Flow

Sigma 920 Area Velocity Flow Meter

The Sigma 920 Area Velocity Flow meter can be used in portable or permanent applications. Measure level and velocity independently in two channels or velocity in one and level in the other. Housed in rugged yet ergonomic watertight enclosure (NEMA 6P) measuring only 7 x 18 inches. Available with submerged pressure transducer/velocity sensor or in-pipe ultrasonic depth sensor combined with a "wafer-thin" velocity sensor that provides greater accuracy in shallow flows.

Features and Benefits

Made for Submergence and Prolonged Surcharge Conditions

The rugged housing of the Sigma 920 Area Velocity Flow Meter is NEMA 6P sealed to withstand submergence and prolonged surcharge conditions. A low power draw creates an extended 90-day battery life. Its size makes it portable and provides for easy storage and fit in a variety of applications such as sewer and storm water monitoring.

Advanced Technology for Accuracy

The technology used in the Sigma 920 flow meter automatically corrects the effect of temperature on level measurement for a higher level of accuracy. With built in sampler pacing capabilities, it is ideal for CSO and storm water studies.

Advanced, ultrasonic one-MHz Doppler sensor technology avoids signal dropouts and ensures—without the need for on-site calibration—high levels of accuracy in low-flow, full-pipe, or reversed-flow conditions. The patented* "Drawdown Correction" feature corrects the effects of velocity on accurate level measurement.

*Patent U55691914

### Versatile Features and Options

The optional rainfall logging feature of the Sigma 920 flow meter records and characterizes rain events—a true innovation in water monitoring. Use the optional internal modem to automate data retrieval, paging, and reporting. And with multiple sensor options, this meter can be used for redundancy, averaging, and multiple pipe monitoring.

Simple and Reliable Velocity Sensor

The Submersible Area Velocity Sensor used with the Sigma 920 flow meter is accurate and reliable for maximum versatility for most open channel applications. It installs quickly and easily with no velocity calibration required. The hydrodynamic body and side-mounted cable also maintains accuracy by reducing turbulence along the sensor body. Noryl sensor housing dramatically improves sensor robustness and integrity. Single point calibration (atmospheric) makes calibration quick and accurate.

Applications

The Sigma 920 Area Velocity Flow Meter is ideal for short-term flow studies, sanitary sewer evaluation studies, CSO studies and monitoring, and NPDES stormwater compliance.
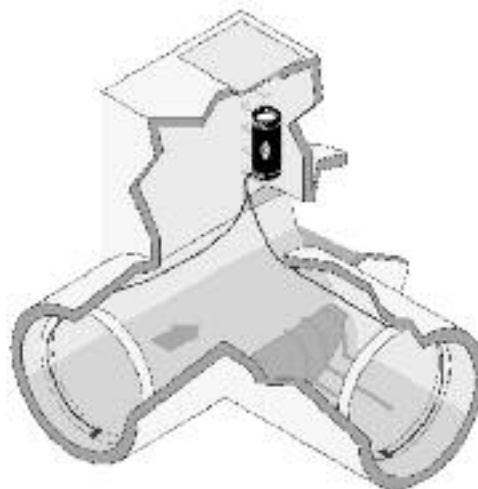
WW

IW

C

HACH ®

Be Right™

Specifications*

920 Flow Meter

Units of Measurement
Level: m, cm, ft., in.

Flow: gps, gpm, gph, lps, lpm, lph, mgd, afd, cfs, cfm, cfh, cfd, m^3s, m^3m, m^3h, m^3d

Totalized Flow: L, m^3, 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 (optional)
Capacity: 240 days of 2 level, 2 velocity readings, and rainfall at 15-minute recording intervals

Data Types: Level, velocity, and rainfall

Storage Mode: Wrap or slate

Sampler Output Conditions (optional)
Set point on level, 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 Sigma 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 alkaline lantern 6 Vdc batteries or external AC power source

Battery Life
90 days typical (with 15-minute recording interval, 1 level 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

Submerged Depth/Velocity (AV) Sensor

VELOCITY MEASUREMENT

Range
-1.52 to 6.10 m/s (-5 to 20 ft./s)

Zero Stability
0.015 m/s (<0.05 ft./s)

Accuracy
±2% of reading

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

Typical Minimum Depth for Velocity
2 cm (0.8 in.)

Method
Doppler ultrasonic

Transducer Type
Twin 1 MHz piezoelectric crystals

DEPTH MEASUREMENT

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

Accuracy
±0.16% full scale ±1.5% of reading at constant temp (±2.5°C)

±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)

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

Air Intake
Atmospheric pressure reference is desiccant protected

Method
Pressure transducer with stainless steel diaphragm

GENERAL

Material
Noryl® plastic outer shell with epoxy potting

Cable
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.)

Sensor Dimensions
2.3 x 3.8 x 13.5 cm (0.9 x 1.5 x 5.3 in.)

Optional Velocity Sensor Accuracy and In-Pipe Ultrasonic Depth

VELOCITY MEASUREMENT

Nose Angle
20 degrees from horizontal

Cable Length
Standard: 7.6 m (25 ft.)
Custom: to 76 m (250 ft.)

Cable Diameter
0.57 cm (0.225 in.)

Materials
Sensor: polymer
Cable: urethane
Mounting hardware: stainless steel

Dimensions
1.12 x 3.81 x 6.86 cm (0.44 x 1.5 x 2.7 in.)

ULTRASONIC DEPTH MEASUREMENT (IN-PIPE)

Range
Distance from sensor to liquid:
0 to 3.35 m (0 to 11 ft.)

Accuracy
0.038 to 4.57 m ±0.003 m (0.125 to 15 ft. ±0.01 ft.) at 22°C (72°F) still air, 40 to 70% relative humidity

Span
0.038 to 4.57 m (0.125 to 15 ft.)

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

Temperature Error
±0.00005 m/°C (±0.0001 ft./°F) maximum error within compensated temperature range per degree of change

Resolution: .0075", (.019 cm)

Material
Stainless steel housing with PVC acoustic window

Cable
4 conductors

Cable Length
Standard: 7.6 m (25 ft.) 305 m (1,000 ft.) using RS-485 two-wire remote sensor option

Crystal Specification
75 KHz, 7° beam angle

Dimensions
3.81 cm diameter x 30 cm (1.5 in. diameter x 12 in.)

Specifications subject to change without notice.

Engineering Specifications

920 Flow Meter

1. The flow meter system shall consist of a flow meter and a submerged depth/velocity sensor.

2. The flow meter shall be capable of storing at least 116,000 data points (240 days at 15-minute logging intervals of two level, two velocity, and rainfall).

3. Slate and wrap-around data storage shall be field selectable. Once programmed, the meter with software shall display the total time available for data logging. For fast data retrieval, the flow meter shall have an RS232 serial interface port with data transfer via modem at 19,200 baud to any IBM compatible PC operating Hach software.

4. Logging intervals shall be 1, 2, 3, 5, 6, 10, 12, 15, 20, 30 and 60-minute intervals. The meter shall log data at logical times automatically, i.e. 5 minute intervals at 0:00, 0:05, 0:10, etc. Battery voltage shall be logged as a separate parameter.

5. The meter shall operate 90 days at 15-minute logging intervals of level/flow and velocity including weekly data download utilizing two 6-volt alkaline lantern batteries.

6. The meter shall communicate with a computer using a serial connection and Modbus to allow integration to SCADA Systems or optional phone modem

7. The meter shall include a rain gauge input to accept contact closures from a tipping bucket rain gauge with 0.01-in. increments.

8. The meter shall include a sampler pacing output consisting of a 6-12V DC pulse, 10 mA maximum, 500 ms duration.

9. The method of velocity measurement shall be Doppler ultrasonic.

10. The sensor shall be equipped with level drawdown correction to compensate for the effects of velocity in depth measurement accuracy.

11. The flow meter housing shall be made of NEMA 6P (IP67) PVC sealed to withstand submergence and prolonged surcharge conditions.

12. The flow meter shall be capable of reporting in the following units:
   a. Level; m, cm, ft., in.
   b. Flow; gps, gpm, gph, lps, lpm, lph, mgd, afd, cfs, cfm, cfh, cfd, m^3s, m^3m, m^3h, m^3d.
   c. Totalized flow; L, m^3, ft. ^{3}, gal., acre-ft.

13. Exterior dimensions shall not exceed 6-5/8 inches diameter and 17-5/8 inches length. The meter shall not exceed 16.5 lbs.

14. The flow meter shall be the Sigma Model 920 Area Velocity Flow Meter manufactured by Hach Company.

Submerged Depth/Velocity (AV) Sensor

1. The sensor shall be capable of directly measuring average velocity.

2. The method of velocity measurement shall employ transducer type that is twin 1-MHz piezoelectric crystals.

3. The method of depth measurement shall be pressure transducer with stainless steel diaphragm.

4. Velocity range shall be -1.52 to 6.10 m/s (-5 to 20 ft./s)

5. The range of depth measurement shall be 0 to 3 m (0 to 10 ft.), standard, and 0 to 9 m (0 to 30 ft.), extended.

6. The body material of the sensor shall be Noryl® plastic outer shell with epoxy potting.

7. The connector of the sensor shall be hard anodized and satisfy Military Spec 5015.

8. Power consumption of the sensor shall be less than or equal to 1.2 W at 12 Vdc.

9. The sensor shall be the Sigma AV Sensor Flow Sensor manufactured by Hach Company.

Dimensions

The Sigma 920 Area Velocity Flow Meter should not be used in hazardous locations where combustible gases may be present. Mount the meter so that the connectors face down. When not in use, cover the connectors with their protective caps to prevent corrosion. Always use the appropriate manhole support bracket/spanner bar.

16.8 cm (6.625")   44.7 cm (17.625")

Ordering Information

Flow Meter

4850   Sigma 920 Area Velocity Flow Meter with two 3667-lantern batteries. *(The meter can accommodate one additional AV sensor or one ultrasonic sensor. Each AV receptacle accommodates one sensor or one low profile velocity sensor.)*

Complete Flow Meter Systems

4850921   Sigma 920 Area Velocity Flow Meter Bundle; includes Sigma 920 flow meter, two submerged AV sensors, and 30-ft cable for each sensor

4850922   Sigma 920 Area Velocity Flow Meter Bundle; includes Sigma 920 flow meter, one in-pipe ultrasonic sensor with 25-ft. cable, and one velocity only sensor with 25-ft. cable

Optional Flow Meter Sensor Configurations

4883   Input; for additional submerged AV or low profile velocity sensor

4869   Input; for 75 kHz ultrasonic sensor

Sensors

Non-oil Filled Standard Submerged Depth/Velocity (AV) Sensors (0 to 10 ft. range)

77065-030   With 30 ft. cable & connector
77065-050   With 50 ft. cable & connector
77065-075   With 75 ft. cable & connector
77065-100   With 100 ft. cable & connector

Oil Filled Standard Submerged Depth/Velocity (AV) Sensors (0 to 10 ft. range)

77064-030   With 30 ft. cable & connector
77064-050   With 50 ft. cable & connector
77064-075   With 75 ft. cable & connector
77064-100   With 100 ft. cable & connector

Down-looking 75 KHz Ultrasonic Level Sensor

1176-01   With connector
1176-03   With bare leads

In-pipe 75 KHz Ultrasonic Level Sensor

3702-01   With connector
3702-02   With bare leads

Sensor Mounting Hardware

Spring Rings

1361   For 6-in. diameter pipe
1362   For 8-in. diameter pipe
1363   For 10-in. diameter pipe
1364   For 12-in. diameter pipe

Miscellaneous

3263   Sensor Mounting Clip; for 88000, wafer velocity, and bubbler level velocity sensors
3305   Velocity Sensor Mounting Plate
9574   Insertion Tool for Non-confined Space Entry
2974   Permanent Wall Mount Bracket; for down-looking ultrasonic sensor.
2904   Floor or Wall Adjustable Mounting Bracket; for down-looking ultrasonic sensor
9538   Tripod Mounting Bracket; for down-looking ultrasonic sensor.
2883   Cable Straightner; for down-looking ultrasonic sensor
3183   Cable Grip; for down-looking ultrasonic sensor

Cables and Interfaces

3513   DTU-to-PC Cable; 115 Vac
3580   DTU-to-PC Cable; 230 Vac
1727   Sampler or Flow Meter to PC Cable
3358   RS232 Extension Cable

Accessories

8764300   Flo-Center Software CD Only
8764500   Flo-Center Software CD with RS232
8764600   Flo-Center Software CD with RS232 and USB
5254   Insight Software (free of charge)
7724700   Silicon Oil; dual 50-ml pack (refills 100 sensors)
7724800   Silicon Oil Refill Kit; includes dispensing tool and oil packs.
7730000   Retrofit Kit (converts non oil-filled to oil-filled); includes kit Silicon Oil Refill Kit
8713200   Solar Module; with 10-Watt panel and power regulator assembly
8713300   Solar Module; with 20-Watt panel and power regulator assembly

At Hach, it's about learning from our customers and providing the right answers. It's more than ensuring the quality of water—it's about ensuring the quality of life. When it comes to the things that touch our lives...

Keep it pure.

Make it simple.

Be right.

For current price information, technical support, and ordering assistance, contact the Hach office or distributor serving your area.

In the United States, Canada, Latin America, sub-Saharan Africa, Asia, Australia/New Zealand, and U.S. exporters, contact:

HACH/MARSH-McBIRNEY
FLOW METER SUPPORT CENTER
4539 Metropolitan Court
Frederick, MD 21704-9452
U.S.A.
Telephone: 800-368-2723
Fax: 301-874-8459
E-mail: orders@marsh-mcbirney.com
www.marsh-mcbirney.com

In Europe, the Middle East, and Mediterranean Africa, contact:

HACH LANGE GmbH
Willstätterstraße 11
D-40549 Düsseldorf
GERMANY
Tel: +49 (0) 211 5288-0
Fax: +49 (0) 211 5288-143
E-mail: info@hach-lange.de
www.hach-lange.com

HACH®

Be Right™