

Marsh-McBirney FLO-DAR™ with Flo-Logger™ Area/Velocity Radar Flow Meter



The Flo-Dar Flow Meter with Flo-Logger provides an ideal solution for non-contact, maintenance-free portable sewer flow monitoring.

Features and Benefits

The Flo-Dar Area/Velocity Radar Flow Meter provides a revolutionary approach to open channel flow monitoring. Flo-Dar combines advanced Digital Doppler Radar velocity sensing technology with ultrasonic pulse echo depth sensing to remotely measure open channel flow. Combined with the Flo-Logger, users have a portable solution for flow measurement needs.

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 Eliminates Lost Data

No lost data with non-contact, above the flow sensor that is unaffected by fouling due to debris and grease.

Easy Installation and Maintenance

As the sensor is mounted above the flow, personnel have little or no contact with the flow during installation. Future sensor removal can be done without the need for confined space entry.

Perfect Solution for Difficult Flow Conditions

Operates in the most difficult conditions including flows with high solids content, high temperature, shallow and caustic flows, large man-made channels, and high velocities up to 20 ft/s.

Optional Surge Velocity Sensor

During surge 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 sensor cleaning or maintenance.

Applications

Municipal

- Sanitary Sewer Evaluation Studies
- Collection Systems
- Capacity Studies
- Combined Sewer Overflows
- Inflow and Infiltration (I&I) Studies
- Billing / Custody Transfer
- Plant Influent and Effluent

Industrial

- Process Waste
- Plant Influent
- Plant Effluent
- Non-contact Cooling Water
- Stormwater Monitoring and Compliance

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



Be Right™

WW

IW

C

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

FLO-LOGGER PORTABLE DC POWERED ELECTRONICS

Data Storage

64K (16K cycles of velocity/depth data)

Local Terminal

RS232C at 19.2K baud

Power Requirements

12 Vdc (Two 6-volt alkaline lantern batteries supplied).

Battery life 60 days (typical) with Flo-Dar sensor, at intervals of one sample every 15 minutes (with recommended Energizer 529 batteries).

The optional long life alkaline battery pack can be used to extend battery life by a factor of 5 or more if the Flo-Logger is ordered with the external power option connector (-P).

Time-Based Accuracy

1 second per day

Housing

Sealed watertight Polystyrene – meets IP68 rating

Length: 34.77 cm (13.69 in.)

Diameter: 19.69 cm (7.75 in.)

Weight: 3.4 kg (7.5 lbs) (including batteries)

Temperature

Operating Range: -10 to 51°C (14 to 125°F)

Storage Range: -20 to 51°C (-4 to 125°F)

Sensor/Logger Disconnect

Both the sensor and the logger have waterproof (IP68) connectors for easy separation from the interconnecting cable.

Set-up/Data Retrieval

Flo-Ware for Windows software is the user on-site set-up, data management, and report generation software. It is compatible with desktop/portable computers utilizing Windows 95/98/2000/Me/NT/XP. Flo-Ware FX for PocketPC has all the same functionality as Flo-Ware for Windows with the exception of report generation.

Continued on next page.

Specifications *continued*

Certification

This Class A device complies with Part 15 of the FCC rules ID P4M-EMIV and Industry Canada RSS129 and RSS133, ID 4594A-EMIV (user licensing is not required). Operation is subject to the following conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CE Both Flo-Dar sensor and Flo-Logger meet CE requirements.

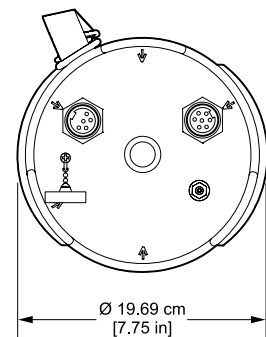
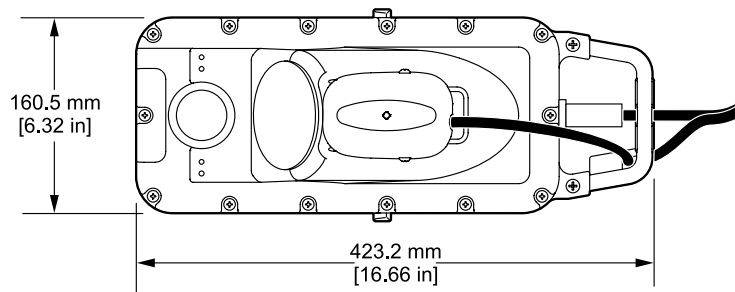
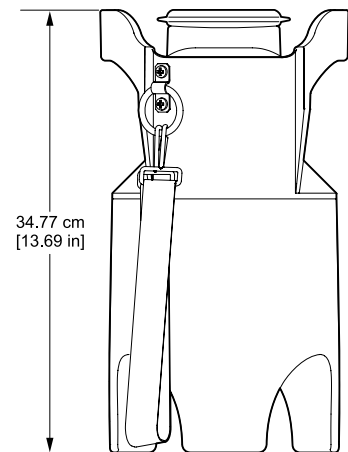
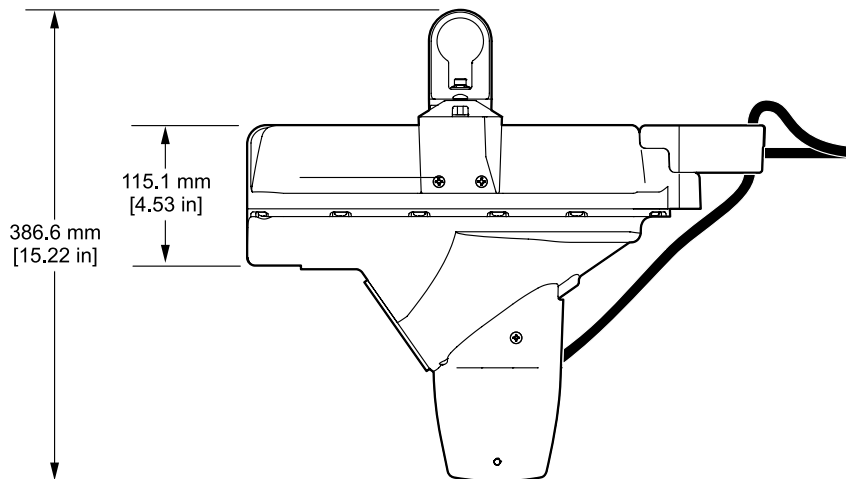
**Specifications subject to change without notice.*

Engineering Specifications

FLO-DAR SENSOR WITH FLO-LOGGER

- The flow meter shall be capable of measuring level, average velocity and surcharge depth.
- The method of velocity measurement shall be Doppler radar.
- The sensor shall combine advanced Doppler Radar velocity sensing technology with ultrasonic pulse echo depth sensing to remotely measure open channel flow.
- Flow shall be calculated based on the Continuity Equation ($Q=V \times A$), where Q =Flow, V =Average Velocity and A =Area.
- The range of velocity measurement shall be 0.23 to 6.10 m/s (0.75 to 20 ft/s).
- The method of depth measurement shall be ultrasonic.
- The standard operating range for depth measurement shall be 0 to 152.4 cm (0 to 60 in.) with an optional operating range of 0 to 6.1 m (0 to 20 ft.) with 43.18 cm (17 in.) deadband, temperature compensated.
- The flow meter shall have a surcharge condition velocity sensor option.
- Exterior dimensions of the sensor shall not exceed 160.5 W x 432.2 L x 297 D mm (6.32 W x 16.66 L x 11.7 D in.) or 160.5 W x 432.2 L x 387 D mm (6.32 W x 16.66 L x 15.2 D in.) with Surcharge Velocity option.
- The flow meter shall be the Marsh-McBirney Flo-Dar with Flo-Logger Open Channel Flow Meter.

Dimensions



FLO-DAR Sensor

Flo-Logger

Ordering Information

			Surcharge Option	Extended Range
Flo-Dar Sensors	Model 4000-			
30 ft.		1		
60 ft.		2		
100 ft.		3		
As needed (Max 1000 feet)		4		
No			0	
Yes			3	
Standard				0
Extended Range Option				1
Extended Range Option w/Remote Depth Sensor				2
		SVS Connector	Flo-Ware Software	Options
Flo-Dar Electronics (Flo-Logger)	Model 1004-			
No		1		
Yes		2		
Current license holder			0	
New license holder			1	
External Power Connector & Relay Output-drives sampler				PE
External Power Connector sampler				P
Relay Output-drives sampler				E

Mounting Hardware

800016701	Permanent Mount - Includes sensor frame and all mounting hardware
800016401	Portable Sensor Mount - 34-54 inch manhole diameters, Includes jack bar assembly, frame, and all hardware
800016402	Portable Sensor Mount - 52-70 inch manhole diameters, Includes jack bar assembly, frame, and all hardware
800016403	Portable Sensor Mount - 70-88 inch manhole diameters, Includes jack bar assembly, frame, and all hardware
800016404	Portable Sensor Mount - 89-107 inch manhole diameters, Includes jack bar assembly, frame, and all hardware
800012402	Laser Alignment Tool

Accessories & Spares

110000701	Replacement Battery Pack - for use in Long Life Battery Pack P/N 800017701
800017701	Long Life Battery Pack (requires external power option)
115000101	Rechargeable Battery - 6V Lantern (requires 2)
800004001	Battery Charger - used for recharging 6V batteries 110 Vac
55032	Desiccant Replacement Cartridge
800007201	Suspension Cable - Stainless Steel to hang Flo-Logger to manhole step
420001001	Suspension Strap - Fabric to hang Flo-Logger to manhole step (spare)
Odd Shape CHANN	Odd Shaped Table - Configures software for user's specified conduit
245000501	Sensor Retrieval Pole - Used to place and retrieve sensor from mounting bracket. Pole extends to 7.3 m (21 ft.)
510012701	Sensor Retrieval Hook - Used with Sensor Retrieval Pole
131013101	Flo-Logger to Laptop Interface Cable - Spare for Logger only
570011401	Grounding Strap (required with Retrieval Pole and Hook when used with IS units)
170007101	Stainless Steel ID Tag

Lit. No. 2608

J9 Printed in U.S.A.

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