pipe geometry and flow velocity

Depth Range

Standard: 0 to 3 m (0 to 10 ft.)
Extended: 0 to 9 m (0 to 30 ft.)

Maximum Allowable Depth

Standard: 10.5 m (34.5 ft.)
Extended: 31.5 m (103.5 ft.)

AV SENSORS GENERAL ATTRIBUTES

Air Intake

Atmospheric pressure transducer is desiccant protected

Body Material

Noryl® plastic outer shell with epoxy potting

Power Consumption

Less than or equal to 1.2 W at 12 Vdc

Cable

Urethane cable with air vent

Connector

Hard anodized; satisfies Military Spec 5015

Cable Lengths

Standard: 9, 15, 23 and 30.5 m (30, 50, 75 and 100 ft.)
Custom: Greater than 30.5 m (100 ft.); maximum: 76 m (250 ft.)

Cable Diameter

0.91 cm (0.36 in.)

Dimensions

2.3 x 3.8 x 13.5 cm (0.9 x 1.5 x 5.31 in.)

Operating Temperature

0 to 70°C (32 to 158°F)

**Subject to change without notice. Specifications will vary depending on channel size, channel. See pages 480-484 for flow meter specs.*

Less Maintenance and Troubleshooting

Two interchangeable depth sensor cover plates are available to adapt the sensor to a variety of site conditions.

- *Oil-filled Cover Plate*—designed for sites susceptible to extreme fouling. The cavity is filled with a high-viscosity silicon oil that prevents fouling for as much as one year. The silicon oil is easily replenished, if needed, with a hand tool provided by Hach.
- *Non oil-filled Cover Plate*—designed to minimize fouling and can be used for most applications or in pipes that could run dry.

Designed for Harsh Environments

- Uses Noryl® plastic in the outer shell to protect the sensor against highly abrasive environments
- Cable is rigidly clamped inside the shell, then potted for strength
- Connectors are hard-anodized to the meter to prevent lost connection due to corrosion

Easy to Install

A single point calibration can be performed on-site without the need of a bucket of water.

Superior Sensor

- Stable and consistent
- Accurate and repeatable
- Versatile to meet many applications

Ideal for:

- Capacity Studies
- Infiltration and Inflow (I&I) Studies
- Sanitary Sewer Evaluation Studies (SSES)
- Billing or Custody Transfer
- CSO and SSO Monitoring
- Stormwater Monitoring and Compliance
- Industrial Wastewater Monitoring – Municipal Pretreatment








Submerged Area Velocity Sensors

Note: For Intrinsically Safe Sensors for use with 911 and 940 I.S. Flow Meters—Consult Factory.

Prod. No.	Description
STANDARD (NON OIL-FILLED)	
77065-030	Submerged AV Sensor 0-10 ft. range, 30 ft. cable, with connector
77065-050	Submerged AV Sensor 0-10 ft. range, 50 ft. cable, with connector
77065-075	Submerged AV Sensor 0-10 ft. range, 75 ft. cable, with connector
77065-100	Submerged AV Sensor 0-10 ft. range, 100 ft. cable, with connector
77065-XXX	Submerged AV Sensor 0-10 ft. range, custom cable, with connector Requires cable 77155-PRB.
77075-030	Submerged AV Sensor 0-30 ft. range, 30 ft. cable, with connector
77075-050	Submerged AV Sensor 0-30 ft. range, 50 ft. cable, with connector
77075-075	Submerged AV Sensor 0-30 ft. range, 75 ft. cable, with connector
77075-100	Submerged AV Sensor 0-30 ft. range, 100 ft. cable, with connector
77075-XXX	Submerged AV Sensor 0-30 ft. range, custom cable, with connector Requires cable 77155-PRB.
OIL-FILLED SENSOR WITH CONNECTOR	
77064-030	Oil-Filled, Submerged AV Sensor 0-10 ft. range, 30 ft. cable, with connector
77064-050	Oil-Filled, Submerged AV Sensor 0-10 ft. range, 50 ft. cable, with connector
77064-075	Oil-Filled, Submerged AV Sensor 0-10 ft. range, 75 ft. cable, with connector
77064-100	Oil-Filled, Submerged AV Sensor 0-10 ft. range, 100 ft. cable, with connector
77064-XXX	Oil-Filled, Submerged AV Sensor 0-10 ft. range, custom cable, with connector Requires cable 77155-PRB.
77074-030	Oil-Filled, Submerged AV Sensor 0-30 ft. range, 30 ft. cable, with connector
77074-050	Oil-Filled, Submerged AV Sensor 0-30 ft. range, 50 ft. cable, with connector
77074-075	Oil-Filled, Submerged AV Sensor 0-30 ft. range, 75 ft. cable, with connector
77074-100	Oil-Filled, Submerged AV Sensor 0-30 ft. range, 100 ft. cable, with connector
77074-XXX	Oil-Filled, Submerged AV Sensor 0-30 ft. range, custom cable, with connector Requires cable 77155-PRB.
BARE WIRE—STANDARD (NON OIL-FILLED SENSOR)	
77265-030	Submerged AV Sensor 0-10 ft. range, 30 ft. cable Requires Junction Box 7725000, Hub Assembly 7722800, Hub Assembly Cable 77155-HUB.
77265-XXX	Submerged AV Sensor 0-10 ft. range, custom cable Requires cable 77155-PRB, Junction Box 7725000, Hub Assembly 7722800, Hub Assembly Cable 77155-HUB.
77275-030	Submerged AV Sensor 0-30 ft. range, 30 ft. cable Requires Junction Box 7725000, Hub Assembly 7722800, Hub Assembly Cable 77155-HUB.
77275-XXX	Submerged AV Sensor 0-30 ft. range, custom cable Requires cable 77155-PRB, Junction Box 7725000, Hub Assembly 7722800, Hub Assembly Cable 77155-HUB.

Prod. No.	Description
BARE WIRE—OIL-FILLED	
77264-030	Oil-Filled, Submerged AV Sensor 0-10 ft. range, 30 ft. cable Requires Junction Box 7725000, Hub Assembly 7722800, Hub Assembly Cable 77155-HUB.
77264-XXX	Oil-Filled, Submerged AV Sensor 0-10 ft. range, custom cable Requires cable 77155-PRB, Junction Box 7725000, Hub Assembly 7722800, HUB Assembly Cable 77155-HUB.
77274-030	Oil-Filled, Submerged AV Sensor 0-30 ft. range, 30 ft. cable Requires Junction Box 7725000, Hub Assembly 7722800, Hub Assembly Cable 77155-HUB.
77274-XXX	Oil-Filled, Submerged AV Sensor 0-30 ft. range, custom cable Requires cable 77155-PRB, Junction Box 7725000, Hub Assembly 7722800, Hub Assembly Cable 77155-HUB.
MISCELLANEOUS	
77155-PRB	Sensor Cable (per ft.) Maximum length 247 ft., minimum length 1 ft.
7725000	Junction Box Silicone gel potting recommended for corrosive or wet environments; use Gel Fill Kit (7725600) and Dispensing Gun (7715300).
7722800	Hub assembly for bare wire sensors Requires Hub Assembly Cable 77155-HUB.
77155-HUB	Hub assembly cable (per ft.) Connects junction box to hub. Maximum length 3 ft., minimum length 1 ft.
7725600	Silicone gel potting kit for j-box Includes 3 tubes of gel fill (7729800) and 3 static mixers (5909900) for replacing/refilling junction box. A single dispensing gun (7715300) is required.
7715300	Silicone oil/gel dispensing gun for oil-filled sub AV sensor

Flow and Depth Sensors

							
	Submerged Area Velocity	Low Profile Velocity	75 KHz Ultrasonic Depth Downlooking	50 KHz Ultrasonic Depth Downlooking	75 KHz Ultrasonic Depth In-Pipe	Submerged Depth	Bubbler Area Velocity
Sigma Model Flow Meter Compatibility							
910	■						
920	■	■	■		■		
930	■	■	■		■		
930T	■	■	■		■		
950 Bubbler							
950 Sub Pressure						■	
950 75KHz US			■		■		
950 OptiFlo				■		■	
950 AV Optiflo	■	■	■		■		■
950 AV Bubbler							
950 AV Submerged	■						■
950 AV 75KHz US		■	■		■		

Specifications*

SUBMERGED AREA VELOCITY SENSOR <i>(See page 487.)</i>	75 KHZ ULTRASONIC DEPTH DOWNLOOKING SENSOR	50 KHZ ULTRASONIC DEPTH DOWNLOOKING SENSOR	75 KHZ ULTRASONIC DEPTH IN-PIPE SENSOR	SUBMERGED DEPTH SENSOR	BUBBLER AREA VELOCITY SENSOR	Velocity Measurement Method
Method Doppler ultrasonic	Range 23 cm to 3.3 m (14 in. to 10.8 ft.) sensor to liquid	Range 38.1 cm to 9.1 m (15 in. to 30 ft.) sensor to liquid	Range 0 to 3.35 m (0 to 11 ft.)	Range 2.5 psi: 0.01 to 1.75 m (0.04 to 5.75 ft.)	Depth Measurement Method Doppler ultrasonic /pressure transducer	Doppler ultrasonic
Accuracy ±2% of reading	Accuracy ±0.03 ft. over 2 ft. change in head with ideal target at 20°C, in still air, 50 ft. cable	Accuracy 1 to 10 ft. ±0.01 ft. (±0.003 m) (at 22°C (72°F), still air, 40 to 70% relative humidity)	Accuracy 0.038 to 4.57 m (0.125 to 15 ft. ±0.01 ft.) (at 22°C (72°F), still air, 40 to 70% relative humidity)	Accuracy ±10.1% full scale (non-linearity and hysteresis)	Accuracy 0.003 to 3.6 m (0.01 to 11.75 ft.)	Transducer Type Twin 1 MHz piezoelectric crystals
Zero Stability ±1.52 cm (±0.05 fps)	Span 0 to 4.57 m (0 to 15 ft.)	Span 0 to 8.84 m (0 to 29 ft.)	Span 0.038 to 4.57 m (0.125 to 15 ft.)	Max Allowable Depth 6x over pressure	Accuracy 0.01 to 11.75 ft. ±0.011 ft. (0.033 m) (linearity and hysteresis at 22°C (72°F))	Range -1.52 to 6.10 m/s (-5 to 20 fps)
Nose Angle 20° from horizontal	Beam Angle ±12° (-10 dB)	Ambient Operating Temperature -18 to 60°C (0 to 140°F)	Ambient Operating Temperature -18 to 60°C (0 to 140°F)	Operating Temp 0 to 71°C (32 to 160°F)	Ambient Operating Temperature -18 to 63°C (0 to 145°F)	Zero Stability < 0.015 m/s (0.05 fps)
Cable Length: 7.6 m (25 ft.) standard; up to 76 m (250 ft.) custom Diameter: 0.57 cm (0.225 in.)	Ambient Operating Temperature -18 to 60°C (0 to 140°F)	Temperature Error ±0.000047 ft./F° max error within comp temp range per degree of change	Temperature Error ±0.00005 m/C° (±0.0001 ft./F°) max error within comp temp range per degree of change	Compensated Temp 0 to 30°C (32 to 86°F)	Compensated Temp 0 to 59°C (32 to 136°F)	Accuracy ±2% of reading
Materials Sensor: Polymer Cable: Urethane Mounting Hardware: Stainless Steel	Material PVC housing Acoustic window	Material Buna-N acoustic window	Material Stat-Kon A-E ABS Plastic	Temperature Error 2.5 psi: 0.04 to 5.75 ft. ±0.006 ft./F° max error within comp temp range per degree of change	Temperature Error ±0.0003 ft./F° (max. error within comp temp range per degree of change)	Depth for Velocity 2 cm (0.8 in.) min, typical.
Dimensions 6.86 x 3.81 x 1.12 cm (2.7 x 1.5 x 0.44 in.)	Cable 4-conductor with integral stainless steel support cable Length: 7.6 m (25 ft.)	Resolution 0.0011 ft.	Resolution 0.019 cm (0.0075 in.)	Air Intake Atmospheric pressure reference is desiccant protected	Temperature Error ±0.0003 ft./F° (max. error within comp temp range per degree of change)	Operating Temp -18 to 60°C (0 to 140°F)
	Dimensions 12.7 x 5.7 cm (5.0 x 2.25 in.)	Material 4-conductor with integral stainless steel support cable. Length: 7.6 m (25 ft.)	Material 4-conductor Length: 7.6 m (25 ft.) std.	Transducer Type Twin 1 MHz piezoelectric crystals. Differential piezo resistive with balanced bridge	Air Intakes Bubble source and reference port desiccant protected. Fittings provided for remote intakes.	Dimensions 1.12 x 3.81 x 6.86 cm (0.44 x 1.5 x 2.7 in.)
		Crystal Spec 11.5° included beam angle	Crystal Spec 7° included beam angle	Material 316 stainless steel body with titanium diaphragm	Filters 10 micron on bubble source intake	
		Dimensions 9.5 x 7 cm (3.75 x 2.75 in.)	Dimensions 3.81 x 30 cm (2.0 x 12 in.)	Cable 4-conductor polyurethane sensor cable with air vent Length: 7.6 m (25 ft.) standard; 76 m (250 ft.) maximum	Line Purge High pressure purged at programmed intervals, or in manual mode on demand	
				Dimensions 2.65 x 17.2 cm (1 x 6.75 in.) Probe Frontal Area: 0.875 in. squared)		

*Subject to change without notice. Specifications will vary depending on channel size, channel. See pages 480-484 for flow meter specs.

Low Profile Velocity Sensors-Non I.S.

Prod. No.	Description
88006	Velocity Sensor, with connector Requires 3722 cable.
88006-25	Velocity probe with connector with 25 ft. cable
88006-50	Velocity probe with connector with 50 ft. cable
88006-100	Velocity probe with connector with 100 ft. cable
88005	Velocity Sensor, bare leads Requires 3722 cable and 4924 junction box.
88005-25	Velocity probe with bare leads with 25 ft. cable Requires 4924 junction box.
88005-50	Velocity probe with bare leads with 50 ft. cable Requires 4924 junction box.
88005-100	Velocity probe with bare leads with 100 ft. cable Requires 4924 junction box.

75 KHz Ultrasonic Depth Sensors

Ultrasonic sensors approved for use in the USA –Class I, Zone 1, Groups A, B, C, D. Canada – Class I, Division 1, Groups A, B, C, D; Class II, Division 1, Groups E, F, G. For conduit installation use 1 inch or larger conduit and bare lead probe.

Prod. No.	Description
DOWNLOOKING	
1176-01	75 kHz ultrasonic sensor with connector Requires 2716 cable.
1176-03	75 kHz ultrasonic sensor with bare leads Requires 2716 cable and 3658 junction box.
5233-05	IS 75 kHz ultrasonic sensor without horn Requires 5245100 cable.
IN-PIPE	
3702-01	75 kHz in-pipe ultrasonic sensor with connector. Requires 2716 cable.
3702-02	75 kHz in-pipe ultrasonic sensor with bare leads. Requires 2716 cable and 3658 junction box.
4741	IS 75 kHz in-pipe ultrasonic sensor with connector and 25 ft. cable

50 KHz Ultrasonic Depth Sensors

Prod. No.	Description
DOWNLOOKING	
1177-01	50 kHz ultrasonic sensor with connector Requires 2716 cable.
1177-03	50 kHz in-pipe ultrasonic sensor with bare leads. Requires 2716 cable and 3658 junction box.

Submerged Depth Sensor

Prod. No.	Description
2963	General purpose depth sensor, 0 to 5.76 ft. with 25 ft. cable Depth sensor cable cannot be extended.

Bubbler AV Sensors

Prod. No.	Description
88007	Bubbler AV sensor, 6-pin connector Requires 3232 cable.
88008	Bubbler AV sensor, 10-pin connector Requires 3232 cable.
88007-25	Bubbler AV sensor, 6-pin connector with 25 ft. cable
88008-25	Bubbler AV sensor with connector with 25 ft. cable
88007-50	Bubbler AV sensor, 6-pin connector with 50 ft. cable
88008-50	Bubbler AV sensor with connector with 50 ft. cable
88007-100	Bubbler AV sensor, 6-pin connector with 100 ft. cable
88008-100	Bubbler AV sensor with connector with 100 ft. cable
88009	Bubbler AV sensor with bare leads Requires 3232 cable and 3366 junction box.
88009-25	Bubbler AV sensor with bare leads with 25 ft. cable Requires 3366 junction box.
88009-50	Bubbler AV sensor with bare leads with 50 ft. cable Requires 3366 junction box.
88009-100	Bubbler AV sensor with bare leads with 100 ft. cable Requires 3366 junction box.

Cable and Junctions Boxes

Prod. No.	Description
3722	Cable for velocity sensor (per ft.) Maximum length is 300 ft.
9708000	Velocity cable (per ft.) Minimum length is 10 ft., maximum is 100 ft.
2716	Ultrasonic sensor cable (per ft.) Maximum length 50 ft. Consult factory for greater distances.
5245100	Ultrasonic sensor cable (per ft.) For use with 5233-05 sensor. Maximum length is 100 ft.
9702300	Ultrasonic sensor cable (per ft.) Minimum length is 10 ft., max. length is 500 ft.
3232	Coax cable, 2 pair, AV (per ft.)
4924	Junction box for velocity probes with bare leads
3658	Junction box for ultrasonic sensor conduit installations
3366	Junction box for bubbler depth/velocity probes 6 pin

Flow Meter Packages



910 Bundle Prod. No. 4900910



920 Bundle Prod. No. 4850921



950 Bundle Prod. No. 3248950



950 Bundle Prod. No. 3959952

Sigma Model 910 Package

Prod. No.	Description
4900910	Includes: (1) Sigma 910 flow meter (Prod. No. 4900) (1) Submerged AV sensor with 30 ft. cable (Prod. No. 77065-030) (1) Suspension harness (Prod. No. 4920)

Sigma Model 920 Packages

Prod. No.	Description
4850921	Includes: (1) Sigma 920 flow meter (Prod. No. 4850) (2) Submerged AV sensors with 30 ft. cables (Prod. No. 77065-030) (1) Input for additional submerged AV sensor (Prod. No. 4883)
4850922	Includes: (1) Sigma 920 flow meter (Prod. No. 4850) (1) Input for 75 kHz ultrasonic sensor (Prod. No. 4869) (1) Submerged AV sensor with 30 ft. cable (Prod. No. 77065-030) (1) 75 kHz in-pipe ultrasonic sensor (Prod. No. 3702-01) (25) Ft. cable (Prod. No. 2716)

Sigma Model 950 Packages

Prod. No.	Description
3672950	Includes: (1) 950 bubbler flow meter (Prod. No. 2672) (1) 25 ft. tubing (Prod. No. 2929)
3680950	Includes: (1) 950 submerged pressure flow meter (Prod. No. 2680) (1) Submerged depth sensor with 25 ft. sensor cable (Prod. No. 2963)
3286951	Includes: (1) 950 75 kHz ultrasonic flow meter (Prod. No. 3286) (1) 75 kHz downlooking ultrasonic sensor (Prod. No. 1176-01) (25) Ft. cable (Prod. No. 2716)
3286952	Includes: (1) 950 75 kHz ultrasonic flow meter (Prod. No. 3286) (1) 75 kHz in-pipe ultrasonic sensor (Prod. No. 3702-01) (25) Ft. cable (Prod. No. 2716)
3248950	Includes: (1) 950 AV bubbler flow meter (Prod. No. 3248) (1) Bubbler AV sensor (Prod. No. 88007) (25) Ft. cable (Prod. No. 3232)
3522950	Includes: (1) 950 AV submerged flow meter (Prod. No. 3522) (1) Submerged AV sensor with 30 ft. cable (Prod. No. 77065-030)
3959951	Includes: (1) 950 AV 75 kHz ultrasonic flow meter (Prod. No. 3959) (1) 75 kHz downlooking ultrasonic sensor (Prod. No. 1176-01) (25) Ft. cable (Prod. No. 2716) (1) Low profile velocity sensor with connector (Prod. No. 88006) (1) 25 ft. cable (Prod. No. 3722)
3959952	Includes: (1) 950 AV 75 kHz ultrasonic flow meter (Prod. No. 3959) (1) 75 kHz in-pipe ultrasonic sensor (Prod. No. 3702-01) (25) Ft. cable (Prod. No. 2716) (1) Low profile velocity sensor with connector (Prod. No. 88006) (1) 25 ft. cable (Prod. No. 3722)

Flo-Center™ Data Management and Analysis Software for Sigma Series Flow Meters

- One software solution that allows you to quickly analyze flow meter data
- Manage, merge, edit, and share data
- Create professional reports and graphs
- Multi-channel editing and recalculation in one easy step
- Advanced SQL data base design
- Windows-type wizards allow for simplified report and graphing configuration

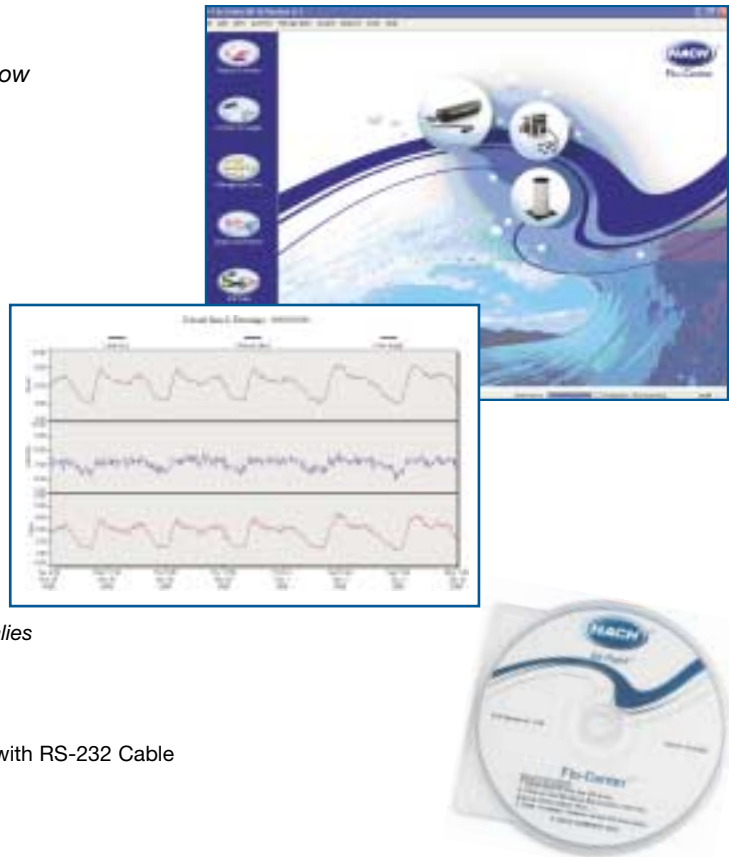
The Hach Sigma Flo-Center analysis software lets you quickly and easily set up your Hach Sigma data logger, download data, and turn it into useful information.

- Designed to minimize the time it takes to analyze flow data
- Pull-down menus and a quick-click toolbar allows even inexperienced users to quickly learn the program
- Import flow, rain, and water quality data from Hach InSight and Vision software as well as CSV files
- Installation wizard makes loading Flo-Center a snap
- Data editing enables you to correct for site or equipment anomalies
- Software support from flow specialists

Prod. No. Description

- 8764300** Flo-Center Data Management and Analysis Software
- 8764500** Flo-Center Data Management and Analysis Software with RS-232 Cable
- 8764600** Flo-Center Data Management and Analysis Software with RS-232 Cable and USB Flash Drive

Consult factory for Insight Software option.



Rain Gauge or Rain Gauge with Rain Logger

Built to National Weather Service standards, the Rain Gauge accurately measures rainfall in 0.01" increments. The rain gauge can be connected to a Hach Sigma Model Flow Meter, or the Rain Logger can be used for stand-alone or long-term rainfall recording, as well as for portable use in stormwater runoff monitoring.

Prod. No. Description

- 2459** Rain Gauge with tipping bucket, bubble depth, depth adjust and base mounting plate
- 2390** Rainlogger, includes 9 Vdc battery
- 2391** Rain Reader, 115 Vac Includes power adapter and rain reader/logger cradle
- 4339** Rain Reader, 230 Vac Includes power adapter and rain reader/logger cradle
- 3638** Remote Rainlogger, requires 2149 Rain Gauge
- 2149** Rain Gauge with 25 ft. cable and mounting base plate, for use with 3638 Remote Rainlogger



Mounting Hardware—Sigma

Prod. No. Description

MOUNTING BANDS

- 9706100** For 15" pipe
- 9706200** For 18" pipe
- 9706300** For 21" pipe
- 9706400** For 24" pipe
- 9706500** For 27" pipe
- 9706600** For 30" pipe
- 9706700** For 33" pipe
- 9706800** For 36" pipe
- 9706900** For 42" pipe

Mounting bands require a sensor mounting clip. Choose from items below.

Prod. No. Description

- 3868** For In-Pipe Ultrasonic Sensors
- 3263** For Low Profile Velocity Sensors (not required for Submerged AV Sensors)
- 2899** For Bubbler
- 1771** For Submerged Depth Sensor

Marsh-McBirney Flo-Dar™ Radar Velocity Flow Meter

Flow Products

The Flo-Dar Flow Meter offers accurate, non-contact flow monitoring.



Accurate Flow Measurement

Flo-Dar provides the user with highly accurate flow measurements under a wide range of flows and site conditions. By measuring the velocity of the fluid from above, Flo-Dar eliminates accuracy problems inherent with submerged sensors including sensor disturbances, high solids content and distribution of reflectors.

Non-Contact Sensor

Data is not prone to fouling errors as the sensor does not contact the fluid and does not accumulate any debris.

Easy Installation and Maintenance

As the sensor is mounted above the flow, personnel have no contact with the flow during installation, and maintenance caused by sensor fouling is eliminated. A sensor re-installation/retrieval tool is available for street-level work eliminating the risk and expense of confined space entry.

Available with Optional Surge Velocity Sensor

During "surcharge events," Flo-Dar's optional electromagnetic sensor will continue to provide uninterrupted and accurate flow monitoring through dry and wet weather flows without the need for routine cleaning or maintenance.

Remote Communications Model Available

The XT Remote Communications Flow Meter provides the versatility of integrated modem technology for reliable, cost-effective wireless flow monitoring for long term/permanent flow studies or temporary installations in inaccessible locations. Users have the flexibility to choose how their data is hosted—Hach's secure server, third party, or their facility.

Note: Requires Flo-Ware for Windows software—the user on-site set-up, data management, and report generation software.

Ideal for:

- Long Term or Permanent Flow Studies
- Sanitary Sewer Evaluation Studies
- CSO Studies and Monitoring
- NPDES Stormwater Compliance
- Industrial Compliance Monitoring

Contact factory for pricing.

The Marsh-McBirney Flo-Dar Open Channel Flow Meter provides a revolutionary approach to open channel flow monitoring



For more information, call to request Literature #2608 for Portable DC Powered Applications, #2616 for Permanent AC/DC Powered Applications, #2617 for Remote Communications Applications, or visit www.hachflow.com

Specifications*

FLO-DAR SENSOR (Without SVS)

Enclosure

IP 68 Waterproof rating, Polystyrene

Dimensions

160.5 W x 432.2 L x 297 D mm (6.32 x 16.66 x 11.7 in.), with SVS, D = 387 mm (15.2 in.)

Weight

4.8 kg (10.5 lbs.)

Operating Temperature

-10 to 50°C (14 to 122°F)

Storage Temperature

-40 to 60°C (-40 to 140°F)

Power Requirements

Supplied by Flo-Logger

Interconnecting Cable

-Disconnectable at both sensor and logger

Polyurethane, 0.400 (±0.015) in. diameter; IP68 Standard length 9M (30 ft), maximum 305 m (1000 ft)

Certification

FCC Rules Part 15, Subpart C; Industry Canada RS-S210 (No user license required)

SURCHARGE DEPTH MEASUREMENT

Auto zero function maintains zero error below 0.5 cm (0.2 in.)

Method

Piezo-resistive pressure transducer with stainless steel diaphragm

Range

3.5 m (138 in.), overpressure rating 2.5 x full scale

VELOCITY MEASUREMENT

Method

Radar

Range

0.23 to 6.10 m/s (0.75 to 20 ft/s)

Frequency Range

24.075 to 24.175 G-Hz, 15.2mW (max.)

Accuracy

±0.5%; ±0.03 m/s (±0.1 ft/s)

DEPTH MEASUREMENT

Method

Ultrasonic

Standard Operating Range from Flo-Dar Housing to Liquid

0 to 152.4 cm (0 to 60 in.)

Optional Extended Operating Range from Transducer Face to Liquid

0 to 6.1 m (0 to 20 ft.) with 43.18 cm (17 in.) dead band, temperature compensated.

Accuracy

±1%; ±0.25 cm (±0.1 in.)

FLOW MEASUREMENT

Method

Based on Continuity Equation

Accuracy

±5% of reading typical where flow is in a channel with uniform flow conditions and is not surcharged, ±1% full scale max.

SURCHARGE CONDITIONS DEPTH/VELOCITY DEPTH (Std with Flo-Dar Sensor)

Surcharge depth supplied by Flo-Dar sensor.

VELOCITY

(Optional Surcharge Velocity Sensor)

Method

Electromagnetic

Range

±4.8 m/s (±16 ft/s)

Accuracy

±0.15 ft/s or 4% of reading, whichever is greater.

Zero Stability

> ±0.05 ft/s

**Subject to change without notice.*



Marsh-McBirney Flo-Mate™ Portable Flow Meter

Flo-Mate hand-held, battery powered velocity flow meter!

Applications Include:

- Streams & NSIP (National Streamflow Information Program)
- Rivers
- Irrigation Channels
- Weir/Flume Calibration
- Sewers
- Laboratories

Features That Make a Difference:

- Instantaneous readout of flow velocity
- Proven electromagnetic sensor—no moving parts
- Water resistant electronics
- Data Storage/Recall automates data collection
- Lightweight, battery powered, rugged field design
- Direct replacement for USGS type mechanical meters
- Optional disconnectable sensor available



The Marsh-McBirney Flo-Mate Model 2000 is a hand-held, battery powered instantaneous velocity meter. Standard Model 2000 includes: water resistant electronics case; electromagnetic velocity sensor; 20 feet of sensor cable; shoulder strap; universal sensor mount; fabric carrying case; and instruction manual.

Prod. No.	Description
Model 2000-11	Hand-held velocity meter with <u>non-disconnectable</u> sensor cable
Model 2000-51	Hand-held velocity meter with <u>disconnectable</u> sensor cable
75002	Standard Wading Rod Kit, English consists of four 2-ft. long sections marked in tenth ft. increments, double end hanger and base plate

GSA pricing available.

For more information, call to request Literature #2636, or visit www.hachflow.com

Marsh-McBirney Flo-Tote™ 3 Electromagnetic Flow Meter

Electromagnetic flow meter for long-term and temporary monitoring of sewers and other open channels.

Applications Include:

- Wastewater/Storm Sewers
- Inflow/Infiltration Studies
- Modeling/Sewer System Evaluation
- EPA Permitting Requirements
- Combined Sewer Overflow (CSO Monitoring)
- Wastewater Treatment Plant Balancing

Customer Requested Features Include:

- Disconnectable Electromagnetic Sensor
- Compact Size
- Increased Data Storage
- Long Battery Life

Contact factory for pricing.
Consult factory for Insight Software option.



The flow industry standard redesigned to include an array of customer requested features.

For more information, call to request Literature #2618 for Portable DC Powered Applications or #2619 for Permanent AC/DC Powered Applications, or visit www.hachflow.com

Hach Model U53 Analyzer & Ultrasonic Sensor

Designed to give highly accurate flow and depth measurement using ultrasonic sensor technology.



Reliable and cost-effective solution for measuring flow and depth, using proven Ultrasonic pulse echo technology.

- Built-in gauging library for most flumes and weirs
- Pulse echo technology
- Automatic temperature compensation
- Requires no routine maintenance
- Multiple language capability

The Model U53 depth and flow monitor has a simple menu-driven system to guide the user through operation sequences and provides reliable and cost effective flow monitoring. A large range of pre-programmed flow structures or user-entered table for custom built structures makes the U53 an invaluable tool for non-intrusive monitoring of open channels.

Flow measurements can be viewed directly on the display or output to a chart recorder, data logger, or remote SCADA system via the two current outputs. Four user-configurable relays allow links to be made with external equipment for total site and process control. The U53 also has a choice of simple calibration routines for high levels of accuracy and ease of use.

The Model U53 can be used for flow and depth control in a variety of applications including monitoring of storm water, inlet flow, final effluent and activated sludge. It is also ideal for use in consent limit monitoring and works control.

Principal of Operation

The Model U53 can be operational in minutes—the user simply selects the primary gauging structure form from the library of flumes and weirs, and enters the setup parameters at the screen prompts. The instrument automatically calculates flow using specified formulae. Alternatively, the user can enter a flow curve for any non-standard structure.

The ultrasonic sensor associated with the U53 requires no maintenance and is designed to provide years of uninterrupted service. In order to minimize temperature effects, it has a short blocking distance of less than 10 inches (250 mm) that allows the sensor to be installed close to the water surface.

Specifications*

Dimensions

14.62" H x 11.88" W x 8.26" D (37.1 cm x 30.2 cm x 21 cm)

Weight

4.6 lbs. (2.08 kg) analyzer and sensor

Enclosure Material

ABS, UV resistant, stable from -40° to 176°F (-40°C to 80°C)

Enclosure Rating

NEMA 4X, IP66 with front cover closed, UV resistant

Mounting

Wall mount and Rail/Pole mount

Graphics Display

Backlit liquid crystal display (LCD). 8 line x 40 character in text mode, 64 x 240 pixels in graphics mode. Displays depth vs. time, flow vs. time, rainfall vs. time, pH and temperature

Keypad

19 position sealed membrane switch including 4 "soft keys", functions defined by display

Totalizers

8-digit resettable and 8-digit non-resettable LCD software totalizer

Totalized Flow

gal., ft.³, acre-ft., lit., m³

*Subject to change without notice.

Prod. No.

U53A4A1N

Description

U53 Permanent Ultrasonic Flow Meter Includes 4 electromechanical relays and is housed in an 1/2 DIN, NEMA 4X enclosure with hardware for panel, surface or pipe mounting.

U53S010

Ultrasonic Sensor, 10 ft. cable

U53S030

Ultrasonic Sensor, 30 ft. cable

U53S100

Ultrasonic Sensor, 100 ft. cable

3004A0017-001

Sensor mounting hardware: Floor or wall adjustable mounting bracket to mount ultrasonic sensor in an open channel or flume without structures to mount the sensor

76A4010-001

NEMA 4X junction box

1W1127

Interconnect cable (per ft.)

1000G3088-001

Sun shield for U53 controller

For more information, call to request Literature #G507, or visit www.hachflow.com