Hach Sigma 980 Permanent Open Channel Flow Meter

Hach Sigma 980 Permanent Open Channel Flow Meter is a permanent, A/C powered, wall-mounted meter with three different level/flow sensing technologies and easy-to-read graphic display.

Features and Benefits

Three Different Level/Flow Sensing Technologies

The Hach Sigma 980 Permanent Open Channel Flow Meter has been designed to use three different sensing technologies to make it appropriate for most flow situations. Technologies include non-contacting ultrasonic, submerged pressure, and Doppler velocity.

Advanced Monitoring and Control

Use the Sigma 980 flow meter to also monitor rainfall and several water quality parameters including level, pH, temperature, and more. Process measurement and control is bundled in one simple unit with available input/output controls—seven standard analog inputs and four user-assigned relays for set points and alarms. Consolidate 4-20 outputs from other monitoring equipment into a standard format. Use it to pace samplers or other equipment in proportion to flow.

Large, Easy-to-Use Interface

The unique backlit display provides easy review of graphs of any logged channel for any time period up to one day or review of minimum, maximum, and total flow values of any logged channel in hourly, daily, or other intervals. The Sigma 980 flow meter also features a sealed-membrane switch keypad and audio signal confirmation of keystrokes. Generate charts, graphs, and reports with Hach's software package.

Data Logging and Built-in Flow Equations

The Sigma 980 flow meter provides a minimum of 396 days of three channels of user-selected readings at 15-minute intervals. Up to 300 events can be recorded. Flow equations are built in—simply select the primary device or use the Manning Equation. For custom applications, enter up to 99 head-versus-flow data points.

Applications

Hach Sigma 980 Permanent Open Channel Flow Meter

- *Surcharge flows*
- *Reversed flow conditions*
- *Weirs and flumes*
- *Small to large channels*

Specifications*

Flow Meter Specifications

Units of Measurement
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.

Primary Devices
Flumes: Parshall, Palmer Bowlus, Leopold-Lagco, H, HL, HS, trapezoidal
Weirs: Compound V-notch (15 to 120°) contracted/non-contracted rectangular, Thel-Mar, compound Cipolletti
Manning Equation: Round, U and rectangular trapezoidal channels
Head vs. Flow: Two independent user-entered, look-up tables (up to 100 points)
Level Only: in., ft., cm, m
Area Velocity: Level-area table, circular pipe, U-shaped channel, trapezoidal channel, rectangular channel
Power Equation: $Q = K\ 1\ H; n^1 \pm K\ 2\ H\ n^2$

Operating Temperature
-20 to 50°C (-4 to 122°F)

Storage Temperature
-20 to 70°C (-4 to 158°F)

Humidity
0 to 90%, non-condensing

Time-Based Accuracy
±6 seconds (0.007%) per day

Totalizers
8-digit resettable and 8-digit non-resettable software

Graphics Display
Backlit LCD
Auto-off when not in use
ASCII 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: level vs. time, flow vs. time
Optional Displays: rainfall, pH, ORP, temperature, DO, conductivity vs. time, sampler events, and alarm events

Keypad
19 position sealed membrane switch
Four “soft keys”, functions defined by display

Data Storage
Capacity: Up to 456k bytes (396 days of three channels user selected readings at 15 minute intervals plus 300 events)
Data Points: 116,000 data points
Daily Statistics: Available for up to 32 days
Monitoring Intervals: 1, 2, 3, 5, 15, 30 or 60-minute intervals
Memory Mode: Wrap-around

Sampler Output
15 Vdc, 100 mA at 500 ms duration

Enclosure Material
ABS, UV resistant

Enclosure Rating
NEMA 4X, IP66 with front cover closed

Mounting
Wall, rail/pole

Power Source
Requirements: 100 to 230 Vac, 50/60 Hz, single phase, 15 W maximum, 0.25 amp maximum
Installation Category: II
Connection: Seven 0.5-in. hubs, one 1.0-in hub
Relay Contact Ratings: 5 amps, 30 to 230 AC

Dimensions
37.1 x 30.2 x 21.0 cm (14.6 x 11.9 x 8.3 in.)

Weight
7.6 kg (16.8 lbs.)

Sensor Specifications

ULTRASONIC TRANSDUCER

Frequency
75 kHz

Beam Angle
±12° (-10 dB)

Range
11.5 in. to 10.7 ft. at 20°C, still air, ideal target, 50 ft. cable

Accuracy
±0.03 ft. over 2-ft. change in head at 20°C, still air, ideal target, 50-ft. cable

Operating Temperature
-20 to 50°C (-4 to 122°F)

Material
PVC housing, acoustic window

Cable
Low-loss cable, coax RG 62/U
Length: 7.6 m (25 ft.) standard; custom to 500 ft. (contact Hach for performance information at custom lengths)

Connection
Bare wire lead connection via terminal blocks

Mounting
Permanent and adjustable mounting brackets

Dimensions
12.7 x 5.7 cm (5.0 x 2.25 in.)

Weight
0.7 kg (1.5 lbs.)

Continued on next page.

Specifications *continued*

VELOCITY SENSOR

Method
Doppler principle

Range
-1.52 to 6.1 m/s (-5 to 20 fps)

Accuracy
±2% of reading

Zero Stability
±1.52 cms (± 0.05 fps)

Resolution
0.3 cm/s (0.01 ft./s)

Response Time
4.8 seconds

Profile Time
4.8 seconds

Mounting
Dedicated mounting rings (mounting clips recommended for pipe diameters 8-in. or less)
Mounting plate (for permanent mounting, drills to pipe wall)
Adjustable mounting band kit

Cable
Urethane sensor cable, shielded
Length: 7.6 m (25 ft.); custom cable lengths up to 100 ft.

Connection
Sensor connector to quick-connect hub or bare leads connection via terminal block

Dimensions
6.9 x 3.8 x 1.1 cm (2.7 x 1.5 x 0.4 in.)

IN-PIPE ULTRASONIC SENSOR

Frequency
75 kHz

Beam Angle
5° (-10 dB)

Range
Distance from Liquid Sensor: 0.64 in. to 13.5 ft. at 20°C, still air, ideal target, 50 ft. cable

Accuracy
±0.014 ft. for sensor-to-liquid distance between 2.86 in. and 13.5 ft. ±1 ft. change in head from calibration point, 20°C, still air, ideal target, 50 ft. cable

Operating Temperature
-20 to 60°C (-4 to 140°F)

Material
StatCon A-E ABS plastic

Mounting
Dedicated mounting rings
Permanent mounting bracket (installs directly to pipe wall)
Adjustable mounting band kit

Cable
Low-loss cable, coax cable RG 62/U
Length: 7.6 m (25 ft.) standard, custom lengths up to 500 ft. (contact Hach for performance information at custom lengths)

Connection
Bare lead connection via terminal blocks

Dimensions
4.4 x 31.4 cm (1.75 x 12.4 in.)

SUBMERGED AREA VELOCITY SENSOR

Method
Doppler principle/pressure transducer

VELOCITY

Range
-1.52 to 6.1 m/s (-5 to 20 ft./s)

Accuracy
±2% of reading

Resolution
0.0028 m/s (0.01 ft./s)

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

Response Time
4.8 seconds

Profile Time
4.8 seconds

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

DEPTH

Accuracy
±2% of reading at 10 in. depth

Allowable Level
Maximum 3X over pressure

Operating Temperature
0 to 71°C (32 to 160°F)

Compensated Temperature
0 to 30°C (32 to 86°F)

Temperature Error
0.005 to 3.5 m ±0.0022 m/°C (0.018 to 11.5 ft. ±0.004 ft./°F)
0.005 to 10.5 m ±0.006 m/°C (0.018 to 34.6 ft. ±0.012 ft./°F)
(maximum error within compensated temperature range per degree of change)

Draw Down Correction
0 to 3.05 m/s (0 to 10 ft./s) = 0.085% of reading

Air Intake
Atmospheric pressure reference, desiccant protected

Continued on next page.

Specifications *continued*

GENERAL

Material
Polyurethane body
316 series stainless steel diaphragm

Mounting
Dedicated mounting rings (mounting clips recommended for pipe diameters 8" or less)
Mounting plate (for permanent mounting, screws to pipe wall)
Adjustable mounting band kit

Cable
Urethane sensor cable with air vent, shielded
Length: 7.6 m (25 ft.) standard, custom cable lengths up to 100 ft.

Connection
Sensor connector to quick-connect hub, bare lead connection via terminal block, or bare lead connection to junction box with bare lead junction box via terminal block

Dimensions
12.7 x 3.8 x 2.0 cm (5.0 x 1.5 x 0.8 in.)

Factory Installed Options

NTEGRAL pH METER

Control/Logging
Field selectable to log pH-temperature independent of flow or in conjunction with flow; also controls sample collection in response to value exceeding low/high set points

pH Sensor
Temperature compensated; impact resistant ABS plastic body; combination electrode with porous Teflon® junction

Range
2 to 12 pH

Operating Temperature
-18 to 80°C (0 to 176°F)

Dimensions
1.9 x 15.2 cm (0.75 x 6 in.) with1.9-cm (0.75-in.) MPT cable end

RAIN GAUGE INPUT

For use with Hach Tipping Bucket Rain Gauge.
Flow Meter records rainfall data.
Flow measurement can be initiated based upon field selectable rate of rain.
Each tip = 0.25 mm (0.01 in.) rain
Shielded cable: 100 ft. maximum

ANALOG INPUT DATA-LOGGING CHANNELS

Up to seven additional data-logging channels record data from external source(s).
-4.5 to +4.5 Vdc input with 1 meg-ohm input impedance on each channel and three channels with 4-20 mA input.

4 TO 20 MA OUTPUTS

Two isolated output signals available; user assignable
Resistive Load: 600 ohms maximum
Output Voltage: 24 Vdc; no load

ALARM RELAYS

Four integral alarm relays; form C (common, normally open, normally closed), 5 amp; connection to instrument through terminal blocks
Relay Contact Ratings: 5 amps, 30 to 230 Vac

COMMUNICATIONS

RS-232: up to 19,200 baud
Modem: 14400 bps, V.32 bis, V.42, MNP2-4 error correction; V.42 bis MNP5 data compression. MNP 10-EC Cellular Protocol Pager
SCADA-MODBUS communication protocol (standard) via RS-232 or optional modem

**Specifications subject to change without notice.*

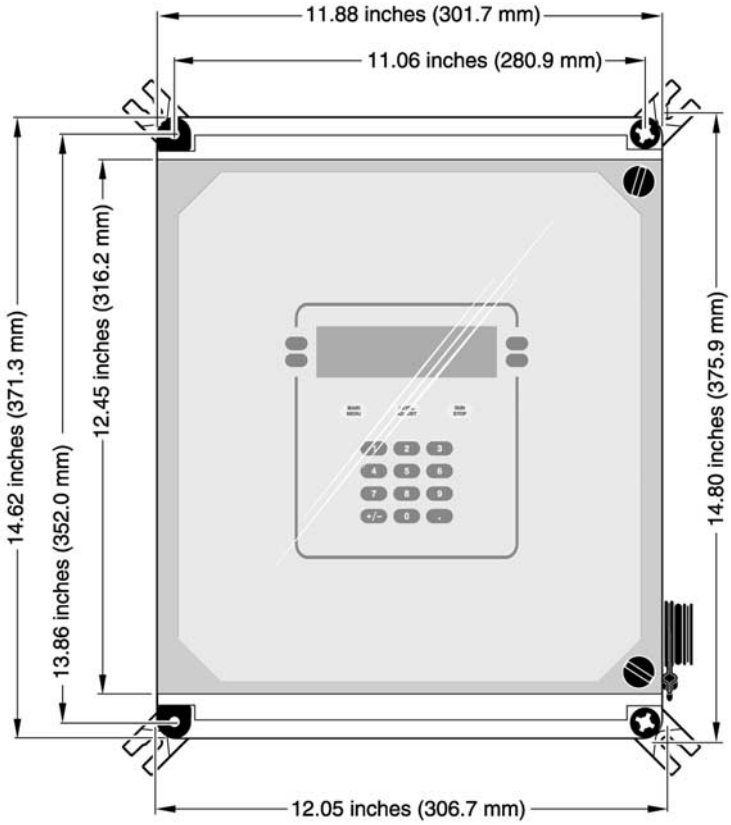
Engineering Specifications

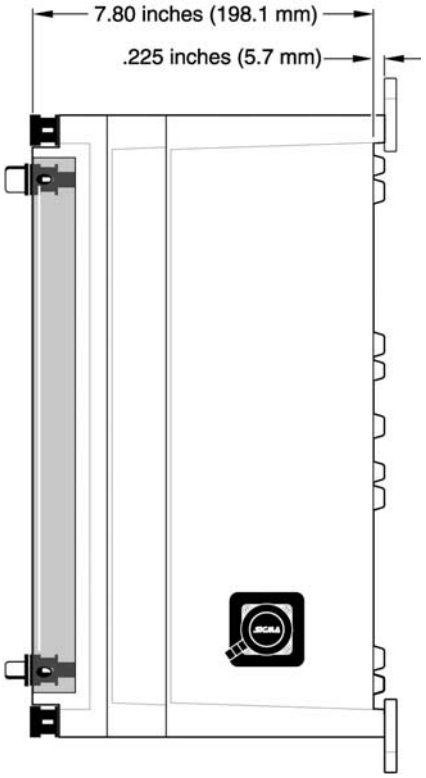
Flow Meter

1. The flow meter shall operate on 100 to 230 Vac power.
2. All electrical components shall be housed in an UV resistant ABS enclosure rated NEMA 4X, IP 66 with front cover closed.
3. The meter shall have an 8 line x 40-character backlit liquid crystal graphics display. In addition to indicating all programming steps and current status such as level, velocity and flow rate, the display shall show all logged data in field selectable tabular and graphics (x-y plot) format.
4. The display shall be capable of displaying instantaneous values for easy viewing of flow and level.
5. All program entries shall be entered via a sealed front panel keypad, and indicated on the front panel display.
6. A personal computer or any other external means shall not be required to program the flow meter.
7. In graphics mode, the display shall have a resolution of 64 x 240 pixels and shall be capable of displaying (depending on the options selected): level vs. time, flow vs. time, rainfall vs. time, sampler event markers, alarm markers and alarm condition indication, pH, and temperature.
8. Flow meter programming/measurements:
   a. The flow meters shall be field programmable for primary devices including:
      i. Weirs: V-notch weirs (any angle from 22.5 to 120 degrees, compound V-notch/rectangular weirs, contracted and non-contracted rectangular weirs, trapezoidal weirs, and Thel-Mar weirs.
      ii. Flumes: Parshall (1 to 144 inch), Palmer Bowlus (4 to 72 inch), trapezoidal (60 degree small, large, and extra large, 45 degree 2 and 12 inch), H. HL, and HS type flumes, and Leopold-Lagco (4 to 72 inch).
      iii. Nozzle: California pipe method; Manning equation for round, U-channel, rectangular, and trapezoidal cross sections; power curve equation.
      iv. Head vs. flow tables: Two tables of up to 99 (head, flow) points per table (tables may be stored in flow meter's memory and retrieved as required).
   b. Field selectable units of measurement shall include:
      i. Level: Inches, feet, centimeters, and meters.
      ii. Flow rate: GPS, GPM, GPH, MGD, AFD, LPS, LPM, LPH, CFS, CFM, CFH, CFD, CMS, CMM, CMH, CMD.
      iii. Total flow: Gallons, cubic feet, acre-feet, liters, and cubic meters.
9. Flow totalizing:
   a. The flow meter shall have two software totalizers, one resettable and the other resettable.
   b. (Optional) The meter shall include a 6-digit non-resettable electro-mechanical totalizer, protected to meet NEMA 4X, 6 standards.
10. Sampler pacing:
    a. The flow meter shall have a 12 Vdc pulse output for pacing an automatic liquid sampler in proportion to flow, with field selectable flow volume between pulses.
    b. The meter shall be capable of initiating a sampler on level, flow rate, and flow rate of change.
11. Integral metering devices (optional):
    a. The meter shall be equipped with an integral pH-temperature/ORP meter. The pH meter shall have a range of 0 to 14 pH with a ±1% resolution over an operating range of 0 to 176 degrees F.
    b. The meter shall be equipped with a rain gauge input. The sampler shall accept contact closure inputs from an external rain gauge.
    c. The meter shall be equipped with seven external analog inputs. The first four channels shall be capable of logging a 4-20 mA current input, and the remaining three channels shall be set up to log -4.5 to +4.5 Vdc voltage input.
12. The flow meter and sensor shall be the Sigma Model 980 Permanent Open Channel Flow Meter manufactured by Hach Company.

Dimensions

Placement of Hach Sigma 980 Permanent Open Channel Flow Meters depends on the suitability of the monitoring site. Select sites that have normalized flow and minimal turbulence. Turbulence can make it difficult to detect an average velocity in the flow stream. Obstructions, vertical drops, pipe bends, and elbows can create turbulence and affect the accuracy of measurements. Mounting options for Sigma 980 flow meters include wall mounting, suspension harness installation, or manhole rung hanger.





Ordering Information

Flow Meter Only

97004-00 Sigma 980 Permanent Flow Meter; includes two 4-20 mA outputs, four internal 5 amp form C relays, seven analog inputs, RS232 data port, sampler output, and wall mounting hardware

Flow Meter Bundles

97000-00 Sigma 980 Permanent Ultrasonic Flow Meter; includes Open Channel Bundle with ultrasonic sensor flow meter, 75 kHz ultrasonic sensor, and 25 ft. cable

97002-00 Sigma 980 Permanent Ultrasonic Flow Meter; includes Open Channel Bundle with submerged AV sensor flow meter, Area Velocity Upgrade, submerged AV sensor, 30 ft. cable, and quick-connect hub for AV sensor

Sensors

97011-00 Downlooking 75 kHz Ultrasonic Sensor

97077-00 In-pipe 75 kHz Ultrasonic Sensor

97078-00 Velocity Sensor with connector

97020-00 Area Velocity Flow Meter Option (required for AV sensor)

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

77065-030 Sigma Submerged AV Sensor; includes 30 ft. cable with connector

77065-050 Sigma Submerged AV Sensor; includes 50 ft. cable with connector

77065-075 Sigma Submerged AV Sensor; includes 75 ft. cable with connector

77065-100 Sigma Submerged AV Sensor; includes 100 ft. cable with connector

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

77064-030 Sigma Submerged AV Sensor; includes 30 ft. cable with connector

77064-050 Sigma Submerged AV Sensor; includes 50 ft. cable with connector

77064-075 Sigma Submerged AV Sensor; includes 75 ft. cable with connector

77064-100 Sigma Submerged AV Sensor; includes 100 ft. cable with connector

Water Quality and Rain Gauge

97083-00 pH Pre-Amp Interface

97081-00 pH-Temperature probe with 25 ft. cable

97084-00 Rain Gauge

Mounting Hardware

Spring Rings

1361 Spring Ring for 6-in. diameter pipe

1362 Spring Ring for 8-in. diameter pipe

1363 Spring Ring for 10-in. diameter pipe

1364 Spring Ring for 12-in. diameter pipe

Miscellaneous

3263 Sensor Mounting Clip for 88000, wafer velocity, and bubbler level velocity sensors

3868 Portable Bracket for in-pipe ultrasonic sensor mounting clip

3875 Permanent In-Pipe Ultrasonic Sensor Mounting Bracket

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 Straightener for down-looking ultrasonic sensor

3183 Cable Grip for down-looking ultrasonic sensor

Cables and Interfaces

1727 Sampler or Flow Meter to PC Cable

3358 RS232 Extension Cable

Accessories

77247-00 Silicon Oil; dual 50-ml pack (refills 100 sensors)

77248-00 Silicon Oil Refill Kit; includes dispensing tool and oil packs

77256-00 Oil-Filled Sub-AV Sensor Kit

77300-00 Retrofit Kit (converts non oil-filled to oil-filled); includes kit Silicon Oil Refill Kit

Complete CSO and stormwater monitoring solutions from Hach...

Sigma 900 Series Portable Samplers

(see Lit. #3405)

Hach Sigma 900 Portable Samplers are made with a molded ABS exterior and a tightly sealed controller that withstands humidity and hostile, corrosive environments. Even with a three-gallon polyethylene bottle installed, it weighs only 28 lbs.

Rain Gauge with Rain Logger

(see Lit. #3423)

Built to National Weather Service standards, the Rain Gauge accurately measures rainfall in 0.01-inch increments. The Rain Logger can be used for stand-alone, long-term rainfall recording or for portable use in storm water runoff monitoring.

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.

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Lit. No. 2546
F63 Printed in U.S.A.

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