

# Area-Velocity Flow Meter

## for Open Channels and Pipes - No Flume or Weir Required

### Area-Velocity Flow Meter

### Model AVFM 5.0

Display, Transmit  
and Totalize Flow  
in Open Channels and Pipes

Simple 5-key Calibration  
Three 4-20mA Outputs  
Two Control Relays  
Measures Reverse Flow  
Works in Irregular Channel Shapes



### Measures Velocity + Level to Monitor Flow with an Ultrasonic Sensor

#### Area-Velocity Flow Meter

Monitor flow through open channels, partially full sewer pipes and surcharged pipes *without* a flume or weir. Ideal for municipal stormwater, combined effluent, raw sewage and irrigation water.

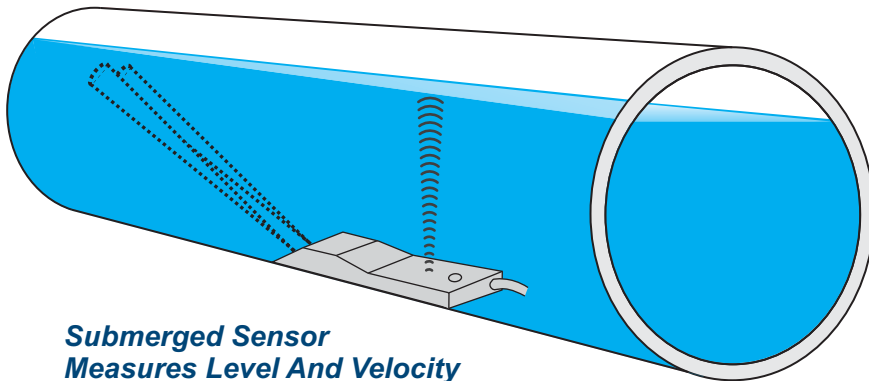
#### Submersible Ultrasonic Sensor

The AVFM 5.0 uses a submerged ultrasonic sensor to continuously measure both Velocity and Level in the channel. The sensor resists fouling, corrosion and abrasion. The flowmeter can be configured with the standard submerged velocity-level sensor, or with submerged velocity plus a separate non-contacting ultrasonic level sensor.



View flowrate and total flow on the large backlit LCD display and connect to external devices with three 4-20mA outputs and two control relays.

# Ultrasonic Flow Monitor for Partially Filled Pipes & Open Channels



**Submerged Sensor Measures Level And Velocity**

## Easy to Use

The AVFM 5.0 Area-Velocity Flow Meter measures both Level and Velocity to calculate flow in an open channel or pipe. Calibration is simple: enter the pipe diameter or channel dimensions and the AVFM 5.0 automatically computes and displays flow volume.

The ultrasonic sensor mounts inside the pipe or on the bottom of a channel with a stainless steel mounting bracket (included) and a single screw into the bottom of the pipe or channel. No special compounds, tools or hardware are required. The sensor is completely sealed with no orifices or ports.

## Recommended Pipe or Channel Conditions

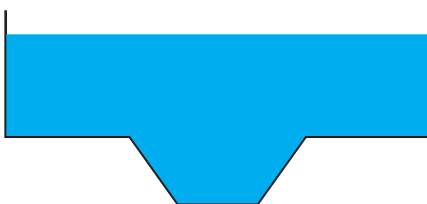
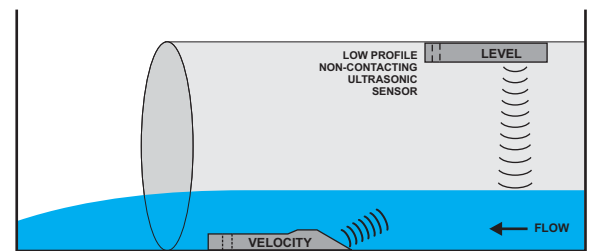
Careful selection of sensor mounting location results in best performance and maintenance-free operation. Avoid locations where sediment builds up.

Best possible accuracy will result when the water is not highly turbulent and where velocity is evenly distributed across the channel. The channel should not have drops or direction changes immediately upstream of the sensor mounting location. Pipe or channel slope should not exceed 3%.

The AVFM 5.0 can measure forward flow velocity up to 20 ft/sec (6 m/sec) and reverse flow up to 5 ft/sec (1.5 m/sec). The electronics and software sample and average flow rates continuously to provide stable readings. The submerged velocity/level sensor will measure flow in partially full and surcharged pipes with pressure up to 10 psi. No special set-up or adjustment is required. Minimum recommended pipe diameter is 6" (150 mm).

## Alternate Sensor Configurations

The standard sensor measures both velocity and level with a single submerged probe. It is installed in the pipe or channel floor with the stainless steel mounting bracket (supplied), or mounted with an optional stainless steel band for round pipes. Alternate sensor models are available for special applications: a separate non-contacting ultrasonic level sensor with a submerged velocity sensor. Sensor cable can be extended up to 500 ft (150 m).



## Custom Channel Shapes

Calibrate the AVFM 5.0 for installation in irregular or compound channel shapes by entering the channel width at multiple level points through a simple menu. Channels of virtually any shape can be monitored with your choice of measurement units.

## Optional 2-Million Point Data Logger

Choose the built-in data logger option if you want the AVFM 5.0 to store time and date-stamped flow values at 10 second to 60 minute intervals. Daily flow reports are automatically created where total, minimum, maximum and average flow rates are displayed on the LCD display. Transfer log files to any USB flash drive just by connecting to the logger's USB output. Windows software is included to display log files in graph and table formats, change measurement units and generate flow reports. Export data to graphic or text file formats, or directly to Microsoft Excel.



# AVFM 5.0 Specifications

## General Specifications

## Greyline AVFM 5.0 Area-Velocity Flow Monitor

<b>Channel Types:</b>	Round pipe, Rectangular, trapezoid, egg or custom shapes
<b>Electronics Enclosure:</b>	Watertight and dust tight NEMA4X (IP 66) polycarbonate with clear, shatterproof cover
<b>Accuracy:</b>	Level: $\pm 0.25\%$ of Range. Velocity: $\pm 2\%$ of Reading. Repeatability and Linearity: $\pm 0.1\%$
<b>Display:</b>	White, backlit matrix - displays flow rate, totalizer, relay states, operating mode and calibration menu
<b>Programming:</b>	built-in 5-key calibrator with English, French or Spanish language selection
<b>Power Input:</b>	100-240VAC 50-60Hz (see Options), 3.0-6.24 Watts depending on options
<b>Outputs:</b>	3 Isolated 4-20mA, 1000 ohm, (Flow, Level and Velocity) or 0-5VDC by menu selection
<b>Control Relays:</b>	2 Relays, form 'C' dry contacts rated 5 amp SPDT; programmable for flow proportional pulse (sampler/totalizer), flow and/or level alarm
<b>Electrical Surge Protection:</b>	Sensor, 4-20mA outputs and AC power input
<b>Operating Temp. (electronics):</b>	-5° to 140°F (-20° to 60°C)
<b>Approximate Shipping Weight:</b>	10 lbs. (4.5 kg)

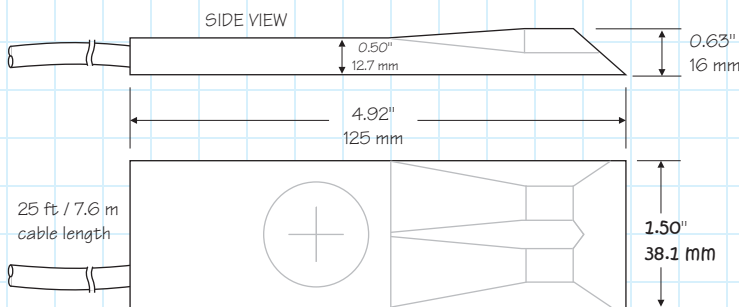
## QZ02L Sensor

<b>Velocity Measurement Range:</b>	0.1 to 20 ft/sec (0.03 to 6.2 m/sec) and reverse flow to -5 ft/sec (-1.5 m/sec) in fluids containing bubbles or solids with a minimum size of 100 microns and a minimum concentration of 75 ppm to act as acoustic reflectors
<b>Level Measurement Range:</b>	Minimum Head: 1 in (25.4 mm). Maximum Head: 15 ft. (4.57 m)
<b>Operating Temperature:</b>	5 to 175°F (-15 to 80°C)
<b>Exposed Materials:</b>	316 stainless steel, epoxy resin, polyurethane
<b>Sensor Cable:</b>	25 ft. (7.6 m) submersible polyurethane jacket, shielded, 3-coaxial
<b>Sensor Mounting:</b>	includes MB-QZ stainless steel mounting bracket
<b>Temperature Compensation:</b>	Automatic, continuous

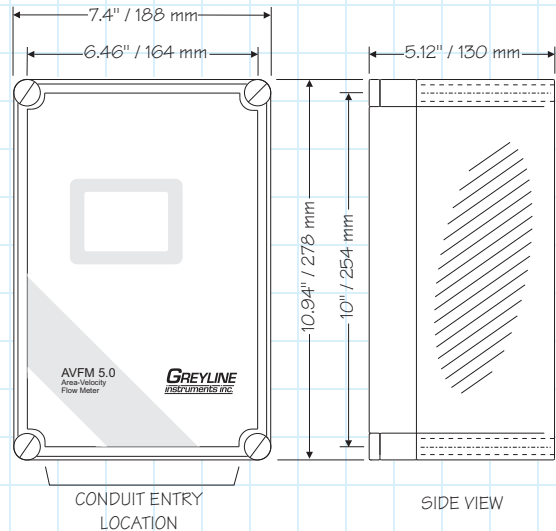
## Options

<b>Data Logging:</b>	Programmable 2-million point data capacity, time and date stamped plus formatted flow reports including Total, Average, Minimum, Maximum and times of occurrence. Includes USB output to Flash Drives and Windows software
<b>Sensor Cable:</b>	50 ft. (15 m) or 100 ft. (30 m) submersible, continuous from Sensor - or splice up to total of 500 ft (150 m) length
<b>Sensor Cable Junction Box:</b>	Watertight NEMA4 steel with connection terminal strip
<b>Power Input:</b>	9-32VDC, 3.4-6.3 Watts depending on options
<b>Enclosure Heater:</b>	Thermostatically controlled - recommended for temperatures below 32°F (0°C)
<b>Intrinsic Safety Barriers:</b>	For Sensor mounting in Class I,II,III, Div. I,II, Groups C,D,E,F,G hazardous locations
<b>Sensors:</b>	Separate non-contacting ultrasonic level sensor and submerged velocity sensor
<b>Sensor Mounting Bands:</b>	Stainless steel sensor mounting bands for pipes 6" to 72" (150 to 1800 mm) diameter

## Dimensions



QZ02L VELOCITY/LEVEL SENSOR



ENCLOSURE

# New Open Channel Flow Monitor

## Measures Velocity + Level to calculate Flow



### AVFM 5.0 Area-Velocity Flow Meter

- ◆ Measure flow in pipes and open channels of any shape
- ◆ Ideal where flumes or weirs are difficult to install
- ◆ Works with water level from 1" (25.4 mm) to 15 ft (4.5 m)
- ◆ Auto-detects field installation of options including data logger and control relays

#### **Recommended for:**

- ✓ Sewer Flow Monitoring and Reporting
- ✓ Industrial Effluent
- ✓ Stormwater Monitoring
- ✓ Natural Streams
- ✓ Irrigation Water

The AVFM 5.0 Area-Velocity Flow Meter includes a submerged ultrasonic sensor that is installed at the bottom of an open pipe or channel. Exposed materials are plastic so the sensor resists fouling and corrosion. It has no moving parts and no orifices, ports or electrodes.

The AVFM 5.0 displays and totalizes flow. It includes three 4-20mA outputs (Flow, Level and Velocity), plus two control relays for level alarms or flow proportionate pulse output for samplers and chlorinators. It is easy to calibrate with the built-in keypad and menu system. A built-in 2-million point data logger with USB output is optional. Intrinsic Safety Barriers for sensor and cable installation in hazardous rated channels is also optional.

#### **How to Order**

Contact a Greyline sales representative in your area or phone one of our sales engineers. Describe your requirements and receive our prompt quotation.

#### **Applications Support**

Take advantage of Greyline's applications experience. Phone 1-888-473-9546 for advice and information on applications, installation or service for Greyline instruments.

#### **No Risk Appraisal**

The Greyline AVFM 5.0 Area-Velocity Flow Meter must meet your requirements. Discuss your application with a Greyline representative to arrange a 30-day trial.

#### **The Greyline Guarantee**

Quality of Materials and Workmanship - Each instrument manufactured by Greyline is warranted against defects in materials and workmanship for a period of one year from date of purchase. Refer to our limited warranty included with each product.



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RELIABLE MEASUREMENT AND CONTROL