

# Marsh-McBirney FLO-TOTE® 3 Electromagnetic Area/Velocity Flow Meter Sensor

FLOW



*The Marsh-McBirney Flo-Tote 3 Flow Meter Sensor, when combined with a Hach FL900 Series Flow Logger, provides an ideal solution for cost-effective portable flow monitoring. (For permanent flow monitoring applications, use with Flo-Station.) Electromagnetic sensor technology provides highly accurate flow measurements.*

WW

## Features and Benefits

The Marsh-McBirney Flo-Tote 3 Electromagnetic Flow Meter Sensor measures both velocity and depth in the same cross-section providing accurate measurements based on the Continuity Equation. Combined with the portable FL900 Flow Logger or permanent Flo-Station, users have an ideal solution for their flow measurement needs.

### Accurate Flow Measurement

Flo-Tote 3 provides the user with highly accurate flow measurements under a wide range of flows and site conditions. The flow accuracy of the Flo-Tote is based upon the accurate measures of both velocity and depth in hydraulic flow labs, as well as under actual sewer conditions. Verification of our specifications by an independent flow laboratory assures you of our commitment to accuracy.

### Disconnectable, Interchangeable and Field Replaceable Sensor

Provides easy maintenance and eliminates meter down time.

### Grease Tolerant Sensor

Grease shedding electrodes allow for reliable data collection even in these difficult environments.

### Q-Stick Band/Sensor Install Tool

Sensor and band can be safely and easily installed from street level with the Q-Stick tool eliminating confined space entry.

### Ideal for a Variety of Open Channel Sizes & Shapes

- Wastewater Sewers- Round, Rectangular, and Odd Shaped
- Storm Sewers
- Creeks, Rivers, and Streams

### Applications

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

IW

C

DW = drinking water WW = wastewater municipal PW = pure water / power  
IW = industrial water E = environmental C = collections FB = food and beverage



Be Right™

## Specifications\*

### FLO-TOTE 3 FLOW METER SENSOR

#### Material

Polyurethane

#### Dimensions

13.6 L x 4.4 W x 2.8 H cm (5.37 L x 1.73 W x 1.10 H in.)

#### Weight

1.1 kg (2.4 lb) with 30 ft cable

#### Operating Temperature

0 to 45°C (32 to 113°F)

#### Storage Temperature

-20 to 52°C (-4 to 125°F)

#### Power Requirements

Supplied by FL900 Logger, Flo-Logger/Logger XT, or Flo-Station

### VELOCITY MEASUREMENT

#### Method

Electromagnetic (Faraday's law)

#### Range

-1.5 to 6.1 m/s (-5 to +20 ft/s)

#### Accuracy

±2% of reading

#### Zero Stability

±0.015 m/s (±0.05 ft/s) at 0 to 3 m/s (0 to 10 ft/s)

#### Resolution

±0.0003 m/s (0.01 ft/s)

### DEPTH MEASUREMENT

#### Method

Submerged pressure transducer

#### Standard Operating Range

10 mm to 3.5 cm (0.4 to 1.38 in.)

Contact the factory for extended ranges.

#### Accuracy

±1% of reading

#### Zero Stability

±0.009 m (±0.03 ft.), for 0 to 3 m (0 to 10 ft.)

Includes non-linearity, hysteresis and velocity effects.

#### Resolution

2.5 mm (0.1 in.)

#### Over Range Protection

2X range

### FLOW MEASUREMENT

#### Method

Conversion of water depth and pipe size to fluid area.

Conversion of local velocity reading to mean velocity.

Multiplication of fluid area by mean velocity to equal flow rate.

#### Conversion Accuracy

±5.0% of reading. Assumes appropriate site calibration coefficient, pipe flowing 10% to 90% full with a level greater than 5.08 cm (2 in.).

### TEMPERATURE MEASUREMENT

#### Method

1 wire digital thermometer

#### Range

-10 to 85°C (14 to 185°F)

#### Accuracy

±2°C (±3.5°F)

### SENSOR CABLE

#### Material

Polyurethane jacketed

#### Length

Available in specified lengths from 30 to 1000 ft.

#### Connectors

To use with portable FL900 Series Logger or Flo-Logger: Sensor with connector end (30 to 1000 ft. lengths)

Sensor with junction box, desiccant hub, sealant/potting kit and connector; allows for usage with conduit (30 to 1000 ft. lengths)

Important Note: The sensor cable assembly with desiccant hub is compatible with either the Marsh McBirney Flo-Logger/Logger XT or the Hach FL900 Series Flow Loggers. When using this cable assembly with the Marsh McBirney Flo-Logger, do not disconnect the desiccant cartridge that is attached to the Flo-Logger itself.

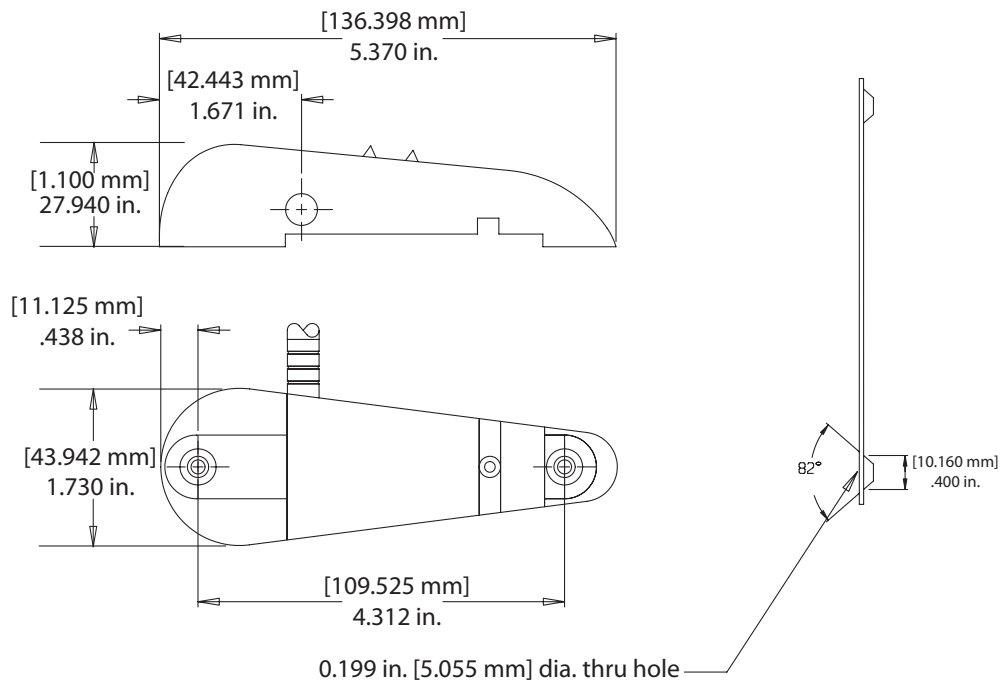
If using Tote 3 cable with Flo-Station, sensor will have bare leads on cable end (30 to 1000 ft. lengths), and there will be no desiccant hub, as the air tube terminates inside of the Flo-Station housing.

 Flo-Tote 3 Electromagnetic Flow Meter Sensor meets CE requirements.

## Engineering Specifications

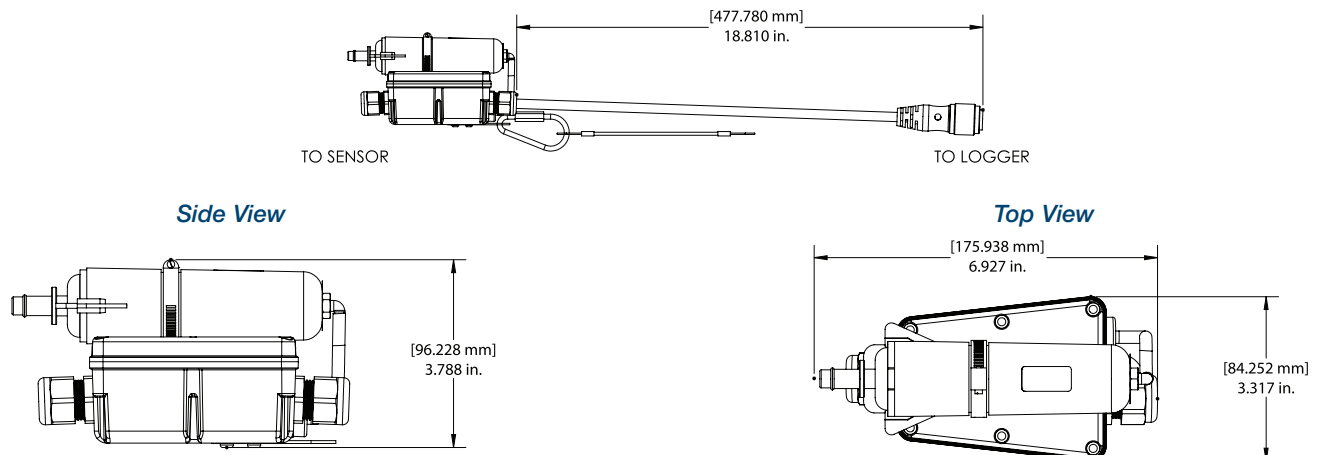
1. The flow meter shall be capable of directly measuring both velocity and depth in the same cross section.
2. The method of measurement shall be electromagnetic.
3. The range of velocity measurement shall be -1.5 to +6.1 m/s (-5 to +20 ft/s)
4. The accuracy of the velocity measurement shall be  $\pm 2\%$  of reading.
5. Zero stability of the velocity measurement shall be  $\pm 0.015$  m/s ( $\pm 0.05$  ft/s) at 0 to 3 m/s (0 to 10 ft/s).
6. The range for depth measurement shall be 10 mm to 3.5 m (0.4 to 138 in.). (Contact the factory for extended ranges.)
7. The accuracy of the depth measurement shall be  $\pm 1\%$  of reading.
8. Zero stability of the depth measurement shall be  $\pm 0.009$  m ( $\pm 0.03$  ft), for 0 to 3 m (0 to 10 ft). Includes non-linearity, hysteresis and velocity effects.
9. The flow sensor shall be the Marsh-McBirney Flo-Tote 3 Open Channel Flow Meter Sensor.

## Dimensions



*Flo-Tote 3 Electromagnetic Flow Meter Sensor*

The desiccant hub assembly includes a junction box to connect sensor cable to the desiccant and subsequently to the FL900 Logger. The desiccant can easily be replaced without need to purchase a separate desiccant module.



*Desiccant Hub Assemblies for use with portable FL900 Series loggers and Flo-Logger.  
(Sensor cable for use with Flo-Station will not contain a desiccant hub and will have bare wires on cable end.)*

## Ordering Information

### Flo-Tote 3 Sensor with Cable

<b>EM9000-XXX*</b>	FL900 Logger, Flo-Logger/Logger XT Includes sensor with cable, sealed desiccant hub and connector to logger.
<b>EMJCTBOXCBL-XXX*</b>	FL900 Logger, Flo-Logger/Logger XT (For use with conduit) Includes sensor with cable, unsealed desiccant hub, potting kit and connector to logger.
<b>Model 3000-9</b>	Flo-Station (Specify cable length of Hach Prod. No. 360001901 using table below) Includes sensor and cable with bare leads.

\*XXX—specify length from table below.

#### Available Cable Lengths (in feet)

30	125	225	400	700
60	150	250	450	800
75	175	300	500	900
100	200	350	600	1000

See Lit. No. 2709 (standard models) and Lit. No. 2711 (wireless models) for FL900 Series Flow Logger ordering information.

See Lit. No. 2616 for Flo-Station ordering information.

### Mounting Hardware

Mounting Bands - Several configurations available. Consult factory.

### Accessories & Spares

<b>55031-SS</b>	Profiling Adapter - allows sensor to be mounted on pole for profiling flow channel
<b>750000201</b>	Q-Stick Insertion Tool
<b>245000501</b>	Q-Stick Replacement Pole Only
<b>8755500</b>	Bulk desiccant beads (1.5 pounds)

Lit. No. 2712

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**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 and all other countries except Europe, contact:*

HACH COMPANY  
4539 Metropolitan Court  
Frederick, MD 21704-9452, U.S.A.  
Telephone: 800-368-2723  
Fax: 301-874-8459  
E-mail: hachflowsales@hach.com  
**www.hachflow.com**

*In Europe contact:*

Flow-Tronic  
Rue J.H. Cool 19a  
B-4840 Welkenraedt Belgium  
Telephone: +32-87-899799  
Fax: +32-87-899790  
E-mail: site@flow-tronic.com  
**www.flow-tronic.com**



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